STORMWATER CONTROL PLAN

For

TUSCANY MEADOWS EAST

PORTION OF SUB 8654

February 13, 2013

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JN 201002

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This Stormwater Control Plan was prepared using the template dated February 15, 2012.

I. PROJECT DATA

Table 1. Project Data

Project Name/Number	Tuscany Meadows – East – Sub 8654 - Ptn JN 201002
Application Submittal Date	
Project Location	South side of Buchanan Rd, approximately 2,300' West of the Buchanan Rd/Somersville Rd intersection in Pittsburg, CA APN: 089-150-013 - PTN
Name of Developer	West Coast Home Builders, Inc.
Project Phase No.	1
Project Type and Description	Single Family Residential
Project Watershed	Kirker Creek
Total Project Site Area (acres)	87.71 ac (3,820,683 sf)
Total Area of Land Disturbed (acres)	87.71 ac
Total New Impervious Surface Area (sq. ft.)	2,585,268
Total Replaced Impervious Surface Area	0
Total Pre-Project Impervious Surface Area	0
Total Post-Project Impervious Surface Area	2,585,268
50% Rule[*]	Doesn't Apply
Project Density	6.3 du/acre (469.5/74.06) single family houses 22 du/acre (300/13.65) apartments
Applicable Special Project Categories [Complete even if all treatment is LID]	None
Percent LID and non LID treatment	100% LID / 0% non LID
HMP Compliance [†]	Option 2 [Per Guidebook Table 1-2 on p. 9]

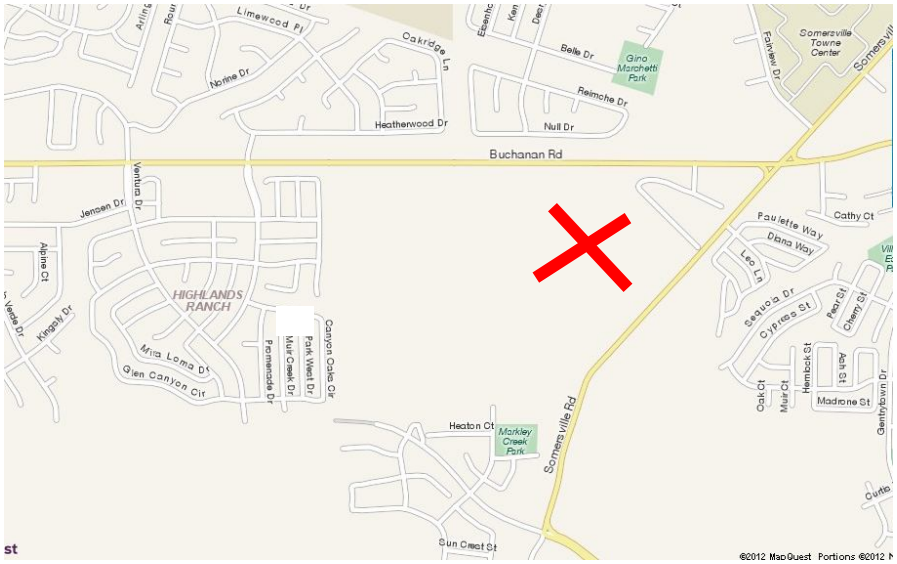
[*50% rule applies if:
Total Replaced Impervious Surface Area > 0.5 x Pre-Project Impervious Surface Area]

[†HMP applies if:
(Total New Impervious Surface Area + Total Replaced Impervious Surface Area) $\geq$ 1 acre]

II.A Project Location and Description

Tuscany Meadows Subdivision 8654 is divided by a north-south drainage watershed boundary line that divides the eastern 1/2 of the project from the western 1/2 of the project. The eastern 1/2 is referred to as Tuscany Meadows East and will create 469.5 single family homes on the eastern portion of the subdivision which is located on the south side of Buchanan Rd., approximately 2,300 feet west of the intersection of Somersville Rd. and Buchanan Rd. in Pittsburg, California. (See Figure 1). The project is bounded on the east by the Contra Costa canal and Somersville Rd., on the south by the Black Diamond Ranch development, and on the west by Tuscany Meadows West and the Chevron property. The developed area of Tuscany Meadows East will be approximately 88 acres.

Figure 1. Project Location



II.B. Existing Site Features and Conditions

The site has a relatively flat slope (2.5%) falling south to north. Total relief on the site is approximately 65 feet, ranging from a high of 175± feet at the southern boundary to a low of 110± feet at the culvert beneath the Contra Costa canal. Drainage from an existing 30" culvert to the south (the Black Diamond development) discharges onto the property and meanders in a northeasterly direction, via an earth ditch, toward the existing 2'x2' reinforced concrete box culvert beneath the Contra Costa canal. This ditch will be replaced by underground pipe as part of the development.

A geotechnical engineering report was prepared by Wallace Kuhl & Associates on 2/3/12 (job no. 9328.01). No groundwater was encountered during excavations of up to 51'. Historical documentation indicates the groundwater level to be approximately 100' deep. The property is currently vacant. No wetlands, seeps or springs were observed on the site. The web soil survey published by the Natural Resources Conservation Service indicates the site soil to be primarily Rincon Clay Loam, with a NRCS Hydrologic Soil Group "C" rating.

II.C. Opportunities and Constraints for Stormwater Control

A site constraint is impermeable soils (soil group C), which makes disposal of runoff to deep infiltration unfeasible. An additional site constraint is the high density land use (4000+ sf lots).

A site opportunity is the location of a deep storm drain culvert beneath the Contra Costa canal near the northeast corner of the site. All site drainage discharges at this site low point, making it a natural location for the proposed bio retention area.

III. LOW IMPACT DEVELOPMENT DESIGN STRATEGIES

III.A. Optimization of Site Layout

III.A.1. Limitation of development envelope

The two story houses to be constructed require less building footprint area.

