PARKS & RECREATION COMMISSION MEETING

Council Chambers
200 H Street
Antioch, CA 94509

Thursday
June 16, 2016
7:00 p.m.

AGENDA

I. **CALL TO ORDER**

II. **PLEDGE OF ALLEGIANCE**

III. **ROLL CALL**

IV. **PUBLIC COMMENTS**

Residents are given the opportunity to address the Commission on Park and Recreation issues not on the regular agenda.

V. **APPROVAL OF MINUTES**

Recommended Action:

1. Motion to approve annotated agenda minutes of the Parks and Recreation Commission meeting of May 19, 2016.

VI. **BUSINESS**

1. Presentation by the Antioch Council of Teens (ACT)
2. Review and Provide Feedback on Conceptual Plans for Waldie Plaza Redesign and Renovation
3. Review and Recommend Park and Trail Conceptual Plans for Aviano Development Project

VII. **COMMUNICATIONS** (Announcements and Correspondence)

1. Staff
2. Commission Communication

VIII. **ADJOURNMENT**

The meetings are accessible to those with disabilities. Auxiliary aides will be made available for persons with hearing or vision disabilities upon request in advance at (925) 779-7078 or TDD (925) 779-7081. Agenda and related writings provided to Commission members are available for viewing by the public during normal office hours at the Antioch Community Center, located at 4703 Lone Tree Way, Antioch, CA 94531, as well as at the Committee meeting. Individuals may view the agenda and related writings on the City of Antioch website: www.ci.antioch.ca.us

PARKS & RECREATION COMMISSION MEETING

NOTE THE LOCATION AND TIME CHANGE

Antioch Water Park – Community Room
4701 Lone Tree Way
Antioch, CA 94509

Thursday
May 19, 2016
6:30 p.m.

ANNOTATED AGENDA

I. CALL TO ORDER

Call to Order by Chair McClelland at 6:30 pm

II. PLEDGE OF ALLEGIANCE

Chair McClelland led the Pledge of Allegiance

III. ROLL CALL

Commissioners Present: J. Farr, K. Farr, Foster, Knight, Kelly, McClelland, Soliz
Staff Present: Nancy Kaiser, Parks and Recreation Director
Mike Bechtholdt, Public Works, Operations

IV. PUBLIC COMMENTS

Residents are given the opportunity to address the Commission on Park and Recreation issues not on the regular agenda.

A resident commented on the poor condition of the greenbelt located behind his residence and inquired about the possibility of removing benches and other amenities that encouraged vandalism and mistreatment of the open space.

V. APPROVAL OF MINUTES

Recommended Action:
Motion to approve annotated agenda minutes of the Parks and Recreation Commission meeting of April 21, 2016.

Motion to Approve Minutes for Meeting of April 21, 2016 7 Yes / 0 No

VI. TOUR ANTIOCH WATER PARK

The Antioch Water Park opens May 28, 2016. Commissioners will tour the

Antioch Water Park and receive an overview of operations in preparation for opening day and the 2016 program year. The public is invited to join Commissioners.

Commissioners convened in the lobby of the Antioch Water Park; staff provided a tour and overview of the facility in preparation for opening day of the 2016 season. Commissioners viewed the construction site for the spray park, staff training and lifeguard certification classes, operational changes, and facility upgrades for 2016.

VII. BUSINESS

(Commission will convene immediately following the tour of Antioch Water Park)

1. Request for recommendations and support for bike and pedestrian projects for ATP and other grant applications

Motion to approve bike and pedestrian projects for Active Transportation Program (ATP) and other grant applications. Priority project recommendations are projects that support safety, bike trails, and cross walks.

2. Draft 2016-2021 Five Year Capital Improvement Program (P.W. 150-16)

Motion to accept the Draft 2016-2021 Five Year Capital Improvement Program (CIP).

VII. COMMUNICATIONS (Announcements and Correspondence)

1. Staff

Mike Bechtholdt, from Public Works, gave an update on repairs and projects happening in parks in preparation for the summer season. Irrigation repairs and tree plantings have been active city-wide; vandalism is high in restrooms. Arbor Day was successful and fire break mowing is going well. Staff is preparing for City Park playground improvements later in the year and improvements to the Worth Shaw Concession Snack Bar.

Nancy Kaiser, Recreation, provided flyers and announcements for numerous programs and events that begin early June including camps, swim lessons, teen events, campfires, and sports clinics. Juneteenth planning is underway; scheduled for June 18th at Waldie Plaza.

2. Commission Communication

Commissioner comments included concerns about the vandalism in restrooms and asked about options to reduce vandalism such as closing in winter. Commissioners inquired about any specific budgeted funds for restrooms. Inquiries were also made about sign consistency in parks and neighborhood adopt-a-park programs. Commissioners are interested in partnering with the Crime Prevention Commission to explore park watch programs. It was announced that the Antioch Marina is being considered as a location for the Bay/Delta water trail.

VIII. ADJOURNMENT

The meeting was adjourned at 8:30pm and the next meeting was announced for Thursday, June 16, 2016 at 7:00pm in Council Chambers, 200 H Street.

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STAFF REPORT TO THE
PARKS AND RECREATION COMMISSION

DATE: Regular Meeting of June 16, 2016

TO: Parks and Recreation Commission

SUBMITTED BY: Nancy Kaiser, Parks and Recreation Director Nancy Kaiser

SUBJECT: **PRESENTATION BY THE ANTIOCH COUNCIL OF TEENS (ACT)**

The members of the Antioch Council of Teens (ACT) will make a presentation about the beginning of the initiative; first meeting, summer activities, school-year activities and year round goals.

VI-1

STAFF REPORT TO THE
PARKS AND RECREATION COMMISSION

DATE: Regular Meeting of June 16, 2016

TO: Parks and Recreation Commission

SUBMITTED BY: Nancy Kaiser – Director of Parks and Recreation Nancy Kaiser

SUBJECT: Review and Provide Feedback on Conceptual Plans for Waldie Plaza Redesign and Renovation

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RECOMMENDED ACTION

It is recommended that the Parks and Recreation Commission review the first draft conceptual plans for renovating and updating Waldie Plaza, discuss merits of changing the name to "Waldie Plaza & Event Center," and provide feedback to staff.

STRATEGIC PURPOSE

Long Term Goal G: Economic Development. Grow the City out of Recession

- **Strategy J-4:** Continue to focus on community enhancements

Long Term Goal J: Parks and Recreation. Provide outstanding facilities and programs for the community.

- **Strategy J-1:** Increase the use of the City's recreation facilities

Long Term Goal K: Public Works & Engineering.

- **Strategy K-1:** Ensure well maintained public facilities, rights-of-ways and parks

DISCUSSION

Developing vision and conceptual plans for Waldie Plaza is a component of the Downtown Specific Plan project, as well as economic development efforts for rebuilding the Historic District of Antioch. The Plaza has been a key gathering place for the community for many years; it offers views of the river, quaint space for conversation, and open space for adjacent businesses. Waldie Plaza hosts some of Antioch's favorite special events including but not limited to summer concerts, the Delta Blues Festival, seasonal parades and holiday celebrations.

Waldie Plaza was named after Mr. Jerome Waldie who was an Antioch native. He represented Antioch in the California State Assembly then served as a US Congressman from 1966-1975. Waldie Plaza provides an important link to community history and builds community relationships today.

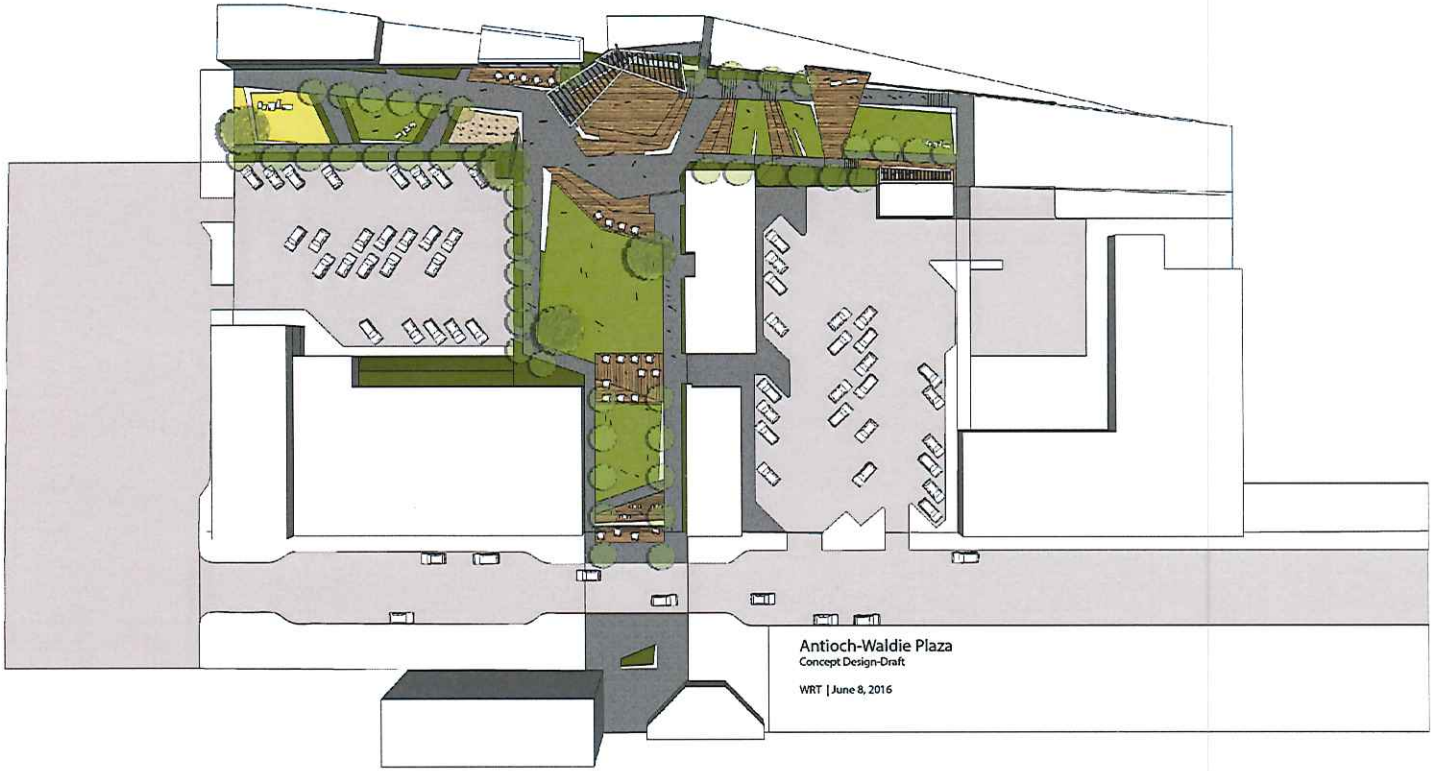
The Plaza design has changed over the generations and the current design has been in place for many years. The current concept represents the City's link to the river and the community's history with river and industry. Maintaining the space and operating the Plaza as designed however, is not practical today. The long-standing drought and climate makes it difficult to operate the simulated river and water flow. The open "river space" may be a hazard to individuals walking through the area. Today's social trends in community also reflect a desire for small spaces for conversation immersed in open spaces.

