

# **STORMWATER CONTROL PLAN**

For

## ***TUSCANY MEADOWS WEST***

**PORTION OF SUB 8654**

**February 13, 2013**

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JN 201002

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HMP Compliance [if applicable].....	N/A
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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 – West – Sub 8654 - Ptn JN 201002
Application Submittal Date	
Project Location	South side of Buchanan Rd, approximately 4,300' 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)	82.18 ac (3,579,558 sf)
Total Area of Land Disturbed (acres)	82.18 ac
Total New Impervious Surface Area (sq. ft.)	2,389,120
Total Replaced Impervious Surface Area	0
Total Pre-Project Impervious Surface Area	0
Total Post-Project Impervious Surface Area	2,389,120
50% Rule[*]	Doesn't Apply
Project Density	6.0 du/acre (493.5/82.18) single family houses
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]

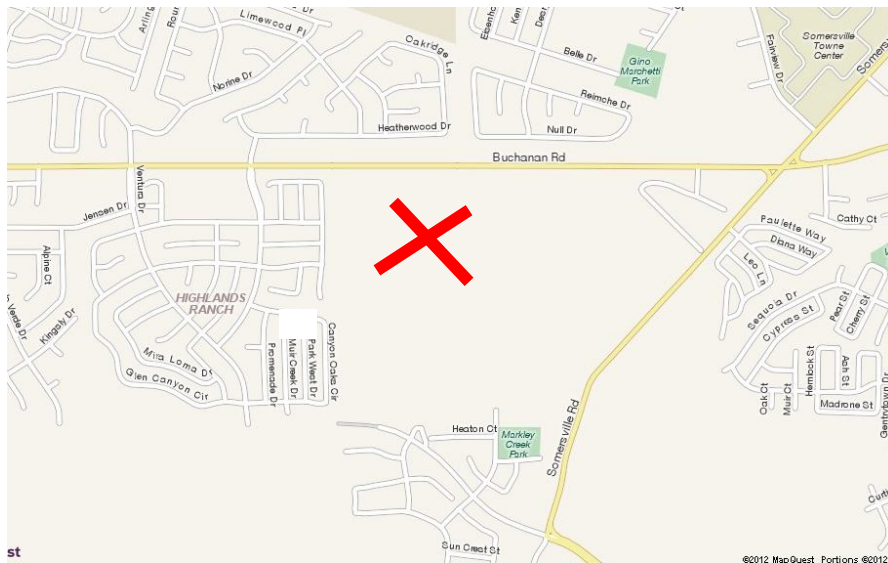
[†HMP applies if:  
(Total New Impervious Surface Area + Total Replaced Impervious Surface Area) ≥ 1 acre]

## II. SETTING

### 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 western 1/2 is referred to as Tuscany Meadows West and will create 493.5 single family homes on the western portion of the subdivision which is located on the south side of Buchanan Rd., approximately 4,300 feet west of the intersection of Somersville Rd. and Buchanan Rd. in Pittsburg, California. (See Figure 1). The project is bounded on the west by the Highlands Ranch development, on the south by the Black Diamond Ranch development, and on the east by Tuscany Meadows East and the Chevron property. The developed area of Tuscany Meadows West will be approximately 82 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 80 feet, ranging from a high of 200± feet at the southern boundary to a low of 120± feet at Buchanan Rd. Drainage from an existing 30" culvert to the south (the Black Diamond development) discharges onto the property and meanders in a northwesterly direction, via an earth ditch, until it enters the existing Highlands Ranch development to the west. This ditch flow will be replaced by underground pipe as part of the Tuscany West development and will no longer drain to Highlands Ranch, but will continue northerly until it discharges into the bio retention basin to constructed with Tuscany West. This redirection of flow is in compliance with the Sky Ranch II Drainage Study for subdivision 8475 prepared by Isakson & Associates, dated 5/07 and approved by the City of Pittsburg.

