

FACT SHEET- RAIN GARDEN

RAIN GARDEN

Also know as: Bioretention cell, infiltration planter



DESCRIPTION

Rain Gardens function as a soil and plant-based filtration and infiltration feature that remove pollutants through a variety of natural physical, biological, and chemical treatment processes. Rain gardens are usually installed in yards or common open areas to treat storm water from rooftops and parking lots.

ADVANTAGES

- Provides both water quality treatment and volume capture.
- Provides storm water treatment that enhances water quality of downstream water bodies through natural processes.
- Vegetation provides shade and wind breaks, absorbs noise, reduces heat island effects and adds to an area's landscape features.
- Establishes habitat for birds and attracts pollinators like butterflies and bees.

LIMITATIONS

- Most effective if installed flat to promote infiltration.
- Prohibited in areas of known soil and/or groundwater contamination. If soil and/or groundwater contamination is present on the site or within a 100' radius of the proposed location, the North Coast Regional Board review and approval is required.

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- Should not be used in areas of high ground water. A minimum of 2' of clearance needs to be provided between the bottom of the BMP and the seasonal high ground water level. If ground water is less than 2' from the bottom, additional design elements may be necessary (impermeable liner, subdrains, etc).
- Do not use in areas of slope instability where infiltrated storm water may cause failure. Slope stability shall be determined by a licensed Geotechnical Engineer.
- Do not use in locations that can negatively impact building foundation or footings. Location shall be approved by a licensed Geotechnical Engineer.

KEY DESIGN FEATURES

- Native soil shall remain uncompacted to preserve infiltration capacity. Fence off during construction.
- Bottom of rain garden should be unlined to allow infiltration into native soil.
- If present, structural soil shall be installed as described in Reference Document E.
- For rain garden that adjoin pavement or utility trenches, moisture barrier shall be installed to protect road sub-base and any trenches.
- Use plants from the approved plant and tree list included in Appendix M.
- Devise vegetation that is both wet and dry tolerant is required.
- Design to achieve 51% cover.
- Install a designated high flow bypass inlet for storms larger than the design storm. See "Sizing Design" below.
- If required, perforated pipe shall be a minimum of SDR 35 plastic and installed in straight runs.
- Volume below the perforated pipe must be sufficient to hold and infiltrate the design volume.
- Surface ponding depth shall range between 6" and 12".
- Must be designed to prevent extended standing water. All surface water must drain within 72 hours to prevent mosquito breeding.
- Select non-floatable surface mulching material to prevent clogging of downstream inlets.
- Direct downspouts into rain gardens and incorporate splash blocks and/or other dissipation methods to prevent erosion.

SIZING DESIGN- GOAL AND REQUIREMENTS

- The **design goal** for all rain gardens is to capture (infiltration and/or reuse) 100% of the volume of runoff generated by the 85th percentile 24 hour storm event. This is a retention requirement. If 100% volume capture is achieved than no additional treatment is required.
- If the *design goal* is not achievable, then the bioretention area *sizing requirement* is:

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- **Water Quality Treatment** of 100% of the flow generated by the 85th percentile 24 hour storm event, as calculated using the Rational Method and a known intensity of 0.92 inches per hour, **and**
- **Volume Capture** (infiltration and/or reuse) of the increase in volume of storm water due to development generated by the 85th percentile 24 hour storm event. This is a retention requirement.
- All calculations shall be completed using the “Storm Water Calculator” available at www.srcity.org/stormwaterLID.

Inspection and Maintenance Requirements

A maintenance plan shall be provided with the Final SUSMP. The maintenance plan shall include recommended maintenance practices, state the parties responsible for maintenance and upkeep, specify the funding source for ongoing maintenance with provisions for full replacement when necessary and provide site specific inspection checklist.

