



Green

Infrastructure

Plan



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Contents

Acronyms.....iii

1 Introduction and Overview.....1

 1.1 Regulatory Mandate1

 1.2 Objectives and Vision2

 1.3 Plan Context and Elements3

2 Green Infrastructure Targets10

 2.1 UrbanSim Private Development Projections.....10

 2.2 Targets for Public Projects11

3 Public Project Identification, Prioritization, and Mapping.....13

 3.1 Tools for Public Project Identification and Prioritization13

 3.2 Maps and Project Lists18

4 Early Implementation Projects20

 4.1 Review of Capital Improvement Projects.....20

 4.2 List of Projects Identified20

5 Tracking and Mapping Public and Private Projects Over Time21

 5.1 Results.....21

6 Design Guidelines and Specifications.....23

 6.1 Guidelines for Streetscape and Project Design23

 6.2 Specifications and Typical Design Details.....23

 6.3 Sizing Requirements.....24

7 Funding Options26

 7.1 Funding Strategies Developed Regionally26

 7.2 Local Funding Strategies29

 7.3 Potential Future Regional Funding Strategy29

8 Adaptive Management30

 8.1 Process for Plan Updates30

 8.2 Pursuing Future Funding Sources.....30

 8.3 Future Considerations.....31

Tables

Table 1. Documents to Align with this Green Infrastructure Plan..... 6
Table 2. Estimates of Impervious Surface to Be Retrofit via Private Development 11
Table 3. Estimates of Impervious Surface to Be Retrofit via Public Projects 12
Table 4: Green Infrastructure Project Types and Categorization Criteria 15
Table 5: CCW SWRP Project Opportunity Infiltration Feasibility Categorization Criteria 16
Table 6. CCW SWRP Ranked Projects 19
Table 7. CIP Projects with Green Infrastructure Potential (identified 2015-2019) 20
Table 8. Grant Programs to Fund Public GI Project Implementation 27

Appendices (links)

- A. Maps
- B. Brentwood Municipal Code Chapter 14.20 – Stormwater Management and Discharge Control
- C. BASMAA Guidance for Identifying Green Infrastructure Potential in Municipal Capital Improvement Program Projects
- D. BASMAA Guidance for Sizing Green Infrastructure Facilities in Street Projects

Acronyms

ABAG	Association of Bay Area Governments
BASMAA	Bay Area Stormwater Management Agencies Association
CCCWP	Contra Costa Clean Water Program
CCW SWRP	Contra Costa Watersheds Stormwater Resource Plan
GI	Green Infrastructure
GIS	Geographic Information System
IRWMP	Integrated Regional Water Management Plan
MRP	Municipal Regional Stormwater Permit
MTC	Metropolitan Transportation Commission
NPDES	National Pollutant Discharge Elimination System
PCBs	Polychlorinated Biphenyls
TMDL	Total Maximum Daily Load
ROW	Right-of-Way
RWQCB	Regional Water Quality Control Board
PW	Public Works

1 Introduction and Overview

1.1 Regulatory Mandate

The City of Brentwood (“City”) is one of 81 local government entities subject to the requirements of the California Regional Water Quality Control Board for the San Francisco Bay Region’s (“RWQCB”) Municipal Regional Stormwater Permit (“MRP”). The MRP was last reissued in November 2015¹ and was amended in February 2019² to add the cities of Antioch, Brentwood, and Oakley in unincorporated East Contra Costa County as Permittees.

The MRP mandates implementation of a comprehensive program of stormwater control measures and actions designed to limit contributions of urban runoff pollutants to San Francisco Bay.

Provision C.16.5.a. in the amended MRP requires the City of Brentwood to prepare a Green Infrastructure Plan, to be submitted to the RWQCB by December 31, 2020.

Green infrastructure (“GI”) refers to the construction and retrofit of storm drainage systems to reduce stormwater runoff volumes, disperse runoff to vegetated areas, harvest and use runoff where feasible, promote infiltration and evapotranspiration, and use bioretention and other natural systems to detain and treat runoff before it reaches our creeks and the San Francisco Bay (“the Bay”). Green infrastructure facilities include, but are not limited to, pervious pavement, infiltration basins, bioretention facilities (“rain gardens”), green roofs, and rainwater harvesting systems. GI may be incorporated into construction on new and previously developed parcels, as well as new and rebuilt streets, roads, and other infrastructure within the public right-of-way (“ROW”).



¹ Order R2-2015-0049

² Order R2-2019-0004

Water quality in the Bay is impaired by mercury and by polychlorinated biphenyls (“PCBs”). Sources of these pollutants include urban stormwater. By reducing and treating stormwater flows, GI reduces the quantity of these pollutants entering the Bay and will hasten the Bay’s recovery.

MRP Provisions C.11 and C.12 require Contra Costa County Permittees (Contra Costa County and its 19 cities and towns) to reduce estimated stormwater loading of PCBs and mercury to the Bay using GI. However, the cities of Antioch, Brentwood, and Oakley are exempt from Provisions C.11 and C.12. Therefore, the City of Brentwood’s Green Infrastructure Plan (“Plan”) is oriented toward maximizing the multiple benefits, including water-quality benefits obtained through GI, and does not have a specific focus on reducing PCBs and mercury.

1.2 Objectives and Vision

This Plan will guide a shift from conventional “collect and convey” storm drain infrastructure to more resilient, sustainable stormwater management systems that reduce runoff volumes, disperse runoff to vegetated areas, harvest and use runoff where feasible, promote infiltration and evapotranspiration, and use natural processes to detain and treat runoff. Green infrastructure features and facilities include, but are not limited to, pervious pavement, infiltration basins, bioretention facilities (“rain gardens”), green roofs, and rainwater harvesting systems.

As required by Provisions C.3.a. through C.3.i. in the MRP, these “Low Impact Development” practices are currently implemented on land development projects in the City. Specific methods and design criteria are spelled out in the Contra Costa Clean Water Program’s (“CCCWP’s”) *Stormwater C.3 Guidebook*, which the City has referenced in Brentwood Municipal Code (“BMC”) Chapter 14.20 – Stormwater Management and Discharge Control.

This Plan details how similar methods will be incorporated to retrofit existing storm drainage infrastructure using green infrastructure facilities constructed on public and private parcels and within the public ROW.

1.3 Plan Context and Elements

1.3.1 Planning Context

Municipal Geography

Incorporated in 1948, Brentwood is located in the far Eastern Contra Costa County region of the San Francisco Bay Area. The community has a long and storied history in agriculture and farming production. That tradition continues today even with the residential growth the City has experienced over the last several years. In the late spring and summer months, area farms are brimming with agri-tourists seeking out the latest stone fruits, corn and cherries.

The geological setting of Contra Costa County is composed of surficial (Quaternary) deposits that overlie fault-bounded bedrock assemblages. East Contra Costa County has four groundwater regions. The City occupies the largest region, an area where groundwater occurs in material that was deposited by streams that originate in the coast ranges to the west. Aquifer materials capable of yielding quantities of water suitable for municipal and/or agricultural purposes extend to depths of 600 feet below the ground surface.

As is common with many East Bay towns in Contra Costa County, Mount Diablo is clearly seen from Brentwood. Brentwood is located on the alluvial plain of the Sacramento-San Joaquin Delta. Brentwood's municipal geography dictates what GI facilities may be implemented and where such implementation is appropriate. Water infiltration is limited in areas of the City where Class D (clayey) soils are found.

Brentwood has a total area of 14.81 square miles (38.4 km²).

Demographics

Brentwood is a family friendly community located in the far east San Francisco Bay Area. Brentwood is home to 66,455 residents (2020, Applied Geographic Systems). The City has grown from 8,300 residents as of 1990. The estimated total number of dwelling units are 21,100, with an ownership rate of about 75%. Ethnicity makeup is generally diverse with households identifying as 48% white, 28% Hispanic, 13% Asian and Pacific Islander, 7% black, and 4% multi-race.

Economic and Social Trends

Brentwood is an attractive and high quality of life community for families and individuals within the greater San Francisco Bay Area. The tagline for the Brentwood Economic Development Department is “Better in Brentwood,” alluding to the experience of residents, visitors and businesses in the community. Comparatively with the San Francisco Bay Area, Brentwood provides high quality, affordable housing options with a median sale price of \$675,000.

The median household income is approximately \$106,000, with over 50% of all households earning over \$100,000 per year. Brentwood attracts a highly educated workforce with 80% of residents in the workforce having some level of college through graduate level degree. Brentwood is also home to Los Medanos College Brentwood Center, a California community college offering associate degrees and Career Technical Education.

There are 2,100 business establishments employing 16,000 individuals in Brentwood. Major local employment sectors include Services, Retail Trade, Finance, Insurance and Real Estate (FIRE), healthcare, government administration and construction/manufacturing. Commuters into major employment hubs in the Bay Area compose a majority of the higher wage and educated workforce. The average one-way commute time for a Brentwood resident is 43.9 minutes.

Brentwood seeks additional opportunities for economic development and job generating uses that have the ability to create new local jobs and diversify the local workforce. Business attraction and retention remain key components of the City’s Economic Development Strategic Action Plan. Additionally, strategies to reinvest in aging and lesser developed in-fill areas of the city remain a priority to improve access to commercial services, public amenities, parks and services for all residents of the community.

Development and Redevelopment Trends

Brentwood has been guided by years of quality current and long range planning in response to regional growth pressures over the past three decades. The City of Brentwood General Plan – 2014 Update (“General Plan”) identifies the community’s vision for the future and provides a framework that will guide decisions on growth, development, and conservation of open space and resources in a manner that is consistent with the quality of life desired by the City’s residents and businesses.

According to the General Plan, the City's buildout population is expected to be slightly over 80,000, along with over 33,000 jobs. Much of the City's growth over the last 20 years has been to the north and west of Downtown, as larger parcels historically used for farming have been developed with new housing units, commercial space, parks, and community facilities. The pace of residential growth has slowed from a peak of approximately 1,500 single-family permits per year in the early 2000s to approximately 350 single-family permits per year currently.

Downtown Brentwood continues to be a historically sensitive destination retail and dining district, with guidance contained in the Downtown Specific Plan. Additional commercial infill at higher densities and new residential housing units are projected in the future.

The Brentwood Boulevard corridor, formerly California State Route 4, is the major north-south arterial connecting the unincorporated County, to Brentwood and the City of Oakley. Additional infill and greenfield development, along with improved streetscape, is planned for the future.

The State Route 4 corridor has been completed as of 2018, including interchanges at Lone Tree Way, Sand Creek Road, and Balfour Road, and now serves a regional traffic flow of 65,000 annual average daily traffic ("AADT"). Major regional commercial centers, a planned office/employment center, medical center uses and master planned residential neighborhoods are located along the highway. Additional infill and greenfield development is possible in multiple locations that bisect the highway.

1.3.2 Watersheds and Storm Drainage Infrastructure

The City lies in the Marsh Creek watershed and is surrounded by the foothills of Mount Diablo and the rich farmlands of the Sacramento-San Joaquin Delta, which drains into the San Francisco Bay. The Marsh Creek watershed drains to the east side of Mount Diablo. It covers about 128 square miles of rangeland, farmland, protected parkland, and urban land (City of Brentwood, 2011). The creek flows approximately 30 river miles from its headwaters in the Morgan Territory Preserve through Brentwood and Oakley to empty into the Delta at Big Break near the confluence of the Sacramento and San Joaquin Rivers. Deer Creek, Dry Creek, and Sand Creek are all smaller creek systems that join Marsh Creek within the City of Brentwood. All three of these systems flow from the west to the east (City of Brentwood, 2013a).

Flood Zones

Portions of Brentwood are located in flood-prone areas as a result of the City’s general low topography and creeks that run through City boundaries. According to the Federal Emergency Management Agency National Flood Insurance Program from 2015, approximately 1.7% of the City is located in a 100-year flood zone, primarily around Marsh Creek and Sand Creek. GI facilities may help address localized flooding in the Brentwood community.

Storm Drains

Drainage facilities in Brentwood include the City’s creeks, inlets, outfalls, manholes, culverts, detention facilities, and drainage channels. The creeks collect both surface runoff and flows from storm drain pipes. Due to the primarily flat topography of the City, beyond certain hillside areas within the City, there is little natural elevation change to enable rapid enough water drainage to avoid storm drain backflow and localized flooding. GI can be well-suited to help address such issues by encouraging stormwater infiltration and slowing the flow of water entering the storm drain system.



1.3.3 Related Local Planning Documents

GI may be integrated into a wide diversity of public and private projects. Public projects may incorporate GI in streets, parks, schools, and other civic properties. In order to ensure that GI is considered and supported in the range of planning and design processes for these projects, the City will update the following planning documents to appropriately incorporate green infrastructure requirements:

Table 1. Documents to Align with this Green Infrastructure Plan

Document	Completion Date
General Plan	Potential Update 2022-2024
Parks, Trails & Recreation Master Plan	No Planned Update
PA-1 (Innovation Center) Specific Plan	Planned Update 2021
Brentwood Blvd Specific Plan	Planned Update 2021
Downtown Specific Plan	Planned Update 2021
Development Fee Program Update	Early 2021
Standard Plans and Specifications	Planned Update 2021

General Plan

The City's General Plan serves as a broad planning guideline to Brentwood's future development goals and provides policy statements to achieve those development goals. Staff will facilitate discussions to require and or promote GI on public and private lands.

Parks, Trails & Recreation Master Plan

Brentwood's park and recreation system encompasses nearly 100 parks and facilities, 19.22 miles of trails, and 63 miles of bike lanes. The City maintains and operates over 237 acres of parkland. The City Council updated the City's Parks, Trails, and Recreation Master Plan ("Master Plan Update") on February 26, 2019, to serve as a guiding document and implementation tool for the management and development of parks and recreation facilities and programs for the City. The Master Plan Update included a comprehensive needs assessment process to identify and examine Brentwood's unique character and setting. It examined the existing conditions and also went through a thorough community participation process to define and articulate the community's top facility and program needs. While most parks already provide space with primarily permeable surfaces, these City-owned and controlled parcels offer key opportunity areas for constructing GI in the future.

Specific Plans

The City has adopted the Downtown, Brentwood Blvd, and PA-1 (Innovation Center) Specific Plans. Specific Plans implement a comprehensive planning and zoning document for defined geographic regions within the City. With the next update of the individual Specific Plans, City staff will include measures to include and promote GI into private developments and public infrastructure within the Specific Plan area.

Development Fee Program Update

The Development Fee Program, codified in Brentwood Municipal Code Chapter 16.130 (Facility Fees and Charges) augments the General Plan, Infrastructure Master Plans and Capital Improvement Program to make certain the required facilities are adequately funded and costs are apportioned to the various types of development in the form of development impact fees. With the planned update in 2021, City staff will ensure the fees collected will account for the implementation of green infrastructure into public facilities.

Standard Plans and Specifications

The City Engineer requires that all public and private improvements within the City of Brentwood to be constructed in accordance with the Standard Plans and Specifications. City staff will ensure that plans and specifications for GI is included with the next update scheduled for 2021.

Future Plans

City staff will work collaboratively on all future specific plans and governing documents to ensure that GI is included in those plans and documents.

1.3.4 Outreach and Education

The City's Plan development process engaged a wide variety of stakeholders, including both government staff and community members who will live, work, and play near future green infrastructure projects. The City also intends to engage relevant government staff and community members as projects move forward towards design and implementation.