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 Buchanan Rd. near the northwest portion 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 northwest 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 4,500 lot	2,025[1] roof only	.046	2.8 res/per du	24.1[2]	524	5,900	no	no  1,810 sf <5,063 sf req'd[3]	no
Total for site	2,389,120 [4]	54.85	2.8 res/per du	11,893[5]	217	5,900	no	no  965,352 sf <5,972,800 sf [6]	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]1,810 (pervious area)= 4,500(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]total impervious area (roof, concrete, asphalt) for entire site – see Insert @ end of report

[5]18,545 = 24.1 gpd/lot \* (493.5 lots)

[6]  $965,352$  (total pervious area for entire site – see Insert @ end of report) and  $2.5 \times 2,389,120 = 5,972,800$  min pervious area required for total site

### **III.E. Integrated Management Practices**

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 West 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 northwest 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 a portion of Black Diamond Ranch and a portion of Sky 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 northwest portion of the site.

The outflow orifice to the bio retention area will slowly meter flow to the existing 18" culvert that passes northerly beneath Buchanan Rd. Said culvert then discharges to a series of storm drain pipes flowing northeasterly until they reach the Los Medanos pond, located approximately 2,700' northeasterly of Buchanan Rd. within the City of Pittsburg. Storms larger than the C.3 10 year design storm will exit the bio retention area via the outlet structure and discharge to said 18" culvert. Maintenance access to the bio retention area will be from the west. An access road will be constructed down to the bio retention area from the proposed cul de sac. 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 West 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 portions of Black Diamond Ranch and Sky 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 planter area BMP and the corresponding areas of the site that drain to this BMP.

The sizes of each tributary drainage area for the bio retention planter 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 Buchanan Rd.

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 18" culvert beneath Buchanan Rd. The overflow drainage will be safely conveyed via the overflow drainage structure to the same existing 18" 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 5 inflow pipes, distributed along the perimeter of the area, are proposed (see stormwater control plan exhibit) to aid in uniform spreading of inflow over the entire 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 PL1.* Runoff from the rooftops, pavement and landscape areas will be directed to bio retention area (PL1) located at the northwest portion of the site. PL1 is an irregular shaped landscaped area of approximately 225,086 square feet at elevation 118.0.

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)*

<u>DMA Name</u>	<u>Surface Type</u>	<u>Area (square feet)</u>
IMP1	Pavement & Rooftops	2,389,120
L1	Landscape & Slopes	965,352
PL1	Bio Retention Area	225,086 (elev 118)
	<b>SUBTOTAL</b>	<b>3,820,683</b>
<u>Untreated Area</u>	<u>Surface Type</u>	<u>Area (square feet)</u>
NT1	Buchanan Rd. along frontage	12,233
<u>Upstream Area</u>	<u>Surface Type</u>	<u>Area (square feet)</u>
CW1	Black Diamond Ranch & Sky Ranch inflow	1,501,386
CW2	Chevron inflow	408,677
	<b>SUBTOTAL</b>	<b>5,501,854</b>

*IV.A.2. Drainage Management Area Descriptions*

**IMP1**, totaling 2,389,120 square feet, consists of pavement and rooftop area. IMP1 drains to PL1, being an irregular shaped bio retention area located at the northwest portion of the developed site.

**L1**, totaling 965,352square feet, consists of landscape area and slopes. L1 drains to PL1, being an irregular shaped bio retention area located at the northwest portion of the developed site.

**PL1**, totaling 225,086 square feet (at elev 118), consists of an irregular shaped bio retention area located at the northwest portion of the developed site.

**NT1**, totaling 12,233 square feet of the Buchanan Rd. frontage cannot be intercepted and drained to the bio retention area PL1 as it naturally drains westerly to the existing storm drain inlet on the south side of Buchanan Rd. at the Meadows Ave. intersection, approximately 800 feet west of the project. This insignificant amount of untreated area will drain to said existing inlet via the existing curb and gutter on Buchanan Rd. constructed with the Highlands Ranch project.

**CW1**, totaling 1,501,386 square feet, consists of upstream impervious and pervious areas which enter the south end of the site via an existing 30" storm drain (at the northerly terminus of Metcalf St.). The storm drain line will be intercepted and incorporated into the Tuscany West storm drain system which will drain to PL1, being an irregular shaped bio retention area located at the northwest portion of the developed site.

**CW2**, totaling 408,677 square feet, consists of upstream impervious and pervious areas which will enter the northeastern corner of the site, via curb and gutter along Buchanan Rd. The drainage will be intercepted and incorporated into the Tuscany West storm drain system which will drain to PL1, being an irregular shaped bio retention area located at the northwest portion of the developed site.

