

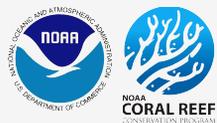


# **Our Islands Our Future**

## **GUIDE TO GREEN BUILDING in the USVI**

**AGENCY STAFF  
Field Guide**

**February 2013**



*Funded by NOAA's Coral Reef  
Conservation Program through NOAA  
Fisheries Caribbean Field Office*

Developed by The FHWGroup. Content  
guided by a steering committee of federal  
and VI agencies and NGOs

This guide is meant to serve as a practice manual demonstrating the concepts detailed in the accompanying classroom module for agency staff. The guide follows the layout of the classroom module, moving through project review, review of best management practices (BMPs), and green landscaping.

The guide, along with the classroom module, is meant to be a training tool for practicing the concepts of green design and construction review in the field or in a classroom setting to familiarize you with how to incorporate these concepts in project review, including recommendations to permit applicants, permit special conditions, and site inspections.

The guide is divided into three sections – [1] project review: incorporating natural resource conservation through green design; [2] project review – construction BMPs; and [2] site inspection. You can review each of the sections in any order based on your interest.



# **Guide to Green Review**

Project Review – *Green  
Design Concepts*



NOAA  
CORAL REEF  
CONSERVATION PROGRAM

# Core Green Design Elements

When reviewing plans submitted as part of permit applications, be sure to look for the following elements i) natural resource protection; ii) water management; and iii) energy optimization.

**Note:** *The structural integrity of the building is a very important element of the design. The content included in this field guide does not focus on structural integrity. As part of project design, conduct the relevant reviews to ensure site plans are appropriate based on soil compaction information and that the soils are suitable for proposed project.*

## Natural Resource Protection



Photo Credit: Gary Ray

*Unstabilized road cut on a steep slope in St. John; will lead to muddy runoff when it rains if exposed soils are not stabilized*

## Water Management



Photo Credit: Hosana Solomon

*Cisterns (one shown above) serve a dual purpose in the VI – they serve as the main potable water source for many and also increase on-site infiltration, reducing stormwater runoff. Appropriate stormwater management measures are also needed to ensure runoff stays on-site.*

## Energy Optimization

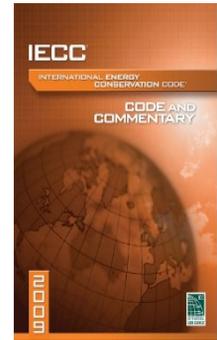


Photo Credit [www.energycodes.gov](http://www.energycodes.gov)

*Ensure basic compliance with the International Energy Conservation Code (IECC)*

This checklist provides the level of detail needed to ensure that submitted plans properly account for natural resource protection during construction. Use this checklist to ensure that site disturbance is minimal when reviewing project plans.

<b>Existing and Proposed Site Features</b> <i>The following site features should be included on the plans, including details as to how disturbance to these features will be avoided and minimized:</i>	YES	NO	N/A
○ Existing and proposed topography and features			
○ Limits of disturbance, size in square feet			
○ Location of existing and proposed roads, curbs, gutters, storm drains, inlets, buildings, and other structures			
○ Location of internal swales, ditches, and other drainage facilities			
○ Flow paths for both existing and proposed topography			
○ Predominant soil types from USDA soil surveys			
○ Boundaries of existing predominant vegetation and proposed limits of clearing and grubbing, including areas of native vegetation to be preserved			
○ Existing and proposed utilities and easements			
○ Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings			

[http://stormwaterhawaii.com/program\\_plan/pdfs/app\\_e2.pdf](http://stormwaterhawaii.com/program_plan/pdfs/app_e2.pdf)

Existing and Proposed Site Features (cont'd)	YES	NO	N/A
<i>If the project or site includes, is adjacent to, or otherwise may impact any of the following, they should be shown on the plans:</i>			
<ul style="list-style-type: none"> <li>○ Perennial and intermittent ghuts or other surface water bodies</li> </ul>			
<ul style="list-style-type: none"> <li>○ Location and boundaries of resource protection areas such as wetlands, lakes, ponds, and other setbacks (e.g., stream buffers, drinking water well setbacks, septic setbacks)</li> </ul>			
<ul style="list-style-type: none"> <li>○ Location of floodplain/floodway limits and relationship of site to upstream and downstream properties and drainages</li> </ul>			
<ul style="list-style-type: none"> <li>○ The limits of the existing and proposed maps and plans shall extend past the project limits if any existing condition has an impact to the project. Include future projects that have the potential to start prior to the subject project.</li> </ul>			
<ul style="list-style-type: none"> <li>○ Stream flow velocity for stream (ghut) work</li> </ul>			

It is also important to ensure that site surveys have included an assessment of whether or not native and threatened or endangered species are present on a site. If they are, then native vegetation should be preserved and the appropriate measures to avoid and minimize impacts to threatened and endangered species should be part of the project design. Evaluate whether avoidance and minimization measures are adequate and include them as special conditions in any permit issued for the project. Site inspections for permitted projects should include an evaluation of whether or not the project is complying with these special conditions.



USVI homes with above-ground cisterns

*Photo Credit: Hosana Solomon, Sustainable Water Supply and Demand in the U.S. Virgin Islands - Mandatory Law of Cistern Construction for Rainwater Harvesting and Desalination Lesson for Sustainable Freshwater Supply for the World*

The USVI building code specifies cistern capacity for dwellings of not less than 10 gallons for every square foot of roof area for a one story building and 15 gallons per square foot for buildings of two or more stories. All other buildings, except churches and warehouses, are also required to have a cistern capacity of 4 ½ gallons minimum for each square foot area.