Regional GI Collaboration

City staff have actively participated in CCCWP and BASMAA meetings since establishment of the GI Plan requirements in 2015. Staff involvement has prioritized incorporating regional GI best practices into the City's Plan and advocating for cost-effective and regionally practicable GI Implementation.

Interdepartment Coordination

Staff from the Public Works Engineering Division facilitated coordination with the Community Development and Economic Development Departments to identify upcoming capital improvement program ("CIP") projects, ROW priorities, future private development, and ROW design guidelines; and create details and specifications to include GI.

City of Brentwood Leadership Engagement: GI Plan Content and Adoption

Upon adoption of the Green Infrastructure Framework by City Council on June 13, 2017, staff have actively incorporated GI elements into CIP and private development projects under the direction of City elected and appointed leaders. The project review and approval process served as an opportunity for elected and appointed leaders, as well as the public, to comment on GI elements to be incorporated into the Plan.

Ongoing Public Engagement: GI Project Implementation

Private GI project implementation will incorporate City feedback through Planning review/entitlement, building permit, and design review process, including approval from the Planning Commission, as required.

Public GI project implementation will incorporate public engagement, as appropriate to the project, during the planning and design phases.

2 Green Infrastructure Targets

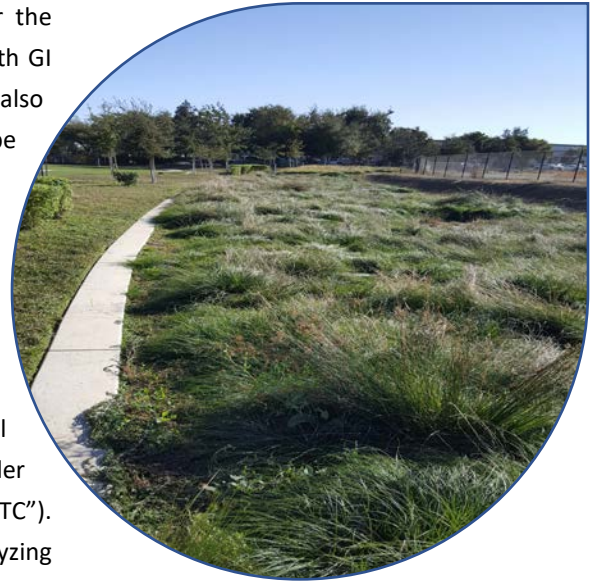
This City’s planning process developed and assessed projections for the square footage of impervious surface to be retrofitted and treated with GI from private projects within the City by 2030 and after 2030. It also incorporates targets for the square footage of impervious surface to be retrofitted and treated with GI through potential public projects within the City’s jurisdiction by 2020, 2030, and 2040.

2.1 UrbanSim Private Development Projections

To forecast private development, the City participated in a regional process coordinated through the CCCWP and shared with BASMAA member agencies. This process utilized the outputs of UrbanSim, a model developed by the Urban Analytics Lab at the University of California under contract to the Bay Area Metropolitan Transportation Commission (“MTC”). UrbanSim is a modeling system developed to support the need for analyzing the potential effects of land use policies and infrastructure investments on the development and character of cities and regions. The Bay Area’s application of UrbanSim was developed specifically to support the development of Plan Bay Area, the Bay Area’s Sustainable Communities planning effort.

MTC forecasts growth in households and jobs and uses the UrbanSim model to identify development and redevelopment sites to satisfy future demand. Model inputs include parcel-specific zoning and real estate data; model outputs show increases in households or jobs attributable to specific parcels. The methods and results of the Bay Area UrbanSim model have been approved by both MTC and the Association of Bay Area Governments (“ABAG”) Committees for use in transportation projections and the regional Plan Bay Area development process.

The CCCWP process used outputs from the Bay Area UrbanSim model to map parcels predicted to undergo development or redevelopment in each Contra Costa jurisdiction at each time increment specified in the MRP (2020, 2030, and 2040). The resulting maps were reviewed by staff from Community Development, Economic Development, and Public Works to ensure consistency with local planning and economic development initiatives. The maps were revised, and each revision documented.



It is assumed that multifamily residential and commercial/industrial developments will incorporate stormwater treatment facilities (typically bioretention) in accordance with MRP Provisions C.3.b., C.3.c., and C.3.d. Because of high land values, it is expected that more than 50% of the existing impervious area in each parcel will be replaced if a parcel is developed and, therefore, the entire parcel will be subject to Provision C.3 requirements (i.e., will be retrofit with GI), consistent with the “50% rule” requirements of MRP Provision C.3.b.

Existing impervious surface for each affected parcel was estimated using the 2011 National Land Cover Database. Estimates were spot-checked and revised based on local knowledge and available satellite imagery.

Based on these assumptions and the revised maps, the amounts of existing impervious surface forecast to be retrofit with GI via private development are as shown in Table 2. The associated Future Development Map can be found in Appendix A.

Table 2. Estimates of Impervious Surface to Be Retrofit via Private Development

Year	Total Square Footage	Total Acres
By 2030	3,347,000	76.8 acres
After 2030	2,165,000	49.7 acres

2.2 Targets for Public Projects

Forecasted impervious surface to be retrofit via public projects is in two categories:

1. Estimated tributary impervious surface for GI Projects identified in this Plan.
2. Additional tributary impervious surface associated with projects yet to be identified. These projects are associated with general geographic areas (neighborhoods or blocks) but specific facility locations have not yet been identified.

These forecasts are summarized in Table 3.

Table 3. Estimates of Impervious Surface to Be Retrofit via Public Projects

Year	Square footage tributary to GI Projects included in this Plan	Additional square footage associated with projects yet to be identified	Total
2020	14,000	0	14,000
2030	TBD	TBD	TBD
2040	TBD	TBD	TBD

3 Public Project Identification, Prioritization, and Mapping

3.1 Tools for Public Project Identification and Prioritization

Publicly-owned parcels and ROWs that could potentially be retrofitted to include multi-benefit stormwater capture facilities were identified as part of the CCW SWRP (CCCWP, 2018). These potential project locations were used as the basis for identifying future public retrofit locations within the City of Brentwood. A summary of the project identification and prioritization process conducted for the CCW SWRP is described herein; additional details may be found in the CCW SWRP (CCCWP, 2018).

3.1.1 CCW SWRP Project Opportunity Identification

The CCW SWRP identified public retrofit opportunities through a request for planned projects, sent to the Contra Costa County Permittees, along with a geographic information system (“GIS”) based project opportunity analysis, conducted using data received from the Permittees through a data request. Information related to the identification of potential projects was received from 25 jurisdictions, government agencies, non-governmental organizations, and watershed groups that were contacted with potential project requests.

The desktop GIS analysis entailed screening for publicly-owned parcels and ROWs without physical feasibility constraints that would preclude implementation of a stormwater capture project. The project opportunity analysis consisted of the following steps:

1. Identify publicly-owned parcels through parcel ownership and/or tax-exempt status.
2. Screen identified publicly-owned parcels to identify those at least 0.1 acres in size; and with average slopes less than 10%.
3. Identify ROW using the county-wide roadway data layer. Roadways considered were state and county highways and connecting roads, as well as local, neighborhood, and rural roads.
4. Identify land uses associated with identified parcels and surrounding identified ROWs with a combination of ABAG land use categories and use codes provided by the Contra Costa County Assessor.



5. Screen all identified locations (i.e., parcels and ROWs) for physical feasibility. The following screening relating to physical constraints was applied to identified sites (to the extent that the necessary data had been provided or obtained):
 - a. Regional facilities were not considered for parcels that were greater than 500 feet from a storm drain, due to limited feasibility in treating runoff from a larger drainage area;
 - b. Parcel-based facilities were not considered for sites that were more than 50% undeveloped land uses, due to the limited potential for pollutant of concern load reduction;
 - c. Parcels with significant drainage area outside of urbanized areas were removed, as these sites would not provide an opportunity for significant pollutant of concern load reduction;
 - d. Sites more than 50% within environmentally sensitive areas (“ESAs”) (designated wetlands, biologically sensitive areas) were removed so as not to disturb these habitats; and
 - e. Sites with more than 50% overlying landslide hazard zones were removed to avoid the potential for increasing landslide risk.

The remaining identified public parcels and ROWs were considered preliminarily feasible for installation of stormwater capture facilities and were analyzed using a metrics-based multi-benefit analysis. The results of the metrics-based multi-benefit analysis provided some information helpful for consideration of GI priorities. A summary of the project opportunity classification and scoring conducted for the CCW SWRP is provided in the following section.

3.1.2 CCW SWRP Project Opportunity Metrics-Based Multi-Benefit Analysis

To conduct the CCW SWRP project opportunity metrics-based multi-benefit analysis required as part of the CCW SWRP, additional data was analyzed and classifications were made regarding the project opportunities. First, all project opportunities (including those identified through the GIS opportunity analysis and the stakeholder potential projects process) were classified using the following information:

- ◆ Stormwater capture project type;
- ◆ Infiltration feasibility;
- ◆ Facility type; and
- ◆ Drainage area information.

Details regarding each of these classifications are provided in the following sections.

Stormwater Capture Project Type

All physically feasible project opportunities that did not include a previously defined non-GI stormwater capture facility (e.g., stream restoration projects provided by stakeholders as part of the CCW SWRP project request) were assumed to be feasible for GI implementation as part of the CCW SWRP project opportunity classification. The projects identified through the GIS opportunity analysis and stakeholder stormwater capture projects process were categorized as parcel-based, regional, or ROW/green streets projects, as summarized in Table 4.

Table 4: Green Infrastructure Project Types and Categorization Criteria

GI Project Type	Definition	Description
ROW/green streets projects	Treating the road and portions of adjacent parcels	<ul style="list-style-type: none"> • All street-based projects.
Regional projects	Treating a large area draining to the parcel	<ul style="list-style-type: none"> • The parcel contains at least 0.5 acre of undeveloped or pervious area (as identified through the land use class); and • The drainage area is larger than the parcel itself and the location is sufficiently close to a storm drain (i.e., within 500 feet, where storm drain pipe data is available).
Parcel-based projects	Treating the drainage area only on the identified parcel	<ul style="list-style-type: none"> • All other parcel locations.

Infiltration Feasibility

All SWRP project opportunity locations were categorized as feasible, infeasible, or partially feasible for infiltration, based on underlying hydrologic soil group, depth to groundwater (as data was available), nearby soil or groundwater contamination, and presence of underlying geotechnical hazards, as described in Table 5.

Table 5: CCW SWRP Project Opportunity Infiltration Feasibility Categorization Criteria

Infiltration Feasibility Category	Description
Hazardous/infeasible for infiltration	Projects that are located: <ul style="list-style-type: none"> • More than 50% overlying liquefaction hazards; or • Within 100 feet of a site with soil or groundwater contamination (e.g., based on proximity to active GeoTracker³ or EnviroStor⁴ sites).
Infiltration safe but only partially feasible	None of the above constraints exist, but the soil underlying the facility is relatively poorly draining (identified as hydrologic soil group [HSG] C or D).
Infiltration feasible	The site has none of the infiltration hazards present and the soil underlying the facility is relatively well draining (identified as HSG A or B).

For the purpose of CCW SWRP project opportunity multi-benefit scoring (i.e., the metrics-based analysis conducted), locations feasible for infiltration were assumed to retain the full water quality capture volume. At locations that are partially feasible for infiltration, it was assumed that infiltration would be promoted in the facility, but the full water quality capture volume would not be infiltrated due to poor drainage. These areas were assumed to infiltrate to the extent possible using a raised underdrain. Locations that are hazardous for infiltration were assumed to implement non-infiltrating GI projects (i.e., lined bioretention) and were assumed to retain no volume.

CCW SWRP Project Opportunity Facility Type

Each CCW SWRP project opportunity location was assigned a facility type. For potential projects identified by the Permittees and/or stakeholders, a facility type was assigned based on the facility description or classification provided by the agency or project proponent. For project opportunities identified through the GIS analysis, the facility type was assumed to be GI, with

³ GeoTracker is a California State Water Resources Control Board website which tracks sites with the potential to impact water quality in California, including contaminated sites (<https://geotracker.waterboards.ca.gov/>).

⁴ EnviroStor is the Department of Toxic Substances Control's data management system for tracking cleanup, permitting, enforcement and investigation efforts at hazardous waste facilities and sites with known contamination or sites where there may be reasons to investigate further (<https://www.envirostor.dtsc.ca.gov/public/>).

infiltration capability defined based on the infiltration feasibility screening. The resulting CCW SWRP multi-benefit stormwater capture project types that were considered for the GI Plan included the following:

- ◆ Capture and Reuse
- ◆ Constructed Wetland
- ◆ Lined Bioretention
- ◆ Unlined Bioretention
- ◆ Unlined Swale
- ◆ Water Quality Basin

CCW SWRP Project Opportunity Drainage Area

For each identified project opportunity, the drainage area was identified and characterized as follows:

1. All project opportunities with identified drainage areas were characterized as provided by project proponents.
2. For ROW project opportunities for which the drainage area had not been characterized, the roadway and an assumed tributary width (e.g., 50 feet per side) that extends into the adjacent parcels was considered the drainage area.
3. For parcel-based project opportunities for which the drainage area had not been characterized, the entire parcel was assumed to make up the drainage area.
4. For regional project opportunities for which the drainage area had not been characterized, the drainage area characterization (i.e., slope and land use) was approximated.

CCW SWRP Project Opportunity Metrics-Based Multi-Benefit Analysis Scoring

Using the information compiled in the identified project opportunity database, each CCW SWRP identified project received a score using a metrics-based multi benefit analysis. A description of each scored project component is provided below:

- ◆ Parcel area (for regional and parcel-based GI projects only) - This scoring component awarded more points for larger parcels.
- ◆ Slope – This scoring component awarded more points to flatter slopes and is related to ease of construction and implementation.
- ◆ Infiltration feasibility – More points were awarded to projects that overlie infiltrating soils.

- ◆ PCBs/mercury yield classification in project drainage area – This scoring component is related to the influent TMDL pollutant loads; higher potential load reduction achieved higher points.
- ◆ Removes pollutant loads from stormwater – Points were awarded to facilities designed as GI or treatment control facilities for this scoring component.
- ◆ Augments water supply – Increasing points were awarded based on potential water supply provided for this scoring component.
- ◆ Provides flood control benefits – Flood control facilities received points specific to providing flood control benefits for this scoring component.
- ◆ Re-establishes natural water drainage systems or develops, restores, or enhances habitat and open space – Hydromodification control, stream restoration, and habitat restoration projects received points specific to providing these environmental benefits, for this scoring component.
- ◆ Provides community enhancement and engagement – Projects that specifically provide public use areas or public education components with potential opportunities for community engagement and involvement were given points specific to providing community benefits, for this scoring component.

All classified and scored CCW SWRP projects were compiled into a master database as part of the CCW SWRP and organized by Permittee. The CCW SWRP identified projects located within the City's jurisdictional boundary and provided to the City for review. The project classification information and CCW SWRP score were provided to the City for informational purposes.

3.2 Maps and Project Lists

The CCW SWRP is a watershed-based plan that contains a list of stormwater management project opportunities which, if implemented, will help improve water quality and may provide additional benefits such as flood control, habitat restoration, community enhancement, and groundwater recharge, where possible.

Through the CCW SWRP preliminary ranking process, 184 potential locations were identified and reviewed. Projects could score up to a maximum of 20 points based on the criteria previously described. The lowest scoring projects earned 10 points and the highest scoring projects earned 14.5 points out of a possible 20 points.

