



# Green Infrastructure Plan



Final August 20, 2019

# Acknowledgments

The City of Orinda acknowledges the following organizations that contributed to this Green Infrastructure Plan:



CONTRA COSTA  
**CLEAN WATER**  
P R O G R A M



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# GI Plan Contents

<b>Tables</b> .....	<b>ii</b>
<b>Figures</b> .....	<b>ii</b>
<b>Appendices</b> .....	<b>ii</b>
<b>Acronyms</b> .....	<b>iii</b>
<b>1 Introduction and Overview</b> .....	<b>1</b>
1.1 Regulatory Mandate .....	1
1.2 Objectives and Vision .....	2
1.3 Plan Context and Elements.....	3
<b>2 Green Infrastructure Targets</b> .....	<b>13</b>
2.1 Private Development Projections.....	13
2.2 Targets for Public Projects .....	14
2.3 Projected Load Reductions .....	15
<b>3 Public Project Identification, Prioritization, and Mapping</b> .....	<b>16</b>
3.1 Tools for Public Project Identification and Prioritization .....	16
3.2 Maps and Project Lists.....	18
<b>4 Early Implementation Projects</b> .....	<b>19</b>
4.1 Review of Capital Improvement Projects .....	19
4.2 Projects Identified .....	19
4.3 Workplan for Completion .....	19
<b>5 Tracking and Mapping Public and Private Projects Over Time</b> .....	<b>20</b>
5.1 Tools and Process .....	20
5.2 Results .....	20
<b>6 Design Guidelines and Specifications</b> .....	<b>21</b>
6.1 Guidelines for Streetscape and Project Design .....	21
6.2 Specifications and Typical Design Details .....	22
6.3 Sizing Requirements .....	24
<b>7 Funding Options</b> .....	<b>25</b>
7.1 Funding Strategies Developed Regionally .....	25
7.2 Local Funding Element .....	25
7.3 State and Federal Grants .....	26

## Tables

Table 1: Green Infrastructure Plan-Related Outreach.....	12
Table 2. Estimates of Cumulative Impervious Surface to Be Retrofit via Private Development .....	14
Table 3. Estimates of Cumulative Impervious Surface to Be Retrofit via Public Development.....	15
Table 4. CCW SWRP Projects Metrics-Based Multi-Benefit Scoring Criteria .....	17
Table 5. Early Implementation Project Workplan.....	19
Table 6: BASMAA Urban Greening Standard Details - Index of Green Infrastructure (GI) Typical Designs.....	23

## Figures

Figure 1: Connect Orinda Workshop, Green Infrastructure Outreach May 2019 .....	5
Figure 2: Orinda Creeks and Watersheds .....	7
Figure 3A: North Orinda FEMA Special Flood Hazard Areas.....	8
Figure 3B: South Orinda FEMA Flood Hazard Areas .....	9

## Appendices

- A. Planning Documents Reviewed for Green Infrastructure
- B. Public Project Lists and Maps
- C. Lavenida Drive Early Implementation Project Plan Details

## Acronyms

<b>ABAG</b>	Association of Bay Area Governments
<b>BASMAA</b>	Bay Area Stormwater Management Agencies Association
<b>CCCWP</b>	Contra Costa Clean Water Program
<b>CCW SWRP</b>	Contra Costa Watersheds Stormwater Resource Plan
<b>CIP</b>	Capital Improvement Plan
<b>DC</b>	Downtown Commercial
<b>FEMA</b>	Federal Emergency Management Agency
<b>FIS</b>	Flood Insurance Study
<b>GI</b>	Green Stormwater Infrastructure
<b>GIS</b>	Geographic Information System
<b>IRWMP</b>	Integrated Regional Water Management Plan
<b>LID</b>	Low Impact Development
<b>MRP</b>	Municipal Regional Stormwater Permit
<b>MTC</b>	Metropolitan Transportation Commission
<b>NAVD</b>	North American Vertical Datum
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>PCBs</b>	Polychlorinated Biphenyls
<b>RAA</b>	Reasonable Assurance Analysis
<b>RWQCB</b>	San Francisco Regional Water Quality Control Board
<b>SB</b>	Senate Bill
<b>SUA</b>	Stormwater Utility Assessment
<b>TMDL</b>	Total Maximum Daily Load
<b>WLA</b>	Waste Load Allocation

# 1 Introduction and Overview

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## 1.1 Regulatory Mandate

The City of Orinda (City) is one of 76 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 2015<sup>1</sup>. 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.

MRP Provision C.3.j.i. requires the City to prepare a Green Infrastructure Plan, to be submitted with its Annual Report to the RWQCB due September 30, 2019.

Green Stormwater Infrastructure (GI) refers to the construction and retrofit of storm drainage systems to reduce 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 Bay. GI facilities include, but are not limited to, pervious pavement, infiltration basins, bioretention facilities or "rain gardens", green roofs, and rainwater harvesting systems. GI can 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.

Water quality in San Francisco 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.

Provisions C.11 and C.12 in the MRP require Contra Costa Permittees (Contra Costa County and its 19 cities and towns) to reduce estimated PCBs loading by 23 grams/year and estimated mercury loading by 9 grams/year using GI by June 30, 2020. Regionally, Permittees must also project the load reductions achieved via GI by 2020, 2030, and 2040, showing that collectively, reductions will amount to 3 kilograms (kg)/year PCBs and 10 kg/year mercury by 2040.

### 1.1.1 Further Background on Mercury and PCBs in San Francisco Bay

The MRP pollutant-load reduction requirements are driven by Total Maximum Daily Load (TMDL) requirements adopted by the RWQCB for mercury (Resolution No. R2-2004-0082 and R2-2005-0060) and PCBs (Resolution No. R2-2008-0012). Each TMDL allocates allowable annual loads to San Francisco Bay (a Waste Load Allocation, or WLA) from identified sources, including from urban stormwater.

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<sup>1</sup> Order R2-2015-0049

The mercury TMDL addresses two water quality objectives. The first, established to protect people who consume Bay fish, applies to fish large enough to be consumed by humans. The objective is 0.2 milligrams (mg) of mercury per kg of fish tissue (average wet weight concentration measured in the muscle tissue of fish large enough to be consumed by humans). The second objective, established to protect aquatic organisms and wildlife, applies to small fish (3-5 centimeters in length) commonly consumed by the California least tern, an endangered species. This objective is 0.03 mg mercury per kg fish (average wet weight concentration). To achieve the human health and wildlife fish tissue and bird egg monitoring targets and to attain water quality standards, the Bay-wide suspended sediment mercury concentration target is 0.2 mg mercury per kg dry sediment.

A roughly 50% decrease in sediment, fish tissue, and bird egg mercury concentrations is necessary for the Bay to meet water quality standards. Reductions in sediment mercury concentrations are assumed to result in a proportional reduction in the total amount of mercury in the system, which will result in the achievement of target fish tissue and bird egg concentrations.

The PCBs TMDL was developed based on a fish tissue target of 10 nanograms (ng) of PCBs per gram (g) of fish tissue. This target is based on a cancer risk of one case per an exposed population of 100,000 for the 95<sup>th</sup> percentile San Francisco Bay Area sport and subsistence fisher consumer (32 g fish per day). A food web model was developed by San Francisco Estuary Institute (SFEI) to identify the sediment target concentration that would yield the fish tissue target; this sediment target was found to be 1 microgram ( $\mu$ g) of PCBs per kg of sediment.

Twenty percent of the estimated allowable PCB external load was allocated to urban stormwater runoff. The Bay Area-wide WLA for PCBs for urban stormwater is 2 kg/yr by 2030. This value was developed based on applying the required sediment concentration (1  $\mu$ g/kg) to the estimated annual sediment load discharged from local tributaries.

## 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. GI features and facilities include, but are not limited to, pervious pavement, infiltration basins, and 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 of Orinda. Specific methods and design criteria are spelled out in the Contra Costa Clean Water Program’s (CCCWP) *Stormwater C.3 Guidebook*, which the City has referenced in Municipal Code Chapter 18.02, Stormwater Management and Discharge Control.

This Plan details how similar methods will be incorporated to retrofit existing storm drainage infrastructure using GI facilities constructed on public and private parcels and within the public right-of-way.

Orinda has had limited opportunities to incorporate GI into public projects to date. However, the City constructed a bioswale on Camino Pablo at the intersection of Camino Sobrante in 2014 as part of a pavement rehabilitation project. The bioswale treats an impervious drainage area of approximately 8,000 square feet. The project was constructed as mitigation for a bridge replacement project under a Clean Water Act Section 401 certification requirement. The bioswale has performed in an acceptable manner and has not created drainage problems.

## **1.3 Plan Context and Elements**

### **1.3.1 Planning Context**

#### *Municipal Geography*

Orinda is a 12.8 square mile, semi-rural community incorporated as a City in 1985 after more than 100 years of gradual development. More than 60 percent of the City's 6,580 homes were built between 1940 and 1970. Orinda is not a full-service city; water, sanitary sewer, electric and solid waste services are provided by special districts or public utility companies. Within the City there are 92 miles of public right-of-way, five two-lane bridges and 31 miles of creeks.

Downtown Orinda, at the geographic center of the City, is split by Highway 24 and BART, with the "Crossroads/Theater District" area on the south and the "Village" area to the north. Anchored by the historic Orinda Theatre and associated Theatre Square outdoor retail/office complex and parking garage, the Crossroads has a primarily traditional "main street" look and feel. In contrast, the Village has a more suburban development pattern within the DC (Downtown Commercial) District and is abutted by the City's main civic spaces (a renovated community center, a new library, and a new city hall) and by two affordable senior housing projects. A channelized and partially culverted San Pablo Creek, fenced off from public access, flows behind Village businesses. Since Theater Square was completed in the late 1980s, the only new development within the DC District has been an 18,100 square foot mixed-use retail/office project approved in early 2016.

Orinda encompasses many hillside areas and is bordered by the cities of Lafayette, Moraga and unincorporated Contra Costa County. It is relatively sloped, with elevations ranging from 330 feet North American Vertical Datum (NAVD), to about 1,800 feet NAVD.

#### *Demographics*

Orinda has a population of approximately 18,500. According to census data, 80% of the population is over 25 years old and holds a college degree. Diversity statistics based on the census data are 75% White, 16% Asian, 5% Hispanic or Latino, and 4% in other categories.



### *Economic and Social Trends*

According to the census data, Orinda's owner-occupied housing rate is 88% and the median household income as of 2017 is \$186,000.

### *Development and Redevelopment Trends, and Commitment and Actions for Sustainability*

Most of Orinda is considered developed based on zoning maps, with the exception of three subdivisions which are not yet built. Two are in the planning and design stage (J & J Ranch and Lavenida Lane) and each consist of 10 or fewer homes. The third subdivision is Southwood, with 18 lots, which is in the application process. All projects are subject to Provision C.3.b requirements. The City has no public C.3.b. projects completed to date.

At this time, the City is preparing downtown planning strategies that would build on prior research and discussion with actionable goals for positive change in downtown Orinda. This is an extension of the Downtown Streetscape Master Plan and is branded as "Connect Orinda". The Connect Orinda process is working with the community to identify streetscape and transportation projects that beautify, improve travel through, and preserve the uniqueness of downtown Orinda. A key element is GI. Momentum has been building, as evidenced by a standing-room only crowd and over 150 public comments received at the September 6, 2016 City Council meeting when the downtown planning discussion was reintroduced. At the May 28, 2019 workshop for Connect Orinda, one of the key information boards addressed GI, as shown in **Figure 1**.

The City also has added an ongoing program for GI work, such as planning and design work, in the 5-year Capital Improvement Plan (CIP), which allots \$25,000 to \$35,000 per year.

# PLANTING + GREEN INFRASTRUCTURE

ConnectOrinda Celebration | Design Guidelines | Spring 2019



## PLANTING

### Principle

Appropriate and well-maintained trees, shrubs and ground-cover improve beauty, ecological function, property values and comfort in the built environment.

### Benefits

Vegetation incorporated in cities helps enhance the overall pedestrian experience. Trees and other landscape planting such as shrubs and ground-cover help enhance aesthetics, and contribute to the overall ecological function of the streetscape environment. Street trees help with enhanced energy efficiency, carbon sequestration, storm-water management, shade coverage and wildlife habitat. These elements can also help soften the built environment of Orinda by adding organic forms, colors, and textures to the semi-rural setting.

