

Drought Response Outreach for Schools (DROPS)

LID Sizing Steps

1. Determine Tool Input
 - a. Design storm depth
 - i. Download Basin Sizer: <http://svctenvims.dot.ca.gov/wgpt/basinsizer.aspx>
 - ii. Select “Other” tab and zoom to school location (see Figure 1)
 - iii. Select nearest rain gauge and record design storm depth(see Figure 2)
 - b. Soil hydraulic conductivity (infiltration rate)
 - i. Use field data if available, or
 - ii. Check with municipality for local soil survey, or
 - iii. Use NRCS data (available in LID Sizing Tool – steps are provided below)
 - c. Impervious Area
 - i. Measure in field, or
 - ii. Measure using LID Sizing Tool (steps are provided below)
2. Enter Input (see Figure 3)
 - a. Go to LID Sizing Tool website: <http://owp-web1.saclink.csus.edu/LIDTool/Start.aspx>
 - b. Select climate station (see Figure 4)
 - i. Zoom to school location and select nearest climate station
 - ii. (Don’t worry too much about this – you will override the default results in a future step using the design storm depth from Step 1).
 - c. Input soil conductivity (see Figure 5)
 - i. Enter value from Step 1, or
 - ii. Using LID Sizing Tool, zoom to school location and read off soil type
 - d. Click “Submit” (see Figure 5)
3. Review the Areas Provided in the Table
 - a. Skip “Site Design Measures” page – click next (see Figure 6)
 - b. Override default design storm depth below table with depth determined from Step 1 (see Figure 7). Click “Submit”
 - c. Read areas from “Design Storm” column (ignore other columns, see Figure 7)
4. Choose an LID BMP
 - a. Click on area value under “Design Storm” column to review details on BMP of interest (see Figure 7)
 - b. Review LID BMP details (see Figure 8)
5. Evaluate feasibility
 - a. Some questions include:
 - i. Do I have enough space?
 - ii. Will utilities interfere?
 - iii. Is the topography appropriate?
 - iv. Do I have enough groundwater clearance?
 - v. Can I commit to the maintenance?
 - b. Tool provides some helpful resources for further evaluations (see Figure 9)