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 12,233 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 PL1. 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.
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

<i>Stormwater Control Plan Page #</i>	<i>BMP Description</i>	<i>See Plan Sheet #s</i>
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 PL1. PL1 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 - West Side - JN 201002

**Project Type:** Treatment and Flow Control

**Location:** Buchanan Rd - Pittsburg

**APN:** 089-150-013

**Drainage Area:** 3579558 sf

**Mean Annual Precipitation:** 14 in

### IV. Areas Draining to IMPs

#### IMP Name: IMP1 (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	IMP Sizing			
					IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
IMP1	2,389,120	Conventional Roof	1.00	2,389,120				
L1	965,352	Landscape	0.50	482,676				
<b>Total</b>				2,871,796				
<b>Area</b>					0.060	1.227	211,479	225,086
<b>Surface Volume</b>					0.050	1.227	176,233	187,572
<b>Subsurface Volume</b>					0.066	1.227	232,627	247,595
<b>Maximum Underdrain Flow (cfs)</b>							2.83	
<b>Orifice Diameter (in)</b>							10.86	

### Software Tool Warnings

No warnings to report.

Report generated on 8/7/2012 12:00:00 AM by the [Contra Costa Clean Water Program](#) IMP Sizing Tool software (version 1.3.1.0).

## **C.3 Area Breakdown Insert**

Tuscany Meadows Subdivision 8654  
West Watershed – 493.5 Lots Total

BASIS: Mean Annual Precipitation = 14 inches  
Type C soil  
Treatment and providing control and mitigation to offset hydro modification impacts is required  
2,220,720 lots  
8,347 landscape  
63,800 slopes  
1,061,605 roads  
225,086 bio retention area  
3,579,558 total onsite area  
1,910,063 offsite upstream water (ptn Chevron, Black Diamond Ranch and Sky Ranch) to pass thru site  
12,233 untreated area on Buchanan Rd  
5,501,854 total project area

### **A. Offsite Upstream Water:**

Upstream water from 1,910,063 sf of upstream offsite tributary area (34.5 acres from Black Diamond Ranch and Sky Ranch and 9.4 acres from Chevron) will be carried through the site and discharged 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:**

12,233 sf on Buchanan Rd is unable to be treated as it is downstream of the C.3 bio retention area. This area is less than 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 = 4,500 sf (2,220,720 sf lot area/493.5 lots).
2. Typical impervious surface area for 4,500 sf lot = 2,690 sf per Contra Costa County “Table 8 – Average Impervious Surface Amounts”

Impervious area:

Impervious lot area = 493.5 lots x 2,690 sf/lot = 1,327,515 sf  
Roads area = = 1,061,605 sf  
Total Impervious Area (IMP1)\* 2,389,120 sf

Pervious area:

Pervious lot area = 2,220,720 sf (total lot area) – 1,327,515 (impervious lot area) +  
8,347 landscape area + 63,800 slopes = 965,352 sf

Total Pervious Area (L1) 965,352 sf

Notes:

\* Total impervious area IMP1 is a composite of all roof, concrete and asphalt surfaces.

Table 8 – Average Impervious Surface Amounts

<u>Land Use</u>	<u>Impervious Surface Area</u>	
	<u>Street Area Not Included</u>	<u>Street Area Included</u>
<u>Commercial/Industrial/Downtown Offices:</u>	41,120 sf/acre	44,170 sf/acre
<u>Offices (Medium):</u>	35,240 sf/acre	39,380 sf/acre
<u>Offices (Light):</u>	29,490 sf/acre	33,240 sf/acre
<u>Multi-Family Residential (Including Mobile Home Parks):</u>		
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
<u>Single Family Residential:</u>		
<u>4,000 to 4,999 sf of land/unit</u>	<u>2,690 sf/unit</u>	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