At a minimum inspection and maintenance shall include the following:

- Inspect twice annually and prior to rain events for blocked or clogged inlets, eroded areas, sedimentation and trash or debris accumulation.
- Obstructions and trash shall be removed and properly disposed of.
- Inspect twice during the rainy season for ponded water.
- If ponded water is observed, the first few inches of topsoil should be removed and replaced. If ponded water is still present, further grading and replacement may be necessary to prevent mosquito breeding.
- Pesticides and fertilizers shall not be used in the rain garden area. Non floatable mulch should be instead.
- Plants should be pruned, weeds pulled and dead plants replaced as needed.
- Observe level and condition of mulch. Add to, re-grade or replace as needed (non-floatable mulch required).
- Confirm slash blocks, or other dissipation method, exist to direct downspouts into rain garden. Readjust location if needed. Replace if necessary.

RAIN GARDEN - CHECKLIST

Rain Garden

Inspection and Maintenance Checklist
(aka: Bioretention Cell, Infiltration Planter)

Date of Inspection: _____
 Inspector(s): _____
 BMP ID #: _____
 Property Owner: _____

Location Description: _____

Type of Inspection: Pre-rainy Season (PRS) Rainy Season (RS) After-rainy Season (ARS)

This Inspection and Maintenance Checklist is to be used in conjunction with its corresponding LID Factsheet and Maintenance Plan. Please review these documents before performing the field inspection.

Inspection Category	When to Inspect	Maintenance Issue	Is the Issue Present?	Require Maintenance	Comments (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)
Drainage	RS	Is there standing or pooling of water in the Rain Garden area after 3 days of dry weather?		<ul style="list-style-type: none"> Check perforated pipe outlet for obstruction or damage. * Flush perforated pipe to remove obstructions/sediment. * Remove and replace the first few inches of topsoil. Remove soil and inspect perforated pipe. Repair or replace perforated pipe, replace with new soil and regrade. 	
	RS	Is there poor drainage during a high intensity storm event?		<ul style="list-style-type: none"> Clean the high flow bypass inlet and pipe. 	
	RS	Is the flow into the Rain Garden even and uniform?		<ul style="list-style-type: none"> Remove any obstruction preventing a uniform flow into the swale. Regrade up slope if necessary. Reposition splash block/dissipater. 	

* If perforated pipe is present.

RAIN GARDEN - CHECKLIST

Inspection Category	When to Inspect	Maintenance Issue	Is the Issue Present?	Require Maintenance	Comments (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)
Erosion	RS ARS	Is there under cutting or washouts around the splash blocks or dissipaters?		<ul style="list-style-type: none"> • Fill in eroded areas and regrade. • Reposition splash block/dissipater. 	
	RS ARS	Is there channelization (gully) forming along the length of the Rain Garden area?		<ul style="list-style-type: none"> • Fill in eroded areas and regrade. 	
	RS ARS	Is there accumulation of sediment (sand, dirt, mud) in the Rain Garden?		<ul style="list-style-type: none"> • Remove sediment and check the grading. Add replacement soil and/or mulch. 	
	PRS RS ARS	Is the mulch unevenly distributed in the Rain Garden area?		<ul style="list-style-type: none"> • Redistribute and add additional mulch if needed. • Regrade planter area. 	
	PRS RS ARS	Are there voids or deep holes present? Is there sediment present in the catch basin and in the overflow pipe?		<ul style="list-style-type: none"> • Check perforated pipe outlet for damage. * 	
	PRS RS ARS	Is there evidence of animal activity such as holes or dirt mounds from digging or borrowing?		<ul style="list-style-type: none"> • Repair and fill in damage areas. • Rodent control activities must be in accordance with applicable laws and do not affect any protected species. 	