III.A.2. Preservation of natural drainage features

There are no natural drainage features to be preserved.

III.A.3. Setbacks from creeks, wetlands, and riparian habitats

There are no creeks, wetlands or riparian habitats requiring setbacks.

III.A.4. Minimization of imperviousness

Impervious paving is decreased as follows:

1. Street widths are reduced from 40' to 36' wherever allowed.

III.A.5. Use of drainage as a design element

Located at the northeast border of the site (downstream low point), a large bio retention area will be constructed to provide treatment and controls and mitigation of the hydro modification impacts for storm drain runoff. Some limited park use may also be achieved, pending further discussions with the City.

III.B. Use of Permeable Pavements

Conventional asphalt is used throughout the site for the roadway pavement and conventional concrete is used for standard curb and gutter and sidewalk areas. Porous pavement does not work with the site due to the impermeability of the underlying type C soils and is also not cost effective.

III.C. Dispersal of Runoff to Pervious Areas

Self retaining areas and areas draining to self retaining areas has not been utilized in this design because of the dense onsite development. Instead, all storm drainage is collected and conveyed to the single onsite bio retention basin for treatment and control and mitigation of the hydro modification impacts at one location.

III.D. Feasibility Assessment of Harvesting and Use for Treatment and Flow-Control

III.D.1. Permeability of Site Soils

Site soils, being group "C", will not have a saturated hydraulic permeability of 1.6 inches/hour or greater. Therefore, a determination of the infeasibility of harvesting and use has been made.

III.D.2. Potential Opportunities for Harvesting and Use

The typical lot size of 4,000± will yield typical roof sizes of much less than 10,000 square feet, thereby making harvesting and reuse for toilets and urinals unfeasible. Capture & reuse for onsite landscaping, as shown on Table 2 below, is also impractical due to the dense development and small amount of irrigated area as compared to impervious area.

III.D.3. Harvesting and Use Feasibility Calculations

Table 2. Harvesting and Use Feasibility

A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*
Building or other Impervious Area Description (sq ft)	*Square feet of impervious surface*	*Acres*	*Uses and User Units*	*Toilet and Urinal Water Usage (gal/day)* (8.6 gal/day/ res	*Water Use per Acre (gal/day/ acre)*	*Required demand (gal/day /acre).*	*Is Projected Use > Required Demand? (Column F > Column G?)*	*Can runoff be piped to an irrigated area 2.5x the impervious area (Column B)?*	*Is there any other consistent, reliable demand for the quantity in Column G?*
Typical 4,382 lot	2,025[1] roof only	.046	2.8 res/ per du	24.1[2]	524	5,900	no	no 1,692 sf <5,063 sf req'd[3]	no
Typical 36 unit 3 story apt bldg	14,247 roof only	0.33	2.8 res/ per du	867[4]	2,627	5,900	no	no 18,277 sf <35,618 sf req'd[5]	no
Total for site	2,585,268 [6]	59.35	2.8 res/ per du	18,545[7]	312	5,900	no	no 1,004,088 sf <6,463,170 sf [8]	no

[1]roof/porch sizes: 50% max coverage allowed for 4,000 sf minimum lot sizes per Pittsburg property development regulations. Typical lot sizes are as follows: 45x90 and 50x80
45*90 = 4,050 sf x 50% = 2,025 sf max coverage
50*80 = 4,000 sf x 50% = 2,000 sf max coverage
Use worst case = 2,025 sf for roof area (conservative)

[2]24.1 gpd/du = 2.8 res/du*8.6 gpd/res

[3]1,692 (pervious area)= 4,382(lot area) - 2,690(total lot imp area per Table 8 – see Insert @ end of report) and 2.5*2,025=5,063 min pervious area required

[4]867 gpd/apt bldg = 2.8 res/du*8.6 gpd/res*36 apts per bldg

[5]152,305 (total pervious area @ apt site = 594,482 total apt site area – 442,177 total imp apt area (see Insert @ end of report)
18,277 (pervious area surrounding single apt bldg)= 152,305*(36 units/300 total units)
2.5*14,247=35,618 min pervious area required around single apt bldg

[6]total impervious area (roof, concrete, asphalt) for entire site – see Insert @ end of report

[7]18,545 = 24.1 gpd/lot * (469.5 lots + 300 apts)

[8] 1,004,088 (total pervious area for entire site – see Insert @ end of report) and
2.5*2,585,268=6,463,170 min pervious area required for total site

III.E. End of Pipe Treatment Approach

Any procedure or device, such as a bio retention area, that is designed to minimize the quantity of pollutants that enter the storm drain system, is referred to as a BMP. Tuscany Meadows East utilizes an end of pipe stormwater basin with bio retention outflow wherein runoff from roofs, asphalt pavement, concrete curbs, walks, patios and driveways will be collected and conveyed to one large bio retention area located at the northeast portion of the site (downstream end). Said bio retention facility will provide large scale treatment and detention.

As indicated by the grades shown on the preliminary grading plan, surface flows, as well as upstream flows from Somersville Rd. and a portion of Black Diamond Ranch, will be graded to drain to the storm drain system within the streets and then discharged to the large bio retention area located at the northeast portion of the site.

The outflow orifice to the bio retention area will slowly meter flow to the existing natural detention area which lies upstream of the 2'x2' concrete box culvert beneath the Contra Costa canal. Said storm drain line continues in a northeasterly direction and ends in a 48" diameter concrete culvert beneath Buchanan Rd in the City of Antioch. Storms larger than the C.3 10 year design storm will exit the bio retention area via the overflow outlet structure and discharge to said natural detention area and storm drain. Maintenance access to the bio retention area will be from two locations. The first location will be via the proposed EVA access road (connecting the apartment site to the single family lots at the western edge of the bio retention area. The second access road will be at the northern end of the bio retention area and will run across the top of the berm, near the outlet structure to the bio retention area. This second access road will come through the apartment site. There is adequate hydraulic head to allow drainage into, and overflow away from the bio retention area without need for pumps.