The City used the CCW SWRP scores as a foundation for ranking the top fifteen projects, which range from scores of 11 to 14.5 as listed in the following Table 6 below. These parcels are shown on the City of Brentwood SWRP Parcels map in Appendix A. Some of the parcels have high GI potential, but are not owned or maintained by the City.

Additionally, the CCW SWRP Project Public Viewer has been made available to the public here:

<https://cccwp.maps.arcgis.com/apps/webappviewer/index.html?id=f0facb60b3da4b28b5622b31913e4893>

Table 6. CCW SWRP Ranked Projects

Rank No.	Potential Project Location
1	Police Department, parking lot project
2	Brentwood Boulevard Widening North – Phase II
3	Vacant lot, Lone Tree Way & Tilton Ln, Brentwood Union School District
4	Steeplechase Park, retrofit
5	Detention basin on Fairview Ave at UPRR
6	Brentwood Union School District office, Guthrie Ln, retrofit parking lot
7	McClarren Park, retrofit
8	Community Center parking lot, retrofit
9	BART bus area on Walnut Blvd, retrofit
10	Trail & landscaping along UPRR, Lone Tree Way to Neroly Rd, retrofit
11	Trail & landscaping along Neroly Rd, east of O’Hara Ave, retrofit
12	Hansen Ln ROW, retrofit
13	Detention basin near Apple Hill Park
14	Brentwood Blvd Widening North – Phase III
15	Brentwood Boulevard Widening – South

4 Early Implementation Projects

4.1 Review of Capital Improvement Projects

MRP Provision C.3.j.ii. requires that the City must prepare and maintain a list of public and private GI projects planned for implementation during the 2015-2020 permit term, and public projects that have potential for GI measures. The City submitted an initial list with the FY 15-16 Annual Report to the RWQCB and updated the list in the FY 16-17 and FY 17-18 Annual Reports.

The creation and maintenance of this list is supported by guidance developed by BASMAA: “Guidance for Identifying Green Infrastructure Potential in Municipal Capital Improvement Projects” (May 6, 2016). The BASMAA Guidance is attached to this document as Appendix D.

“The City submitted an initial project list with the FY 15-16 Annual Report, and updated the list in the FY 16-17 and FY 17-18 Annual Reports.”

4.2 List of Projects Identified

CIP projects with GI potential that were identified during 2015-2019 are listed in Table 7, along with their status.

Table 7. CIP Projects with Green Infrastructure Potential (identified 2015-2019)

Project Name	Description	Potential Tributary Impervious Area (SF)	Project Status/Completion	Included in Green Infrastructure Plan (Y/N)
Brentwood Blvd Widening North - Phase I	Widen Brentwood Blvd to include 4 lanes, 2 bike lanes, curb & gutters, medians, and sidewalk	~100,800	Planning / TBD	Y
PA-1 Infrastructure Improvements	Replace Heidorn Ranch Road with two lane arterials street section between Old Sand Creek Road and East Bay Municipal Utility District and extend Jeffery Way from Amber Lane to Empire Avenue.	~226,600	Planning & Design / 2022	Y
Amphitheater	Construct an amphitheater at Marsh Creek	TBD	Planning / 2023	Y

5 Tracking and Mapping Public and Private Projects Over Time

5.1 Results

The CCCWP has developed a county-wide GIS platform for maintaining, analyzing, displaying, and reporting relevant municipal stormwater program data and information related to MRP Provisions C.10 (trash load reduction activities) and C.11/C.12 (mercury and PCBs source property identification and abatement screening activities). This tool is also used to track and report on GI project implementation.

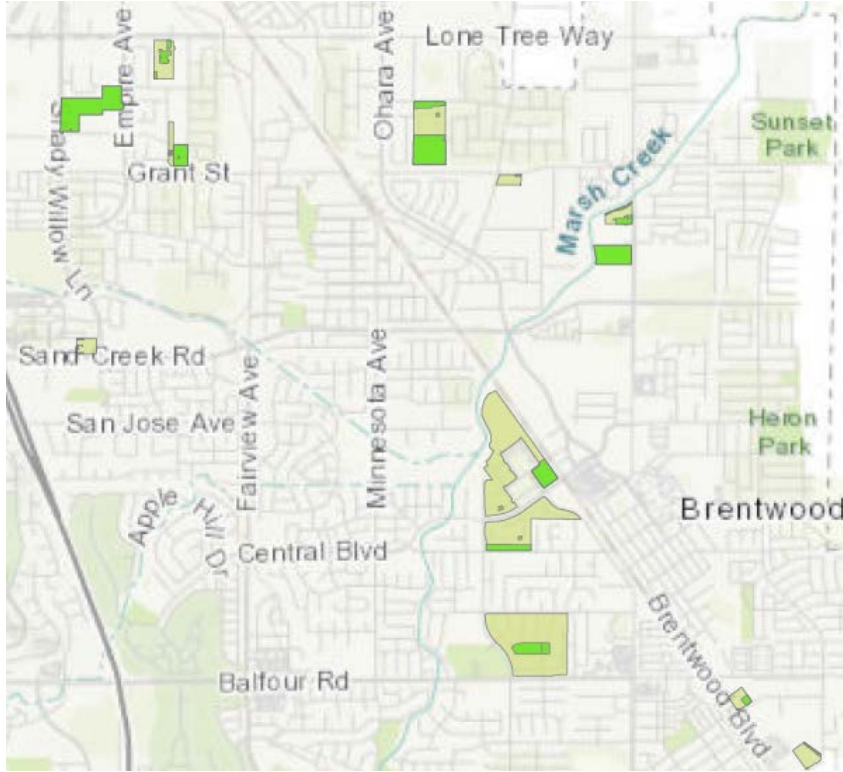
The CCCWP's stormwater GIS platform features web maps and applications created using ESRI's ArcGIS Online ("AGOL") for Organizations environment, which accesses GIS data, custom web services and reports that are hosted within an Amazon cloud service running ESRI's ArcGIS Server technology.

The *C.3 Project Tracking and Load Reduction Accounting Tool* within the CCCWP AGOL system is used to track and report on GI project implementation. It is currently used to track and map existing private and public projects incorporating GI; in the future it may also be used to map planned projects and will allow for ongoing review of opportunities for incorporating GI into existing and planned CIPs. The AGOL system can be used to develop maps that can be displayed on public-facing websites or distributed to the public. These maps can be developed to contain information regarding the GI project data input into the AGOL system.

The *C.3 Project Tracking and Load Reduction Accounting Tool* is intended to be used to allow for estimates of potential project load reduction for PCBs and mercury and presently supports the BASMAA Interim Accounting Methodology for certain load reduction activities. In the future, the tool is planned to be updated with the RAA methodology developed for the County. That functionality is planned to be active by the end of the current permit term.



The City actively engages with the AGOL tool and maintains up-to-date project data. The City currently conducts updates of the AGOL tool at an annual frequency. Below is a snapshot of a current AGOL output.



6 Design Guidelines and Specifications

6.1 Guidelines for Streetscape and Project Design

The City's PW Engineering Division shall provide general design resources to assist with the integration of GI facilities into the public ROW. Staff, designers, and developers are encouraged to reference the National Association of City Transportation Officials *Urban Street Stormwater Guide*, the San Mateo County *Sustainable Green Streets and Parking Lots Design Guidebook*, and other resources from the CCCWP website in designing ROW improvements with integrated stormwater management features.

For parcel-based development, both public and private, project designers and developers should refer to the most recent edition of the CCCWP *Stormwater C.3 Guidebook* for stormwater management requirements and general design guidelines.

6.2 Specifications and Typical Design Details

All GI features and facilities must be designed and constructed in accordance with the applicable specifications and criteria in the CCCWP *Stormwater C.3 Guidebook*. Staff will create City-specific typical details and specifications for the GI facilities and elements that are most relevant for Brentwood: slope-sided bioretention facilities, planter-box bioretention facilities, curb cut inlets, concrete check dams, and permeable pavers.

See the City website for the most up-to-date City typical details and specifications. LIDI Bioretention Standard Details and Specifications, which were developed with funding support from California Stormwater Quality Association ("CASQA") Proposition 84 Grant, will be used as the basis for the City standards. Additional typical details and specifications, as may be needed for design of ROW improvement projects, may be adapted from the Central Coast LIDI *Bioretention Standard Details and Specifications*, Appendix B of the SFPUC *Stormwater Requirements and Design Guidelines*, or other resources compiled by the CCCWP and available through the CCCWP website, subject to approval by the City Engineer.

Moving forward, the City supports regional standardization of GI typical details and specifications to facilitate cross-jurisdictional simplicity and consistency. At this time there are no Countywide standards. Should a



countywide interagency process be convened by the CCCWP to promote consistency in the design and construction of GI facilities, the City will:

- ◆ Share with other Contra Costa municipalities, through the CCCWP, plans and specifications developed for GI projects.
- ◆ Share lessons learned and best practices via interagency workshops and meetings.
- ◆ Participate in the evaluation and recommendation of typical design details and specifications for GI, with the goal of advancing countywide consistency, cost-efficiency, and quality of GI facilities.
- ◆ Provide comments on a countywide “Green Infrastructure Design Guide” to assist with project identification, evaluation, and design.
- ◆ Consider superseding City standards with the Countywide standards.

6.3 Sizing Requirements

MRP Provision C.3.d contains criteria for sizing stormwater treatment facilities. Facilities may be sized on the basis of flow, volume, or a combination of flow and volume. The adoption of the 2009 MRP allowed for an additional option, where “treatment systems that use a combination of flow and volume capacity shall be sized to treat at least 80% of the total runoff over the life of the project, using local rainfall data.” This option can also be used to develop sizing factors for facilities with a standard cross-section (i.e. where the volume available to detain runoff is proportional to facility surface area). To calculate sizing factors, inflows, storage, infiltration to groundwater, underdrain discharge, and overflows are tracked for each time-step during a long-term simulation. The continuous simulation is repeated, with variations in the treatment surface area, to determine the minimum area required for the facility to capture and treat 80% of the inflow during the simulation.

The City uses the sizing guidelines generated by the BASMAA report, *Guidance for Sizing Green Infrastructure Facilities in Street Projects*. See Appendix D.

The City of Brentwood is committed to incorporating GI facilities in future development and infrastructure retrofits in order to move away from existing “gray” infrastructure. The City will collaborate with fellow Contra Costa permittees in the pursuit of funding and project opportunities that enable GI development. Note that private (re)development must cover the costs of GI facilities and NPDES permit compliance within their own budgets. The

following discussion of GI funding is specific to City projects on publicly-owned parcels and/or the public ROW.

Existing Permittee Resources

Currently the City has a Combined Community Facilities District (CCFD) that collects a Stormwater NPDES assessment. The funds from the assessment are not sufficient to cover all of the costs related to the implementation of the NPDES permit; therefore, the NPDES program is supplemented by the City's General Fund.

However, the City's General Fund will not be able to cover the additional expected expense for GI as part of public (re)development of public priority parcels and ROW in Brentwood. The City does not anticipate proposing a new tax or fee on residents for GI construction. Therefore, the City will rely on funding from outside sources for any implementation of GI beyond the requirements outlined in Provision C.3.b of the MRP.

7 Funding Options

The City of Brentwood is committed to incorporating GI facilities in future development and infrastructure retrofit projects in order to move away from existing “gray” infrastructure. The City will collaborate with fellow Contra Costa County permittees in the pursuit of funding and project opportunities that enable GI. Note that private development must cover the costs of GI facilities and NPDES permit compliance within their own budgets. The following discussion of GI funding is specific to City projects on publicly-owned parcels and/or the public ROW.

7.1 Funding Strategies Developed Regionally

The City plans to seek grant funding for public parcel-based and ROW projects through various sources. Current State funding opportunities for projects that incorporate GI facilities include Prop 1 (2014) – the “Water Quality, Supply, and Infrastructure Improvement Act of 2014” and Prop 68 (2018) – the “California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access for All Act of 2018.”

Additional potential funding opportunities for projects which may incorporate GI facilities within City ROW include the Greenhouse Gas Reduction Fund from State Cap-and-Trade proceeds. However, many funding sources for ROW projects include many specific requirements, such as a projected reduction in vehicle miles travelled or the inclusion of specific safety improvements. Such requirements may limit the opportunities to incorporate GI; however, City staff will continuously review projects and outside funding sources to include GI features whenever possible.

Grant funding opportunities are summarized in Table 8. Many of these opportunities were drawn from the Roadmap of Funding Solutions for Sustainable Streets Report produced by the Regional Roundtable on Sustainable Streets, convened by BASMAA in 2017, as well as summary reports produced by the California Natural Resources Agency.

Table 8 will be consulted as part of the funding evaluations for priority CIP projects, but does not require the City to apply for these funds. The City will utilize other local and regional funding opportunities and will seek out additional funding opportunities as needed.

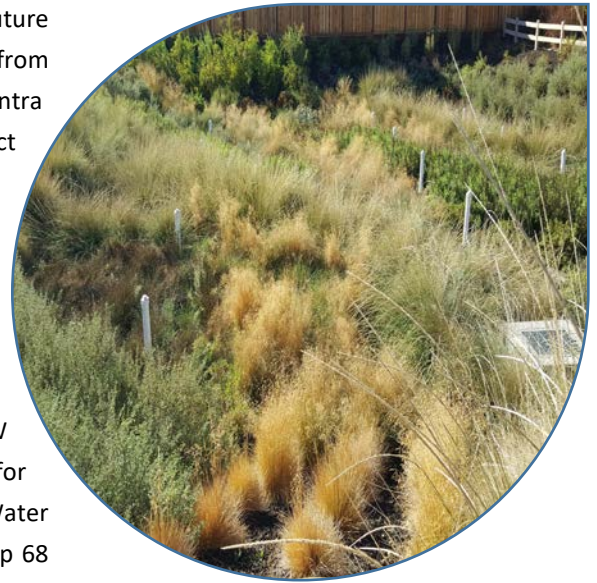


Table 8. Grant Programs to Fund Public GI Project Implementation

Grant Program	Administering Agency	Funding Source	Match Requirements	Example Project
One Bay Area Grant (OBAG) Program	MTC/ABAG	Surface Transportation Block Grant Program, Congestion Mitigation and Air Quality Improvement	11.47% Locally-funded design is highly encouraged.	ROW projects that incorporate GI as part of streetscape/safety improvement.
Active Transportation Program	CTC (California Transportation Commission)	Multiple (Federal and State)	Not Required by CTC. MTC requires 11.47%	ROW projects that incorporate GI as part of streetscape/safety improvement.
Transportation Development Act Article 3	Contra Costa County via MTC/ABAG	TDA (State)	Not Required	ROW projects that incorporate GI as part of streetscape/safety improvement.
Transportation for Livable Communities	Contra Costa County via MTC/ABAG	Measure J	Not Required	ROW projects that incorporate GI as part of bicycle and pedestrian facilities
Safe Routes to School	Contra Costa County via MTC/ABAG	Congestion Mitigation and Air Quality Improvement (Federal)	Not required	ROW projects that incorporate GI as part of pedestrian safety improvements.
Transportation for Clean Air (TFCA)	Bay Area Air Quality Management District	TFCA Regional Fund (State)	10% of total eligible project costs.	ROW projects that incorporate GI as part of new bicycle facilities.
Pedestrian, Bicycle and Trail Facilities	Contra Costa County	Measure J (local)	Not Required	ROW projects that incorporate GI as part of bicycle and pedestrian facilities.
Stormwater Grant Program (SWGP) – Implementation Grants	Stormwater Resources Control Board	Prop 1 (State)	Min. 50%	Multi-benefit projects that include GI.
Integrated Regional Water Management Implementation Grants	Department of Water Resources	Prop 1 (State)	Min. 50%	Multi-benefit projects that include GI.
Proposition 1	State Coastal Conservancy	Prop 1 (State)	Not Required	Multi-benefit projects that include GI.
Urban Greening Grant Program	CNRA	Cap-and-Trade (State)	Not Required	Multi-benefit projects that include GI.
San Francisco Bay Water Quality Improvement Grants	US Environmental Protection Agency	Multiple (Federal)	Min 50%	Multi-benefit Projects that include GI.
Cultural Community & Natural Resources	CNRA	Prop 68 (State)	Not Required	Projects that enhance park, water, and natural resources and/or develop community resources
Green Infrastructure Program	CNRA	Prop 68 (State)	Not Required	Multi-benefit Projects that include GI.
California River Parkways	CNRA	Prop 68 (State)	Not Required	River parkway projects that provide public access along creeks.

