➢ Indicate the treatment facility(s) chosen for this project in the following table.

TABLE 11: GROUPS OF POLLUTANTS and relative effectiveness of treatment facilities

Pollutants of Concern	Bioretention Facilities (LID)	Settling Basins (Dry Ponds)	Wet Ponds and Constructed Wetlands	Infiltration Facilities or Practices (LID)	Media Filters	Higher-rate biofilters*	Higher-rate media filters*	Trash Racks & Hydro -dynamic Devices	Vegetated Swales
Coarse Sediment and Trash	High	High	High	High	High	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	High	High	High	High	High	Medium	Medium	Low	Medium
Pollutants that tend to be dissolved following treatment	Medium	Low	Medium	High	Low	Low	Low	Low	Low

➢ Please check the box(s) that best describes the Treatment BMP(s) and/or LID BMP selected for this project.

TABLE 12: PROJECT LID AND TC-BMPS

LID and TC-BMP Type	Water Quality Treatment Only	Hydromodification Flow Control
Bioretention Facilites (LID)		
☒ Bioretention area	X	X
☐ Flow-through Planter		
☐ Cistern with Bioretention		
Settling Basins (Dry Ponds)		
☒ Extended/dry detention basin with grass/vegetated lining	X	X
☐ Extended/dry detention basin with impervious lining		
Infiltration Devices (LID)		
☐ Infiltration basin		
☐ Infiltration trench		
☐ Other____________________		
Wet Ponds and Constructed Wetlands		
☐ Wet pond/basin (permanent pool)		
☐ Constructed wetland		
Vegetated Swales (LID[1])		
☐ Vegetated Swale		
Media Filters		

☐ Austin Sand Filter		
☐ Delaware Sand Filter		
☐ Multi-Chambered Treatment Train (MCTT)		
Higher-rate Biofilters		
☐ Tree-pit-style unit		
☐ Other_______________		
Higher-rate Media Filters		
☐ Vault-based filtration unit with replaceable cartridges		
☐ Other_______________		
Hydrodynamic Separator Systems		
☐ Swirl Concentrator		
☐ Cyclone Separator		
Trash Racks		
☐ Catch Basin Insert		
☒ Catch Basin Insert w/ Hydrocarbon boom	X	
☐ Other_______________		

(1) Must be designed per SUSMP "Vegetated Swales" design criteria for water quality treatment credit (p. 65).

For design guidelines and calculations refer to Chapter 4 "Low Impact Development Design Guide" in the SUSMP. Please show all calculations and design sheets for all treatment control BMPs proposed in Attachment D.

Create a Construction Plan SWMP Checklist for your project.

Instructions on how to fill out table

1. Number and list each measure or BMP you have specified in your SWMP in Columns 1 and Maintenance Category in Column 3 of the table. Leave Column 2 blank.

2. When you submit construction plans, duplicate the table (by photocopy or electronically). Now fill in Column 2, identifying the plan sheets where the BMPs are shown. List all plan sheets on which the BMP appears. This table must be shown on the front sheet of the grading and improvement plans.

Stormwater Treatment Control and LID BMP's			
Description / Type	Sheet	Maintenance Category	Revisions
Bioretention Area, permeable pavers*		1	
Detention Basins w/filtration underlayment		3	
Catch basin fossil filter inserts		2	

- Permeable pavers are proposed as an option to add another component to the storm water treatment train and to reduce or eliminate the required detention basins.

STEP 8

OPERATION AND MAINTENANCE

➢ Please check the box that best describes the maintenance mechanism(s) for this project.

TABLE 13: PROJECT BMP CATEGORY

CATEGORY	SELECTED		BMP Description
	YES	NO	
First	X		Irrigation and Bioretention, fossil filter inserts, detention basin
Second[1]	X		
Third[2]	X		
Fourth			

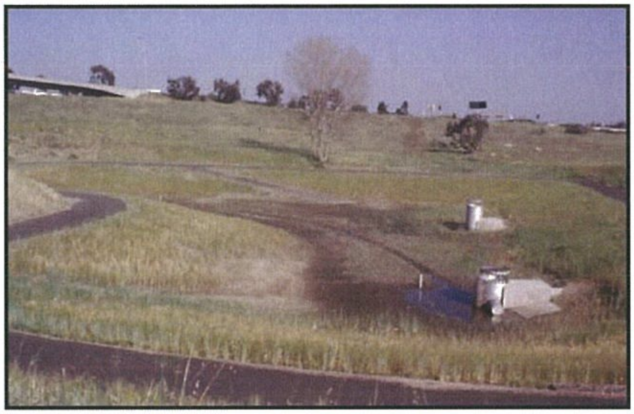
Note:
1. A recorded maintenance agreement will be required.
2. Project will be required to establish or be included in a Stormwater Maintenance Assessment District for the long-term maintenance of treatment BMPs.

➢ Please list all individual LID and Treatment Control BMPs (TC-BMPs) incorporated into project. Pléase ensure the "BMP Identifier" is consistent with the legend in Attachment C "LID and/or TC-BMP Exhibit". Please attach the record plan sheets upon completion of project and amend the Major SWMP where appropriate. For each type of LID or TC-BMP provide an inspection sheet in Attachment F "Maintenance Plan".

TABLE 14: PROJECT SPECIFIC LID AND TC-BMPS

BMP Identifier*	LID or TC-BMP Type	BMP Pollutant of Concern Efficiency (H,M,L) – Table 11	Final Construction Date *(to be completed by County inspector)*	Final Construction Inspector Name *(to be completed by County inspector)*
Fossil Filter Inserts	Media Filters	Sediment (H) Nutrients (M)		
Irrigation and Bioretention in landscaped areas	Irrigation and Bioretention	Sediment (H) Nutrients (H) Bacteria & Viruses (H)		
Detention basins	Settling and filtration	Sediment (H) Nutrients (H) Bacteria & Viruses (H)		

Extended Detention Basin TC-22



Design Considerations

- Tributary Area
- Area Required
- Hydraulic Head

Description

Dry extended detention ponds (a.k.a. dry ponds, extended detention basins, detention ponds, extended detention ponds) are basins whose outlets have been designed to detain the stormwater runoff from a water quality design storm for some minimum time (e.g., 48 hours) to allow particles and associated pollutants to settle. Unlike wet ponds, these facilities do not have a large permanent pool. They can also be used to provide flood control by including additional flood detention storage.

California Experience

Caltrans constructed and monitored 5 extended detention basins in southern California with design drain times of 72 hours. Four of the basins were earthen, less costly and had substantially better load reduction because of infiltration that occurred, than the concrete basin. The Caltrans study reaffirmed the flexibility and performance of this conventional technology. The small headloss and few siting constraints suggest that these devices are one of the most applicable technologies for stormwater treatment.

Advantages

- Due to the simplicity of design, extended detention basins are relatively easy and inexpensive to construct and operate.
- Extended detention basins can provide substantial capture of sediment and the toxics fraction associated with particulates.
- Widespread application with sufficient capture volume can provide significant control of channel erosion and enlargement caused by changes to flow frequency

Targeted Constituents

	Constituent	
☑	Sediment	▲
☑	Nutrients	●
☑	Trash	■
☑	Metals	▲
☑	Bacteria	▲
☑	Oil and Grease	▲
☑	Organics	▲

Legend *(Removal Effectiveness)*

● Low ■ High

▲ Medium

relationships resulting from the increase of impervious cover in a watershed.

Limitations

- Limitation of the diameter of the orifice may not allow use of extended detention in watersheds of less than 5 acres (would require an orifice with a diameter of less than 0.5 inches that would be prone to clogging).
- Dry extended detention ponds have only moderate pollutant removal when compared to some other structural stormwater practices, and they are relatively ineffective at removing soluble pollutants.
- Although wet ponds can increase property values, dry ponds can actually detract from the value of a home due to the adverse aesthetics of dry, bare areas and inlet and outlet structures.

Design and Sizing Guidelines

- Capture volume determined by local requirements or sized to treat 85% of the annual runoff volume.
- Outlet designed to discharge the capture volume over a period of hours.
- Length to width ratio of at least 1.5:1 where feasible.
- Basin depths optimally range from 2 to 5 feet.
- Include energy dissipation in the inlet design to reduce resuspension of accumulated sediment.
- A maintenance ramp and perimeter access should be included in the design to facilitate access to the basin for maintenance activities and for vector surveillance and control.
- Use a draw down time of 48 hours in most areas of California. Draw down times in excess of 48 hours may result in vector breeding, and should be used only after coordination with local vector control authorities. Draw down times of less than 48 hours should be limited to BMP drainage areas with coarse soils that readily settle and to watersheds where warming may be determined to downstream fisheries.

Construction/Inspection Considerations

- Inspect facility after first large to storm to determine whether the desired residence time has been achieved.
- When constructed with small tributary area, orifice sizing is critical and inspection should verify that flow through additional openings such as bolt holes does not occur.

Performance

One objective of stormwater management practices can be to reduce the flood hazard associated with large storm events by reducing the peak flow associated with these storms. Dry extended detention basins can easily be designed for flood control, and this is actually the primary purpose of most detention ponds.

Dry extended detention basins provide moderate pollutant removal, provided that the recommended design features are incorporated. Although they can be effective at removing some pollutants through settling, they are less effective at removing soluble pollutants because of the absence of a permanent pool. Several studies are available on the effectiveness of dry extended detention ponds including one recently concluded by Caltrans (2002).

The load reduction is greater than the concentration reduction because of the substantial infiltration that occurs. Although the infiltration of stormwater is clearly beneficial to surface receiving waters, there is the potential for groundwater contamination. Previous research on the effects of incidental infiltration on groundwater quality indicated that the risk of contamination is minimal.

There were substantial differences in the amount of infiltration that were observed in the earthen basins during the Caltrans study. On average, approximately 40 percent of the runoff entering the unlined basins infiltrated and was not discharged. The percentage ranged from a high of about 60 percent to a low of only about 8 percent for the different facilities. Climatic conditions and local water table elevation are likely the principal causes of this difference. The least infiltration occurred at a site located on the coast where humidity is higher and the basin invert is within a few meters of sea level. Conversely, the most infiltration occurred at a facility located well inland in Los Angeles County where the climate is much warmer and the humidity is less, resulting in lower soil moisture content in the basin floor at the beginning of storms.

