Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Sandwich, MA • 02563
Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com

WORKSHOP SUMMARY

TO:	Lisamarie Carrubba, Marlon Hibbert, Glenis Padilla (NOAA), JP Oriol, Dave Rosa, and Jonathan Small (DPNR); Barry Devine, Doug White, Gary Ray, and Bill Willigerod (IGBA)
FROM:	Anne Kitchell (HW)
DATE:	July 30, 2013
RE:	Summary of USVI Green Construction Training, St John

This memorandum provides a brief summary of the July 16, 2013 USVI Green Construction Training at the UVI St. John Academic Center in Cruz Bay. The purpose of the clinic was to: 1) kickoff a series of workshops on green design and construction in the USVI sponsored by NOAA and DPNR; 2) increase exposure and build membership for the Island Green Building Association (IGBA); and 3) distribute DVDs with newly compiled training materials related to building green in the USVI. The training on St. John is to be followed by trainings on St. Croix and St. Thomas over the next year targeting designers, implementers, agencies, and homeowners.

The one-day training on St. John involved classroom sessions by local architect Doug White and native plant specialist Gary Ray, with a facilitated discussion (**Figure 1**). Lisamarie Carrubba and Bill Willigerod introduced the training and provided background on the IGBA. A field trip to three residential sites (one completed, one partially completed, and one just recently cleared) was led by Dave Rosa, Tim Coyle, and Doug White in the afternoon. Thirty-seven people were in attendance, which includes ten workshop organizers from NOAA, DPNR, IGBA, and Horsley Witten. Participants included agency representatives from Building and Permits and the VI Energy Office; private sector designers, landscapers, builders, and realtors/assessors; as well as community groups.

Figure 1. Classroom portion of training at UVI St. John Academic Center

Each participant was provided a workshop folder with an agenda, participants list, evaluation form, session handouts, IGBA flyer, and a DVD (with instructions) of NOAA's Green Construction training materials. **Attachment A** includes a digital copy of the workshop packet materials, excluding the DVD. The DVD materials include modules (slideshows), videos, and field guides that are also available for download from the IGBA website at www.igbavi.org/green/?page_id=897 and www.igbavi.org/green/?page_id=51. Attendees were asked to sign a liability waiver for participation in the field trip that included a video release statement. **Attachment B** includes results of the workshop evaluation, a copy of the sign in sheet, and a final contact list.

At the end of the training, remaining participants were given a certificate from IGBA to claim one of four incentive awards ranging from a value of $100-$250. Table 1 summarizes the numbers of incentives claimed to date. According to IGBA, this represents 19 new memberships.

Table 1. Summary of Incentives Claimed

Incentive	Value	Number Claimed to date	Total Incentive Value
1-yr professional IGBA membership	$250	11	$2,750
2-yr green leaf/ family IGBA membership	$100	11	$1,100
Residential Tropical Green Certification Voucher	$250	1	$250
2 hours of consultation services	$250	4	$1,000
		27	***$4,100***

Classroom Discussion

During the classroom session, Doug discussed the key elements of the Green Certification Design Program, using the program checklist booklet as a session handout. Doug introduced the 8 key checklist elements below, briefly discussing the rationale of major items under each:

1. Site planning and design
2. Building Structure
3. Water Management
4. Energy Conservation and Management
5. Waste Minimization and Recycling
6. Light pollution
7. Visual impacts
8. Landscaping, Green Belts, and Native/Natural Vegetation

Gary focused on the last check list item related to landscaping and vegetation. His emphasis was on protecting and replicating native landscapes, species selection, and the future of commercially available plant stock.

A group discussion was facilitated on how to advance green design techniques in the USVI during these sessions are summarized in **Table 2**.

