

ALAMEDA BOATWORKS GREEN DEVELOPMENT PLAN



The Island of Alameda:

The "Boatworks Green" project is situated close to the Park St. Bridge, one of the major access points onto the island of Alameda. This proposed new single family and multi-family residential community commands easy access to "mainland" assets (major freeways leading directly to San Francisco and East Bay cities, Jack London Square and downtown Oakland, Lake Merritt, the Oakland Airport, etc.) while enjoying the special benefits offered by the City of Alameda's "small town" culture and island geography.

Exhibit 1
Item 7-A, 7/25/16
Planning Board Meeting

BantaDESIGN, A DIVISION OF BETA, INC. ARCHITECTURE PLANNING URBAN DESIGN 6050 HOLLIS STREET EMERYVILLE, CA 94608 510-654-3255		AERIAL MAP	
Alameda Boatworks Green 2229 & 2235 CLEMENT AVENUE, ALAMEDA, CA		DATE: APR. 14, 2016	ps/DP-1



A New Planned Residential Community Connecting the City with its Waterfront:

The "Boatworks Green" Community internal vehicular drives, bikeways and pedestrian paseos are organized to match and extend existing routes in the City. Main entrances align exactly opposite Blanding Ave. and Elm St. providing direct line extensions of roadways, sidewalks and bike paths into the Boatworks site.

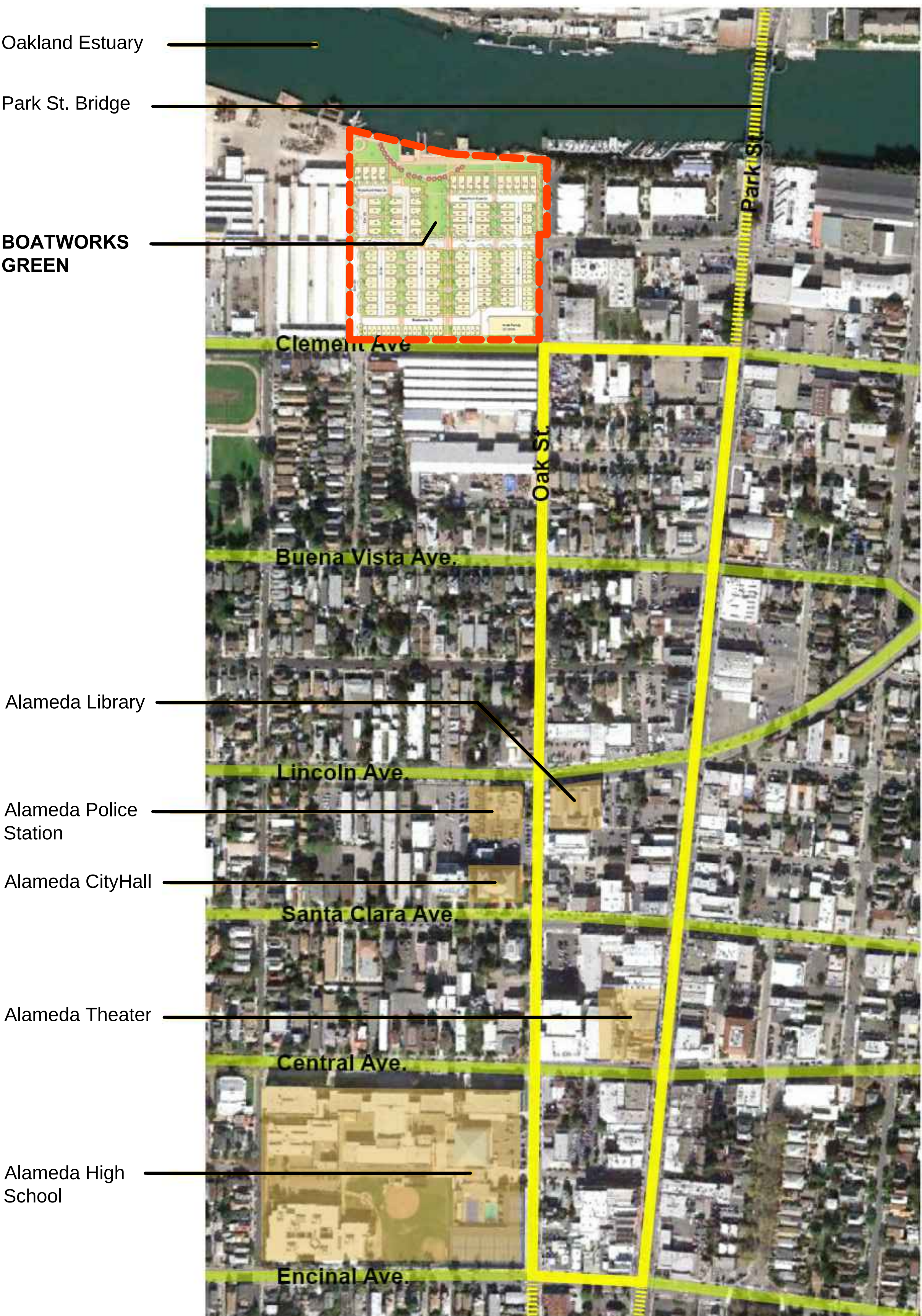
Landscaped pedestrian pathways continue beyond Oak St. and Elm Drive to lead pedestrians up to the Publicly Accessible Open Space at the waterfront. In addition one major and two minor paseo's for pedestrians and bicycles-only lead from Clement Ave. up through the site, concluding at the Estuary Open Space. Our site plan is an exercise in enhancing the urban fabric of Alameda at a critical connection point to its northern waterfront.

"Boatworks Green" Site along Alameda's Northern Waterfront

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Alameda Boatworks Green 2229 & 2235 CLEMENT AVENUE, ALAMEDA, CA	DATE: APR. 14, 2016	ps/DP-2



North/South width of the Island at Park St.



Alameda Downtown Loop

The Texture of Alameda:

The "Boatworks Green" project proposes to transform a former industrial site between Clement Ave. and the Oakland Estuary into a new residential "community of gardens" within walking distance of the civic and commercial centers of Alameda. In place of the former warehouse structures, four mini-neighborhoods, combining into a pedestrian-oriented network of open space, walking and bike paths, will lace a new pattern into the city.

Urban Design Elements:

The "Boatworks Green" Community will serve as an anchor to the north end of a natural pedestrian and vehicular loop formed by Park and Oak Streets. This loop introduces visitors arriving from the Park St. Bridge down Alameda's main commercial avenue to longtime service businesses fronting onto Park St. and to the refurbished Alameda Theater and a host of historic buildings that occupy the center of town. The return leg of the loop brings pedestrians, bicyclists and vehicles up Oak St., Alameda's main Civic corridor, connecting the high school, City Hall, Police Headquarters, and the new main Library. Where the north end of Oak St. intersects Clement Ave. and Blanding Ave., the Boatworks project provides a network of access points onto the waterfront integrating a new public asset into the city.

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Alameda Boatworks Green 2229 & 2235 CLEMENT AVENUE, ALAMEDA, CA		DATE: APR. 14, 2016	ps/DP-3



Public and Private open space = 49% of the site.

The “Boatworks Green” proposal provides a very large percentage of its site to ground level and vertical structure deck open space. In addition the layout of the public pathways and roadways is designed to reinforce connection with the surrounding community to graciously invite citizens up to the Waterfront open space, where visitors can enjoy previously unavailable proximity to the Estuary waters and to views across the East Bay hills.

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OVERALL OPEN SPACE PERSPECTIVE

Alameda Boatworks Green

2229 & 2235 CLEMENT AVENUE, ALAMEDA, CA

DATE:

APR. 14, 2016

ps/DP-4



Community Green and Boatways Pier combine to form a unique Publicly Accessible Open Space for Alameda.

The project’s Community Green is a generously dimensioned landscaped open field for use by the residential community and the public. The Green leads to the landscaped waterfront open space that includes an arc of blossoming fruit trees forming the outer edge of a stepped landscaped arena where the community can assemble to enjoy HOA organized events (this natural seating doubles as a C-3 stormwater treatment swale).

Part of the open space complex includes a concrete pier with an accessibility ramp and steps leading to seating areas and a viewing and fishing deck framed with flower boxes and text plaques detailing the history of the site. This pier brings the public closer to the water than at any other place along the northern waterfront at this end of the island. The waterfront open space continues the BCDC Bayside Trail beginning at the adjacent Park St. Landing to the East and concludes at a widened section of the landscaped area that features a large oak tree at the center of a ceremonial circle, and a connection to a continuation of the Bayside Trail when the Dutra Property to the West is developed in the future.

BantaDESIGN, A DIVISION OF BETA, INC. ARCHITECTURE PLANNING URBAN DESIGN 6050 HOLLIS STREET EMERYVILLE, CA 94608 510-654-3255	PERSPECTIVE at COMMUNITY GREEN and BOATWAYS PIER		
Alameda Boatworks Green 2229 & 2235 CLEMENT AVENUE, ALAMEDA, CA	DATE: APR. 14, 2016	ps/DP-4.1	



2015 Proposed Site Plan: 182 Units + Open Space based on 2010 Approved Settlement Agreement (including 87 units planned for Universal Design, 48% of total)

This current 2015 reduced density site plan of 182 units substantially conforms to and improves upon the 2011 approved reduced density 182 unit site plan. The 2015 plan takes into account the difference in the shoreline topography of today and the previously proposed 2011 edition. This current site plan preserves the boatways in their existing configuration which generated modifications to the distribution of units facing the shoreline. The number of units directly facing the shoreline was reduced from 18 to 14 to accommodate the difference in geometry at the boatways and to eliminate a pinch point between those boatways and the proposed housing. The Central Green has also increased in size and quality.