Vegetated detention basins appear to have greater pollutant removal than concrete basins. In the Caltrans study, the concrete basin exported sediment and associated pollutants during a number of storms. Export was not as common in the earthen basins, where the vegetation appeared to help stabilize the retained sediment.

Siting Criteria

Dry extended detention ponds are among the most widely applicable stormwater management practices and are especially useful in retrofit situations where their low hydraulic head requirements allow them to be sited within the constraints of the existing storm drain system. In addition, many communities have detention basins designed for flood control. It is possible to modify these facilities to incorporate features that provide water quality treatment and/or channel protection. Although dry extended detention ponds can be applied rather broadly, designers need to ensure that they are feasible at the site in question. This section provides basic guidelines for siting dry extended detention ponds.

In general, dry extended detention ponds should be used on sites with a minimum area of 5 acres. With this size catchment area, the orifice size can be on the order of 0.5 inches. On smaller sites, it can be challenging to provide channel or water quality control because the orifice diameter at the outlet needed to control relatively small storms becomes very small and thus prone to clogging. In addition, it is generally more cost-effective to control larger drainage areas due to the economics of scale.

Extended detention basins can be used with almost all soils and geology, with minor design adjustments for regions of rapidly percolating soils such as sand. In these areas, extended detention ponds may need an impermeable liner to prevent ground water contamination.

The base of the extended detention facility should not intersect the water table. A permanently wet bottom may become a mosquito breeding ground. Research in Southwest Florida (Santana et al., 1994) demonstrated that intermittently flooded systems, such as dry extended detention ponds, produce more mosquitoes than other pond systems, particularly when the facilities remained wet for more than 3 days following heavy rainfall.

A study in Prince George's County, Maryland, found that stormwater management practices can increase stream temperatures (Galli, 1990). Overall, dry extended detention ponds increased temperature by about 5°F. In cold water streams, dry ponds should be designed to detain stormwater for a relatively short time (i.e., 24 hours) to minimize the amount of warming that occurs in the basin.

Additional Design Guidelines

In order to enhance the effectiveness of extended detention basins, the dimensions of the basin must be sized appropriately. Merely providing the required storage volume will not ensure maximum constituent removal. By effectively configuring the basin, the designer will create a long flow path, promote the establishment of low velocities, and avoid having stagnant areas of the basin. To promote settling and to attain an appealing environment, the design of the basin should consider the length to width ratio, cross-sectional areas, basin slopes and pond configuration, and aesthetics (Young et al., 1996).

Energy dissipation structures should be included for the basin inlet to prevent resuspension of accumulated sediment. The use of stilling basins for this purpose should be avoided because the standing water provides a breeding area for mosquitoes.

Extended detention facilities should be sized to completely capture the water quality volume. A micropool is often recommended for inclusion in the design and one is shown in the schematic diagram. These small permanent pools greatly increase the potential for mosquito breeding and complicate maintenance activities; consequently, they are not recommended for use in California.

A large aspect ratio may improve the performance of detention basins; consequently, the outlets should be placed to maximize the flowpath through the facility. The ratio of flowpath length to width from the inlet to the outlet should be at least 1.5:1 (L:W) where feasible. Basin depths optimally range from 2 to 5 feet.

The facility's drawdown time should be regulated by an orifice or weir. In general, the outflow structure should have a trash rack or other acceptable means of preventing clogging at the entrance to the outflow pipes. The outlet design implemented by Caltrans in the facilities constructed in San Diego County used an outlet riser with orifices

Figure 1
Example of Extended Detention Outlet Structure

sized to discharge the water quality volume, and the riser overflow height was set to the design storm elevation. A stainless steel screen was placed around the outlet riser to ensure that the orifices would not become clogged with debris. Sites either used a separate riser or broad crested weir for overflow of runoff for the 25 and greater year storms. A picture of a typical outlet is presented in Figure 1.

The outflow structure should be sized to allow for complete drawdown of the water quality volume in 72 hours. No more than 50% of the water quality volume should drain from the facility within the first 24 hours. The outflow structure can be fitted with a valve so that discharge from the basin can be halted in case of an accidental spill in the watershed.

Summary of Design Recommendations

(1) Facility Sizing - The required water quality volume is determined by local regulations or the basin should be sized to capture and treat 85% of the annual runoff volume. See Section 5.5.1 of the handbook for a discussion of volume-based design.

Basin Configuration – A high aspect ratio may improve the performance of detention basins; consequently, the outlets should be placed to maximize the flowpath through the facility. The ratio of flowpath length to width from the inlet to the outlet should be at least 1.5:1 (L:W). The flowpath length is defined as the distance from the inlet to the outlet as measured at the surface. The width is defined as the mean width of the basin. Basin depths optimally range from 2 to 5 feet. The basin may include a sediment forebay to provide the opportunity for larger particles to settle out.

A micropool should not be incorporated in the design because of vector concerns. For online facilities, the principal and emergency spillways must be sized to provide 1.0 foot of freeboard during the 25-year event and to safely pass the flow from 100-year storm.

(2) Pond Side Slopes - Side slopes of the pond should be 3:1 (H:V) or flatter for grass stabilized slopes. Slopes steeper than 3:1 (H:V) must be stabilized with an appropriate slope stabilization practice.

(3) Basin Lining – Basins must be constructed to prevent possible contamination of groundwater below the facility.

(4) Basin Inlet – Energy dissipation is required at the basin inlet to reduce resuspension of accumulated sediment and to reduce the tendency for short-circuiting.

(5) Outflow Structure - The facility's drawdown time should be regulated by a gate valve or orifice plate. In general, the outflow structure should have a trash rack or other acceptable means of preventing clogging at the entrance to the outflow pipes.

The outflow structure should be sized to allow for complete drawdown of the water quality volume in 72 hours. No more than 50% of the water quality volume should drain from the facility within the first 24 hours. The outflow structure should be fitted with a valve so that discharge from the basin can be halted in case of an accidental spill in the watershed. This same valve also can be used to regulate the rate of discharge from the basin.

The discharge through a control orifice is calculated from:

$$Q = CA(2g(H-H_o))^{0.5}$$

where: Q = discharge (ft^3/s)
C = orifice coefficient
A = area of the orifice (ft^2)
g = gravitational constant (32.2)
H = water surface elevation (ft)
H_o= orifice elevation (ft)

Recommended values for C are 0.66 for thin materials and 0.80 when the material is thicker than the orifice diameter. This equation can be implemented in spreadsheet form with the pond stage/volume relationship to calculate drain time. To do this, use the initial height of the water above the orifice for the water quality volume. Calculate the discharge and assume that it remains constant for approximately 10 minutes. Based on that discharge, estimate the total discharge during that interval and the new elevation based on the stage volume relationship. Continue to iterate until H is approximately equal to H_o. When using multiple orifices the discharge from each is summed.

(6) Splitter Box - When the pond is designed as an offline facility, a splitter structure is used to isolate the water quality volume. The splitter box, or other flow diverting approach, should be designed to convey the 25-year storm event while providing at least 1.0 foot of freeboard along pond side slopes.

(7) Erosion Protection at the Outfall - For online facilities, special consideration should be given to the facility's outfall location. Flared pipe end sections that discharge at or near the stream invert are preferred. The channel immediately below the pond outfall should be modified to conform to natural dimensions, and lined with large stone riprap placed over filter cloth. Energy dissipation may be required to reduce flow velocities from the primary spillway to non-erosive velocities.

(8) Safety Considerations - Safety is provided either by fencing of the facility or by managing the contours of the pond to eliminate dropoffs and other hazards. Earthen side slopes should not exceed 3:1 (H:V) and should terminate on a flat safety bench area. Landscaping can be used to impede access to the facility. The primary spillway opening must not permit access by small children. Outfall pipes above 48 inches in diameter should be fenced.

Maintenance

Routine maintenance activity is often thought to consist mostly of sediment and trash and debris removal; however, these activities often constitute only a small fraction of the maintenance hours. During a recent study by Caltrans, 72 hours of maintenance was performed annually, but only a little over 7 hours was spent on sediment and trash removal. The largest recurring activity was vegetation management, routine mowing. The largest absolute number of hours was associated with vector control because of mosquito breeding that occurred in the stilling basins (example of standing water to be avoided) installed as energy dissipaters. In most cases, basic housekeeping practices such as removal of debris accumulations and vegetation management to ensure that the basin dewaters completely in 48-72 hours is sufficient to prevent creating mosquito and other vector habitats.

Consequently, maintenance costs should be estimated based primarily on the mowing frequency and the time required. Mowing should be done at least annually to avoid establishment of woody vegetation, but may need to be performed much more frequently if aesthetics are an important consideration.

Typical activities and frequencies include:

- Schedule semiannual inspection for the beginning and end of the wet season for standing water, slope stability, sediment accumulation, trash and debris, and presence of burrows.
- Remove accumulated trash and debris in the basin and around the riser pipe during the semiannual inspections. The frequency of this activity may be altered to meet specific site conditions.
- Trim vegetation at the beginning and end of the wet season and inspect monthly to prevent establishment of woody vegetation and for aesthetic and vector reasons.
- Remove accumulated sediment and re-grade about every 10 years or when the accumulated sediment volume exceeds 10 percent of the basin volume. Inspect the basin each year for accumulated sediment volume.

Cost

Construction Cost

The construction costs associated with extended detention basins vary considerably. One recent study evaluated the cost of all pond systems (Brown and Schueler, 1997). Adjusting for inflation, the cost of dry extended detention ponds can be estimated with the equation:

$$C = 12.4V^{0.760}$$

where: C = Construction, design, and permitting cost, and
V = Volume (ft^3).

Using this equation, typical construction costs are:

$ 41,600 for a 1 acre-foot pond

$ 239,000 for a 10 acre-foot pond

$ 1,380,000 for a 100 acre-foot pond

Interestingly, these costs are generally slightly higher than the predicted cost of wet ponds (according to Brown and Schueler, 1997) on a cost per total volume basis, which highlights the difficulty of developing reasonably accurate construction estimates. In addition, a typical facility constructed by Caltrans cost about $160,000 with a capture volume of only 0.3 ac-ft.

An economic concern associated with dry ponds is that they might detract slightly from the value of adjacent properties. One study found that dry ponds can actually detract from the perceived value of homes adjacent to a dry pond by between 3 and 10 percent (Emmerling-Dinovo, 1995).