### Recommendations

1. Establish a list of low-maintenance and preferred tree and understory species that help unify the areas of downtown.
2. Preserve existing and plant future heritage trees such as the heritage Oak at the corner of Moraga Way and Brookwood.
3. Expand street tree and understory planting along Moraga Way to provide shade, beautification, and to enhance the retail environment.
4. Expand shade tree and understory planting on the connector route between the Village and Theatre Districts to enliven and enhance the

pedestrian route. Improved maintenance should be required by the City to sustain the amenity and is justified by the benefit to active transportation.

5. Understory and groundcover planting should avoid creating maintenance issues for the city.
6. Incorporate green infrastructure (planting areas where street runoff is directed for treatment to remove pollutants) where possible. Locations on Orinda Way, Moraga Way, and near the creek are preliminarily identified.



Rich plantings of seasonal color mark the seasons and enliven the senses.



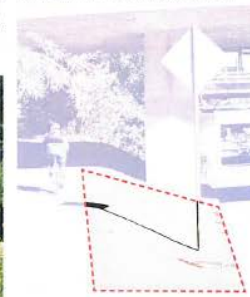
Regularly spaced street trees would create an attractive shade canopy along Moraga Way, enhancing comfort for customers through shading, greening and scale.

Planting at the Orinda Library plaza combines Mediterranean, climate appropriate species with interesting color and textures.



Combining decorative pots with climate appropriate understory plantings at special locations in downtown adds interest in the pedestrian environment.

The existing slopes along the pedestrian walk should be planted with climate appropriate species and maintained as part of Downtown's mobility infrastructure. Trees such as native oaks and maples would create much needed shade and comfort.



## GREEN INFRASTRUCTURE

### Principle

Green infrastructure can provide cost-effective and resilient strategies to help filter water, while also providing aesthetic enhancements.

### Benefits

Green infrastructure strategies help reduce stormwater runoff with plant material that intercepts water, eventually infiltrating back into the ground. These systems can be natural or engineered. Both types can provide habitat for wildlife, learning opportunities for community members and help beautify downtown Orinda.

### Recommendations

1. Incorporate green infrastructure strategies such as rain gardens and bio-swales at corner locations to capture and treat runoff.
2. Provide riparian planting species at these locations that can tolerate water inundation and dry-spells for long periods of time.

This planting strategy could be applied throughout downtown Orinda. Locations such as the corners of Moraga Way and Northwood Drive are perfect locations to transform the corner bulb-out location with colorful planting.

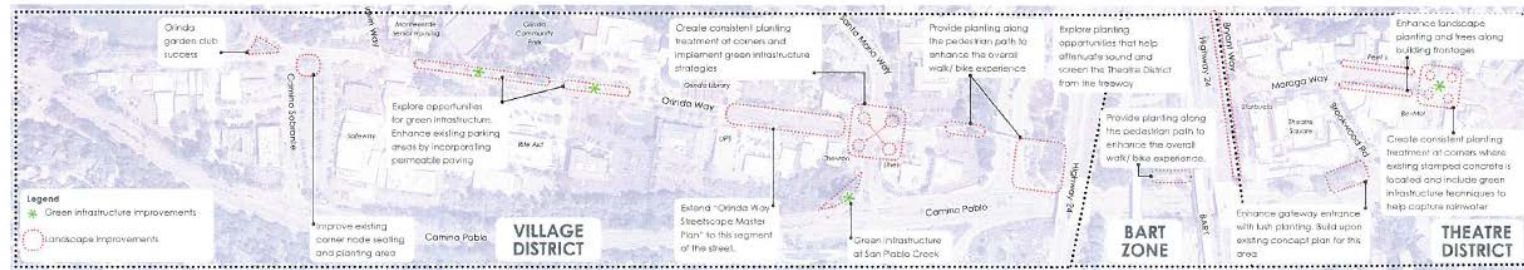


Figure 1: Connect Orinda Workshop, Green Infrastructure Outreach May 2019

### 1.3.2 Watersheds and Storm Drainage Infrastructure

#### *Watersheds*

The City's watersheds and creeks are shown on **Figure 2**. Precipitation that falls within Orinda generates stormwater runoff that is conveyed into stormwater drainage systems that discharge primarily to San Pablo Creek. Other watersheds to which the City's stormwater drainage system discharges are Las Trampas Creek and San Leandro/Moraga Creek watersheds.

Some components of the stormwater drainage system are owned by the City, while others are private. Many City-owned storm drains traverse and discharge to private property. Determining private/City ownership is complex and often requires detailed study and legal analysis. Stormwater systems can interact with one another, and potential improvements to one system may impact the performance of other systems.

Most of the streets in Orinda do not have traditional curb and gutters. This more rural drainage layout tends to attenuate runoff by slowing velocities and creating surface ponding. In addition, much of Orinda was developed with minimal grading on hillside lots, and the roadways are therefore narrow and hilly. Roadside drainage is typically via earthen or concrete ditches immediately adjacent to upslope or downslope topography. This has created limited opportunities for retrofitting drainage to include GI.

#### *Flood Zones*

Flooding locations during a 100-year storm event were identified within the 2009 FEMA Flood Insurance Study (FIS) for the City of Orinda. Special Flood Hazard Areas comprise about 2 percent of the City and include Zone A, Zone AE and regulatory floodways. The largest contributors to 100-year floodplain in Orinda are flows from San Pablo Creek at the Orinda Village and Theatre Square, along with Lauterwasser Creek near its confluence with San Pablo Creek. **Figures 3A** and **3B** show the FEMA flood zones in Orinda. More detailed mapping is available on the FEMA web site ([www.msc.fema.gov](http://www.msc.fema.gov)).

Flood protection is provided to Orinda by the San Pablo channel that conveys storm-generated runoff to the north into the San Pablo Reservoir.

Some of the GI projects included in this Plan are located within Special Flood Hazard Areas. Such GI projects may also provide some flood mitigation capacity.