In addition the proposed site plan provides up to 44 units: (24%) that can be considered as conforming to Universal Design criteria, 14 A-2 units and the five story, 30 unit multi-family elevator equipped building. An additional 43 units: B2/B3 (24%) can be considered as convertible to meet Universal Design criteria with the installation of a pre-planned or retrofitted residential elevator.

		Parking
Publicly Accessible Open Space:		2 car garages for 104 townhomes & SFD's
a. Acres within Property Lines	2.08	1 car garages for 48 townhomes
b. Acres outside Property Lines controlled by USACE	0.19	1 space/unit for Multi-Family
Total Acres of Publicly Accessible Open Space:		286
		Parking @ Private Drives incl. guest and BCDC parking
		46
		Total number of parking spaces
		332

UNITS

Parcel Line	Unit	Front Yard	Total Habitable Area	4 or 5 Bedrooms	Yard	Private Rooftop Space	Private Open Space	Townhomes
30'	A2	10'	2,824.0 s.f.	14 units	590 s.f. Deck: 108 s.f.	480sf	1178sf	Total: 152 Units
32'	B1	10'	2,878.0 s.f.	8 units	695 s.f. Deck: 110 s.f.	475sf	1280sf	
23'	B2	10'	2,648.0 s.f.	15 units	620 s.f. Deck: 74 s.f.	396sf	1090sf	
23'	B3	10'	2,546.0 s.f.	28 units	638 s.f. Deck: 75 s.f.	405sf	1113sf	
23'	B3R	10'	2,546 s.f.	4 units	638 s.f. Deck: 75 s.f.	405sf	1113sf	
16'	B5	10'	2,106 s.f.	30 units	207 s.f. Deck: 60 s.f.	405sf	267sf	
23'	D1	10'	2,191 s.f.	30 units	560 s.f. Deck: 80 s.f.	337sf	640sf	
16'	E	10'	1,697.0s.f.	40 units	155 s.f. Deck: 35 s.f.	150sf	340sf	
33'-7"	F1	10'	2,680.0 s.f.	5 units	470 s.f. Deck: 101 s.f.	387sf	1428sf	
								30 Units
								182

--- a. Accessible Open Space

AIP Includes capability for in-law unit conversion

EL Includes stacked closet space for retrofit to residential elevator
* All 30 multi-family units accessible by ADA elevator

Multi-family building
Total No. of Units

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PROPOSED SITE PLAN

Alameda Boatworks Green

2229 & 2235 CLEMENT AVENUE, ALAMEDA, CA

DATE: APR. 14, 2016
ps/DP-8

A) 2011 Approved Site Plan and Tentative Map

1.A) Shoreline: Tentative Map reflects proposed infill of concrete boatways and continuing condition of unimproved dilapidated concrete piers under the control of the US Army Corps of Engineers.

2.A) Publicly Accessible Waterfront Open Space: Tentative Map illustrates approved widths of open space improvements up to northern property line only with dilapidated concrete piers and lands to be repaired at unknown future date by the US Army Corps of Engineers. Setbacks are dimensioned from property line.

3.A) Pinch Point: 2011 Tentative Map is predicated on the infill of Boatways to avoid pinch point between SW corner of Boatways and fronting residences.

4.A) 18 Residential Units fronting onto Waterfront Open Space: 2011 Tentative Map reflects infill of Boatways and improvements up to shoreline of dilapidated concrete piers owned by and to be repaired in future by the US Army Corps of Engineers.

5.A) Central Green: 2011 Tentative Map features a 57'-1" wide Central Green perpendicular to the Waterfront Open Space leading to Blanding Drive and connecting to the Main North-South Paseo.

6.A) Pedestrian Access at Western Boundary: 2011 Tentative Map provides publicly accessible pedestrian access along Elm Dr. extension and at NW corner of site up to Waterfront Open Space with a 12' wide path.

7.A) Public Street Parking at Central Green: 2011 Tentative Map provides public parking directly adjacent to Central Green.

8.A) Extension of Blanding Ave. into Boatworks Site: The approved 2011 Tentative Map extends the existing street grid into the site with a 28' wide Blanding Drive (1 parking lane and 2 travel lanes).

9.A) Pedestrian Access at Eastern Boundary up from Oak St.: 2011 Tentative Map provides a 21'-9" wide public access path up to the Waterfront Open Space as an extension of the sidewalk along Oak St.

10.A) Vehicular Access Drives: The approved 2011 Tentative Map provided 22' wide private access roads for all the units served by A, B, C and D Drives and by Boatworks Drive and Waterfront East and West Drives.

11.A) 29 Unit Multi-Family Housing Structure at Clement Ave. and Oak St.: The approved 2011 Tentative Map locates the 50' high Multi-Family Structure with all the affordable housing units at the SE corner of the Boatworks Green project. The approved setback at Clement is Ave. is 0' and is 5' at Oak St.

12.A) Publicly Accessible Central Pedestrian Paseo: The approved 2011 Tentative Map provides a North-South 24' wide Publicly Accessible Paseo from the center of the block at Clement Ave. up to the Waterfront Open Space past the Central Green. Typically public paths are bordered by private front yards at all Paseo's.

B) 2015 Improvements to Approved Tentative Map recommended by Alameda Planning Board, Members of the Public, the Planning Board Design Subcommittee, and the Assistant Director of Planning, Alameda CDC.

1.B) Shoreline Improvements: 2015 Site Plan reflects new shoreline improvements completed in 2014 (removal of navigation hazards & dilapidated piers & contaminated soils, replacement of retaining walls, improvement of existing center conc. pier and installation of fresh rip-rap by the US EPA in coordination with City of Alameda, BCDC, DTSC and RWQCB and as funded by Applicant.)

2.B) Increased Publicly Accessible Waterfront Open Space: 2015 Site Plan increases setback widths from improved waterfront edge to face of houses along open space. (Compare dimensions) Overall area at waterfront open space is increased from 44640 s.f. to 65620 s.f. . In addition, proposed improvements at the boatways Pier bring the public closer to the water than previously allowed with potential for fishing and display of historical placards. Program for the Open Space includes picnic areas, children's playground, seating areas, and light recreational activity areas. Publicly accessible open space will be constructed in Phase 1 of the project development.

3.B) Widened area eliminating Pinch Point: 2015 Site Plan increases width between SW corner of existing Boatways and closest fronting residences by reducing the number of waterfront units. A small HOA Clubhouse has been added in this area.

4.B) Reduced to 14 Residential Units fronting onto Waterfront Open Space: 2015 Site Plan reduces number of private residential single family homes fronting onto Publicly Accessible Waterfront Open space from 18 to 14.

5.B) Widened Central Green: the 2015 Site Plan increases the width of the Central Green to 90' visible as cars enter along Blanding Dr. and connecting to the Main North-South Paseo. The overall area of the Boatworks Green is increased by 82% to 11962 s.f.

6.B) Widened Pedestrian Access at Western Boundary: 2015 Site Plan increases width to 25' between Western boundary and Residential units at NW site corner, expanding the view corridor to the Waterfront Open Space.

7.B) Public Street Parking relocated and replaced with Front yard entrances positioned along Central Green: The 2015 Site Plan relocates the Public Parking along the Elm Drive extension at the Western Property line and replaces it with residential front yards and doors along both sides of the Central Green.

8.B) Widened Blanding Drive through Boatworks Site with dedicated bicycle lane: The 2015 Site Plan increases Blanding Drive to a 35' width with 2 travel lanes, a dedicated bicycle lane and a parking lane. This new street geometry turns down Elm Drive to connect with Elm St. with the same width and capacities.

9.B) Widened Pedestrian Access at Eastern Boundary: 2015 Site Plan increases public open space width to 25' at Eastern boundary with increased front yard setbacks for fronting residential units at NE corner of site. Landscaping with trees and fencing is positioned to shield adjacent parking lot and commercial frontage at Park Street Landing.

10.B) Widened Vehicular Access Drives: The 2015 Site Plan increases the width of all the private vehicular Drives to a minimum of 28' clear. Turning Radii for the maximum sized emergency vehicle criteria provided by the Alameda Fire Dept. work at all private Drive intersections and at main project entrances off Clement Ave. and at Oak St. & Blanding Ave.

11.B) Widened 30 Unit Multi-Family Structure with increased setbacks: The 2015 Site Plan increases the width of the 50' high Multi-family structure to provide larger affordable housing units. This creates a new jog in Boatworks Drive that connects to A Drive and B Drive but maintains the same circulation as approved in 2011. Setbacks increase to 9' at Clement and 10' Oak St.