Maintenance Cost

For ponds, the annual cost of routine maintenance is typically estimated at about 3 to 5 percent of the construction cost (EPA website). Alternatively, a community can estimate the cost of the maintenance activities outlined in the maintenance section. Table 1 presents the maintenance costs estimated by Caltrans based on their experience with five basins located in southern California. Again, it should be emphasized that the vast majority of hours are related to vegetation management (mowing).

Table 1 Estimated Average Annual Maintenance Effort

Activity	Labor Hours	Equipment & Material ($)	Cost
Inspections	4	7	183
Maintenance	49	126	2282
Vector Control	0	0	0
Administration	3	0	132
Materials	-	535	535
Total	56	$668	$3,132

References and Sources of Additional Information

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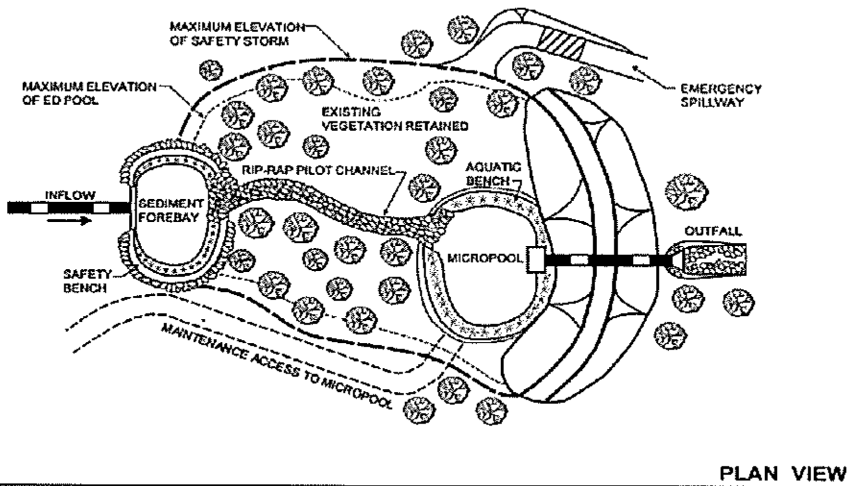
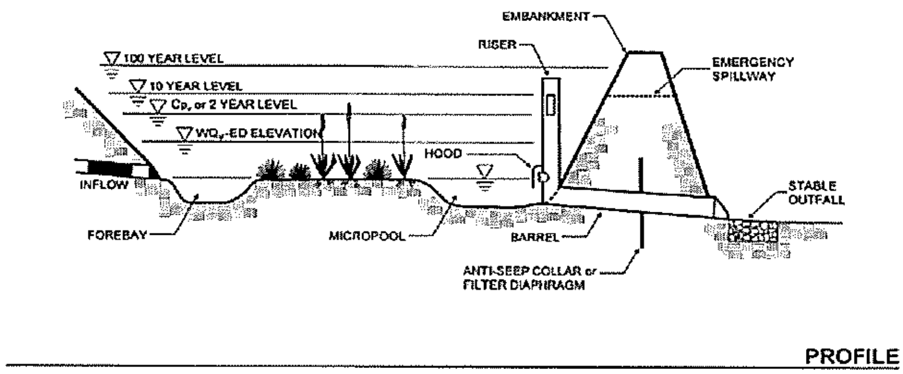




Schematic of an Extended Detention Basin (MDE, 2000)

ATTACHMENT E

Geotechnical Certification Sheet

The design of stormwater treatment and other control measures proposed in this plan requiring specific soil infiltration characteristics and/or geological conditions has been reviewed and approved by a registered Civil Engineer, Geotechnical Engineer, or Geologist in the State of California.

______________________________ _______________

Name Date

N/A, even though the project proposes infiltration BMPs such as the Retention/Irrigation, the anticipated water quality runoff volume is not required to infiltrate into the underlying native soil. The runoff only needs to infiltrate into the top soil section and be discharge to downstream channel via outlet pipe. The pad retention/irrigation BMP will retain the water quality runoff volume.

ADVANCED GEOTECHNICAL SOLUTIONS, INC.
25109 Jefferson Avenue, Suite 220
Murrieta, California 92562
Telephone: (619) 708-1649 Fax: (714) 409-3287

The Accretive Group
12275 El Camino Real, Suite 220
San Diego, CA 92130

March 22, 2012
P/W 1102-01
Report No. 1102-01-B-11

Attention: Mr. Jon Rilling

Subject: Preliminary Infiltration Rates, Lilac Hills Ranch, Valley Center Community Planning Area, County of San Diego, California

Reference: *Feasibility Level Geotechnical Report, Las Lilas Project, Valley Center Area, San Diego, California, prepared by Pacific Soils Engineering, Inc. dated May 23, 2007 (PSE W.O. 401120)*

Gentlemen:

Pursuant to a request from representatives of Landmark Consulting, transmitted herein is Advanced Geotechnical Solutions, Inc.'s (AGS) estimated infiltration rates for use in the preliminary design of infiltration basins for the Lilac Hills Ranch project, Valley Center Community Planning Area, County of San Diego, California. Site specific testing has not been conducted onsite for the determination of infiltration rates. The rates presented herein are based upon USDA Natural Resource Conservation Service (NCRS) mapping, information provided by the County of San Diego, Department of Public Works, and the characteristics of the onsite soils and bedrock.

We have provided you preliminary mapping of the site showing the approximate location of the various geologic units onsite. Based upon the geologic units the following estimated infiltration rates are presented:

- **Artificial Fill, Compacted** (no map symbol)- Soil Group D (rates 0 to 0.05 inches per hour)
- **Artificial Fill, Undocumented** (map symbol afu)- Soil Group D (rates 0 to 0.05 inches per hour)
- **Alluvium** (map symbol Qal)- Soil Group C (rates 0.05 to 0.15 inches per hour)
- **Older Alluvium** (map symbol Qoal)- Soil Group C (rates 0.05 to 0.15 inches per hour)
- **Granitic Rock** (map symbol Kgr)- Soil Group D (rates 0 to 0.05 inches per hour)

The aforementioned rates are highly dependent upon the depth to the underlying relatively impermeable granitic rock and whether the area has been subjected to loading from grading or farming equipment as this will tend to densify the soils and reduce the infiltration rates. Infiltration basins should be located such that the infiltration water is located down gradient from all structural building pads.

Should you desire more accurate design rates than these general rates presented herein, additional testing can be conducted. This testing should be conducted utilizing a Double Ring Infiltrometer apparatus.

Rates determined with the Double Ring Infiltrometer are considered to be more accurate by the local Water Quality Control Board than other methods.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact the undersigned.

Respectfully Submitted,
Advanced Geotechnical Solutions, Inc.

JEFFREY A. CHANEY, Vice President
RCE 46544/ GE 2314

REGISTERED PROFESSIONAL ENGINEER
JEFFREY A. CHANEY
No. 2314
EXP 6-30-13
GEOTECHNICAL
STATE OF CALIFORNIA

Distribution: (4) Addressee
(1) Landmark Consulting, Attn: Mark Brencick

VI. General Maintenance Requirements:

BMP CATEGORY (FIRST)	MAINTENANCE ACTIVITIES	ANNUAL COST
BIO-FILTERATION AREAS	- CUT VEGETATION IN CHANNEL TO 8" or 6" HEIGHT - RESEED/VEGETATE BARE SPOTS AS NECESSARY - REMOVE SEDIMENT FROM CHANNEL AS NECESSARY - BACKFILL BURROW HOLES AS NECESSARY	$38,500
	TOTAL	**$ 38,500**
MAINTENANCE RESPONSIBILITY	The County should have only minimal concern for ongoing maintenance. The property owners and HOA can naturally be expected to do so as a requirement of taking care of their property.	
BMP CATEGORY (THIRD)	**MAINTENANCE ACTIVITIES**	ANNUAL COST
DETENTION BASIN (1 total)	- CUT VEGETATION IN BASIN TO 8" HEIGHT - RESEED/VEGETATE BARE SPOTS AS NECESSARY - REMOVE SEDIMENT FROM BASIN AS NECESSARY - INSPECT STRUCTURAL INTEGRITY - BACKFILL BURROW HOLES AS NECESSARY	
MAINTENANCE RESPONSIBILITY	The County needs to assure ongoing maintenance is heightened, to the point that the County is willing to take on this responsibility. The master HOA will be primarily responsible for maintenance. A permanent funding mechanism needs to be established. A special assessment district will be established for this project, the assessment will be collected with property tax.	
	TOTAL	**$10,000**
BMP CATEGORY (SECOND)	**MAINTENANCE ACTIVITIES**	ANNUAL COST
FOSSIL FILTER INSERTS	- INSPECT UNIT INTEGRITY - REMOVED ACCUMULATED SEDIMENT AND DIPOSE OF PROPERLY - REPLACE HYDROCARBON BOOM AS NECESSARY	
MAINTENANCE RESPONSIBILITY	The Developer would provide the County with security to substantiate the maintenance agreement; security would remain in place for an interim period of 5 years. The amount of the security would equal the estimated cost of 2 years of maintenance activities. The security can be a Cash Deposit, Letter of Credit or other acceptable to the County. If at any time, owners fail to maintain BMPs and the County must perform any of the maintenance activities, then owners shall pay all of County's costs incurred in performing the maintenance as defined in the maintenance agreement.	
	TOTAL	**$12,000**
	GRAND TOTAL	**$60,500**

ATTACHMENT G

Treatment Control BMP Certification for DPW Permitted Land Development Projects

County of San Diego

DEPARTMENT OF PUBLIC WORKS

Treatment Control BMP Certification for DPW Permitted Land Development Projects

Permit Number____________________ SWMP #_________________________

Project Name____

Location / Address ____

Responsible Party for Construction Phase

Developer's Name: ____

Address: ____

City ____________________ State _________________________ Zip______________

Email Address: ____

Phone Number: ____

Engineer of Work: ____

Engineer's Phone Number: _________________________________

Responsible Party for Perpetual Maintenance

Owner's Name(s)*____

Address: ____

City ____________________ State _________________________ Zip______________

Email Address: ____

Phone Number: ____

* Note: If a corporation or LLC, provide information for principal partner or Agent for Service of Process. If an HOA, provide information of president at time of project closeout.

