Appendix E.3 LID Report

kpff Consulting Engineers

PRELIMINARY
CITY OF LA
LOW IMPACT DEVELOPMENT
(LID)

HARVARD-WESTLAKE SCHOOL
PARKING STRUCTURE
3700 Coldwater Canyon Ave.
North Hollywood, CA 91604
KPFF Job # 109046

August 12, 2013

CLIENT:

Innovative Design Group
17848 Sky Park Circle, Suite
Irvine, CA 92614

PREPARED BY:

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Los Angeles, California 90045
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REFERENCES

Development Best Management Practices Handbook, 4th Edition (Tentative). City of Los Angeles Public Works, May 2012.

Los Angeles County Standard Urban Storm Water Mitigation Plan. Los Angeles County Department of Public Works, September 2002.

I. INTRODUCTION

A. Project Description

The project consists of the design and construction of a new parking structure for Harvard-Westlake School at 3700 Coldwater Canyon, in North Hollywood. The new parking structure will be on the west side of Coldwater Canyon and will be connected to the main campus via a pedestrian bridge that will span over the roadway. We understand that a new soccer field and small facilities building will be included on the top level of the parking structure.

City of LA B-permit will be required to improve approximately 1,300-lf of Coldwater Canyon along the project frontage. B-permit work will include street widening for new turn lanes, relocation of an existing signal and access road, and new driveways for the proposed parking structure.

The project includes reconfiguration of the existing main campus entrance on the east side of Coldwater as required to accommodate the pedestrian bridge access tower and reconfigured entrance road.

B. Drainage Characteristics

The drainage area of the project site is approximately 3.6 acre. The area is on a fairly sloped ground. The area is sloping from south west toward the northeast direction. The drainage area is composed of driveways, small building facilities and dirt. The existing run off is draining towards north east direction to Coldwater Canyon Avenue.

With the construction of the underground parking structure, new soccer field construction and small facilities building, the proposed drainage system of the area is described as follows:

1) The surface runoff from will be collected at multiple points through catch basins with flow guard filter insert and discharged to the bio-swale and flow-through planter box. Bio-swale and flow-through planters are designed to treat storm water for the first 0.75 inches of rainfall. The storm water passes through the grass mix at the top with plant sustaining soil at the top and granular soil at the bottom layer. 4” perforated pipe runs at the bottom to collect the infiltrated water. The sides and bottom of the grassy swale is protected with impermeable membrane to avoid any infiltration to the ground water. The treated storm water will be day lighted to the street through 4” curb drain.

Pollutants of concern include trash and dried leaves, twigs from the trees and shrubs, silt, pesticides and fertilizers in the planter areas.

C. Peak Mitigate Discharge Values

The peak mitigated discharge value (Q_{PM}) has been calculated to be 0.59 cfs or an equivalent volume of 8115 cf. The value was determined using the Los Angeles County

Department of Public Works method for calculating standard urban stormwater mitigation plan flow rates and volumes based on 0.75-inches of rainfall.

Input parameters and calculations are shown in Appendix A.

II. BEST MANAGEMENT PRACTICES (BMPs)

The following is a list of all BMP's to be implemented onsite:

A. Structural BMPs

1. Kristar FloGard Plus Catch Basin Filter Inserts

Kristar Catch Basin Filter Inserts, LA City research reference RR#5591 and LA City approval reference RR#5584, by KriStar Enterprises, Inc., which will be installed in both catch basins, are being proposed as structural BMPs for the removal of silt and debris in storm water runoff. The filter inserts have been selected to accommodate, up to and including, the 85th percentile storm event. See appendix "A" for calculations. See Appendix "B" for additional information including details and flow capacities.

2. Bio-swale

In addition to the catch basin filter insert, a bio-swale is being proposed as structural BMPs for the removal of silt and debris in storm water runoff. The bio-swale has been designed to accommodate, up to and including, the 85th percentile storm event. See Exhibits and Calculations for details.