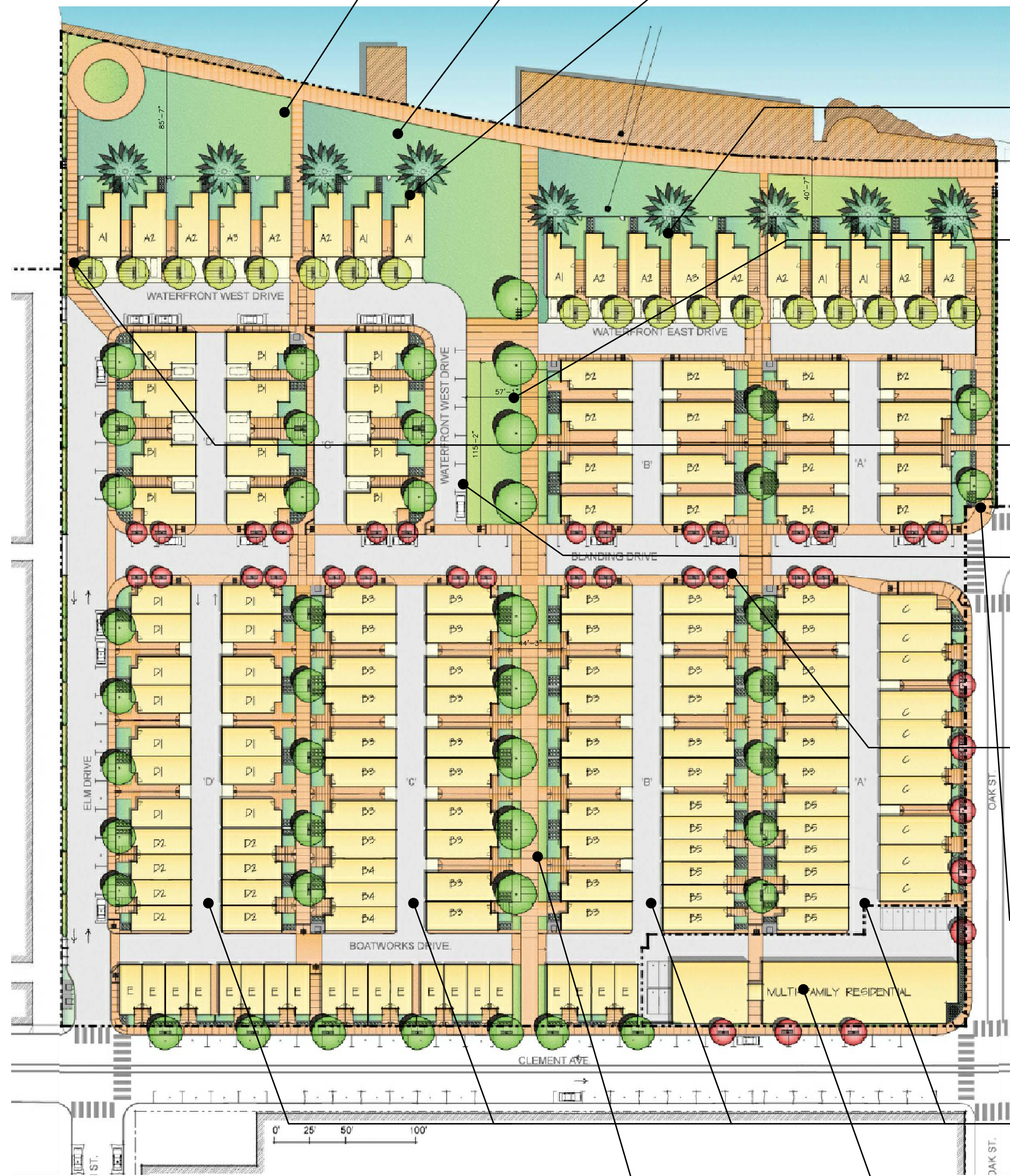
12.B) Widened Publicly Accessible Central Paseo and Roof Decks at every unit: The 2015 Site Plan increases the width of the Central Paseo to 30' for the landscaped publicly accessible portion framed by 8' deep private front yards on either side. Overall private outdoor space is increased by 72% as a result of new large roof decks at every unit.

The 2015 Proposed Development Plan reflects improvements to the 2011 Approved Development Plan recommended by the Alameda Planning Board and Alameda CDC. The 2015 Development Plan is in substantial conformance with the 2011 Approved Tentative Map. The current 2015 site plan of 182 units is in every significant aspect identical to the 2011 approved 182 unit site plan.

- 1) Same number of units: 182 total composed of 152 Townhomes/SFD's and 30 Multi-Family Apartment units including 21 affordable housing units at the Multi-Family structure as originally approved. (Affordable units have increased in floor area. Total number of units accommodating Universal Design Criteria has increased from 30 to 72).
- 2) Same roadway plan for integrating Alameda City Street Grid into Project: Blanding Ave. extends directly into site, and Elm St. extends directly into site. (2015 Plan increases Road and Drive widths and includes a dedicated Bike Lane).
- 3) Same layout of approximately 2 acres of publicly accessible Waterfront Open Space, Central Green, and Main Paseo. (2015 Plan increases widths and overall area).
- 4) Same provision of private front yards at each townhouse and decks at Multi-Family building as in 2011 Plan. Introduction of proposed full width Roof Decks at each unit increasing overall private outdoor space by 72%.

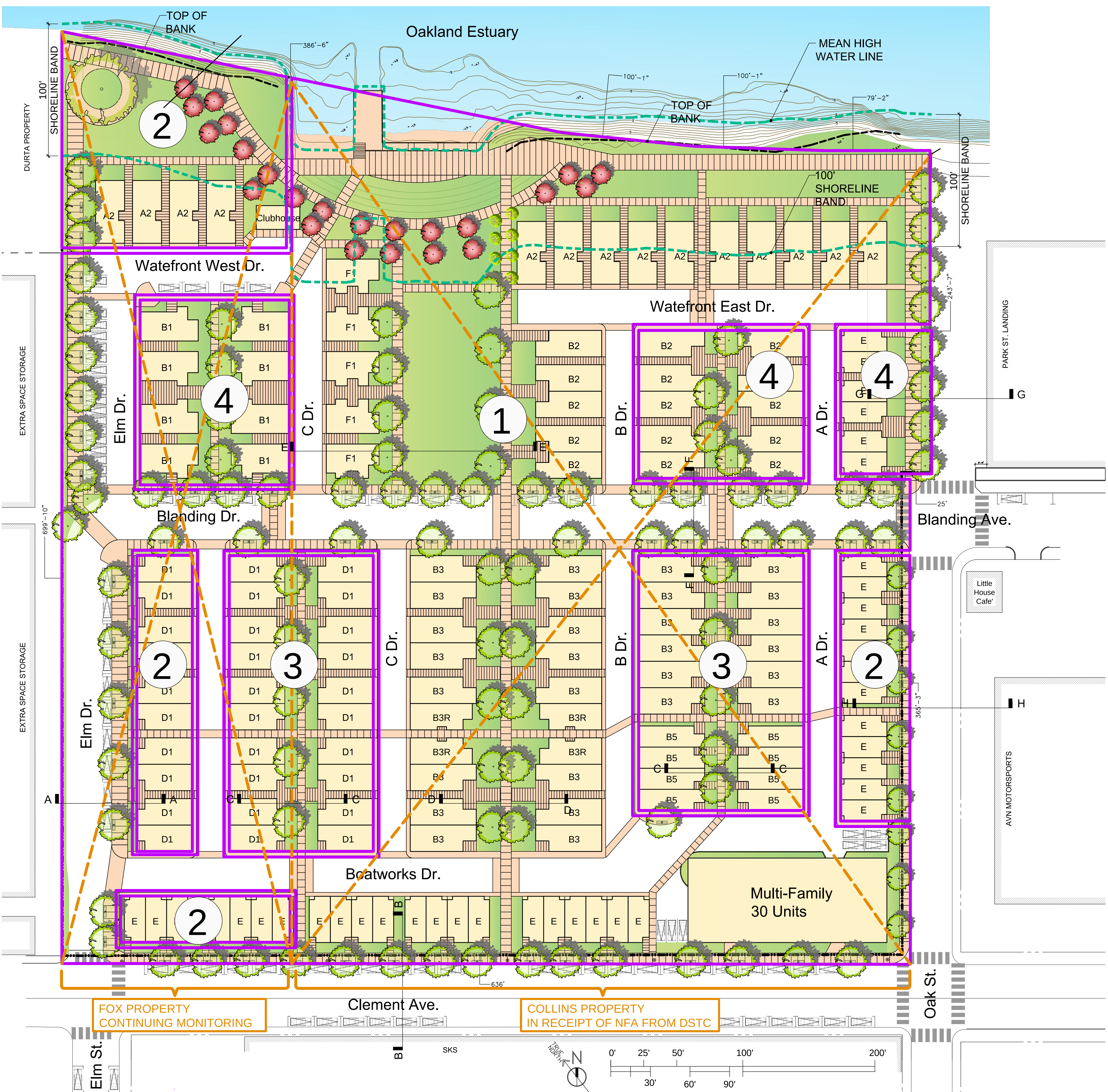
12 specific recommended improvements to the 2011 Development Plan are noted in the comparison list to the 2015 Development Plan on this sheet.

2011 Approved Development Plan



2015 Proposed Modified Development Plan





2015 Site Plan: Four Phases for Development of “Boatworks Green” project.

The 2015 site plan retains the extension of Elm St. and Blanding Ave. into the site as well as the 30 unit multi-family building that houses the affordable housing units at the SE corner of the site as included in the approved 2010/2011 - 182 unit site plan. The 2015 edition proposes a similar mix of single family detached and attached 3 story, 1 and 2 car garage, 2 to 5 bedroom units that are ideal for starting and established extended families. All the townhome units have private front yards and have rooftop decks.