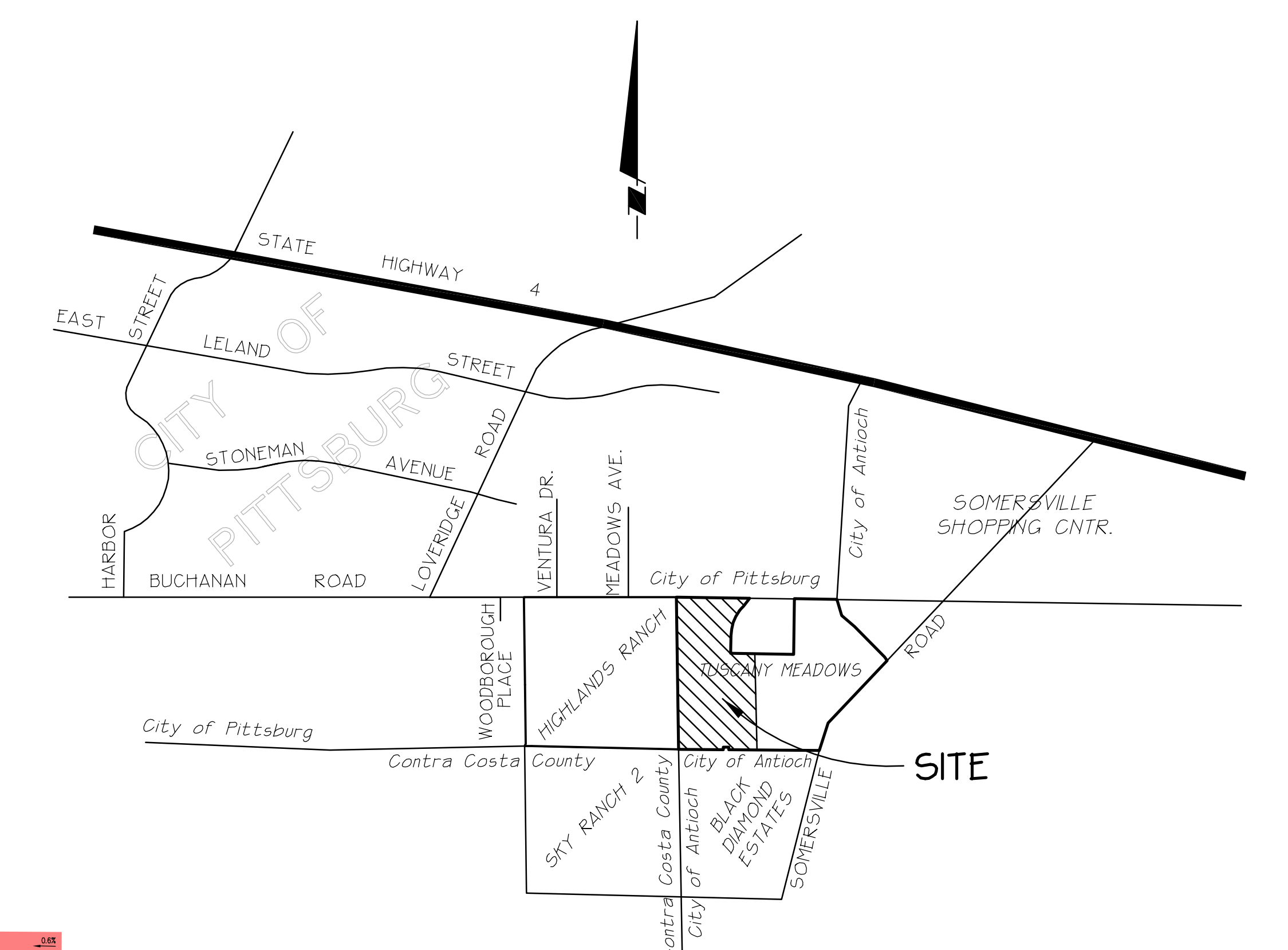