Drought Response Outreach for Schools (DROPS) LID Sizing Steps

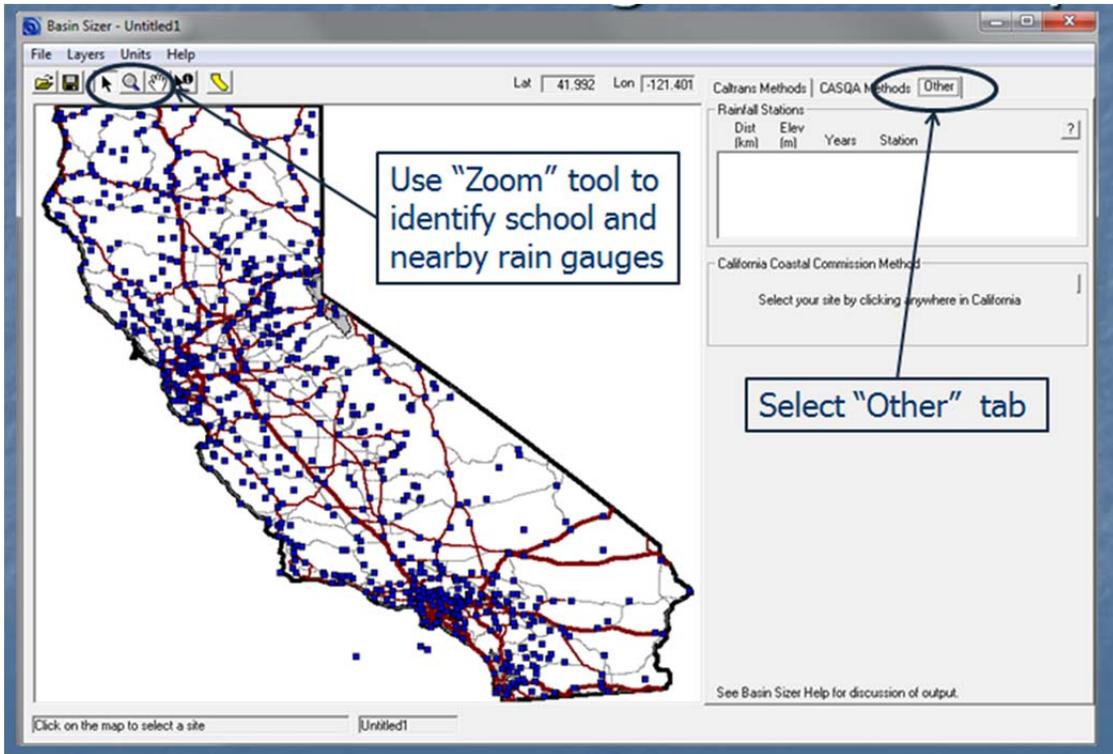


Figure 1. Basin Sizer – Select "Other" Tab and Zoom to School Location