Phase 1 of the Development Plan calls for the construction and landscaping of most of the main publicly accessible open spaces (Majority of Waterfront Open Space, the community Green, and the Main Paseo) as well as the 30 unit multi-family housing structure that contains all the inclusionary affordable housing units.

Below please find a table displaying estimated commencement and completion dates for each Phase. These estimated dates are contingent upon the City of Alameda awarding the project a Building Permit before the end of 2016. The areas of the 4 Phases of the project are noted on sheet ps/DP-10 which has been revised to indicate most open space, all roads, and all inclusionary affordable housing will be constructed in Phase 1:

	Start Date	Completion Date
Phase 1	2/01/2017	2/01/2018
Phase 2	2/02/2018	2/02/2019
Phase 3	2/03/2019	2/03/2020
Phase 4	2/04/2020	2/04/2021

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PHASING PLAN for DEVELOPMENT

Alameda Boatworks Green

2229 & 2235 CLEMENT AVENUE, ALAMEDA, CA

DATE:

APR. 14, 2016

ps/DP-10



Increased Public & Private Open Space compared to Approved 2010 Settlement Agreement

(Average open space per unit (incl. all common and private spaces) > 1,000 sf./unit)

In the currently proposed 2015 site plan the amount of publicly accessible open space and landscaped area has been increased compared to the 2010/2011 site plan. As a result of meetings with an Alameda Planning Board subcommittee this current site plan also relocated the public parking serving the open space from along the central commons to along the Elm Drive extension that provides a pedestrian pathway up the west boundary of the property directly to the open space. This permitted us to widen the community “Green” at the center of the site and to design it to be free of cars or roads. Townhome front doors and yards now exclusively face the “Green” on both the east and west.

Private Open Space has been increased by the introduction of full-width Roof Decks at the majority of units, providing elevated views, secure private open space, and convenient entertainment and recreational square footage.

OPEN SPACE SUMMARY

Overall Site Area:

9.48 Ac

a. Publicly Accessible Open Space :

2.16 Ac

b. Private Open Space (yards & decks) :

1.61 Ac

c. Private Rooftop Decks:

1.37 Ac

d. Total Open Space:(a+b+c)

5.14 Ac

e. 5.14 Ac (a+b+c) = 223,898 s.f. / 182 = 1,230 s.f. open space per unit average

f. Publicly Accessible Path & Parking : (17 spaces with 2 ADA)

0.19 Ac

g. Boatways:

0.10 Ac

OPEN SPACE LEGEND

①

Shoreline Open Space

②

Green commons

③

Main Paseo

④

Elm Dr. Walk

⑤

West Paseo

⑥

East Paseo

⑦

Oak St. Walk

Total Street Parking Spaces = 46

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PUBLICLY ACCESSIBLE OPEN SPACE PLAN

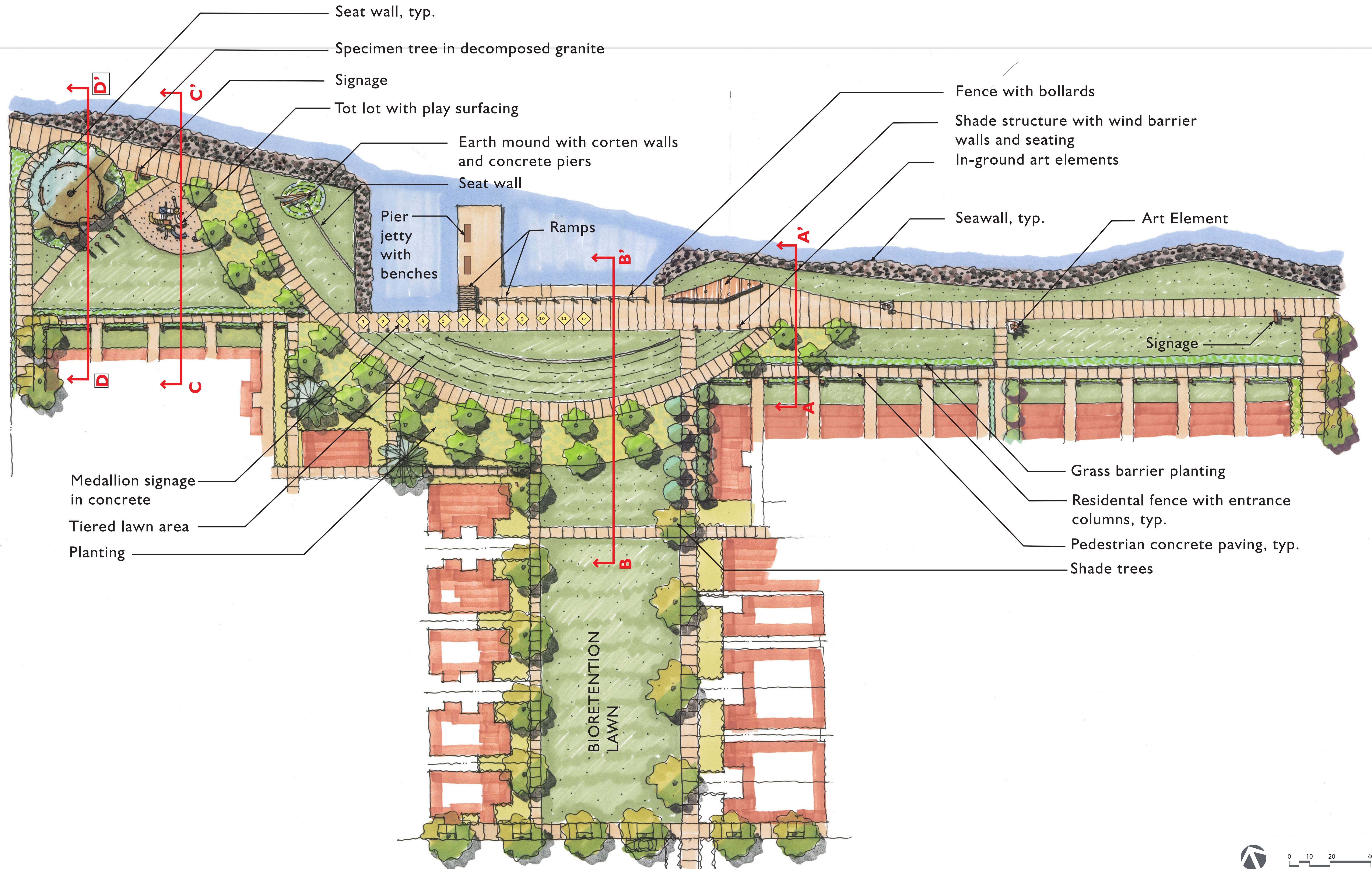
Alameda Boatworks Green

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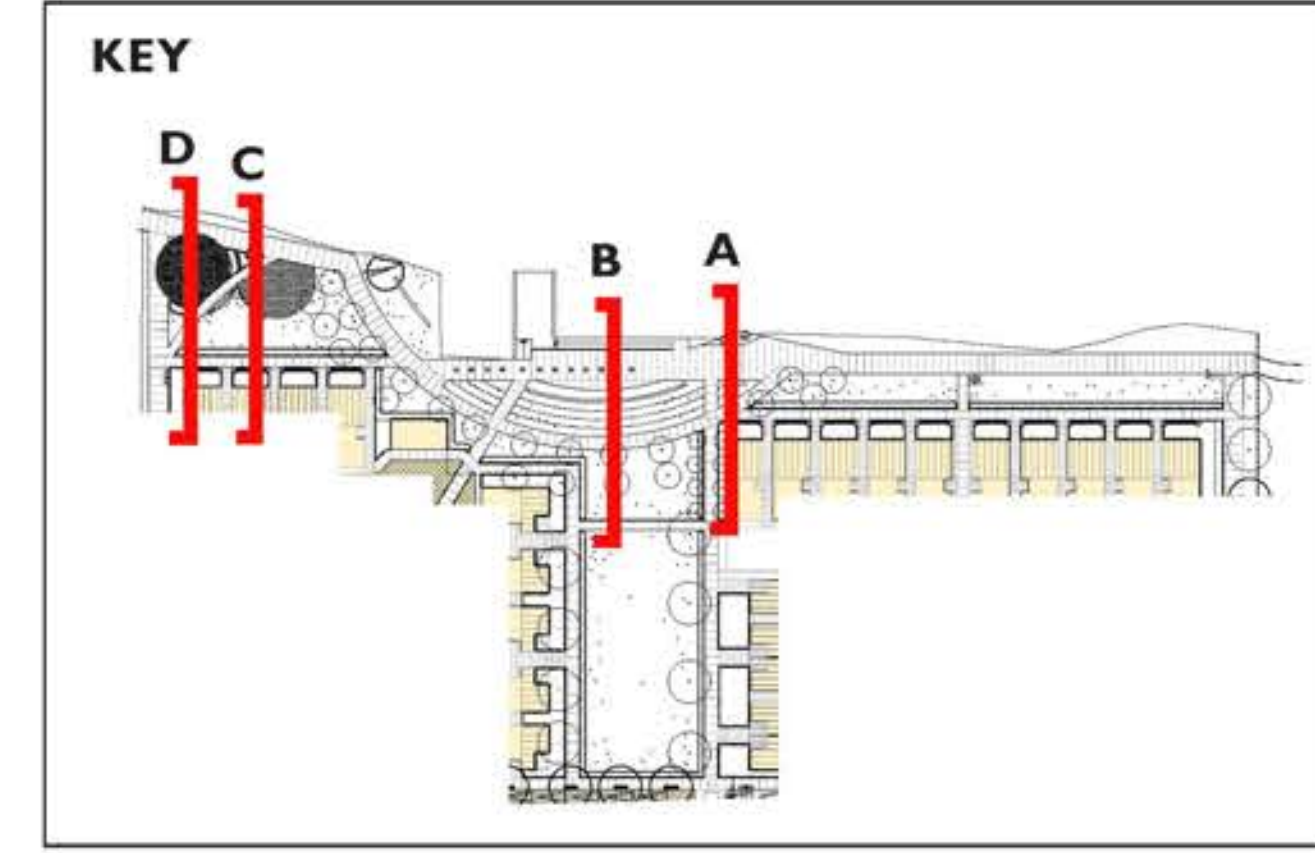
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MAY. 18, 2016