Runoff from all onsite impervious areas will undergo treatment and control and mitigation of the hydro modification impacts and the following should be noted:

- The bio retention area is designed to accommodate runoff for treatment and provide controls and mitigation of the hydro modification impacts for the Tuscany Meadows East site as specified in the C.3 manual. The outfall facility overflow release point will be set much higher than the minimum 12" depth to allow the bio retention area to be jointly used as a flood control detention facility to reduce peak outflows. Therefore, runoff from somewhat more intense storms will also be treated and controls and mitigation provided to offset the hydro modification impacts . Also, the upstream drainage from Somersville Rd. and a portion of Black Diamond Ranch, which will also discharge to the bio retention area, will undergo additional cleaning and controls and mitigation provided to offset the hydro modification impacts. Calculations for flood control detention are

prepared under a separate document and are not considered a part of this stormwater control plan.

Due to its size, the project requires treatment and source control measures as well as controls and mitigation to offset the hydro modification impacts.

The attached Stormwater Control Plan exhibit shows the bio retention area and the corresponding areas of the site that drain to this BMP.

The sizes of each tributary drainage area for the bio retention area is listed in Table 4 as well on the C.3 calculator spread sheet located in the back of this report.

III.F. General Treatment Bio Retention Characteristics

Bio Retention Area.

The bio retention area will be designed and constructed according to the following criteria, adapted from the *Contra Costa Clean Water Program Stormwater C.3 Guidebook, Sixth Edition*:

Volume and depth of surface reservoir meets or exceeds minimum.

18" depth "loamy sand" soil mix with minimum long-term percolation rate of 5"/hour.

Area of soil mix meets or exceeds minimum.

Volume of subsurface storage meets or exceeds minimum.

Perforated pipe (PVC SDR 35 or approved equivalent) under drain bedded near the top of the in Caltrans "Class 2 perm" with holes facing downward. Connection and sufficient head to storm drain or discharge point (except in "A" or "B" soils).

In "C" and "D" native soils, under drain is connected via an appropriately sized orifice or other flow-limiting device.

Under drain has a clean-out port consisting of a vertical, rigid, non-perforated PVC pipe, with a minimum diameter of 6 inches and a watertight cap, or approved equivalent.

No filter fabric to be used.

Overflow connected to a downstream storm drain or approved discharge point.

Emergency spillage will be safely conveyed overland via an emergency overflow spillway to the existing 2' x 2' concrete box culvert beneath the Contra Costa canal.

Plantings are suitable to the climate, exposure, and a well-drained soil, and occasional inundation during large storm events.

Irrigation system with connection to water supply, on a separate zone.

Vaults, utility boxes, and light standards are located outside the minimum soil mix surface area.

III.G. Specific Characteristics of Each Bio Retention Tributary Area

Drainage entering the bio retention area will be accomplished as described in Section III.E, above. The discharge pipe for the bio retention area will drain to the existing natural detention area and 2'x2' box culvert. The overflow drainage will be safely conveyed via the overflow drainage structure to the same existing natural detention area and box culvert. The main design issue for the bio retention area will be to place appropriate dissipaters within the bio retention area to prevent erosion. Due to the large size of the bio retention area, a minimum of 4 inflow pipes, distributed along the perimeter of the single family residential area, are proposed (see stormwater control plan exhibit) to aid in uniform spreading of inflow over the entire area. An additional inflow pipe from the apartment site area will

also be added at the time of development of the apartment area. The incoming flow locations and cobble dissipater locations will be shown on the final plans.

Pending the outcome of talks with the City, some limited park use may be achieved within the bio retention area. The primary use of the bio retention facility is, of course, to treat and provide controls and mitigation to offset the hydro modification impacts. To the extent that this primary use is not compromised, plans for limited park use may be developed on the final plans for the bio retention area.

Specific descriptions of each drainage area follow:

Bio Retention Area PL2. Runoff from the rooftops, pavement and landscape areas will be directed to bio retention area (PL2) located at the northeast portion of the site. PL2 is an irregular shaped landscaped area of approximately 224,171 square feet at elevation 122.5 with an area of 231,327 square feet at elevation 223.5.

IV. DOCUMENTATION OF DRAINAGE DESIGN

IV.A. Descriptions of each Drainage Management Area

IV.A.1. Table of Drainage Management Areas (see C.3 Area Breakdown Insert)

DMA Name	*Surface Type*	*Area (square feet)*
IMP2	Pavement & Rooftops	2,585,268
L2	Landscape & Slopes	1,004,088
PL2	Bio Retention Area	231,327 (elev 123.5)
	SUBTOTAL	3,820,683
Untreated Area	*Surface Type*	*Area (square feet)*
NT2	Buchanan Rd. along frontage	40,022
Upstream Area	*Surface Type*	*Area (square feet)*
CW1-3	Black Diamond Ranch inflow	1,036,154
CW4	Somersville Rd inflow	226,907
CW5	Chevron inflow	677,662
	SUBTOTAL	5,801,428

IV.A.2. Drainage Management Area Descriptions

IMP2, totaling 2,585,268 square feet, consists of pavement and rooftop area. IMP2 drains to PL2, being an irregular shaped bio retention area located at the northeast portion of the developed site.

L2, totaling 1,004,088 square feet, consists of landscape area and slopes. L2 drains to PL2, being an irregular shaped bio retention area located at the northeast portion of the developed site.

PL2, totaling 231,327 square feet (at elev 123.5 – bottom elev @ 122.5=224,171), consists of an irregular shaped bio retention area located at the northeast portion of the developed site.

NT2, totaling 40,022 square feet of the Buchanan Rd. frontage cannot be intercepted and drained to the bio retention planter area PL2 as it naturally drains easterly over the Contra Costa canal to the existing storm drain inlet on the south side of Buchanan Rd., approximately 450 feet east of the project. This insignificant amount of untreated area will drain to the existing curb and gutter on Buchanan Rd.