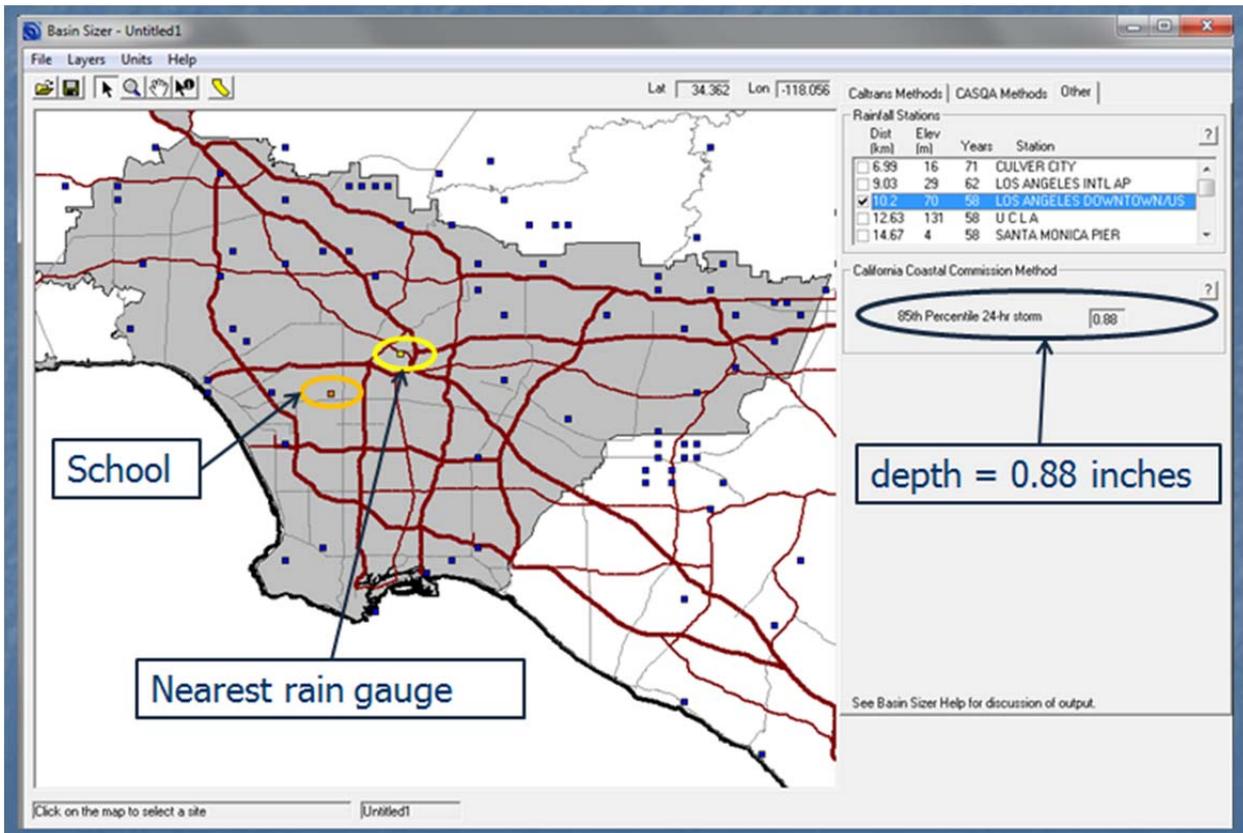


Figure 2. Basin Sizer – Select Nearest Rain Gauge and Record Design Storm Depth

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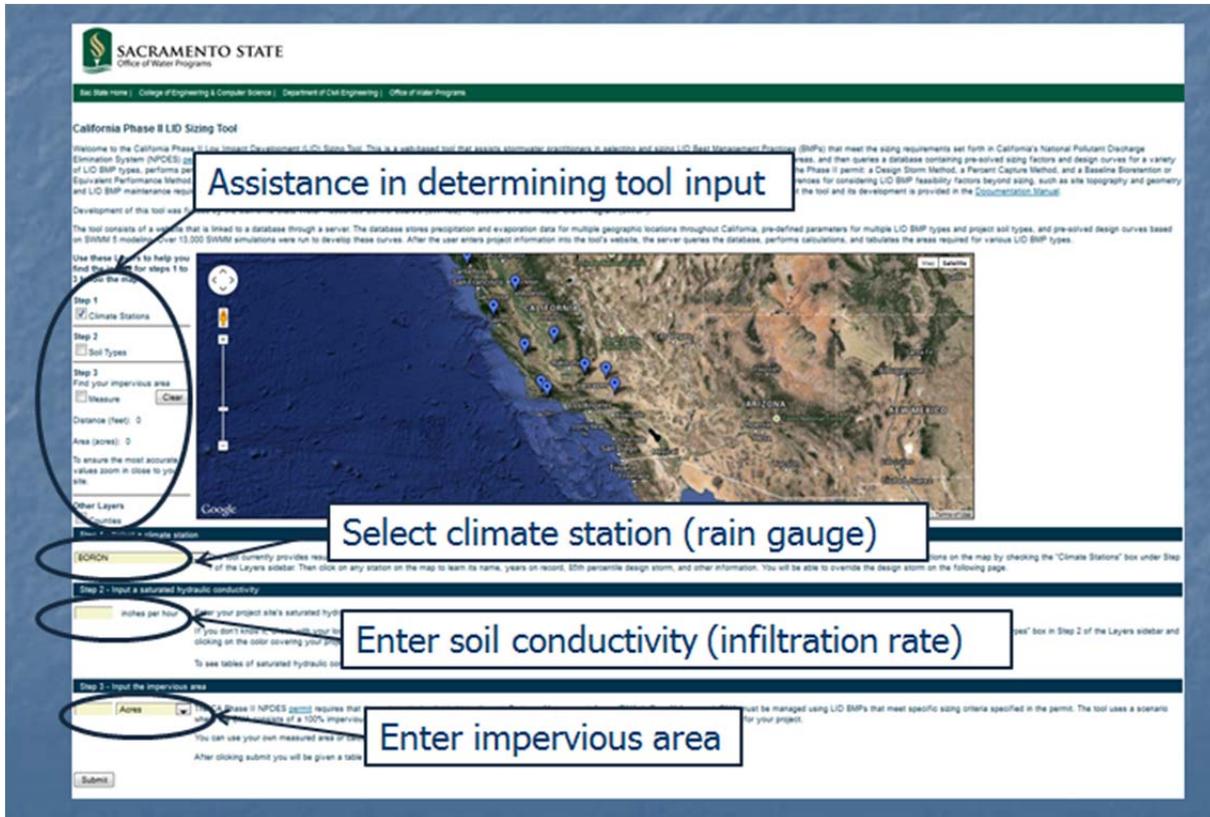