Environmental Enhancement and Mitigation	CNRA	Prop 68 (State)	Not Required	Projects that incorporate GI to mitigate negative impacts of transportation projects
California Trails and Greenway Investments	CNRA	Prop 68 (State)	Unclear	Projects that incorporate GI with trails
Urban Stormwater and Waterways Improvement Program	CNRA	Prop 68 (State)	Unclear	Multi-benefit projects that address urban flooding and include GI.

The Roadmap of Funding Solutions for Sustainable Streets produced by BASMAA’s Regional Roundtable compiled a list of key challenges that may constrain the City’s ability to utilize grant funding sources:

- ◆ **Ineligible components:** Grant funding might not cover certain project components, e.g. transportation grants might not cover the cost of GI facilities and water quality grants might not cover the cost of transportation facilities.
- ◆ **Ineligible activities:** Grant funding might not cover all project phases, e.g. planning or maintenance.
- ◆ **Matching funds constraints:** Constraints on federal, state, and local eligible matching funds can limit the City’s ability to fund a project due to lack of available General Funds or in-kind match.
- ◆ **Lack of funding cycle coordination:** Corridor projects—such as the ROW priorities identified by the City—are large projects that typically require multiple funding sources with different grant application, administration, and completion schedules.
- ◆ **Grant application requirements:** Limited staff capacity in PW (the Department responsible for securing grant funding) limits the number of grants that staff can pursue at a given time.
- ◆ **Grant administration requirements:** Limited staff capacity in PW (the Department responsible for grant management) limits the number of grants that staff can manage at a given time.
- ◆ **Counterproductive scoring mechanisms:** Most competitive grant applications incorporate cost-effectiveness as a key criterion; however, most multi-benefit projects incur significant costs because of the intent to create holistic improvements.

7.2 Local Funding Strategies

The City may evaluate instituting in-lieu fees and/or local alternative compliance for certain types of projects to fund the development of non-regulated GI facilities in public projects located in other regions of the City. No in-lieu fee program will be developed until further analysis has been completed; however, in concept, a potential in-lieu fee would be applied to development within hillside regions and in potentially contaminated lands, where it has been determined that GI facilities may cause a safety or water quality concern. Such an in-lieu fee would fund the developer's "fair share" of GI facility development within the City. The intent is to levy a fee that is approximately equal to what it would have cost to develop the appropriate GI facilities on the proposed project site. The exact value of such a fee is yet to be determined.

7.3 Potential Future Regional Funding Strategy

The cities of Brentwood, Antioch, and Oakley (in conjunction with cities across the Bay Area) are proposing to research the feasibility of a water quality trading/banking system. Water quality credit trading and banking systems have been developed across the country as a way to reduce overall compliance costs of reducing pollutant sources within a watershed. Credit trading/banking systems are based on the fact that the cost of controlling pollutant sources may vary substantially depending on the location within a watershed. Trading systems enable locations facing higher pollution control costs to meet regulatory obligations by purchasing environmentally equivalent (or superior) pollution reductions from another source at a lower cost. Establishing a credit banking/trading or alternative compliance system will be very complex with many different legal, regulatory, and political matters to resolve before a program can be implemented. The City will actively investigate the viability of these regional systems as a potential funding source for GI facilities in the City.

8 Adaptive Management

8.1 Process for Plan Updates

The City will amend or update this GI Plan as required by the RWQCB. Plan revisions may include updates of implemented public and private GI projects, as well as public GI projects identified for future implementation. As significant changes occur, the City may choose to update the GI Plan to reflect the changing environment; otherwise, all changes relevant to GI implementation will be incorporated directly into internal policies and procedures.

The City will employ adaptive management techniques to assess City policies, procedures, and decision processes to allow for continual improvement in GI Plan implementation. This learn-implement-evaluate-adjust approach is appropriate for contexts with considerable uncertainty. Identified uncertainties of the GI Plan include:

- ◆ funding sources and amounts;
- ◆ costs of GI implementation (labor, materials, and maintenance);
- ◆ rates of private (re)development;
- ◆ NPDES permit requirements;
- ◆ changing community concerns and priorities;
- ◆ infrastructure existing conditions; and
- ◆ new technologies.

As projects are identified and built, the City will evaluate project performance, identify internal and external barriers to implementation, document best practices and lessons learned, and adjust for future implementation. This approach will lead to continual improvement and revisiting of the GI Plan, along with an evolving list of potential projects.

8.2 Pursuing Future Funding Sources

Two key areas will greatly influence implementation of the City's GI Plan:

1. Future Funding Sources
2. Rates of (Re)Development



8.2.1 Future Funding Sources

Due to California Proposition 13, Proposition 218, and Proposition 26, the City does not currently have the ability to independently raise taxes to implement the projects identified in the GI Plan. In 2012, Contra Costa County Permittees put forth a ballot measure to establish a tax in Contra Costa to help with the compliance costs of the NPDES permit; however, this measure failed. The City will continue to evaluate the feasibility to raise funds for the implementation of this Plan through grant sources, fees, or other means. However, until an established funding source can be identified, the City cannot commit to implementation of public projects beyond those identified for completion by 2020 in Section 3.1.

8.2.2 Rates of (Re)Development

The City of Brentwood has no control over the location and timeline for private (re)development in the City. The City will encourage (re)development when applicable, while following all federal, state, and local laws. Due to the limited control over (re)development, the projects and timelines listed in Section 4.1 are projections only, with no implied City commitment to their (re)development.

The City will ensure that all projects regulated under Provision C.3.b, or any other future provisions, will comply with the City's NPDES permit. As rates of development change, and projects are implemented, the City may choose to update the private project list to reflect the current situation. The City envisions this update to occur through the AGOL tool discussed in Section 5.1.

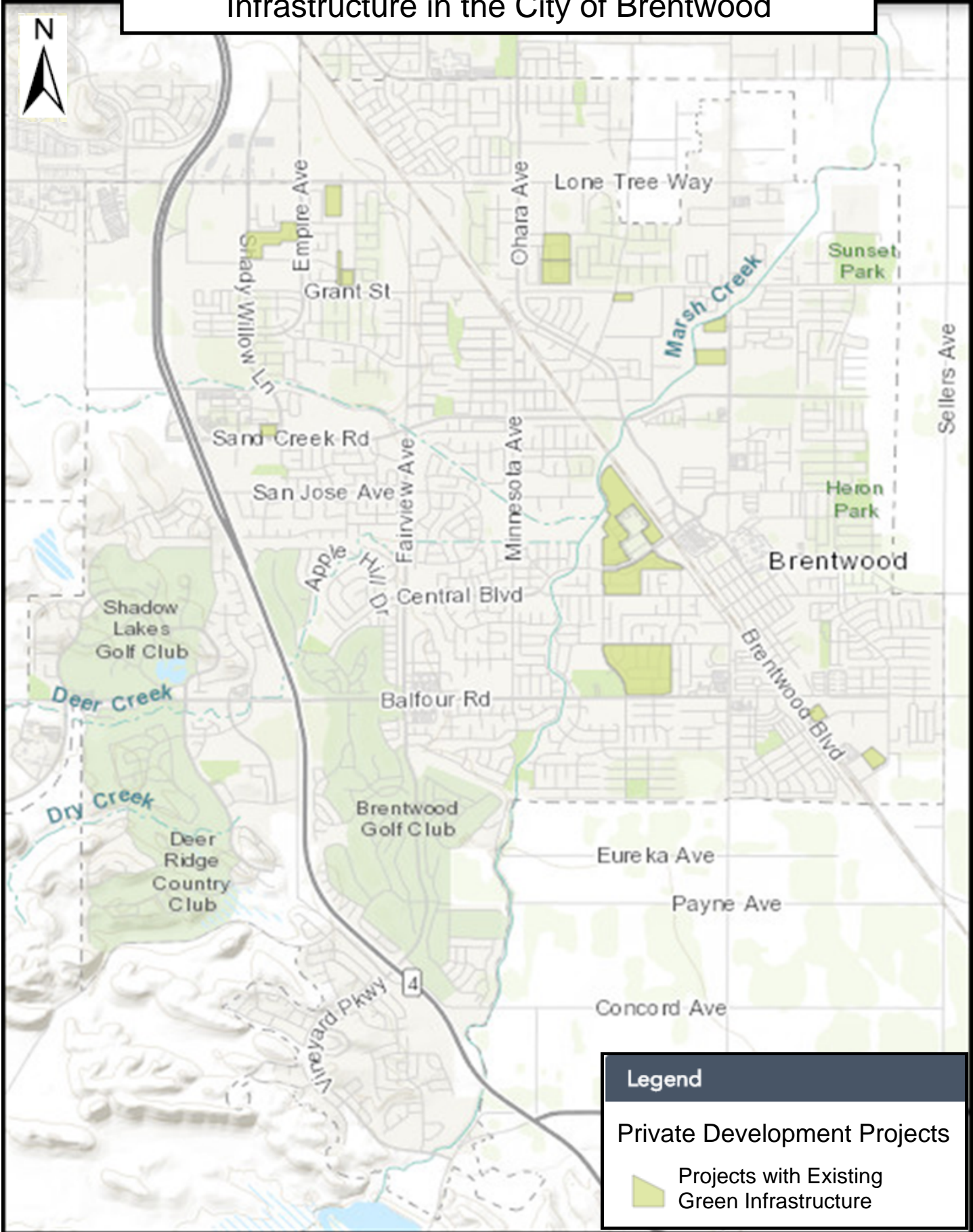
8.3 Future Considerations

The City could further evaluate and prioritize GI projects based on other considerations including potential impervious area capture, location, potential to address multiple needs and integrate with other infrastructure improvements, interest levels from stakeholders and community groups, and availability of funding.

The City could further evaluate private property incentive programs to encourage GI implementation outside of publicly-owned parcels, particularly for parking lots, but also for other privately-owned properties (e.g., residential downspout disconnections, rain barrels, and rain gardens).

Periodically, City Staff should review and, if necessary, update the City's Green Infrastructure Plan in response to changes in the City's NPDES Permit or other changes.

ArcGIS Online Output Map of Existing Green Infrastructure in the City of Brentwood



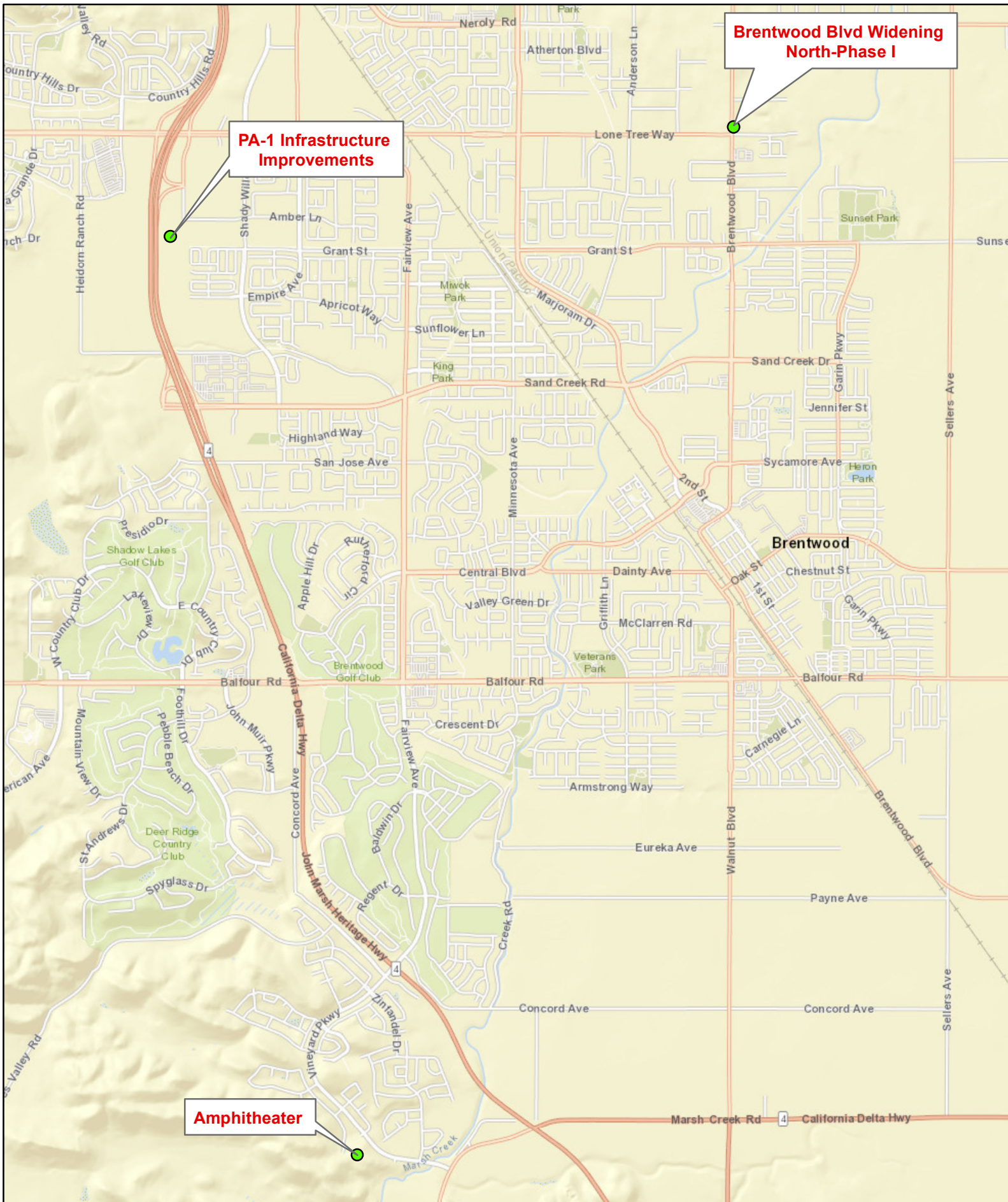
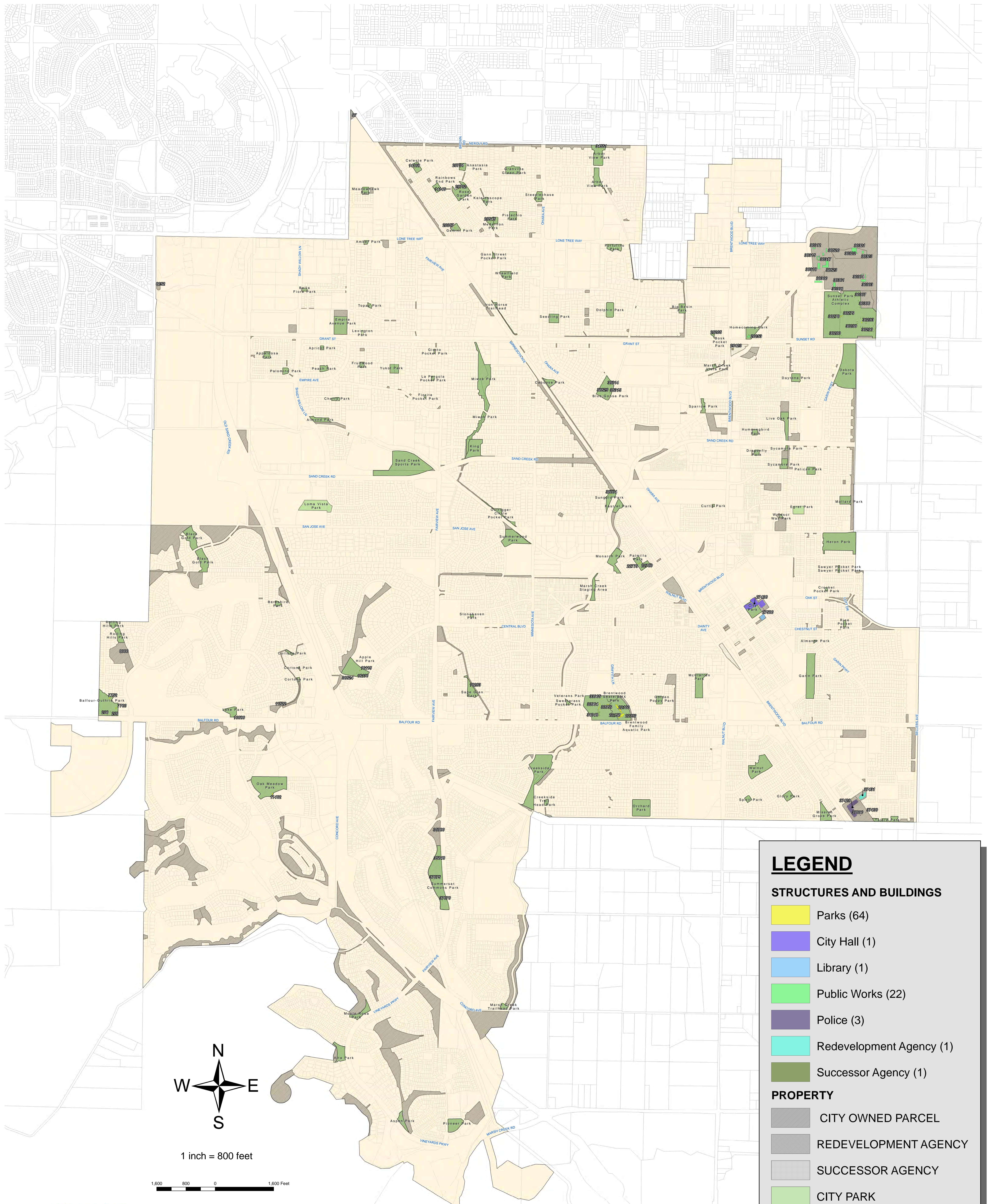