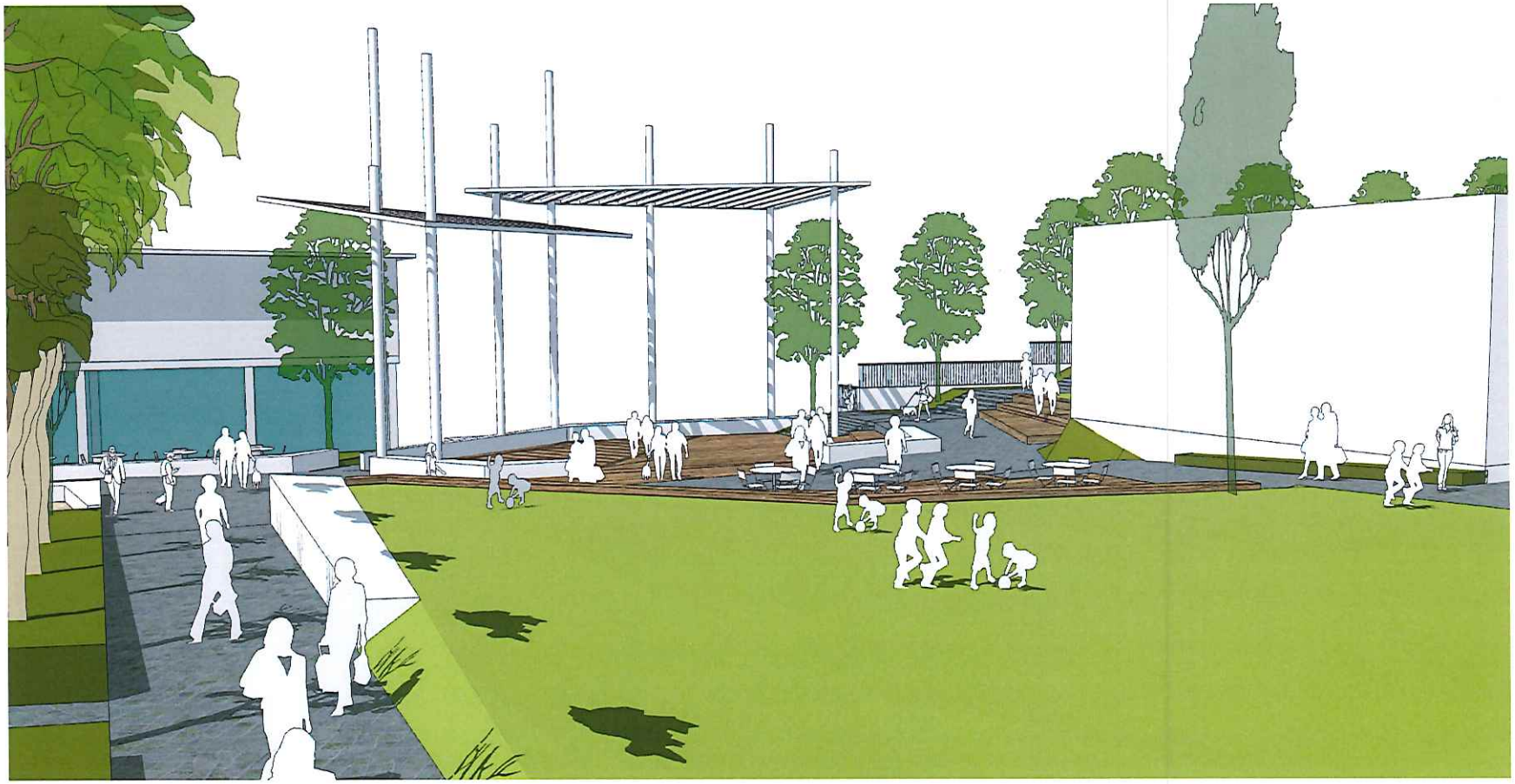
In preparation for upcoming funding opportunities the City is looking for conceptual designs of Waldie Plaza that can accompany grant applications. Confirming a new and vibrant vision for the space will demonstrate that the City is prepared to move forward as soon as possibilities are available.

Attached are conceptual designs that reveal a new Waldie Plaza; a vibrant and attractive element that serves as the anchor for the Historic District and invites all residents to enjoy the views of the river. The activities and events that currently take place at Waldie Plaza can expand and grow, and this park can become the signature event center for the community. The Parks and Recreation Commission has an opportunity to review and discuss the vision and concept for Waldie Plaza and provide feedback to staff in preparation for review by City Council in the future.

ATTACHMENTS

1. Waldie Park Vision and Conceptual Plans


Antioch-Waldie Plaza
Concept Design-Draft
WRT | June 8, 2016




ALDIE PLAZA & EVENT CE

STAFF REPORT TO THE
PARKS AND RECREATION COMMISSION

DATE: Regular Meeting of June 9, 2016

TO: Parks and Recreation Commission

SUBMITTED BY: Lynne Filson, Assistant City Engineer

APPROVED BY: Ron Bernal, Public Works Director/City Engineer

SUBJECT: Aviano parks and trails review

RECOMMENDED ACTION

Staff recommends that the Parks and Recreation Commission recommend approval of the Aviano parks and trails conceptual plans to City Council subject to the conditions in this report and as discussed in the meeting.

DISCUSSION

The Aviano development was approved by the City Council on August 25, 2015. Several of the Conditions of Approval include:

1. Development of Parcel L Park which is an expansion to the existing Chaparral Park
2. Development of Parcel P Park, a new City owned and maintained park
3. Trails and landscaping around the C.3 storm basins along the PG&E right-of-way
4. Landscaping and trails (also serve as maintenance roads) around the C.3 storm basins south of Sand Creek Road

These items are to be reviewed by the Parks and Recreation Commission and recommendations made to the City Council. Staff has reviewed the conceptual plans and recommends the Park and Recreation Commission consider the following conditions in their recommendation to the Council. Also, there are two options for the Parcel P Park. The Parks and Recreation Commission is requested to select one option for recommendation to the City Council.

Parcel L Park:

1. Surface treatments, fencing, and planting shall be complementary to Chaparral Park. Irrigation and other items shall be tied to Chaparral Park for ease of maintenance as approved by the City Engineer.

2. Provide pathway security lighting with motion sensor and dimming features as approved by the City Engineer.
3. Provide sufficient trash and recycling receptacles as approved by the City Engineer.
4. Provide for adequate and positive drainage of all site areas as approved by the City Engineer
5. Provide bollards at all street access points as approved by the City Engineer.
6. Provide a three (3') foot high chain link vinyl clad perimeter fence or other means of preventing vehicle access to the parks along all street frontages as approved by the City Engineer.
7. Provide sufficient trash and recycling receptacles as approved by the City Engineer.
8. Provide barbecue areas near picnic areas as approved by the City Engineer and Parks and Recreation Director.
9. Furnish and install standard City of Antioch park name signs with a distinctive entry treatment as well as park watch signs at the main park entrances as approved by the City Engineer.
10. Provide curb extensions (bulbouts) at decorative crosswalk to the trail system to the south.

Parcel P Park:

1. Children play area will be accessible with poured-in-place rubber chip mat.
2. Install a play lot large enough to provide playground equipment for children ages 2-12 including swings.
3. Provide drinking fountains near the children's play area and meadow/field.
4. Provide pathway security lighting with motion sensor and dimming features as approved by the City Engineer.
5. Provide water and sewer stubs and a suitable location for a potential restroom facility including drinking fountains as approved by the City Engineer.
6. Provide bollards at all street access points as approved by the City Engineer.
7. Provide a three (3') foot high chain link vinyl clad perimeter fence or other means of preventing vehicle access to the parks along all street frontages as approved by the City Engineer.
8. Provide bicycle racks near the main play areas and meadow/field as approved by the City Engineer.