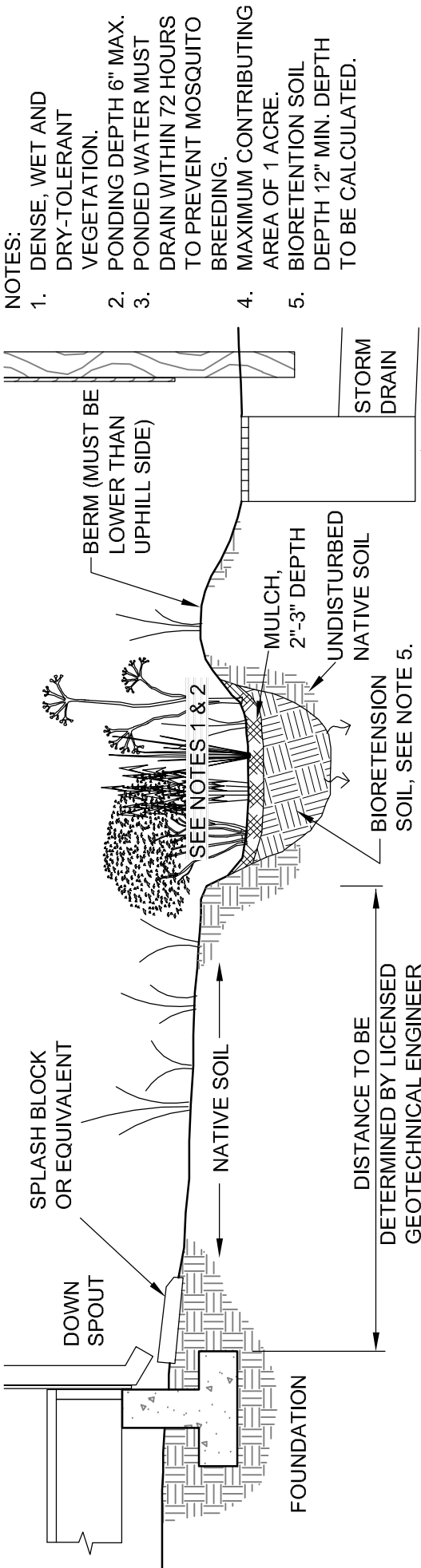
* If perforated pipe is present.

RAIN GARDEN - CHECKLIST

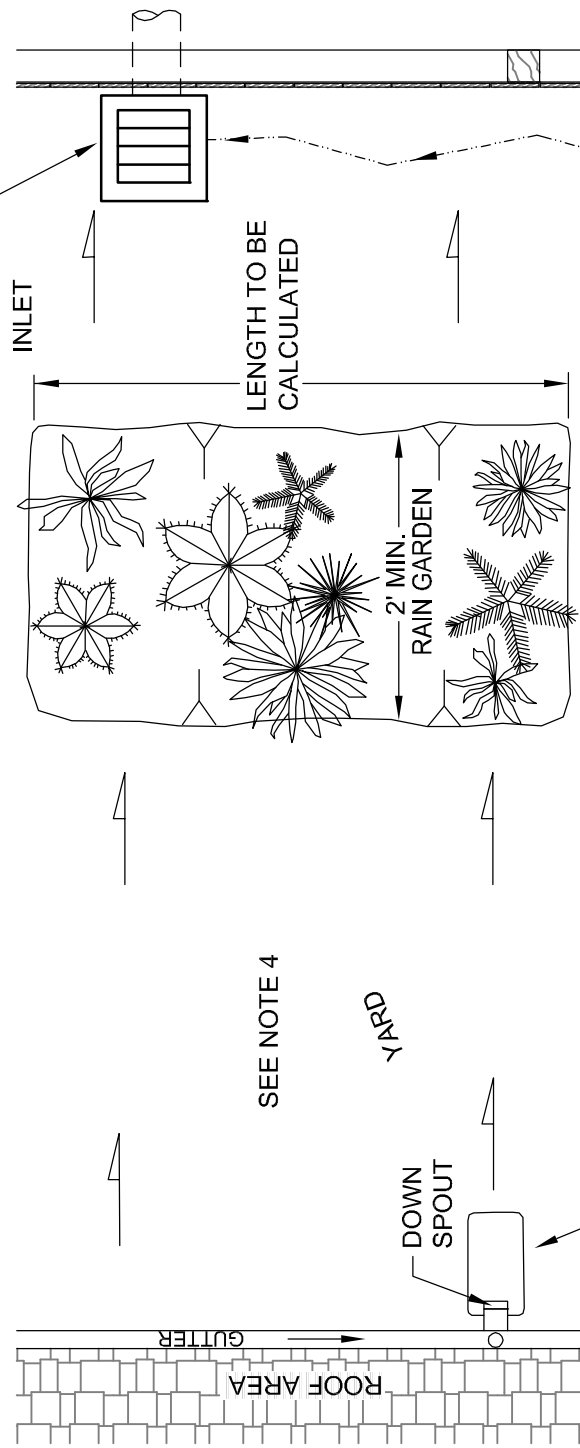
Inspection Category	When to Inspect	Maintenance Issue	Is the Issue Present?	Require Maintenance	Comments (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)
Vegetation	PRS RS ARS	Is the vegetation clogging or diverting the input flow areas?		<ul style="list-style-type: none"> Trim and /or remove the excess vegetation. 	
	PRS RS ARS	Is the mulch evenly distributed throughout the area?		<ul style="list-style-type: none"> Redistribute and add additional mulch if needed. Regrade planter area. 	
	PRS RS ARS	Are there dead or dry plants/weeds? Is the vegetation over grown?		<ul style="list-style-type: none"> Remove dead and/or dry vegetation. Replace as needed. Remove or trim any vegetation that is causing a visual barrier, trip, and/or obstruction hazard. 	