Maintenance Agreement No.: ____

Percent Impervious Before Construction: %____________________________
Percent Impervious After Construction: %______________________________

Proposed Disturbed Area: ____________Acres

Hydromodification Management:
Yes ☐ or No ☐

Primary or Secondary Pollutants of Concerns *(check all that apply)*

- ☐ Sediment
- ☐ Organic Compounds
- ☐ Oxygen Demanding Substances
- ☐ Bacteria and Viruses
- ☐ Nutrients
- ☐ Trash and Debris
- ☐ Oil and Grease
- ☐ Pesticides

Site Layout Strategies *(check all that apply)*

- ☐ Conserve Natural Areas
- ☐ Minimize and Disconnect Imp.Surfaces
- ☐ Minimize erosion from slopes
- ☐ Minimize Disturbance to Natural Areas
- ☐ Minimize Soil Compaction

Disperse Runoff from Impervious Surfaces to Pervious *(check all that apply)*

- ☐ Use of pervious surfaces
- ☐ Parking Lot Design
- ☐ Building Design
- ☐ Street and Road Design
- ☐ Driveway, Sidewalk, Bikepath Design
- ☐ Landscape Design

Source BMPs *(check all that apply)*

- ☐ Storm Drain Inlets
- ☐ Interior Parking Garages
- ☐ Landscape/Outdoor Pesticide Use
- ☐ Food Service
- ☐ Industrial Processes
- ☐ Vehicle and Equipment Cleaning
- ☐ Fuel Dispensing Areas
- ☐ Fire Sprinkler Test Water
- ☐ Plazas, sidewalks, and parking lots
- ☐ Interior Floor Drains
- ☐ Indoor & Structural Pest Control
- ☐ Pools, spas, etc.
- ☐ Refuse Areas
- ☐ Outdoor Storage of Equipment and Materials
- ☐ Vehicle/ Equipment Repair and Maintenance
- ☐ Loading Docks
- ☐ Misc. drain or wash water

Treatment Control, Hydromodification and LID BMPs

BMP Identifier: (Identifier to match TCBMPs on TCBMP Table.)	Type	Record Plan Page for TCBMP	BMP Pollutant of Concern Efficiency (H,M,L)

(Add sheet for all additional BMPs)
The Maintenance Agreement has been recorded. Yes ☐ or No ☐

I certify that the above items for this project are in substantial conformance with the approved plans. Yes ☐ or No ☐

Please sign your name and seal. [SEAL]

Engineer's Print Name: ______________________________

Engineer's Signed Name: ______________________________

Date: ______________________________

Submittals Required with Certification:

- Copy of the final approved SWMP.
- Copy of the approved record plan showing Stormwater TCBMP Table and the location of each verified as-built TCBMP.
- Copy of the specification sheets for the verified proprietary TCBMPs
- Recorded Maintenance Agreement (Category 1 or 2 only)
- Photograph(s) of TCBMP(s)

COUNTY - OFFICIAL USE ONLY:

For PDCI:
PDCI Inspector:____

Date Project has/expects to close:________________________________

Date Certification received from EOW:__________________________

DPW Inspector concurs that every noted BMP on the plan and the SWMP or SWMP Addendum is installed onsite through field verification and completed as certified: Yes ☐ or No ☐

PDCI Inspector's Signed Name: ________________________________ Date: ___________

FOR WPP:
Date Received from PDCI:____

WPP Submittal Reviewer:____

WPP Reviewer concurs that the provided TC-BMP information is acceptable to enter into the TC-BMP Maintenance verification inventory. Yes ☐ or No ☐

WPP Reviewer's Signed Name: ________________________________ Date:____________

ATTACHMENT H

HMP Exemption Documentation

(if applicable)

ATTACHEMENT I
ADDEMDUM

Due to advancement of technology we have more choices than ever to enhance our project's storm water treatment capability and facilities. In the past few years, it has been recognized that rainwater capturing offers great augmentation to the overall sustainability of our project by reducing the required detention basin for 100-year storm runoff volume attenuation, and subsequently reducing the overall project foot print to preserve more natural land. Furthermore, rainwater capturing will also reduce the water demand for irrigation to reduce the long term impact of the proposed development.

The commercially available rain barrels offer a great variety of colors, shapes and sizes to suite almost any type of development.

Currently, the commercially available pavers have a wide range of colors and textures that differ from the monochromatic asphaltic concrete (AC) pavement, pavers has the ability to visually and sonically alert drivers to slow down as they are entering areas with increased pedestrians and bicycle riders such as town centers, schools and interior residential areas. This will greatly enhance the safety, quality of life and promote walkability of the neighborhoods.

The permeable paver structural section offer significant capacity to store excess runoff volume within the void spaces of the base material. This underground storage capacity will offset the required detention basin size for both the 100-year storm runoff attenuation and hydromodification mitigation. The proposed permeable pavers will reduce the oval all project footprint to preserve more natural areas. Furthermore, during low intensity rain events where the runoff has the highest potential to carry pollutants such as sediments, oils and grease and other as identified in the project SWMPs has the greatest opportunity to seep into the permeable paver structural section such that the pollutants have time to settle and be filtered through the base material. The pavers add another component to the storm water runoff treatment train further enhances the runoff water quality leaving the project site. In conjunction with the reduced detention basins, bio-retention area and other BMP facilities, the paver will greatly contribute to the proposed project being hydrologic impact neutral.

ASSUMPTIONS:

Bio-retention:

-Typical lot size = 4500 sf

-Typical impervious coverage per lot = 1500 sf roof + 300 sf walkways and driveway = 1800 sf

-Typical pervious coverage (bio-retention) per lot = 1000 sf with the top 12" layer providing a minimum of 5"/hour infiltration rate.

Rain barrels:

-Typical home rain gutter down spout location = 4

These permeable pavers and rain barrels offer a great alternative to the proposed detention basins for 100-year runoff volume attenuation.

The project developers projected a total of 23 acres of pavers throughout the project. Per the calculations presented in this report, the proposed rain barrels and permeable pavers will provide adequate storage capacity to eliminate the required detention basin for 100-year storm water runoff volume attenuation purposes.

TABLE 8: LID AND SITE DESIGN

1. Conserve natural Areas, Soils, and Vegetation
☒ Preserve well draining soils (Type A or B)
☒ Preserve Significant Trees
☒ Preserve critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions
☐ Other. Description:
2. Minimize Disturbance to Natural Drainages
☒ Set-back development envelope from drainages
☐ Restrict heavy construction equipment access to planned green/open space areas
☐ Other. Description:
3. Minimize and Disconnect Impervious Surfaces (see 5)
☒ Clustered Lot Design
☐ Items checked in 5?
☐ Other. Description:
4. Minimize Soil Compaction
☒ Restrict heavy construction equipment access to planned green/open space areas
☒ Re-till soils compacted by construction vehicles/equipment
☐ Collect & re-use upper soil layers of development site containing organic Materials
☐ Other. Description:
5. Drain Runoff from Impervious Surfaces to Pervious Areas
LID Street & Road Design
☐ Curb-cuts to landscaping
☐ Rural Swales
☐ Concave Median
☐ Cul-de-sac Landscaping Design
☒ Other. Description: all runoff from streets and roadways are conveyed to proposed permeable pavers located at low points of roadways, the first flush runoff will drain into the base materials under the paver and be
LID Parking Lot Design
☒ Permeable Pavements
☒ Curb-cuts to landscaping
☐ Other. Description:
LID Driveway, Sidewalk, Bike-path Design
☒ Permeable Pavements
☒ Pitch pavements toward landscaping

	☐ Other. Description:
	LID Building Design
	☒ Cisterns & Rain Barrels
	☐ Downspout to swale
	☐ Vegetated Roofs
	☐ Other. Description:
	LID Landscaping Design
	☒ Soil Amendments
	☒ Reuse of Native Soils
	☒ Smart Irrigation Systems
	☒ Street Trees
	☐ Other. Description:
6.	Minimize erosion from slopes
	☒ Disturb existing slopes only when necessary
	☒ Minimize cut and fill areas to reduce slope lengths
	☒ Incorporate retaining walls to reduce steepness of slopes or to shorten slopes
	☒ Provide benches or terraces on high cut and fill slopes to reduce concentration of flows
	☒ Rounding and shaping slopes to reduce concentrated flow
	☒ Collect concentrated flows in stabilized drains and channels
	☐ Other. Description:

TABLE 11: GROUPS OF POLLUTANTS and relative effectiveness of treatment facilities

Pollutants of Concern	Bioretention Facilities (LID)	Settling Basins (Dry Ponds)	Wet Ponds and Constructed Wetlands	Infiltration Facilities or Practices (LID)	Media Filters	Higher-rate biofilters *	Higher-rate media filters*	Trash Racks & Hydro-dynamic Devices	Vegetated Swales
Coarse Sediment and Trash	High	High	High	High	High	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	High	High	High	High	High	Medium	Medium	Low	Medium
Pollutants that tend to be dissolved following treatment	Medium	Low	Medium	High	Low	Low	Low	Low	Low

➢ Please check the box(s) that best describes the Treatment BMP(s) and/or LID BMP selected for this project.