Figure - Potential Green Infrastructure CIP Projects

CITY OWNED PARCELS AND STRUCTURES



LEGEND

STRUCTURES AND BUILDINGS

- Parks (64)
- City Hall (1)
- Library (1)
- Public Works (22)
- Police (3)
- Redevelopment Agency (1)
- Successor Agency (1)

PROPERTY

- CITY OWNED PARCEL
- REDEVELOPMENT AGENCY
- SUCCESSOR AGENCY
- CITY PARK

Date Printed: 11/23/2020

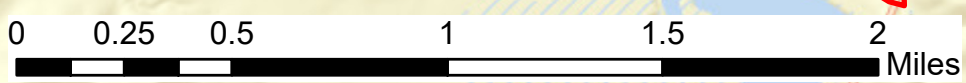
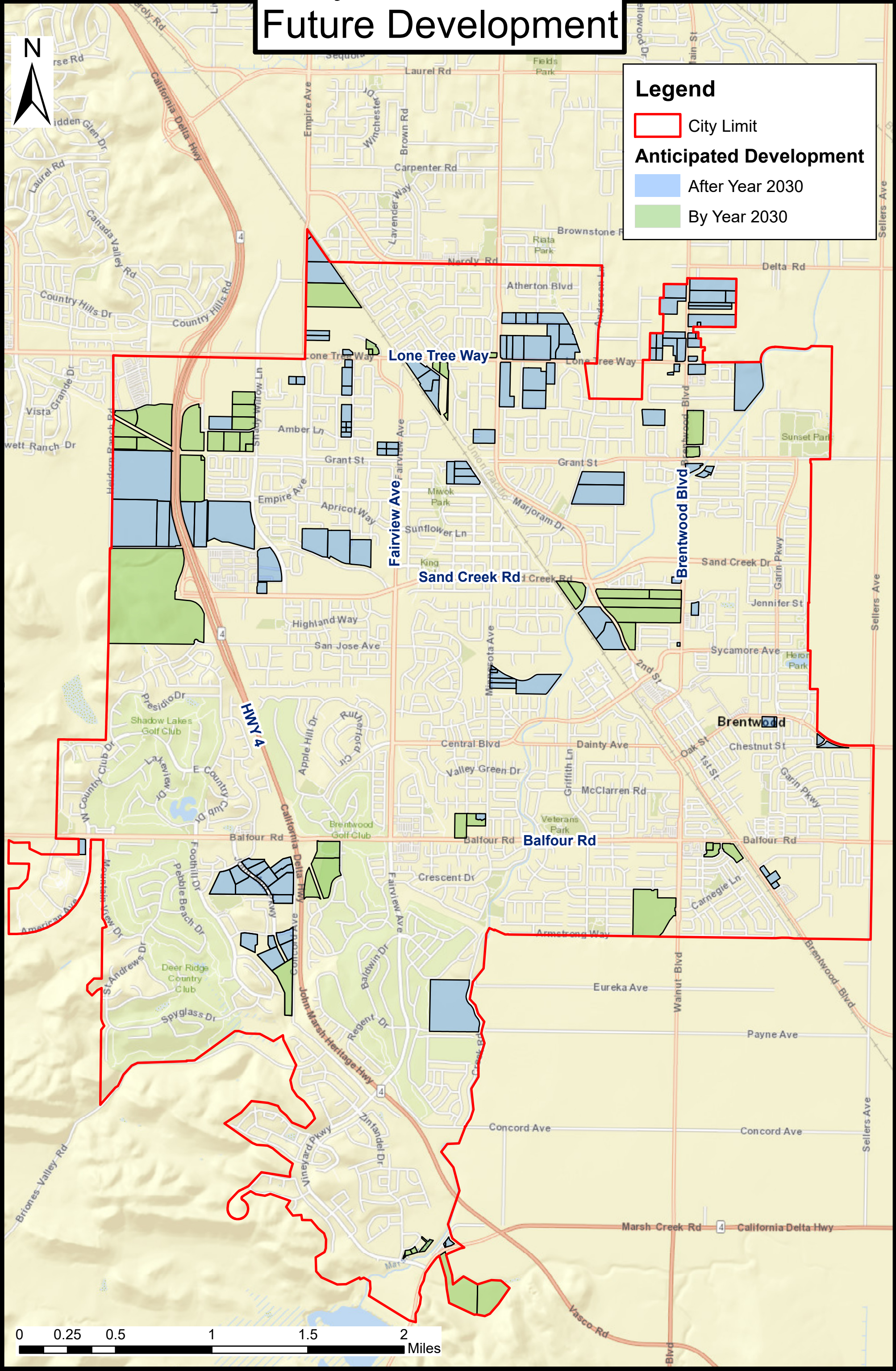


City of Brentwood Future Development



Legend


- City Limit
- Anticipated Development**
 - After Year 2030
 - By Year 2030

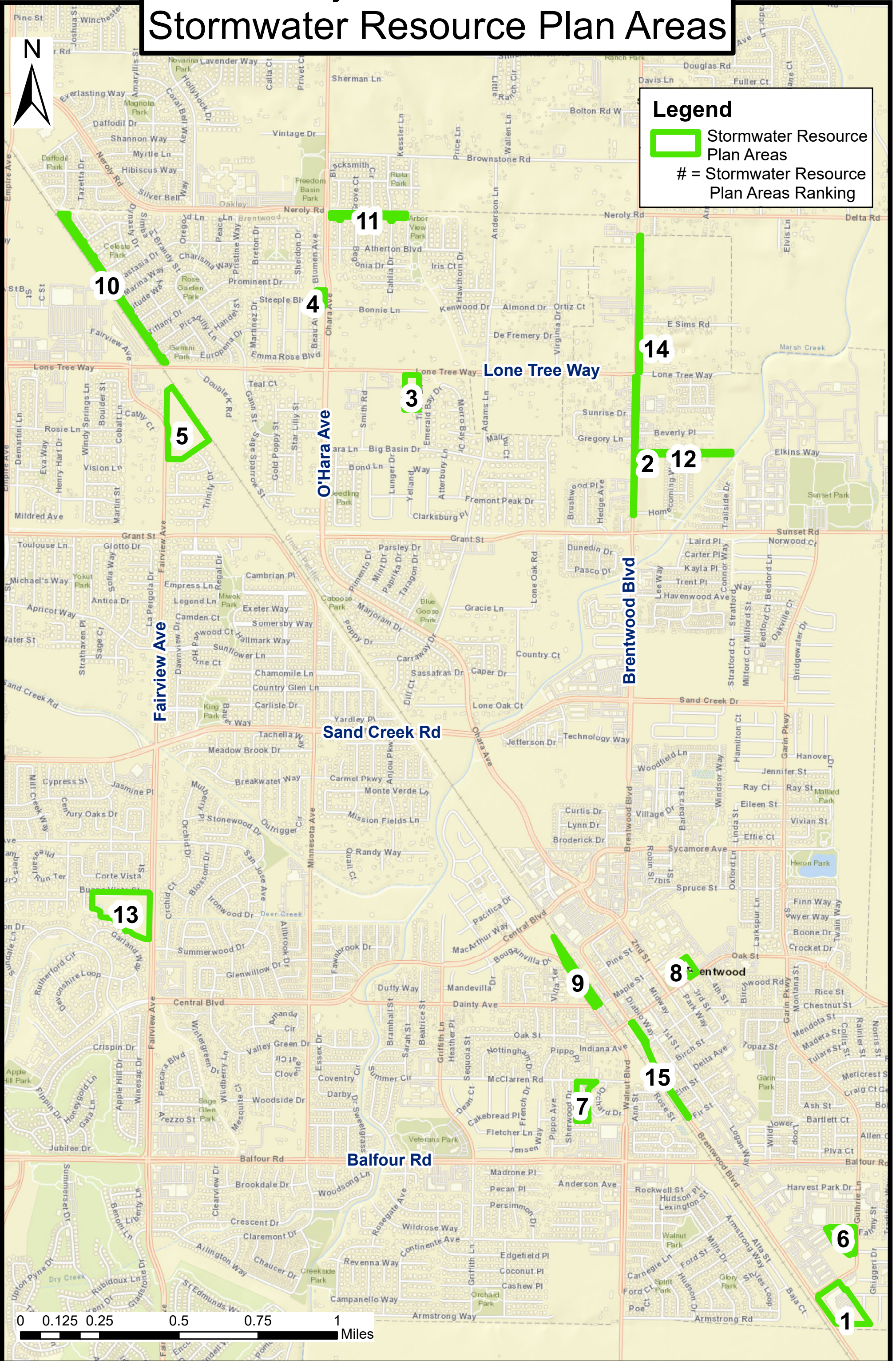


Stormwater Resource Plan Areas



Legend

-  Stormwater Resource Plan Areas
- # = Stormwater Resource Plan Areas Ranking



Brentwood Municipal Code

[Up](#)
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[Next](#)
[Main](#)
[Collapse](#)
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[Title 14 WATER](#)

Chapter 14.20 STORMWATER MANAGEMENT AND DISCHARGE CONTROL

14.20.010 Intent and purpose.

A. The intent of this chapter is to protect and enhance the water quality in the city of Brentwood's watercourses pursuant to, and consistent with the Porter-Cologne Water Quality Control Act (Water Code Section 13000 et seq.) and the Federal Clean Water Act (33 U.S.C. Section 1251 et seq.).

B. This chapter also carries out the conditions in the city's national pollutant discharge elimination system (NPDES) permit that require implementation of appropriate source control and site design measures and stormwater treatment measures for development projects.

C. It is the purpose of the city council in enacting this chapter to protect the health, safety and general welfare of Brentwood's citizens by:

1. Minimizing non-stormwater discharges, whose pollutants would otherwise degrade the water quality of local streams, to the stormwater system.
2. Minimizing increases in nonpoint source pollution caused by stormwater runoff from development that would otherwise degrade local water quality.
3. Controlling the discharge to the city's stormwater system from spills, dumping or disposal of materials other than stormwater.
4. Reducing stormwater run-off rates and volumes and nonpoint source pollution whenever possible, through stormwater management controls and ensuring that these management controls are properly maintained and pose no threat to public safety. (Ord. 929 § 2, 2014)

14.20.020 Definitions.

The following words and phrases when used in this chapter shall be as defined herein. Words and phrases in this chapter and not otherwise defined shall be interpreted as defined in the regulations issued by the U.S. Environmental Protection Agency to implement the provisions of the Federal Clean Water Act, and as defined by the State Water Resources Control Board to implement the Porter-Cologne Act:

“Best management practices” or “BMPs” are structural devices, measures, stormwater management facilities, activities, prohibitions, or practices; general good housekeeping, pollution prevention practices, maintenance procedures, and other management practices, to prevent or reduce the discharge of pollutants directly or indirectly to watercourses, water bodies, and wetlands.

“City's NPDES permit” shall mean the NPDES permit issued to the city of Brentwood [Permit No. CAS083313] and any subsequent amendment, reissuance or successor to this NPDES permit.

“Development runoff requirements” shall mean the provisions in the city's NPDES permit that contain performance standards to address both the construction and post-construction phase impacts of new projects and redeveloped projects on stormwater quality.

“Director” shall mean the public works director of the city of Brentwood or designee.

“Enforcement officer or officer” shall mean those individuals designated by the director to act as authorized enforcement officers.

“Guidebook” shall mean the most recent version of the Contra Costa Clean Water Program Stormwater C.3. Guidebook.

“Non-stormwater discharge” is any addition of any pollutant to the city's stormwater system, except discharges pursuant to a NPDES permit, or discharges further exempted in Section 14.20.060(C) and (D) of this chapter.

“Pollutant” shall mean any material other than stormwater including, but not limited to, petroleum products or by-products, solid waste, incinerator residue, sewage, sewage sludge, heat, chemical waste, biological materials, radioactive materials, wrecked or discarded equipment, rock, sand, soil and industrial, municipal or agricultural waste discharged into the water or stormwater system.

“Premises” shall mean any building, structure, facility, or installation, (including a building’s grounds or other appurtenances), and adjacent sidewalks and parking strips.