3. Flow-through Planter Box

In addition to the catch basin filter insert, a flow-through planter box is being proposed as a structural BMP for the removal of silt and debris in storm water runoff. The flow-through planter has been designed to accommodate, up to and including, the 85th percentile storm event. See Exhibits and Calculations for details.

B. Non-structural BMPs

1. **Open Paved Areas and Planter Areas**

   a. Regular sweeping of all open and planter areas, at a minimum, on a weekly basis in order to prevent dispersal of pollutants that may collect on those surfaces.

   b. Regular pruning of the trees and shrubs in the planter areas to avoid formation of dried leaves and twigs, which are normally blown by the wind during windy days. These dried leaves are likely to clog the surface inlets of the drainage system when rain comes, which would result to flooding of the surrounding area due to reduced flow capacities of the inlets.

c. Trash and recycling containers shall be used such that, if they are to be located outside or apart from the principal structure, are fully enclosed and watertight in order to prevent contact of storm water with waste matter, which can be a potential source of bacteria and other pollutants in runoff. These containers shall be emptied and the wastes disposed of properly on a regular basis.

2. Education and Training

The owners shall be made aware of the structural BMPs installed in the project. Information materials, such as brochures, shall also be provided for their complete information. They shall also be briefed about chemical management and proper methods of handling and disposal of wastes and should understand the on-site BMPs and their maintenance requirements.

3. Landscaping

Minimize the use of pesticides and fertilizers to the maximum extent practical.

4. Monitoring and Maintenance

a. All BMPs shall be operated, monitored, and maintained for the life of the project and at a minimum, all structural BMPs shall be inspected, cleaned-out, and where necessary, repaired, at the following minimum frequencies: 1) prior to October 15th each year; 2) during each month between October 15th and April 15th of each year and, 3) at least twice during the dry season (between April 16 and October 14 of every year).

b. Maintenance procedures and recommendations outlined by KriStar Enterprises, Inc. shall be followed by the owner to ensure proper performance of the filter insert.

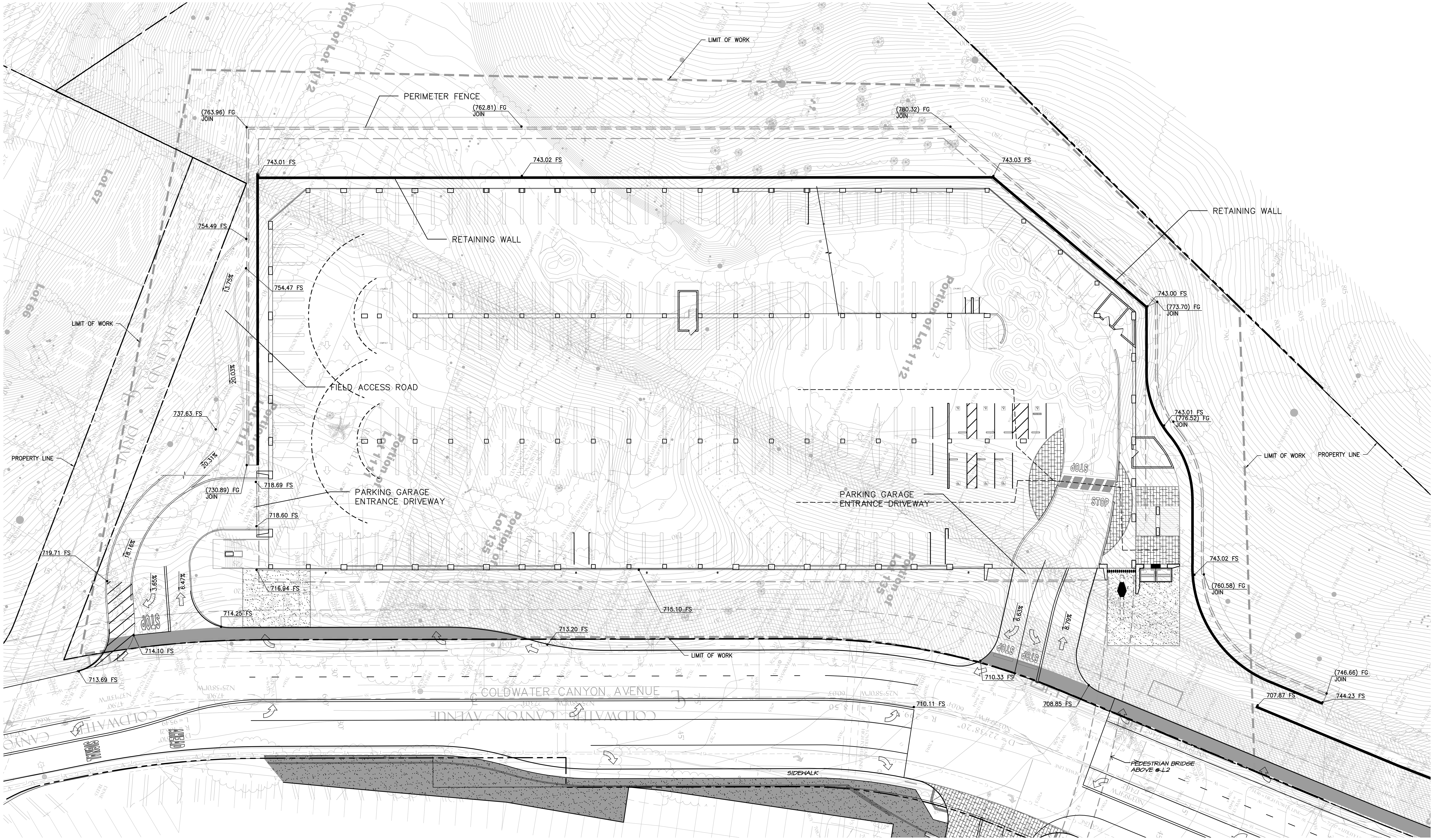
c. Debris and other water pollutants removed from structural BMPs during cleanout shall be contained and disposed of in a proper manner.