TABLE 12: PROJECT LID AND TC-BMPS

LID and TC-BMP Type	Water Quality Treatment Only	Hydromodification Flow Control
Bioretention Facilites (LID)		
☒ Bioretention area	X	X
☐ Flow-through Planter		
☒ Cistern with Bioretention * rain barrels	X	
Settling Basins (Dry Ponds)		
☐ Extended/dry detention basin with grass/vegetated lining		X
☐ Extended/dry detention basin with impervious lining		
Infiltration Devices (LID)		
☐ Infiltration basin		
☐ Infiltration trench		
☐ Other________________________		
Wet Ponds and Constructed Wetlands		
☐ Wet pond/basin (permanent pool)		
☐ Constructed wetland		
Vegetated Swales (LID[1])		
☐ Vegetated Swale		
Media Filters		
☐ Austin Sand Filter		
☐ Delaware Sand Filter		
☐ Multi-Chambered Treatment Train (MCTT)		
Higher-rate Biofilters		
☐ Tree-pit-style unit		
☐ Other________________________		
Higher-rate Media Filters		
☐ Vault-based filtration unit with replaceable cartridges		
☐ Other________________________		
Hydrodynamic Separator Systems		
☐ Swirl Concentrator		
☐ Cyclone Separator		
Trash Racks		
☐ Catch Basin Insert		
☒ Catch Basin Insert w/ Hydrocarbon boom	X	
☐ Other________________________		

Stormwater Treatment Control and LID BMP's			
Description / Type	Sheet	Maintenance Category	Revisions
Bioretention Area, permeable pavers, rain barrels		1	
Catch basin fossil filter inserts		2	

CATEGORY	SELECTED		BMP Description
	YES	NO	
First	X		Irrigation and Bioretention, fossil filter inserts, permeable pavers, rain barrels.
Second[1]	X		
Third[2]			
Fourth			

TABLE 14: PROJECT SPECIFIC LID AND TC-BMPS

BMP Identifier*	LID or TC-BMP Type	BMP Pollutant of Concern Efficiency (H,M,L) – Table 11	Final Construction Date *(to be completed by County inspector)*	Final Construction Inspector Name *(to be completed by County inspector)*
Fossil Filter Inserts	Media Filters	Sediment (H) Nutrients (M)		
Irrigation and Bioretention in landscaped areas	Bioretention	Sediment (H) Nutrients (H) Bacteria & Viruses (H)		
Permeable pavers	Permeable pavers	Sediment (H) Nutrients (H) Bacteria & Viruses (H)		
Rain barrels	Rain barrels	Sediment (H) Nutrients (H) Bacteria & Viruses (H)		

NGBS Credit:

403.5 Stormwater management. *Stormwater management design includes one or more of the following low-impact development techniques:*

(1) *Natural water and drainage features are preserved and used.*

APPLICANT RESPONSE:

The project preserves and incorporates 43.5 acres of natural water and drainages as part of the project (table 6, page 64), while only impacting 6.5 total acres. The wetland impacts are mitigated through onsite wetland creation and enhancement. In addition, the project incorporates minimum 50-foot buffers around onsite wetlands. See the Biological Resources Report *[Figures 11a,b,c]*

(2) *Vegetative swales, French drains, wetlands, drywells, rain gardens, and similar infiltration features are used.*

APPLICANT RESPONSE:

a. Storm Water Management Plan - Implementing Tentative Map, Page 36 (Table 12)
b. Storm Water Management Plan - Master Tentative Map, Page 36 (Table 12)

(3) *Permeable materials are selected/specified for common area roads, driveways, parking areas, walkways, and patios.*

APPLICANT RESPONSE:

See attached "Exhibit A" showing permeable backbone roads with pavers. Approximately 48% of all major roads to include permeable materials.

(4) *Stormwater management practices are selected/specified that manage rainfall on-site and prevent the off-site discharge from all storms up to and including the volume of the 95th percentile storm event.*

APPLICANT RESPONSE:

Post-development run-off does not exceed pre-development run-off for 100-year storm event. The summary for this is shown:

a. Preliminary Drainage Report – Implementing Tentative Map, Page 15
b. Preliminary Drainage Report – Master Tentative Map, Page 14

(5) *A hydrologic analysis is conducted that results in the design of a stormwater management system that maintains the pre-development (stable, natural) runoff hydrology of the site throughout the development or redevelopment process. Post construction runoff rate, volume, and duration do not exceed predevelopment rates.*

APPLICANT RESPONSE:

The Drainage Reports so the pre-development runoff and the post-development runoff rates, volume, and time of concentration. The increase in volume and runoff rates and decrease in time of concentration are mitigated by the implementation of onsite detention basins which ensure the runoff leaving the site does not exceed the pre-developed condition.

SEE (4) ABOVE
Preliminary Drainage Report – Implementing Tentative Map, Page 15
Preliminary Drainage Report – Master Tentative Map, Page 14

(6) *Stormwater management features/structures are designed for the reduction of nitrogen, phosphorus, and sediment.*

APPLICANT RESPONSE:

Bio-retention, detention, and sediment traps are proposed to reduce sediment and nutrients (such as nitrogen and phosphorus). Please refer to:

a. Storm Water Management Plan - Implementing Tentative Map, Pages 36-40 and 73-101
b. Storm Water Management Plan - Master Tentative Map, Pages 35-41 and 75-104

CREDIT
403.5 (1)

BIOLOGICAL RESOURCES REPORT
LILAC HILLS RANCH
SAN DIEGO COUNTY, CALIFORNIA

SPECIFIC PLAN
GENERAL PLAN AMENDMENT
REZONE
EIR
TENTATIVE MAP (MASTER)
TENTATIVE MAP (PHASE 1 IMPLEMENTING TM)
MAJOR USE PERMIT

PROJECT APPLICANT:
ACCRETIVE INVESTMENTS, INC.
12275 EL CAMINO REAL, SUITE 110
SAN DIEGO, CA 92130
ATTN: JON RILLING
PH: 858-546-0700

PREPARED FOR:
COUNTY OF SAN DIEGO
5510 OVERLAND AVENUE, THIRD FLOOR
SAN DIEGO, CA 92123
KIVA PROJECT: 09-0112513
SP 3810-12-001
GPA 3800-12-001
REZ 3600-12-003
TM 5571 RPL4~~3~~ and 5572 RPL4~~3~~
MUP 3300-12-005

PREPARER:

GERRY SCHEID
COUNTY-APPROVED BIOLOGIST

RECON ENVIRONMENTAL, INC.
1927 FIFTH AVENUE
SAN DIEGO, CA 92101
619-308-9333

June 4, 2014
~~June 5, 2013~~

TABLE 6
SUMMARY OF DIRECT IMPACTS TO
JURISDICTIONAL WATERS WITHIN THE PROJECT AREA

Jurisdictional Waters	Existing (acres)	Impacts (acres)	Offsite Impacts (acres)
USACE Jurisdiction			
Non-wetland waters of the U.S.	4.69	2.92	
Wetlands	13.44	1.30	0
USACE Total Jurisdiction	**18.13**	**4.22**	**0**
CDFG/RWQCB Jurisdiction			
Streambed	4.18	3.1	
State Wetlands (Riparian habitat)	39.35	3.45	0
CDFG Total Jurisdiction[1]	**43.52**	**6.55**	**0**
County of San Diego RPO Wetlands	**37.64**	**2.23**	**0**

Locations of impacts to jurisdictional waters and wetland on-site are shown on Figures 11a–d. A determination of the significance of these impacts is discussed in Section 5.1 and 5.2, and mitigation requirements in Section 5.4.

Impacts to RPO wetlands on-site would result from seven road crossings. An analysis of the required findings to allow crossings of RPO wetlands was prepared for the on-site crossing impact locations (Attachment 15). This analysis concludes that the proposed crossings meet the findings necessary to allow the impacts through impact avoidance and minimization by placing the proposed crossings where RPO wetlands are narrow, disturbed, and at existing roads. Further, the findings show that there is the potential to eliminate crossings of RPO wetlands from future adjacent development projects, and that the impacts to RPO wetlands will be mitigated per County requirements.

Off-site improvements to Rodriquez Road may be necessary, depending on the timing of the construction of the Lilac Hills Ranch project. If these road improvements are constructed by the Lilac Hills Ranch project, an additional 0.03 acre of USACE/CDFW/RWQCB/RPO wetland would be impacted due to improvements to the existing road.

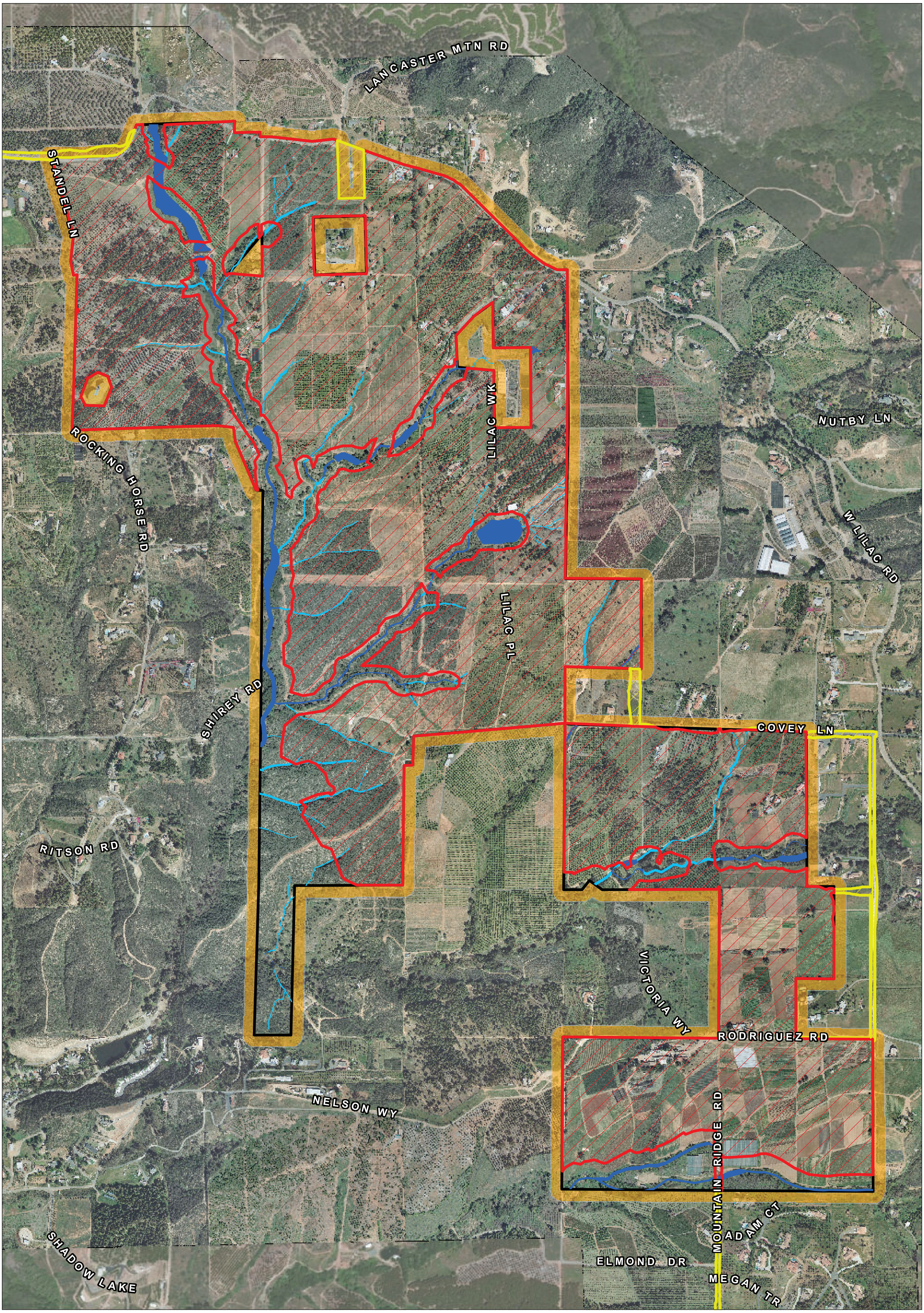
2.3 Impacts to Sensitive Species

This section discusses the direct and indirect impacts the proposed project would have on sensitive species present on-site. Impacts to sensitive plants and sensitive wildlife are discussed separately below.