“Responsible person” shall mean the owner or occupant of any premises or who engages in any activity from which there is or may be a non-stormwater discharge or any person who releases pollutants to the city’s stormwater system.

“Stormwater” shall mean flow on the surface of the ground resulting from precipitation.

“Stormwater control plan” shall mean a plan that meets those criteria contained in the most recent version of the Contra Costa Clean Water Program Stormwater C.3. Guidebook.

“Stormwater management facility” shall mean any device that utilizes detention, retention, filtration, harvest for reuse, evapotranspiration or infiltration to provide treatment (and/or control volume, flows, and durations) of stormwater for purposes of compliance with development runoff requirements.

“Stormwater system” is that system of facilities by which stormwater may be conveyed to any stream, watercourse, other body of water or wetlands, including flood control channels, any roads with drainage systems, city streets, catch basins, curbs, gutters, ditches, improved channels, storm drains or storm drain system, which are not part of a publicly owned treatment works (“POTW”) as that term is defined in 40 CFR Section 122.2. (Ord. 929 § 2, 2014)

14.20.030 Responsibility for administration.

The director or designee shall administer this chapter for the city. (Ord. 929 § 2, 2014)

14.20.040 Construction and application.

This chapter shall be construed consistent with the requirements of the Federal Clean Water Act and amendments thereto or applicable implementing regulations and the city’s NPDES permit. (Ord. 929 § 2, 2014)

14.20.050 Stormwater control plan required.

A. In accordance with thresholds and effective dates in the city’s NPDES permit, every application for a development project, including, but not limited to, a rezoning, tentative map, parcel map, conditional use permit, variance, site development permit, design review, or building permit that is subject to the development runoff requirements in the city’s NPDES permit shall be accompanied by a stormwater control plan that meets the criteria in the most recent version of the Contra Costa Clean Water Program Stormwater C.3. Guidebook.

B. Implementation of an approved stormwater control plan and submittal of an approved stormwater control operation and maintenance plan by the applicant shall be a condition precedent to the issuance of a certificate of occupancy for a project subject to this section.

C. All stormwater management facilities shall be designed in a manner to minimize the need for maintenance and reduce the chances of failure. Design guidelines are outlined in the Guidebook.

D. All stormwater management facilities shall be maintained according to the Guidebook and the approved stormwater control operation and maintenance plan. The person(s) or organization(s) responsible for maintenance shall be designated in the stormwater control operation and maintenance plan. Unless a different time period is provided for in the plan, those responsible for maintenance shall inspect the stormwater management facility at least annually. The stormwater operation and maintenance plan shall also describe how the maintenance costs will be funded. Upon the failure of a responsible person to maintain a stormwater management facility in accordance with this chapter or the plan, the city may perform the maintenance and recover its costs from the responsible person as provided in Sections 14.20.190 and 14.20.200.

E. For access to stormwater management facilities for inspections and maintenance, recorded covenants or easements shall be provided by the property owner for access by the city, the Contra Costa Mosquito and Vector Control

District, and the Regional Water Quality Control Board. (Ord. 929 § 2, 2014)

14.20.060 Prohibited discharges.

- A. The release of non-stormwater discharges to the city stormwater system is prohibited.
- B. The discharge of stormwater from premises or an activity that causes or contributes to a violation of receiving water limitations in the city's NPDES permit is prohibited.
- C. The following discharges are exempt from the prohibition set forth in subsection A above:
 - 1. Any discharge in compliance with a NPDES permit issued to the discharger.
 - 2. Flows from riparian habitats and wetlands, diverted stream flows, flows from natural springs, rising ground waters, uncontaminated and unpolluted groundwater infiltration, single-family homes' pumped groundwater, foundation drains, and water from crawl space pumps and footing drains, and pumped groundwater from drinking water aquifers.
- D. The following discharges are exempt from the prohibition set forth in subsection A if and only if the discharges are in accordance with conditions including, but not limited to, specific conditions for each type of discharge set forth in Section C.15 of the city's NPDES permit: pumped groundwater from non-drinking-water aquifers; pumped groundwater from other sources, foundation drains, and water from crawl space pumps and footing drains; air conditioning condensate; planned discharges from routine operation and maintenance activities in the potable water distribution system; unplanned discharges from breaks, leaks, overflows, fire hydrant shearing, or emergency flushing of the potable water distribution system; emergency discharges of the potable water distribution system as a result of firefighting, unauthorized hydrant openings, or natural or man-made disasters; individual residential car washing; swimming pool, hot tub, spa, and fountain water discharges, and discharges from irrigation water, landscape irrigation, and lawn or garden watering. (Ord. 929 § 2, 2014)

14.20.070 Discharge in violation of NPDES permit.

Any discharge that would result in or contribute to a violation of the city's NPDES permit either separately considered or when combined with other discharges, is prohibited. Liability for any such discharge shall be the responsibility of the person causing or responsible for the discharge, and such person shall defend, indemnify and hold harmless the city in any administrative or judicial enforcement action relating to such discharge. (Ord. 929 § 2, 2014)

14.20.080 Unlawful discharge and unlawful connections.

- A. It is unlawful to establish, use, maintain or continue unauthorized drainage connections to the city's stormwater system, and to commence or continue any unauthorized discharges to the city's stormwater system.
- B. No discharge shall cause the following conditions, create a nuisance, or adversely affect beneficial uses of waters of the state:
 - 1. Floating, suspended or deposited macroscopic matter or foam;
 - 2. Bottom deposits or aquatic growth;
 - 3. Alterations of temperature, sediment load, nutrient load, or dissolved oxygen, which cause significant adverse impacts to native aquatic biota;
 - 4. Visible, floating, suspended or deposited oil or products of petroleum origin; or
 - 5. Substances present in concentrations or quantities which cause deleterious effects on aquatic biota, wildlife or waterfowl, or which render any of these unfit for human consumption. (Ord. 929 § 2, 2014)

14.20.090 Best management practices and standards.

- A. Generally. Any person owning or operating premises that may contribute pollutants to the city's stormwater system shall undertake best management practices to reduce the potential for pollutants entering the system to the maximum extent practicable. Examples of such premises include, but are not limited to, parking lots, gasoline stations, industrial facilities, and other commercial enterprises. Examples of best management practices include, but are not limited

to, those described in publications by the United States Environmental Protection Agency, the California Water Boards, the California Stormwater Quality Association, the Bay Area Stormwater Management Agencies Association, the Contra Costa Clean Water Program, and the city of Brentwood.

B. Litter. No person shall throw, deposit, leave, keep or permit to be thrown, deposited, placed, left or maintained, any refuse, rubbish, garbage or other discarded or abandoned objects, articles or other litter in or upon any street, alley, sidewalk, business place, creek, stormwater system, fountain, pool, lake, stream, river or any other body of water, or upon any public or private parcel of land so that the same might become a pollutant, except in containers or in lawfully established waste disposal facilities.

C. Sidewalks. The occupant or tenant, or in the absence of occupant or tenant, the owner or proprietor of any real property in front of which there is a paved sidewalk shall maintain said sidewalk free of dirt or litter to the maximum extent practicable. Sweepings from the sidewalk shall not be swept or otherwise made or allowed to go into the gutter or roadway, but shall be disposed of in receptacles maintained as required for the disposal of solid waste. This section constitutes an alternative procedure and shall not limit or restrict the city from the civil, criminal or administrative enforcement of this or other city ordinances in any other matter provided by law.

D. Maintenance of Facilities and Landscaped Areas. Best management practices shall be implemented to minimize the release of pesticides, fertilizers, herbicides, and other related materials used to maintain landscaping and facilities.

E. Parking Lots, Paved Areas and Related Stormwater Systems. Persons owning, operating or maintaining a paved parking lot, the paved areas of a gasoline station, a paved private street or road, and related stormwater systems shall clean those premises as frequently and thoroughly as practicable in a manner that does not result in the discharge of pollutants to the city's stormwater system. The director may require installation and maintenance of devices or facilities to prevent the discharge of trash or other pollutants from private parking lots, streets, roads, and drainage facilities into the storm drain system. Failure or refusal to comply with such requirement is prohibited and shall constitute a violation of this chapter.

F. Construction Activities. All construction projects shall incorporate site-specific BMPs, which can be a combination of BMPs from the California BMP Handbook, Construction, January 2003, the CalTrans Stormwater Quality Handbooks, Construction Site Best Management Practices Manual, March 2003, the San Francisco Bay Regional Water Quality Control Board Erosion and Sediment Control Field Manual, 2002, the city's grading and erosion control ordinance and other generally accepted engineering practices for erosion control as required by the director. The director may establish controls on the rate, volume, and duration of stormwater runoff from new developments as may be appropriate to minimize the discharge and transport of pollutants.

G. Notification of Intent and Compliance with General Permits. Each discharger associated with construction activity or other discharger described in any general stormwater permit addressing discharges, as may be adopted by the United States Environmental Protection Agency, the State Water Resources Control Board, or the California Regional Water Quality Control Board, San Francisco Bay Region [for East County: Central Valley Region], shall provide the director with the notice of intent, comply with and undertake all other activities required by any general stormwater permit applicable to such dischargers. Each discharger identified in an individual NPDES permit relating to stormwater discharges shall comply with and undertake all activities required by the permit.

H. Development Runoff Requirements. For each new development project subject to the development runoff requirements, every applicant will submit a stormwater control plan and implement conditions of approval that reduce stormwater pollutant discharges through the construction, operation and maintenance of treatment measures and other appropriate source control and site design measures. Similarly, increases in runoff volume, flows, and durations shall be managed in accordance with the development runoff requirements.

I. Stormwater Pollution Prevention Plan. The director may require any business or utility in the city that is engaged in activities that may result in non-stormwater discharges or runoff pollutants to develop and implement a stormwater pollution prevention plan, which must include an employee training program. Business activities which may require a stormwater pollution prevention plan include maintenance, storage, manufacturing, assembly, equipment operations, vehicle loading, fueling, vehicle maintenance, food handling or processing, or cleanup procedures, carried out partially or wholly out of doors.

J. Coordination with Hazardous Material Release Response and Inventory Plans. Any business subject to the Hazardous Material Release Response and Inventory Plan, Division 20, Chapter 6.95 of the California Health and Safety Code (commencing with Section 25500), shall include, in that Plan, provision for compliance with this chapter, including

the prohibitions of non-stormwater discharges and the requirement to reduce release of pollutants to the maximum extent practicable. (Ord. 929 § 2, 2014)

14.20.100 Authority to inspect.

A. Generally. Routine or scheduled inspections shall be based upon as reasonable a selection process as may be deemed necessary to carry out the intent of this chapter, including, but not limited to, random sampling or sampling in areas with evidence of stormwater contamination, evidence of the discharge of non-stormwater to the stormwater system, inspection of stormwater treatment and flow-control facilities for proper operation and evidence of routine and corrective maintenance, or similar activities. Inspections may also be conducted in conjunction with routine or scheduled inspections conducted by other public agencies or special districts, including, but not limited to, the Central Contra Costa sanitary district, the Contra Costa County fire protection district, county environmental health department, the Contra Costa mosquito and vector control district, or the Regional Water Quality Control Board. The city council may by resolution establish a schedule of fees for inspections.

B. Authority to Sample and Establish Sampling Devices. With the consent of the owner or occupant, or pursuant to a search or inspection warrant, any officer may establish on any property such devices as are reasonably necessary to conduct sampling or metering operations. During all authorized inspections, the officer may take any sample deemed necessary to aid in the pursuit of the inquiry or in the recordation of the activities on site.

C. Notification of Spills. All persons in charge of the premises or responsible for emergency response for the premises have a responsibility to train premises' personnel and maintain notification procedures to ensure that immediate notification is provided to the city of any suspected, confirmed or unconfirmed release of pollutants creating a risk of non-stormwater discharge into the city stormwater system.

As soon as any person in charge of the premises or responsible for emergency response for the premises has knowledge of any suspected, confirmed or unconfirmed release of non-stormwater discharge entering the city stormwater system, such person shall take all necessary steps to ensure the detection and containment and cleanup of such release and shall notify the city of the occurrence by telephoning the director. This notification requirement is in addition to and not in lieu of other required notifications.

D. Requirement to Test or Monitor. Any officer may require that any person engaged in any activity or owning or operating any premises that may cause or contribute to non-stormwater discharges, undertake such monitoring activities or analysis and furnish such reports as the officer may specify. The burden, including costs of these activities, analysis and reports shall bear a reasonable relationship to the need for the monitoring, analysis and reports and the benefits to be obtained. The recipient of such request shall undertake and provide the monitoring, analysis and reports required. (Ord. 929 § 2, 2014)

14.20.110 Violations.

A. The violation of any provision of this chapter, or failure to comply with any of the mandatory requirements of this article shall constitute a misdemeanor, except that notwithstanding any other provisions of this article, any violation constituting a misdemeanor under this chapter may, at the discretion of the officer or city attorney, be charged and prosecuted as an infraction.

B. Any person required to perform monitoring, analysis, reporting or corrective activity pursuant to this chapter by any officer may be informed of such decision, in writing, by a notice of violation. Any person aggrieved by the decision of the officer, may file a written appeal of the notice of violation to the director within ten days following the date of the notice of violation. Upon receipt of such request, the director shall request a report and recommendation from the officer and shall set the matter for hearing at the earliest practical date. At said hearing, all evidence and testimony deemed relevant and admissible by the director shall be considered, and the director may reject, affirm, or modify the officer's decision. Formal rules of evidence shall not apply. The decisions of the director shall be final. Failure to request a hearing or appear at the hearing shall constitute a waiver and failure to exhaust administrative remedies.

C. In addition to the penalties and procedures provided herein, any condition caused or permitted to exist in violation of any of the provisions of this chapter is a threat to the public health, safety and welfare. Such condition is hereby declared and deemed to be a nuisance, which may be abated as provided in this code, including the assessment of the costs of abatement which may be collected at the same time and in the same manner as ordinary municipal taxes as

provided by Government Code Section 38773.5, and by civil action to abate, enjoin or otherwise compel the cessation of such nuisance by the city attorney. (Ord. 929 § 2, 2014)

14.20.120 Penalty for violation.

A. Upon conviction of a misdemeanor, a person shall be subject to payment of a fine, or imprisonment, or both, not to exceed the limits set forth in California Government Code Section 36901.

B. Upon conviction of an infraction, a person shall be subject to payment of a fine, not to exceed the limits set forth in California Government Code Section 36900. (Ord. 929 § 2, 2014)

14.20.130 Continuing violation.

Every day that any violation of this chapter shall continue shall constitute a separate offense. (Ord. 929 § 2, 2014)

14.20.140 Concealment.

Concealing, aiding or abetting a violation of any provision of this chapter shall constitute a violation of such provision. (Ord. 929 § 2, 2014)

14.20.150 Acts potentially resulting in violation of the Federal Clean Water Act or Porter-Cologne Act.

Any person who violates any provision of this chapter, or the provisions of any permit issued pursuant to this chapter, or who releases a non-stormwater discharge, or who violates any cease and desist order, prohibition or effluent limitation, may also be in violation of the Federal Clean Water Act or the Porter-Cologne Act and may be subject to the enforcement provisions of those acts, including civil and criminal penalties. Any enforcement actions authorized pursuant to this chapter may also include notice to the violator of such potential liability pursuant to federal or state law. (Ord. 929 § 2, 2014)

14.20.160 Civil actions.

A. In addition to any other remedies provided in this chapter, any violation of this chapter may be enforced by civil action brought by the city. In any such action, the city may seek, as appropriate, any and all of the following remedies:

1. A temporary restraining order, preliminary injunction and permanent injunction;
2. An action for an unlawful business practice pursuant to Business and Professions Code Section 17206.