RAIN GARDEN - CHECKLIST

Inspection Category	When to Inspect	Maintenance Issue	Is the Issue Present?	Require Maintenance	Comments (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)
BMP General	PRS RS ARS	Is there debris/trash in the Rain Garden area?		<ul style="list-style-type: none"> Remove all trash and debris. 	
	PRS RS ARS	Is Graffiti present?		<ul style="list-style-type: none"> Remove all graffiti from the area. 	
	PRS RS ARS	Are there missing or disturbed aesthetic features?		<ul style="list-style-type: none"> Replace and/or reposition aesthetic features to original placement. Placement should not disrupt flow characteristics/design. 	
	PRS RS ARS	Is the vegetation irrigation functional?		<ul style="list-style-type: none"> Repaired broken missing spray/drip emitters. Reposition and/or adjust to eliminate over spray and/or over watering. 	
	PRS RS ARS	Are the aesthetic features firmly secured in place?		<ul style="list-style-type: none"> Repair and/or replace loose or damaged features. 	



TYPICAL SECTION



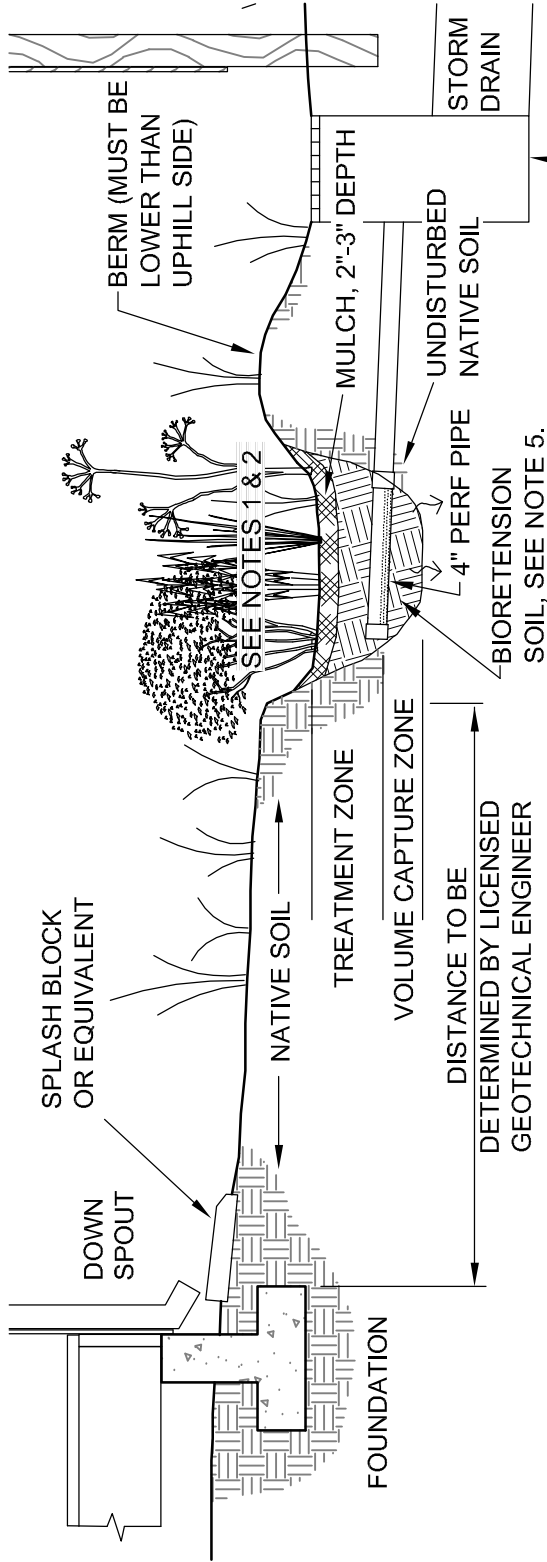
PLAN

- NOTES:
1. DENSE, WET AND DRY-TOLERANT VEGETATION.
 2. PONDING DEPTH 6" MAX.
 3. PONDED WATER MUST DRAIN WITHIN 72 HOURS TO PREVENT MOSQUITO BREEDING.
 4. MAXIMUM CONTRIBUTING AREA OF 1 ACRE.
 5. BIORETENTION SOIL DEPTH 12" MIN. DEPTH TO BE CALCULATED.

