

# Model Green Infrastructure Language

*for Incorporation into Municipal Plans*



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Developed by:

The Santa Clara Valley Urban Runoff  
Pollution Prevention Program

With assistance from:  
EOA, Inc.



# Contents

## Table of Contents

<b>Introduction</b> .....	<b>i</b>
<b>Section A: General Plans and Specific Plans</b> .....	<b>1</b>
A.1 Vision Statements .....	1
A.1.a City of Cupertino.....	1
A.1.b City of Emeryville .....	1
A.1.c City of Richmond .....	2
A.2 Goals, Policies, and Implementation Measures .....	2
A.2.a City of Cupertino: General Plan.....	2
A.2.b City of Emeryville: General Plan.....	4
A.2.c City of Richmond: General Plan .....	5
A.2.d City of San José: General Plan .....	6
A.2.e City of Mountain View: General Plan.....	9
A.2.f City of El Cerrito: San Pablo Avenue Specific Plan .....	10
A.2.g City of Berkeley: Downtown Streets & Open Space Improvement Plan.....	11
A.2.h City of Emeryville: Design Guidelines .....	12
A.2.i City of Malibu: Green Street Policy.....	13
A.2.j City of Mountain View: San Antonio Precise Plan .....	14
A.2.k City of Mountain View: El Camino Real Precise Plan .....	14
<b>Section B: Urban Forest, Parks, and Open Space Plans</b> .....	<b>15</b>
B.1 Vision Statements .....	15
B.1.a City of Palo Alto: Urban Forest Master Plan.....	15
B.1.b City of Emeryville: Parks and Recreation Strategic Plan .....	15
B.1.c City of San Diego: Urban Forest Master Plan .....	15
B.2 Goals, Policies, and Implementation Measures .....	15

B.2.a	City of Palo Alto: Urban Forest Master Plan .....	16
B.2.b	City of Emeryville: Parks and Recreation Strategic Plan .....	17
B.2.c	City of San Diego: Urban Forest Master Plan .....	17
<b>Section C: Watershed Plans .....</b>		<b>18</b>
C.1	Vision Statements .....	18
C.1.a	City of Santa Monica: Watershed Management Plan .....	18
C.2	Goals, Policies, and Implementation Measures .....	18
C.2.a	City of Berkeley: Watershed Management Plan .....	18
C.2.b	City of Santa Monica: Watershed Management Plan .....	19
<b>Section D: Transportation Plans .....</b>		<b>21</b>
D.1	Vision Statements .....	21
D.1.a	City of San Mateo: Sustainable Streets Plan .....	21
D.1.b	City/County of San Francisco: Better Streets Plan .....	21
D.1.c	City of Oakland: Complete Streets Design Guidelines .....	22
D.2	Goals, Policies, and Implementation Measures .....	22
D.2.a	City of Palo Alto: Bicycle and Pedestrian Transportation Plan .....	22
D.2.b	City of San Mateo: Sustainable Streets Plan .....	23
D.2.c	City/County of San Francisco: Better Streets Plan .....	24
D.2.d	City of Emeryville: Pedestrian and Bicycle Plan .....	25
D.2.e	City of Oakland: Complete Streets Design Guidelines .....	25
<b>Section E: Utility and Infrastructure Plans .....</b>		<b>27</b>
E.1	Vision Statements .....	27
E.1.a	City of Mountain View: North Bayshore Precise Plan .....	27
E.2	Goals, Policies, and Implementation Measures .....	28
E.2.a	City of Palo Alto: Storm Drain Master Plan Update .....	28
E.2.b	City of Los Altos: Stormwater Master Plan .....	28
E.2.b	City of Mountain View: North Bayshore Precise Plan .....	29
<b>Citations .....</b>		<b>31</b>

# Introduction

## **Background**

As a municipal agency considers the future needs of its organization and the community it serves, the aim of achieving environmental sustainability is becoming increasingly significant. Faced with the challenges of global and local climate instability and sea level rise, planning efforts take on increased importance and urgency. Urban planning is one of the most powerful instruments in the municipal toolbox and can be harnessed for improved stormwater programs to the benefit of the whole community.

Green Infrastructure (GI) is generally defined as built or natural systems that use, store, slow, infiltrate, and/or treat stormwater and rainwater. In the sphere of development and construction, these landscape and built elements are also referred to as Low Impact Development (LID) methods. Sometimes GI is used to describe other sustainability related systems such as for energy, materials and other non-stormwater related topics. Therefore, recently there has been a trend to more precisely define GI as Green Stormwater Infrastructure (GSI). However, for the purposes of this document, the term GI will be used in accordance with the Bay Area's Municipal Regional Stormwater Permit (MRP) and is the term most often used in existing planning documents around the Bay Area and California.

In the sphere of planning activities, GI implementation opportunities abound as the principles of GI are disrupting the standard operating procedures of many long-held engineering and municipal practices. In order to meet the MRP requirements, many status quo methods will have to change. The process of change begins with the elected authorities of a municipality approving of revised goals, policies and objectives in planning documents that are consistent with the new direction required. By including GI goals and policies in general plans or other planning documents, a community works toward enhancing water quality in creeks, the Bay, and the Ocean and protects the natural resources and recreational benefits these water bodies provide. The implementation of GI municipality-wide will not be accomplished in the next 10 or even 20 years, but will likely occur over several decades into the next century, therefore long-range planning is essential in determining the prioritization and strategy for the most cost-effective use of limited public funds.

Much of the change that municipal agencies can accomplish related to GI implementation is in the realm of public infrastructure – this is where they have the most control and retrofit possibilities. Human, product and services mobility and circulation related activities typically represent more than half of the carbon emissions identified in a typical Bay Area climate action plan. Therefore streetscapes present an important opportunity to achieve sustainability goals as they can provide multiple services for a more resilient community taking advantage of stacked benefits through the use of integrated design.

Informed with new concepts, thoughtfully designed, constructed and well-maintained public and private travel ways can provide not only circulation functions but also ecologically beneficial stormwater facilities, resilient utilities infrastructure, water efficient landscaping, a large healthy urban forest, open space, community meeting areas, habitat diversity, public health benefits, cleaner air, local agriculture, community cooling, public commerce, public art and aesthetics.

When thinking of stormwater as a resource instead of a problem, drainage infrastructure elements installed along streets, sidewalks, roadways, and parking areas start to offer opportunities instead of barriers. Stormwater bioretention systems that use plants and soil are typically used to reduce flooding and urban runoff pollution. But even better, they can do more than reduce problems, when combined with the practices of sustainable landscaping principles, such as those of Bay-Friendly Landscaping, they can regenerate soils and ecological systems and provide other benefits such as increased tree canopy, carbon sequestration, and energy and water conservation. Goals and policies regarding the installation of these elements can be integrated into planning documents to work in harmony with other “complete street” elements that provide safer, more active, and more beautiful public streetscapes.

## **Regulatory Requirements**

On November 19, 2015, the San Francisco Bay Regional Water Quality Control Board reissued the Municipal Regional Stormwater Permit (MRP), which regulates stormwater discharges from 76 municipal agencies, including those in Santa Clara Valley. Provision C.3 of this permit requires permittees develop a long term GI Plan and to amend policies, ordinances, and planning documents to support the implementation of the GI Plan. The permit also requires permittees to evaluate all public projects to identify opportunities to integrate LID designs into public and private streets, storm drains, parking lots, and building roofs. Furthermore, LID methods and GI are important components of the strategy for achieving the PCBs and mercury pollutant load reductions required in Provisions C.11 and C.12 of the MRP.

## **Purpose and Organization of Document**

The Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) has prepared this guidance document to assist its member agencies in completing the required updates to municipal planning documents to support implementation of their GI Plans. Municipal general plans, specific plans, and transportation plans are the obvious places to start this process; however, GI goals and policies also fit naturally into watershed management plans and public utilities plans, as well as urban forestry, parks and recreation, and open space plans. Example language regarding GI in these types of plans from several California and Bay Area agencies is presented in this document and organized into the following sections:

- Section A** General Plans and Specific Plans
- Section B** Urban Forestry, Parks, and Open Space Plans
- Section C** Watershed Plans
- Section D** Transportation Plans
- Section E** Utility and Infrastructure Plans

In each section of this document, SCVURPPP has created examples of additional GI language to consider in the gray “Comment” boxes such as the following:

**COMMENT:** When planting new street trees use stormwater tree trench designs to infiltrate and/or treat stormwater runoff from adjacent roadways wherever feasible.