Table 2. Summary of Discussion Topics

Topic	Comments
How does agency permitting hinder or promote green building?	• Alexis, DBP – question about photovoltaic, he explained information needs for permit applications, now promoting use of alternate energy; can't obstruct ghuts or divert flows, can come to DBP for orientation regarding water extraction for irrigation (based on question from Turnbull about person who was given notice of violation for doing work in a ghut) • Alexis – ICC requirement for electrical compliance October 1, will require motion sensors in residential and commercial or retrofitting if project needs a permit
What incentives are available?	• Joseph Daniel, VI Energy Office – promotes use of green building in terms of alternate energy; have had incentives such as one for solar water heater or rebate program with federal funds for solar panels or loan for water heater, have also done rebates for energy efficient appliances (and encourage people to get rid of the old appliance as well because before when they did this type of thing they found that people kept both)
Can improved enforcement improve compliance with green building practices?	• Rick – knows there are challenges with enforcement, get a lot of bashing of DPNR but a lot of times it's by people who are doing something they're not supposed to. • Alexis and Ellerton - DBP's responsibility is to protect environment and citizens from things like structures getting undermined; need community organizations to help with documentation because often by the time DPNR gets to site, damage is done or activity is over; DPNR wants to have community orientations on each island and is planning to kick those off next FY about what DPNR does and doesn't do; trying to get process with heavy equipment operators so they get fined rather than or in addition to homeowners and contractors and equipment gets confiscated; issues in enforcing – need to hit person in pocket – sometimes hard for DPNR to find owners because deeds not filed • Alexis- Lack of restrictions on steep slope development, leads to DPNR having to allow projects that are ultimately going to become enforcement issues
What are some examples of Green Construction Projects and do you have any advice?	• Erin and Leonardo – small footprint, consider what you need in terms of size, keep natural ventilation and shading, often don't need expensive systems to do the same things, a lot is client input and engaging them on property • Winston – sister is LEEDS AP and led design team (US Green Building Assn qualification for practitioners to achieve certain level in energy efficiency) – promotes green building in energy use, building materials, site clearing in responsible way, reuse of waste from site; project was in states, rainwater collection and reuse, pavers, going for LEEDS silver; client enthusiastic initially but as costs went up needed more convincing; more up front expenses with this type of project but pays off later, about 25% more expensive than conventional projects up front
How can we incorporate the value of green building in appraisals?	• Alissa, Appraisal Board Chair – as people start to build more green, costs are higher but costs do not equal market value, a gentleman just built a LEEDS platinum but appraisal value is nowhere near because there were no projects to compare to especially because cost of components may decrease and that will affect value; appraisal board is federally regulated, audited every 2 yrs, all requirements come from DC, lenders are in control and don't care; how do you measure the value of a property and have that translate into appraisal value. • Erin - need to incorporate long-term maintenance cost reduction due to efficiency of green materials, better quality of materials • Sharon, Coral Bay – people are buying view, no one wants to remind people of cost of running some of these houses • Gary – need to move from monetary to resource economy; need to incorporate penalties in valuation; what's starting to be left are extremely steep areas; lurching into future that will require restrictions such as slopes • Alissa – now have appraisal management companies with people going down checklist and appraisers don't see lenders any more • Winston – cap and trade idea for resources, especially in appraising house based on

Topic	Comments
	carbon values/footprint which is a concept accepted worldwide; add category for consumption to home values • Marlon – coupled with view, do clients ever ask if water is clean? • Alissa – no and broker won't mention this • Marlon – is there a way to tell people why water is clean and why view is so pretty, economic valuation study was done in VI that also looked at real estate value, can we get this incorporated in sales? Can make study available for everyone and possibly have IGBA post it or link to it. • Alexis - Role of coral reef in our economy, calculate impact of runoff on corals and impact on economy • Leonardo and Erin – relating with nature, constructing studio and workspace in Bordeaux, constructing from steel and hardwood, no driveway just carry things up, keeping footprint very small and doing all work themselves, starting small but planning for expansion areas for future construction • Bill – education and energy cost will drive this; started designing solar, earth-sheltered, etc. in 1970s and, as energy costs went up, clients wanted operating costs to go down so were interested in building green. Then, when costs did go down, people weren't interested again. Passive solar doesn't cost anything; has found that most clients demand efficiency; one board member is in real estate and is finding clients ask about energy cost this will begin to drive market and appraisal market • Gary – should have cost per square foot information for buildings, problem with residential is that it varies with lifestyle • Sharon – WAPA has information on website and is on your bill regarding average energy costs, would be harder to do cost estimates with rental property
Regulatory or policy issues?	• Issue with subdivision roads because contractor/developer builds to size to meet federal highway standards in order to transfer road to local government rather than make it smaller which leaves it under homeowners association/property owners • Importance of forest communities for migratory bird species that use them during migrations in Caribbean, need to market this and not just reefs • Phytosanitary permit trying to minimize pests from Florida; no APHIS station here and it is essential that we establish facilities including for fumigating entire shipments

Subsequent to the workshop, Alissa Runyon sent a link to a draft document from the Appraisal Foundation addressing the key issues with, and recommendations for, incorporating of green design into the valuation process (download available at the following URL: https://appraisalfoundation.sharefile.com/download.aspx?id=s319e3972cbd4fe7a).