Figure 3. LID Sizing Tool – Enter Input

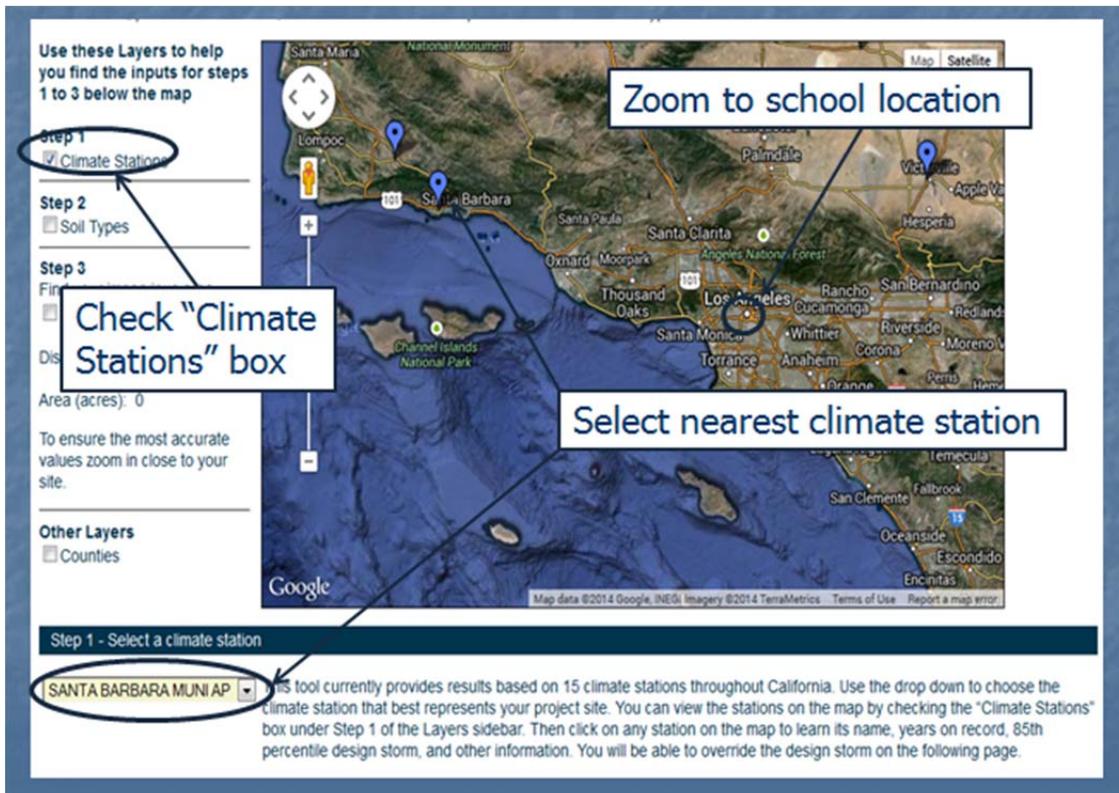


Figure 4. LID Sizing Tool – Zoom to School Location and Select Climate Station

Drought Response Outreach for Schools (DROPS) LID Sizing Steps

Use these Layers to help you find the inputs for steps 1 to 3 below the map

Step 1
 Climate Stations

Step 2
 Soil Types

Step 3
Find your impervious area
 Measure

Distance (feet): 0

Area (acres): 0

To ensure values zoom in close to your site.

Other Layers
 Counties

Step 1 - Select a climate station

SANTA BARBARA MUNI AP

This tool currently provides results based on 15 climate stations throughout California. Use the drop down to choose the climate station that best represents your project site. You can view the stations on the map by checking the "Climate Stations" box under Step 1 of the Layers sidebar. Then click on any station on the map to learn its name, years on record, 85th percentile design storm, and other information. You will be able to override the design storm on the following page.

Step 2 - Input a saturated hydraulic conductivity

0.03 inches per hour

Enter your project site's saturated hydraulic conductivity.

If you don't know it, check with your local regulator to see if it is acceptable to use estimates from the USDA NRCS group on the map above by checking the "Soil Types" box in Step 2 of the Layers sidebar and clicking on the color.

To see tables of saturated hydraulic conductivities for soil groups and textures click here

These tables provide infiltration rates commonly affiliated with different soil hydrologic groups and soil textures.

Soil Hydrologic Group	Typical Saturated Hydraulic Conductivity (in/hr)	Saturated Hydraulic Conductivity Range (in/hr)	Soil Texture	Typical Saturated Hydraulic Conductivity (in/hr)
A	1.5	5.67 - 1.42	Sand	4.74
B	1	1.42 - 0.57	Loamy Sand	1.18
C	0.32	0.57 - 0.06	Sandy Loam	0.43
D	0.03	0.06 - 0.01	Silt Loam	0.26
USDA NRCS 2002				
			Loam	0.13
			Sandy Clay Loam	0.06
			Clay Loam	0.04
			Silty Clay Loam	0.04
			Sandy Clay	0.02
			Silty Clay	0.02
			Clay	0.01

Figure 5. LID Sizing Tool – Zoom to School Location and Enter Soil Conductivity

Use these Layers to help you find the inputs for steps 1 to 3 below the map

Step 1
 Climate Stations

Step 2
 Soil Types

Step 3
Find your impervious area
 Measure

Distance (feet): 271.08

Area (acres): 0.14

To ensure values zoom in close to your site.

Other Layers
 Counties

Step 1 - Select a climate station

SANTA BARBARA MUNI AP

This tool currently provides results based on 15 climate stations throughout California. Use the drop down to choose the climate station that best represents your project site. You can view the stations on the map by checking the "Climate Stations" box under Step 1 of the Layers sidebar. Then click on any station on the map to learn its name, years on record, 85th percentile design storm, and other information. You will be able to override the design storm on the following page.

Step 2 - Input a saturated hydraulic conductivity

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Enter your project site's saturated hydraulic conductivity.