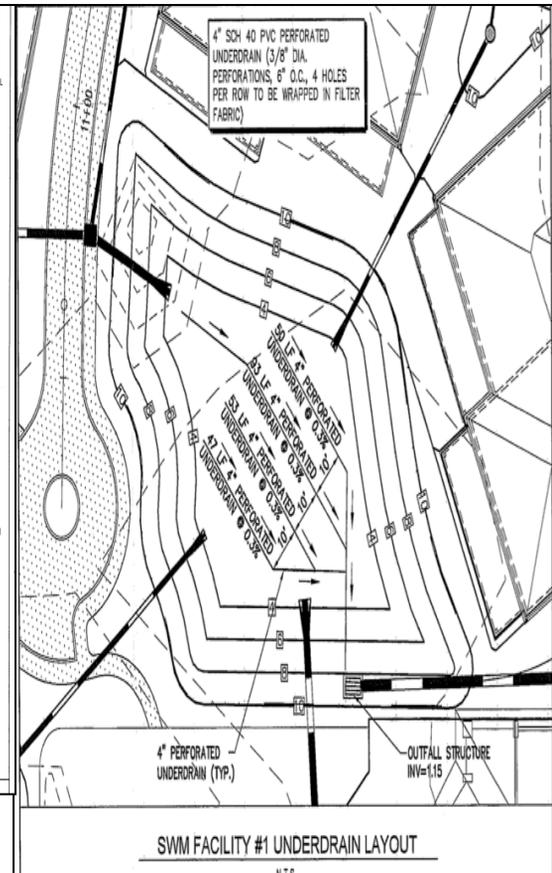
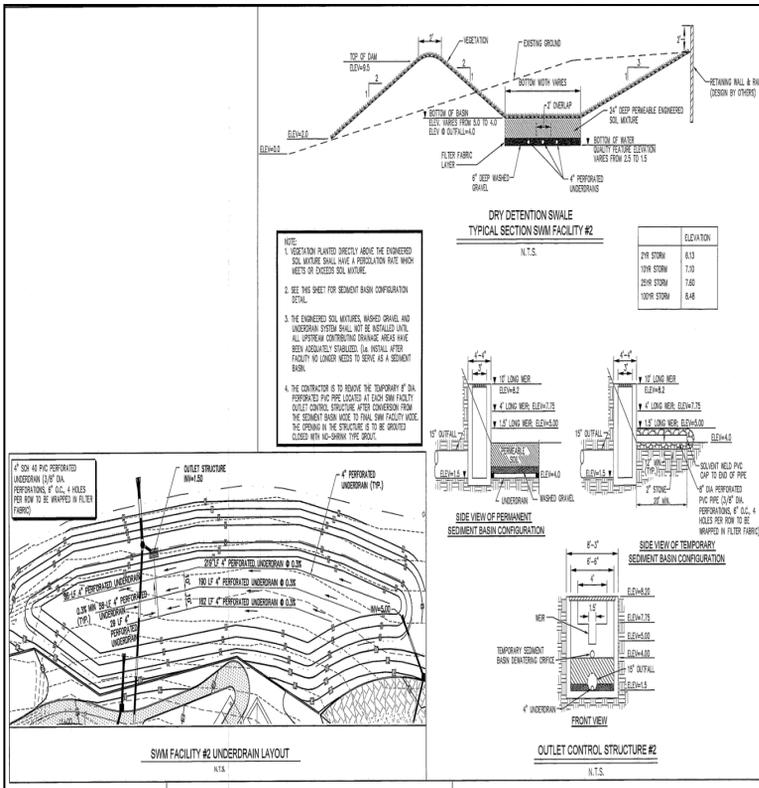


## Stormwater Management

Two pre-development drainage areas were defined as part of the design of the stormwater management system for the project. The largest area, measuring 11.34-acres drained to the Salt Ponds and the other 3.12-acres drained directly to Chocolate Hole Bay. The post-development drainage patterns were designed to minimize the area draining to Chocolate Hole Bay and maximize the drainage to the Salt Pond while treating runoff in terms of water quality and quantity.

## Sediment Control

Temporary sediment controls include silt fences, sediment traps and basins, and diversion dikes. Biofilters and sediment control basins will be converted into permanent sediment treatment structures post-construction.



Stormwater management plans.  
Credit: Springline Architects

This is a proposed hotel, casino, golf course, recreational, commercial, and residential development. Based on the photos and plans (see next page as well), what aspects of green design should be considered in the project?

Architects: *Springline Architects, St Thomas, VI, JCI Architecture, CT*

Structural Engineer: *Dewberry*

Marine Biologist: *BioImpact, Inc., St Thomas*

Environmental Engineers: *Williamsburg Environmental Group - WEG*

Civil Engineer: *Harris Civil Engineers*

MEP Engineers: *X-nth, Inc., FL*

Land Surveyor: *Systems Engineering*

Archaeologist: *SOLTEC, St. Croix, VI*



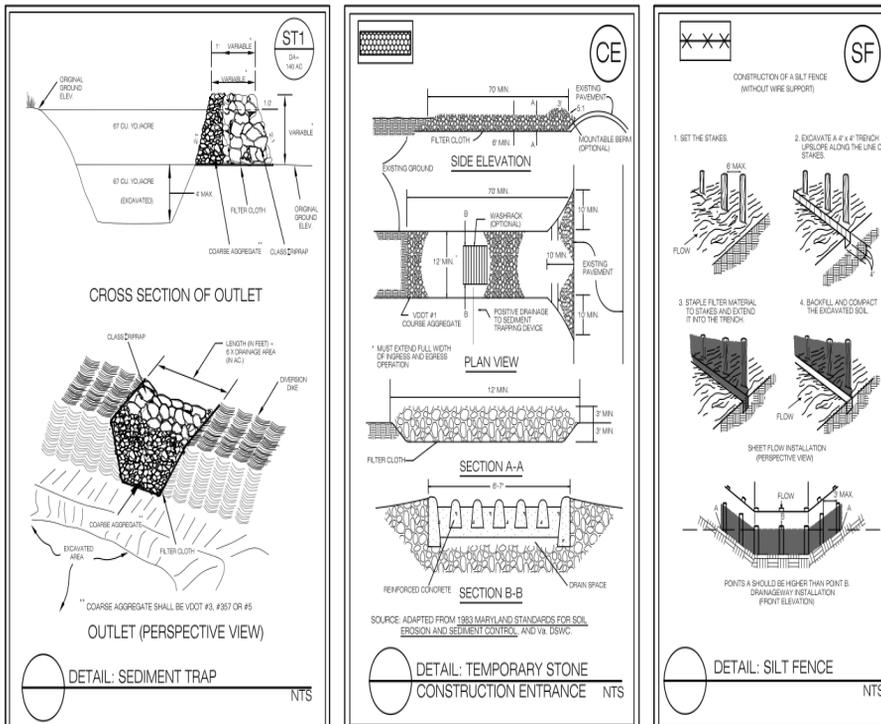
Aerial view of proposed project site, Robin Bay, St. Croix  
*Credit: Springline Architects*

## Stormwater Management

Proposed project combines low impact development and conventional storm water management practices. The proposed stormwater management plan includes wet ponds providing detention and irrigation storage volume and dry storage areas and conveyance channels. The dry detention areas serve as dry storage facilities providing peak flow attenuation and promote pollutant removal and infiltration to reduce actual runoff volume to the salt pond on site.

## Sediment Control

Temporary control methods such as stabilized construction entrances, tensor-wire supported and standard silt fences, diversion dikes, sediment basins, sediment traps, turbidity curtains, inlet and outlet protection, check dams, and erosion control matting. Permanent controls include retaining walls, bio-filters, and sediment control basins installed and used during construction and then converted to permanent controls post-construction.



In addition to stormwater and sediment controls, what other natural resource protections should be considered as part of the project?

Stormwater management designs  
Credit: Springline Architects

Another part of water management is the control of stormwater. When reviewing projects, ensure measures such as porous paving, capture of runoff from parking areas and driveways in a cistern for reuse in irrigation, rain gardens, rock check dams, swales, and/or retention ponds (depending on the scale of the project) have been included in project design.

When reviewing project plans, make sure all of the stormwater BMPs are clearly marked on plans along with information on installation requirements, phasing of installation, and instructions for maintenance of the different measures. Project plans should also identify whether measures are temporary or permanent.

# Energy Efficiency/Optimization

The following items should be part of project review to ensure the energy efficiency of new residential construction has been optimized: [1] the building envelope, [2] domestic hot water systems, and [3] lighting

## 1. Tropical Building Envelope



<http://tancheesing.files.wordpress.com/2012/09/tropical-space-vs-manicured-space.jpg>



<http://puebloverde.org/building-in-pueblo-verde>

Residential buildings are usually skin-dominated, having smaller internal heat generation as compared to the heat gain/loss through the envelope. The building envelope can contribute up to 73% of the total heat gain/loss in a residence. Building envelope characteristics such as building geometry and orientation, properties of materials, type and quality of construction, and interaction with outdoor conditions impact the heat gain and loss through the envelope.