9. Provide sufficient trash and recycling receptacles as approved by the City Engineer.

10. Provide barbecue areas near picnic areas as approved by the City Engineer.

11. Furnish and install standard City of Antioch park name signs with a distinctive entry treatment as well as park watch signs at the main park entrances as approved by the City Engineer.

12. Provide for adequate and positive drainage of all site areas as approved by the City Engineer

13. All walkways to be constructed of concrete and wide enough for use by City maintenance vehicles as approved by the City Engineer.

14. Construct a shade structure near the play area and over 25% of the picnic tables as approved by the City Engineer.

15. Provide decorative (non-fence) means of separating City maintained Parcel P Park from the HOA maintained C.3 drainage basins/trail area such as edge of walkway or meandering cobble band as approved by the City Engineer.

Trails at C.3 basins/PG&E Right of Way and adjacent paths:

1. Provide pathway security lighting with motion sensor and dimming features as approved by the City Engineer.

2. Provide path access to court.

3. Provide bollards at all street access points as approved by the City Engineer.

4. Provide a three (3') foot high chain link vinyl clad perimeter fence or other means of preventing vehicle access to the parks along all street frontages as approved by the City Engineer.

5. All walkways to be constructed of concrete and wide enough for use by HOA and PG&E maintenance vehicles as approved by the City Engineer.

6. Provide trash and recycling receptacles at locations where paths meet the street as approved by the City Engineer.

7. Provide ADA compliant ramps opposite all paths with crosswalks, signs, and legends as approved by the City Engineer.

8. Fencing adjacent to residential lots shall be 6' black tubular steel, black vinyl clad chain link, or masonry as approved by the City Engineer.

Trails south of Sand Creek Road:

1. All fencing adjacent to open space (trails and basins), shall be wrought iron, black vinyl clad chain link, or other material as approved by the City Engineer.

2. The bottoms and slopes of the C.3 basins shall be landscaped to enhance the trail experience. Landscaping a minimum of 10' in width with native shade trees and benches shall be provided along the trails south, west, east, and between the basins.

Attachments:

A. Concept Plans
B. C.3 Basin Planting Criteria
C. Sample C.3 Basin

NEIGHBORHOOD PARK

CITY PARK

PUBLIC PARK

WATER QUALITY SYSTEM / OPEN SPACE TRAILS

BUS STOP

ENTRY TREATMENT

LIFESTYLE HUB

ENTRY TREATMENT

CLUSTER MAILBOX LOCATIONS

0 160 320 640ft

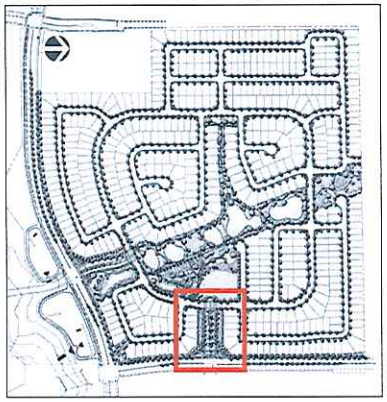
AVIANO ANTIOCH, CALIFORNIA

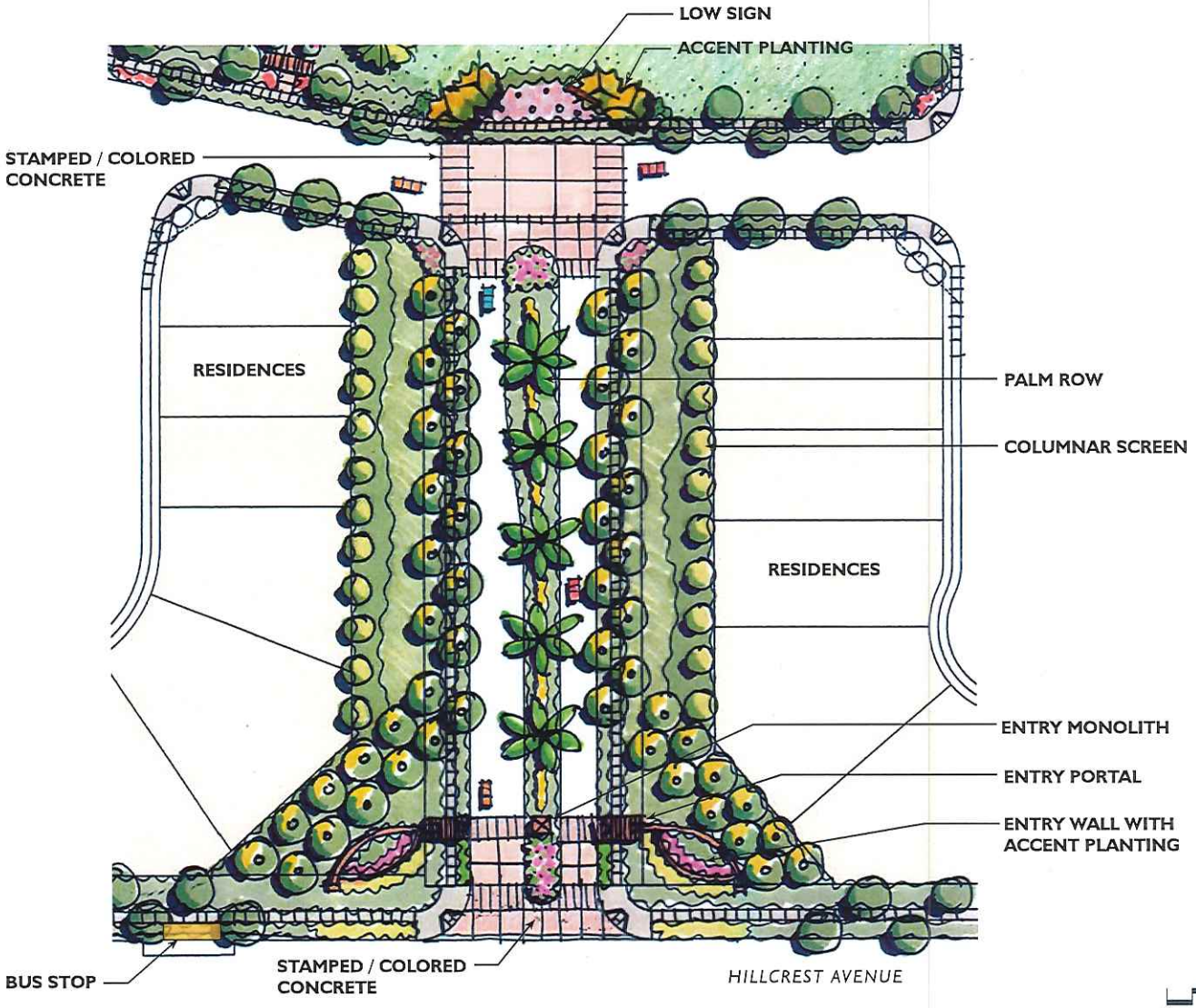
ILLUSTRATIVE SITE PLAN

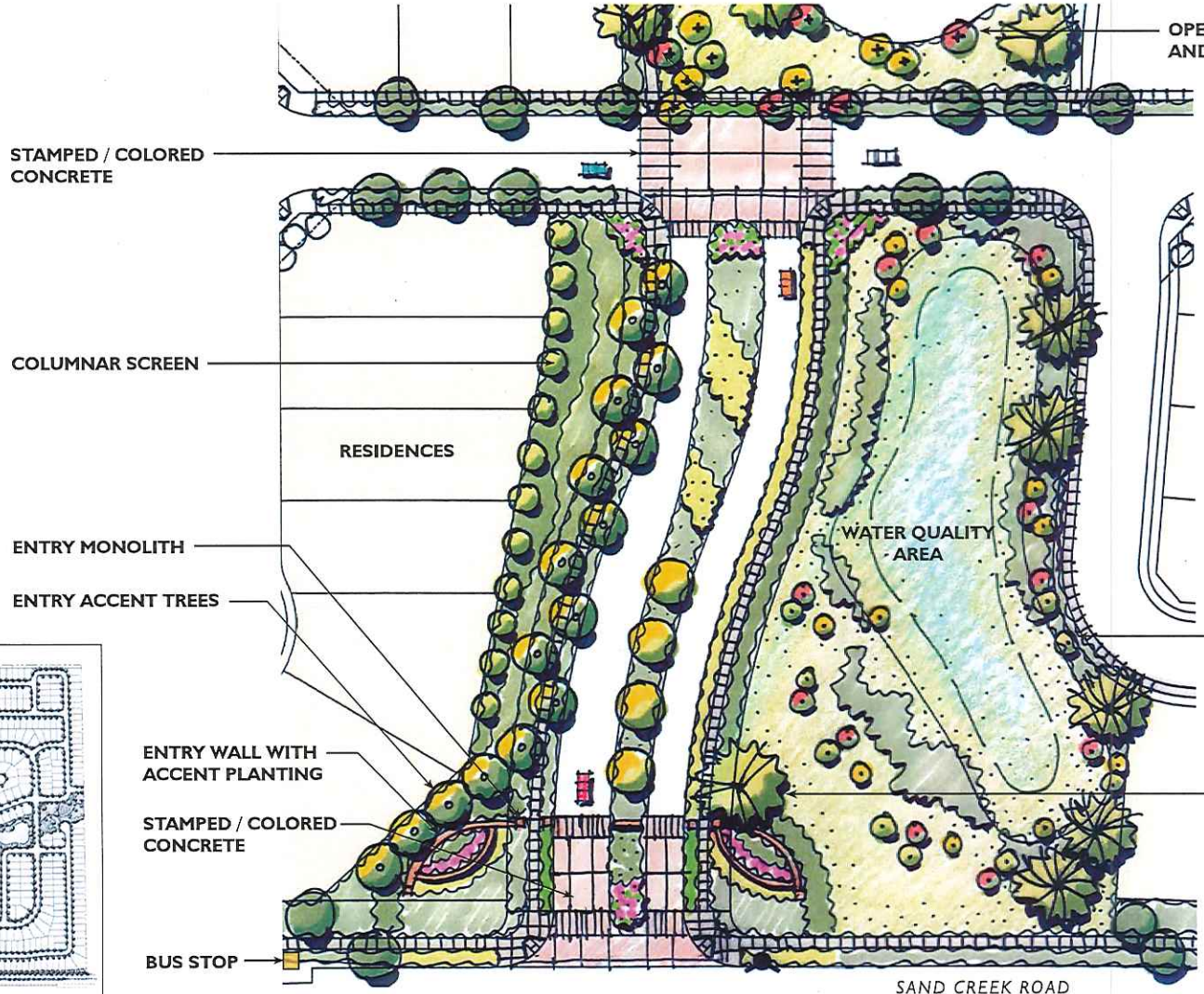
JUNE 2016

VI-3

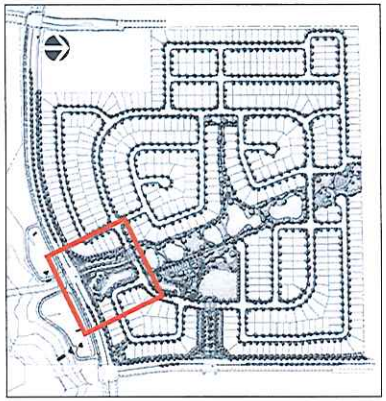
Stamped concrete
Pattern: Random stone
Davis color: Cobblestone







Stamped concrete
Pattern: Random stone
Davis color: Cobblestone



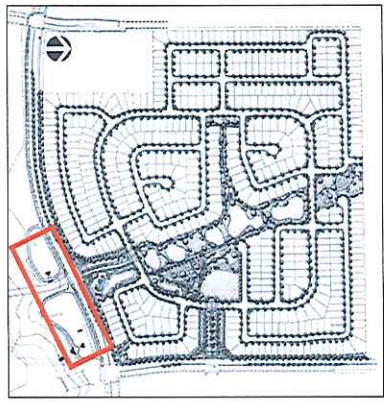
0 30 60 120ft

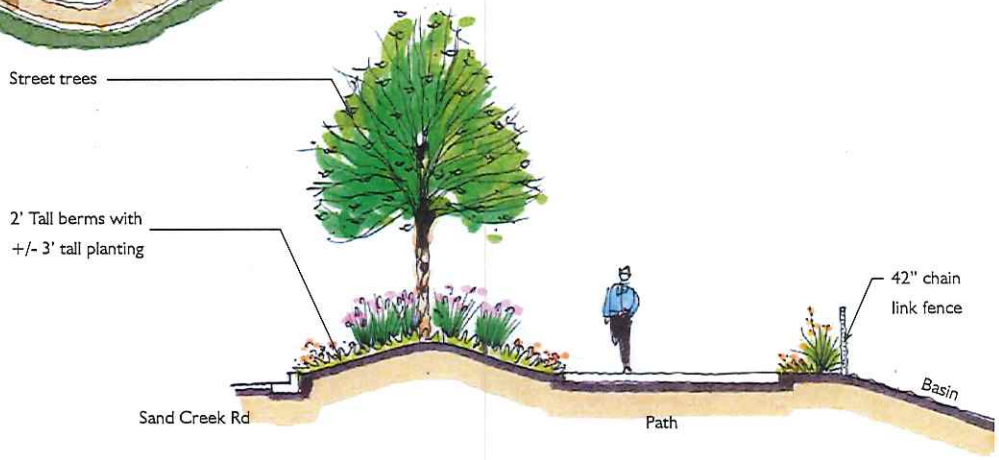
AVIANO

ANTIOCH, CALIFORNIA

ENTRY AT SAND CREEK ROAD - PLAN

JUNE 2016

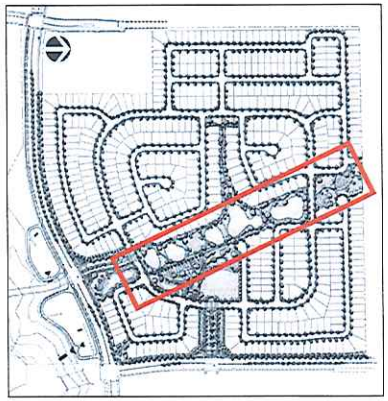




AVIANO ANTIOCH, CALIFORNIA

BASIN SCREENING AT SAND CREEK ROAD

JUNE 2016



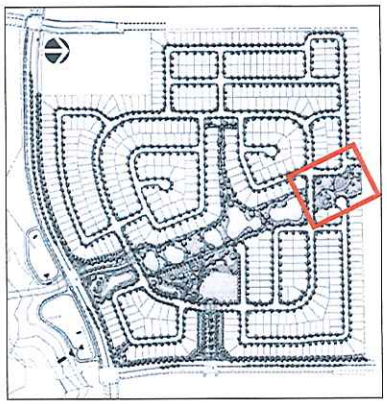
AVIANO

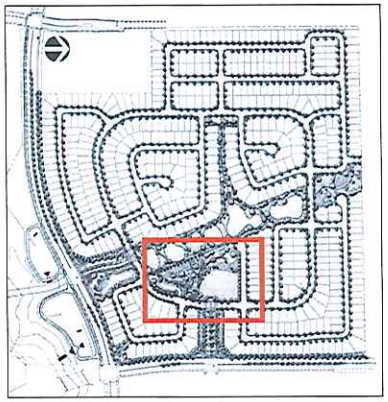
ANTIOCH, CALIFORNIA

WATER QUALITY SYSTEM / OPEN SPACE TRAILS

JUNE 2016


BENCHES FLANKING WALK
STREET TREE ±30'O.C
CONNECTION TO EX. PARK
CHAPPARAL PARK
LAWN
NEW PARK SHALL INTEGRATE WITH CHAPPARAL PARK
NATIVE PLANTINGS ON BERMS
PET. AREAS
NATIVE GRASSES



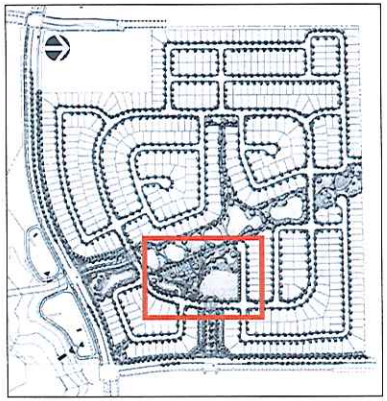


AVIANO ANTIOCH, CALIFORNIA

LIFESTYLE HUB "PLAZA" OPTION (PARCEL P)

JUNE 2016


LARGE DOG
DOG-FRIENDLY ENTRY
SMALL DOG
PICNIC AREA WITH BBQ ISLANDS AND TABLES
PICNIC AREA
TERRACED PICNIC PLAZA
PICNIC AREA
OVERLOOK
SEATING AREA CENTRAL GREEN
MEADOW/FIELD
MEADOW ENTRY
VINE ARBOR ENTRIES · COLOR PLANTING
PLAY AREA
RESTROOM
PARK I.D SIGN WITH COLOR PLANTING
PLAZA
· SHADE STRUCTURES
· SHADE TREES
· SEATTINGS and BENCHES
· BOCCE COURTS WITH TRELLIS
· COLOR PLANTING



Appendix

B

Soils, Plantings, and Irrigation for Bioretention Facilities

Additional guidance for design and construction of bioretention facilities and flow-through planters

Bioretention facility owners are responsible for ensuring the following standards of performance are achieved throughout the life of the facility:

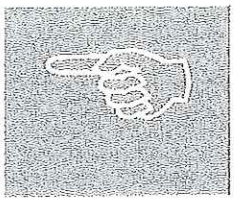
- Runoff must percolate through the imported bioretention soil mix at a minimum rate of 5" per hour.
- Plantings must be maintained in a healthy condition without use of conventional fertilizers or pesticides.
- Irrigation systems must minimize water use and be controlled to prevent overwatering and underdrain flow during dry weather.

As described in Chapter 6, municipalities will periodically verify these standards continue to be achieved. Operation and maintenance verification is required by the municipalities' stormwater NPDES permit issued by the Regional Water Quality Control Board.

The design criteria and checklists and other guidance in Chapter 4—including the design sheets—aim to ensure new bioretention facilities and planter boxes can reliably meet these standards of performance.

The additional guidance in this Appendix will assist applicants and their designers as they proceed from initial planning through design and construction.