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Step 3 - Find your impervious area

6,100 Square Feet

The California Phase II NPDES permit requires that the project site be divided into discrete Drainage Management Areas (DMAs). Runoff from each DMA must be managed using LID BMPs that meet specific sizing criteria specified in the permit. The tool uses a scenario where the DMA consists of a 100% impervious catchment draining to a LID BMP. Input the size of the impervious catchment of the DMA of interest for your project.

You can use your local regulator to determine the size of the impervious area.

Submit

Figure 5. LID Sizing Tool – Zoom to School Location and Enter Impervious Area

Drought Response Outreach for Schools (DROPS) LID Sizing Steps

California Phase II LID Sizing Tool - Site Design Measures

Climate station	SANTA BARBARA MUNI AP
Saturated hydraulic conductivity	0.03 in/hr
Impervious area	6100 square feet

Site Design Measures (SDMs) must first be implemented to the extent technically feasible before implementing Storm Water Treatment Measures (SWTMs). SDMs must be sized using the 85th percentile, 24-hour storm, or an other design storm as adopted by local regulators.

Site Design Measures	
LID BMP Types	Permit Compliant LID BMP Areas (square feet)
	Design Storm 0.96 inches ¹
Porous Pavement	3627
Strip, Amended 6"	6219
Strip, Amended 12"	1979
Strip, Amended 18"	1176
Swale, Amended 6" ²	6219
Swale, Amended 12" ²	1979
Swale, Amended 18" ²	1176
Capture and Use Storage ³	447 cf

¹ Complies with Phase II permit design storm sizing criteria (Section E.12.e.ii.c.1.a)
² For design storm and simple sizing methods, values only represent invert areas of the swale with invert width of 1 ft (side slopes are excluded). For percent capture and baseline bioretention or equivalent capture methods, values are for the length of swale having invert width of 1 ft and 3:1 (H:V) side slopes.
³ Value is a volume: cubic feet

Select a design storm depth in inches (The 85th percentile design storm for this location is: 0.96 in)

IMPLEMENT SWTMs Skip this page - click "Next".

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Figure 6. LID Sizing Tool – Skip Site Design Measures Page

Storm Water Treatment Measures

LID BMP Types	Permit Compliant LID BMP Areas (square feet)			
	Design Storm 0.88 inches ^{1, 4}	Percent Capture ²	Baseline Bioretention or Equivalent	Central Coast Simple Method
Bioretention Cell - 18" Soil - 12" Gravel Storage	325			
Bioretention Cell - 18" Soil - 24" Gravel Storage	253	425	238	837
Bioretention Cell - 18" Soil - 36" Gravel Storage	207	412	230	409
Bioretention Cell - 24" Soil - 12" Gravel Storage	290	421	234	1442
Bioretention Cell - 24" Soil - 24" Gravel Storage	231	407	228	837
Bioretention Cell - 24" Soil - 36" Gravel Storage	192			
Bioretention Cell - Soil Depth Varies ⁵ - No Gravel Storage	2310			
Infiltration Basin - Vegetated	4275	N/A	N/A	4275
Infiltration Gallery	935	N/A	2087	935
Infiltration Trench	3050	N/A	N/A	3050
Overland Flow no amendment	N/A	N/A	N/A	N/A
Porous Pavement	3150	N/A	3287	3150
Strip, Amended 6"	5205	N/A	3758	5205
Strip, Amended 12"	1780	N/A	2259	1780
Strip, Amended 18"	1059			
Swale, Amended 6" ⁶	5205			
Swale, Amended 12" ⁶	1780	N/A	N/A	1780
Swale, Amended 18" ⁶	1059	N/A	3535	1059
Capture and Use Storage ⁷	409 cf	1910 cf	2170 cf	409 cf

¹ Complies with Phase II permit design storm sizing criteria (Section E.12.e.ii.c.1.a)

Select a design storm depth in inches (The 85th percentile design storm for this location is: 0.96 in)

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Use areas from Design Storm column

LID BMPs (click on an area to see details)