In the tropics, the building envelope behaves more like a climatic filter rather than a climatic shelter. If the building envelope is designed to be responsive to the climatic conditions, the interior space will then be habitable and comfortable to the inhabitants.

The provision of generous overhang, semi-outdoor spaces, ample shade trees and landscaping, are useful strategies in layering climatic filters and creating pockets of spaces to soften the edge of buildings and soften the impact of tropical weathering.

The choice of materials is critical in determining the thermal performance of buildings. Thermal properties of building materials need to be understood. For example, while the extensive use of glass may allow ample daylight and views, it can also let in excessive heat. The use of a thermal mass wall to absorb excess heat to keep the building cool and the use of reflective roofing materials to reflect sunlight are examples of strategies to climate-proof the building.

# Energy Efficiency/Optimization

## 2. Domestic Hot Water Systems



*www.solargreen.net.au*

Ensure energy efficient solar water heaters are included and provide at least 70% of the building's water heating needs as required by the 2009 Renewable Energy Act.

## 3. Lighting

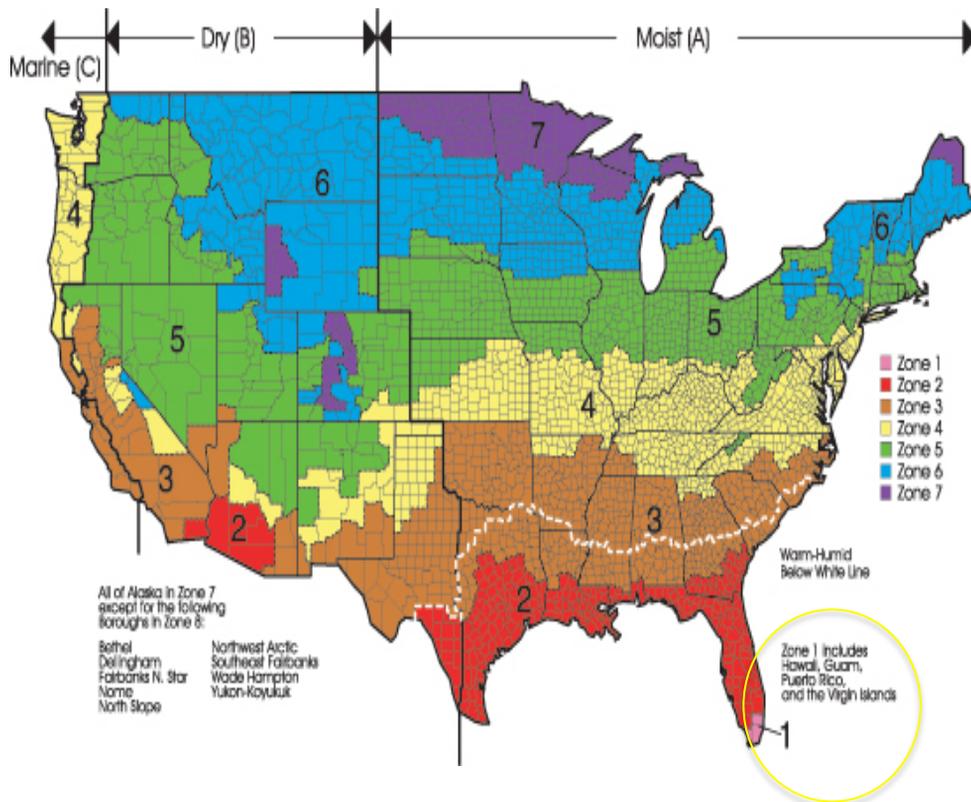


*architecturalhousemodels.com*

In designs, ensure 50% of lamps in permanent fixtures are high efficacy as required by the 2009 IECC. (Note: It is also important, when projects are located in coastal areas or can be seen from nearshore waters, that lighting is sea turtle friendly to minimize disorientation of these animals in nearshore waters and on nesting beaches.)

# IECC 2009 Compliance

The USVI follows design guidance for Zone 1



Compliance Approach: Compliance with the energy code can be demonstrated through a prescriptive, trade-off, or performance approach. In evaluating building compliance, the prescriptive approach should be assumed unless documentation is obtained from the building department or responsible authority demonstrating compliance with either the trade-off or performance approach.



## **Guide to BMP Review**

Project Review -  
*Construction Best  
Management Practices*



# What's the Plan for BMPs?

This checklist provides items to keep in mind when reviewing project plans to assess whether adequate construction BMPs have been included in the project design for erosion and sediment control and stormwater management.

Scheduling (Construction Phases)	YES	NO	N/A
<ul style="list-style-type: none"> <li>○ Ensure schedule that includes sequencing of construction activities with the implementation of construction site BMPs is provided</li> </ul>			
<ul style="list-style-type: none"> <li>○ Ensure plans show timing of soil-disturbing and restabilization activities to avoid the rainy season (August to November)</li> </ul>			
<ul style="list-style-type: none"> <li>○ Ensure schedule includes, by phase, details of the implementation and deployment of soil stabilization, sediment control, non-stormwater management, waste management and pollution control, and inspection and maintenance of BMPs</li> </ul>			
<ul style="list-style-type: none"> <li>○ Ensure, if the project will be constructed in multiple phases, that there phase-specific BMPs that take into account phase-specific potential pollutants</li> </ul>			

# What's the Plan for BMPs?

<b>Construction Site BMPs</b> <i>Soil Stabilization Practices</i> <i>Check that the plans address or include the following practices and situations:</i>	YES	NO	N/A
<ul style="list-style-type: none"> <li>○ Preservation of existing vegetation</li> </ul>			
<ul style="list-style-type: none"> <li>○ Stabilized construction entrance</li> </ul>			
<ul style="list-style-type: none"> <li>○ Protection of material stockpiles</li> </ul>			
<ul style="list-style-type: none"> <li>○ Topsoil management</li> </ul>			
<ul style="list-style-type: none"> <li>○ Mulching, seeding, and/or planting with installation/application procedures and requirements</li> </ul>			
<ul style="list-style-type: none"> <li>○ Velocity reduction devices in flow paths</li> </ul>			
<ul style="list-style-type: none"> <li>○ Geotextiles, plastic covers, turf reinforce mats, and/or erosion control blankets/mats, with installation/application procedures and requirements?</li> </ul>			
<ul style="list-style-type: none"> <li>○ Temporary drains, swales, earth dikes, and/or lined ditches</li> </ul>			
<ul style="list-style-type: none"> <li>○ Slope drains, subsurface drains</li> </ul>			
<ul style="list-style-type: none"> <li>○ Top and toe of slope diversion ditches/berms</li> </ul>			