CW1-3, totaling 1,036,154 square feet, consists of upstream impervious and pervious areas which enters the south end of the site via an existing 30" storm drain (at the northerly terminus of Summit Way) and an 18" storm drain (at the City of Antioch park constructed with the Black Diamond Ranch development). Both storm drain lines will be intercepted and incorporated into the Tuscany East storm drain system which will drain to PL2, being an irregular shaped bio retention area located at the northeast portion of the developed site.

CW4, totaling 226,907square feet, consists of upstream impervious and pervious areas which will enter the eastern corner of the site, via an 18" storm drain, approximately 100 feet southwest of the Somersville Rd./Contra Costa canal intersection, when Somersville Rd. improvements are constructed within the City of Antioch. The 18" storm drain line will be intercepted and incorporated into the Tuscany East storm drain system which will drain to PL2, being an irregular shaped bio retention area located at the northeast portion of the developed site.

CW5, totaling 677,662 square feet, consists of upstream impervious and pervious areas which will enter the northern boundary of the site and drain southerly toward the PL2. This drainage will bypass bio retention area PL2 and will connect directly to the PL2 outlet structure. No additional cleaning or controls and mitigation are provided to offset the hydro modification impacts to these waters.

IV.B. TABULATION AND SIZING CALCULATIONS

IV.B.1. Information Summary for Bio Retention Area Design

Total Project Area (Square Feet)	3,820,683 plus 40,022 untreated area
Mean Annual Precipitation	14"
IMPs Designed For:	treatment + flow control

IV.B.2. Self-Treating Areas

This does not apply.

IV.B.3. Self-Retaining Areas

This does not apply.

IV.B.4. Areas Draining to Self-Retaining Areas

This does not apply.

IV.B.5. Areas Draining to Bio Retention Area

(See C.3 calculator @ end of this report)

IV.B.6. Areas Draining to Non-LID Treatment ["Special Projects" only—See Table 4-14, p. 60]

This does not apply.

V. SOURCE CONTROL MEASURES

V.A. Site activities and potential sources of pollutants

This single family residential project will create few potential sources of stormwater pollutants. Sources to be controlled are:

Routine vehicle maintenance/repair/cleaning generates heavy metals and oils/greases.

Potential dumping of wash water or other liquids into storm drain inlets.

Need for future indoor or structural pest control.

Fertilizers and pesticides used in home yard and garden maintenance.

The following Source Control Table lists potential pollutant sources on the development site and the corresponding source control measures specified in the *Stormwater C.3 Guidebook, Sixth Edition,* Appendix D.

All areas where these activities occur will drain to the bio retention area PL2. To further reduce the potential for pollutants to enter runoff, permanent and operational BMPs will be implemented as described in V.B. below.

V.B. Source Control Table

Table 3. Sources and Source Control BMPs

Potential Source	Permanent BMPs	Operational BMPs
On-site storm drain inlets	All accessible on-site inlets will be marked with the words "No Dumping! Flows to Bay"	Markings will be periodically repainted or replaced. Inlets and pipes conveying stormwater to BMPs will be inspected and maintained as part of BMP Operation and Maintenance Plan.
Need for future indoor and structural pest control.		Integrated Pest Management (IPM) information will be provided to new homeowners.

Potential Source	Permanent BMPs	Operational BMPs
Landscape/outdoor pesticide use	Final landscape plans will: Be designed to minimize irrigation and runoff and to minimize use of fertilizers and pesticides that can contribute to stormwater pollution. Specify plantings within the bio retention area that are tolerant of saturated soil conditions. Include pest-resistant plants. Include plantings appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency and plant interactions.	Landscape will be maintained using minimum or no pesticides. IPM information will be provided to new homeowners.
Vehicle washing, repair, maintenance, outdoor storage.	Driveways and parking areas drain to the bio retention area	Distribute stormwater pollution prevention information to homeowners.

V.C. Features, Materials, and Methods of Construction of Source Control BMPs

No special features, materials or construction methods are required for the source control BMPs listed above.

VI. STORMWATER FACILITY MAINTENANCE

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

Commitment to Execute any Necessary Agreements.

West Coast Home Builders, Inc. agrees to provide any necessary easements or rights of entry to the City of Pittsburg for access and inspection of stormwater BMPs and to make provision of easements or rights of entry a condition of sale.

Statement Accepting Responsibility for Operation and Maintenance until Responsibility is Transferred.

West Coast Home Builders, Inc. agrees to operate and maintain the stormwater BMPs constructed in connection with the project unless any other private entity to be responsible for maintenance, execution of Codes, Covenants, and Responsibilities is formed or other agreement that runs with the land and requires future owners to provide and pay for maintenance of stormwater BMPs, and execution of a Stormwater Management Facilities Operation and Maintenance Agreement and Right of Entry in the form provided by the City.

VI.B. Summary of Maintenance Requirements for Each Stormwater Facility

Bio retention Areas

These facilities remove pollutants primarily by filtering runoff slowly through an active layer of soil. Routine maintenance is needed to ensure that flow is unobstructed, that erosion is prevented, and that soils are held together by plant roots and are biologically active. Typical maintenance consists of the following:

Inspect inlets for channels, exposure of soils, or other evidence of erosion. Clear any obstructions and remove any accumulation of sediment. Examine rock or other material used as a splash pad and replenish if necessary.

Inspect outlets for erosion or plugging.

Inspect side slopes for evidence of instability or erosion and correct as necessary.

Observe soil at the bottom of the filter for uniform percolation throughout. If portions of the filter do not drain within 48 hours (except in the case of an excessively large storm event, such as the 100 year storm), the soil should be tilled and replanted. Remove any debris or accumulations of sediment. High storm volumes may require renovation or replacement of the bio filtration medium on a more frequent than usual basis in order to maintain the minimum 5" per hour percolation rate.