SCVURPPP has also developed a GI Resource Library on its website for agency use, which will be updated on an on-going basis. The Library provides agencies with examples of planning documents (such as those referenced in this document), design guides, ordinance language, and funding resources, as well as SCVURPPP products. The link to the Library is: <http://scvurppp-w2k.com/membersonly.asp> (a user ID and password is required.)

### Green Infrastructure Benefits

- Improved water quality
- Reduced risk of flooding
- Increased shade and energy conservation
- Higher property values
- Better air quality
- Safer pedestrian and bicycle facilities
- Improved aesthetics and plant communities



### Restoring the Natural Balance

In natural landscapes, much of the rain that falls on the ground soaks into the soil. However, in urban areas, development typically increases the amount of impervious surface on the landscape, resulting in an increase in stormwater runoff and pollutants flowing into storm drains, local creeks, the Bay and the Pacific Ocean. GI techniques in streets include features such as vegetated curb extensions, pervious pavement, and tree trenches, which allow stormwater to soak into the ground and reduce the quantity of runoff flowing into storm drains and local creeks.

**More Information:**

[www.epa.gov/green-infrastructure.com](http://www.epa.gov/green-infrastructure.com) | [www.scvurppp.org](http://www.scvurppp.org)

## Section A. GENERAL PLANS AND SPECIFIC PLANS

General plans are usually organized into an overarching *vision* with related *goals* and *policies* or *implementation measures*. Examples of general plan language focused on GI are included in the following subsections. Communities are encouraged to reference these examples as they tailor goals, policies, and implementation measures to local needs, concerns, and conditions, and to identify the local agency or department responsible for implementation.

### A.1 VISION STATEMENTS

Vision statements may include broad goals for environmental protection. GI planning is an important strategy in achieving sustainability goals.

#### A.1.a A Vision for Cupertino:

Cupertino Guiding Principle #10 - Preserve Cupertino's environment by enhancing or restoring creeks and hillsides to their natural state, limiting urban uses to existing urbanized areas, encouraging environmental protection, promoting sustainable design concepts, improving sustainable municipal operations, adapting to climate change, conserving energy resources and minimizing waste.

- [Cupertino General Plan: Community Vision 2015-2040](#)

#### A.1.b Emeryville Guiding Principle #3: Enhanced and connected open space network and green streets

The General Plan outlines strategies for an expanded public realm, building on the strength and connectivity of the city's greenways, with a range of new parks, plazas, community commons, and recreational paths. Open space is strategically located to maximize accessibility and building forms are organized to ensure that sunlight reaches streets and parks. Many more trees along streets and enhanced landscaping will provide a greener city.

- [Emeryville General Plan Amended through October 20, 2015](#)

**COMMENT:** Consider adding language stating that sustainable landscaping principles, such as Bay-Friendly Landscaping principles, will be required in all vegetated stormwater landscapes (and other public and/or private landscapes, if desired by the agency).

### A.1.c **Community Vision: Richmond, California in 2030**

The City of Richmond plays a pivotal role in developing climate policy at a local level that, in turn, influences regional, state and national objectives. The City relies on clean energy sources, waste reduction practices, sustainable buildings and innovative land use planning to reduce energy and climate impacts. These progressive measures have resulted in broad community benefits including dramatic reductions in fossil fuel use, cost savings, emission reductions, water conservation and an improved quality of life. City officials and community members value and protect natural resources and continue to work together to reduce the impacts of a changing climate. A renewed focus on education and local and regional partnerships further supports sustainable practices that will nurture human health and environmental quality for future generations.

- [Richmond General Plan, Energy and Climate Element](#)

**COMMENT:** When drafting a vision statement, consider discussing the multiple benefits of integrated GI planning and development that are pertinent to that document or section of the document. For example, a vision statement for the Conservation Element of a General Plan could include, “The (agency name) will strive to incorporate multiple environmental outcomes in public and private infrastructure within the agency’s jurisdiction with the goal of restoring the natural function and benefits of those systems. Outcomes from those actions, such as improved stormwater quality in receiving water bodies, will be identified and prioritized within a framework of integrated design and green infrastructure improvements agency-wide and institutionalized within all pertinent departments.” (See example language in Santa Monica Watershed Management Plan, Section C.2.b, and Palo Alto Bicycle and Pedestrian Transportation Plan, Section D.2.a)

## A.2 **GOALS, POLICIES, and IMPLEMENTATION MEASURES**

Various elements of general plans may include language relating to the planning or implementation of GI.

### A.2.a **City of Cupertino, General Plan:**

- *Environmental Resources and Sustainability Element*
  - Strategy ES-2.1.5: Urban Forest. Encourage the inclusion of additional shade trees, vegetated stormwater treatment and landscaping to reduce the “heat island effect” in development projects.
    - [Page ES-17; Goal ES-2: Promote Conservation of Energy Resources, Policy ES-2.1: Conservation and Efficient Use of Energy Resources](#)
  - Strategy ES-5.1.1: Urban Forest. Ensure that the City’s tree planting, landscaping and open space policies enhance the urban ecosystem by

encouraging medians, pedestrian crossing and curb-extensions planting that is native, drought tolerant, treats stormwater and enhances urban plant, aquatic and animal resources.

- Page ES-22; Goal ES-5: Protect the City’s Urban and Rural Ecosystems, Policy ES-5.1: Urban Ecosystem

**COMMENT:** Consider adding language such as “when planting new street trees, the agency will use stormwater tree trench designs to infiltrate and/or treat stormwater runoff from adjacent roadways wherever feasible”.

- Strategy ES-5.1.2: Built Environment. Ensure that sustainable landscaping design is incorporated in the development of City facilities, parks and private projects with the inclusion of measures such as tree protection, stormwater treatment and planting of native, drought tolerant landscaping that is beneficial to the environment.
  - Page ES-22; Goal ES-5: Protect the City’s Urban and Rural Ecosystems, Policy ES-5.1: Urban Ecosystem
- Strategy ES-7.2.1: Lot Coverage. Consider updating lot coverage requirements to include paved surfaces such as driveways and on-grade impervious patios to incentivize the construction of pervious surfaces.
  - Page ES-25; Goal ES-7: Ensure Protection and Efficient Use of Water Resources, Policy ES-7.2: Reduction of Impervious Surfaces
- Strategy ES-7.2.2: Pervious Walkways and Driveways. Encourage the use of pervious materials for walkways and driveways. If used on public or quasi-public property, mobility and access for the disabled should take precedence.
  - Page ES-25; Goal ES-7: Ensure Protection and Efficient Use of Water Resources, Policy ES-7.2: Reduction of Impervious Surfaces
- Strategy ES-7.2.3: Maximize Infiltration. Minimize impervious surface areas, and maximize on-site filtration and the use of on-site retention facilities.
  - Page ES-25; Goal ES-7: Ensure Protection and Efficient Use of Water Resources, Policy ES-7.2: Reduction of Impervious Surfaces
- Strategy ES-7.3.1: Development Review. Require LID designs such as vegetated stormwater treatment systems and green infrastructure to mitigate pollutant loads and flows.
  - Page ES-26; Goal ES-7: Ensure Protection and Efficient Use of Water Resources, Policy ES-7.3: Pollution and Flow Impacts

**COMMENT:** Consider Development Review language stating that development projects regulated by the MRP or local ordinance are required to submit a stormwater plan for onsite systems as part of the planning application, with schematic plans showing the site plan identified with stormwater treatment systems, pervious pavement and hydromodification controls, sizing of systems and pertinent plant palettes as part of the design package presented to the agency's Planning Commission or other approval body for entitlement approvals.