# What's the Plan for BMPs?

<b>Construction Site BMPs</b> <i>Sediment Control Practices</i> <i>Check that the plans address or include the following practices and situations:</i>	YES	NO	N/A
<ul style="list-style-type: none"> <li>○ Location of potential sediment sources</li> </ul>			
<ul style="list-style-type: none"> <li>○ Whether on-site drainage normally moves to off-site drainage and plans for temporary diversions and permanent management of site runoff</li> </ul>			
<ul style="list-style-type: none"> <li>○ Silt fence, brush berms, or rock filters and maintenance requirements/schedule</li> </ul>			
<ul style="list-style-type: none"> <li>○ Storm drain inlet protection</li> </ul>			
<ul style="list-style-type: none"> <li>○ Temporary sediment basins or sediment traps and maintenance requirements</li> </ul>			
<ul style="list-style-type: none"> <li>○ Flared culvert end sections</li> </ul>			
<ul style="list-style-type: none"> <li>○ Outlet protection and maintenance requirements</li> </ul>			
<ul style="list-style-type: none"> <li>○ Slope roughening / terracing / rounding</li> </ul>			
<ul style="list-style-type: none"> <li>○ Entrance / exit equipment tire wash and maintenance requirements</li> </ul>			

# What's the Plan for BMPs?

<b>Construction Site BMPs</b> <i>Check that the plans address or include the following practices and situations:</i>	YES	NO	N/A
<ul style="list-style-type: none"> <li>○ Employee training regarding BMP maintenance and site management, including natural resource protection requirements</li> </ul>			
<ul style="list-style-type: none"> <li>○ Vehicle and equipment cleaning, refueling, and maintenance schedules and location of maintenance activities in relation to natural resources such as ghuts, as well as material disposal and storage requirements</li> </ul>			
<ul style="list-style-type: none"> <li>○ Dewatering operations (if dredging or excavating in areas with a high water table)</li> </ul>			
<ul style="list-style-type: none"> <li>○ Hydrotesting operations</li> </ul>			
<ul style="list-style-type: none"> <li>○ Paving operations</li> </ul>			
<ul style="list-style-type: none"> <li>○ Concrete washout procedures</li> </ul>			
<ul style="list-style-type: none"> <li>○ Structure construction and painting</li> </ul>			
<ul style="list-style-type: none"> <li>○ Good housekeeping practices for material storage and disposal and staging areas, waste disposal, spill prevention</li> </ul>			

# What's the Plan for BMPs?

<b>Inspection and Maintenance Responsibility</b> <i>Verify that the plans address or include the following practices and situations:</i>	YES	NO	N/A
<ul style="list-style-type: none"> <li>○ Inspection entity identified</li> </ul>			
<ul style="list-style-type: none"> <li>○ Maintenance identified</li> </ul>			
<ul style="list-style-type: none"> <li>○ Record keeping methods identified</li> </ul>			
<ul style="list-style-type: none"> <li>○ Schedule and/or triggers for inspection of BMP measures clearly stated</li> </ul>			
<ul style="list-style-type: none"> <li>○ Rain gauge or other means of determining whether additional BMPs may be necessary due to predicted rainfall during work day</li> </ul>			
<ul style="list-style-type: none"> <li>○ Incident reporting procedures clearly described, including contact numbers</li> </ul>			

The designer and owner are responsible, directly or through an inspector, for ensuring that designed BMPs function at all times. In order to avoid delays and reaction time in the field, project designs and plans should clearly identify all erosion control items and the labor to install and maintain these items. Contractors, heavy equipment operators, and all other project personnel are also responsible for preventing pollution from leaving a site.

Be sure that plans are in keeping with Territorial requirements, including Stormwater Pollution Prevention Plans (SWPPPs).