Examine the vegetation to ensure that it is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary, remove fallen leaves and debris, prune large shrubs or trees, and mow turf areas. When mowing, remove no more than 1/3 height of grasses. Confirm that irrigation is adequate and not excessive. Replace dead plants and remove noxious and invasive vegetation.

Abate any potential vectors by filling holes in the ground in and around the swale and by insuring that there are no areas where water stands longer than 48 hours following a storm. If mosquito larvae are present and persistent, contact the Contra Costa Mosquito and Vector Control District for information and advice. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor.

VII. CONSTRUCTION PLAN C.3 CHECKLIST

Stormwater Control Plan Page #	*BMP Description*	*See Plan Sheet #s*
Table IV.A.1, Exhibit, Sections III.F. and III.G.	Drainage from the roof, pavement and landscaping, as delineated, graded and paved to direct drainage to bio retention area PL2. PL2 sized and designed as stated in Sections III.F. and III.G., including erosion protection via placement of cobbles.	

VIII. CERTIFICATIONS

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R2-2009-0074 and Order R2-2011-0083.

Project Name: Tuscany Meadows - East Side - JN 201002
Project Type: Treatment and Flow Control
Location: Buchanan Rd - Pittsburg
APN: 089-150-013
Drainage Area: 3820683 sf
Mean Annual Precipitation: 14 in

IV. Areas Draining to IMPs

IMP Name: PL2 (Soil Type: C)

IMP Type: Bioretention Facility
Soil Type: C

DMA Name	DMA Area (sq ft)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
IMP2	2,585,268	Conventional Roof	1.00	2,585,268
L2	1,004,088	Landscape	0.50	502,044
			Total	3,087,312

IMP Sizing	IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
Area	0.060	1.227	227,350	231,327
Surface Volume	0.050	1.227	189,458	227,749
Subsurface Volume	0.066	1.227	250,085	254,460
Maximum Underdrain Flow (cfs)				3.03
Orifice Diameter (in)				11.24

Software Tool Warnings

No warnings to report.

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C.3 Area Breakdown Insert

Tuscany Meadows Subdivision 8654
East Watershed – 469.5 Lots Total

BASIS: Mean Annual Precipitation = 14 inches
Type C soil
Treatment and providing control and mitigation to offset hydro modification impacts is required
2,057,473 lots
594,482 apts
57,265 slopes
880,136 roads
231,327 bio retention area (@ elevation 123.5)
3,820,683 total onsite area
1,940,723 offsite upstream water (ptn Chevron, Black Diamond Ranch and Somersville Rd) to pass thru site
40,022 offsite untreated area on Buchanan Rd
5,801,428 total project area

A. Offsite Upstream Water:

Upstream water from 1,940,723 sf of upstream offsite tributary area (23.8 acres from Black Diamond Ranch, 5.2 acres from Somersville Rd and 15.6 acres from Chevron) will be carried through the site. 677,662 (ptn Chevron) will bypass the bio retention area in a separate pipe. The remainder (1,263,061) will discharge into the bio retention area. Above-ground storage volume V1 in the bio retention area exceeds the minimum 10" height requirement for onsite treatment and providing control and mitigation of the hydro modification impacts. Therefore, additional treatment and control and mitigation of the hydro modification impacts for the offsite upstream waters will also occur.

No treatment or control and mitigation of the hydro modification impacts is required - however, some will occur

B. Untreated Area:

40,022 sf on Buchanan Rd is unable to be treated as it drains downstream of the C.3 bio retention area. This area is only 1% of the total onsite project area and is considered insignificant.

C. Onsite Area Breakdown:

Basis for lot calculations is as follows:

1. Typical average lot = 4,382 sf (2,057,473 sf lot area/469.5 lots).

2. Typical impervious surface area for 4,382 sf lot = 2,690 sf per Contra Costa County "Table 8 – Average Impervious Surface Amounts"

Basis for apartment site calculations is as follows:

1. Typical average apt unit = 1,982 sf (594,482 sf apt site area/300 units).
2. Typical impervious surface area for 1,982 sf / unit = 32,400 sf/ac per Contra Costa County "Table 8 – Average Impervious Surface Amounts"

Impervious area:

Impervious lot area = 469.5 lots x 2,690 sf/lot	=	1,262,955 sf
Impervious apt area = 32,400 sf/ac x 594,482sf/43,560 sf per ac	=	442,177 sf
Roads area =	=	880,136 sf
Total Impervious Area (IMP2)*		2,585,268 sf

Pervious area:

Pervious lot area = 2,057,473 sf (total lot area) – 1,262,955 (impervious lot area) + 594,482 sf (total apt area) – 442,177 (impervious apt area) + 57,265 slopes = 1,004,008 sf

Total Pervious Area (L2)	1,004,008 sf

Notes:

* Total impervious area IMP2 is a composite of all roof, concrete and asphalt surfaces.