- Strategy ES-7.4.1: Storm Drainage Master Plan. Develop and maintain a Storm Drainage Master Plan which identifies facilities needed to prevent “10-year” event street flooding and “100-year” event structure flooding and integrate green infrastructure to meet water quality protection needs in a cost effective manner.
  - Page ES-26; Goal ES-7: Ensure Protection and Efficient Use of Water Resources, Policy ES-7.4: Watershed Based Planning
- Strategy ES-7.11.7: Green Business Certification and Water Conservation. Continue to support the City’s Green Business Certification goals of long-term water conservation within City facilities, vegetated stormwater infiltration systems, parks and medians, including installation of low-flow toilets and showers, parks, installation of automatic shut-off valves in lavatories and sinks and water efficient outdoor irrigation.
  - Page ES-26; Goal ES-7: Ensure Protection and Efficient Use of Water Resources, Policy ES-7.4: Watershed Based Planning

#### **A.2.b City of Emeryville, General Plan:**

- Urban Design Element
  - UD-P-43 Continuous and consistent street tree planting shall be provided along Green Streets and in Neighborhood Centers
    - Page 138; Policies – Streetscapes and Building-to-Street Interface
  - UD-P-46 Street trees shall be provided on City streets where feasible. Street trees shall be planted in a row along the curb, between the vehicle roadway and sidewalk, unless this is physically impossible due to constraints such as underground water or sewer lines.
    - Page 138; Policies – Streetscapes and Building-to-Street Interface
  - UD-P-43 Streetscape landscaping shall follow Bay-Friendly Landscaping guidelines and serve the dual purpose of treating stormwater runoff and providing shade and beauty to the urban realm.
    - Page 138; Policies – Streetscapes and Building-to-Street Interface

- CSN-P-8 The City will continue to support regional watershed conservation through local land use planning, open space policies, and water quality conservation efforts.
  - [Page 138; Policies – Conservation](#)

**COMMENT:** For language in General Plans and related documents, consider stating that prioritization factors will be used in the locating of new GI measures. Factors may include current and historic land uses, pollutant of concern (e.g. PCBs) loading rates, presence and/or conflict with above ground and below ground utilities, drainage infrastructure and grading, slope, adequate space for trees and tree roots, trash generation, community priorities, canopy coverage, excess right of way, on-street parking demand, ability to link/connect important habitat areas, bicycle and pedestrian safety, public safety vehicle needs, localized flooding issues, and challenges with groundwater or tidal waters.

### A.2.c City of Richmond, General Plan:

- Energy and Climate Change Element
  - Policy EC4.4 Green Infrastructure: Develop green infrastructure standards that rely on natural processes for stormwater drainage, groundwater recharge and flood management. Green approaches for infrastructure development are environmentally and fiscally efficient and provide long-term benefits to the community by reducing energy consumption and maintenance and capital improvement costs.
    - [Page 8.28; Goal EC4: Sustainable Development](#)
  - Action EC4.E Street Design Standards: Identify priority thoroughfares for developing green streets in the City to implement a natural systems approach for stormwater management and to expand urban greenery.
    - [Page 8.30; Goal EC4: Sustainable Development](#)
  - Action EC4.F Green Streets Program: Expand the green streets program to support a sustainable approach to stormwater drainage, groundwater recharge and landscaping. Incorporate green streets standards and guidelines in all streetscape improvement projects in the City.
    - [Page 8.30; Goal EC4: Sustainable Development](#)
  - Action EC6.D Storm Water Drainage: Provide storm drainage in accordance with best management practices and guidelines. Assess the system’s ability to accommodate current and future users, sea level rises, and include all necessary improvements in development plans. Reduce runoff into creeks

and the Bay, and address groundwater recharge through the use of pervious materials, retention basins, bio-swales and other methods.

- Page 8.38; Goal EC6: Climate-Resilient Communities

**COMMENT:** Consider adding language stating that all street retrofit, construction or beautification projects over a certain cost threshold will include GI measures to treat stormwater within the project area to the extent feasible. Additional language can be added to prioritize treatment (using factors in sample language on the previous page) within the project area when challenges occur and not all of the catchment area can be treated.

#### A.2.d City of San José, General Plan:

- Envision San José 2040: Chapter 3. Environmental Leadership
  - Goal MS-3: Maximize the use of green building practices in new and existing development to minimize use of potable water and to reduce water pollution.
    - Page 6; Chapter 3: Measurable Environmental Sustainability section;  
Goal MS-3: Water Conservation and Quality
  - Policy MS-3.4: Promote the use of green roofs (i.e., roofs with vegetated cover), landscape-based treatment measures, pervious materials for hardscape, and other stormwater management practices to reduce water pollution.
    - Page 6; Chapter 3: Measurable Environmental Sustainability section;  
Goal MS-3: Water Conservation and Quality

**COMMENT:** To provide incentives to the private sector, consider adding language stating that private projects with green roofs, rainwater harvesting that reduces potable water use, or other stormwater features that exceed MRP requirements or are desirable by the jurisdiction for other reasons, will be given preferential treatment from the agency. Examples of preferential treatment include expedited permitting, height and/or density bonuses, grant funding, alternative compliance options, reduced property related development fees or taxes etc.

- Policy MS-3.5: Minimize areas dedicated to surface parking to reduce rainwater that comes into contact with pollutants.
  - Page 6; Chapter 3: Measurable Environmental Sustainability section;  
Goal MS-3: Water Conservation and Quality
- Action MS-3.6: Develop and maintain policies, ordinances, and guidelines that require reduced use of potable water and that reduce water pollution.
  - Page 6; Chapter 3: Measurable Environmental Sustainability section;  
Goal MS-3: Water Conservation and Quality

**COMMENT:** Consider adding language stating that sustainable landscaping principles, such as Bay-Friendly Landscaping principles, will be required in the design, construction and maintenance of all vegetated stormwater landscapes and/or other landscapes as appropriate.

- Policy MS-18.12: Encourage stormwater capture and encourage, when feasible and cost-effective, on-site rainwater catchment for new and existing development.
  - Page 21; Chapter 3: Measurable Environmental Sustainability section;  
Goal MS-18: Water Conservation
- Policy MS-18.14: Participate in regional efforts to develop codes and standards for stormwater capture and graywater reuse, whenever feasible and cost-effective, and in areas that do not impact groundwater quality as determined through coordination with local agencies.
  - Page 21; Chapter 3: Measurable Environmental Sustainability section;  
Goal MS-18: Water Conservation
- Policy MS-20.3: Protect groundwater as a water supply source through flood protection measures and the use of stormwater infiltration practices that protect groundwater quality. In the event percolation facilities are modified for infrastructure projects, replacement percolation capacity will be provided.
  - Page 23; Chapter 3: Measurable Environmental Sustainability section;  
Goal MS-20: Water Quality
- Policy MS-21.1: Manage the Community Forest to achieve San José’s environmental goals for water and energy conservation, wildlife habitat preservation, stormwater retention, heat reduction in urban areas, energy conservation, and the removal of carbon dioxide from the atmosphere.
  - Page 24; Chapter 3: Measurable Environmental Sustainability section;  
Goal MS-21: Community Forest
- Goal ER-8 Stormwater: Minimize the adverse effects on ground and surface water quality and protect property and natural resources from stormwater runoff generated in the City of San José.
  - Page 34; Chapter 3: Environmental Resources section;  
Goal ER-8: Stormwater
- Policy ER-8.5: Ensure that all development projects in San José maximize opportunities to filter, infiltrate, store and reuse or evaporate stormwater runoff onsite.
  - Page 34; Chapter 3: Environmental Resources section;  
Goal ER-8: Stormwater

- Policy ER-8.6: Eliminate barriers to and enact policies in support of the reuse of stormwater runoff for beneficial uses in existing infrastructure and future development in San José.
  - Page 34; Chapter 3: Environmental Resources section;  
Goal ER-8: Stormwater
- Policy ER-8.7: Encourage stormwater reuse for beneficial uses in existing infrastructure and future development through the installation of rain barrels, cisterns, or other water storage and reuse facilities.
  - Page 34; Chapter 3: Environmental Resources section;  
Goal ER-8: Stormwater

**COMMENT:** Encouraging stormwater capture and use promotes valuing stormwater as a resource, while also reducing runoff pollution, flooding, and downstream erosion.

- Policy IN-3.10: Incorporate appropriate stormwater treatment measures in development projects to achieve stormwater quality and quantity standards and objectives in compliance with the City’s National Pollutant Discharge Elimination System (NPDES) permit.
  - Page 56; Chapter 3: Infrastructure section;  
Goal IN-3: Water Supply, Sanitary Sewer and Storm Drainage
- SAN JOSÉ Envision San José 2040: Chapter 4. Quality of Life
  - Policy CD-2.5: Integrate Green Building Goals and Policies of this Plan into site design to create healthful environments. Consider factors such as shaded parking areas, pedestrian connections, minimization of impervious surfaces, incorporation of stormwater treatment measures, appropriate building orientations, etc.
    - Page 16; Chapter 4: City Design section;  
Goal CD-2: Function

**COMMENT:** Integrating green stormwater policies in various sections of planning documents aids in the inter-departmental collaboration process necessary to implement green infrastructure.