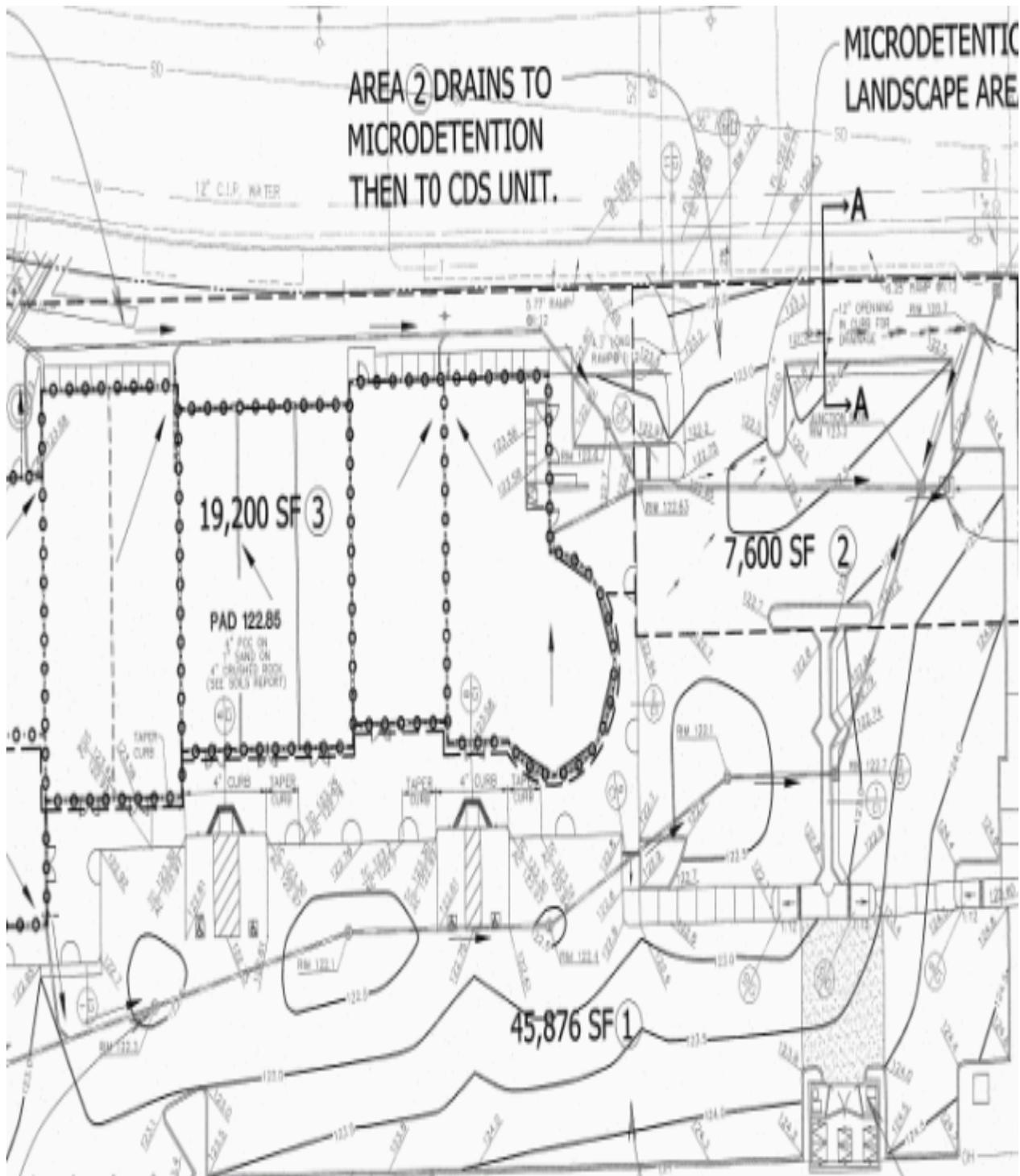
# **Guide to BMP Review**

Site Inspection

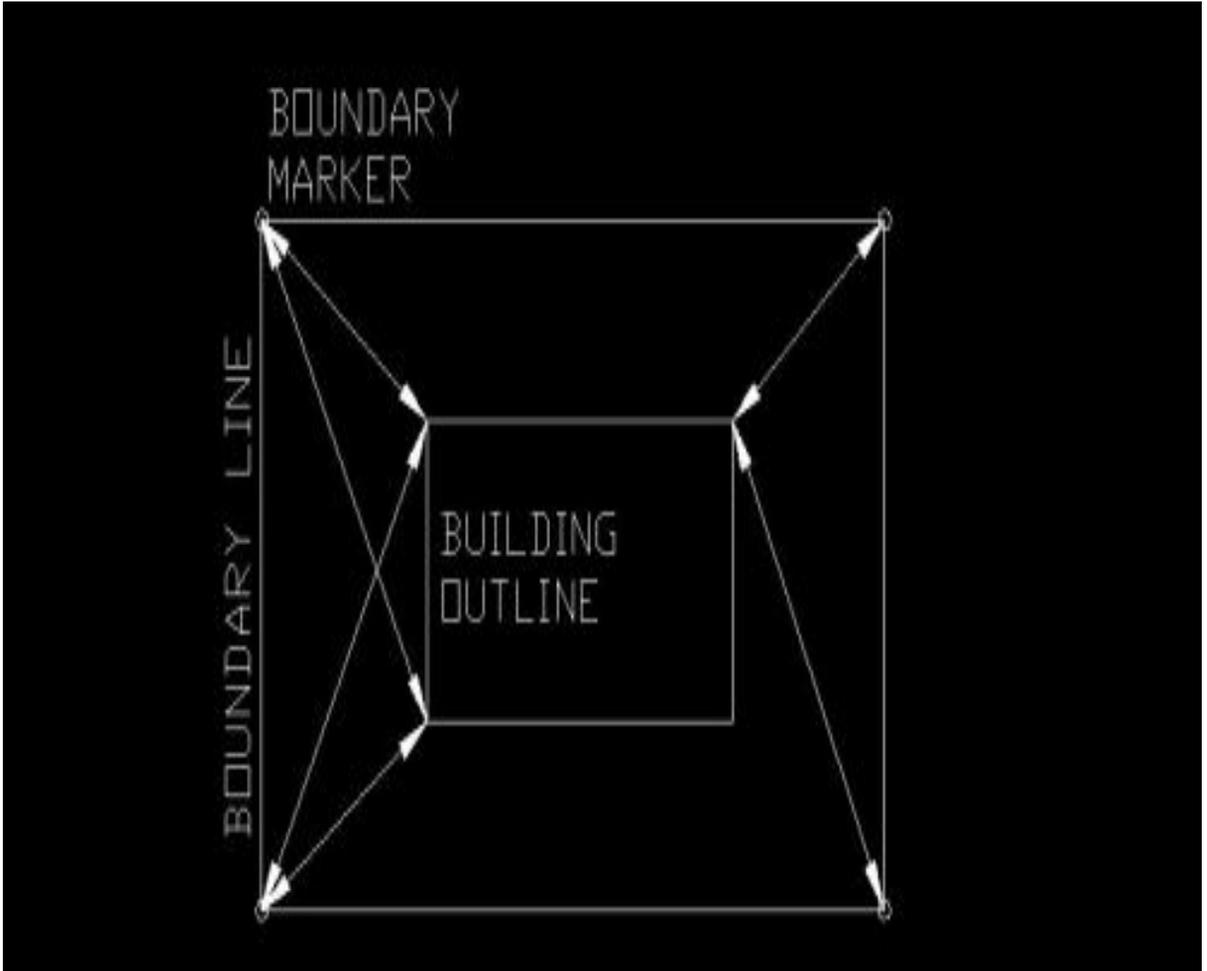


When conducting site inspections, have copies of the plans with you and the locations of BMPs clearly identified. It makes it easier to explain problems (or good practices).

**SITE INSPECTIONS**



Check that the corner-to-boundary marker distances are in accordance with those on the site plan and have minimized site disturbance. Ensure limits of disturbance are clearly marked before any earth movement begins.



<http://researching.wordpress.com/2008/03/10/the-worst-house-that-the-code-will-allow/>

Conduct at least one inspection of the site right after a heavy rain. The effectiveness of BMPs or significant problems with drainage will be more obvious.



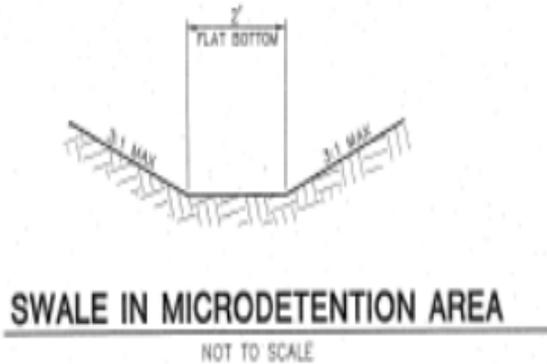
*Permeable pavement with pooling in a few areas*

[http://www.scvurppp-w2k.com/pdfs/0607/Post-Construction\\_CASQA\\_Lessons\\_Learned\\_030907.pdf](http://www.scvurppp-w2k.com/pdfs/0607/Post-Construction_CASQA_Lessons_Learned_030907.pdf)

While on site also inquire about foundation stability. A stable foundation can eliminate or reduce the risk of the building settling, especially during periods of heavy rainfall. This means excavation should be done to reach a hard bearing layer. If the builder reaches limestone, then the excavator should be instructed to cut into the rock at least 75 mm (3" ) in order to remove the weathered top section.

# Do installed BMPs match the BMPs indicated on project plans?

## Submitted Design



*In plans (show above) no rocks are indicated for swale. Yet as shown in the right, a rock-lined swale was installed. It is unclear if this new version has been properly designed (see next page for more information on rock-lined swales)*

## Actually Installed



*Photo & Figure Credit: [www.scvurppp-w2k.com/pdfs/0607/Post-Construction\\_CASQA\\_Lessons\\_Learned\\_030907.pdf](http://www.scvurppp-w2k.com/pdfs/0607/Post-Construction_CASQA_Lessons_Learned_030907.pdf)*

NOTE: Rock lined and vegetated swales are conveyance systems designed, shaped, and lined to convey surface runoff in a non-erosive manner downstream, preferably to a treatment and/or infiltration system. If the slope exceeds 3 percent, check dams should be incorporated to decrease the velocity and promote infiltration. **Vegetated swales should never be used in areas where slopes exceed 6 percent.**