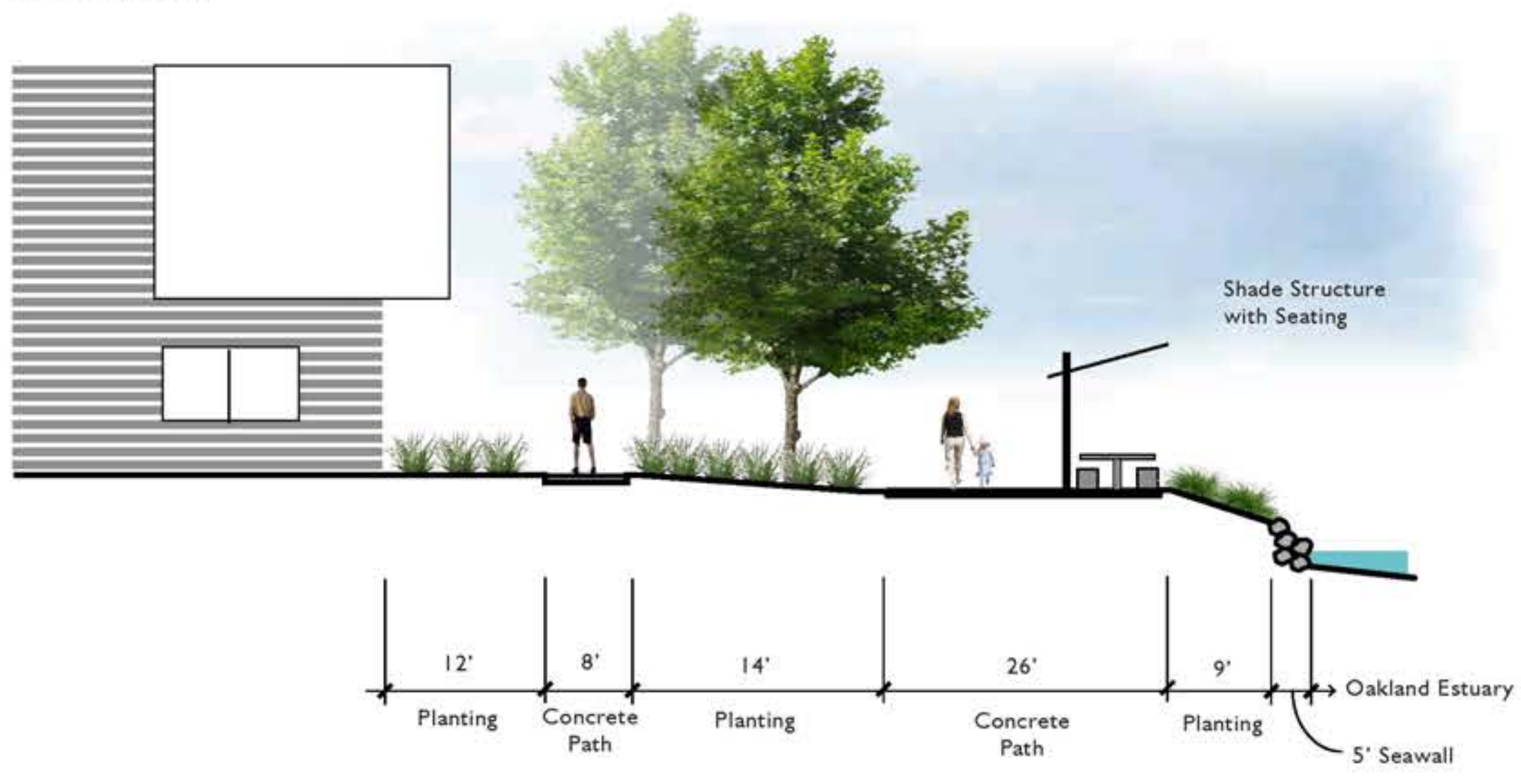
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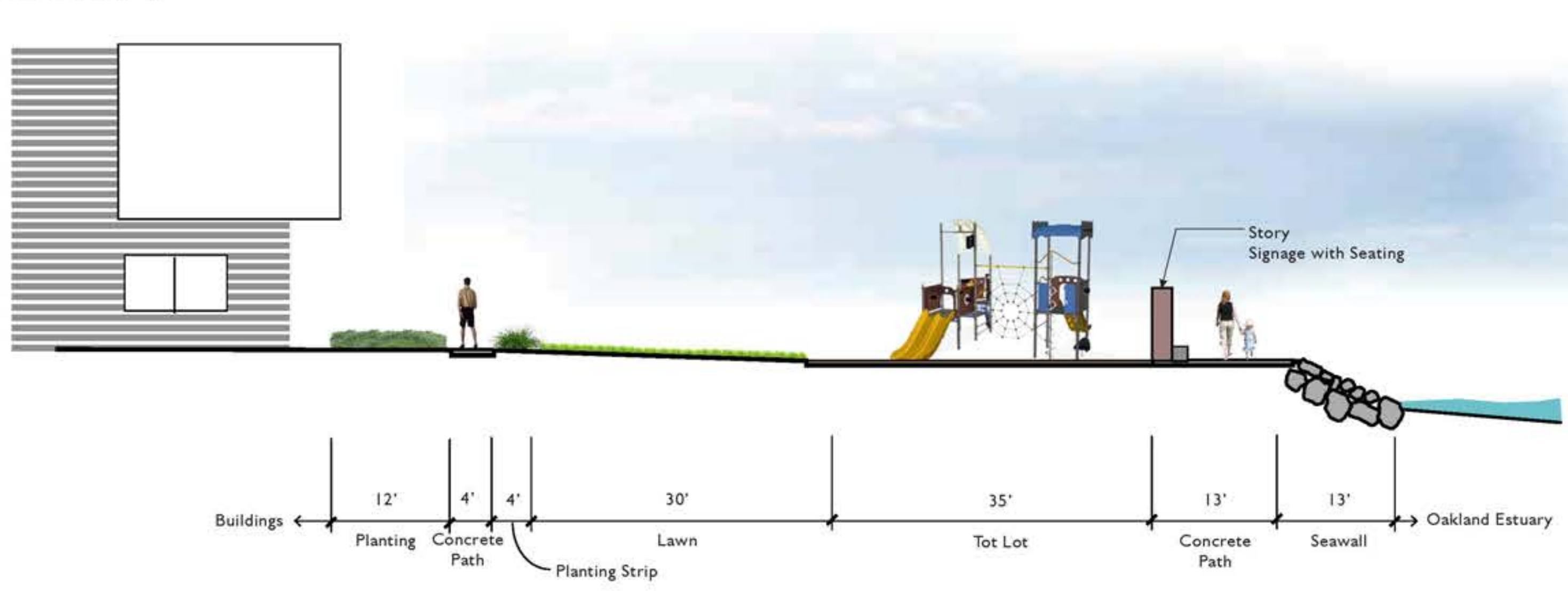
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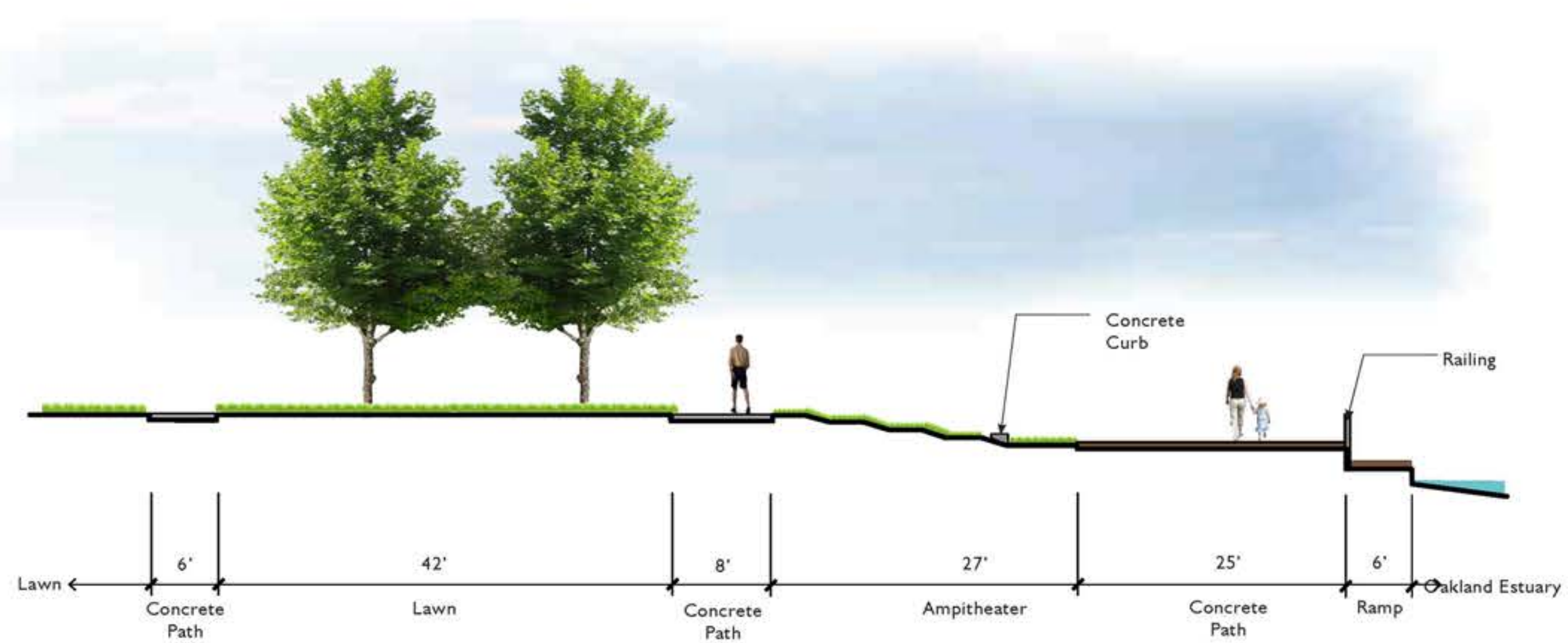