Override default design storm

Figure 7. LID Sizing Tool – Review Area Table

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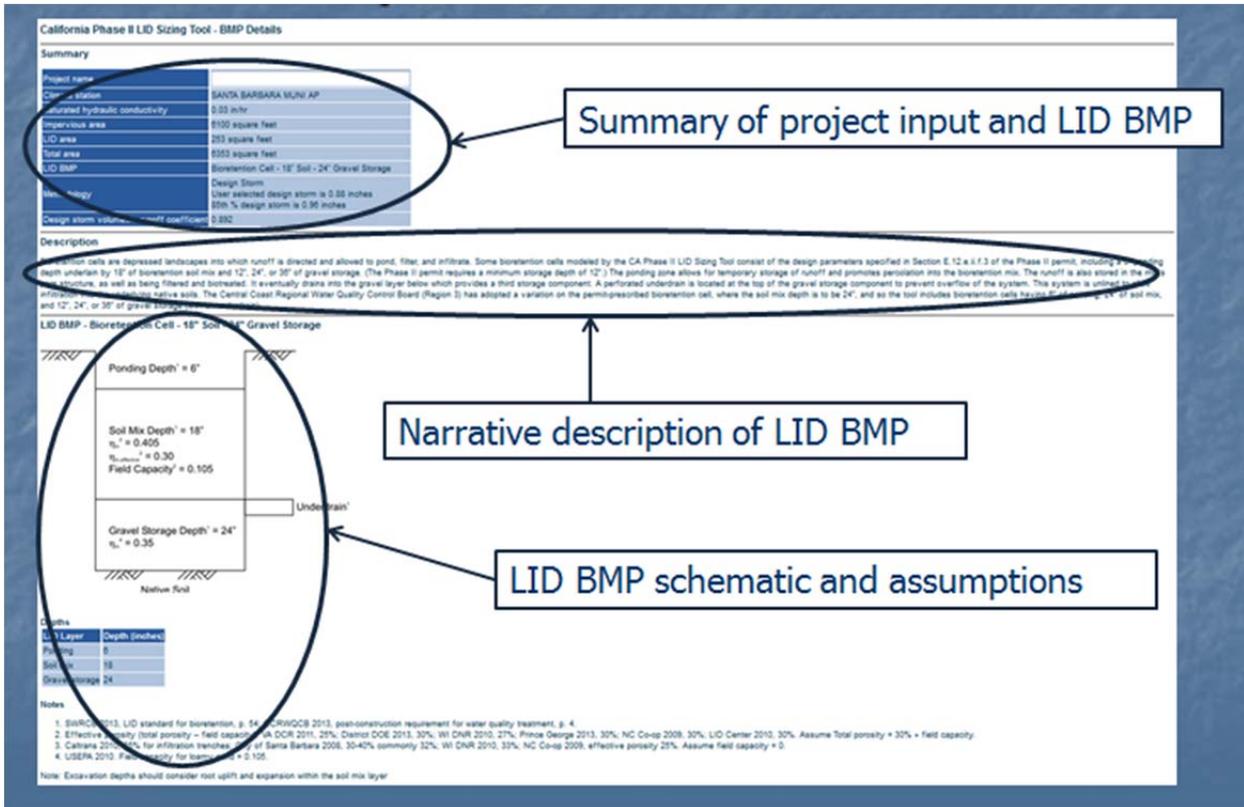


Figure 8. LID Sizing Tool – Review LID BMP Details

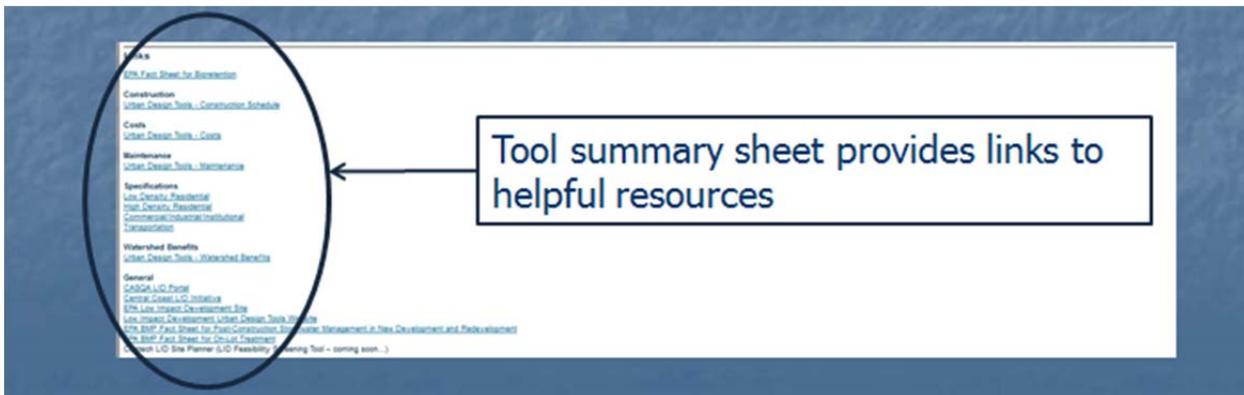


Figure 8. LID Sizing Tool – Evaluate Feasibility