- SAN JOSÉ Envision San José 2040: Chapter 6: Land Use and Transportation
  - Policy TR-2.12: Consider alternative public right of way materials for roadways, sidewalks, park strips, crosswalks, and trails, etc. to enhance the pedestrian and bicyclist experience as well as provide other benefits such as stormwater management and hydromodification control.

- Page 40; Chapter 6: Transportation Policies section;  
Goal TR-2: Walking and Bicycling

### A.2.e City of Mountain, View General Plan:

- Infrastructure and Conservation Chapter
  - Proactive stormwater management: Mountain View will continue to be proactive and forward-thinking in its approach to stormwater management by anticipating new regional and national regulations. This will also mean continuing to require post-construction stormwater treatment controls in new development and redevelopment and encouraging low-impact development approaches such as rainwater capture and re-use, infiltration and biotreatment.
    - Page 126; Chapter 5: Infrastructure and Conservation;  
Looking Forward section
  - A healthy watershed: Continuing to maintain the health and natural hydrology of the watershed, avoiding or requiring special strategies for development within flood-prone areas and protecting residents from flood hazards will improve the overall long-term safety within the community. Eliminating sources of watershed pollution is also an important long-term strategy.
    - Page 126; Chapter 5: Infrastructure and Conservation;  
Looking Forward section
  - Goal INC-3: Functional, safe and well-maintained public rights-of-way that promote environmental sustainability.
    - Page 129; Chapter 5: Infrastructure and Conservation;  
Goals and Policies section; City Infrastructure
  - Policy INC 3.3 Street design for stormwater. Encourage street designs that reduce stormwater flows and accomplish other City stormwater goals.
    - Page 129; Chapter 5: Infrastructure and Conservation;  
Goals and Policies section; City Infrastructure
  - Goal INC-5: Effective and comprehensive programs utilizing water use efficiency, water conservation and alternative water supplies to reduce per capita potable water use.
    - Page 130; Chapter 5: Infrastructure and Conservation;  
Goals and Policies section; Water Conservation
  - Policy INC 5.3 Water reuse. Remove barriers and provide guidance for the use of rainwater and graywater as alternative water supplies.

- Page 130; Chapter 5: Infrastructure and Conservation; Goals and Policies section; Water Conservation
- Goal INC-8: An effective and innovative stormwater drainage system that protects properties from flooding and minimizes adverse environmental impacts from stormwater runoff.
  - Page 131; Chapter 5: Infrastructure and Conservation; Goals and Policies section; Stormwater
- Policy INC 8.6 Green Streets. Seek opportunities to develop green streets and sustainable streetscapes that minimize stormwater runoff, using techniques such as on-street bio-swales, bio-retention, permeable pavement or other innovative approaches.
  - Page 132; Chapter 5: Infrastructure and Conservation; Goals and Policies section; Stormwater
- Policy INC 8.7 Stormwater quality. Improve the water quality of stormwater and reduce flow quantities
  - Page 132; Chapter 5: Infrastructure and Conservation; Goals and Policies section; Stormwater
- Policy INC 8.8 Stormwater infrastructure funding. Develop permanent and ad hoc sources of funding to implement stormwater best practices in the city.
  - Page 132; Chapter 5: Infrastructure and Conservation; Goals and Policies section; Stormwater

#### A.2.f City of El Cerrito, San Pablo Avenue Specific Plan:

- San Pablo Ave Specific Plan: Complete Streets Chapter
  - Streetscape Improvements: Install rain gardens planned at Moeser and Stockton
    - Page 3-23; 3.03.02.02.01 Downtown San Pablo Avenue - Streetscape Improvements
  - Streetscape Improvements: Use planting strip for green infrastructure opportunities such as stormwater planters and urban agriculture
    - Page 3-30; 3.03.06.01 Neighborhood Streets (Residential) - Streetscape Improvements
  - CS Table 14. Parking Lane Standards: Consider permeable paving, such as pervious concrete or pavers, for stormwater management and traffic calming purposes
    - Page 3-60; 3.05.02.03 Right of Way Design Standards – Parking Lanes

- A.2: Design bulb-outs to incorporate green infrastructure installations such as stormwater planters; to create public spaces such as pocket parks; and/or to facilitate transit operations with bus stops and waiting areas.
  - Page 3-60; 3.05.02.04.03 Right of Way Design Standards – Pedestrian Way – Bulb-outs

#### A.2.g **Berkeley, Downtown Streets & Open Space Improvement Plan:**

- Watershed Management and Green Infrastructure Chapter
  - Policy 4.1: Green Infrastructure Priorities: Green Infrastructure features should promote the health and function of watersheds within which they are sited. Green Infrastructure should be considered whenever street or open space improvements may be made, but should also be coordinated to leverage benefits.
    - Page 71; Chapter 7: Watershed Mgmt. & Green Infrastructure, Policy 4.1 Green Infrastructure Priorities
  - Policy 4.1.a: Green Infrastructure should be incorporated into all major subarea projects, and should be considered throughout the Downtown Area as part of landscaping and traffic calming improvements.
    - Page 71; Chapter 7: Watershed Mgmt. & Green Infrastructure, Policy 4.1 Green Infrastructure Priorities
  - Policy 4.1.b: Consider which types of Green Infrastructure investments and locations might best leverage benefits within the Strawberry and Potter watersheds
    - Page 71; Chapter 7: Watershed Mgmt. & Green Infrastructure, Policy 4.1 Green Infrastructure Priorities
  - Policy 4.2: Function and Location: Green Infrastructure improvements should be coordinated to optimize benefits. The specific functional needs of a location should be addressed by the particular Green Infrastructure selected. Functional types for streets and open space include: filtration & absorption, detention, retention & infiltration, evapotranspiration, and conveyance. Also consult with the Department of Public Works as detailed design and engineering is undertaken.
    - Page 71; Chapter 7: Watershed Mgmt. & Green Infrastructure, Policy 4.2 Function and Location
  - Policy 4.2: Function and Location: *The following Green Infrastructure approaches suitable for Downtown are discussed on pages 71 & 72:*
    - Bio-Retention Features (including rain gardens & tree basins)

- Bio-Filtration Features (e.g. shallow swales and flow-through planters)
  - Permeable Paving
  - Channels & Runnels
  - Water Storage (e.g. cisterns & “rain catchers”)
    - Page 71, 72; Chapter 7: Watershed Mgmt. & Green Infrastructure, Policy 4.2 Function and Location
- Policy 4.3: District-Level Opportunities – Green Infrastructure and watershed management should be addressed at the scale of the Downtown Area and might extend into surrounding areas in recognition of watershed boundaries. A district-scaled approach should be used to leverage benefits more fully.
- Further develop a master plan for Green Infrastructure Features as conceptualized in Figure g.9. Coordinate improvements address unique challenges resulting from relatively small parcels and high-intensity development.
  - Consider ways that rainwater could be stored and used to irrigate landscaping, for flushing toilets, or for use during emergencies as San Francisco has done. Because it is situated at lower elevation, consider storage facilities in or near the Park Blocks.
  - Highlight the use of Green Infrastructure to reveal natural processes and communicate Berkeley’s commitment toward sustainability. Use interpretive signage to teach basic environmental principles and dispel misconceptions regarding Green Infrastructure. Consider demonstration projects to advance best practices in urban settings.
  - Private development standards and design guidelines should be refined to reinforce district-scaled strategies. Consider ways to encourage green roofs and other on-site infrastructure features. Allow fees to be paid in lieu of some requirements so that private funds can be used to construct improvements on public land, thereby leveraging additional benefits.
    - Page 73; Chapter 7: Watershed Mgmt. & Green Infrastructure, Policy 4.3 Green Infrastructure Priorities

### **A.2.h City of Emeryville, Design Guidelines:**

- A-14: Follow the City’s Stormwater Guidelines for Green, Dense Redevelopment, which includes measures such as bioretention basins, biofiltration swales, cisterns integrated into the architecture, and/or green roofs, to meet stormwater treatment thresholds.
  - Page 11; Chapter 2: General Guidelines – A: Street Landscaping
- A-15: Follow the Bay-Friendly Landscaping guidelines. These guidelines represent a whole systems approach to the design, construction, and maintenance of the landscape in order to support the integrity of the San Francisco Bay watershed. Key components include:
  - Reducing waste and using materials that contain recycled content.
  - Nurturing healthy soils with mulch and compost while reducing fertilizer use.