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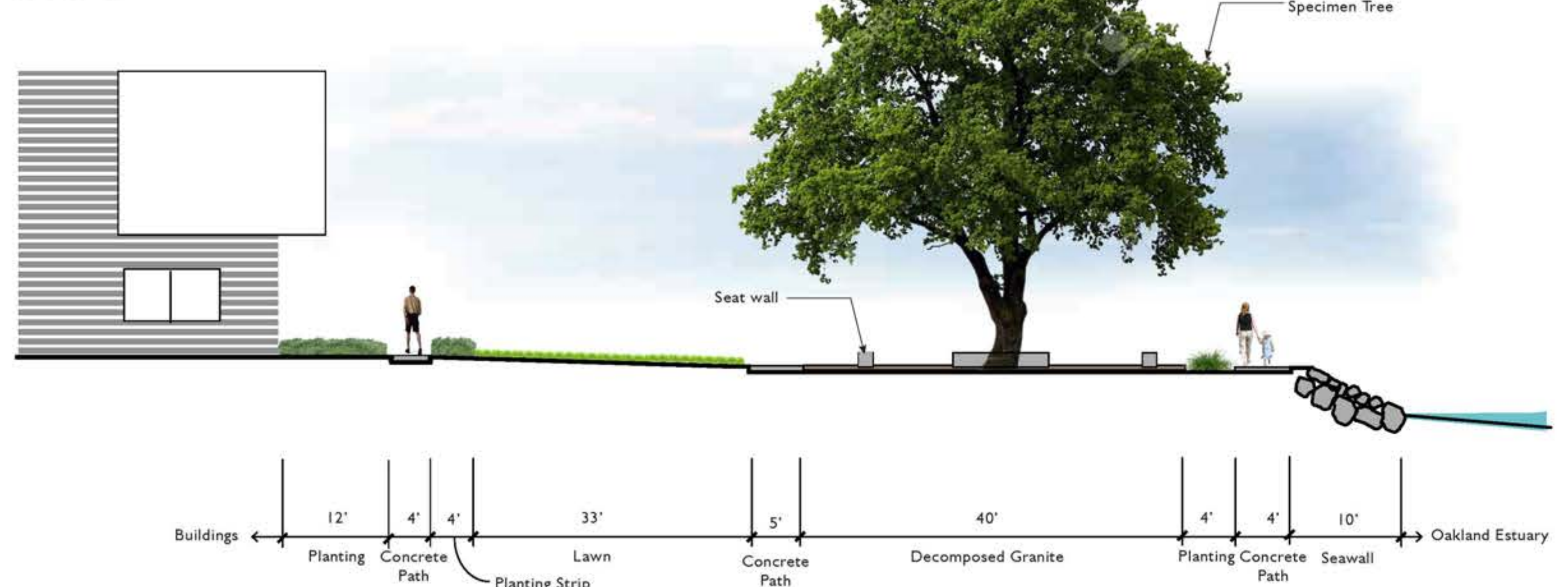
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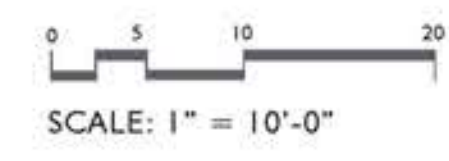
SECTION B