Appendix B Contents



Responsibility for design, construction, maintenance, and performance of stormwater treatment and flow-control facilities and their components rests with the applicant or property owner.

Soils

Soils for bioretention facilities must meet the specifications in Attachment L to Water Board Order R2-2009-0074 (added November 28, 2011). These specifications were adapted from specifications in the 5th Edition of this *Guidebook*. The principal substantive change is the addition of particle size distribution for compost as well as for sand.

Use of the standard (rather than "alternative") soil mix is strongly encouraged. See the CCCWP C.3 web pages for a list of suppliers. These suppliers have submitted sample testing data to CCCWP. At their sole discretion, municipal construction inspectors may choose to accept test results and certification for a "brand-name" mix from a soil supplier.

▸ PLACEMENT AND COMPACTION OF BIORETENTION SOILS

Place the bioretention soil in 8" to 12" lifts. Lifts are **not to be compacted** but are placed to reduce the possibility of excessive settlement. Allow time for natural compaction and settlement prior to planting. Bioretention soil may be watered to encourage compaction.

Plantings

▸ PLANT SELECTION GUIDELINES

The plants tabulated in Attachment B-1 were selected for the following characteristics:

- Adaptation to Contra Costa's climate
- Drought tolerance
- Adaptation to well-drained soils
- Adaptation to low soil fertility
- Allow infiltration
- Are not invasive weeds
- Do not have aggressive roots

Characteristics noted in the table, including irrigation preferences and ability to tolerate heat, coastal conditions, flooding, and wind should be considered when selecting plants.

This list is not comprehensive, nor will all these species succeed at every site. Selection for a particular site should be done by experienced professionals familiar with the plants and site conditions. Avoid planting species on the California Invasive Plant Council's invasive plant inventory list.

► PLANT INSTALLATION

Trees and large shrubs installed in bioretention facilities are susceptible to blowing over before roots are established. They should be staked securely. Three stakes per tree are recommended at windy sites. Straps should be inspected once or twice a year and removed once trees are established to prevent girdling.

► FERTILIZATION

Due to the potential for conveying nutrients to storm drains, no fertilizer should be added to bioretention facilities or planter boxes. **Compost tea**, available from various nurseries and garden supply retailers, may be applied at a recommended rate of 5 gallons mixed with 15 gallons of water per acre.

Compost tea can be applied up to two weeks prior to planting and once per year between March and June. Application is not recommended when temperatures are below 50°F or above 90°F or when rain is forecast in the next 48 hours. Additional applications may be made as needed to correct nutrient deficiencies.

► MULCH

Mulch is not required but is recommended for the purpose of retaining moisture, preventing erosion and minimizing weed growth. Aged mulch, also called compost mulch, reduces the ability of weeds to establish, keeps soil moist, and replenishes soil nutrients. Aged mulch can be obtained through soil suppliers or directly from commercial recycling yards. Apply 1" to 2" of composted mulch, once a year, preferably in June following weeding.

Compared to bark mulch, aged mulch has somewhat less of a tendency to float into overflow inlets during intense storms. To reduce mulch entering overflow inlets, it is recommended to use atrium or beehive grates with ¼" openings over overflow inlets.

► WEED CONTROL

Weeds should be controlled primarily by manual methods and soil amendment. In response to problem areas or threatening invasions, corn gluten, white vinegar, vinegar-based products such as Burn-out, or non-selective natural herbicides such as Safer's Sharpshooter may be used.

▸ PEST AND DISEASE CONTROL

Synthetic pesticides should not be used on bioretention facilities. Beneficial nematodes and non-toxic controls may be used. Acceptable natural pesticides include Safer® Aphid, Whitefly, and Mealybug Killer, Safer® Tree and Shrub Insect Attach, Safer® for Evergreens, and Neem oil.

Irrigation

Bioretention soils have a high infiltration rate and require a different irrigation system design than what is typically used for heavy clay soils in Contra Costa County. Irrigation systems must be designed to minimize water use, avoid overwatering, and prevent the underdrain discharges during dry weather.

Bioretention facilities and planter boxes may need to be irrigated more than once a day. Irrigation controls should allow **separate control** of times and durations of irrigation for bioretention facilities and planter boxes vs. other landscape areas.

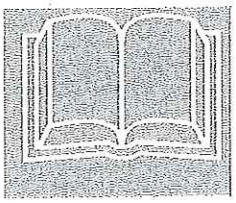
Smart irrigation controllers are strongly encouraged. Available controllers may access weather stations, use sensors to measure soil temperature and moisture, and allow input of soil types, plant types, root depth, light conditions, slope, and usable rainfall.

Drip emitters are strongly recommended over spray irrigation. Use multiple, lower-flow (one-half to two gallons per hour) emitters in fast-draining bioretention soils. Use two or more emitters for perennials, ground covers, and bunchgrasses. Four to six emitters may be needed for larger shrubs and trees. Some types of emitters encourage horizontal distribution of water.

Spray heads must be positioned to **avoid direct spray** into bioretention facility or planter box outlet structures.

References and Resources

- *Municipal Regional Permit* Appendix L
- *Recommendations for Soils Specification, Planting, and Irrigation of Bioretention Facilities,* WRA Environmental Consultants, November 5, 2008.
- US Composting Council
- ASTM International
- *Plant List and Planting Guidance for Landscape-Based Stormwater Measures.* Appendix B in the *Alameda County Clean Water Program C.3 Technical Guidance* (2006).
- *Plants and Landscapes for Summer Dry Climates,* Nora Harlow, Ed. East Bay Municipal Utility District, Oakland
- *California Native Plants for Your Garden and Wildlife,* Las Pilitas Nursery, 2008.
- *Native Treasures: Gardening with the Plants of California.* M. Nevin Smith, 2006. University of California Press.
- *The Califlora Database, 2008.*
- California Invasive Plant Council
- *A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California,* University of California Cooperative Extension and California Department of Water Resources
- Our Water Our World, website to developed to assist consumers in managing home and garden pests in a way that helps protect water.
- Bay-Friendly Landscaping for Professionals, a whole systems approach to the design, construction, and maintenance of the landscape to support the integrity of the San Francisco Bay watershed.
- University of California Statewide Integrated Pest Management (IPM) Program



ATTACHMENT L

Provision C.3.c.i.(1)(b)(vi)

Specification of soils for Biotreatment or Bioretention Facilities

Soils for biotreatment or bioretention areas shall meet two objectives:

- Be sufficiently permeable to infiltrate runoff at a minimum rate of 5" per hour during the life of the facility, and
- Have sufficient moisture retention to support healthy vegetation.

Achieving both objectives with an engineered soil mix requires careful specification of soil gradations and a substantial component of organic material (typically compost).

Local soil products suppliers have expressed interest in developing 'brand-name' mixes that meet these specifications. At their sole discretion, municipal construction inspectors may choose to accept test results and certification for a 'brand-name' mix from a soil supplier.

Tests must be conducted within 120 days prior to the delivery date of the bioretention soil to the project site.

Batch-specific test results and certification shall be required for projects installing more than 100 cubic yards of bioretention soil.

SOIL SPECIFICATIONS

Bioretention soils shall meet the following criteria. "Applicant" refers to the entity proposing the soil mixture for approval by a Permittee.

1. General Requirements – Bioretention soil shall:
   a. Achieve a long-term, in-place infiltration rate of at least 5 inches per hour.
   b. Support vigorous plant growth.
   c. Consist of the following mixture of fine sand and compost, measured on a volume basis:

      60%-70% Sand

      30%-40% Compost
2. Submittal Requirements – The applicant shall submit to the Permittee for approval:
   a. A sample of mixed bioretention soil.
   b. Certification from the soil supplier or an accredited laboratory that the Bioretention Soil meets the requirements of this guideline specification.
   c. Grain size analysis results of the fine sand component performed in accordance with ASTM D 422, Standard Test Method for Particle Size Analysis of Soils.
   d. Quality analysis results for compost performed in accordance with Seal of Testing Assurance (STA) standards, as specified in 4.

e. Organic content test results of mixed Bioretention Soil. Organic content test shall be performed in accordance with by Testing Methods for the Examination of Compost and Composting (TMECC) 05.07A, "Loss-On-Ignition Organic Matter Method".

f. Grain size analysis results of compost component performed in accordance with ASTM D 422, Standard Test Method for Particle Size Analysis of Soils.

g. A description of the equipment and methods used to mix the sand and compost to produce Bioretention Soil.

h. Provide the name of the testing laboratory(s) and the following information:

(1) Contact person(s)

(2) Address(s)

(3) Phone contact(s)

(4) E-mail address(s)

(5) Qualifications of laboratory(s), and personnel including date of current certification by STA, ASTM, or approved equal

3. Sand for Bioretention Soil

a. Sand shall be free of wood, waste, coating such as clay, stone dust, carbonate, etc., or any other deleterious material. All aggregate passing the No. 200 sieve size shall be non-plastic.

b. Sand for Bioretention Soils shall be analyzed by an accredited lab using #200, #100, #40, #30, #16. #8, #4, and 3/8 inch sieves (ASTM D 422 or as approved by municipality), and meet the following gradation:

Sieve Size	Percent Passing (by weight)	
	Min	*Max*
3/8 inch	100	100
No. 4	90	100
No. 8	70	100
No. 16	40	95
No. 30	15	70
No. 40	5	55
No. 100	0	15
No. 200	0	5

Note: all sands complying with ASTM C33 for fine aggregate comply with the above gradation requirements.