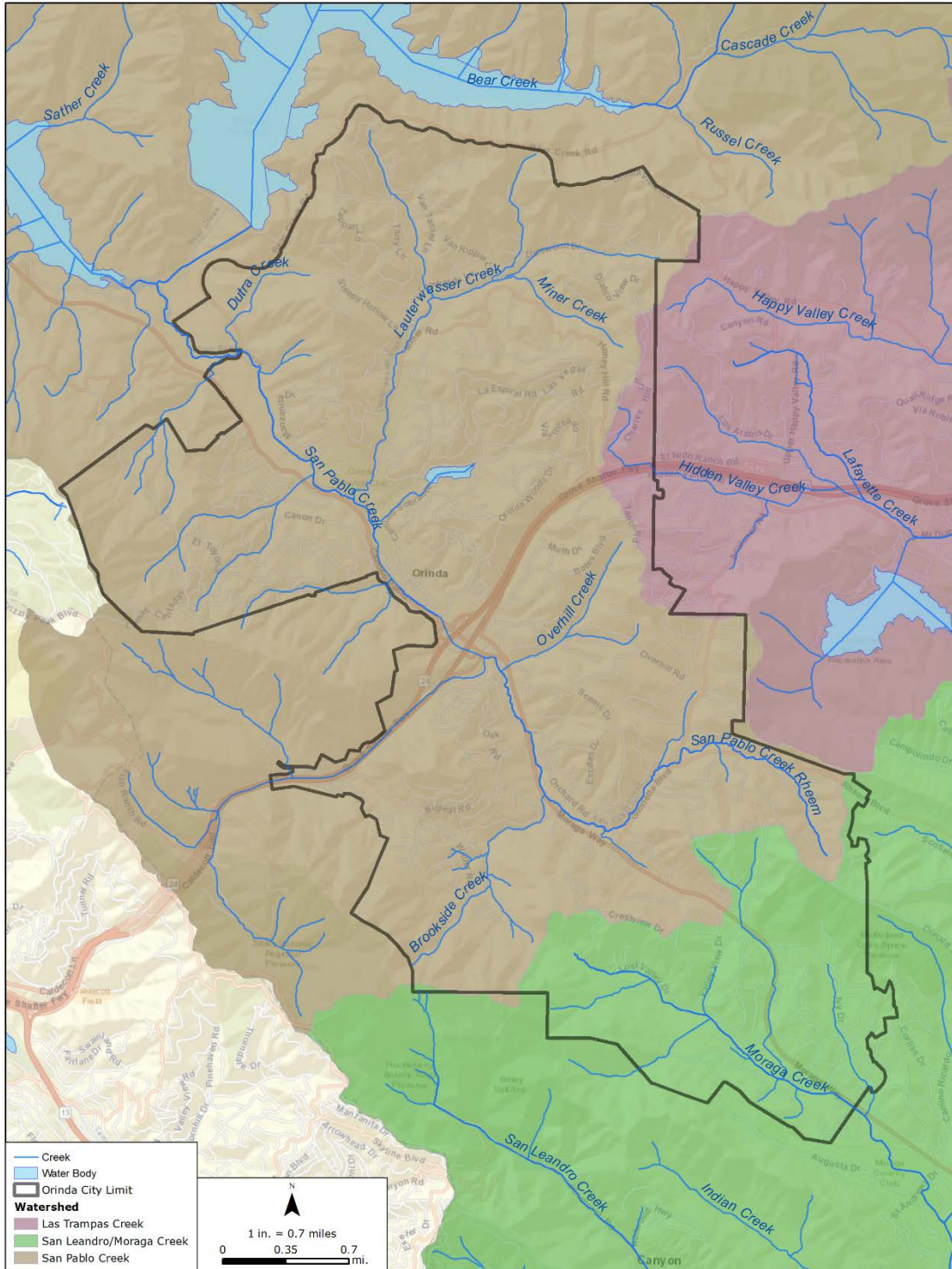


Figure 2: Orinda Creeks and Watersheds

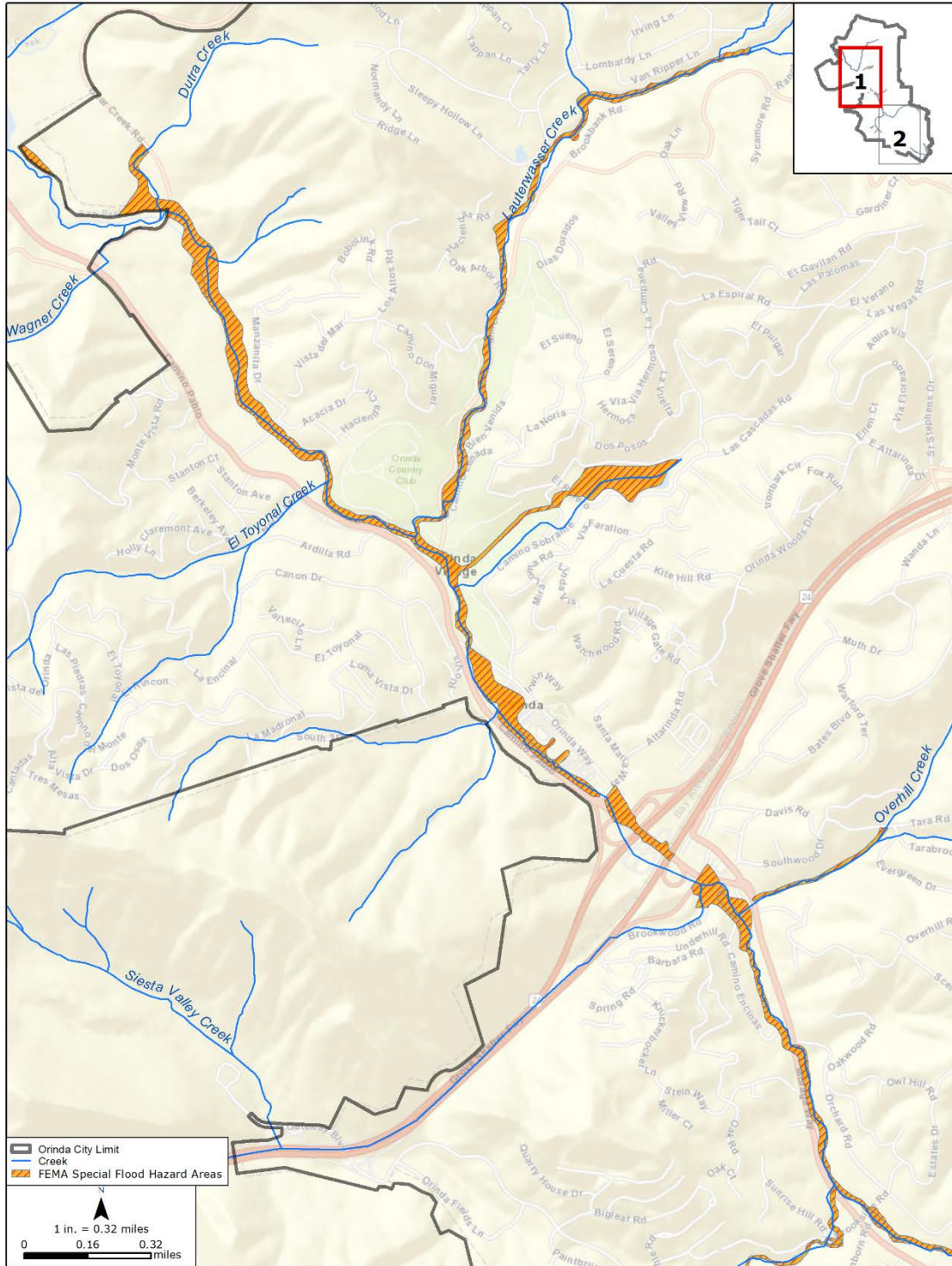


Figure 3A: North Orinda FEMA Special Flood Hazard Areas

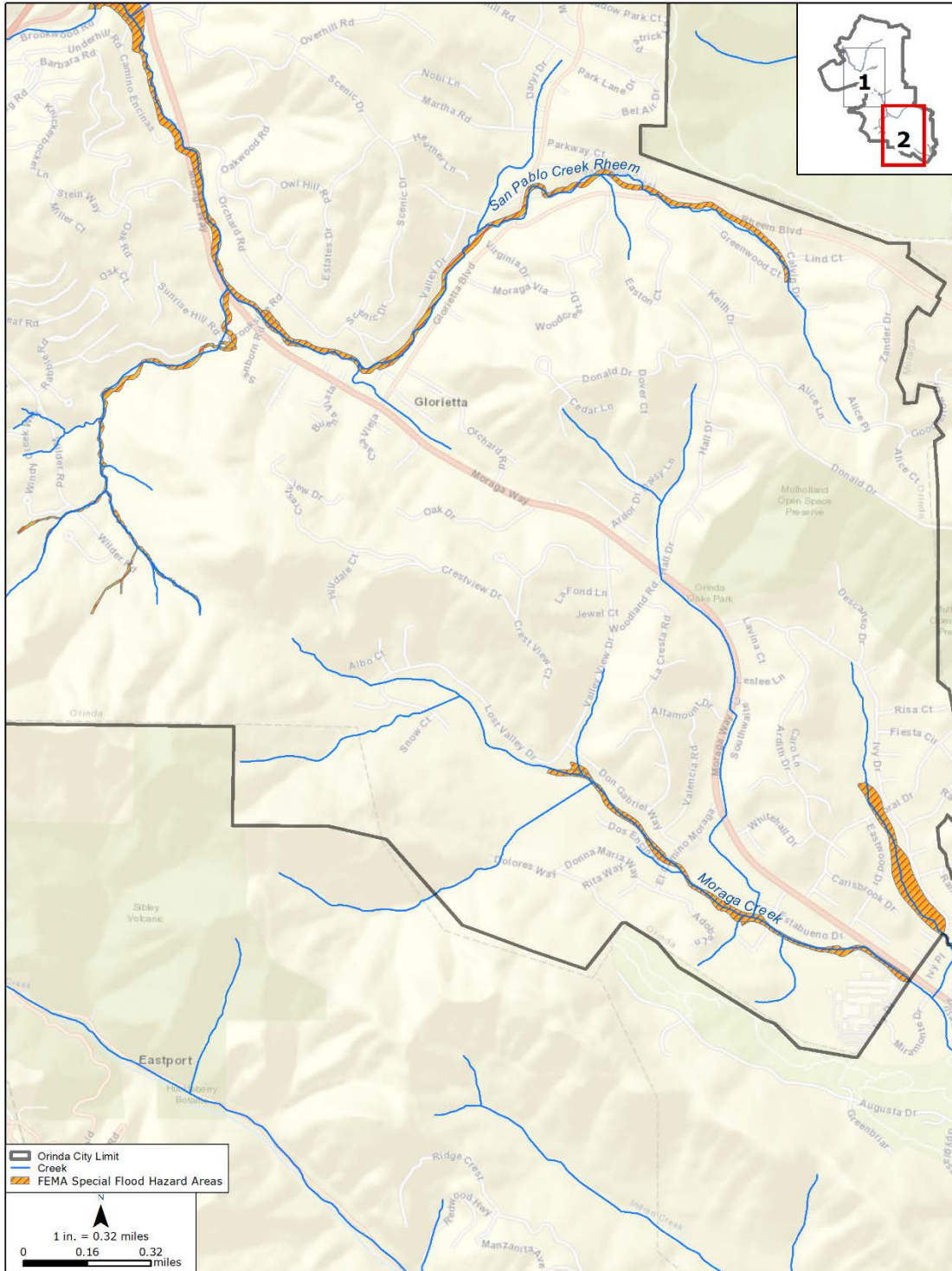


Figure 3B: South Orinda FEMA Flood Hazard Areas

### 1.3.3 Related Regional and Countywide Plans and Planning Documents

This Plan has been coordinated with the following regional stormwater documents:

- The Contra Costa Watersheds Stormwater Resource Plan (CCW SWRP). The CCW SWRP was funded by the State Water Resources Control Board under a Proposition 1 grant, with matching contributions provided by Contra Costa municipalities individually and collectively through the CCCWP. The CCW SWRP identified and prioritized potential multi-benefit stormwater management projects, including GI projects in watersheds and jurisdictions throughout Contra Costa County. Projects identified within the CCW SWRP are eligible to apply for future state funding. Many of the projects included in this Plan were drawn from the CCW SWRP project opportunity lists.
- The Contra Costa Countywide Reasonable Assurance Analysis (RAA). The RAA for GI is being prepared by Contra Costa municipalities collectively through the CCCWP and is consistent with guidance prepared by the Bay Area Stormwater Management Agencies Association (BASMAA). The RAA for GI uses a water quality model coupled with continuous simulation hydrologic output to estimate baseline loadings of pollutants and the reductions that might be achieved through GI implementation in 2020, 2030, and 2040 under various scenarios, which include implementation of projects identified in this Plan. Results pertinent to GI planning and implementation are discussed in Section 2 of this Plan.

### 1.3.4 Related Local Planning Documents

GI can be integrated into a wide diversity of public and private projects. Public projects can 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 of Orinda has reviewed the following planning documents to appropriately incorporate GI requirements:

- General Plan 1987-2007
- Downtown Design Guidelines (1990)
- Orinda Way Streetscape Master Plan (2000)
- San Pablo Creek Through Downtown Orinda Preliminary Restoration Plan (2001)
- North Orinda Specific Plan (1978)
- Bicycle, Trails and Walkways Master Plan (2011)

A summary of the status of these documents including a workplan for planned updates is included in **Appendix A. Table A-1** includes information on planning documents that require updates to incorporate GI requirements and provides a schedule for the updates. The incorporation of GI language into plans requiring updates will be accomplished by implementing the following steps:

*Step 1: Draft Text to Incorporate in the Planning Documents.* City staff will develop draft text to incorporate into the identified plans and planning documents. The draft text will set forth GI requirements for projects that are identified in the applicable plans or planning documents, and for projects that may be developed to meet the planning goals, objectives, and policies articulated in the documents.

*Step 2: Coordination and Outreach to Update Planning Documents.* City staff will prepare draft revisions of relevant sections of planning documents to ensure that the GI implementation text prepared in Step 1 is included in the scheduled updates of applicable plans and planning documents. This step will include coordination with and outreach to departments within the City, stakeholders, decision-making bodies, and the general public. Proposed updates to planning document updates are anticipated to be circulated for public review prior to the final approval of the documents that are updated to include GI requirements.

*Step 3: Track and Record the Update of Planning Documents.* Throughout the process of updating plans and planning documents, and after the documents are updated, City staff will document coordination with and outreach to departments within the agency, stakeholders, decision-making bodies, and the general public, including the final approval of the documents that are updated to include GI requirements. This includes tracking and recording the dates on which draft planning documents are circulated for review, the dates on which public hearings or other public meetings are held, and the dates when final planning documents are approved.

### 1.3.5 Outreach and Education

The City of Orinda's GI Plan development process engaged a wide variety of stakeholders, including both government staff and community members who live, work, and recreate near future GI projects. The City of Orinda also intends to engage relevant government staff and community members as projects move forward towards design and implementation. **Table 1** summarizes the City's outreach and engagement activities associated with this GI Plan.



**Table 1: Green Infrastructure Plan-Related Outreach**

<b>Event</b>	<b>Date</b>	<b>Topic</b>
City Council Meeting	June 20, 2017	GI Plan Framework adopted
CCCWP C.3. Workshop	April 24, 2018	C.3. workshop for municipal staff and land development professionals
CCTA Planning Director's meeting	May 10, 2018	CCCWP GI Plan presentation by Dan Cloak  Attended by the City Planning Director
Planning Department Weekly Meetings	May 23, 2018  October 26, 2018  January 28, 2019	Reviewed Provision C.3. and GI Plan requirements
City Council Meeting	June 19, 2018	Staff presentation on GI Plan
GI Workshop	September 26, 2018	Attended by City engineering and planning staff
Contra Costa Planning Directors meeting	January 11, 2019	CCCWP GI Plan presentation by Dan Cloak
Contra Costa City/County Engineering Advisory Committee	January 17, 2019	CCCWP GI Plan presentation by Dan Cloak
City website revisions: <a href="https://www.cityoforinda.org/405/Green-Infrastructure">https://www.cityoforinda.org/405/Green-Infrastructure</a>	February 5, 2019	Completed in collaboration with planning. Website includes information about the GI Plan process.
Connect Orinda Public Forum	May 28, 2019	Presented GI concepts to be incorporated in future Downtown Streetscape projects

## 2 Green Infrastructure Targets

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Provision C.3.j.i.2.c of the MRP requires the City's GI Plan to identify impervious surface targets to be retrofitted with GI projects by 2020, 2030, and 2040.

This planning process developed and assessed projections for the acreage of impervious surface to be retrofitted and treated with GI from private projects within the City of Orinda's jurisdiction by 2020, 2030, and 2040. 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 of Orinda's jurisdiction by 2020, 2030, and 2040.



### 2.1 Private Development Projections

To forecast private development, the City of Orinda 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 Association of Bay Area Government [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 local staff for consistency with the City of Orinda's local knowledge and 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. Due to 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 (that is, will be retrofitted 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.

City Planning and Public Works Staff reviewed the UrbanSim output and made the following revisions:

- Revised/reclassified assumed development or redevelopment periods
- Removed parcels which are not likely to be developed or redeveloped prior to 2040
- Added parcels that are known to have subdivision applications and assigned a development period
- Removed parcels which were outside City limits

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**. It should be noted that the City has no control over private development or redevelopment; the actual rate of development may be significantly different than forecast.

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

Year	Cumulative Impervious Area [Acres]
2020	5.5
2030	7.9
2040	8.6

## 2.2 Targets for Public Projects

Forecasted impervious surface to be retrofitted 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 Cumulative Impervious Surface to Be Retrofit via Public Development**

<b>Year</b>	<b>Cumulative Impervious Area [Acres]</b>
2020	0.2
2030	1.0
2040	13.4

### 2.3 Projected Load Reductions

MRP Provisions C.11/12.c.ii.(2) require Permittees to prepare Reasonable Assurance Analyses (RAA) for mercury and PCBs that achieve the following objectives:

- a) Quantify the relationship between areal extent of GI implementation and load reductions, taking into consideration the scale of contamination of the treated area as well as the pollutant removal effectiveness of likely GI strategies;
- b) Estimate the amount and characteristics of land area that will be treated through GI by 2020, 2030, and 2040;
- c) Estimate the amount of load reductions that will result from GI implementation by 2020, 2030, and 2040; and
- d) Quantitatively demonstrate that PCBs reductions of at least 0.5 kg/yr and mercury reductions of 1.7 kg/yr will be realized within the County by 2040 through implementation of GI projects.

The CCCWP Annual Report includes a memorandum prepared by Geosyntec Consultants, “Reasonable Assurance Analysis [RAA] Countywide Attainment Strategy”. The memorandum summarizes the objectives and methodology for the CCCWP RAA analysis that will be submitted with the Fiscal Year 2019-2020 Annual Report to meet each of the objectives noted above.