SECTION D



BantaDESIGN, A DIVISION OF BETA, INC. ARCHITECTURE PLANNING URBAN DESIGN 6050 HOLLIS STREET EMERYVILLE, CA 94608 510-654-3255	ILLUSTRATIVE SITE SECTIONS AT BOATWORKS GREEN		
Alameda Boatworks Green 2229 & 2235 CLEMENT AVENUE, ALAMEDA, CA	MAY. 18, 2016	ps/OS-10	



TREES



Acer palmatum 'Bloodgood'
Japanese Maple



Aesculus x carnea
Red Horse Chestnut



Ginkgo biloba 'Saratoga'
Maidenhair Tree



Quercus agrifolia
Coast Live Oak



Tilia tomentosa 'Sterling'
Silver Linden



Zelkova serrata 'City Sprite'
Zelkova

TURF



Delta Blue Grass
50% Bluegrass / 50% Ryegrass Blend

SHRUBS



Anigozanthos hybrids
Kangaroo Paws



Buddleia davidii 'Blue Chip'
Butterfly Bush



Chondropetulum tectorum 'El Campo'
Cape Rush



Correa 'Dusky Bells'
Red Australian Fuchsia



Lavandula angustifolia
English Lavender



Myoporum parvifolium 'Prostratum'
Myoporum



Phormium 'Dazzler'
New Zealand Flax



Phormium 'Duet'
New Zealand Flax



Polystichum munitum
Swordfern



Spiraea nipponica 'Snowmound'
Spiraea



Tibouchina urvilleana
Princess Flower

GRASSES



Festuca californica
California Fescue



Leymus condensatus 'Canyon Prince'
Canyon Prince Wild Rye



Pennisetum setaceum 'Eaton Canyon'
Dwarf Purple Fountain Grass



Helictotrichon sempervirens
Blue Oat Grass



Lomandra longifolia 'Breeze'
Dwarf Mat Rush



Sisyrinchium idahoense
Idaho Blue-eyed Grass



Juncus patens
California Gray Rush



Muhlenbergia rigens
Deer Grass

PROPOSED LANDSCAPE
PLANT PALETTE

MAY. 18, 2016

ps/OS-8



PLAY STRUCTURE



HARDSCAPE



SEATING



SCULPTURE / ART ELEMENT

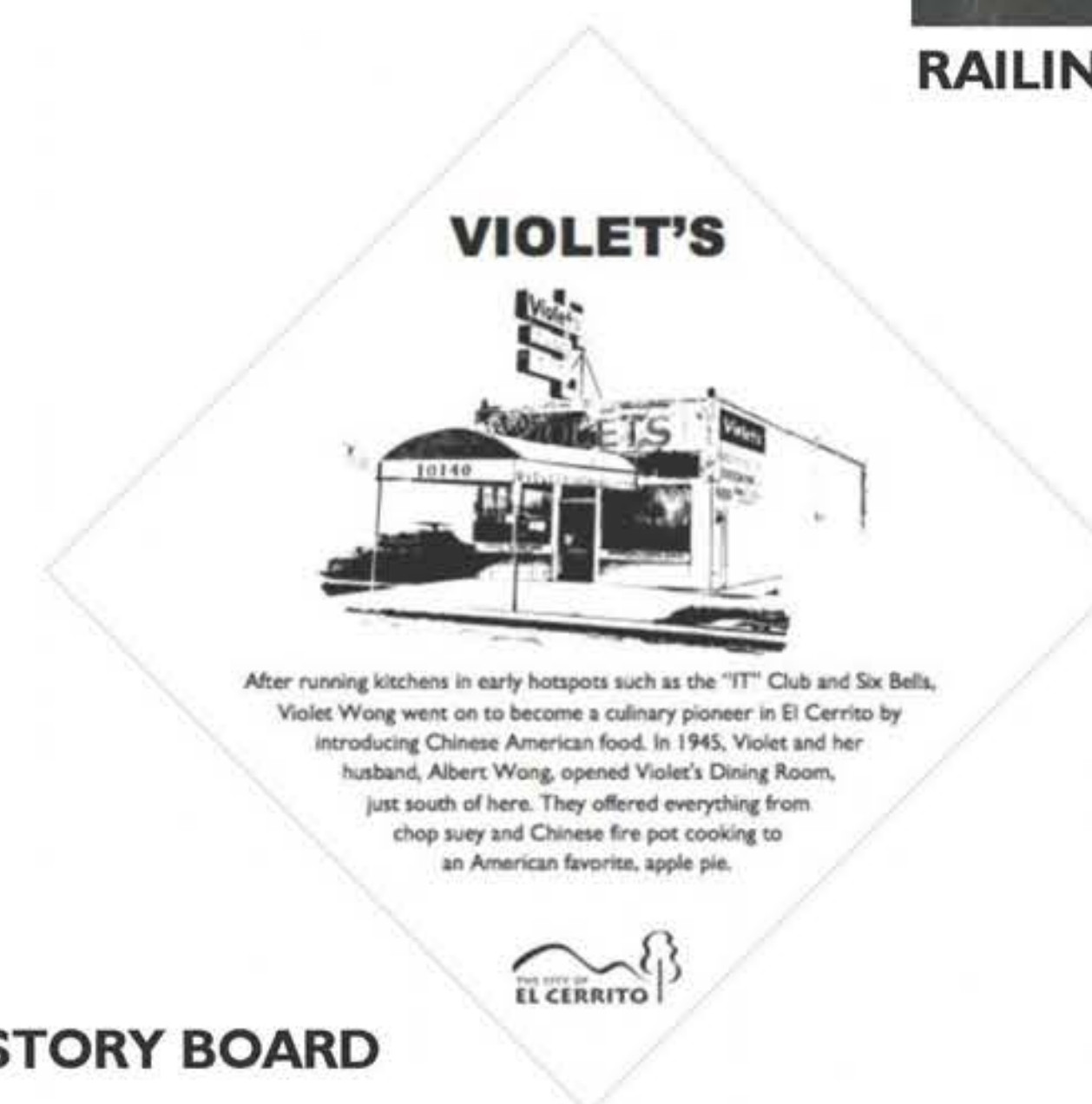


RAILING TREATMENT

PROPOSED LANDSCAPE SITE FURNITURE EXAMPLES

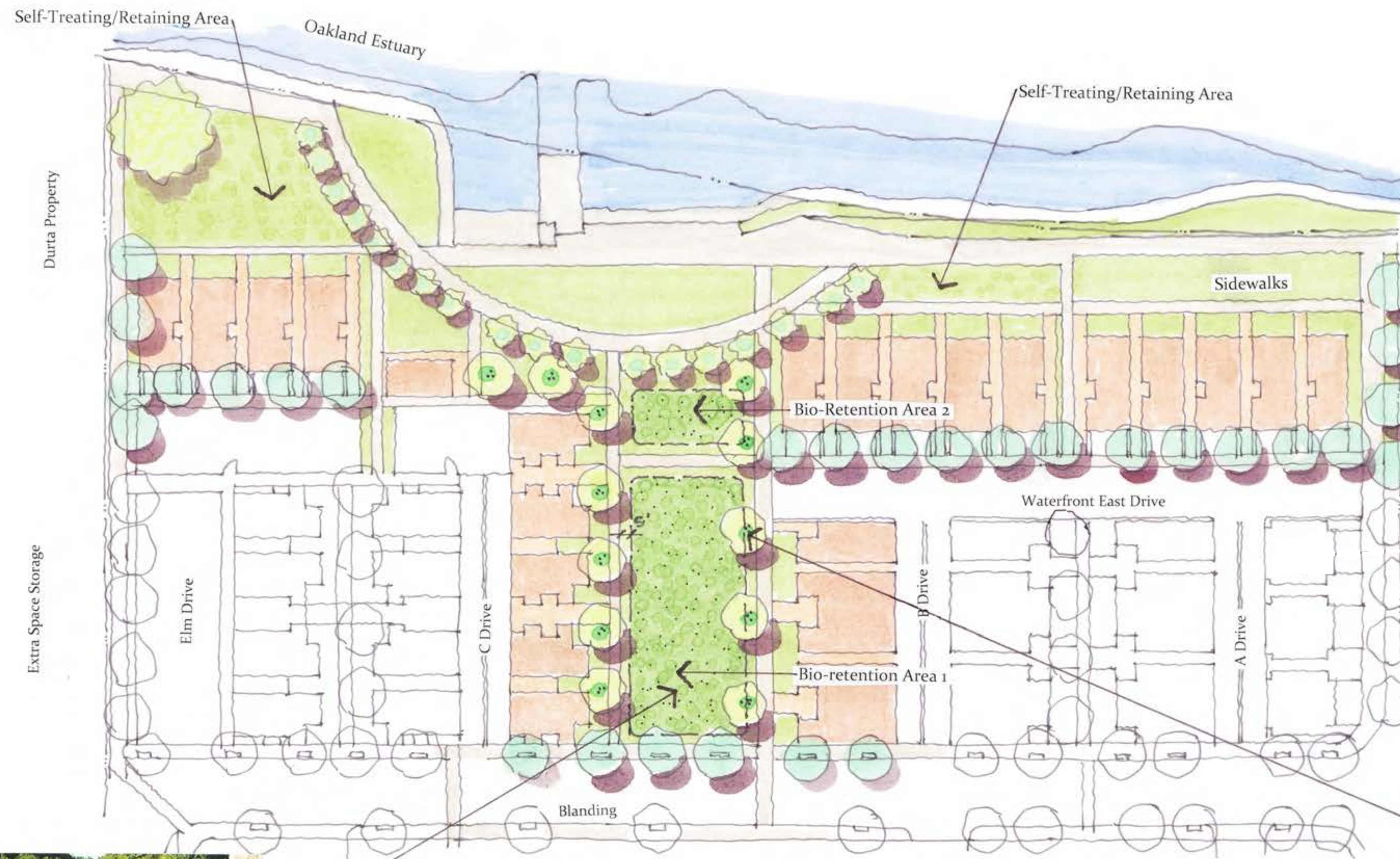
MAY. 18, 2016

ps/OS-9



STORY BOARD





Blue Rye Grass

Alameda Boatworks Green Open Space Bio-Retention Concept

2.5.16



The Boatworks Central Green Space/ Bio-retention area is planted with Blue Rye Grass, a mix of Ryegrass and Kentucky Blue Grass typically installed on athletic fields. This area will be able to withstand daily use by project residents and community visitors. This mix can also take a lot of sunshine near the coast, requiring more water and more fertilizer than dwarf fescue (especially during hot seasons). Blue Rye Grass has good winter disease tolerance, excellent reparability and presents a deep green color across all seasons. Use of the area after a storm depends on rainfall intensity and duration. The Central Green Space/Bio-retention area should drain at a minimum percolation rate of 5" per hour. If properly installed the space should be able to accept use within a few hours.

The trees along the perimeter and planted in the sidewalk shoulder at the Central Green Space/Bio-retention area are Melaleuca quinquenervia-Cajuput Tree, an Australian native that grows well in Northern California in coastal environments. Also known as the "Tea Tree" it is an evergreen that requires little to regular water, has thick light brown/whitish bark, narrow oval pale green leaves and foliage that turns purple in frosts. This species also has yellowish white sometimes pinkish flower spikes and makes an excellent street tree.



Melaleuca Quinquenervia

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1 Project Name:

BOATWORKS

1-2 City application ID:

1-3 Site Address or APN:

1-4 Tract or Parcel Map No:

1-5 Site Mean Annual Precip. (MAP)¹

21.0

Inches

1-6 Applicable Rain Gauge²

Oakland

The calculations presented here are based on the combination flow and volume hydraulic sizing method provided in the Clean Water Program Alameda County C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Chapter 5, Section 5.1 of the guidance manual, applicable portions of which are included in this file, in the tab called "Guidance from Chapter 5".

Refer to the Mean Annual Precipitation Map in Appendix D of the C.3 Technical Guidance to determine the MAP, in inches, for the site.

Enter "Oakland Airport" if the site MAP is 16.4 inches or greater. Enter "San Jose" if the site MAP is less than 16.4 inches.

MAP adjustment factor is automatically calculated as:

1.14

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5.2, below.)

Click here for map

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA:

DMA 1

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	248,000	1.0	248,000
2-3	Pervious service	28,000	0.1	2,800
Total DMA Area (square feet) =		276,000		

2-4

Total Effective Impervious Area (EIA)

250,800

Square feet

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-2: Unit Basin Storage Volumes (in inches) for 80 Percent Capture Using 48-Hour Drawdowns		
		Unit Basin Storage Volume (in) for Applicable Runoff Coefficients
Applicable Rain Gauge	Mean Annual Precipitation (in)	Coefficient of 1.00
Oakland Airport	18.35	0.67
San Jose	14.4	0.56

3-1

Unit basin storage volume from Table 5.2:

0.67

Inches

(The coefficient for this method is 1.00, due to the conversion of any landscaping to effective impervious area)

3-2

Adjusted unit basin storage volume:

0.77

Inches

(The unit basin storage volume is adjusted by applying the MAP adjustment factor.)