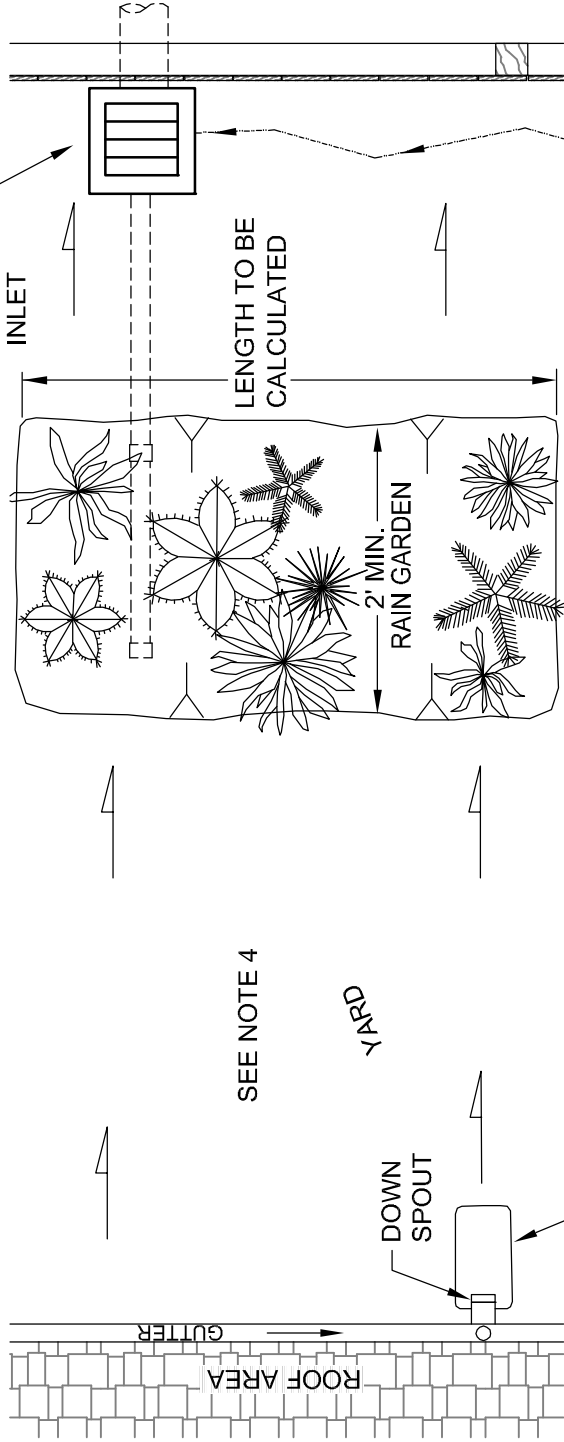
PRIORITY 1
RAIN GARDEN

SCALE: NONE	DATE: 05/10/11
DWN. DIT	SHEET 1 of 1
CHK. HH	P1-01

Not to Scale



TYPICAL SECTION



PLAN

NOTES:

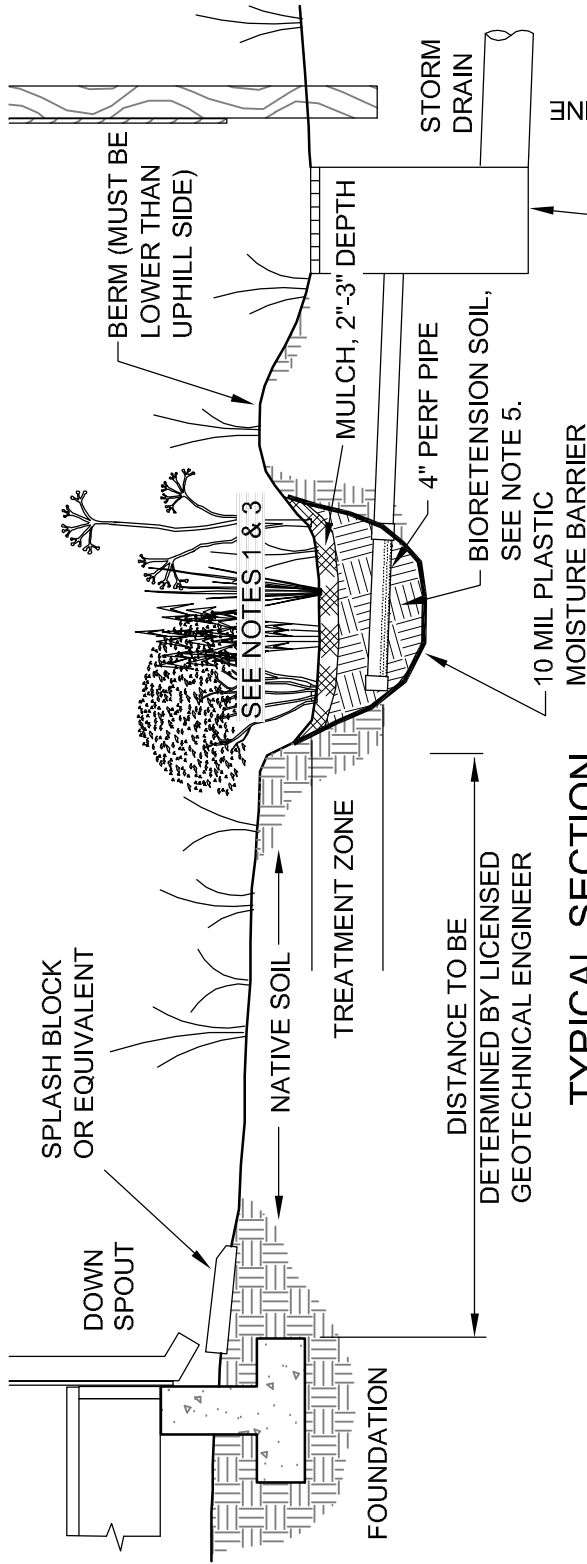
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3. PONDED WATER MUST DRAIN WITHIN 72 HOURS TO PREVENT MOSQUITO BREEDING.
4. MAXIMUM CONTRIBUTING AREA OF 1 ACRE.
5. BIORETENTION SOIL DEPTH 12" MIN. DEPTH TO BE CALCULATED.