2.3.1 Impacts to Sensitive Plants

The proposed project could impact an estimated 100 individuals of prostrate spineflower. No direct impacts to spiny rush or Engelmann oak would result from project implementation.

Image source: Custom image provided by client (flown March 2012), and Microsoft, All Rights Reserved (flown May 2010)



0 Feet 800

Project Boundary
100-ft. Survey Buffer
Wetland
Non-wetland Water
Project Impacts
Off-site Improvement Areas

RECON

FIGURE 11a

Impacts to USACE Waters of the U.S.

M:\JOBS4\6153\common_gis\fig11a_bio.mxd 5/30/2014 ccn

Image source: Custom image provided by client (flown March 2012), and Microsoft, All Rights Reserved (flown May 2010)

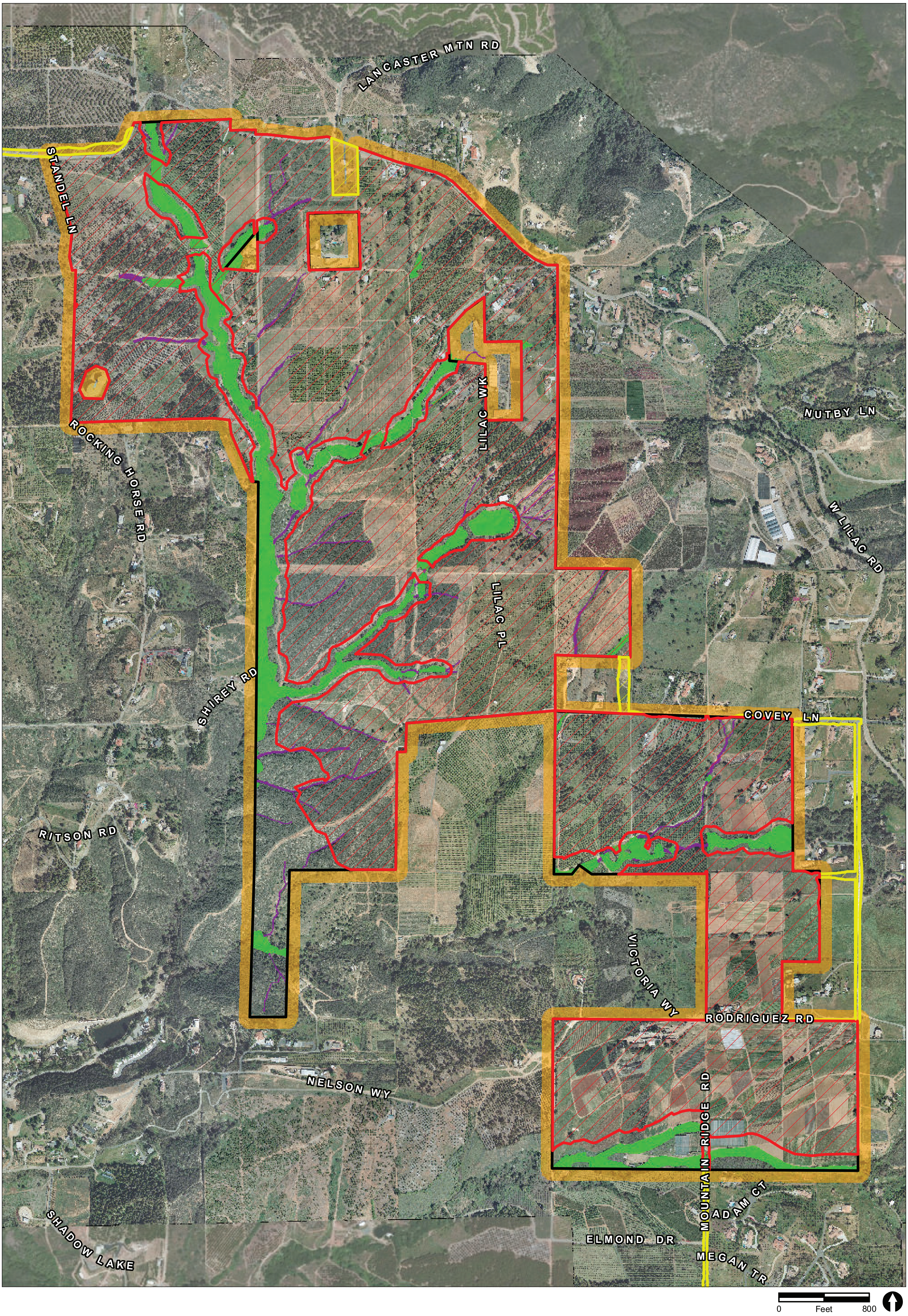


FIGURE 11b

Impacts to CDFG/RWQCB State Waters

RECON

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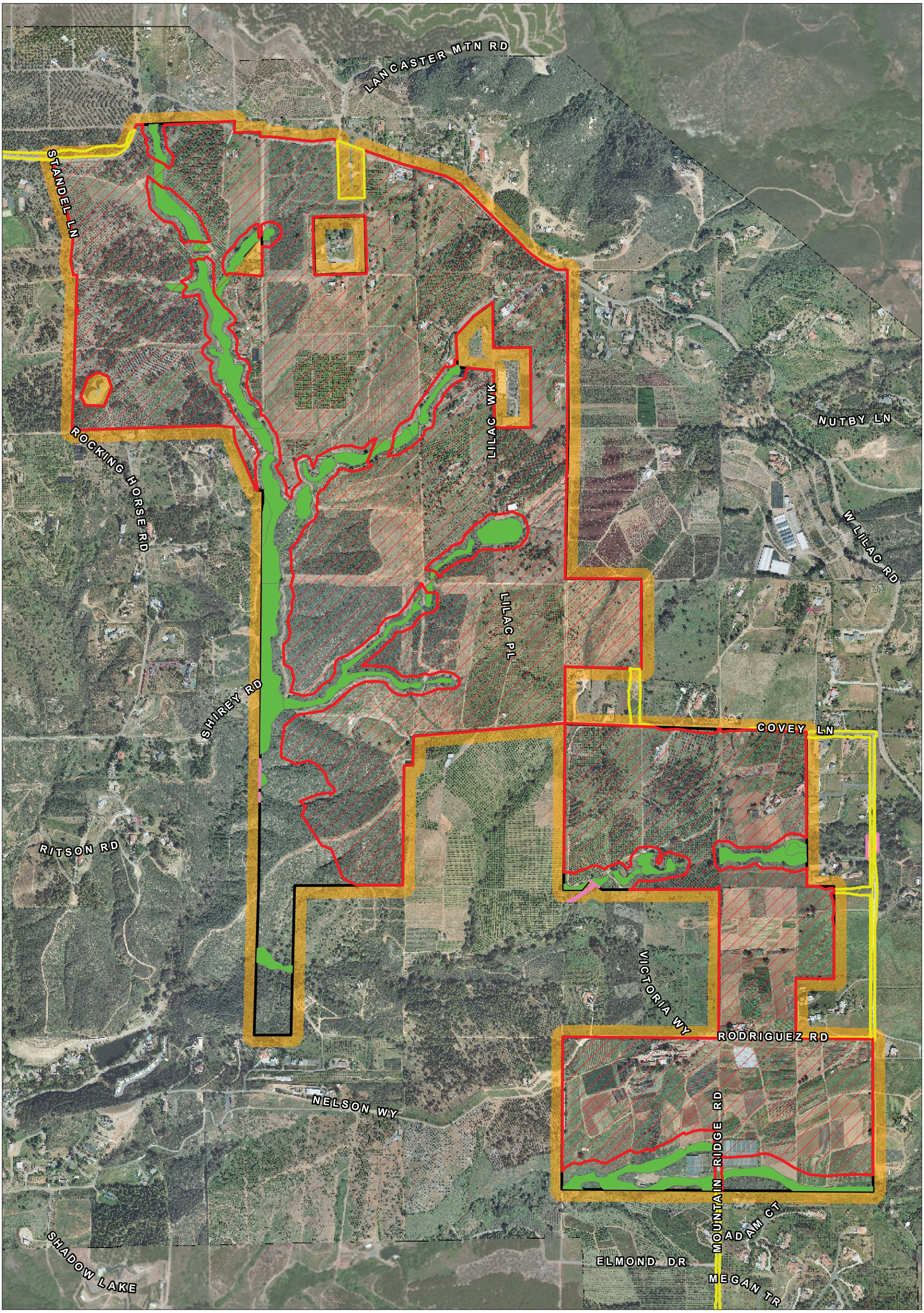
Image source: Custom image provided by client (flown March 2012), and Microsoft, All Rights Reserved (flown May 2010)



0 Feet 800

Project Boundary
100-ft. Survey Buffer
County RPO Wetland
County RPO Wetland - Off-site
Project Impacts
Off-site Improvement Areas

FIGURE 11c

Impacts to County of San Diego RPO Wetlands

RECON

M:\JOBS4\6153\common_gis\fig11c_bio.mxd 5/30/2014

CREDIT
403.5 (2)

Major Stormwater Management Plan
(Major SWMP)
For
LILAC HILLS RANCH-MASTER TM
TM – 5571 RPL-3
Valley Center, San Diego County, California

Preparation/Revision Date: 5-3-13

Prepared for:

Accretive Investments, Inc.
12275 El Camino Real, Suite 110
San Diego, Ca 92130

Prepared by:

Landmark Consulting
9555 Genesee Ave. Ste. 200
San Diego, Ca 92121
858-587-8070

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan have been prepared under the direction of the following Registered Civil Engineer and meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments.