Table 8 – Average Impervious Surface Amounts

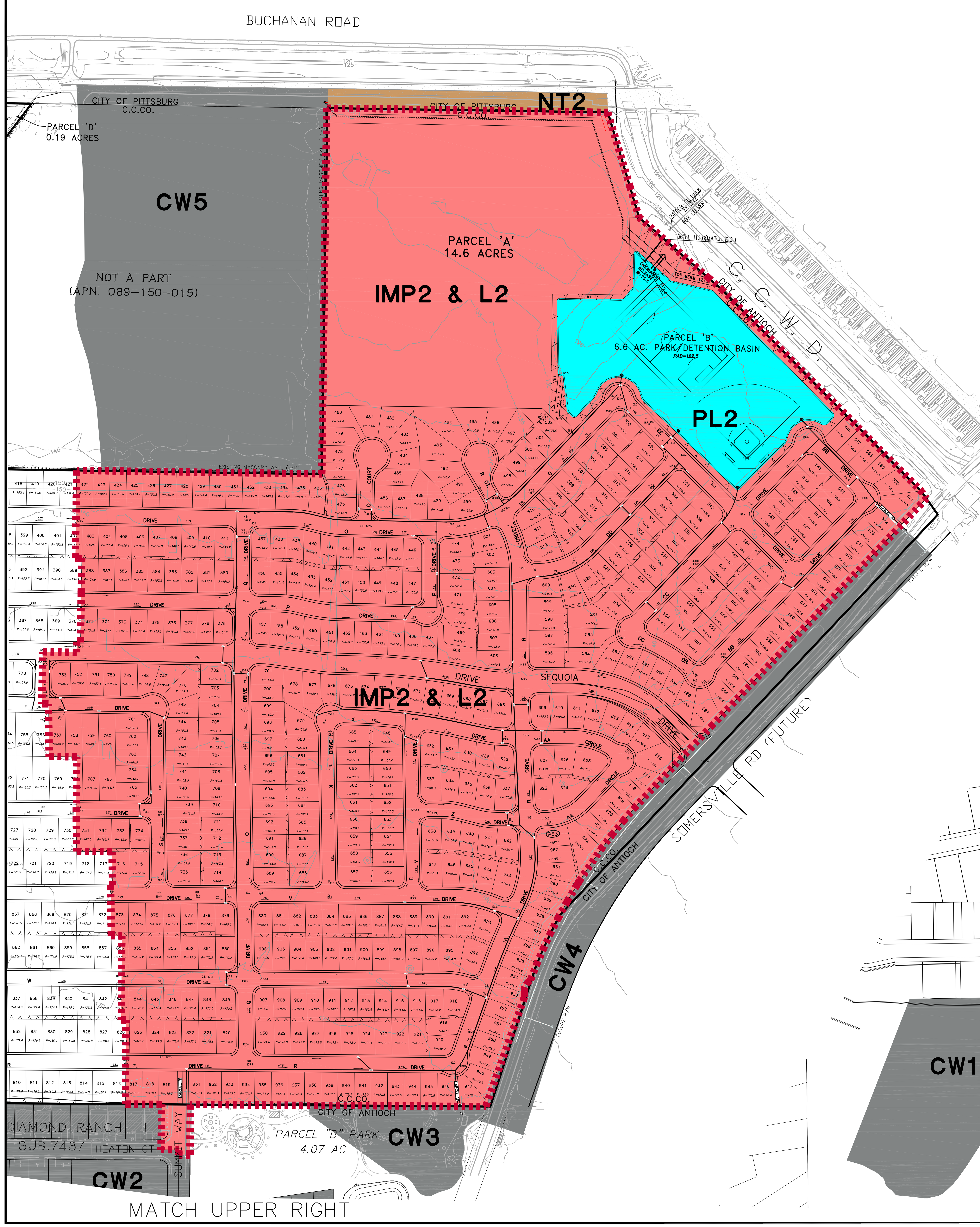
Land Use	Impervious Surface Area	
	Street Area Not Included	Street Area Included
Commercial/Industrial/Downtown Offices:	41,120 sf/acre	44,170 sf/acre
Offices (Medium):	35,240 sf/acre	39,380 sf/acre
Offices (Light):	29,490 sf/acre	33,240 sf/acre
Multi-Family Residential (Including Mobile Home Parks):		
Less than 2,500 sf of land/unit	32,400 sf/acre	32,400 sf/acre
2,500 to 2,999 sf of land/unit	1,920 sf/unit	1,920 sf/unit
3,000 to 3,999 sf of land/unit	2,200 sf/unit	2,200 sf/unit
4,000 to 4,999 sf of land/unit	2,560 sf/unit	2,560 sf/unit
5,000 to 5,999 sf of land/unit	2,930 sf/unit	2,930 sf/unit
6,000 to 6,999 sf of land/unit	3,290 sf/unit	3,290 sf/unit
7,000 to 7,999 sf of land/unit	3,640 sf/unit	3,640 sf/unit
8,000+ sf of land/unit	3,820 sf/unit	3,820 sf/unit
Single Family Residential:		
4,000 to 4,999 sf of land/unit	2,690 sf/unit	4,310 sf/unit
5,000 to 5,999 sf of land/unit	2,810 sf/unit	4,490 sf/unit
6,000 to 6,999 sf of land/unit	2,930 sf/unit	4,670 sf/unit
7,000 to 7,999 sf of land/unit	3,050 sf/unit	4,850 sf/unit
8,000 to 9,999 sf of land/unit	3,230 sf/unit	5,110 sf/unit
10,000 to 13,999 sf of land/unit	3,590 sf/unit	5,630 sf/unit
14,000 to 19,999 sf of land/unit	4,190 sf/unit	6,480 sf/unit
20,000 to 29,999 sf of land/unit	5,180 sf/unit	7,770 sf/unit
30,000 to 39,999 sf of land/unit	6,430 sf/unit	9,280 sf/unit
40,000 +	7,710 sf/unit	10,690 sf/unit