The CCCWP also developed a Countywide Attainment Strategy memorandum that describes potential next steps for County Permittees to implement projects collectively to meet the MRP load reduction requirements. The RAA analysis includes a scenario outlined in the Countywide Attainment Strategy that evaluates PCBs loads reduced by public projects in each Permittee’s GI Plan. This demonstrates how PCBs load reduction goals could be achieved at the countywide level. The Permittees collectively believe that a countywide strategy will be the most effective and efficient way to achieve the PCBs load reduction goals.

## 3 Public Project Identification, Prioritization, and Mapping

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### 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 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. A summary of the project identification and prioritization process conducted for the SWRP is described herein; additional details may be found in the CCW SWRP (CCCWP, 2018).

A metrics-based, multi-benefit analysis SWRP project opportunity scoring process used the following categories, and scoring criteria are included in **Table 4**:

- Parcel Area
- Location Slope
- Infiltration Feasibility
- PCBs/Mercury Yield Classification in Project Drainage Area
- Removes Pollutant Loads from Stormwater
- Augments Water Supply
- Provides Flood Control Benefits
- Re-establishes natural water drainage systems or develops, restores, or enhances habitat and open space
- Provides Community Enhancement

**Table 4. CCW SWRP Projects Metrics-Based Multi-Benefit Scoring Criteria**

Project Component	Benefit Addressed	Points		
		0	1	2
<i>General Stormwater Management Performance/Implementation Feasibility</i>				
Parcel area (for regional and parcel-based projects only)	All	<1 acre	1-<4 acres	>4 acres
Location slope	All	7-10%	3-7%	0-3%
Infiltration feasibility	All	No	Partial	Yes
<i>Individual Benefit Performance</i>				
PCBs/Mercury yield classification in project drainage area <sup>1</sup>	Water Quality	New Urban, Agriculture/Open Space, or Other	Old Urban	Old Industrial or Source Property (+1)
Removes pollutant loads from stormwater	Water Quality	Trash Capture Devices	Non-Green Infrastructure and Non-Infiltrating Green Infrastructure Treatment Control	Partially and Fully Infiltrating Green Infrastructure Project or Regional Project (+1)
Augments Water Supply	Water Supply	--	Infiltrating Green Infrastructure of Infiltrating Flood Control Project over Potential Water Supply Aquifer	Harvest/Use of Other Water Augmentation Project <sup>2</sup>
Provides Flood Control Benefits	Flood	--	Fully and Partially Infiltrating Green Infrastructure Project	Flood Control Project <sup>2</sup>
Re-establishes Natural Water drainage systems	Environmental	--	Fully and Partially Infiltrating Green Infrastructure Project	Stream Restoration or Hydromodification on Control <sup>2</sup>
Develops, restores or enhances habitat and open space	Environmental	--	Green Infrastructure Project	Habitat Restoration Project <sup>2</sup>
Provides enhanced or created recreational and public use areas with potential opportunities for community involvement and education	Community	--	Green Infrastructure Project	Public Use Area or Public Education Project Component <sup>3</sup>

1. Includes parcel yield classification for parcel-based projects; drainage area yield classification for regional projects; and adjacent parcel yield classification for ROW projects. Scores will be weighted on the portion of the drainage area in each yield classification.
2. As identified by the project proponent.
3. Defined as providing "enhanced or created recreational and public use areas, community involvement, or employment opportunities" per the State Storm Water Resource Plan Guidelines (SWRCB, 2015) per Permittee/Stakeholder project information. Typically an added project feature.

### *City Prioritization Process*

City staff review the 5-year CIP on an ongoing basis. Opportunities to incorporate GI are considered during this review. Emphasis is placed on opportunities where projects identified through the CCW SWRP process align with CIP projects listed in the 5-year CIP and/or the unfunded project list, which is used as a source for future CIP projects and grant opportunities.

Based on the CCW SWRP scores, opportunities were prioritized and reviewed by City staff. Several project opportunities were removed for the following reasons:

- Projects were located on private roads;
- Projects were public but not under City control, such as school district, Caltrans, BART, or utility company properties;
- Projects were in or adjacent to areas of slope instability or landslides;
- Projects were isolated residential cul-de-sacs and would provide minimal overall community enhancement;
- Projects did not have adequate existing storm drain facilities;
- Projects along roadways that are narrow and/or windy with limited usable right of way due to topography, thus providing insufficient room for bioswales and bioretention;

### **3.2 Maps and Project Lists**

Potential areas for GI projects are included in **Appendix B. Figures B-1** and **B-2** show a) the City's completed GI project and Early Implementation projects, projects entered into ArcGIS Online from 2003 to the present, as well as planned private development projects where developers have entered into agreements with the City, and potential future public projects. **Table B-1** lists the City's potential public projects to be completed by 2040.

## 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 of Orinda 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 City is moving forward with incorporation of GI elements in the Lavenida Drive 2019 repaving project and Orinda Community Park CIP project.*

### 4.2 Projects Identified

The City has identified one CIP Project with GI potential for the 2015-2020 time period:

1. Lavenida Drive 2019 repaving project

A portion of Lavenida drive will be treated with roadside bioretention; the impervious area to be treated is approximately 200 square feet. **Appendix C** includes the plan details for this project.

### 4.3 Workplan for Completion

Tasks and timeframes for constructing the City’s Early Implementation project is included in **Table 5**.

**Table 5. Early Implementation Project Workplan**

Name of Project	Schedule								Budget	Funding source	Responsible Party
	Planning		Preliminary Design		Final Design		Construction				
	Start	Finish	Start	Finish	Start	Finish	Start	Finish			
Lavenida Drive 2019 repaving project	July 2018	Dec. 2018	Dec. 2018	Feb. 2019	Feb. 2019	Mar. 2019	Oct. 2019	Nov. 2019	\$26,000	Add on Sales Tax	Public Works Dept.



## 5 Tracking and Mapping Public and Private Projects Over Time

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### 5.1 Tools and Process

CCCWP developed a countywide geographic information system (GIS) platform for maintaining, analyzing, displaying, and reporting 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 as part of Provision C.3.

The CCCWP GIS uses web maps and applications by ESRI's ArcGIS Online (AGOL) cloud-based mapping service. The City uses the C.3 Project Tracking and Load Reduction Tool to track existing private and public projects incorporating GI. This system will continue to be used for the future GI projects. The CCCWP intends to update the AGOL tool as the RAA analysis is developed and refined.

### 5.2 Results

Residents interested in obtaining updated PDF maps of completed GI projects may contact the City Public Works and Engineering Department at (925) 253-4231.

## 6 Design Guidelines and Specifications

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### 6.1 Guidelines for Streetscape and Project Design

GI retrofits of existing streets and public parcels within the City will consider the following principles, as applicable:

- Ensure projects design and construct adequate conveyance facilities that meet local drainage standards and consider the potential for flood risk;
- Whenever possible integrate GI with bicycle, pedestrian and transit needs of the right-of-way or parcel;
- Maximize GI opportunities in parking lots and other large paved areas;
- Preserve trees and mature vegetation whenever possible and promote the planting of native trees in project designs;
- Ensure that appropriate design standards and guidelines are followed when designing and implementing GI;
- Promote internal and external communication prior to and during construction to minimize the impact of construction activity on GI.

For projects not regulated under MRP Provision C.3.b that incorporate GI into an existing roadway segment or a previously developed public parcel, the City will use the guidelines presented below. These guidelines provide high level recommendations for managers/designers/contractors related to drainage conveyance, soils/geotechnical; vegetation, utilities and other infrastructure, and constructability.

*San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, January 2009.* The guidebook provides practical information on creating low impact development roadways and parking lots. The guidebook focuses on San Mateo County conditions but much of the guidance is applicable to the City. Roads and parking lots offer significant opportunities for managing stormwater with GI because they constitute as much as 70 percent of the total impervious cover in ultra-urban landscapes. The guidebook contents include:

- Principles of sustainable stormwater design for green streets and parking lots;
- A stormwater design “toolbox” with various site layout strategies and stormwater facility options;
- A description of how varying street and parking lot conditions may provide GI opportunities;
- Design details for green streets and practical advice on how to design and construct green street and parking lot projects; and
- Key considerations for implementing green street and parking lot projects/programs.

*National Association of City Transportation Officials (NACTO) Urban Street Stormwater Guide, 2017.* This resource was developed collaboratively by practitioners and professionals across the United States and provides planning and design guidance for green stormwater infrastructure on city streets to achieve multiple benefits. The guide was developed using other design guidance, city case studies, best practices in urban environments, research and evaluation of existing designs, and professional consensus. These sources, as well as the specific designs and elements included in the guide, are based on North American street design practice.

In addition, the City may refer to guidance for GI facilities included in Chapters 3 and 4 of the CCCWP Stormwater C.3 Technical Guidebook, 7<sup>th</sup> Edition (CCCWP 2017).

## **6.2 Specifications and Typical Design Details**

The City will use the typical design drawings and standard specifications for GI projects that are referenced below, to be approved on a project-specific basis by the City Engineer. GI projects may also utilize design guidance included in Chapter 4 of the *CCCWP Stormwater C.3 Technical Guidebook, 7th Edition* (CCCWP 2017) for other types of low impact development stormwater treatment facilities, subject to City Engineer approval.

- BASMAA Urban Greening Standard Details (See **Table 6**)
- CASQA updates to the Central Coast Low Impact Development Initiative Details and Specifications: <https://www.casqa.org/resources/california-lid-portal/standard-lid-design-plans-specifications>

**Table 6: BASMAA Urban Greening Standard Details- Index of Green Infrastructure (GI) Typical Designs**

Type of GI Facility	Type of Document	Name of Document	Date Prepared	File Type	Weblink
Bioretention Area	Plan View	C-1.1 Bulbout Alternative 1: Sloped Sides, Inline Overflow Structure, Curb Cut Inlet Type A	April 2017	PDF, CAD	PDF file: <a href="http://www.sfestuary.org/wp-content/uploads/2017/07/FinalGIDetails_Compiled.pdf">http://www.sfestuary.org/wp-content/uploads/2017/07/FinalGIDetails_Compiled.pdf</a> CAD files: <a href="http://www.sfestuary.org/wp-content/uploads/2017/07/GI-Details_CAD-20170714T182742Z-001.zip">http://www.sfestuary.org/wp-content/uploads/2017/07/GI-Details_CAD-20170714T182742Z-001.zip</a>
Bioretention Area	Plan View	C-1.2 Bulbout Alternative 2: Walled Bioretention on Both Sides of Corner, Curb Cut Inlets Type A & B	April 2017	PDF, CAD	
Bioretention Area	Plan View	C-1.3 Bulbout Alternative 3: Sloped and Walled Sides, Curb Cut Inlet Type B, Curb Cut Overflow Only	April 2017	PDF, CAD	
Bioretention Area	Plan View	C-1.4 Bulbout Alternative 4: Midblock Bulbout with Raised Bike Lane and Pedestrian Crossing	April 2017	PDF, CAD	
Bioretention Area	Section	S-A-A Section A-A: Sloped Sides / No Curb Walls	April 2017	PDF, CAD	
Bioretention Area	Section	S-B-B Section B-B: Walls on Both Sides, Utility Main Protection	April 2017	PDF, CAD	
Bioretention Area	Section	S-C-C Section C-C: Raised Bike Lane, Overflow Structure	April 2017	PDF, CAD	

### 6.3 Sizing Requirements

MRP Provision C.3.j.i.(2)(g) requires GI projects to meet the treatment and hydromodification management sizing requirements included in Provisions C.3.c and C.3.d. Provision C.3.c also requires the use of low impact development (LID) stormwater controls. To meet the MRP definition of LID, bioretention facilities must have a surface area no smaller than what is required to accommodate a 5 inches/hour stormwater runoff surface loading rate, and infiltrate runoff through biotreatment soil media at a minimum of 5 inches per hour.

Provision C.3.d of the MRP includes volume-based, flow-based, and the combination volume-and flow-based hydraulic sizing criteria. Bioretention areas may be sized using a simplified flow-based hydraulic sizing method, known as the “4 percent method,” in which the surface area of the bioretention area is 4 percent of the effective impervious surface area that is treated.