B. In addition any person violating this chapter shall be liable for:

1. Reimbursement for the costs of any investigation, inspection or monitoring which led to the discovery of the violation;
2. Costs incurred in removing, correcting, or terminating the adverse effect(s) resulting from the violation;
3. Compensatory damages for the loss of, or destruction to, water quality, wildlife, fish or aquatic life. Costs and damages under this subsection shall be paid to the city and shall be used exclusively for costs associated with monitoring and establishing a stormwater discharge pollution control system and implementing or enforcing the provisions of this chapter;
4. The cost of maintenance and repair of any BMP or stormwater management facility that is not maintained in accordance with the guidebook or the stormwater control plan;
5. The reasonable costs of preparing and bringing administrative action under this chapter. (Ord. 929 § 2, 2014)

14.20.170 Remedies not exclusive.

The remedies identified in this chapter are in addition to, and do not supersede or limit, any and all other remedies, administrative, civil or criminal. The remedies provided for herein shall be cumulative and not exclusive. (Ord. 929 § 2,

2014)

14.20.180 Fee.

All fees associated with this chapter shall be set forth in the city's master fee schedule as adopted by the Brentwood city council. (Ord. 929 § 2, 2014)

14.20.190 Enforcement officer.

For the purpose of Section 1.08.030 of this code, the city manager has designated code enforcement officers as enforcement officers. (Ord. 929 § 2, 2014)

14.20.200 Judicial review.

The provisions of Code of Civil Procedure Section 1094.5 are applicable to judicial review of determinations made by the director pursuant to this chapter. (Ord. 929 § 2, 2014)

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BASMAA Development Committee

Guidance for Identifying Green Infrastructure Potential
in Municipal Capital Improvement Program Projects
May 6, 2016**Background**

In the recently reissued [Municipal Regional Stormwater Permit](#) (“MRP 2.0”), Provision C.3.j. requires Permittees to develop and implement Green Infrastructure Plans to reduce the adverse water quality impacts of urbanization on receiving waters over the long term. Provisions C.11 and C.12 require the Permittees to reduce discharges of Mercury and PCBs, and portion of these load reductions must be achieved by implementing Green Infrastructure. Specifically, Permittees collectively must implement Green Infrastructure to reduce mercury loading by 48 grams/year and PCB loading by 120 grams/year by 2020, and plan for substantially larger reductions in the following decades. Green Infrastructure on both public and private land will help to meet these load reduction requirements, improve water quality, and provide multiple other benefits as well. Implementation on private land is achieved by implementing stormwater requirements for new development and redevelopment (Provision C.3.a. through Provision C.3.i.). These requirements were carried forward, largely unchanged, from MRP 1.0.

MRP 2.0 defines Green Infrastructure as:

Infrastructure that uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems that mimic nature by soaking up and storing water.

In practical terms, most green infrastructure will take the form of diverting runoff from existing streets, roofs, and parking lots to one of two stormwater management strategies:

1. Dispersal to vegetated areas, where sufficient landscaped area is available and slopes are not too steep.
2. LID (bioretention and infiltration) facilities, built according to criteria similar to those currently required for regulated private development and redevelopment projects under Provision C.3.

In some cases, the use of tree-box-type biofilters may be appropriate¹. In other cases, where conditions are appropriate, existing impervious pavements may be removed and replaced with pervious pavements.

In MRP 2.0, Provision C.3.j. includes requirements for Green Infrastructure planning and implementation. Provision C.3.j. has two main elements to be implemented by municipalities:

1. Preparation of a Green Infrastructure Plan for the inclusion of LID drainage design into storm drain infrastructure on public and private land, including streets, roads, storm drains, etc.
2. Early implementation of green infrastructure projects (“no missed opportunities”),

This guidance addresses the second of these requirements. The intent of the “no missed opportunities” requirement is to ensure that no major infrastructure project is built without assessing the opportunity for incorporation of green infrastructure features.

Provision C.3.j.ii. requires that each Permittee prepare and maintain a list of green infrastructure projects, public and private, that are already planned for implementation during the permit term (not including C.3-regulated projects), and infrastructure projects planned for

¹ Standard proprietary tree-box-type biofilters are considered to be non-LID treatment and will only be allowed under certain circumstances. Guidance on use and sizing of these facilities will be provided in a separate document.

implementation during the permit term that have potential for green infrastructure measures. The list must be submitted with each Annual Report, including:

“... a summary of how each public infrastructure project with green infrastructure potential will include green infrastructure measures to the maximum extent practical during the permit term. For any public infrastructure project where implementation of green infrastructure measures is not practicable, submit a brief description for the project and the reasons green infrastructure measures were impracticable to implement”.

This requirement has no specified start date; “during the permit term” means beginning January 1, 2016 and before December 31, 2020. The first Annual Report submittal date will be September 30, 2016.

Note that this guidance primarily addresses the review of proposed or planned public projects for green infrastructure opportunities. The Permittee may also be aware of proposed or planned private projects, not subject to LID treatment requirements, that may have the opportunity to incorporate green infrastructure. These should be addressed in the same way as planned public projects, as described below.

Procedure for Review of Planned Public Projects and Annual Reporting

The municipality’s Capital Improvement Program (CIP) project list provides a good starting point for review of proposed public infrastructure projects. Review of other lists of public infrastructure projects, such as those proposed within separately funded special districts (e.g., lighting and landscape districts, maintenance districts, and community facilities districts), may also be appropriate. This section describes a two-part procedure for conducting the review.

Part 1 – Initial Screening

The first step in reviewing a CIP or other public project list is to screen out certain types of projects from further consideration. For example, some projects (e.g., interior remodels, traffic signal replacement) can be readily identified as having no green infrastructure potential. Other projects may appear on the list with only a title, and it may be too early to identify whether green infrastructure could be included. Still others have already progressed past the point where the design can reasonably be changed (this will vary from project to project, depending on available budget and schedule).

Some “projects” listed in a CIP may provide budget for multiple maintenance or minor construction projects throughout the jurisdiction or a portion of the jurisdiction, such as a tree planting program, curb and sidewalk repair/upgrade, or ADA curb/ramp compliance. It is recommended that these types of projects not be included in the review process described herein. The priority for incorporating green infrastructure into these types of projects needs to be assessed as part of the Permittees’ development of Green Infrastructure Plans, and standard details and specifications need to be developed and adopted. During this permit term, Permittees will evaluate select projects, project types, and/or groups of projects as case studies and develop an approach as part of Green Infrastructure planning.

The projects removed through the initial screening process do not need to be reported to the Water Board in the Permittee’s Annual Report. However, the process should be documented and records kept as to the reason the project was removed from further consideration. Note that projects that were determined to be too early to assess will need to be reassessed during the next fiscal year’s review.

The following categories of projects may be screened out of the review process in a given fiscal year:

1. **Projects with No Potential** - The project is identified in initial screening as having no green infrastructure potential based on the type of project. For example, the project does not include any exterior work. Attachment 1 provides a suggested list of such projects that Permittees may use as a model for their own internal process.

2. **Projects Too Early to Assess** – There is not yet enough information to assess the project for green infrastructure potential, or the project is not scheduled to begin design within the permit term (January 2016 – December 2020). If the project is scheduled to begin within the permit term, an assessment will be conducted if and when the project moves forward to conceptual design.
3. **Projects Too Late to Change** – The project is under construction or has moved to a stage of design in which changes cannot be made. The stage of design at which it is too late to incorporate green infrastructure measures varies with each project, so a “percent-complete” threshold has not been defined. Some projects may have funding tied to a particular conceptual design and changes cannot be made even early in the design process, while others may have adequate budget and time within the construction schedule to make changes late in the design process. Agencies will need to make judgments on a case-by-case basis.
4. **Projects Consisting of Maintenance or Minor Construction Work Orders** – The “project” includes budgets for multiple maintenance or minor construction work orders throughout the jurisdiction or a portion of the jurisdiction. These types of projects will not be individually reviewed for green infrastructure opportunity but will be considered as part of a municipality’s Green Infrastructure Plan.

Part 2 – Assessment of Green Infrastructure Potential

After the initial screening, the remaining projects either already include green infrastructure or will need to go through an assessment process to determine whether or not there is potential to incorporate green infrastructure. A recommended process for conducting the assessment is provided later in this guidance. As a result of the assessment, the project will fall into one of the following categories with associated annual reporting requirements. Attachment 2 provides the relevant pages of the FY 15-16 Annual Report template for reference.

- **Project is a C.3-regulated project and will include LID treatment.**

Reporting: Follow current C.3 guidance and report the project in Table C.3.b.iv.(2) of the Annual Report for the fiscal year in which the project is approved.

- **Project already includes green infrastructure and is funded.**

Reporting: List the project in “Table B-Planned Green Infrastructure Projects” in the Annual Report, indicate the planning or implementation status, and describe the green infrastructure measures to be included.

- **Project may have green infrastructure potential** pending further assessment of feasibility, incremental cost, and availability of funding.

Reporting: If the feasibility assessment is not complete and/or funding has not been identified, list the project in “Table A-Public Projects Reviewed for Green Infrastructure” in the Annual Report. In the “GI Included?” column, state either “TBD” (to be determined) if the assessment is not complete, or “Yes” if it has been determined that green infrastructure is feasible. In the rightmost column, describe the green infrastructure measures considered and/or proposed, and note the funding and other contingencies for inclusion of green infrastructure in the project. Once funding for the project has been identified, the project should be moved to “Table B-Planned Green Infrastructure Projects” in future Annual Reports.

- **Project does not have green infrastructure potential.** A project-specific assessment has been completed, and Green Infrastructure is impracticable.

Reporting: In the Annual Report, list the project in “Table A-Public Projects Reviewed for Green Infrastructure”. In the “GI Included?” column, state “No.” Briefly state the reasons for the determination in the rightmost column. Prepare more detailed documentation of the reasons for the determination and keep it in the project files.

Process for Assessing Green Infrastructure Potential of a Public Infrastructure Project

Initial Assessment of Green Infrastructure Potential

Consider opportunities that may be associated with:

- Alterations to roof drainage from existing buildings
- New or replaced pavement or drainage structures (including gutters, inlets, or pipes)
- Concrete work
- Landscaping, including tree planting
- Streetscape improvements and intersection improvements (other than signals)

Step 1: Information Collection/Reconnaissance

For projects that include alterations to building drainage, identify the locations of roof leaders and downspouts, and where they discharge or where they are connected to storm drains.

For street and landscape projects:

- Evaluate potential opportunities to substitute pervious pavements for impervious pavements.
- Identify and locate drainage structures, including storm drain inlets or catch basins.
- Identify and locate drainage pathways, including curb and gutter.

Identify landscaped areas and paved areas that are adjacent to, or down gradient from, roofs or pavement. These are potential facility locations. *If there are any such locations, continue to the next step.* Note that the project area boundaries may be, but are not required to be, expanded to include potential green infrastructure facilities.

Step 2: Preliminary Sizing and Drainage Analysis

Beginning with the potential LID facility locations that seem most feasible, identify possible pathways to direct drainage from roofs and/or pavement to potential LID facility locations—by sheet flow, valley gutters, trench drains, or (where gradients are steeper) via pipes, based on existing grades and drainage patterns. Where existing grades constrain natural drainage to potential facilities, the use of pumps may be considered (as a less preferable option).

Delineate (roughly) the drainage area tributary to each potential LID facility location. Typically, this requires site reconnaissance, which may or may not include the use of a level to measure relative elevations.

Use the following preliminary sizing factor (facility area/tributary area) for the potential facility location and determine which of the following could be constructed within the existing right-of-way or adjacent vacant land. Note that these sizing factors are guidelines (not strict rules, but targets):

- Sizing factor ≥ 0.5 for dispersal to landscape or pervious pavement² (i.e., a maximum 2:1 ratio of impervious area to pervious area)
- Sizing factor ≥ 0.04 for bioretention
- Sizing factor ≥ 0.004 (or less) for tree-box-type biofilters

For bioretention facilities requiring underdrains and tree-box-type biofilters, note if there are potential connections from the underdrain to the storm drain system (typically 2.0 feet below soil surface for bioretention facilities, and 3.5 feet below surface for tree-box-type biofilters).

² Note that pervious pavement systems are typically designed to infiltrate only the rain falling on the pervious pavement itself, with the allowance for small quantities of runoff from adjacent impervious areas. If significant runoff from adjacent areas is anticipated, preliminary sizing considerations should include evaluation of the depth of drain rock layer needed based on permeability of site soils.

If, in this step, you have confirmed there may be feasible potential facility locations, *continue to the next step*.

Step 3: Barriers and Conflicts

Note that barriers and conflicts do not necessarily mean implementation is infeasible; however, they need to be identified and taken into account in future decision-making, as they may affect cost or public acceptance of the project.

Note issues such as:

- Confirmed or potential conflicts with subsurface utilities
- Known or unknown issues with property ownership, or need for acquisition or easements
- Availability of water supply for irrigation, or lack thereof
- Extent to which green infrastructure is an “add on” vs. integrated with the rest of the project

Step 4: Project Budget and Schedule

Consider sources of funding that may be available for green infrastructure. It is recognized that lack of budget may be a serious constraint for the addition of green infrastructure in public projects. For example, acquisition of additional right-of-way or easements for roadway projects is not always possible. Short and long term maintenance costs also need to be considered, and jurisdictions may not have a funding source for landscape maintenance, especially along roadways. The objective of this process is to identify opportunities for green infrastructure, so that if and when funding becomes available, implementation may be possible.

Note any constraints on the project schedule, such as a regulatory mandate to complete the project by a specific date, grant requirements, etc., that could complicate aligning a separate funding stream for the green infrastructure element. Consider whether cost savings could be achieved by integrating the project with other planned projects, such as pedestrian or bicycle safety improvement projects, street beautification, etc., if the schedule allows.

Step 5: Assessment—Does the Project Have Green Infrastructure Potential?

Consider the ancillary benefits of green infrastructure, including opportunities for improving the quality of public spaces, providing parks and play areas, providing habitat, urban forestry, mitigating heat island effects, aesthetics, and other valuable enhancements to quality of life.

Based on the information above, would it make sense to include green infrastructure into this project—*if funding were available for the potential incremental costs of including green infrastructure in the project?* Identify any additional conditions that would have to be met for green infrastructure elements to be constructed consequent with the project.