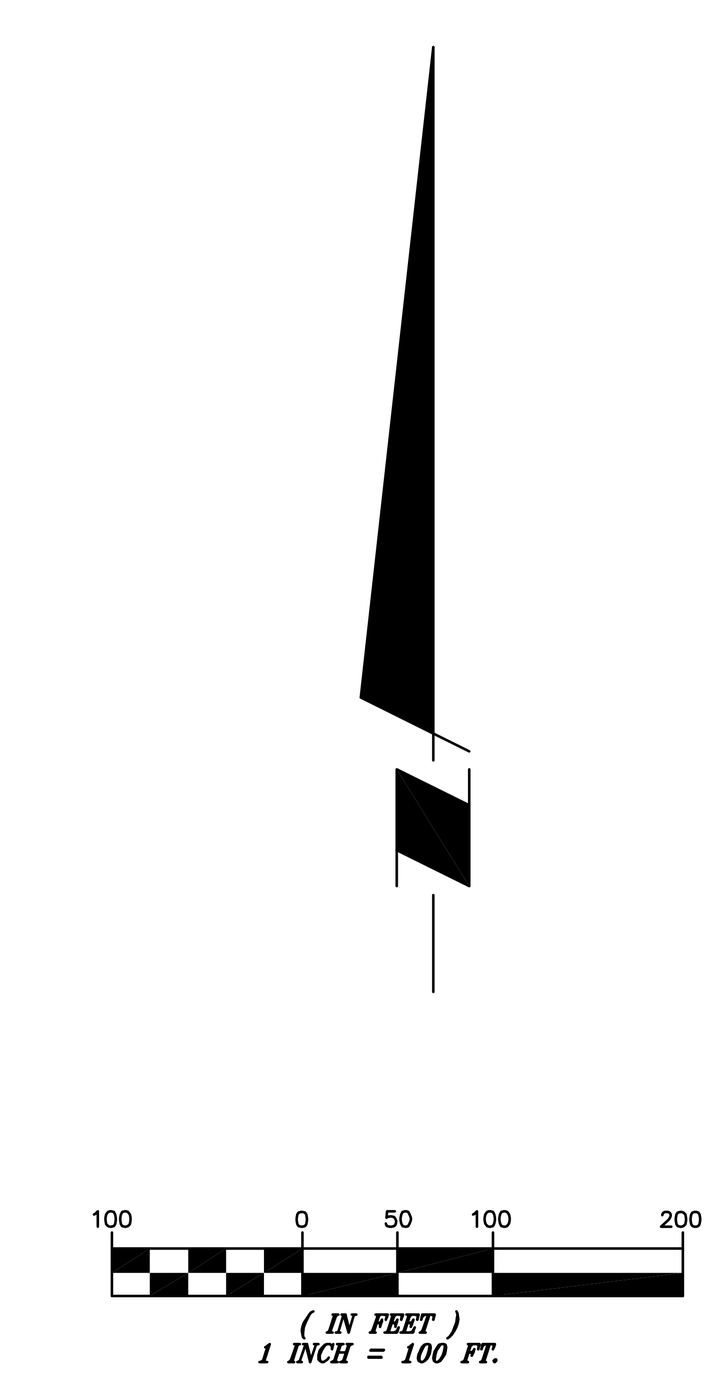
Use 2,690 sf/lot for single family housing
Use 32,400 sf/ac for apt site (est 1,982sf per unit [594,482sf /300 units])