Instructions for how to size facilities are provided in Chapter 3 (LID Site Design Guide) of the *CCCWP Stormwater C.3 Technical Guidebook, 7th Edition* (CCCWP 2017). Chapter 3 of the C.3 Technical Guidebook includes an LID design procedure, equations for sizing facilities and a format for documenting facility sizing calculations. Sizing factors for “Treatment and Flow Control” are provided in Table 3-6 of the C.3 Technical Guidebook and Appendix E of the C.3 Technical Guidebook provides background on stormwater facility sizing criteria. The guidebook uses the 0.2 inches per hour criterion for flow-based facilities to develop a consistent countywide sizing factor for bioretention facilities used for stormwater treatment only and not for flow control. The sizing factor is based on a design maximum surface loading rate of 5 inches per hour (per Provision C.3.c). The sizing factor is the ratio of the design intensity of rainfall on tributary impervious surfaces (0.2 inches/hour) to the design percolation rate in the facility (5 inches/hour), or 0.04 (dimensionless). The CCCWP has also created a sizing calculator (i.e., IMP Sizing Calculator) to be used in conjunction with Chapter 3 of the Stormwater C.3 Guidebook.

Provision C.3.j.i.(2)(g) of the MRP allows the MRP Permittees to develop an alternate sizing approach for street projects that are not subject to Provision C.3.b.ii. (non-Regulated Projects) in which project constraints preclude fully meeting the C.3.d sizing requirements. This approach, developed by BASMAA, is described as follows.

The Guidance for Sizing GI Facilities in Street Projects, provided by BASMAA (June 2019)<sup>2</sup>, states that bioretention facilities in street projects should be sized as large as feasible and meet the Provision C.3.d sizing criteria where possible. It further states that 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, and provides guidance that may be applied to those circumstances.

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<sup>2</sup><http://basmaa.org/Announcements/basmaa-guidance-for-sizing-green-infrastructure-facilities-in-street-projects-june-2019>. Accessed June 9, 2019.

## 7 Funding Options

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### 7.1 Funding Strategies Developed Regionally

As a small city with limited financial resources available to support the stormwater program, including the implementation of this GI Plan, the strategy will remain opportunistic utilizing funds from as many sources as available. Regionally, as a member of the Contra Costa Clean Water Program, the City will collaborate with fellow Contra Costa permittees in the pursuit of funding and project opportunities that enable GI development. BASMAA's "Roadmap for Funding of Sustainable Streets" will also be used as a guideline for seeking appropriate funding.

### 7.2 Local Funding Element

Consistent with current practice, private (re)development must cover the costs of GI facilities and NPDES permit compliance within their own budgets. The City will continue to ensure compliance with C.3 requirements on private projects in the City through existing development code.

For City projects on City property or within public right-of-way, the following funding opportunities will be used in a portfolio approach:

1. Stormwater Utility Assessment (SUA) – Revenue generated by the SUA is limited and currently does not cover the total costs of complying with the MRP requirements and Orinda's participation in the CCCWP. Due to Proposition 218 it is extremely difficult to raise the SUA rate. The City invested heavily in 2012, in partnership with the CCCWP, to pursue a ballot measure (election) to supplant the SUA fee with a "Clean Water Initiative" fee, which did not pass. At this time the City has neither the financial nor political capital to pursue another ballot measure.
2. Senate Bill (SB) 231 was approved in October 2017, which expanded the definition of sewer to include stormwater services. Local agencies were initially optimistic that this would allow SUAs to be considered like other utilities such as sanitary sewer or potable water and only subject to a majority protest hearing by mail. However, after the final version of SB 231 passed, the legal community has opined that while SB 231 can make it easier for local agencies to finance projects which collect stormwater and treat it for recycling or recharge, they caution against relying on SB 231 to pass separate fees or charges solely for storm sewer system operation, maintenance and capital costs. Orinda's stormwater system does not treat water for recycling or recharge and therefore at the present time SB 231 does not appear to allow exemptions from Prop. 218 for Orinda's stormwater program. *Therefore, this funding option has limited value to the City at this time.*
3. Capitalize on Capital Improvement Plan (CIP) – The City examines the 5-year CIP (Capital Improvement Plan) on an ongoing basis to identify opportunities to integrate GI. For example, the Lavenida Dr. bioswale was added into the project scope for this 2019 Measure J & L paving project,

which includes paving work on Lavenida Dr. To fund the GI element, the City was able to utilize bond measure funding. The City will continue to look for opportunities to integrate GI into CIP projects as appropriate. Note this bond measure sunsets in 2021.

4. General Fund – The City has added a GI component to the work program for Public Works to complete GI planning and design in conjunction with the 5-year CIP, at a level of approximately \$25,000 to \$35,000 per year.

### **7.3 State and Federal Grants**

When appropriate and available the City will identify and pursue state and federal grants that support the planning, design and construction of GI Projects.

## **Appendix A**

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Planning Documents Reviewed for Green Infrastructure



Table A-1

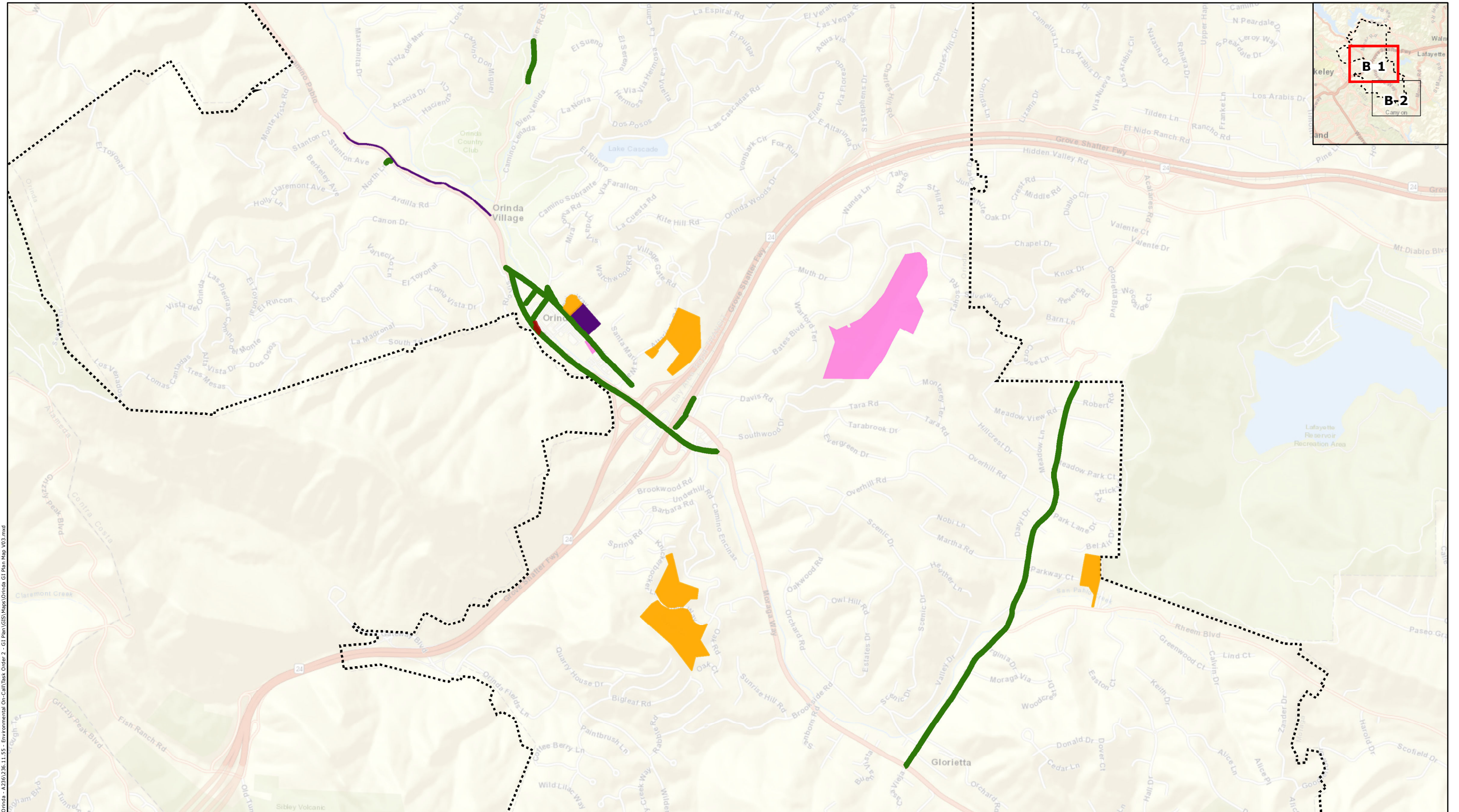
Summary of Planning Documents Reviewed for Incorporating Green Infrastructure Requirements

Document Name	Department Responsible for Document	Contact Person in Department	Do Policies, Guidance, or Requirements in Document Create...		Describe Opportunities and/or Conflicts	Is Document Appropriate to Update?				Estimated Update Schedule		
			Opportunities to Install GI? (Y/N)	Conflicts with GI? (Y/N)		Yes	Additional GI Opportunities, if Yes	No	Reason, if No	Draft Text	Circulate Draft	Outreach/ Final Approval
General Plan 1987-2007 (1987)	Planning	Planning Director	Y	N	<ul style="list-style-type: none"> <li>Land Use and Circulation Element encourages more connectivity with San Pablo Creek and enhancement and preservation of the creek with landscaping, pathways and other pedestrian amenities, consistent with its primary purpose for flood control.</li> <li>The Environmental Resources section includes policies that support the concept of keeping much of the land on the north and west of the City which drains into EBMUD reservoirs designated as parks, very low-density residential, and watershed land.</li> </ul>	Y	Land Use Element Update will be done in parallel with Downtown Specific Plan. GI will be identified as a desired feature to be incorporated			2019	2020	2021
Downtown Specific Plan.	Planning	Planning Director	Y	N	Private development encouraged to utilize GI	NA	This is a new document. A component of the plan will in effect replace the Downtown Design Guidelines			2019	2020	2021
Downtown Design Guidelines (1990)	Planning	Planning Director	N	N		NA	See Downtown Specific Plan					
Orinda Way Streetscape Master Plan (2000)	Planning	Planning Director	N	N		Y	To be updated as the Downtown Streetscape Master Plan, which includes "Connect Orinda". GI concepts will be included (see GI Plan Figure 1.) The Plan is scheduled for completion September 2019.			2019	2019	2019
San Pablo Creek Through Downtown Orinda Preliminary Restoration Plan (2001) Prepared by Friends of Orinda Creeks	Friends of Orinda Creeks (FOC), Planning, Public Works		NA	NA	City Council authorized Staff to apply for restoration grants at its March 5, 2019 meeting. San Pablo Creek restoration plan underway and initial design will be completed 2020-2021. The creek runs parallel to Camino Pablo and Orinda Way; in between, there are businesses with parking lots with GI can be incorporated.		Building on the work of FOC, the City may adopt its own San Pablo Creek restoration plan pursuant to the grant application and strategic priorities set by the City Council. Any City-adopted plan will have a GI component.	N	It is not a City-sponsored plan.			
North Orinda Specific Plan (1978)	Planning	Planning Director	Y	N	The Plan states: Natural tree cover and vegetation should, wherever possible, be protected to insure the preservation of watershed protection and the natural beauty of the area.	N		N	This Plan deals with height limits on residential properties.			
Bicycle, Trails and Walkways Master Plan (2011)	Parks and Recreation Public Works	Public Works Director	N	N	The Master Plan is updated on an ongoing basis by drawing project ideas from it when the CIP is reviewed. Approximately half of the projects have been completed. Some areas could be revisited.	Y	City will evaluate GI opportunities as the CIP gets updated each year.			N/A	N/A	N/A

## **Appendix B**

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Public Project Lists and Maps



Document Path: P:\Active Projects\Orinda - A236\236.11.55 - Environmental On-Call\Task Order 2 - GI Plan\GIS\Maps\Orinda GI Plan Map V03.mxd

- Completed Public
- AGOL Sites (2003 to Present)
- Early Implementation
- Public Planned by 2030
- Public Potential by 2040
- Private Potential by 2030
- City Limit



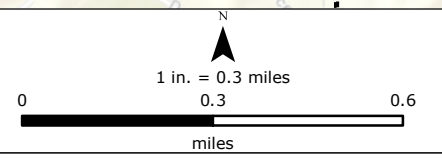
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Bing Hybrid Basemap, City