- Conserving water, energy and topsoil.
- Using Integrated Pest Management to minimize chemical use and prevent pollution
- Reduce stormwater runoff.
- Creating wildlife habitat.
  - Page 11; Chapter 2: General Guidelines – A: Street Landscaping
- E-5: Incorporate green roofs into building design to manage stormwater runoff and reduce energy consumption through insulation.
  - Page 20; Chapter 2: General Guidelines – E: Building Form and Articulation
- Greenways and Green Streets Greenways and green streets are envisioned as landscaped green oases, offering opportunities for strolling, lingering, sitting, and jogging, while providing environmental benefits such as stormwater treatment.
  - Page 51; Chapter 3: Area Specific, Building, and Street Type Guidelines – I: Area Specific Guidelines: Greenways and Green Streets

**COMMENT:** Consider adding language stating that when planting new street trees the agency will use stormwater tree trench designs to infiltrate and/or treat stormwater runoff from adjacent roadways wherever feasible and identify minimum rootable soil volumes for each tree depending on the size of the tree species at maturity.

#### A.2.i City of Malibu, Green Street Policy:

- Green Street Policy
  - Purpose: The City of Malibu Public Works Department shall implement green street BMPs for transportation corridors associated with new and redevelopment street and roadway projects, including Capital Improvement Projects (CIPs). This policy is enacted to demonstrate compliance with the NPDES MS4 Permit for the Los Angeles Region (Order No. R4-2012-0175). Green streets are an amenity that provides many benefits including water quality improvement, groundwater replenishment, creation of attractive streetscapes, creation of parks and wildlife habitats, and pedestrian and bicycle accessibility. Green streets are defined as right-of-way areas that incorporate infiltration, biofiltration, and/or storage and use BMPs to collect, retain, or detain stormwater runoff as well as a design element that creates attractive streetscapes.
  - Policy:
    - A. Application. The Public Works Department shall require new development and/or redevelopment streets and roadway projects and CIP projects conducted within the right-of-way of transportation corridors to incorporate green street BMPs. ... Routine maintenance

or repair and linear utility projects are excluded from these requirements. Routine maintenance includes slurry seals, repaving, and reconstruction of the road or street where the original line and grade are maintained and new impervious surface is not added.

- B. Amenities. The Public Works Department shall consider opportunities to replenish groundwater, create attractive streetscapes, create parks and wildlife habitats, and provide pedestrian and bicycle accessibility through new development and redevelopment of streets and roadway projects and CIPs.
- C. Guidance. The Public Works Department shall use the City of Los Angeles Green Streets guidance, USEPA’s *Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets*, or equivalent guidance for use in public and private developments.
- D. Retrofit Scope. The Public Works Department shall use the City’s Watershed Management Program or Enhanced Watershed Management Program to identify opportunities for green street BMP retrofits. Final decisions regarding implementation will be determined by the [CITY ENGINEER] based on the availability of adequate funding.
- E. Training. The Public Works Department shall incorporate aspects of green streets into internal annual staff trainings.

#### A.2.j City of Mountain View, San Antonio Precise Plan:

- Stormwater run-off treatment: “Green street” concepts should be integrated into street designs to minimize the impacts of pollution runoff. Green streets typically include biotreatment areas to drain runoff from curb flowlines, but other systems, such as modular wetland systems, may also achieve this objective.
- Trash capture: Green street concepts should also consider options to include full or partial trash capture controls, where feasible, to reduce trash discharging into creeks during storm events.
  - [Page 66; Green Streets](#)

#### A.2.k City of Mountain View, El Camino Real Precise Plan:

- Green Streets: The City, working with CalTrans, should integrate “green street” concepts into street design to minimize impacts of pollution runoff from ECR. Green streets typically include draining runoff from the curb flowline into biotreatment areas, but other systems, such as modular wetlands

systems, may also achieve this goal. Trash capture devices should also be considered.

- [Page 54; Landscape, Lighting, and Furnishings](#)

## **Section B. URBAN FOREST, PARKS, and OPEN SPACE PLANS**

Communities should also consider adding GI language to plans related to urban forest, parks and recreation, or open and green spaces.

### **B.1 VISION STATEMENTS**

#### **B.1.a City of Palo Alto, Urban Forest Master Plan:**

Palo Alto’s urban forest will be a model of form and function -- a complement of diverse yet symbiotic ecotypes that will mirror the city’s vibrant and thriving population and provide a tangible connection to nature. Trees, vegetation, soil, air, water, and wildlife will be valued for their individual and interdependent attributes and cared for as a whole. Natural processes will be undisturbed, supplemented, emulated, or mitigated as appropriate. Both tangible and intangible benefits of green infrastructure will be valued and stewardship will reflect collaboration by city leaders, city staff, residents, property owners, business owners, and partners...Careful management that prioritizes efficiency and innovation and takes advantage of technological advances, will ensure the continuance of these benefits and advances... Opportunities presented by new development will be optimized and negative impacts of new development will be minimized.

#### **B.1.b Emeryville Parks and Recreation Strategic Plan—Guiding Principles:**

- A cohesive city of distinctive districts and livable neighborhoods;
- A connected place;
- Enhanced and connected open space network and green streets;
- A walkable, fine-grained city, emphasizing pedestrians;
- A diversity of transportation modes and choices;
- A vibrant, urban community;
- A diverse, balanced and inclusive community;
- A balance of regional and local amenities;
- Sustainability and innovation, with respect for the past; and
- An “imageable” and memorable city.

#### **B.1.c City of San Diego, Urban Forest Management Action Plan:**

To grow a resilient world class urban forest for all San Diegans. The City’s Urban Forest Management Action Plan sets out actions for trees to be prominent in our world class city. Trees make vital contributions to livable neighborhoods, resilient

and prosperous communities, environmental quality, and public health. The Climate Action Plan outlines a climate resiliency strategy that depends on trees to sequester carbon, reduce energy use, and make neighborhoods cooler and more walkable.

## B.2. GOALS, POLICIES, and IMPLEMENTATION MEASURES

### B.2.a City of Palo, Alto Urban Forest Master Plan:

- Storm water runoff reductions: Urban trees reduce the amount of runoff and pollutants that reach water bodies in three ways: 1) Tree leaves and branches intercept rainfall and act as mini-reservoirs that delay flows and reduce the volume of peak flows. This is especially important in urban settings with significant impervious surfaces near waterways. 2) Root growth and decomposition increase the capacity and rate of soil infiltration by rainfall – thereby reducing overland flow. 3) Tree canopies reduce soil erosion and surface flows by diminishing the impact of raindrops on barren surfaces.
  - Page 42; 2.D: Benefits and Value, Palo Alto street-tree report
- The Palo Alto i-Tree streets analysis indicates that, annually, the street trees intercept 42,600,000 gallons of storm water – 1,462 gallons per tree.
  - Page 42; 2.D: Benefits and Value, Palo Alto street-tree report
- The i-Tree streets analysis indicates that the annual stormwater runoff reduction benefit has a value of \$170,504 or \$5.85/tree.
  - Page 42; 2.D: Benefits and Value, Palo Alto street-tree report

**COMMENTS:** Urban forestry naturally reduces the amount of runoff and pollutants that reach water bodies as described above. However, additional benefits can be realized by planting trees in filter boxes or connected trenches that allow for runoff from streetscapes to infiltrate or flow through the soil around the roots of the trees.