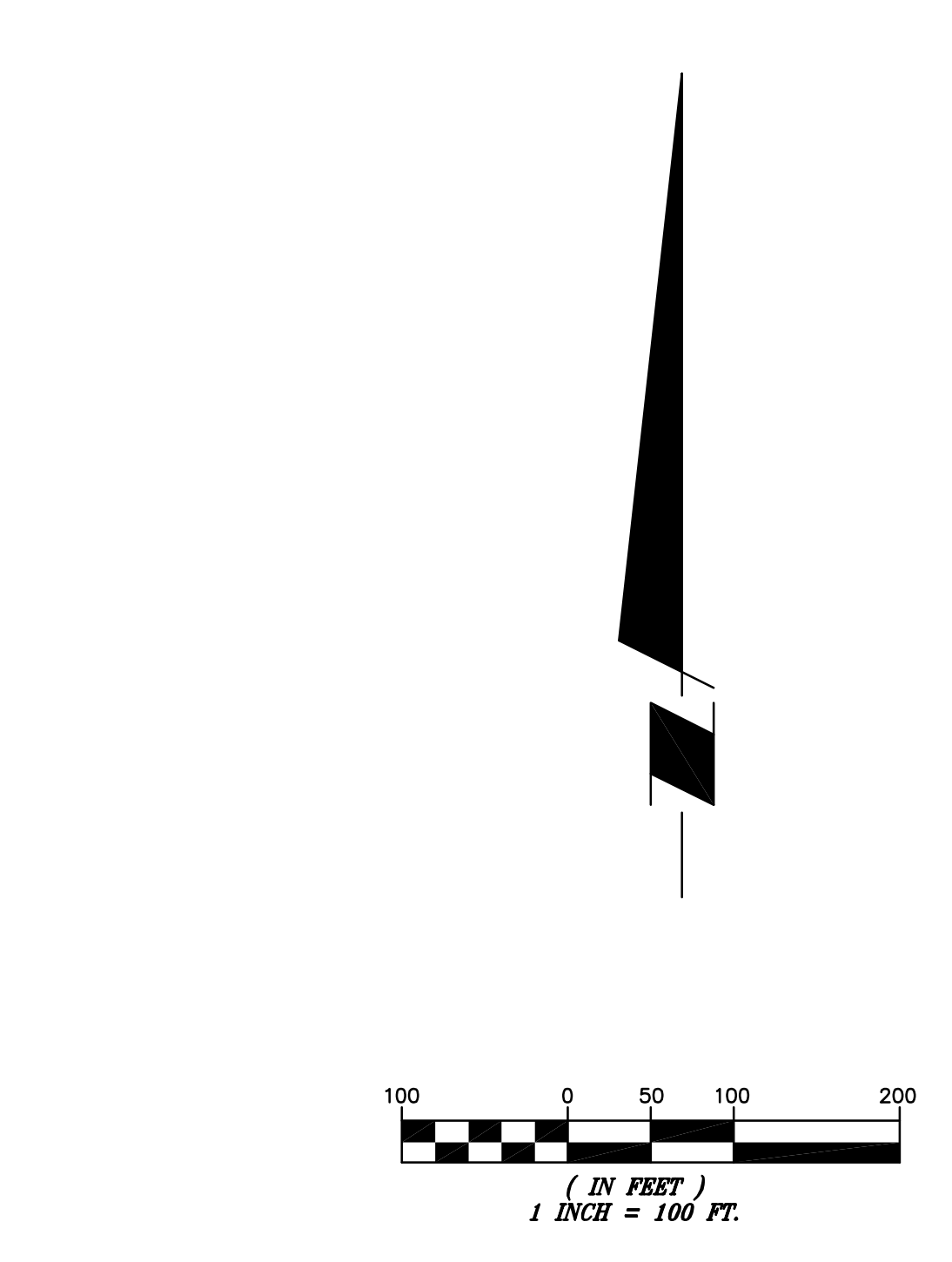