# Rock-lined versus Vegetated Swale Design Detail

## Rock Lined Swale

## Vegetated Swale

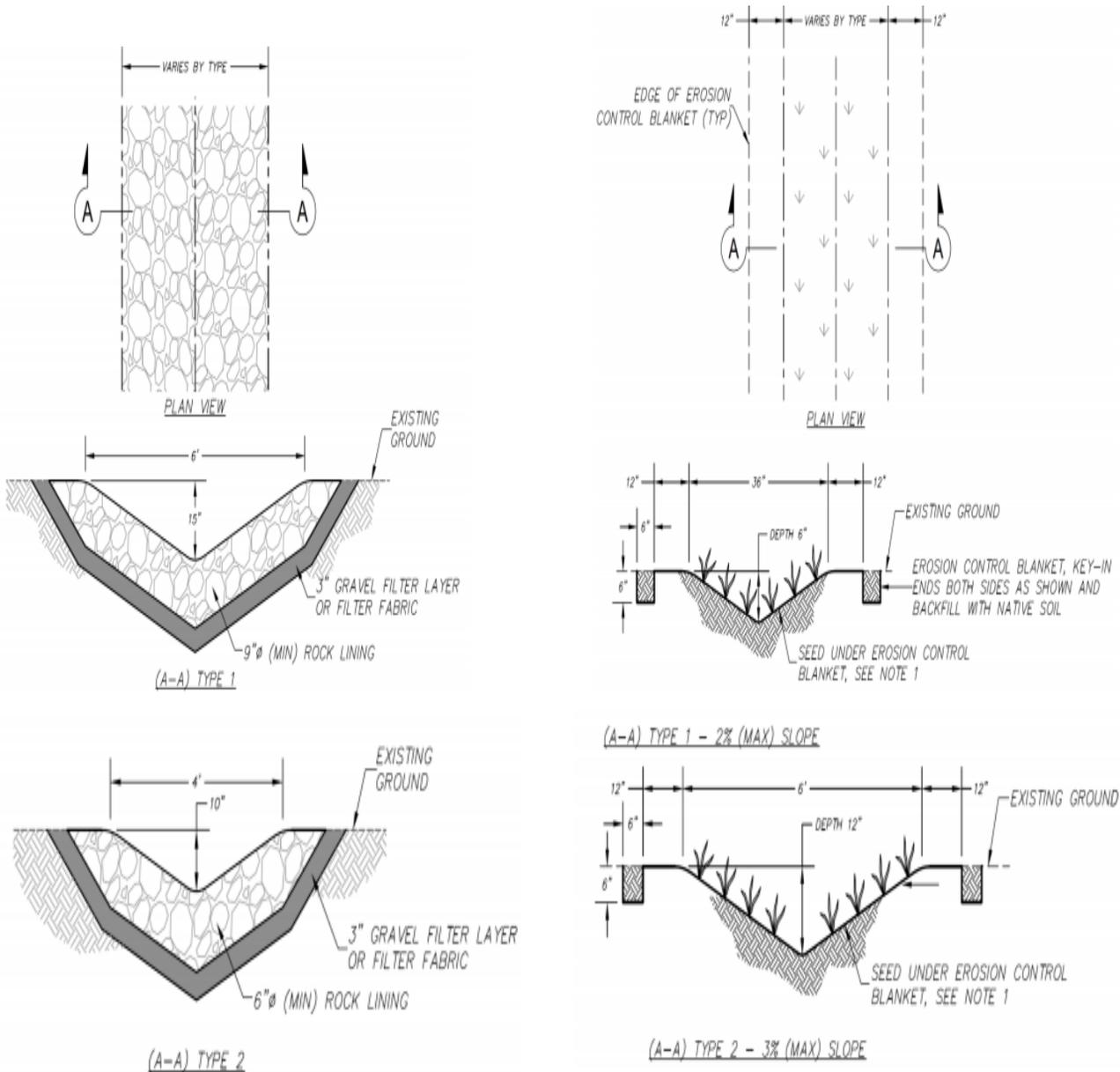


Figure Source: [http://www.tahoebmp.org/Documents/BMPHandbook/Chapter%204/4.3%20Stormwater%20Collection%20and%20Conveyance/10\\_RckVegSwl.pdf](http://www.tahoebmp.org/Documents/BMPHandbook/Chapter%204/4.3%20Stormwater%20Collection%20and%20Conveyance/10_RckVegSwl.pdf)

A vegetated swale should not to be confused with a bioswale whose primary purpose is biofiltration and detention, not collection and conveyance of stormwater.

Vegetated swales have the capability to filter sediment and uptake nutrients. Rock swales also filter sediments.

## Best Swale Option?

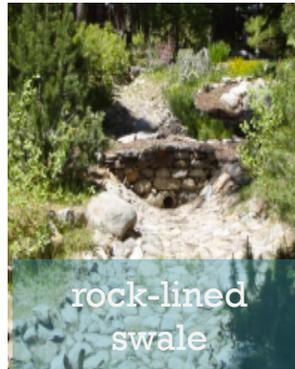
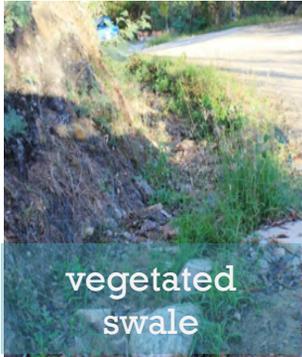


Photo Credit: NOAA ARRA USVI Watershed Stabilization Project Reports for Coral Bay & Carolina Valley