d. The drainage system and the associated structures and BMPs shall be maintained according to manufacturer's specification to ensure maximum pollutant removal efficiencies.

EXHIBITS

EXHIBIT 1 GRADING AND DRAINAGE PLAN

EXHIBIT 2 LID EXHIBIT



ESTIMATED EARTHWORK QUANTITIES:	
TOTAL ESTIMATED EARTHWORK	– NET CUT: 143,000 CUBIC YARDS

PLAN
SCALE: 1" = 20'-0"
0 10' 20' 40'
GRAPHIC SCALE

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CONSULTANTS:

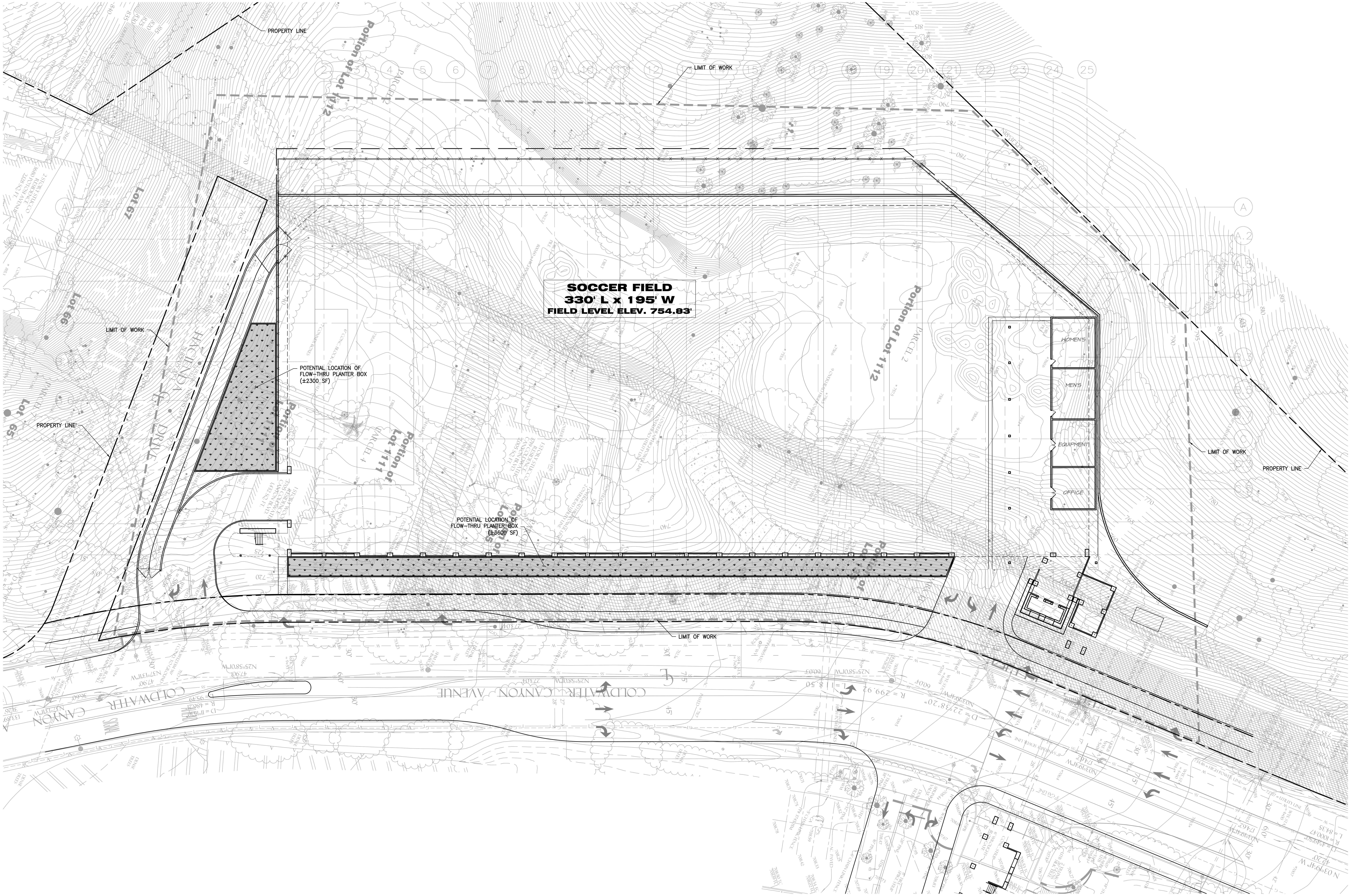
DATE	△	ISSUED FOR:

Date: 08-12-13
Project Number: 109046
Drawn By: ID
Checked By: DC
Scale: AS SPECIFIED

PRELIMINARY GRADING EXHIBIT

SHEET:

EXH-1



PLAN
SCALE: 1" = 20'-0"
0 10' 20' 40'
GRAPHIC SCALE

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PRELIMINARY LID EXHIBIT

SHEET:

EXH-2

APPENDIX A

LID Calculations

Vegetated Swale Design

Note:

Red values to be changed by user.
Black values are automatically calculated.

[1]	Total Area (SF)		44675
[2]	Impervious Area (SF)		44675
[3]	Pervious Area (SF)	**[1]-[2] =**	0
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	40208
[5]	V_{design} (CF)	**1.5*0.0625*[4] =**	3769
[6]	Swale Base Width (ft)	**(Must be 2 to 10)**	7.0
[7]	Swale Length per Acre of Catchment Area (ft/AC)	**(Uses Table 1)**	370
[8]	**Min. Total Swale Length (ft)**	**MIN(100,[4]*(1/43560)*[7]) =**	**342**
[9]	Swale Longitudinal Slope (%)	**(Must be 1% to 6%)**	2.0%
[10]	**Max. Distance Between Check Dams (ft)**	**(Uses Table 2)**	**50**

NOTE: "Swales shall be designed with a trapezoidal channel shape with side slopes of 3:1 (H:V). They shall incorporate at least two feet of soil beneath the vegetated surface."
"Max ponding/flow depth = 5 in."