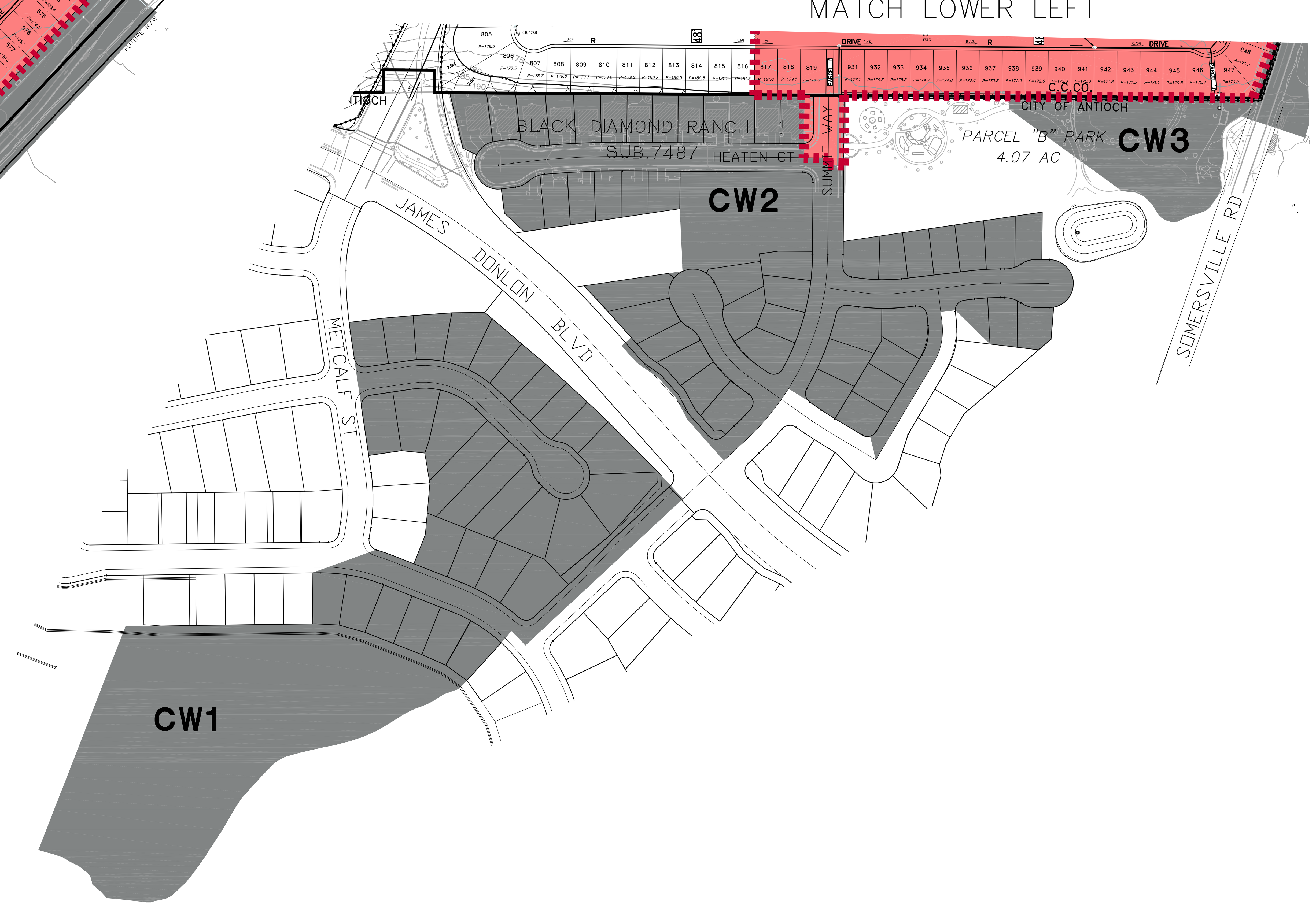
STORM WATER CONTROL PLAN

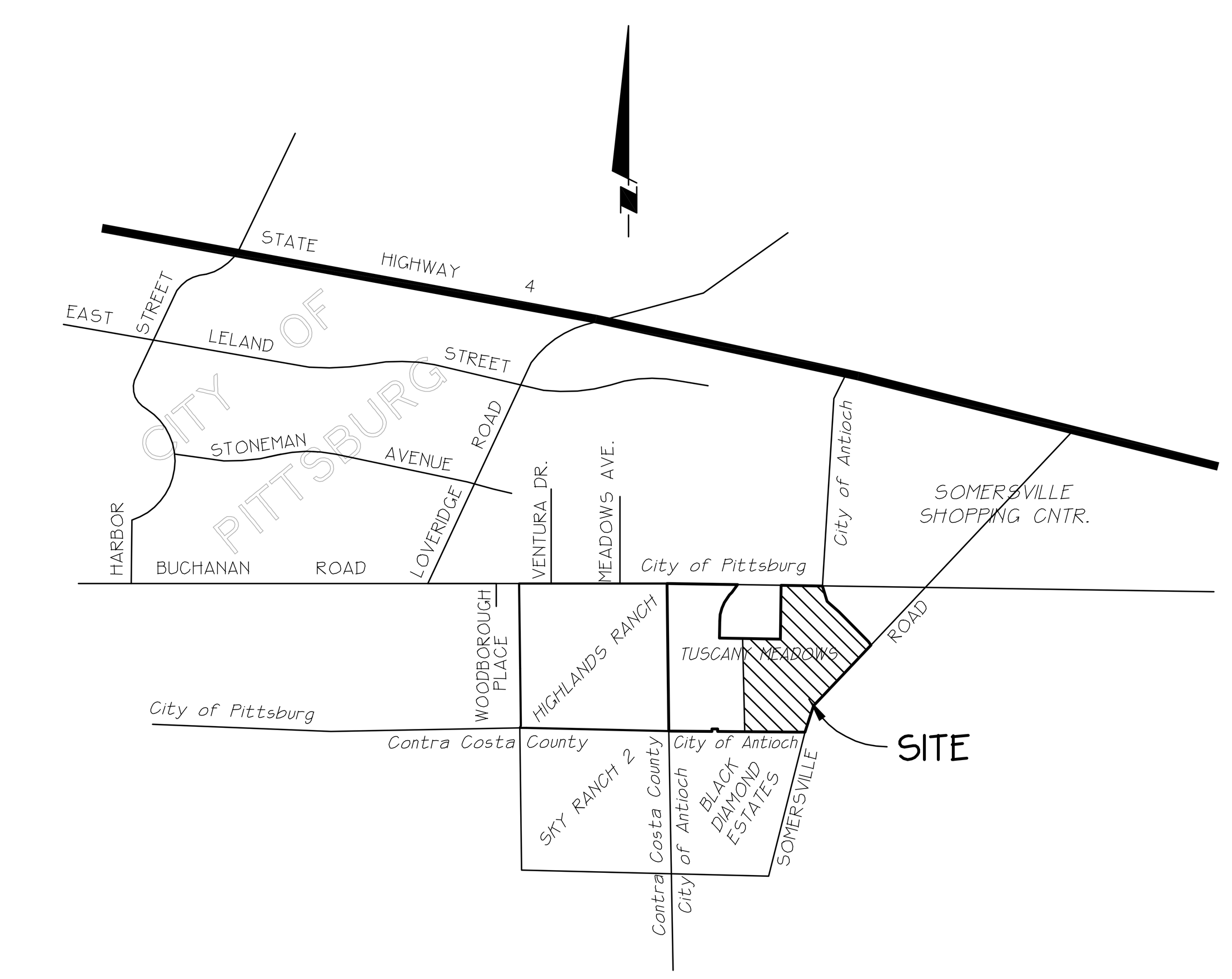
Tuscany Meadows East

SUBDIVISION 8654









VICINITY MAP
NOT TO SCALE

DESIGNATED AREA LEGEND:	
DRAINAGE MANAGEMENT AREAS:	
IMPERVIOUS AREA (PAVEMENT AND ROOFTOP) AND PERVIOUS LANDSCAPE AREA	IMP2 & L2
NO TREATMENT AREA	NT2
BMP:	
BIO RETENTION AREA	PL2
BMP TRIBUTARY BOUNDARY:	
UPSTREAM AREAS:	
UPSTREAM WATER FROM OFFSITE AREA	CW5

SEE SECTION IV.A OF THE STORMWATER CONTROL PLAN AND "C.3 AREA BREAKDOWN INSERT" AT THE END OF THE STORMWATER CONTROL PLAN FOR DETERMINATION OF IMPERVIOUS AREA IMP2 AND PERVIOUS AREA L2

REGISTERED PROFESSIONAL ENGINEER DAVID O. ISAKSON NO. 21764 CIVIL STATE OF CALIFORNIA

Tuscany Meadows East
STORMWATER CONTROL PLAN EXHIBIT

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civil engineering & land surveying
2255 Ygnacio Valley Road, Suite C, Walnut Creek, CA. 94598 Phone: (925) 937-9333

DATE: 10-11-12	DESIGNED BY: F/D	DRAWN BY: STAFF	CHECKED BY: DOI	JOB NO. 201002	SHEET 1 OF 1

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