- Planting, Species Selection: When replacing street trees, staff take many things into consideration such as: ecological benefits, *stormwater runoff reduction potential* ...
  - Page 124; Field Activities
- Policy 5.1: Utilize American Planning Association recommendations for land use objectives and actions including: ... promote responsible storm water management that reuses and restores the quality of on-site run-off e.g., constructed marsh or wetland systems
  - Page 149; Goals, Policies, and Programs

### B.2.b City of Emeryville, Parks and Recreation Strategic Plan

- Intent: Create park designs that are consistent with sustainable design principles and practices, with efficient use of open space.
  - Page 124; Appendix B, Sustainable Design
- Guidelines: Does the site or project: ... Incorporate surface storm water management such as bioswales, storm water planters, rain gardens, permeable pavers and porous concrete and asphalt for all parking lots and trails?
  - Page 124; Appendix B, Sustainable Design

### B.2.c City of San Diego, Urban Forest Master Plan:

- Goal CE-J.4: Continue to require the planting of trees through the development permit process: Consider tree planting as mitigation for air pollution, stormwater runoff, and other environmental impacts as appropriate.
  - Page 48; Goals, Objectives and Actions: CE-J.4
- Objective CE-J.4.4: Use trees to shade paved areas, especially parking lots; and use trees and other landscaping to provide shade, screening and filtering of stormwater runoff in parking lots.
  - Page 50; Goals, Objectives and Actions: CE-J.4
- Action CE-J.4.5: The Urban Forestry Program Manager and the Storm Water Division will investigate ways of using trees and other green infrastructure activities to reduce storm water runoff.
  - Page 50; Goals, Objectives and Actions: CE-J.4: Objective 5

**COMMENT:** Consider adding language stating that when planting new street trees the agency will use stormwater tree trench designs to infiltrate and/or treat stormwater runoff from adjacent roadways wherever feasible.

## Section C. WATERSHED PLANS

Watershed management plans may already include policies and goals relating to stormwater management and thus present an opportunity to promote replacing traditional, gray infrastructure with GI. GI plays a role in achieving goals commonly included in watershed plans, such as enhancing water quality and reducing flooding.

### C.1 VISION STATEMENTS

#### C.1.a City of Santa Monica, Watershed Management Executive Summary:

To Support the Mission Statement, the goals that have been established for this Plan are to:

- Reduce urban runoff pollution
- Reduce urban flooding
- Increase water conservation
- Increase recreational opportunities and open space
- Increase wildlife and marine habitat

### C.2 GOALS, POLICIES, and IMPLEMENTATION MEASURES

#### C.2.a City of Berkeley, Watershed Management Plan

- Street and Sidewalk Retrofit BMPs: Berkeley has an estimated 49 million sq. ft. of streets and sidewalks comprising the public right-of-way. Berkeley streets and sidewalks can be retrofitted to reduce impervious surface area and reduce runoff volumes by:
  - Replacing concrete sidewalks with permeable materials.
  - Installing bio-swales within the existing planter-strip area of sidewalks.
  - Installing curb extensions for bio-retention cells.
  - Converting medians and traffic circles to vegetated bio-filtration areas.
  - Replacing impermeable asphalt with permeable surfacing on low volume traffic streets.
  - Using open-graded gravels and amended soils as subsurface media for storage and treatment.
  - Installing underground stormwater storage pipes or cisterns that meter outflow to the storm drain pipe infrastructure (or for potential non-potable re-use). Additional benefits common to most of these BMPs are aesthetic improvements to the local neighborhood.
    - [Page 19; Chapter 3: Low Impact Development / Green Infrastructure](#)

**COMMENT:** Berkeley's Watershed Management Plan uses specific language to describe strategies and opportunities for installing Green Infrastructure.

- Recommendations for LID / Green Infrastructure: LID/GI Coordination Opportunities with other Public Works Programs: seek opportunities for incorporating LID/GI measures as a standard element in the design and implementation of various Public Works projects and programs. The City undertakes numerous capital improvement projects annually to enhance transportation, public safety, community aesthetics, environmental processes, and internal and external services. The City can and should be a model for others to follow in designing and implementing LID/GI BMPs for future projects.
  - Page 27; Chapter 3: Low Impact Development

### **C.2.b City of Santa Monica, Watershed Management Plan**

- Multi-purpose Capital Improvement Projects: Multi-purpose projects are recommended in addition to conveyance system upgrades to accomplish the mission of the WMP. Specifically, multipurpose projects provide improved water quality, water conservation, and increased recreational and wildlife habitat areas. Each multi-purpose project would incorporate a variety of water treatment technologies in a multi-benefit design. For example, water would be treated by screening, separation, and infiltration in a design that also provides recreational area, flood reduction, wildlife habitat, and groundwater recharge.
  - *LID methods described in this section of the Santa Monica Watershed Management Plan:*
    - Catch Basin Retrofits
    - Bioretention
    - Subsurface Storage
    - Subsurface Infiltration
  - *Project Design examples in this section that include LID:*
    - Retrofitted Recreational Areas at Schools and Parks
    - Bioretention in Residential and Street Landscaping
  - Pages 4-1 to 4-7; Multi-purpose Capital Improvement Projects
- Green Streets - Bicknell Avenue: Bicknell is currently a wide street with excess pavement. The project will reduce the existing pavement width from 56 feet to 40 feet: include 22 feet of original pavement in the center, bordered by an 8-foot parking lane of pervious pavers on each side of the street. The existing curb and gutter will be replaced with porous concrete. The reduced width of the street, added to existing parkway space, will allow room to create two 12-foot wide biofilter swales with mulch and plantings. Overflow

will drain into an existing catch basin at the base of the project area. This solution demonstrates how a project can beautify a street with decorative pavement, landscaping, while treating runoff for groundwater recharge and reducing the amount of pollution reaching the neighboring beach.

- [Page 4-9; Multipurpose Capital Improvement Projects](#)

- Green Streets – Hollister Avenue Phase I – Main Street to Neilson Way:  
This section of street is bordered on one-side by commercial buildings and a parking lot and on the other by a small community garden. The 5-feet of pavement closest to the curb will be replaced with pervious pavers and the curb and gutter will be replaced with porous concrete. Due to the limited right-of-way, a storage/treatment trench will be developed under the sidewalk, out of sight from the public and allowing continued pedestrian access. The overflow will be connected to an existing catch basin at the base of the project. This portion of the project demonstrates how groundwater recharge and runoff treatment can occur in a dense urban setting, with limited public right-of-way.

- [Page 4-10; Multipurpose Capital Improvement Projects – Green Streets](#)

- Green Streets – Hollister Avenue Phase II – Neilson to Ocean Avenue: High density, multi-family housing and a narrow public right-of-way characterize this block. The street is narrow with a 5-foot sidewalk and a 3.5-foot parkway. This project will demonstrate maximizing the beneficial uses of existing parkway space by replacing 5-feet of pavement on both sides of the street with pervious pavers and constructing porous curbs and gutters. A storage-treatment trench will be constructed in the existing parkway and will include additional landscaping.

- [Page 4-10; Multipurpose Capital Improvement Projects – Green Streets](#)

- Green Streets:
  - LID methods described in this section of the Santa Monica Watershed Management Plan:
    - Tree Well Infiltration Pits
    - Parking Lot Retrofits
    - Street Storage
    - Flow-Through Treatment

- [Page 4-10; Multipurpose Capital Improvement Projects – Green Streets](#)

- On-Site Stormwater Management Systems:
  - LID methods described in this section of the Santa Monica Watershed Management Plan:
    - Cisterns and Rain Barrels
    - Downspout Disconnect Program
    - Green Roofs

- [Page 4-10; Multipurpose Capital Improvement](#)

## **Section D. TRANSPORTATION PLANS**

A key component of adapting municipal plans to support GI is adding GI language to plans related to transportation. Many transportation plans now incorporate the “Complete Streets” concept of designing public streetscapes to better engage pedestrians, bikers, and public transportation users, and support active living and healthy, connected communities. Incorporation of GI in public streetscapes can enhance Complete Street benefits and provide the additional benefits of improved water quality, water conservation, and flood protection.

### **D.1 VISION STATEMENTS**

#### **D.1.a City of San Mateo, Sustainable Streets Plan - Vision**

The City of San Mateo envisions a transportation system that is sustainable, safe, and healthy and supports a sense of community and active living, where walking, bicycling, and transit are integral parts of daily life. Furthermore, the City envisions integrating Complete Streets and Green Streets into street designs that are comfortable and convenient for the breadth of travel choices and that improve water quality and reduce other environmental impacts, while creating more vital places that fit with desired community character.

Complete Streets are routinely planned, designed, operated, and maintained with the consideration of the needs and safety of all travelers along and across the entire public right of way. This includes people of all ages and abilities who are walking, bicycling, using transit, traveling with mobility aids, driving vehicles, and driving commercial freight. Green Streets are designed to take further advantage of landscape and urban design elements that enhance the pedestrian experience and also capture, slow, treat, and potentially infiltrate stormwater runoff, while providing an array of additional environmental and economic benefits.