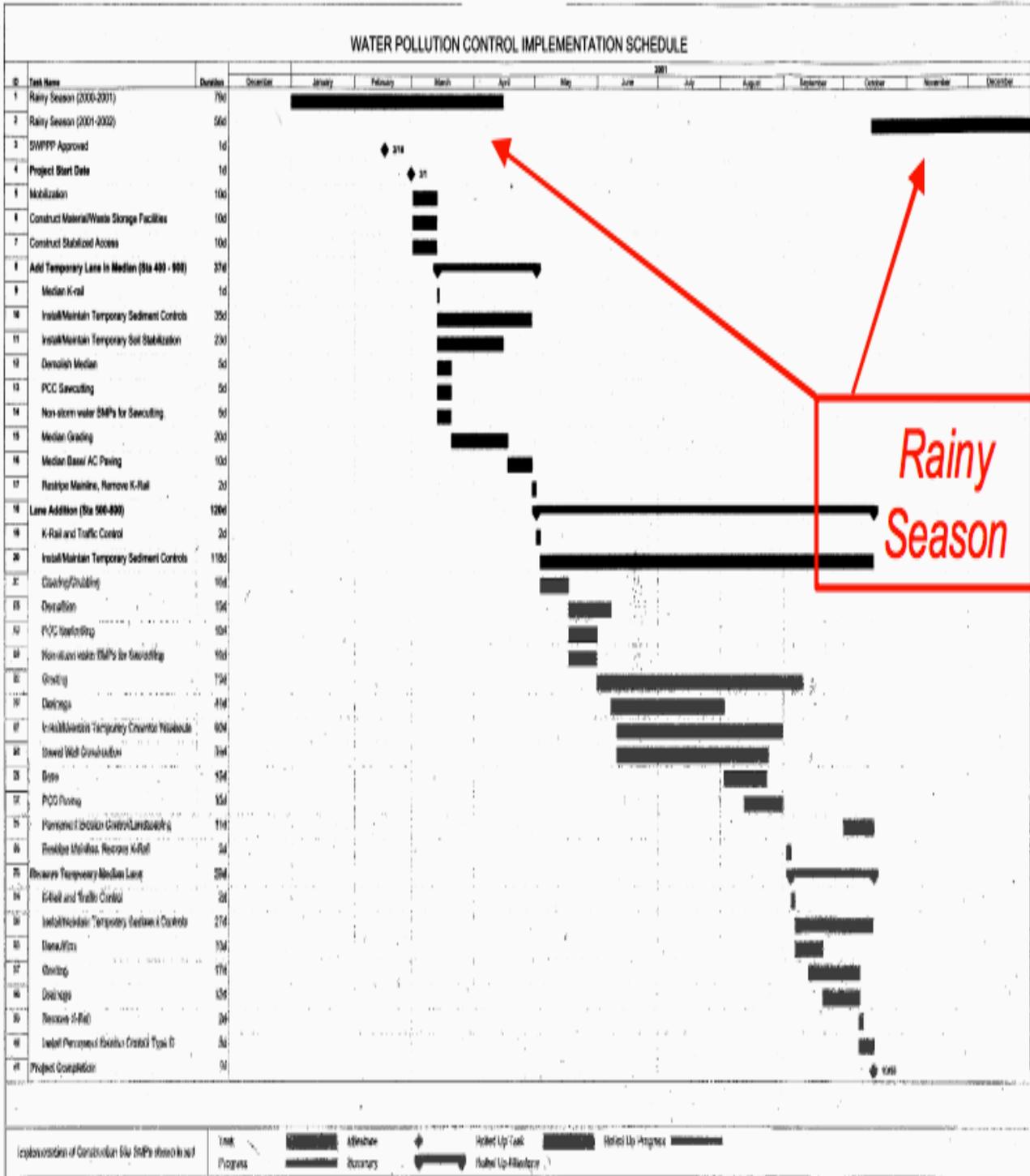
*fps = feet per second*

Design Criteria	Vegetated Swale	Rock-Lined Swale	Cemented Swale
Runoff velocity less than 3 fps and slope less than 6 percent	✓	✓	✓
Runoff velocity 3 fps to 10 fps and slope less than 6 percent	✗	✓	✓
Runoff velocity greater than 10 fps/ slope greater than 6 percent	✗	✗	✓

[http://www.maine.gov/dep/land/stormwater/stormwaterbmps/vol3/chapter8\\_1.pdf](http://www.maine.gov/dep/land/stormwater/stormwaterbmps/vol3/chapter8_1.pdf)

# What are we looking for?

Earth disturbing activities are phased to minimize potential corrective measures by avoiding work with heavy equipment during the rainy season.



# What are we looking for?

Properly designed sediment controls have:

1. Side Containment Berms
2. Rock Check Berm
3. Equipment Access

Well maintained sediment traps are:

1. Less than 50% full
2. Maintained with a spillway depth a minimum of 1.5 feet below the low point of the trap embankment

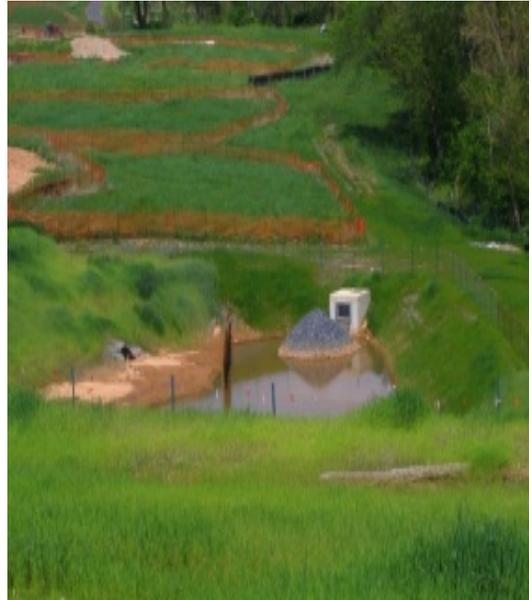


Photo Credit: [www6.montgomerycountymd.gov/dectmpl.asp?url=/Content/dep/water/spabmps.asp](http://www6.montgomerycountymd.gov/dectmpl.asp?url=/Content/dep/water/spabmps.asp)

Sediment traps (shown above) are small impoundments that allow sediment to settle out of construction runoff. They are usually installed in a drainageway or other point of discharge from a disturbed area. In the photo on the right in particular, note the placement of rocks to filter sediment from water prior to its exit from the sediment basin.

# What are we looking for?

A properly designed sediment basin has:

1. Standpipe drawdown
2. Emergency outfall
3. Stabilized side slopes
4. Equipment access

A well-maintained sediment basin is:

1. Less than 50% full
2. Characterized by a drawdown location free of trash and debris

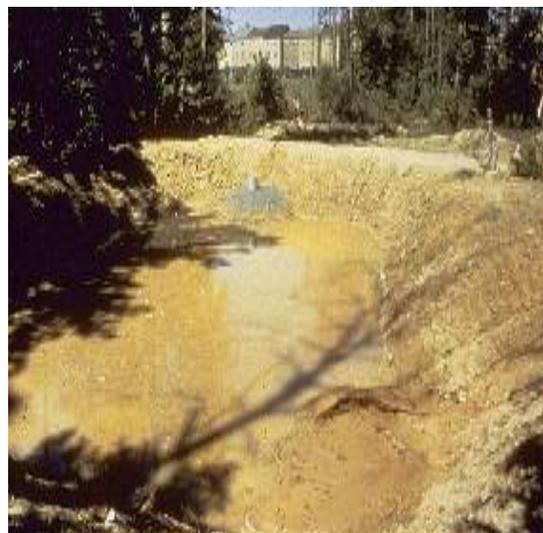


Photo Credit: [www6.montgomerycountymd.gov/dectmpl.asp?url=/Content/dep/water/spabmps.asp](http://www6.montgomerycountymd.gov/dectmpl.asp?url=/Content/dep/water/spabmps.asp) (left) & [epa.gov](http://epa.gov) (right)

A sediment basin (examples shown above) captures sediment from stormwater runoff before it leaves a construction site and is usually used for drainage areas of 5 to 100 acres. A pool is allowed to form in an excavated or natural depression, where sediment can settle. The pool is dewatered through a single riser and drainage hole leading to a suitable outlet on the downstream side of the embankment. The water is released more slowly than it would be without the control structure.

# What are we looking for?

Properly functioning sediment and erosion controls and proper maintenance.



*Photo Credit: Idaho Construction Site Erosion and Sediment Control Field Guide*

Silt fence is properly installed in the picture above. The presence of vegetation in front of the fence shows erosion control is adequate for reducing flows going to the silt fence.

Although silt fence is installed, the absence of vegetation in front of the fence shows more erosion control is needed to reduce the flow going to the silt fence.

## What are we looking for?

Bottom of silt fence fabric should be buried (~6") in a trench that has then been backfilled. Silt fences should be inspected to ensure the fabric is not torn or sagging and to remove accumulated sediment (and dispose of it properly on uplands). Silt fences should not be installed across gullies or other water bodies.

*Photo Credit: Idaho Construction Site Erosion and Sediment Control Field Guide*



## What are we looking for?

Perimeter controls must be actively maintained until final stabilization. In the picture below, the offsite transport of runoff is evidenced by the gully that has formed, signaling inadequate perimeter controls.