4. Composted Material

Compost shall be a well decomposed, stable, weed free organic matter source derived from waste materials including yard debris, wood wastes or other organic materials not including manure or biosolids meeting the standards developed by the US Composting Council (USCC). The product shall be certified through the USCC Seal of Testing Assurance (STA) Program (a compost testing and information disclosure program).

a. Compost Quality Analysis – Before delivery of the soil, the supplier shall submit a copy of lab analysis performed by a laboratory that is enrolled in the US Composting Council's Compost Analysis Proficiency (CAP) program and using approved Test Methods for the Evaluation of Composting and Compost (TMECC). The lab report shall verify:

(1) Feedstock Materials shall be specified and include one or more of the following: landscape/yard trimmings, grass clippings, food scraps, and agricultural crop residues.

(2) Organic Matter Content: 35% - 75% by dry wt.

(3) Carbon and Nitrogen Ratio: C:N < 25:1 and C:N >15:1

(4) Maturity/Stability: shall have a dark brown color and a soil-like odor. Compost exhibiting a sour or putrid smell, containing recognizable grass or leaves, or is hot (120F) upon delivery or rewetting is not acceptable. In addition any one of the following is required to indicate stability:

(i) Oxygen Test < 1.3 O2 /unit TS /hr

(ii) Specific oxy. Test < 1.5 O2 / unit BVS /

(iii) Respiration test < 8 C / unit VS / day

(iv) Dewar test < 20 Temp. rise (°C) e.

(v) Solvita® > 5 Index value

(5) Toxicity: any one of the following measures is sufficient to indicate non-toxicity.

(i) NH4- : NO3-N < 3

(ii) Ammonium < 500 ppm, dry basis

(iii) Seed Germination > 80 % of control

(iv) Plant Trials > 80% of control

(v) Solvita® > 5 Index value

(6) Nutrient Content: provide analysis detailing nutrient content including N-P-K, Ca, Na, Mg, S, and B.

(i) Total Nitrogen content 0.9% or above preferred.

(ii) Boron: Total shall be <80 ppm; Soluble shall be <2.5 ppm

(7) Salinity: Must be reported; < 6.0 mmhos/cm

(8) pH shall be between 6.5 and 8. May vary with plant species.

b. Compost for Bioretention Soil Texture – Compost for bioretention soils shall be analyzed by an accredited lab using #200, 1/4 inch, 1/2 inch, and 1 inch sieves (ASTM D 422 or as approved by municipality), and meet the following gradation:

Sieve Size	Percent Passing (by weight)	
	Min	*Max*
1 inch	99	100
1/2 inch	90	100
1/4 inch	40	90
No. 200	2	10

c. Bulk density shall be between 500 and 1100 dry lbs/cubic yard

d. Moisture content shall be between 30% - 55% of dry solids.

e. Inerts – compost shall be relatively free of inert ingredients, including glass, plastic and paper, < 1 % by weight or volume.

f. Weed seed/pathogen destruction – provide proof of process to further reduce pathogens (PFRP). For example, turned windrows must reach min. 55C for 15 days with at least 5 turnings during that period.

g. Select Pathogens – Salmonella <3 MPN/4grams of TS, or Coliform Bacteria <10000 MPN/gram.

h. Trace Contaminants Metals (Lead, Mercury, Etc.) – Product must meet US EPA, 40 CFR 503 regulations.

i. Compost Testing – The compost supplier will test all compost products within 120 calendar days prior to application. Samples will be taken using the STA sample collection protocol. (The sample collection protocol can be obtained from the U.S. Composting Council, 4250 Veterans Memorial Highway, Suite 275, Holbrook, NY 11741 Phone: 631-737-4931, www.compostingcouncil.org). The sample shall be sent to an independent STA Program approved lab. The compost supplier will pay for the test.

VERIFICATION OF ALTERNATIVE BIORETENTION SOIL MIXES

Bioretention soils not meeting the above criteria shall be evaluated on a case by case basis. Alternative bioretention soil shall meet the following specification: "Soils for bioretention facilities shall be sufficiently permeable to infiltrate runoff at a minimum rate of 5 inches per hour during the life of the facility, and provide sufficient retention of moisture and nutrients to support healthy vegetation."

The following steps shall be followed by municipalities to verify that alternative soil mixes meet the specification:

1. General Requirements – Bioretention soil shall achieve a long-term, in-place infiltration rate of at least 5 inches per hour. Bioretention soil shall also support vigorous plant growth. The applicant refers to the entity proposing the soil mixture for approval.

   a. Submittals – The applicant must submit to the municipality for approval:

      (1) A sample of mixed bioretention soil.

      (2) Certification from the soil supplier or an accredited laboratory that the Bioretention Soil meets the requirements of this guideline specification.

      (3) Certification from an accredited geotechnical testing laboratory that the Bioretention Soil has an infiltration rate between 5 and 12 inches per hour as tested according to Section 1.b.(2)(ii).

      (4) Organic content test results of mixed Bioretention Soil. Organic content test shall be performed in accordance with by Testing Methods for the Examination of Compost and Composting (TMECC) 05.07A, "Loss-On-Ignition Organic Matter Method".

      (5) Grain size analysis results of mixed bioretention soil performed in accordance with ASTM D 422, Standard Test Method for Particle Size Analysis of Soils.

      (6) A description of the equipment and methods used to mix the sand and compost to produce Bioretention Soil.

      (7) The name of the testing laboratory(s) and the following information:

         (i) contact person(s)

         (ii) address(s)

         (iii) phone contact(s)

         (iv) e-mail address(s)

         (v) qualifications of laboratory(s), and personnel including date of current certification by STA, ASTM, or approved equal

   b. Bioretention Soil

      (1) Bioretention Soil Texture

      Bioretention Soils shall be analyzed by an accredited lab using #200, and 1/2" inch sieves (ASTM D 422 or as approved by municipality), and meet the following gradation:

Sieve Size	Percent Passing (by weight)	
	Min	*Max*
1/2 inch	97	100
No. 200	2	5

      (2) Bioretention Soil Permeability testing

      Bioretention Soils shall be analyzed by an accredited geotechnical lab for the following tests:

(i) Moisture – density relationships (compaction tests) shall be conducted on bioretention soil. Bioretention soil for the permeability test shall be compacted to 85 to 90 percent of the maximum dry density (ASTM D1557).

(ii) Constant head permeability testing in accordance with ASTM D2434 shall be conducted on a minimum of two samples with a 6-inch mold and vacuum saturation.

MULCH FOR BIORETENTION FACILITIES

Mulch is recommended for the purpose of retaining moisture, preventing erosion and minimizing weed growth. Projects subject to the State's Model Water Efficiency Landscaping Ordinance (or comparable local ordinance) will be required to provide at least two inches of mulch. Aged mulch, also called compost mulch, reduces the ability of weeds to establish, keeps soil moist, and replenishes soil nutrients. Aged mulch can be obtained through soil suppliers or directly from commercial recycling yards. It is recommended to apply 1" to 2" of composted mulch, once a year, preferably in June following weeding.

Plant Recommendations for Bioretention Facilities and Planter Boxes

Grasses and Grass-like Plants

Scientific name Common name	Light Preference			Size (feet)		Watering				Tolerates				CA Native	Other Notes
	Sun	Part	Shade	Ht.	Width	L	M	H	Summer	Heat	Coast	Flood	Wind		
Bromus carinatus California brome	✓			2	1	✓			ok	✓		✓	✓	✓	
Bouteloua gracilis blue grama	✓			1.5	1	✓				✓		✓	✓		Tolerates no summer water, good for non-irrigated remote sites
Carex densa dense sedge	✓			1	1		✓	✓	✓	✓		✓		✓	
Carex obnupta slough sedge	✓			2	1		✓	✓	✓	✓	✓	✓	✓	✓	
Carex praegracilis clustered field sedge	✓	✓		1.5	1.5		✓	✓	✓	✓	✓	✓	✓	✓	
Carex subfusca rusty sedge	✓	✓		1	1		✓		ok	✓	✓	✓	✓	✓	Great for swales
Carex divulsa Berkeley sedge		✓	✓	1	1		✓		ok		✓	✓	✓	✓	AKA *Carex tumulicola*,. Full sun along coast.
Deschampsia cespitosa tufted hairgrass	✓			2	1		✓		ok			✓	✓	✓	Can look weedy
Distichlis spicata salt grass	✓			0.3	3		✓	✓	✓	✓	✓	✓	✓	✓	Looks like bermuda grass, withstands foot traffic, for soils with high salt
Eleocharis palustris creeping spikerush	✓			1	1		✓	✓	ok	✓	✓	✓	✓	✓	
Elymus glaucus blue wildrye	✓			1.5	2		✓	✓	ok	✓	✓	✓	✓	✓	good for grazing, difficult to mow, messy looking lawn
Festuca californica California fescue	✓	✓	✓	2	2	✓			ok	✓	✓		✓	✓	
Festuca idahoensis Idaho fescue	✓	✓		1	1	✓	✓		ok	✓	✓		✓	✓	Can mow. Needs light summer water at hot sites
Festuca rubra red fescue	✓	✓		1	1.5	✓	✓		ok	✓	✓	✓	✓	✓	Can mow. Lawn alternative
Festuca rubra 'molate' molate fescue	✓	✓		1	1.5	✓	✓		ok	✓	✓		✓	c	Can mow. Lawn alternative
Hordeum brachyantherum	✓	✓		1.5	1		✓	✓	ok	✓	✓		✓	✓	