#### **D.1.b San Francisco, Better Streets Plan - Vision**

The Better Streets Plan will result in a street system designed to promote human needs for the use and enjoyment of public streets. It will prioritize the needs of walking, bicycling, transit use, and the use of streets as public spaces for social interaction and community life, following San Francisco’s General Plan, Transit-First Policy, and Better Streets Policy. The Better Streets Plan will result in streets where people walk and spend time out of choice—not just necessity— because streets are memorable, engaging, safe, accessible, healthy, attractive, fun, and convenient. The Better Streets plan will result in streets that improve pedestrian

connections and linkages among the City’s nodes, hubs, destinations, transit system, and major land use centers. The Better Streets Plan will result in a green network that enhances the City’s long-term ecological functioning and peoples’ connection to the natural environment. Finally, the Better Streets Plan will result in improved street-based social opportunities, community life, access, and mobility for all San Franciscans, regardless of cultural identity, income group, neighborhood identity, or mobility level.

### **D.1.c City of Oakland, Complete Streets Design Guidelines**

Streets Are Ecosystems: Streets should be designed as ecosystems where man-made systems interface with natural systems. From pervious pavements and bioswales that manage stormwater runoff to street trees that provide shade and are critical to the health of cities, ecology has the potential to act as a driver for long-term sustainable design.

## **D.2 GOALS, POLICIES, and IMPLEMENTATION MEASURES**

### **D.2.a City of Palo Alto, Bicycle and Pedestrian Transportation Plan**

- At the project scale, seek integrated design solutions that achieve multiple benefits (e.g., a sidewalk extension that also provides landscaping or stormwater management opportunities) and avoid or improve abrupt transitions in the public realm.
  - [Page 25; 2.2 Strategic Guiding Principles – The “Five I’s”; Integration](#)
- Policy N-22: Limit the amount of impervious surface in new development or public improvement projects to reduce urban runoff into storm drains, creeks, and San Francisco Bay. The BPTP does not directly address these issues, but recommends development of a Complete Streets project checklist that could include review and incorporation of green stormwater infrastructure or other improvements consistent with the Drainage Master Plan.
  - [Page 274; Goals and Policies; Goal N-4 \(water resources prudently managed\), Policy N-22](#)

### **D.2.b City of San Mateo, Sustainable Streets Plan**

- Objective 3D: Develop a green infrastructure plan that addresses the design, implementation, and maintenance of landscape and streetscape improvements as an integral part of San Mateo’s Sustainable Streets to manage stormwater

runoff, create a better pedestrian environment, and improve community character.

- Page 25; Goal 3 – Infrastructure and Support Facilities, Objective 3.D
- Policy 3.D.2: Manage stormwater runoff using green infrastructure from 10% of roadway segments citywide and from 20% of roadway segments within the Downtown and PDAs within the city by the year 2050.
  - Page 25; Goal 3 – Infrastructure and Support Facilities, Policy 3.D.2

**COMMENTS:** The goal above is unique in specifying a quantifiable target and timeline for implementation of GI in city streets. This type of statement can be added to municipal plans and policies after a municipality’s GI Plan is completed and special local goals are identified.

- Policy 3.D.4: Create design guidance, standards, and best practices for the design of green infrastructure elements in public rights-of-way. Guidance, standards, and best practices should:
  - Be consistent with federal and regional requirements, including those related to water quality and be integral to city policies that support Sustainable Streets.
  - Be coordinated with the City’s land use planning and development guidelines and standards and other applicable City guidelines and standards.
  - Coordinate with the San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook.
  - Define the applicability of tools and techniques to maintain specific conditions with respect to streets’ role in the transportation network, their stormwater function, and characteristics of the built and natural context.
- Page 25; Goal 3 – Infrastructure and Support Facilities, Policy 3.D.4

**COMMENT:** Consider adding language stating that sustainable landscaping rating systems, such as the Bay-Friendly Landscaping principles, will be required in the design, construction and maintenance of all vegetated stormwater landscapes and/or other landscapes as desired for projects in the public right of way and/or on private projects to ensure that water efficient landscape ordinance measures are implemented and verified.

- Policy 3.D.5: Establish a strategy and work plan for developing a comprehensive interdepartmental Operations and Maintenance Plan that integrates street, landscape, stormwater, and utility operations and maintenance.
  - Page 25; Goal 3 – Infrastructure and Support Facilities, Policy 3.D.5

**COMMENT:** Consider adding language stating that sustainable streets rating systems, such as the “Green Roads” scorecard ([www.greenroads.org](http://www.greenroads.org)), will be required in the design, construction and maintenance of all projects in the public right of way and/or on private projects.

- Policy 3.D.6: Establish a monitoring program that can inform future changes and modifications to established green infrastructure design guidance, standards, and operations and maintenance practices.
  - [Page 25; Goal 3 – Infrastructure and Support Facilities, Policy 3.D.6](#)
- Policy 3.D.7: Maximize the potential to implement green infrastructure by:
  - Reducing or removing administrative, physical, and funding barriers;
  - Setting implementation priorities based on stormwater management and Sustainable Streets needs, as well as the effectiveness of improvements and the ability to identify funding.
  - Taking advantage of opportunities such as grant funding, routine repaving or similar maintenance projects, funding associates with Priority Development Areas, public private partnerships, and other funding opportunities.
  - [Page 25; Goal 3 – Infrastructure and Support Facilities, Policy 3.D.7](#)
- Policy 3.D.8: Identify and develop an educational program that informs City of San Mateo residents, employers, and employees of the environmental, economic, and place-making benefits of integrating green infrastructure into public rights-of way.
  - [Page 25; Goal 3 – Infrastructure and Support Facilities, Policy 3.D.8](#)

### **D.2.c City of San Francisco, Better Streets Plan**

- Goal: San Francisco’s streets will be designed as a green network, enhancing the City’s long-term ecological functioning.
  - [Page 47; Chapter 3, Goals & Policies: Section 8: Ecologically Sustainable](#)
- Objectives: Streets that are ecologically sustainable are designed to:
  - Reduce downstream flooding and untreated wastewater overflows into the Bay and ocean;
  - [Page 47; Chapter 3, Goals and Policies: Section 8: Ecologically Sustainable](#)

**COMMENTS:** For cities without combined sewer systems, the above text might be substituted with something like the following: “Reduce localized flooding and polluted runoff flows into storm drains, creeks, Bay, and ocean.”

- Policy: Maximize opportunities in the streetscape for on-site stormwater retention and infiltration.
  - [Page 47; Chapter 3, Goals and Policies: Section 8: Ecologically Sustainable](#)
- Stormwater Management Tools: Plantings, permeable paving, and other facilities to retain, detain, convey, infiltrate, and treat stormwater.
  - [Page 172; Chapter 6: Guide: Streetscape Elements; Section: Introduction](#)

- Other Considerations: Stormwater management: The design of planting areas should consider including appropriate conditions for improved stormwater detention and infiltration. See Section 6.2. See also the Stormwater Design Guidelines Vegetation Palette for planting ideas.
  - [Page 174; Chapter 6: Guide: Streetscape Elements; Section: Urban Forest](#)

#### D.2.d City of Emeryville, Pedestrian and Bicycle Plan

- Example Projects Referenced in Pedestrian and Bicycle Plan:
  - **53<sup>rd</sup> Street Greenway:** Between Hollis Street and San Pablo Avenue, three alternatives are proposed. All alternatives would maintain 53rd Street as a bicycle boulevard. Alternative A would selectively narrow the street at select locations by installing storm water curb extensions. Alternative B would widen the sidewalks on both sides and install bioswales. Alternative C would involve widening the sidewalk on the south side only and creating a creek feature similar to Frog Park along Temescal Creek in Oakland.
  - **San Pablo Avenue:** Additionally, a greening study shall be considered for San Pablo Avenue, which would consider improvements such as installing bioswales in bulb-outs at intersections, to improve the aesthetic of the street and reduce run-off, provide pedestrian improvements, and calm traffic.
    - [Page 106; 7-4; Section 7: Site-Specific Projects](#)

#### D.2.e City of Oakland, Complete Streets Design Guidelines

- Functions of Green Infrastructure Elements: ... the functions of green infrastructure that the designer should consider on a location and project specific basis:
  - **Infiltration:** The process or rate at which water percolates into the ground. The infiltration capacity of a green infrastructure feature is dependent on the capacity of soils present under the feature to percolate water and has to be verified on a site-by-site basis prior to the final design of a green infrastructure element.
  - **Bioretention:** The absorption and temporary storage of stormwater in a green infrastructure feature and the soil media and vegetation located in the retention area. This process also reduces peak flows and the movement of stormwater as it passes through soil and vegetation.
  - **Pollutant Removal:** The removal of solid (particulate) matter and pollutants from the runoff by means of porous media, such as sand and soil, as well as through microbial action associated with soil microbes. Where vegetation is present, some pollutants are also absorbed by plant roots and bound to plant surfaces.
  - **Interception:** The process of precipitation temporarily adhering to the leaves and other parts of trees and other plants before reaching the

ground. This leads to a modest delay in the concentration and peaking of stormwater runoff flows.