*Photo Credit: Idaho Construction Site Erosion and Sediment Control Field Guide*

# What are we looking for?

Construction entrances and exits that are properly installed to prevent tracking of sediment from the construction site onto public roads.

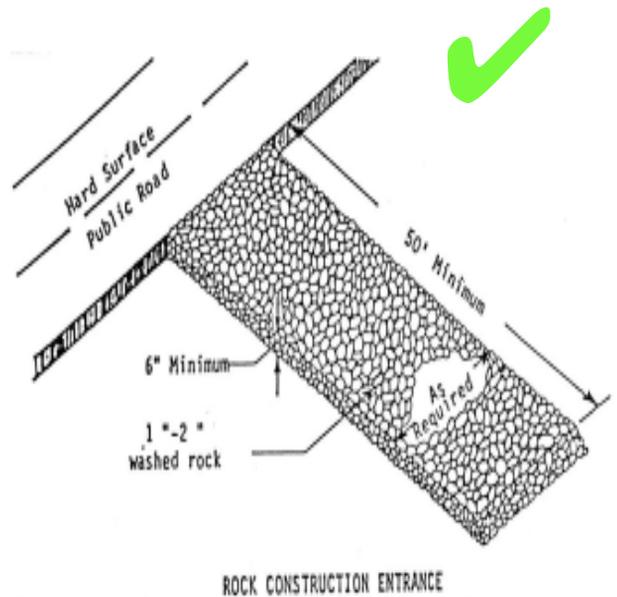


Photo & Figure Credit: Idaho Construction Site Erosion and Sediment Control Field Guide

A rock construction pad may be necessary at construction access/ egress locations to prevent the transport of soil onto paved public roads by construction vehicles. In the photo above, no pad was installed and the transport of sediment from the site to the road is clearly visible.

The rock construction entrance is a stabilized pad of aggregate installed over a geotextile fabric base. The effectiveness of the entrance in trapping sediment depends on length, depth of rock, frequency of use, and maintenance.

## What are we looking for?

Ensure maps accurately indicate ALL stormwater discharge locations and that they have been properly installed and are being properly maintained.



Inspector visually checking water quality at outlet

*Photo Credit: Idaho Construction Site Erosion and Sediment Control Field Guide*

# What are we looking for?

Check inlets and outlets to determine if control measures are properly installed and are effective in preventing the introduction of contaminants and solid materials into the stormwater system.



Photo Credit (all): Idaho Construction Site Erosion and Sediment Control Field Guide

## What are we looking for?

Verify there is a minimum 25-foot buffer zone between disturbed soil and the edge of ghuts (or 30 ft from center of ghut, whichever is greater), a 150-foot buffer from shoreline mean low water, a 30-foot buffer along both sides of estate roads, and a buffer of 50 to 150 feet from the edge of wetlands.



*Photo Credit: Idaho Construction Site Erosion and Sediment Control Field Guide*

Keeping vegetation healthy in vegetated buffers requires routine maintenance like mowing and pruning. Green belts (or vegetated buffers) can also be native vegetation that is preserved on site. Sediment controls such as silt fences need to be installed between the limit of soil disturbance and the buffer or green belt to prevent sediment transport from the construction area into these areas. Buffers, green belts, and sediment controls meant to protect these areas should be inspected after heavy rainfall and as part of the regular BMP maintenance schedule. Focus on encroachment, gully erosion, vegetation density, evidence of concentrated flows through the areas, and any damage from foot or vehicular traffic as part of inspections. Ensure sediment accumulation around buffer is less than 6 inches.

## SWWPP Inspections

On July 1, 2003, the U.S. Environmental Protection Agency (EPA) reissued the Construction General Permit (CGP) to extend coverage ***to construction sites that disturb one or more acres***, including smaller sites that are a part of a larger development plan. Qualifying sites are required to have a Storm Water Pollution Prevention Plan (SWPPP).

A SWPPP is a written document, which is broader and more complicated than a typical erosion and sediment control plan, that describes the construction operator's activities to comply with the requirements in the CGP.

EPA's regulations for SWPPPs include:

- SWPPP Creation
- Secure on-site storage of SWPPP and other necessary documents that can be monitored by inspectors 24 hours a day.
- Initial SWPPP updating and continued updating throughout the life of the project based on effectiveness of plan elements
- On-site inspections every 7 days and 24 hours after any rainfall greater than a 1/2 inch to ensure BMPs are adequate and functioning properly
- Maintenance of existing control measures and installation when needed of additional measures

## 5 SWWPP Inspection Strategies



*Sediment Basin*

1. Inspect **ALL** areas of the site
2. Ensure you understand **which** sediment and erosion control BMPs are required under **what** conditions
3. Ensure you understand **how** BMP's should be maintained
4. Assess non-allowable discharges
5. Recommend Maintenance/Corrective Actions

## 5 Questions/Requests for the Site Representative

1. How are SWPPP maps maintained?
2. Who monitors and maintains BMPs?
3. Where are BMPs installed?
4. How often are BMPs inspected?

The Representative should indicate that BMP's are checked once every seven (7) calendar days OR once every 14 calendar days and within 24 hours of the end of a storm event producing more than 0.5 inches of rain. The schedule described should match the schedule documented in the SWPPP.

5. Show me SWPPP maintenance, inspection, and monitoring records.

- For post-construction inspections, try to bring all responsible parties (developer, property owner/ manager & persons responsible for operation and maintenance) together
- Make sure all post-construction stabilization and planting and seeding is completed and that landscaping is in keeping with project plans
- Make sure final retaining walls have been constructed on cut and steep slopes that cannot be planted and boulders from site clearing are used as possible
- Make sure porous pavers and rain gardens have been installed as possible to absorb water on-site
- Make sure all temporary BMPs have been removed and the areas regraded and planted
- Make sure the permanent storm drainage system has been restored
- Ensure all permanent BMPs are receiving appropriate maintenance

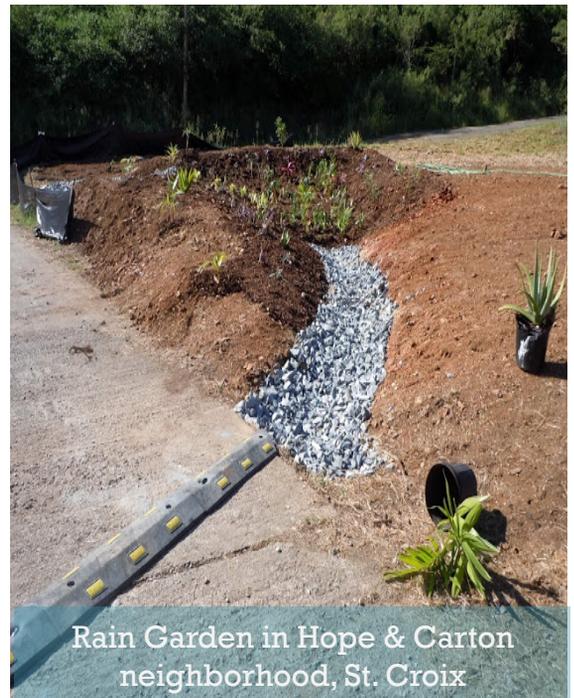


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