Plant Recommendations for Bioretention Facilities and Planter Boxes

meadow barley														
Juncus patens blue rush	✓			2	1		✓	✓	✓	✓		✓		✓	
Leymus triticoides creeping wildrye	✓	✓		3	1	✓	✓		ok	✓	✓	✓	✓	✓	Can mow. Recommended for swales.
Melica californica California melica	✓	✓		1	1	✓				✓			✓	✓	
Melica imperfect melic	✓	✓		1	1	✓			ok		✓	✓		✓	Part shade inland, light water in Summer to keep green or goes dormant
Muhlenbergia rigens deergrass	✓			3	3	✓	✓		ok	✓		✓		✓	
Nasella pulchra purple needlegrass	✓	✓		2	1	✓	✓		ok	✓		✓	✓	✓	
Nassella lepida foothill needlegrass	✓	✓	✓	1.5	1	✓	✓		ok	✓	✓		✓	✓	
Phalaris californica California canarygrass		✓	✓	1.5	1		✓	✓	ok		✓	✓	✓	✓	Can be aggressive spreader

Plant Recommendations for Bioretention Facilities and Planter Boxes

Herbaceous Perennials and Groundcovers

Scientific name Common name	Light Preference			Size (feet)		Watering				Tolerates				CA Native	Other Notes
	Sun	Part	Shade	Ht.	Width	L	M	H	Summer	Heat	Coast	Flood	Wind		
Achillea filipendulina fernleaf yarrow	✓			3	3	✓			✓	✓					
Achillea millefolium common yarrow	✓			1.5	1	✓			ok	✓				✓	Good for hot sites
Achillea tomentosa woolly yarrow	✓	✓		1	1.5	✓	✓		ok	✓			✓		
Aloe striata coral aloe	✓	✓		2	2	✓			ok						Sun along coast, afternoon shade inland
Arctostaphylos hookeri Monterey manzanita	✓	✓		1	4	✓	✓		ok		✓		✓	✓	Better in part shade in hot sites
Arctostaphylos uva-ursi kinnick-kinnick	✓	✓		1	15	✓	✓		ok		✓		✓	✓	Full sun at coast, part shade inland. Cultivars to try include 'emerald carpet,' 'Point Reyes,' 'San Bruno Mountain' depending on site
Ceratostigma plumbaginoides dwarf plumbago		✓		0.75	5	✓	✓		✓	✓					
Epilobium canum California fuchsia	✓	✓		1	4	✓			ok					✓	
Eriogonum fasciculatum flattop buckwheat	✓			3	4	✓				✓				✓	
Eschscholzia californica California poppy	✓			1	1	✓			ok	✓	✓	✓	✓	✓	
Fragaria chiloensis beach strawberries	✓	✓	✓	0.3	2	✓			ok		✓			✓	
Gazania spp. treasure flower	✓			0.5	2	✓	✓		✓	✓			✓		
Iris douglasiana Douglas iris	✓	✓		1.5	2	✓	✓		ok	✓			✓	✓	Also, Iris hybrids

Plant Recommendations for Bioretention Facilities and Planter Boxes

Scientific name / Common name	Light Preference			Size (feet)		Watering				Tolerates				CA Native	Other Notes
	Sun	Part	Shade	Ht.	Width	L	M	H	Summer	Heat	Coast	Flood	Wind		
Lotus scoparius deerweed	✓			4	3	✓				✓		✓		✓	
Lupinus bicolor miniature lupine	✓			1	1	✓					✓	✓		✓	Adds nitrogen
Mimulus aurantiacus common monkeyflower	✓	✓		3	3	✓			ok			✓		✓	
Mimulus cardinalis scarlet monkeyflower	✓	✓	✓	3	3	□	✓	✓	✓			✓		✓	Aggressive seeder
Polygonum capitatum pink knotweed	✓	✓		0.5	4	✓			✓	✓	✓		✓		
Prunella vulgaris self heal	✓	✓				✓	✓		ok		✓	✓	✓	✓	
Rudebeckia californica California coneflower	✓			3	2	✓	✓		ok	✓		✓		✓	
Salvia clevelandii Cleveland sage						✓									
Scaevola 'mauve clusters' fan flower	✓	✓		1	4	✓				✓			✓		
Sedum spathulifolium stone crop	✓					✓			ok	✓			✓	varies	For above the high water line
Sisyrinchium bellum blue eyed grass				1	1	✓			ok	✓	✓	✓	✓	✓	
Sisyrinchium californicum yellow eyed grass	✓	✓		1	1		✓		✓	✓	✓	✓	✓	✓	
Solidago californica California goldenrod		✓		3	2	✓	✓		ok	✓		✓		✓	
Stachys byzantine lamb's ears	✓	✓		1	3	✓			ok	✓	✓		✓		
Verbena tenuisecta moss verbena	✓			0.5	5	✓			ok	✓	✓		✓		

Plant Recommendations for Bioretention Facilities and Planter Boxes

Small Shrubs

Scientific name / Common name	Light Preference			Size (feet)		Watering				Tolerates				CA Native	Other Notes
	Sun	Part	Shade	Ht.	Width	L	M	H	Summer	Heat	Coast	Flood	Wind		
Artemisia californica California sagebrush	✓			2-5	4-5	✓				✓	✓		✓	✓	Will not tolerate sprinklers
Baccharis pilularis 'Twin Peaks' or Pigeon Point' dwarf coyote brush	✓			2	6	✓	✓		ok	✓	✓	✓	✓	c	
Cistus skanbergii hybrid rockrose	✓			3	5	✓	✓		✓	✓	✓	✓	✓		Best with annual shearing
Correa 'Carmine Bells' or 'ivory bells' Australian fuchsia	✓	✓		3	6	✓	✓		✓	✓			✓		Ivory bells does not tolerate wind. Attracts hummingbirds. Sunset Zones 16-17 (not recommended for E. Contra Costa)
Erigeron glaucus seaside daisy	✓			1	1.5				ok		✓			✓	
Eriogonum crocatum saffron buckwheat	✓			1.5	1.5	✓				✓	✓		✓	✓	
Eriogonum umbellatum sulfur buckwheat	✓			0.7	3	✓			ok	✓			✓	✓	
Grevillea lanigera woolly grevillea	✓			4	6	✓				✓			✓		Sunset Zones 15-24 (not recommended for E. Contra Costa)
Lavendula spp. lavender	✓			1.5	1.5	✓			ok	✓	✓				
Mahonia pinnata California holly grape	✓	✓	✓	4	4	✓	✓			✓		✓	✓	✓	
Mahonia repens creeping Oregon grape	✓	✓		2	3	✓	✓		ok		✓	✓		✓	
Rosmarinus officinalis rosemary	✓			2.5	5	✓			✓	✓	✓		✓		
Rubus ursinus California blackberry		✓	✓	3	5		✓	✓	ok	✓	✓	✓	✓	✓	Thorns. Harbors beneficial insects

Plant Recommendations for Bioretention Facilities and Planter Boxes

Symphorocarpos albus common snowberry	✓	✓	✓	4	4	✓	✓	✓	ok	✓				✓	Adaptable to many conditions
Westringia fruticosa coast rosemary	✓			4	8	✓				✓	✓		✓		
Whipplea modesta whipplevine		✓	✓	0.5	3		✓	✓	✓		✓	✓		✓	Sunset zones 16-17, 19-24 only (not recommended E. Contra Costa), best for moist shady spots

Large Shrubs

Scientific name Common name	Light Preference			Size (feet)		Watering				Tolerates				CA Native	Other Notes
	Sun	Part	Shade	Ht.	Width	L	M	H	Summer	Heat	Coast	Flood	Wind		
Alyogyne huegelii blue hibiscus	✓			6	5	✓				✓					Very low water after second year, Sunset zones 15-17 & 20-24 (not recommended E. Contra Costa)
Arctostaphylos densiflora 'Howard Mcminn' McMinn manzanita	✓	✓		3	7	✓				✓			✓	c	
Baccharis pilularis coyote brush	✓			6	7	✓	✓		ok	✓	✓	✓	✓		Fast-growing, short-lived
Berberis darwinii Darwin's barberry	✓	✓		6	6	✓				✓		✓	✓		Sprinklers will kill foliage
Carpenteria californica Bush anemone	✓	✓		6	4	✓	✓		✓	✓				✓	Interior climate with occasional water otherwise low water needs
Ceanothus spp. Various ceanothus	✓	✓		varies	varies	✓			☐	✓			✓	✓	fast-growing but short-lived
Cercis occidentalis western redbud	✓			12	8	✓			☐	✓		✓	✓	✓	Prune low branches for small tree form, susceptible to disease if overwatered
Cotinus coggygia smoke bush	✓			15	15	✓			☐			✓	✓		No water after second year
Eriogonum arborescens Santa Cruz Island buckwheat	✓			3	5	✓			✓	✓	✓	✓	✓	✓	Low water after second year