- [Page 67; Section 2.5 Stormwater](#)
- In addition to understanding the potential functions of a given green infrastructure element, the designer also needs to consider the environmental and built context of a given green infrastructure element. (*Environmental and Built Context Factors are listed in this section – e.g. soil conditions, topography, adjacent buildings and uses, available right-of way width, etc.*)
  - [Page 69; Section 2.5 Stormwater](#)
- Green Infrastructure Elements: The following green infrastructure elements are discussed in this section of Oakland’s Complete Streets Design Guidelines including descriptions, design considerations, and illustrated examples are included in this section:
  - Bioswales
  - Stormwater Trees / Linked Tree Wells
  - Rain Gardens
  - Stormwater Curb Extensions
  - Stormwater Planters
  - Green Gutters
  - Pervious, Permeable and Porous Pavement
  - [Page 70-73; Section 2.5 Stormwater](#)
- Final Design: The sizing and final technical design of green infrastructure elements should follow the guidance and requirements provided in the most recent version of the Alameda County C.3 Technical Guidance. The plant selection should occur using the Stormwater Facilities Plan Palette, which includes preferred plants for green infrastructure features identified by the City Oakland Public Works – Park & Tree Services Division.
  - [Page 73; Section 2.5 Stormwater](#)
- Green Infrastructure Maintenance *is also discussed in section 2.5.B*
  - [Page 74; Section 2.5.B Stormwater](#)

## Section E. UTILITY AND INFRASTRUCTURE PLANS

Communities should consider GI during the development of storm drain master plans and other related utility plans. GI facilities may provide more benefits and be more cost-effective than the traditional gray infrastructure projects identified in these plans.

### E.1 VISION STATEMENTS

#### *E.1.a* **City of Mountain View, North Bayshore Precise Plan**

North Bayshore is envisioned as a district that supports and enhances wildlife, trees, and habitat areas. In 2030, sensitive species within Shoreline at Mountain View Regional Park remain and thrive. Shoreline at Mountain View, the Stevens and Permanente Creeks, Charleston Retention Basin, and the Stevens Creek Trail remain unique and defining features of the area. Businesses and development respect and enhance the nearby wildlife, wetlands, trees and habitat areas. Workers and visitors enjoy nature and views of open space, the San Francisco Bay, and mountains.

North Bayshore is a leader in highly sustainable and innovative development. New development incorporates highly sustainable design features and materials, including habitat enhancements, sustainable transportation systems, green buildings, and incentives to reduce water and energy use.

#### Guiding Principle 7. Make the Area Highly Sustainable.

- Require all new construction to meet the intent of LEED BD+C Gold.
- Provide incentives for highly-sustainable development.
- Support district infrastructure pilot projects.

### E.2 GOALS, POLICIES, and IMPLEMENTATION MEASURES

#### *E.2.a* **City of Palo Alto, Storm Drain Master Plan Update**

- Low Impact Development: LID measures include rainwater harvesting/reuse, infiltration, and evapotranspiration. If these measures are deemed infeasible, then biotreatment can be used. It is likely in the future more and more

emphasis will be placed on using the following technologies on construction sites recommended by the Water Board:

- Bioretention & Rain Gardens
  - Rooftop Gardens
  - Sidewalk Storage
  - Vegetated Swales, Buffers & Strips, Tree Preservation
  - Roof Leader Disconnection
  - Rain Barrels and Cisterns
  - Permeable Pavers
  - Soil Amendments
  - Impervious Surface Reduction & Disconnection
  - Pollution Prevention & Good Housekeeping
- [Page 5-4; 5.9 Low Impact Development](#)

### **E.2.b City of Los Altos, Stormwater Master Plan**

- Green Infrastructure Plan: The 2015 MRP requires that every Co-permittee (cities and agencies under the 2015 MRP) develop a Green Infrastructure (GI) Plan by 2019. Achieving this requirement will entail a significant effort from the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) and its Co -permittees. The City will need to begin green infrastructure planning in the near future to determine how best to meet these requirements. ... The City will need to complete actions and specific tasks related to the Green Infrastructure Plan that will need to be reported for the FY15-16 Annual Report and subsequent reports. By the second year of the permit, permittees will need to adopt a GI plan framework and identify mechanisms for beginning the prioritization process.
- [Page 2-2, Chapter 2 – Regulatory Requirements](#)

### **E.2.c City of Mountain View, North Bayshore Precise Plan**

- Stormwater: The City is required by the State of California’s San Francisco Regional Water Quality Control Board to meet local municipal stormwater requirements and requirements of the Bay Area Municipal Regional Stormwater Permit (MRP). The MRP requires post-construction stormwater controls on all regulated development and redevelopment projects under Provision C.3 of the MRP. The MRP regulates stormwater discharge into local creeks and the San Francisco Bay to address stormwater runoff quality, and to limit the quantity of runoff from development.
- [Page 78; Chapter 4 – Green Building Design, Section 4 - Stormwater](#)

- Stormwater Standards: The Precise Plan builds upon the C.3 provisions for the installation of stormwater treatment controls, adding requirements for higher treatment levels for stormwater and accelerating reductions in trash loads, which are included in Provision C.10 of the MRP:
  - **Post-construction stormwater controls.** Regulated new construction and redevelopment construction projects shall meet the stormwater requirements contained under Provision C.3 of the Bay Area MRP.
  - **Two-year events.** New construction shall treat stormwater runoff from a 2-year event and less using low impact development best management practices.
  - **Trash capture.** As determined by the City, new construction shall include installation of partial and/or full trash capture systems within a portion of the storm drain system.
  - **Vehicle washing.** For businesses that conduct vehicle washing services, including fleet bus washing, wash water shall be collected and shall not be allowed to enter the storm drain system.
  - **Source controls.** New construction projects and some renovation projects may be required to install pollutant source controls, such as covered trash enclosures, and grease controls for food service facilities.
- [Page 78; Chapter 4 – Green Building Design, Section 4 - Stormwater](#)

**COMMENTS:** Consider including language supporting the integration of Low Impact Development measures with other stormwater requirements (e.g. trash capture devices, wash water diversion, or source control facilities).

- Stormwater Guidelines:
  - **Impervious surface.** During site redevelopment, new construction is encouraged to reduce the amount of impervious surface on a site.
  - **Vegetated Roofs.** New construction and additions are encouraged to install vegetative roofs to reduce and slow stormwater runoff and to filter pollutants from rainfall.
  - **Design for sea level rise.** Stormwater infrastructure should be designed to accommodate sea level rise and coastal flooding by incorporating system enhancements such as increased drainage system capacity and higher on-site stormwater capture.
- [Page 79; Chapter 4 – Green Building Design, Section 4 - Stormwater](#)
- Streetscape Design Guidelines:
  - **Stormwater features.** Rainwater and stormwater features can be designed as amenities and remain highly visible within public

areas. The City Engineer will have final authorization to allow any stormwater features in public areas.

- Page 117; Chapter 6 - Mobility, Section 3 – Streetscape Design
- Infrastructure: The objectives of the Infrastructure chapter include the following:
  - Identify infrastructure improvements needed to meet the current and future needs of the North Bayshore area;
  - Implement capital improvements in a cost-effective and efficient manner;
  - Meet or exceed Santa Clara County’s standard for stormwater discharge quality and minimize impacts to local channels and the San Francisco Bay;
  - Upgrade flood protection and stormwater infrastructure to ensure buildings are protected from sea level rise and coastal flooding; and
  - Continue compliance with local, state, and federal regulations.
- Page 153; Chapter 7 - Infrastructure, Introduction
- Storm Drainage and Flooding Guidelines:
  - **Treatment of public street runoff.** Public street stormwater should be treated within bio-swales and bio-retention areas adjacent to roadways.
- Page 158; Chapter 7 - Infrastructure, Section 4 – Storm Drainage and Flooding

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