P1-01 WITH A PERFORATED UNDER DRAIN

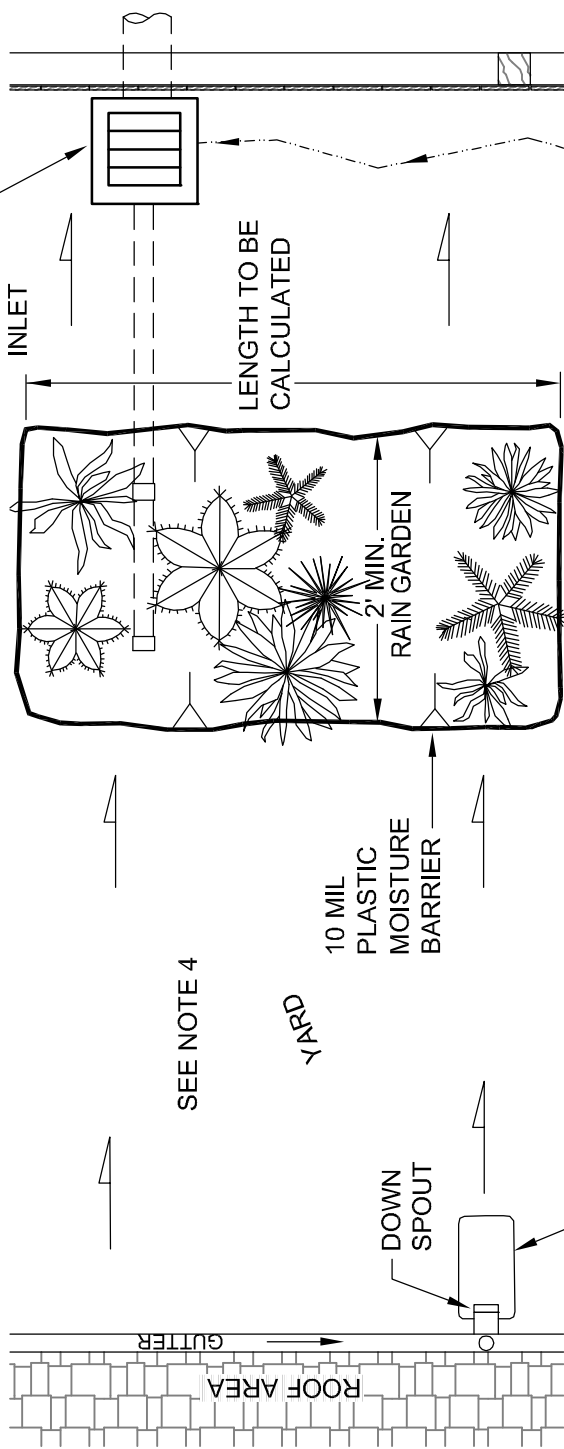
**PRIORITY 2
RAIN GARDEN**

SCALE: NONE	DATE: 05/10/11
DWN. DIT	SHEET 1 of 1
CHK. HH	P2-01

Not to Scale



TYPICAL SECTION



NOTES:

1. DENSE, WET AND DRY-TOLERANT VEGETATION.
2. PONDING DEPTH 6" - 12"
3. PONDING WATER MUST DRAIN WITHIN 72 HOURS TO PREVENT MOSQUITO BREEDING.
4. MAXIMUM CONTRIBUTING AREA OF 1 ACRE.
5. BIORETENTION SOIL DEPTH 12" MIN. DEPTH TO BE CALCULATED.

PLAN

P2-01 WITH A MOISTURE BARRIER, NO INFILTRATION.

Not to Scale

**PRIORITY 3
RAIN GARDEN**

SCALE: NONE DATE: 05/10/11

DWN. DIT
CHK. HH

SHEET 1 of 1

P3-01