### City of Orinda, California AGOL and GI Plan Sites

JOB NUMBER  
236.11.55

DRAWN  
kando

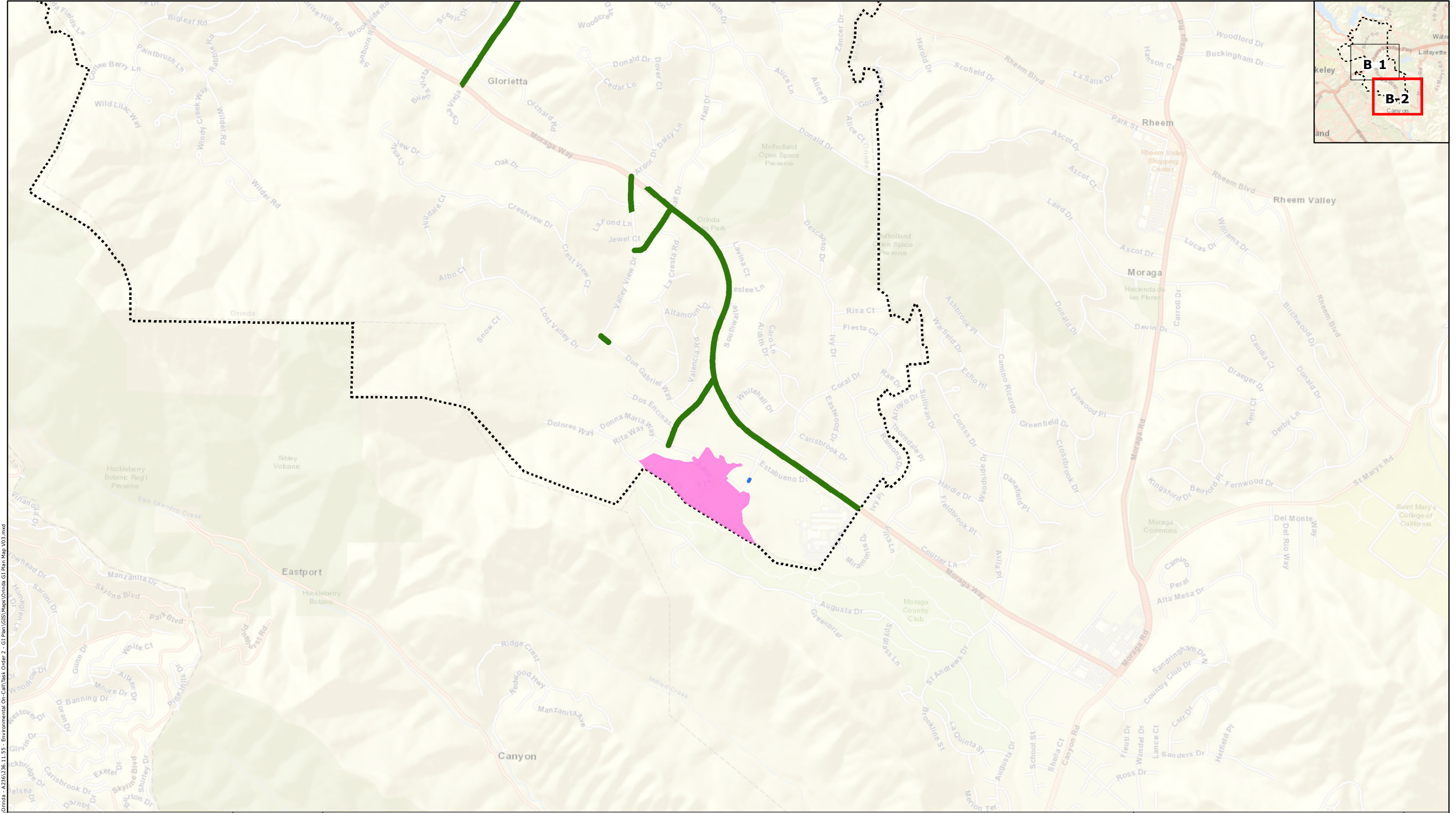
DATE  
5/28/2019



REVISED DATE  
8/5/2019

FIGURE  
**B-1**

APPROVED  
jdrew




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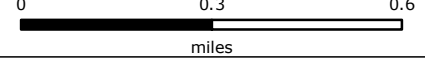
- Completed Public
- AGOL Sites (2003 to Present)
- Early Implementation
- Public Planned by 2030
- Public Potential by 2040
- Private Potential by 2030
- City Limit



<h3 style="margin: 0;">City of Orinda, California</h3> <h4 style="margin: 0;">AGOL and GI Plan Sites</h4>			
SOURCE Bing Hybrid Basemap, City	JOB NUMBER 236.11.55	DRAWN kando	DATE 5/28/2019



1 in. = 0.3 miles



0 0.3 0.6  
miles

**FIGURE**  
**B-2**  
 APPROVED  
 jdrew

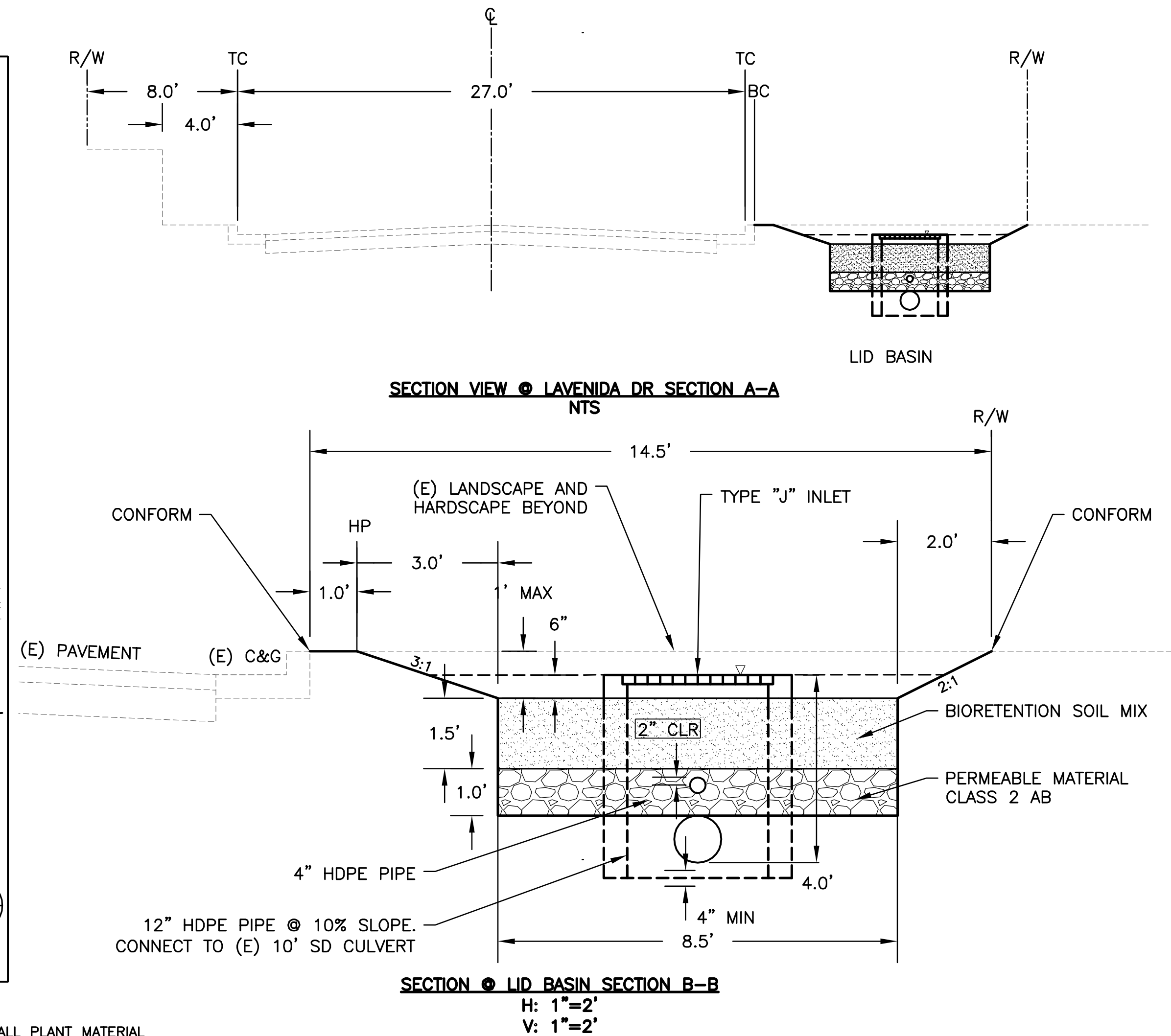
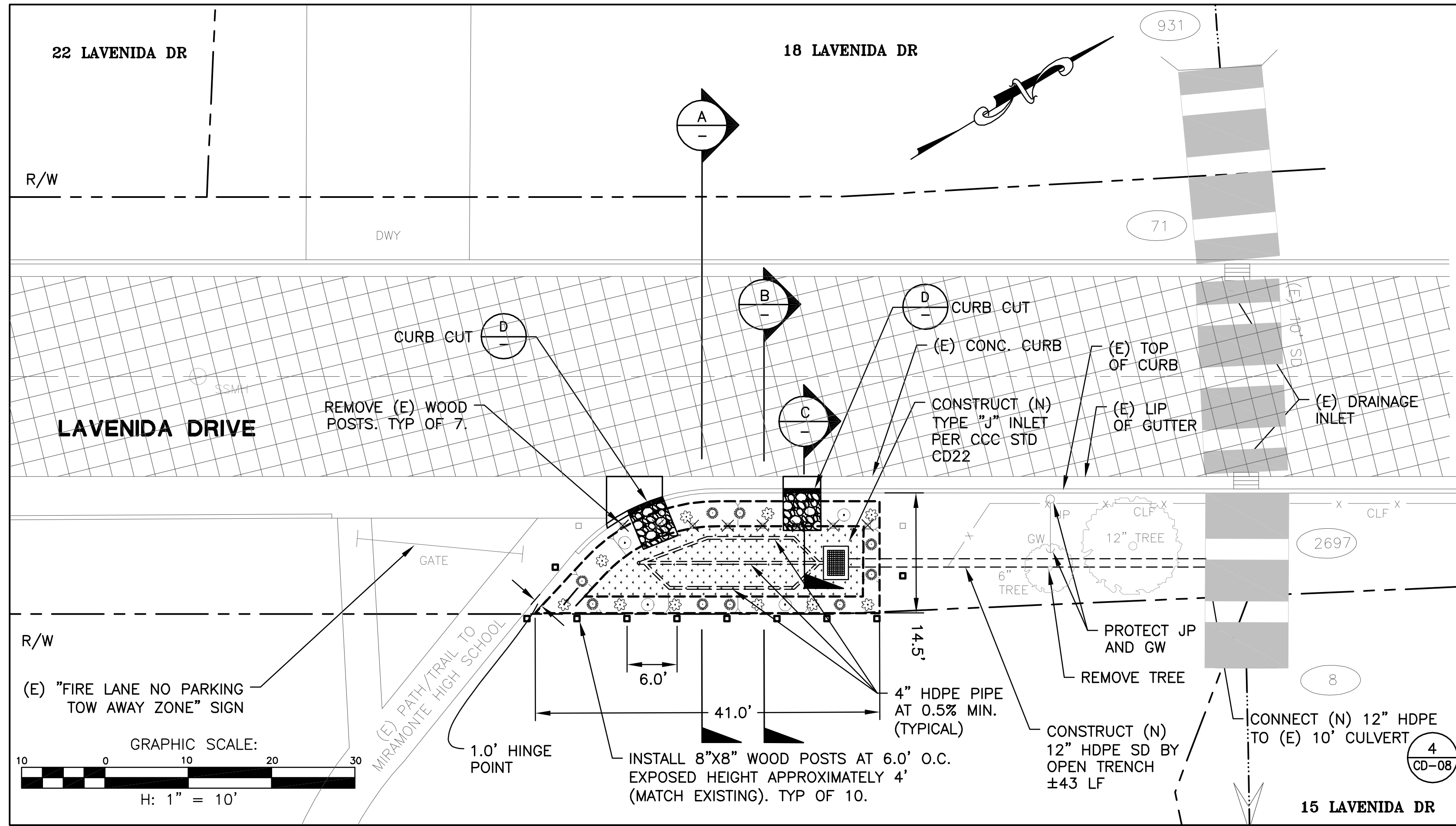
**Table B-1  
City of Orinda List of Potential Public GI Projects to be Completed by 2040**

	SWRP db_index	Project Type	Ownership	Street Name	Total Score from SWRP Metrics Based Evaluation	Estimated Impervious Area Treated [Acres]	Comment
1	planned_151	ROW	Public	Orinda Way	6	2.50	This project is part of the Streetscape Master Plan. The Plan is funded and is in the report preparation phase. The detailed design and construction phases are not yet funded.
2	ROW_3164	ROW	Public	Camino Sobrante	11	0.40	
3	ROW_1414	ROW	Public	Avenida De Orinda	5.5	0.27	
4	ROW_3140	ROW	Public	Camino Pablo	11	0.10	
5	ROW_12882	ROW	Public	Moraga Way	11	2.62	
6	ROW_12883	ROW	Public	Moraga Way	11	0.18	
7	ROW_2841	ROW	Public	Bryant Way	12	0.58	
8	ROW_3162	ROW	Public	Camino Sobrante	10	0.14	
9	ROW_3143	ROW	Public	Camino Pablo	10	1.70	
10	ROW_10783	ROW	Public	Lavenida Drive	11	0.39	
11	ROW_21369	ROW	Public	Woodland Road	11	0.36	
12	ROW_7997	ROW	Public	Glorietta Blvd	11	0.07	
13	ROW_3159	ROW	Public	Camino Sobrante	11	0.06	
14	ROW_12559	ROW	Public	Miner Rd	9	0.13	
15	ROW_6478	ROW	Public	El Camino Moraga	11	0.66	
16	ROW_7998	ROW	Public	Glorietta Blvd	10	1.70	
17	ROW_5914	ROW	Public	Don Gabriel Way	9	0.08	
18	ROW_19916	ROW	Public	Valley View Dr	11	0.27	
19	N/A	ROW	TBD	Camino Pablo	N/A	0.15	Camino Pablo Pathway Project, CIP unassigned project in CIP FY 18-22. Project area may not be City right-of-way, but rather through an agreement or license from EBMUD, who owns the adjacent property.