Plant Recommendations for Bioretention Facilities and Planter Boxes

Scientific name Common name	Light Preference			Size (feet)		Watering				Tolerates				CA Native	Other Notes
	Sun	Part	Shade	Ht.	Width	L	M	H	Summer	Heat	Coast	Flood	Wind		
Eriogonum giganteum St. Catherines lace	✓			5	6	✓			☐		✓	✓	✓	✓	best at coast, tolerant of unwatered inland garden
Fremontodendron californicum flannel bush	✓			20	14	✓			☐	✓		✓		✓	Fast-growing, short-lived
Garrya elliptica Coast silktassel	✓	✓		8	8	✓	✓		✓	✓		✓	✓	✓	'Evie' is compact variety
Heteromeles arbutifolia toyon	✓	✓	✓	7	5	✓	✓		✓	✓	✓	✓		✓	Doesn't respond well to pruning low branches
Juniperus chinensis 'Mint Julep" mint julep juniper	✓	✓		3	6	✓	✓		✓	✓	✓	✓	✓		
Lonicera hispidula California honeysuckle	✓	✓	✓	4	2		✓	✓	✓		✓	✓		✓	Climbing vine-like. Best in part shade. Attracts birds
Lonicera involucrate twinberry honeysuckle	✓	✓	✓	6	3		✓	✓	✓		✓	✓		✓	Best in part shade. Attracts birds
Nandina domestica heavenly bamboo	✓	✓		4	3	✓	✓		✓	✓		✓			
Philadelphus coronaries sweet mock orange	✓	✓		10	10		✓		✓				✓		Best with annual pruning
Physocarpus capitatus Pacific ninebark	✓	✓		5	5	✓	✓	✓	ok		✓	✓		✓	Part shade and summer water required in hot locations
Pittosporum eugeniodes Pittosporum	✓	✓		40	15	✓	✓		✓	✓		✓	✓		shear to control height
Pittosporum tenuifolium Pittosporum	✓	✓		40	15	✓	✓		✓	✓		✓	✓		shear to control height
Prunus illicifolia holly leaf cherry	✓	✓		15	15	✓	✓			✓	✓	✓	✓	✓	
Prunus lyonii Catalina cherry	✓	✓		15	15	✓	✓			✓	✓	✓	✓	✓	
Rhamnus californica California coffeeberry	✓	✓		3-15	6	✓			✓	✓		✓	✓	✓	'Eve Case' is compact with broad foliage
Rhus integrifolia	✓	✓		8	6	✓			✓	✓			✓	✓	Shear to hedge if desired

lemonade berry														
Ribes malvaceum chaparral currant	✓	✓		5	5	✓	✓		ok	✓				✓	
Ribes sanguineum flowering currant		✓	✓	5-12	5-12	✓	✓		✓	✓	✓	✓		✓	Needs good air movement to avoid white fly
Ribes speciosum fuchsia-flowered gooseberry	✓	✓	✓	3-6	3-6	✓	✓		✓	✓	✓	✓		✓	
Rosa californica California wild rose	✓	✓		3	3-6		✓	✓	ok	✓	✓	✓	✓	✓	hooked thorns not compatible with foot traffic
Rosa gymnocarpa wood rose	✓	✓		2	3		✓		ok	✓	✓	✓		✓	
Vitis californica California grape	✓	✓		10	2-10	✓	✓		✓	✓	✓	✓	✓	✓	Climbing vine. Best in full sun. Can be aggressive in moist area.
Vitis girdiana desert grape	✓			8	2-11	✓	✓		✓	✓		✓	✓	✓	Climbing vine. May be more suited to biofilter soils than californica.

Small Trees

Scientific name Common name	Light Preference			Size (feet)		Watering				Tolerates				CA Native	Other Notes
	Sun	Part	Shade	Ht.	Width	L	M	H	Summer	Heat	Coast	Flood	Wind		
Acer Negundo box elder	✓	✓	✓	30	30	✓	✓		ok	✓	✓	✓	✓	✓	Tough shade tree, deciduous
Arbetus unedo strawberry tree	✓	✓				✓	✓		✓	✓	✓	✓			'Elfin King' is dwarf from 6' tall
Arctostaphylos manzanita common manzanita	✓			6-15	8-12	✓				✓			✓	✓	Prune to be small tree. "Dr. Hurd" is more tolerant of summer water.
Cercis occidentalis western redbud	✓	✓		12	8	✓				✓			✓	✓	Prune low branches for small tree form; susceptible to disease if overwatered.
Eriobotrya deflexa bronze loquat	✓	✓		18	25	✓	✓		✓	✓		✓			Monthly deep watering
Eriobotrya japonica Japanese loquat	✓	✓		25	20	✓	✓		✓	✓		✓			Susceptible to blight under stress
Fraxinus angustfolia Raywood ash	✓			30	30		✓		✓	✓					Fall color
Fraxinus dipetala California ash	✓	✓		20	20				ok	✓		✓		✓	

Plant Recommendations for Bioretention Facilities and Planter Boxes

Scientific name / Common name	Light Preference			Size (feet)		Watering				Tolerates				CA Native	Other Notes
	Sun	Part	Shade	Ht.	Width	L	M	H	Summer	Heat	Coast	Flood	Wind		
Fraxinus latifolia Oregon ash	✓	✓	✓	30	25	✓			✓	✓	✓	✓		✓	
Fraxinus velutina velvet ash	✓			25	15	✓	✓		ok	✓		✓	✓		
Garrya elleptica coast silk tassel	✓	✓		20	20	✓	✓		ok		✓				Afternoon shade inland, responds well to pruning
Laurus 'Saratoga' hybrid laurel	✓	✓		12-40	12-40	✓				✓		✓	✓		prune for tree form
Myrica californica Pacific wax myrtle	✓	✓	✓	10-30	10-30	✓	✓				✓				best at coast
Pinus thumbergiana Japanese black pine	✓	✓		25	20	✓			✓	✓	✓			✓	Asymmetrical, often leaning habit
Pittosporum undulatum victorian box	✓	✓		15	15	✓	✓		✓	✓					Sunset zones 16-17, 21-24 only (not recommended E. Contra Costa. Prune low branches for tree form.
Prunus ilicifolia holly leaf cherry	✓	✓		15	15	✓	✓			✓	✓		✓	✓	
Prunus lyonii Catalina cherry	✓	✓		15	15	✓	✓			✓	✓		✓	✓	
Prunus serrulata "shirofugen' cherry	✓			25	25		✓				✓	✓	✓		Additional cultivars

Plant Recommendations for Bioretention Facilities and Planter Boxes

Key

Water Preference-Low/Moderate/High	We have provided recommendations for irrigation. All plants should be watered with more frequency during the first two years after planting. After this establishment period, Low water use plants will only need supplemental irrigation at the hottest and driest sites. Plants with Moderate irrigation needs will be best with occasional supplemental water (once per week to once per month) and plants with High irrigation needs will be best with more frequent watering especially during periods of drought in the cooler seasons.
Water Preference-Summer Irrigation	Plants with a check in this column will not withstand a long period of summer drought without irrigation. Plants with an 'ok' in this column are tolerant of, but do not require, frequent summer irrigation. Plants with nothing in this column may not tolerate summer irrigation.
Tolerates Heat	A check in the heat column indicates that the plant will tolerate hot sites. It should not be confused with a plants preference for sun. Absence of the check indicates it should only be used in areas close to the Bay or other cool sites.
Tolerates Coast	The coast column indicates plants that perform well within 1,000 feet of the ocean or bay. Most of these plants tolerate some amount of salt air, fog, and wind.
Tolerates Flooding	
Tolerates Wind	A check in the wind column means that the plant will tolerate winds of ten miles per hour or more.
CA Native - c	Cultivar of California native. Cultivars offer habitat benefits to native wildlife and are adapted to the local climate but have reduced genetic diversity.
Other Notes - Sunset Climate Zones	Under the Other Notes category, we have indicated appropriate Sunset Climate Zones only for plants that will not do well across all of Contra Costa County. Please refer to the *Sunset Western Garden Book* which defines climate zones in the Bay Area based on elevation, influence of the Pacific Ocean, presence of hills and other factors.

Bioretention Facilities

Bioretention facilities can rectangular, linear, or nearly any shape.
Photo by Scott Wikstrom

Bioretention detains runoff in a surface reservoir, filters it through plant roots and a biologically active soil mix, and then infiltrates it into the ground. Where native soils are less permeable, an underdrain conveys treated runoff that does not infiltrate to a storm drain or to surface drainage.

Bioretention facilities can be configured as in-ground or above-ground planter boxes, with the bottom open to allow infiltration to native soils underneath. *If infiltration cannot be allowed, use the sizing factors and criteria for the Flow-Through Planter.*

Best Uses

- Commercial areas
- Residential subdivisions
- Industrial developments
- Roadways
- Parking lots
- Fit in setbacks, medians, and other landscaped areas

Advantages

- Can be any shape
- Low maintenance
- Can be landscaped

Limitations

- Require 4%-15% of tributary impervious square footage
- Typically require 3-4 feet of head
- Irrigation may be required

▶ CRITERIA

For development projects subject only to runoff treatment requirements, the following criteria apply:

Parameter	Criterion
Soil mix depth	18 inches minimum
Soil mix requirements	See Appendix B
Soil mix surface area	0.04 times tributary impervious area (or equivalent)
Surface reservoir depth	6 inches minimum; may be sloped to 4 inches adjacent to walkways.
Underdrain	Perforated pipe (PVC SDR 35 or approved equivalent) embedded in gravel ("Class 2 permeable" recommended), connected to storm drain or other accepted discharge point. Include a cleanout.

CONTRA COSTA CLEAN WATER PROGRAM

Stormwater C.3 Guidebook

www.cccleanwater.org