Attachment 1**Examples of Projects with No Potential for Green Infrastructure**

- Projects with no exterior work (e.g., interior remodels)
- Projects involving exterior building upgrades or equipment (e.g., HVAC, solar panels, window replacement, roof repairs and maintenance)
- Projects related to development and/or continued funding of municipal programs or related organizations
- Projects related to technical studies, mapping, aerial photography, surveying, database development/upgrades, monitoring, training, or update of standard specs and details
- Construction of new streetlights, traffic signals or communication facilities
- Minor bridge and culvert repairs/replacement
- Non-stormwater utility projects (e.g., sewer or water main repairs/replacement, utility undergrounding, treatment plant upgrades)
- Equipment purchase or maintenance (including vehicles, street or park furniture, equipment for sports fields and golf courses, etc.)
- Irrigation system installation, upgrades or repairs

Attachment 2

**Excerpts from the C.3 Section of the FY 15-16 Annual Report Template:
Tables for Reporting C.3-Regulated Projects and Green Infrastructure Projects**

C.3.b.iv.(2) ► Regulated Projects Reporting Table (part 1) – Projects Approved During the Fiscal Year Reporting Period

Project Name Project No.	Project Location ⁹ , Street Address	Name of Developer	Project Phase No. ¹⁰	Project Type & Description ¹¹	Project Watershed ¹²	Total Site Area (Acres)	Total Area of Land Disturbed (Acres)	Total New Impervious Surface Area (ft ²) ¹³	Total Replaced Impervious Surface Area (ft ²) ¹⁴	Total Pre-Project Impervious Surface Area ¹⁵ (ft ²)	Total Post-Project Impervious Surface Area ¹⁶ (ft ²)
Private Projects											
Public Projects											
Comments:											
Guidance: If necessary, provide any additional details or clarifications needed about listed projects in this box. Do not leave any cells blank.											

⁹Include cross streets

¹⁰If a project is being constructed in phases, indicate the phase number and use a separate row entry for each phase. If not, enter "NA".

¹¹Project Type is the type of development (i.e., new and/or redevelopment). Example descriptions of development are: 5-story office building, residential with 160 single-family homes with five 4-story buildings to contain 200 condominiums, 100 unit 2-story shopping mall, mixed use retail and residential development (apartments), industrial warehouse.

¹²State the watershed(s) in which the Regulated Project is located. Downstream watershed(s) may be included, but this is optional.

¹³All impervious surfaces added to any area of the site that was previously existing pervious surface.

¹⁴All impervious surfaces added to any area of the site that was previously existing impervious surface.

¹⁵For redevelopment projects, state the pre-project impervious surface area.

¹⁶For redevelopment projects, state the post-project impervious surface area.

C.3.b.iv.(2) ► Regulated Projects Reporting Table (part 2) – Projects Approved During the Fiscal Year Reporting Period (public projects)

Project Name Project No.	Approval Date ²⁹	Date Construction Scheduled to Begin	Source Control Measures ³⁰	Site Design Measures ³¹	Treatment Systems Approved ³²	Operation & Maintenance Responsibility Mechanism ³³	Hydraulic Sizing Criteria ³⁴	Alternative Compliance Measures ^{35/36}	Alternative Certification ³⁷	HM Controls ^{38/39}
Public Projects										
<p>Comments:</p> <p>Guidance: If necessary, provide any additional details or clarifications needed about listed projects in this box. Note that MRP Provision C.3.c. contains specific requirements for LID site design and source control measures, as well as treatment measures, for <u>all</u> Regulated Projects. Entries in these columns should not be "None" or "NA". Do not leave any cells blank.</p>										

²⁹For public projects, enter the plans and specifications approval date.

³⁰List source control measures approved for the project. Examples include: properly designed trash storage areas; storm drain stenciling or signage; efficient landscape irrigation systems; etc.

³¹List site design measures approved for the project. Examples include: minimize impervious surfaces; conserve natural areas, including existing trees or other vegetation, and soils; construct sidewalks, walkways, and/or patios with permeable surfaces, etc.

³²List all approved stormwater treatment system(s) to be installed onsite or at a joint stormwater treatment facility (e.g., flow through planter, bioretention facility, infiltration basin, etc.).

³³List the legal mechanism(s) (e.g., maintenance plan for O&M by public entity, etc...) that have been or will be used to assign responsibility for the maintenance of the post-construction stormwater treatment systems.

³⁴See Provision C.3.d.i. "Numeric Sizing Criteria for Stormwater Treatment Systems" for list of hydraulic sizing design criteria. Enter the corresponding provision number of the appropriate criterion (i.e., 1.a., 1.b., 2.a., 2.b., 2.c., or 3).

³⁵For Alternative Compliance at an offsite location in accordance with Provision C.3.e.i.(1), on a separate page, give a discussion of the alternative compliance site including the information specified in Provision C.3.b.v.(1)(m)(i) for the offsite project.

³⁶For Alternative Compliance by paying in-lieu fees in accordance with Provision C.3.e.i.(2), on a separate page, provide the information specified in Provision C.3.b.v.(1)(m)(ii) for the Regional Project.

³⁷Note whether a third party was used to certify the project design complies with Provision C.3.d.

³⁸If HM control is not required, state why not.

³⁹If HM control is required, state control method used (e.g., method to design and size device(s) or method(s) used to meet the HM Standard, and description of device(s) or method(s) used, such as detention basin(s), bioretention unit(s), regional detention basin, or in-stream control).

C.3.j.ii.(2) ► Table A - Public Projects Reviewed for Green Infrastructure

Project Name and Location ⁴³	Project Description	Status ⁴⁴	GI Included? ⁴⁵	Description of GI Measures Considered and/or Proposed or Why GI is Impracticable to Implement ⁴⁶
EXAMPLE: Storm drain retrofit, Stockton and Taylor	Installation of new storm drain to accommodate the 10-yr storm event	Beginning planning and design phase	TBD	Bioretention cells (i.e., linear bulb-outs) will be considered when street modification designs are incorporated

C.3.j.ii.(2) ► Table B - Planned Green Infrastructure Projects

Project Name and Location ⁴⁷	Project Description	Planning or Implementation Status	Green Infrastructure Measures Included
EXAMPLE: Martha Gardens Green Alleys Project	Retrofit of degraded pavement in urban alleyways lacking good drainage	Construction completed October 17, 2015	The project drains replaced concrete pavement and existing adjacent structures to a center strip of pervious pavement and underlying infiltration trench.

⁴³ List each public project that is going through your agency’s process for identifying projects with green infrastructure potential.

⁴⁴ Indicate status of project, such as: beginning design, under design (or X% design), projected completion date, completed final design date, etc.

⁴⁵ Enter “Yes” if project will include GI measures, “No” if GI measures are impracticable to implement, or “TBD” if this has not yet been determined.

⁴⁶ Provide a summary of how each public infrastructure project with green infrastructure potential will include green infrastructure measures to the maximum extent practicable during the permit term. If review of the project indicates that implementation of green infrastructure measures is not practicable, provide the reasons why green infrastructure measures are impracticable to implement.

⁴⁷ List each planned (and expected to be funded) public and private green infrastructure project that is not also a Regulated Project as defined in Provision C.3.b.ii. Note that funding for green infrastructure components may be anticipated but is not guaranteed to be available or sufficient.

Guidance for Sizing Green Infrastructure Facilities in Street Projects



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Introduction and Regulatory Background

Provision C.3.j. in the reissued Municipal Regional Stormwater Permit¹ (MRP) requires each Permittee to “complete and implement a Green Infrastructure (GI) Plan for the inclusion of low impact development drainage design into storm drain infrastructure on public and private lands, including streets, roads, storm drains, parking lots, building roofs, and other storm drain infrastructure elements.”

Provision C.3.j.i.(g) further mandates that these plans include:

Requirements that projects be designed to meet the treatment and hydromodification sizing requirements in Provisions C.3.c. and C.3.d. For street projects not subject to Provision C.3.b.ii. (i.e., non-Regulated Projects) Permittees may collectively propose a single approach with their Green Infrastructure Plans for how to proceed should project constraints preclude fully meeting the C.3.d. sizing requirements. The single approach can include different options to address specific issues or scenarios. That is, the approach shall identify the specific constraints that would preclude meeting the sizing requirements and the design approach(es) to take in that situation. The approach should also consider whether a broad effort to incorporate hydromodification controls into green infrastructure, even where not otherwise required, could significantly improve creek health and whether such implementation may be appropriate, plus all other information as appropriate (e.g., how to account for load reduction for the PCBs or mercury TMDLs).

This document represents the “single approach” collectively proposed by the Permittees for how to proceed when constraints on GI projects affect facility sizing in street projects. For other types of projects, information on hydraulic sizing is provided in the technical guidance manuals for Provision C.3 developed by each countywide stormwater program.

Hydraulic Sizing Requirements

MRP Provision C.3.d contains criteria for sizing stormwater treatment facilities. Facilities may be sized on the basis of flow, volume, or a combination of flow and volume. With adoption of the 2009 MRP, a third option for sizing stormwater treatment facilities was added to Provision C.3.d. This option states that “treatment systems that use a combination of flow and volume capacity shall be sized to treat at least 80 percent of the total runoff over the life of the project, using local rainfall data.”

This option can also be used to develop sizing factors for facilities with a standard cross-section (i.e., where the volume available to detain runoff is proportional to facility surface area). To calculate sizing factors, inflows, storage, infiltration to groundwater, underdrain discharge, and overflows are tracked for each time-step during a long-term simulation. The continuous simulation is repeated, with variations in the treatment surface area, to determine the minimum area required for the facility to capture and treat 80% of the inflow during the simulation.

¹ Order R2-2015-0049

Such an analysis was conducted for BASMAA by Dubin Environmental Consulting and is described in the attached Technical Report. The analysis shows that bioretention facilities with the current-standard cross-section can capture and treat the Provision C.3.d amount of runoff when sized to 1.5% - 3% of tributary equivalent impervious area, depending on location.

Hydromodification Management

A principal objective of LID is to mimic natural hydrology in the post-development condition. This is accomplished by retaining and infiltrating runoff flows during small to medium events. Flows from larger events are detained and slowed.

MRP Provision C.3.g. includes requirements and criteria for implementing hydromodification management (HM). These HM requirements apply to Regulated Projects that create or replace an acre or more of impervious area, increase the amount of impervious area over the pre-project condition, and flow to creeks that are at risk of erosion. As such, the HM requirements do not apply to street projects that retrofit drainage systems that receive runoff from existing roofs and paving.

However, Provision C.3.j.i.(g) states that the Permittees' approach to sizing GI facilities "...should also consider whether a broad effort to incorporate hydromodification controls into green infrastructure, even where not otherwise required, could significantly improve creek health and whether such implementation may be appropriate..."

Various criteria for HM design have been used in California and throughout the U.S. These criteria have been based on one or more of the following principles:

- Maintaining watershed processes
- Maintaining a site-specific water balance
- Maintaining the value of the curve number used in the NRCS method of computing peak runoff
- Controlling increases in peak flows from a specified storm size
- Controlling increases in the duration of flows at each intensity within a specified range (flow duration control)
- Controlling the likelihood of downstream erosion in streams (erosion potential, or Ep)

Generally, for any HM criterion used, facilities with more storage and a larger infiltrative area will be more effective in meeting the criterion than facilities with less storage and a smaller infiltrative area.

In the statewide municipal stormwater NPDES permit for small MS4s, Provision E.12.f. includes the following HM standard applicable to Bay Area small MS4s: "Post-project runoff shall not exceed estimated pre-project flow rate for the 2-year, 24-hour storm..."

Dubin (2014) conducted modeling to evaluate whether this standard would be met in the San Francisco Phase II counties (Marin, Sonoma, Napa, and Solano) by a bioretention facility meeting the minimum requirements in that permit's Provision

E.12.f. Dubin's analysis found that a facility sized to 4% of tributary equivalent impervious area, and having a 6-inch deep reservoir with 2 inches of freeboard, 18 inches of treatment soil, and a 12-inch-deep "dead storage" gravel layer below the underdrain, would meet this standard, even in the wettest portions of the Bay Area.

Additional Considerations for Bioretention Sizing

In summary, bioretention facilities for street projects sized to 1.5% - 3% of tributary equivalent impervious area (depending on their location in the Bay Area) can meet the criteria in Provision C.3.d., according to the modeling study documented in the attached Technical Memo.

There are many reasons to design and build facilities larger than the Provision C.3.d. minimum. Building larger facilities helps ensure the facilities perform to the minimum hydraulic capacity intended, despite minor flaws in design, construction, and maintenance, providing an engineering safety factor for the project. Further, larger-sized facilities may more effectively address objectives to maximize the removal of pollutants (particularly pollutants in dissolved form), to operate as full trash capture devices, and to manage hydromodification effects.

However, municipalities often face considerable challenges in retrofitting existing streetscapes with GI facilities. Constraints and design challenges typically encountered in the public right-of-way include:

- The presence of existing underground utilities (known and unknown during the design phase);
- The presence of existing above-ground fixtures such as street lights, fire hydrants, utility boxes, etc.;
- The presence of existing mature trees and root systems;
- The elevation of or lack of existing storm drains in the area to which to connect underdrains or overflow structures;
- Challenges of defining and controlling any catchment areas on adjacent private parcels that drain to the roadway surface;
- Low soil permeability and strength, and the need to protect the adjacent roadway structure;
- Competition with other assets & uses for limited right-of-way area; and
- Presence of archeologic/cultural deposits.

Use of the sizing factors in the attached Technical Memo will provide municipalities flexibility in design of bioretention facilities for street projects where constraints are present.

Recommendations for Sizing Approaches for Green Infrastructure Retrofit Facilities in Street Projects

1. Bioretention facilities in street projects should be sized as large as feasible and meet the C.3.d criteria where possible. Constraints in the public right-of-way may affect the size of these facilities and warrant the use of smaller sizing factors.

Bioretention facilities in street projects may use the sizing curves in the attached memorandum to meet the C.3.d criteria. Local municipal staff involved with other assets in the public right of way should be consulted to provide further guidance to design teams as early in the process as possible.

2. Bioretention facilities in street projects smaller than what would be required to meet the Provision C.3.d criteria may be appropriate in some circumstances. As an example, it might be appropriate to construct a bioretention facility where a small proportion of runoff is diverted from a larger runoff stream. Where feasible, such facilities can be designed as “off-line” facilities, where the bypassed runoff is not treated or is treated in a different facility further downstream. In these cases, the proportion of total runoff captured and treated should be estimated using the results of the attached memorandum. In cases where “in-line” bioretention systems cannot meet the C.3.d criteria, the facilities should incorporate erosion control as needed to protect the facility from high flows. See Figures 1 and 2 below for illustration of the in-line and off-line concepts.
3. Pollutant reduction achieved by GI facilities in street projects will be estimated in accordance with the Interim Accounting Methodologyⁱ or the applicable Reasonable Assurance Analysisⁱⁱ.



Figure 1: Off-line system in El Cerrito where low flow is diverted to the sidewalk planter and high flows continue down the gutter.



Figure 2: In-line system in Berkeley/Albany where low and high flows enter the system and overflows exit through a drain within the system.

ⁱ The Interim Accounting Methodology for TMDL Loads Reduced Report (BASMAA 2017) describes the methodology that is being used to demonstrate progress towards achieving the PCB and mercury load reductions required during the term of MRP 2.0. The methodology is based on the conversion of land use from a higher to a lower PCB or mercury loading rate during the redevelopment of a parcel. See:

[www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/Municipal/POC/Final%20Interim%20Accounting%20Methodology%20Report%20v.1.1%20\(Revised%20March%202017\).pdf](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/Municipal/POC/Final%20Interim%20Accounting%20Methodology%20Report%20v.1.1%20(Revised%20March%202017).pdf)

ⁱⁱ A Reasonable Assurance Analysis (RAA) is a methodology used to demonstrate that implementation of pollutant control measures (such as GI facilities) over a specified time period will meet required pollutant load reductions associated with a TMDL. The Bay Area Reasonable Assurance Analysis Guidance Document (BASMAA 2017) establishes a regional framework and provides guidance for conducting PCBs and mercury RAAs in the San Francisco Bay Area. See: <http://basmaa.org/Announcements/bay-area-reasonable-assurance-analysis-guidance-document>