Source: LID Handbook, City of LA (June 2011)

Table 1

Base of Swale (ft)	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Minimum Swale Length per Acre Catchment Area (ft/AC)	**770**	**635**	**535**	**470**	**415**	**370**	**335**	**305**	**285**

Table 2

Slope (%)	**1**	**2**	**3**	**4**	**5**	**6**
Distance Between Check Dams (ft)	**100**	**50**	**33**	**25**	**20**	**17**

Planter Sizing

Note:

Red values to be changed by user.
Black values are automatically calculated.

[1]	Total Area (SF)		44675
[2]	Impervious Area (SF)		44675
[3]	Pervious Area (SF)	**[1]-[2] =**	0
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	40208
[5]	V_{design} (CF)	**1.5*0.0625*[4] =**	3769
[6]	$K_{sat,media}$ (in/hr)		5.0
[7]	FS		2.0
[8]	$K_{sat,design}$ (in/hr)	**[6]/[7] =**	2.5
[9]	d_{p_max}, Max. Ponding Depth (ft)	**MIN(1, [8]*48/12) =**	1.0
[10]	d_p, Ponding Depth (ft)		1.0
[10]	T_{fill} (hr)		3
[11]	**A_{min} (sq. ft)**	**[5]/([8]*[11]/12 + [10])**	**2320**

NOTE: "The calculated BMP surface area only considers the surface area of the BMP where infiltration through amended media can occur. The total footprint of the BMP should include a buffer for sideslopes and freeboard."

Source: LID Handbook, City of LA (June 2011)

APPENDIX B

Operation and Maintenance Plan

Operation and Maintenance Plan

a. All BMPs will be operated, monitored, and maintained for the life of the project and at a minimum, all structural BMPs shall be inspected, cleaned-out, and where necessary, repaired, at the following minimum frequencies: 1) prior to October 15th each year; 2) during each month between October 15th and April 15th of each year and, 3) at least twice during the dry season (between April 16 and October 14 of every year).

b. Debris and other water pollutants removed from structural BMPs during cleanout will be contained and disposed of in a proper manner.

Specific Operation and Maintenance Plan for Bio-Swale

-The typical Operation and Maintenance Plan for Bio-Filtration System is given below:

S.N.	Activity	Schedule
1	Mow grass to maintain a height of 3-6 inches.	As needed (frequently/seasonally)
2	Remove sediment buildup in the bottom of the swale once it has accumulated to 25% of the original design volume.	As needed (Infrequently)
3	Inspect grass along side slopes for erosion and formation of rills or gullies and correct.	Annually (Semi-annually for the first year.)
4	Remove trash and debris accumulated in the channel.	
5	Based on the inspection, plant alternative grass species if the original grass cover has not been successfully established.	

- Keep a log of all inspections and maintenance performed on the bio-filtration system. Keep this log on-site.

Specific Operation and Maintenance Plan for Flow-Through Planter

The inspection and maintenance program will include the following key components:
Filtration planters remove stormwater pollutants through a combination of overland flow through vegetation,
surface detention, and filtration through soil. Frequent inspection and maintenance is required until
vegetation becomes established. Thereafter, routine maintenance requirements are considered minimal.
Typical routine maintenance consists of the following:

a. Inspect soil and plantings. Remove weeds, prune vegetation and replenish mulch as needed.
Clear any obstructions and remove any accumulation of sediment.
b. Inspect side slopes for evidence of instability or erosion and correct as necessary.

c. Observe soil at the bottom of the ponding area for uniform percolation throughout. If portions of the area do not drain within 48 hours after the end of a storm, the soil should be tilled and replanted. Remove any debris or accumulated sediment.
d. Examine the vegetation to insure that it is healthy and dense enough to provide filtering and to protect soils from erosion. Confirm that irrigation is adequate and not excessive. Replace dead plants and remove invasive vegetation.
e. Abate any potential vectors by filling holes in the surface and around the ponding area. If mosquito larvae are present and persistent, contact the County 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.

Specific Operation and Maintenance Plan for Catch Basin Filter Inserts

-See Attached.

APPENDIX C

Storm Drain Stenciling and Signage

Sample Stencil 1