# Appendix C

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Lavenida Drive Early Implementation Project Plan Details



**PLANT SCHEDULE**

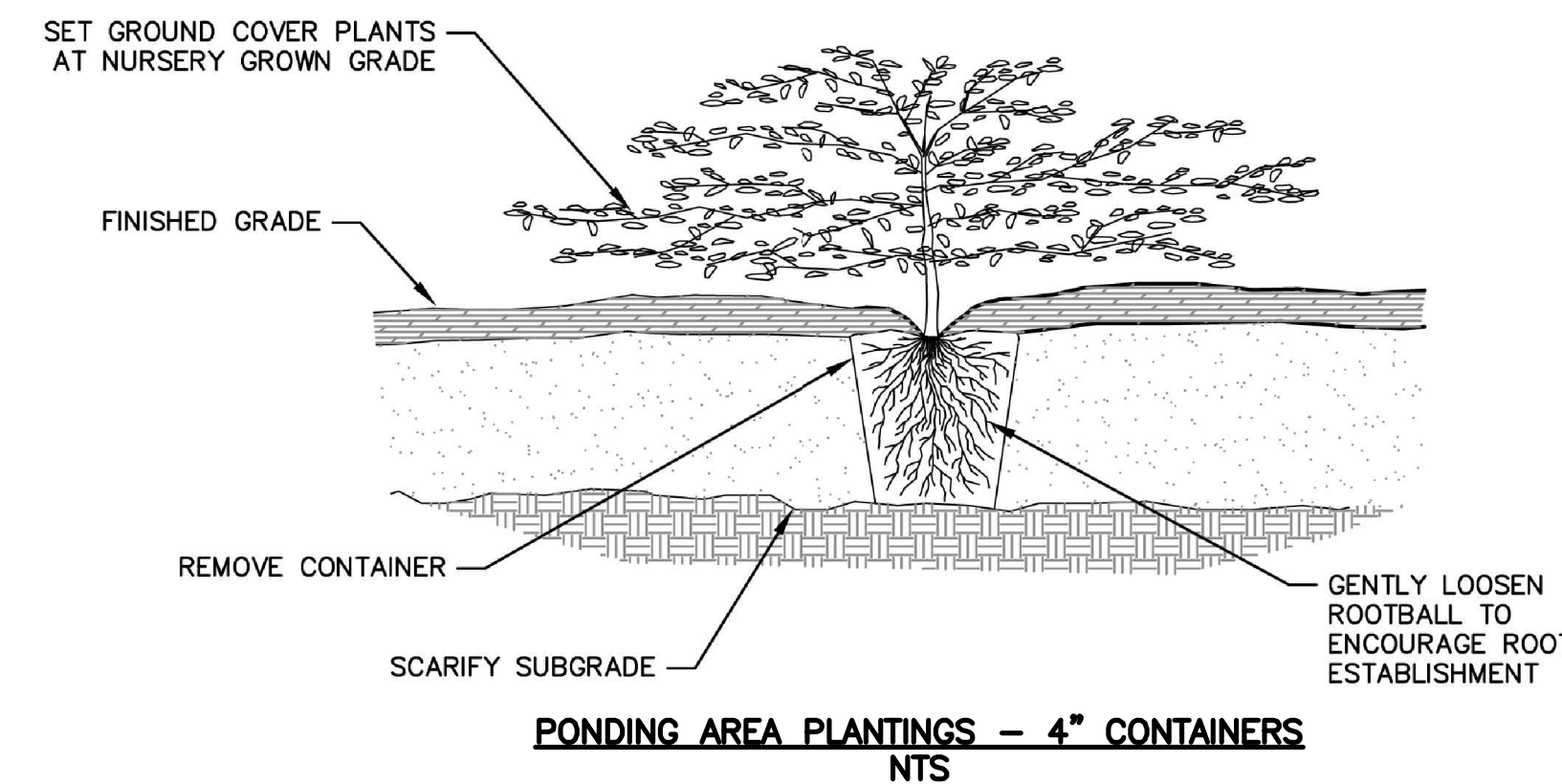
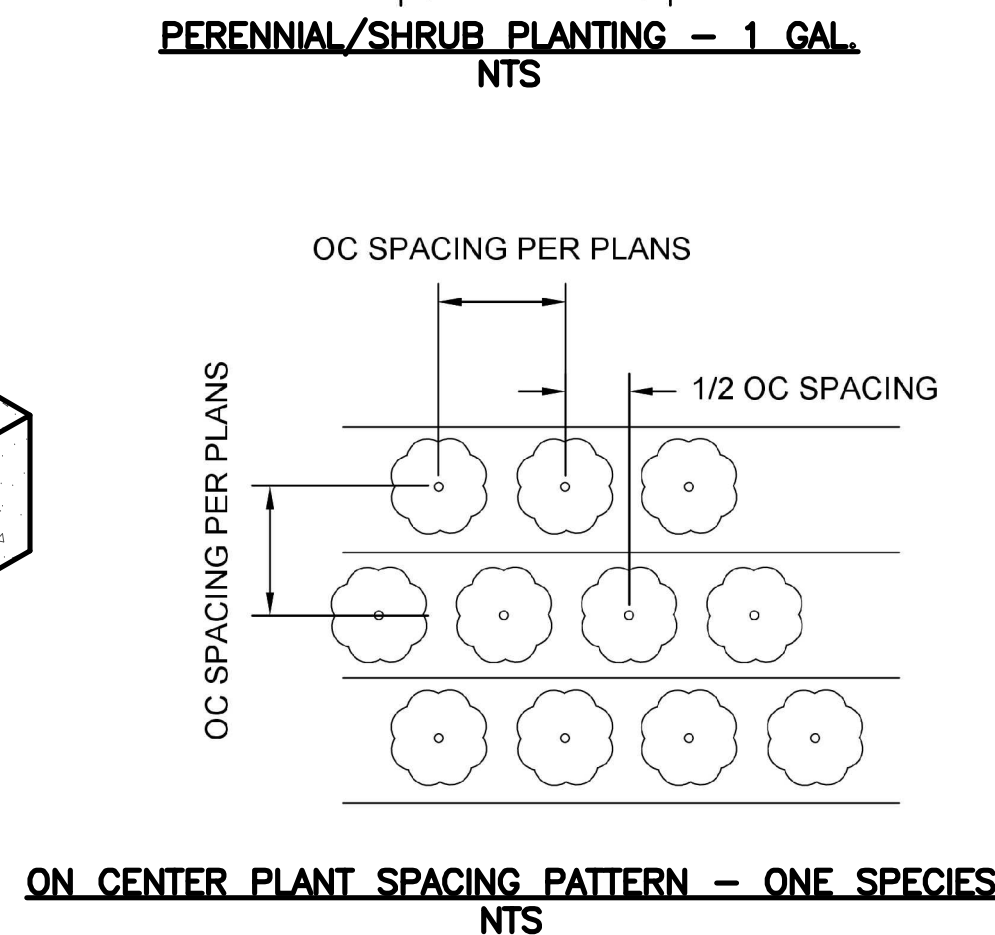
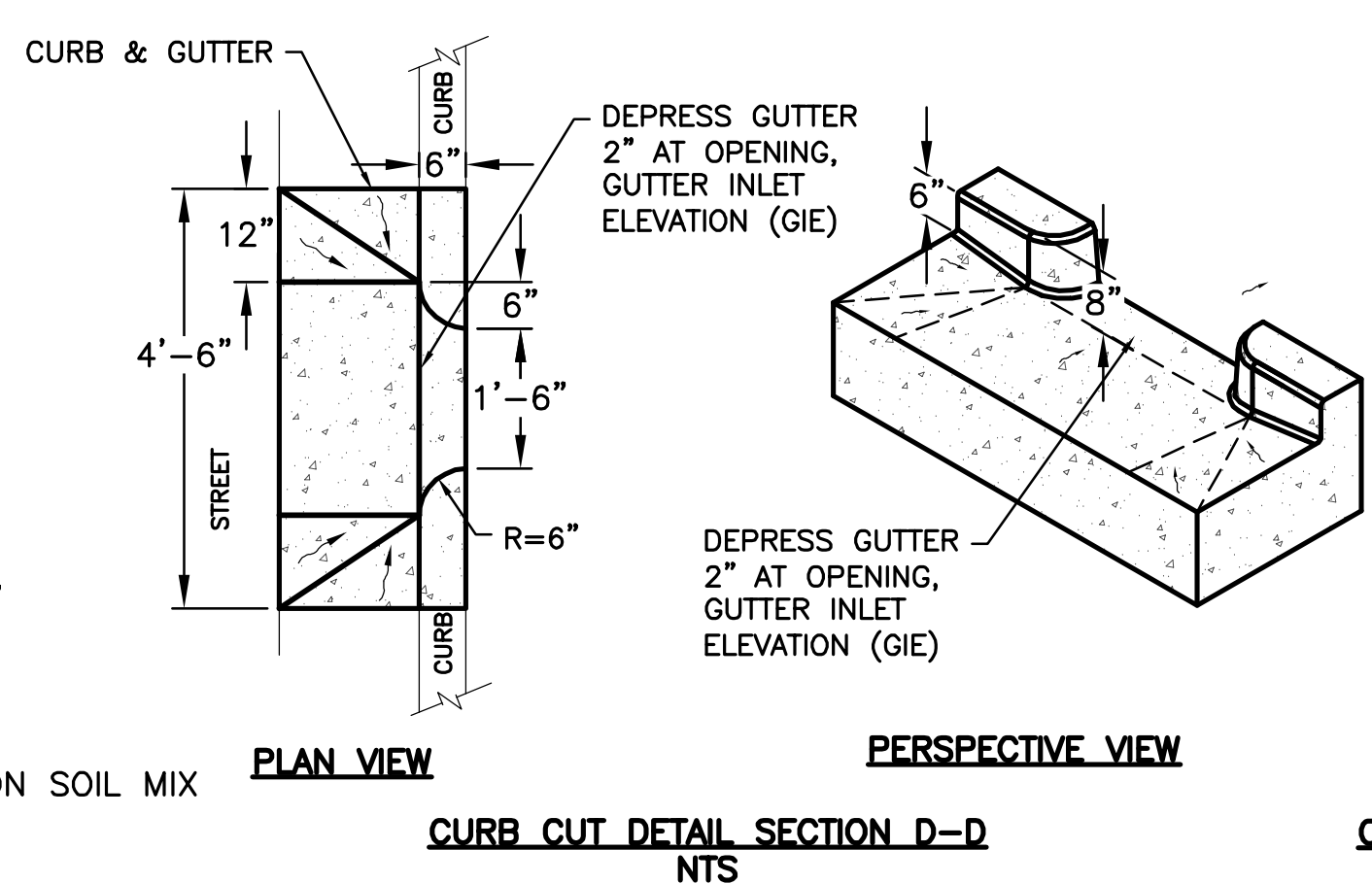
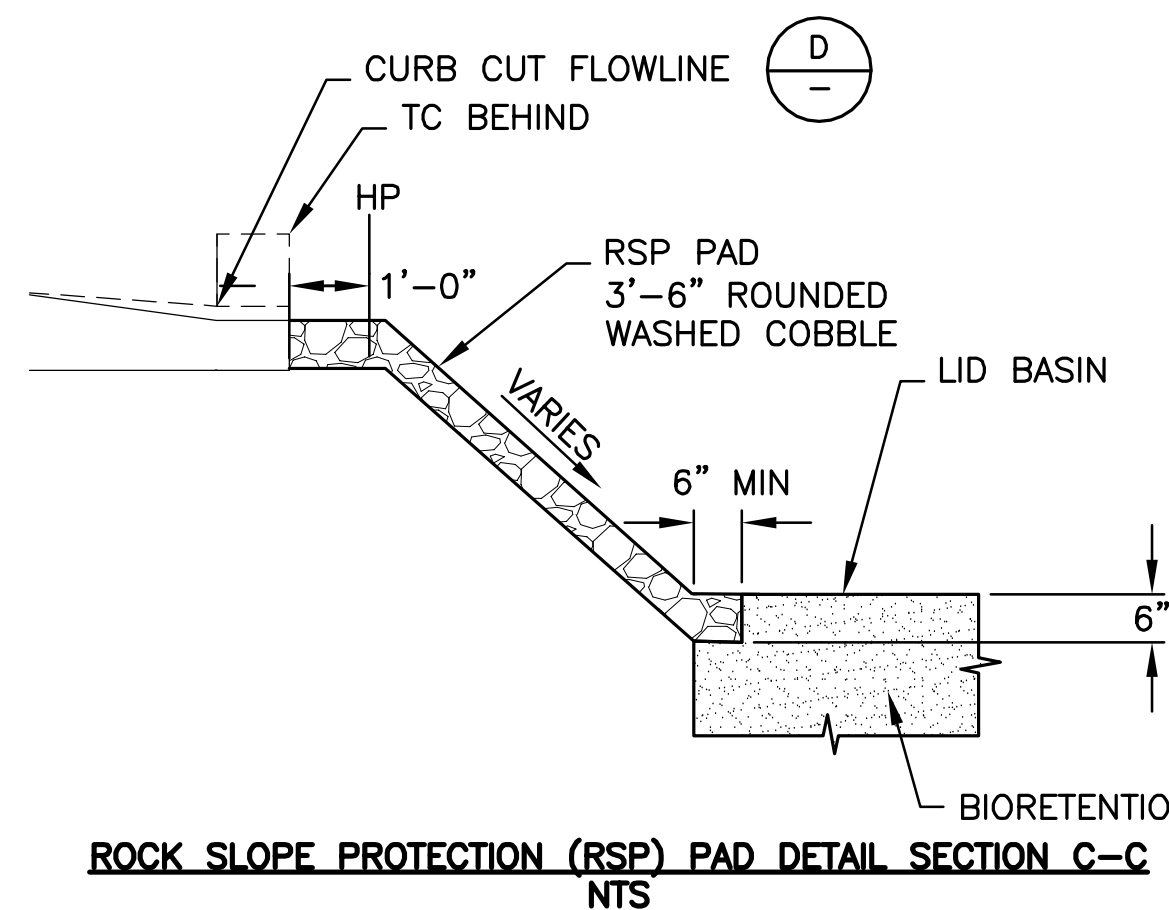
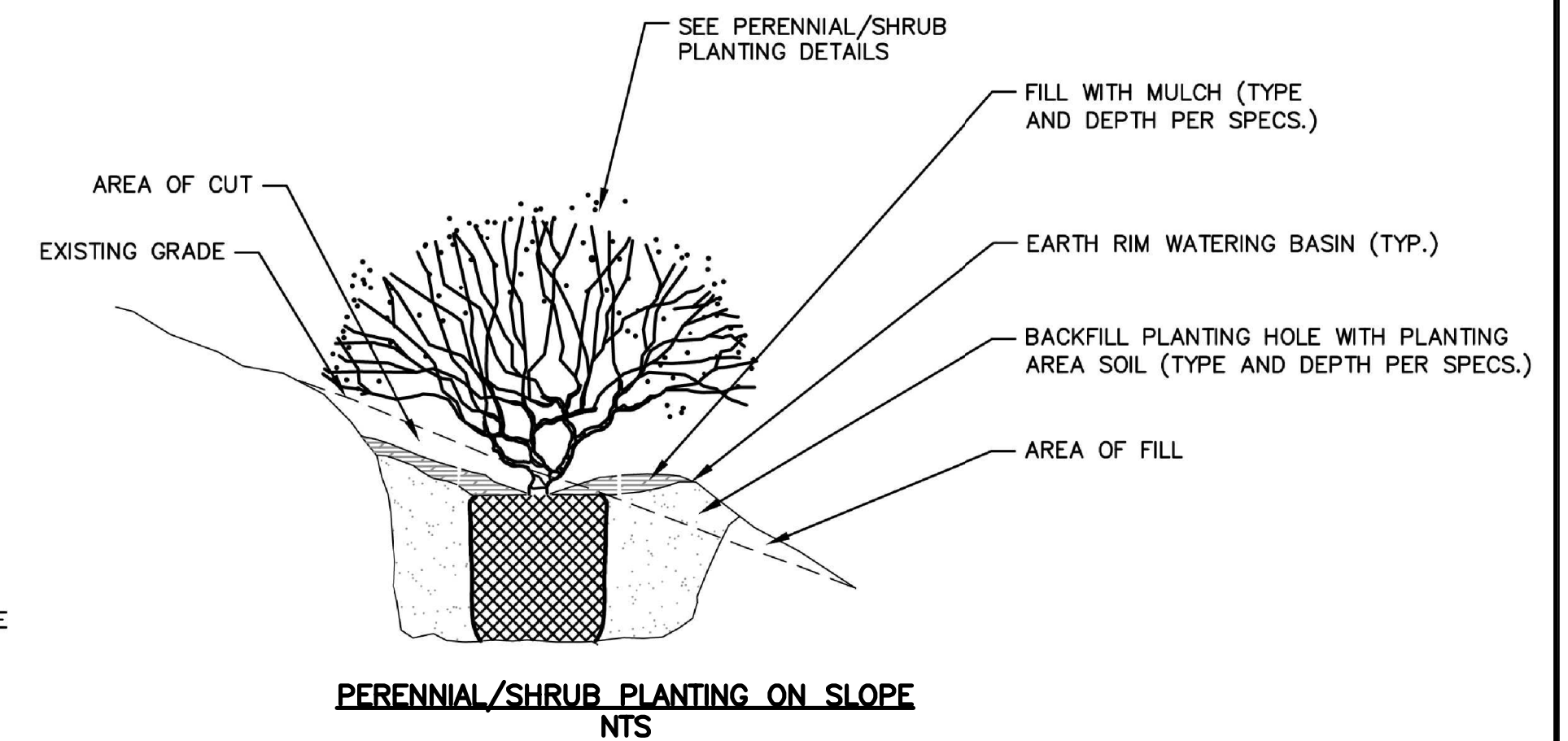
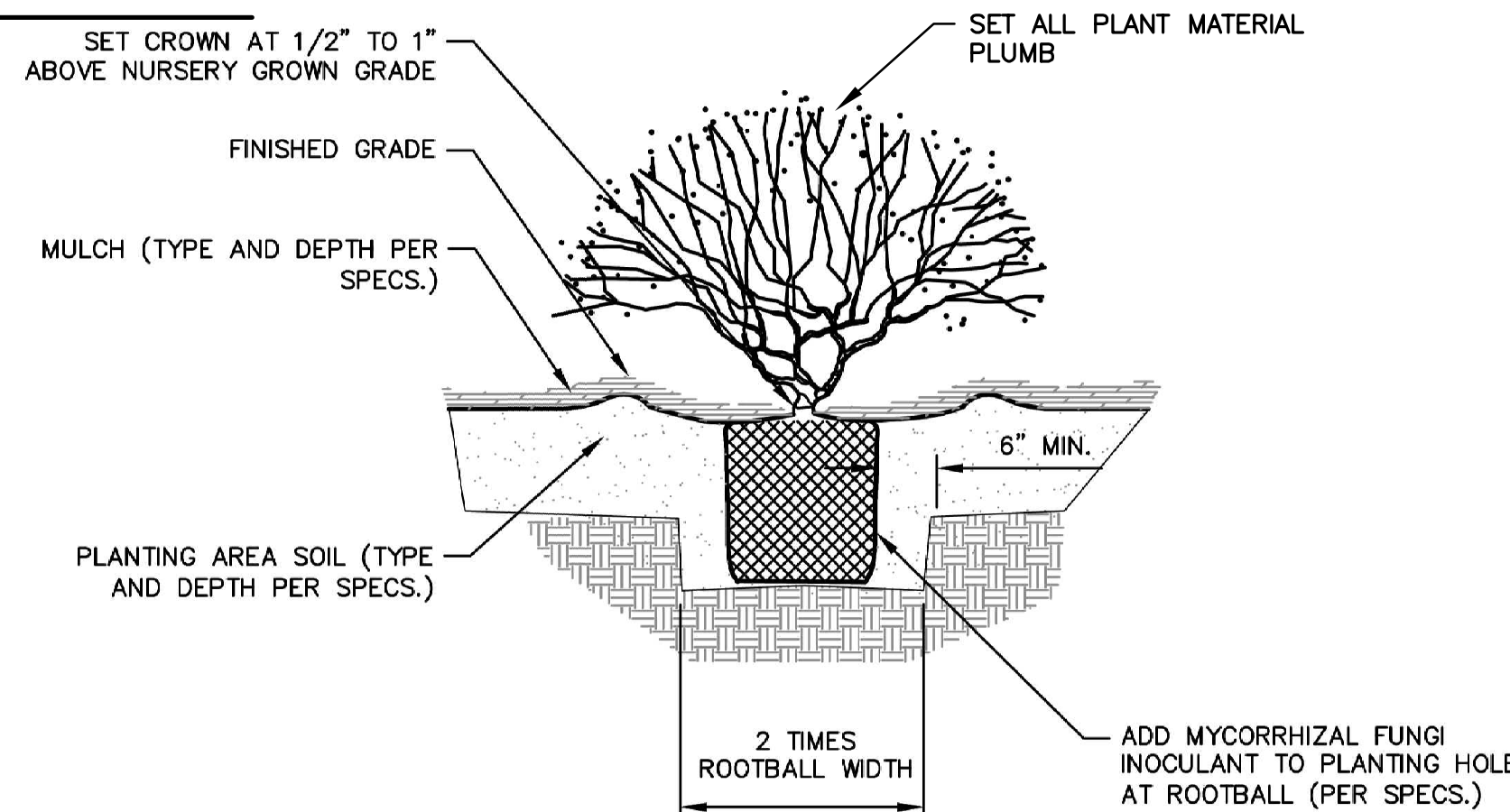
SHRUBS	BOTANICAL NAME/COMMON NAME	SIZE	QTY	
	Epilobium californicum 'Bowman's #1'/California Fuchsia	1 GAL.	10	
	Hunnemannia fumariifolia/Mexican Tulip Poppy	1 GAL.	4	
	Muhlenbergia dubia/Pine Muhly	1 GAL.	9	
PONDING AREA PLANTINGS		QTY	SIZE	SPACING
	Juncus patens/California Gray Rush	51	4 INCH	24" OC

**LANDSCAPE NOTES:**

- BIORETENTION SOIL MEDIA LIMITS PER PLANS
- HOLD BACK PLANTINGS 1'-0" MIN. FROM BACK OF CURB TO PREVENT OVERSPREAD FROM PLANTER AREA
- NO IRRIGATION
- 6 MONTH PLANT ESTABLISHMENT PERIOD PER SPECIFICATIONS
- ACTUAL LOCATION OF PLANTS SHALL BE DIRECTED BY ENGINEER IN FIELD

**1 LAVENIDA DR LID BASIN**

H: 1"=10'



NO.	BY	DATE	REVISION

**LAVENIDA DR LID BASIN**

**CITY OF ORINDA**  
2019 ANNUAL AND MEASURE J & L PAVEMENT REHABILITATION  
22 ORINDA WAY  
ORINDA, CA 94563

**Harris & Associates**  
1401 Willow Pass Rd, Suite 500 Concord, CA 94520  
www.harris.com (925) 827-4900

DESIGNED BY: KLC  
DRAWN BY: KLC  
CHECKED BY: SN  
DATE ISSUED: APR 24, 2019  
JOB NO.: 160-1102.01  
DWG NO.: MI-08  
SHEET 90 OF 104