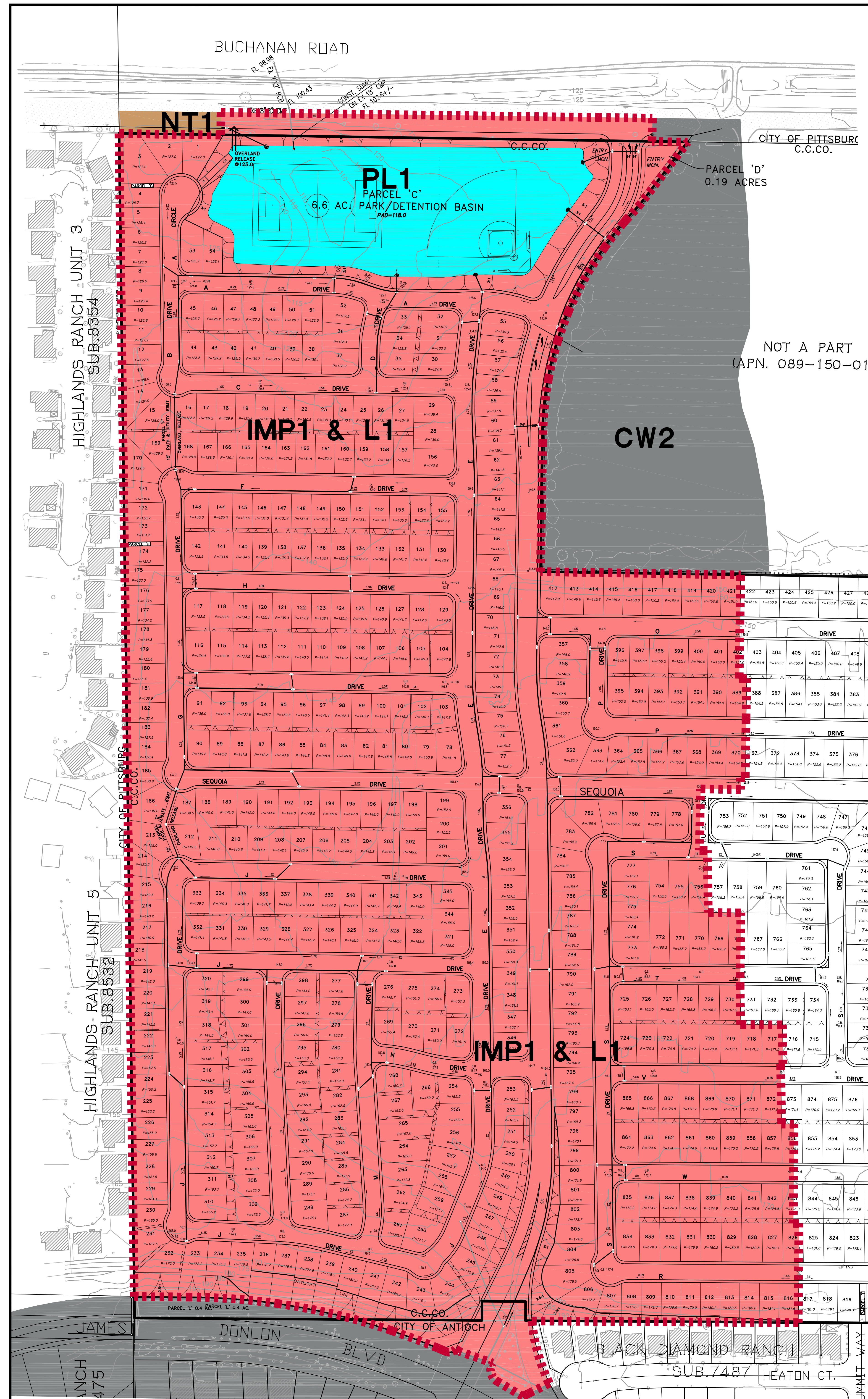
3 of 3