3-3

Required Capture Volume (in cubic feet):

16,025

Cubic feet

(The adjusted unit basin sizing volume [inches] is multiplied by the size of the DMA and converted to feet)

4.0 Calculate the Duration of the Rain Event

4-1 Rainfall intensity

0.2

Inches per hour

4-2 Divide Item 3-2 by Item 4-1

3.83

Hours of Rain Event Duration

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1 4% of DMA impervious surface

10,032

Square feet

5-2 Area 25% smaller than item 5-1

7,524

Square feet

5-3 Volume of treated runoff for area in Item 5-2

12,019

Cubic feet

(Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1 Subtract Item 5-3 from Item 3-3

4,006

Cubic feet

(Amount of runoff to be stored in ponding area)

6-2 Divide Item 6-1 by Item 5-2

0.5

Feet

(Depth of stored runoff in surface ponding area)

6-3 Convert Item 6-2 from ft to inches

6.4

Inches

(Depth of stored runoff in surface ponding area)

6-4 If ponding depth in Item 6-3 meets your target depth, skip to Item 8-1. If not, continue to Step 7-1.

7.0 Optimize Size of Treatment Measure

7-1 Enter an area larger or smaller than Item 5-2

7700

Sq.ft.

(enter larger area if you need less ponding depth; smaller for more depth.)

7-2 Volume of treated runoff for area in Item 7-1

12,300

Cubic feet

(Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)

7-3 Subtract Item 7-2 from Item 3-3

3,725

Cubic feet

(Amount of runoff to be stored in ponding area)

7-4 Divide Item 7-3 by Item 7-1

0.48

Feet

(Depth of stored runoff in surface ponding area)

7-5 Convert Item 7-4 from feet to inches

5.81

Inches

(Depth of stored runoff in surface ponding area)

7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.

8.0 Surface Area of Treatment Measure for DMA

8-1 Final surface area of treatment*

7,700

Square feet

(Either Item 5-2 or final amount in Item 7-1)

*Note: Check with the local jurisdiction as to its policy regarding the minimum biotreatment surface area allowed.

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1 Project Name:

BOATWORKS

1-2 City application ID:

1-3 Site Address or APN:

1-4 Tract or Parcel Map No:

1-5 Site Mean Annual Precip. (MAP)¹

21.0

Inches

1-6 Applicable Rain Gauge²

Oakland

The calculations presented here are based on the combination flow and volume hydraulic sizing method provided in the Clean Water Program Alameda County C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Chapter 5, Section 5.1 of the guidance manual, applicable portions of which are included in this file, in the tab called "Guidance from Chapter 5".

Refer to the Mean Annual Precipitation Map in Appendix D of the C.3 Technical Guidance to determine the MAP, in inches, for the site.

Enter "Oakland Airport" if the site MAP is 16.4 inches or greater. Enter "San Jose" if the site MAP is less than 16.4 inches.

MAP adjustment factor is automatically calculated as:

1.14

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5.2, below.)

Click here for map

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA:

DMA 2

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	41,000	1.0	41,000
2-3	Pervious service	3,000	0.1	300
Total DMA Area (square feet) =		44,000		

2-4

Total Effective Impervious Area (EIA)

41,300

Square feet

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-2: Unit Basin Storage Volumes (in inches) for 80 Percent Capture Using 48-Hour Drawdowns		
		Unit Basin Storage Volume (in) for Applicable Runoff Coefficients
Applicable Rain Gauge	Mean Annual Precipitation (in)	Coefficient of 1.00
Oakland Airport	18.35	0.67
San Jose	14.4	0.56

3-1

Unit basin storage volume from Table 5.2:

0.67

Inches

(The coefficient for this method is 1.00, due to the conversion of any landscaping to effective impervious area)

3-2

Adjusted unit basin storage volume:

0.77

Inches

(The unit basin storage volume is adjusted by applying the MAP adjustment factor.)

3-3

Required Capture Volume (in cubic feet):

2,639

Cubic feet

(The adjusted unit basin sizing volume [inches] is multiplied by the size of the DMA and converted to feet)

4.0 Calculate the Duration of the Rain Event

4-1 Rainfall intensity

0.2

Inches per hour

4-2 Divide Item 3-2 by Item 4-1

3.83

Hours of Rain Event Duration

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1 4% of DMA impervious surface

1,652

Square feet

5-2 Area 25% smaller than item 5-1

1,239

Square feet

5-3 Volume of treated runoff for area in Item 5-2

1,979

Cubic feet

(Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1 Subtract Item 5-3 from Item 3-3

660

Cubic feet

(Amount of runoff to be stored in ponding area)

6-2 Divide Item 6-1 by Item 5-2

0.5

Feet

(Depth of stored runoff in surface ponding area)

6-3 Convert Item 6-2 from ft to inches

6.4

Inches

(Depth of stored runoff in surface ponding area)

6-4 If ponding depth in Item 6-3 meets your target depth, skip to Item 8-1. If not, continue to Step 7-1.

7.0 Optimize Size of Treatment Measure

7-1 Enter an area larger or smaller than Item 5-2

1300

Sq.ft.

(enter larger area if you need less ponding depth; smaller for more depth.)

7-2 Volume of treated runoff for area in Item 7-1

2,077

Cubic feet

(Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)

7-3 Subtract Item 7-2 from Item 3-3

562

Cubic feet

(Amount of runoff to be stored in ponding area)

7-4 Divide Item 7-3 by Item 7-1

0.43

Feet

(Depth of stored runoff in surface ponding area)

7-5 Convert Item 7-4 from feet to inches

5.19

Inches

(Depth of stored runoff in surface ponding area)

7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.

8.0 Surface Area of Treatment Measure for DMA

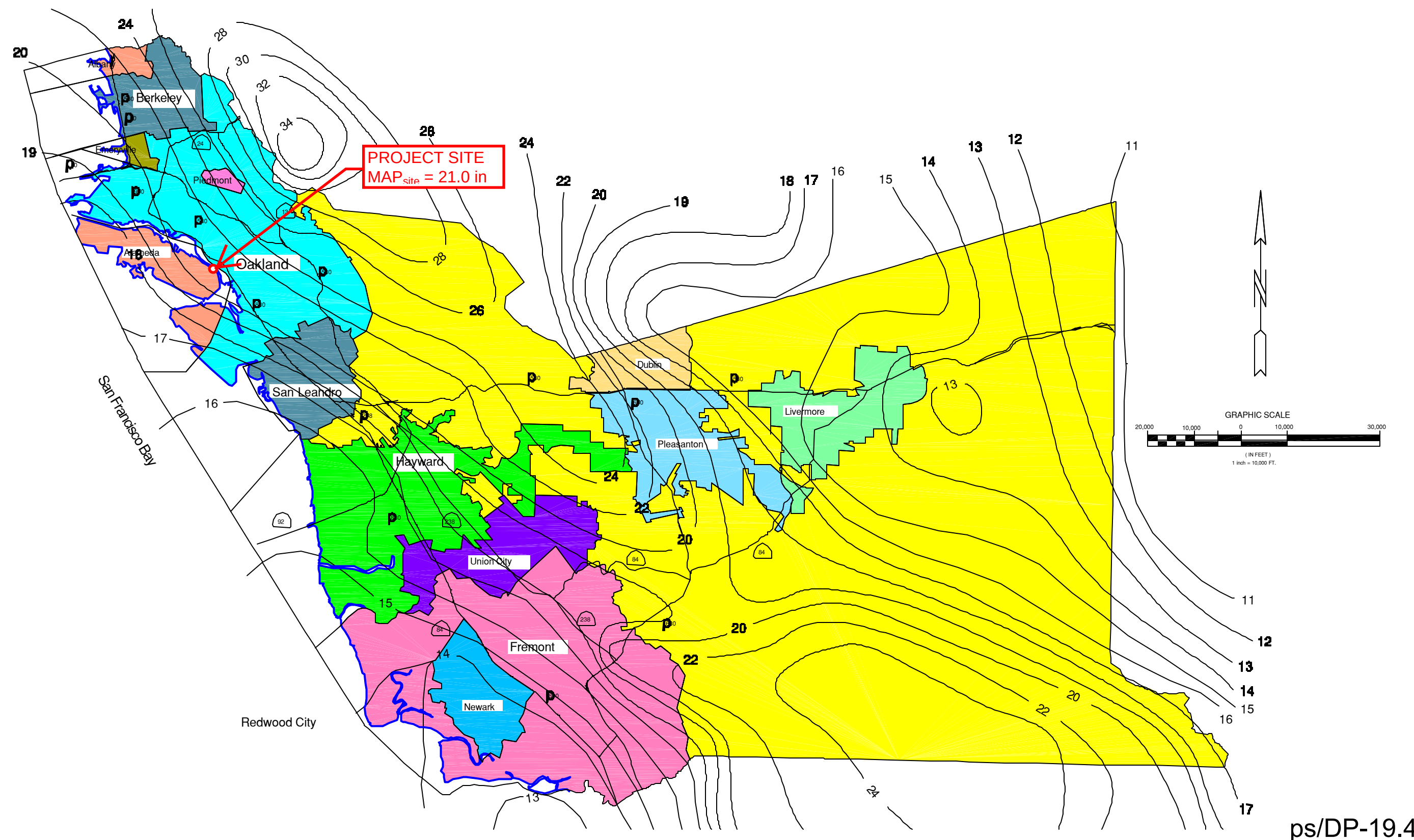
8-1 Final surface area of treatment*

1,300

Square feet

(Either Item 5-2 or final amount in Item 7-1)

*Note: Check with the local jurisdiction as to its policy regarding the minimum biotreatment surface area allowed.



ps/DP-19.4

ALAMEDA COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

MEAN ANNUAL PRECIPITATION
(VALUES IN INCHES)

DATE: MAY 2003

ATTACHMENT-6