David Yeh, RCE 62717, Exp 6-30- 14 | 5-3-13

______________________________ | ____________ Date

STEP 7

LID AND TREATMENT CONTROL SELECTION

A treatment control BMP and/or LID facility must be selected to treat the project pollutants of concern identified in Table 7 "Project Pollutants of Concern". A treatment control facility with a high or medium pollutant removal efficiency for the project's most significant pollutant of concern shall be selected. It is recommended to use the design procedure in Chapter 4 of the SUSMP to meet NPDES permit LID requirements, treatment requirements, and flow control requirements. If your project does not utilize this approach, the project will need to demonstrate compliance with LID, treatment and flow control requirements. Review Chapter 2 "Selection of Stormwater Treatment Facilities" in the SUSMP to assist in determining the appropriate treatment facility for your project.

Will this project be utilizing the unified LID design procedure as described in Chapter 4 of the Local SUSMP? *(If yes, please document in Attachment D following the steps in Chapter 4 of the County SUSMP)*	
Yes	
If this project is not utilizing the unified LID design procedure, please describe how the alternative treatment facilities will comply with applicable LID criteria, stormwater treatment criteria, and hydromodification management criteria.	

- Indicate the project pollutants of concern (POCs) from Table 7 in Column 2 below.

TABLE 10: GROUPING OF POTENTIAL POLLUTANTS of Concern (POCs) by fate during stormwater treatment

Pollutant	Check Project Specific POCs	Coarse Sediment and Trash	Pollutants that tend to associate with fine particles during treatment	Pollutants that tend to be dissolved following treatment
Sediment	X	X	X	
Nutrients	X		X	X
Heavy Metals	X		X	
Organic Compounds	X		X	
Trash & Debris	X	X		
Oxygen Demanding	X		X	
Bacteria			X	
Oil & Grease	X		X	
Pesticides	X		X	

- Indicate the treatment facility(s) chosen for this project in the following table.

TABLE 11: GROUPS OF POLLUTANTS and relative effectiveness of treatment facilities

Pollutants of Concern	Bioretention Facilities (LID)	Settling Basins (Dry Ponds)	Wet Ponds and Constructed Wetlands	Infiltration Facilities or Practices (LID)	Media Filters	Higher-rate biofilters*	Higher-rate media filters*	Trash Racks & Hydro -dynamic Devices	Vegetated Swales
Coarse Sediment and Trash	High	High	High	High	High	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	High	High	High	High	High	Medium	Medium	Low	Medium
Pollutants that tend to be dissolved following treatment	Medium	Low	Medium	High	Low	Low	Low	Low	Low

- Please check the box(s) that best describes the Treatment BMP(s) and/or LID BMP selected for this project.

TABLE 12: PROJECT LID AND TC-BMPS

LID and TC-BMP Type	Water Quality Treatment Only	Hydromodification Flow Control
Bioretention Facilites (LID)		
☒ Bioretention area	X	
Flow-through Planter		
Cistern with Bioretention		
Settling Basins (Dry Ponds)		
☒ Extended/dry detention basin with grass/vegetated lining	X	X
☒ Extended/dry detention basin with impervious lining	X	
Infiltration Devices (LID)		
Infiltration basin		
Infiltration trench		
Other______________________		
Wet Ponds and Constructed Wetlands		
Wet pond/basin (permanent pool)		
Constructed wetland		
Vegetated Swales (LID[1])		
Vegetated Swale		

Media Filters		
Austin Sand Filter		
Delaware Sand Filter		
Multi-Chambered Treatment Train (MCTT)		
Higher-rate Biofilters		
Tree-pit-style unit		
Other___________________________		
Higher-rate Media Filters		
Vault-based filtration unit with replaceable cartridges		
Other___________________________		
Hydrodynamic Separator Systems		
Swirl Concentrator		
Cyclone Separator		
Trash Racks		
Catch Basin Insert		
Catch Basin Insert w/ Hydrocarbon boom		
Other___________________________		

(1) Must be designed per SUSMP "Vegetated Swales" design criteria for water quality treatment credit (p. 65)

For design guidelines and calculations refer to Chapter 4 "Low Impact Development Design Guide" in the SUSMP. Please show all calculations and design sheets for all treatment facilities proposed in Attachment D.

CREDIT
403.5 (2)

Major Stormwater Management Plan
(Major SWMP)
For
LILAC HILLS RANCH-IMPLEMENTING TM
TM – 5572 RPL-3
Valley Center, San Diego County, California

Preparation/Revision Date: 5-3-13

Prepared for:

Accretive Investments, Inc.
12275 El Camino Real, Suite 110
San Diego, Ca 92130

Prepared by:

Landmark Consulting
9555 Genesee Ave. Ste. 200
San Diego, Ca 92121
858-587-8070

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan have been prepared under the direction of the following Registered Civil Engineer and meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments.

David Yeh, RCE 62717, Exp 6-30- 14 5-3-13

________________________________ ______________
Date

STEP 7

LID AND TREATMENT CONTROL SELECTION

A treatment control BMP and/or LID facility must be selected to treat the project pollutants of concern identified in Table 7 "Project Pollutants of Concern". A treatment control facility with a high or medium pollutant removal efficiency for the project's most significant pollutant of concern shall be selected. It is recommended to use the design procedure in Chapter 4 of the SUSMP to meet NPDES permit LID requirements, treatment requirements, and flow control requirements. If your project does not utilize this approach, the project will need to demonstrate compliance with LID, treatment and flow control requirements. Review Chapter 2 "Selection of Stormwater Treatment Facilities" in the SUSMP to assist in determining the appropriate treatment facility for your project.

Will this project be utilizing the unified LID design procedure as described in Chapter 4 of the Local SUSMP? *(If yes, please document in Attachment D following the steps in Chapter 4 of the County SUSMP)*	
Yes	
If this project is not utilizing the unified LID design procedure, please describe how the alternative treatment facilities will comply with applicable LID criteria, stormwater treatment criteria, and hydromodification management criteria.	

- Indicate the project pollutants of concern (POCs) from Table 7 in Column 2 below.

TABLE 10: GROUPING OF POTENTIAL POLLUTANTS of Concern (POCs) by fate during stormwater treatment

Pollutant	Check Project Specific POCs	Coarse Sediment and Trash	Pollutants that tend to associate with fine particles during treatment	Pollutants that tend to be dissolved following treatment
Sediment	X	X	X	
Nutrients	X		X	X
Heavy Metals	X		X	
Organic Compounds	X		X	
Trash & Debris	X	X		
Oxygen Demanding	X		X	
Bacteria	X		X	
Oil & Grease	X		X	
Pesticides	X		X	

➢ Indicate the treatment facility(s) chosen for this project in the following table.

TABLE 11: GROUPS OF POLLUTANTS and relative effectiveness of treatment facilities

Pollutants of Concern	Bioretention Facilities (LID)	Settling Basins (Dry Ponds)	Wet Ponds and Constructed Wetlands	Infiltration Facilities or Practices (LID)	Media Filters	Higher-rate biofilters*	Higher-rate media filters*	Trash Racks & Hydro -dynamic Devices	Vegetated Swales
Coarse Sediment and Trash	**High**	**High**	High	**High**	High	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	**High**	**High**	High	**High**	High	Medium	Medium	Low	Medium
Pollutants that tend to be dissolved following treatment	**Medium**	**Low**	Medium	**High**	Low	Low	Low	Low	Low

➢ Please check the box(s) that best describes the Treatment BMP(s) and/or LID BMP selected for this project.

TABLE 12: PROJECT LID AND TC-BMPS

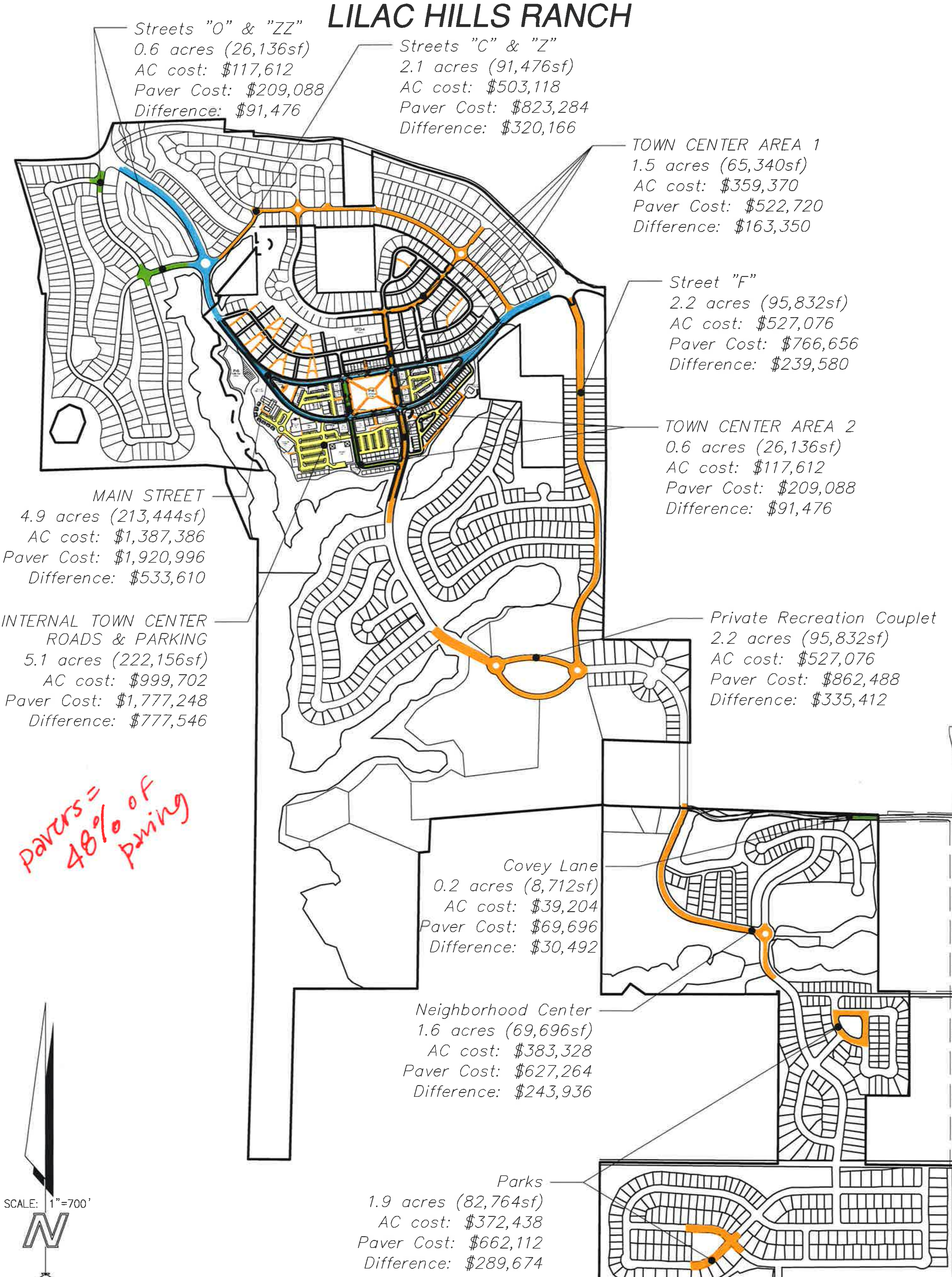
LID and TC-BMP Type	Water Quality Treatment Only	Hydromodification Flow Control
Bioretention Facilites (LID)		
☒ Bioretention area	X	X
☐ Flow-through Planter		
☐ Cistern with Bioretention		
Settling Basins (Dry Ponds)		
☒ Extended/dry detention basin with grass/vegetated lining	X	X
☐ Extended/dry detention basin with impervious lining		
Infiltration Devices (LID)		
☐ Infiltration basin		
☐ Infiltration trench		
☐ Other__________________________		
Wet Ponds and Constructed Wetlands		
☐ Wet pond/basin (permanent pool)		
☐ Constructed wetland		
Vegetated Swales (LID[1])		
☐ Vegetated Swale		
Media Filters		