Use 2,690 sf/lot

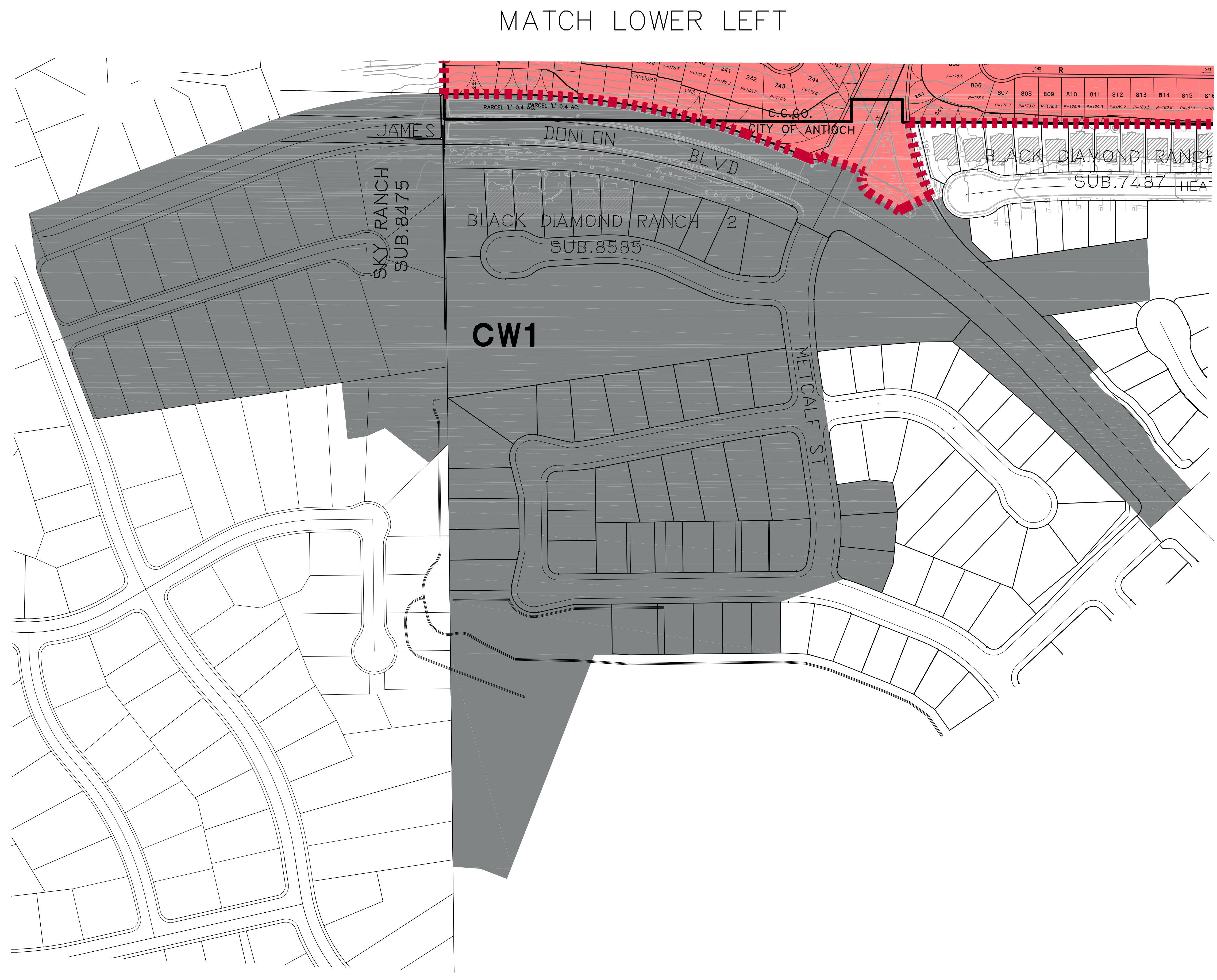
# STORM WATER CONTROL PLAN

## *Tuscany Meadows West*

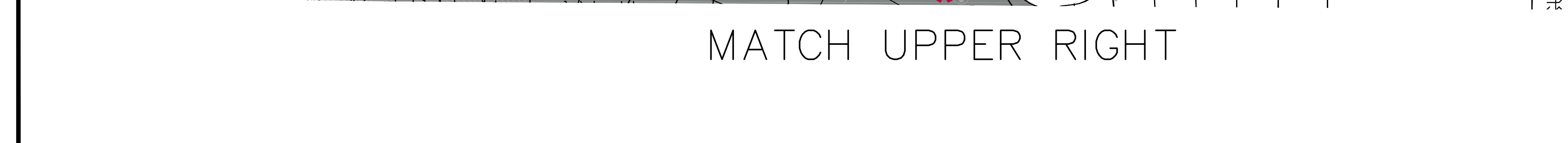
SUBDIVISION 8654



VICINITY MAP  
NOT TO SCALE



MATCH LOWER LEFT



MATCH UPPER RIGHT

DESIGNATED AREA LEGEND:	
DRAINAGE MANAGEMENT AREAS:	
IMPERVIOUS AREA (PAVEMENT AND ROOFTOP) AND PERVIOUS LANDSCAPE AREA	IMP1 & L1
NO TREATMENT AREA	NT1
INTEGRATED MANAGEMENT PRACTICES:	
BIO RETENTION PLANTER AREA	PL1
BMP TRIBUTARY BOUNDARY:	-----
UPSTREAM AREAS:	
UPSTREAM WATER FROM OFFSITE AREA	CW1

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 IMP1 AND PERVIOUS AREA L1

**Tuscany Meadows West**  
STORMWATER CONTROL PLAN EXHIBIT

**Isakson & Assoc. Inc.**  
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/J DRAWN BY: STAFF CHECKED BY: JCB 201002 SHEET 1 OF 1