☐ Austin Sand Filter		
☐ Delaware Sand Filter		
☐ Multi-Chambered Treatment Train (MCTT)		
Higher-rate Biofilters		
☐ Tree-pit-style unit		
☐ Other___________________________		
Higher-rate Media Filters		
☐ Vault-based filtration unit with replaceable cartridges		
☐ Other___________________________		
Hydrodynamic Separator Systems		
☐ Swirl Concentrator		
☐ Cyclone Separator		
Trash Racks		
☐ Catch Basin Insert		
☒ Catch Basin Insert w/ Hydrocarbon boom	X	
☐ Other___________________________		

(1) Must be designed per SUSMP "Vegetated Swales" design criteria for water quality treatment credit (p. 65).

For design guidelines and calculations refer to Chapter 4 "Low Impact Development Design Guide" in the SUSMP. Please show all calculations and design sheets for all treatment control BMPs proposed in Attachment D.

PERMEABLE PAVERS ANALYSIS
LILAC HILLS RANCH



LEGEND		
PAVEMENT TYPE	AC	
1	$6.50/sqft	(blue)
2	$5.50/sqft	(orange)
3	$4.50/sqft	(green)
Internal Town Center	$4.50/sqft	(yellow)

* $8.00/sqft for pavers was used on roads without roundabouts (per email from Oldcastle)
$9.00/sqft for pavers was used on roads with roundabouts (assumption)

CREDIT
403.5 (4)

A CEQA LEVEL OF PRELIMINARY DRAINAGE REPORT FOR:

LILAC HILLS RANCH
MASTER TM
TM 5571 RPL-3

San Diego County, California

PREPARED FOR:

Accretive Investments, Inc
12275 El Camino Real, Suite 110
San Diego, Ca 92130

PREPARED BY:

Landmark Consulting
9555 Genesee Ave. Ste. 200
San Diego, Ca 92121
858-587-8070

Rev. Date: 5-3-13

DAVID YEH, RCE 62717, EXP 6-30-14

SUMMARY

PEAK DISCHARGE RATE (unmitigated)

DIS-CHARGE POINT	PRE-DEVELOPMENT CONDITIONS						DIS-CHARGE POINT	POST-DEVELOPMENT CONDITIONS						PROPOSED MITIGATION (for velocity only)
	C	Tc	I	A	V	Q		C	Tc	I	A	V	Q	
Node 150	0.36	34.18	2.67	617.5	2.93	530.84	Node 1131	0.36	21.48	3.6	598	2.4	933.0	Discharge into existing natural channel, no increase in velocity, no mitigation required
Node 2 23	0.30	25.47	3.23	520.30	15.2	526.19	Node 248	0.35	16.58	4.2	509.3	9.1	789.4	Discharge into existing natural channel, no increase in velocity, no mitigation required
Node 313	0.30	35.07	2.74	238.30	5.15	193.65	Node 327	0.30*	37.1	2.5	242.3	29.9	242.1	Riprap will be placed at discharge point

- From immediate upstream tributary area.

RUNOFF VOLUME

	BASIN 100	BASIN 200	BASIN 300
PRE-DEV (Ac-Ft)	320.2	267.3	123
POST-DEV(Ac-Ft)	345.3	249.4	132.9
REQUIRED DETENTION VOL(Ac-Ft)	25.1	-17.9	9.9

Riprap will be placed at all internal discharge points, downstream from proposed pipes and ditches, etc. the sizing of riprap will be determined during final engineering.

The proposed detention pond for each sub-basin is adequately size to store all the excessive runoff volume. Their outlet structures will restrict the peak runoff rate exiting these ponds at or below that of under the pre-development conditions. Based on the proposed mitigation facilities – detention ponds in the volume of 26.0Ac-ft, 2.77 Ac-ft (for hydromodification mitigation only), and 10.0Ac-ft for Sub-basins 100, 200 and 300, respectively. The proposed development will not adversely affect the downstream drainage facilities.

CREDIT
403.5 (4)

A CEQA LEVEL OF PRELIMINARY DRAINAGE REPORT FOR:

LILAC HILLS RANCH IMPLEMENTING TM TM 5572 RPL-3

San Diego County, California

PREPARED FOR:

Accretive Capital Partners, LLC
3655 Nobel Drive, Suite 650
San Diego, Ca 92122

PREPARED BY:

Landmark Consulting
9555 Genesee Ave. Ste. 200
San Diego, Ca 92121
858-587-8070
Rev. date: 5-3-13

David Yeh, RCE 62717, EXP 6-30-14

SUMMARY

PEAK DISCHARGE RATE

DIS-CHARGE POINT	PRE-DEVELOPMENT CONDITIONS						DIS-CHARGE POINT	POST-DEVELOPMENT CONDITIONS						PROPOSED MITIGATION
	C	Tc (Min)	I (in)	A (Ac)	V (fps)	Q (cfs)		C	Tc (Min)	I (in)	A (Ac)	V (fps)	Q (cfs)	
Node 118	0.30	27.8	3.04	395.5	7.3	384.7	Node 1132	0.30	19.5	4.5	391	7.5*	482.9*	Runoff is directed into a proposed detention with a restricted outlet structure such that the discharge from the detention basin is at or less than that of the pre-development conditions.

*unmitigated velocity and runoff rate

RUNOFF VOLUME

	BASIN 100
PRE-DEV (Ac-Ft)	141.1
POST-DEV(Ac-Ft)	150.5
DETENTION VOL(Ac-Ft)	9.4
DESIGN VOL (Ac-Ft)	12.5

The proposed detention pond for each sub-basin is adequately size to store all the excessive runoff volume. Their outlet structures will restrict the peak runoff rate exiting these ponds at or below that of under the pre-development conditions. Based on the minimum volume requirement –a detention pond in the volume of 12.5 Ac-Ft is proposed for the development. The proposed detention basin has adequate storage volume to hold the entire excess runoff from the proposed development, the outlet structure will be designed to release no more than 78 cfs to from the detention basin such that the total peak discharge from the entire project site at the final discharge point is less than that of the pre-development conditions. The proposed development will not adversely affect the downstream drainage facilities.

CREDIT
403.5 (6)

Major Stormwater Management Plan
(Major SWMP)
For
LILAC HILLS RANCH-IMPLEMENTING TM
TM – 5572 RPL-3
Valley Center, San Diego County, California

Preparation/Revision Date: 5-3-13

Prepared for:

Accretive Investments, Inc.
12275 El Camino Real, Suite 110
San Diego, Ca 92130

Prepared by:

Landmark Consulting
9555 Genesee Ave. Ste. 200
San Diego, Ca 92121
858-587-8070

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan have been prepared under the direction of the following Registered Civil Engineer and meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments.

David Yeh, RCE 62717, Exp 6-30- 14 ________________________

5-3-13 ____________
Date

➢ Indicate the treatment facility(s) chosen for this project in the following table.

TABLE 11: GROUPS OF POLLUTANTS and relative effectiveness of treatment facilities

Pollutants of Concern	**Bioretention Facilities (LID)**	**Settling Basins (Dry Ponds)**	Wet Ponds and Constructed Wetlands	**Infiltration Facilities or Practices (LID)**	Media Filters	Higher-rate biofilters*	Higher-rate media filters*	Trash Racks & Hydro -dynamic Devices	Vegetated Swales
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Pollutants that tend to associate with fine particles during treatment	**High**	**High**	High	**High**	High	Medium	Medium	Low	Medium
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Settling Basins (Dry Ponds)		
☒ Extended/dry detention basin with grass/vegetated lining	X	X
☐ Extended/dry detention basin with impervious lining		
Infiltration Devices (LID)		
☐ Infiltration basin		
☐ Infiltration trench		
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Higher-rate Media Filters		
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Hydrodynamic Separator Systems		
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☐ Cyclone Separator		
Trash Racks		
☐ Catch Basin Insert		
☒ Catch Basin Insert w/ Hydrocarbon boom	X	
☐ Other___________________________		

(1) Must be designed per SUSMP "Vegetated Swales" design criteria for water quality treatment credit (p. 65).

For design guidelines and calculations refer to Chapter 4 "Low Impact Development Design Guide" in the SUSMP. Please show all calculations and design sheets for all treatment control BMPs proposed in Attachment D.

Create a Construction Plan SWMP Checklist for your project.

Instructions on how to fill out table

1. Number and list each measure or BMP you have specified in your SWMP in Columns 1 and Maintenance Category in Column 3 of the table. Leave Column 2 blank.

2. When you submit construction plans, duplicate the table (by photocopy or electronically). Now fill in Column 2, identifying the plan sheets where the BMPs are shown. List all plan sheets on which the BMP appears. This table must be shown on the front sheet of the grading and improvement plans.

Stormwater Treatment Control and LID BMP's			
Description / Type	Sheet	Maintenance Category	Revisions
Bioretention Area, permeable pavers*		1	
Detention Basins w/filtration underlayment		3	
Catch basin fossil filter inserts		2	

- Permeable pavers are proposed as an option to add another component to the storm water treatment train and to reduce or eliminate the required detention basins.