Field Trip

A safari was rented to transport participants to three separate field sites, one in Chocolate Hole/Pillsbury Bay area and two sites in Peter Bay. The first site, Tim Coyle's Residence, is an active construction site where the owner is adding onto an existing home voluntarily applying green design techniques that go beyond the requirements of USVI building code (**Figure 2**). The owner was there and led the discussion; he highlighted the following green design features of the site:

- Use of plastic grid pavers on the road right of way and in the proposed boat trailer storage area; he is watering to help establish Bermuda grass;

- Underground stormwater collection system for reuse of driveway runoff in landscape irrigation system; currently receiving muddy runoff from un-stabilized area; will want to clean out prior to hooking up to irrigation system;
- Relocation of plants on the property from construction area to newly constructed landscaped areas in the front;
- Installation of retaining wall graded to drain back towards property instead of down cliff-face; silt fence used to trap sediment and rock sloughing during wall construction; and
- Wastewater system with aeration chamber and chlorination system; includes an alarm notification system in case of pump failure.

The second site, #1 Peter Bay, is an occupied residence featuring a number of green design elements (**Figure 3**). Doug White was the architect for the home and led the field trip. He covered the following key points:

- Constructed wetland for wastewater treatment; aesthetically pleasing and provides better treatment than a conventional septic system;
- Green roof over carport;
- Replanting of beach species to enhance impacted vegetative buffer;
- Underground stormwater system collects driveway runoff for reuse in landscaping; trench drain, drain inlet with screen for organics, and overflow orifice with paved flume are included; and
- Diversion of stormwater runoff from upper watershed down beach access trail into a swale and sediment basin.

The third site was in upper Peter Bay and had been cleared within the last three weeks (**Figures 4A and 4B**). Dave Rosa led the field trip, which focused primarily on erosion and sediment control, construction sequencing, clearing and loss of valuable topsoil, and understanding the permitting and enforcement process.

In small groups, participants were asked to brainstorm suggestions for stormwater management at the site (**Table 3**).

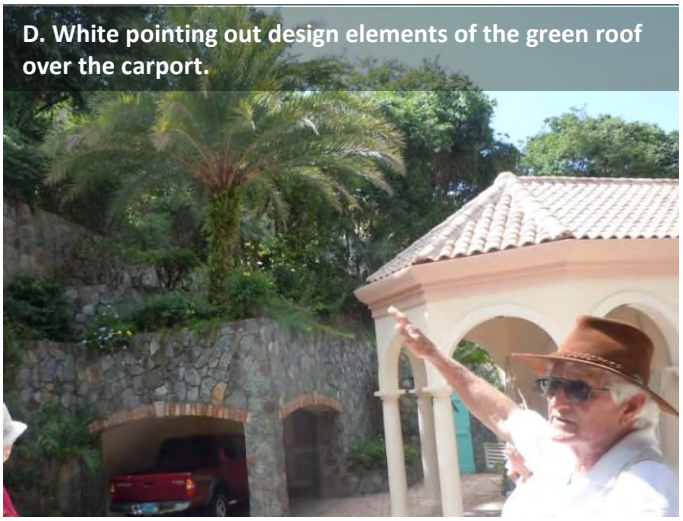
Next Steps

Workshop follow-up items include:

- Processing of training incentive certificates by IGBA;
- DPNR following up with upper Peter Bay construction site on alternatives to address stormwater runoff problems on site.
- Review and editing of video footage taken during the training for potential usage by IGBA in subsequent training or educational messaging.
- HW, NOAA, DPNR and IGBA to continue planning for additional trainings for agency staff, practioners, and homeowners on St. Thomas and St. Croix.

Figure 2. Field Trip to Tim Coyle's Residential Construction Site

Figure 3. Field Trip to #1 Peter Bay Residential Property



D. White pointing out design elements of the green roof over the carport.

Stormwater runoff from driveway is collected via trench drain and stored in underground tanks for reuse in irrigation system.

Participants observing the constructed wetland system used to treat wastewater. Traditional septic systems are no longer allowed in the coastal zone in the USVI.

Diversion berm installed on beach access trail to direct stormwater into vegetated swale/basin rather than direct discharge to the beach.

D. White explaining the importance of protective beach vegetation and describing additional plantings installed by homeowners.

Table 3. Summary of Stormwater Suggestions at Upper Peter Bay

Topic	Comments
Enforcement /Plan modification	• Suggested DPNR stop job until owners initiate mitigation plan. Measure actual and proposed disturbed area; if over 1-acre, site should have SWPPP. • Need to get rid of what was old septic tank after pumping. • Keep cut already made for access rather than cut another driveway and expand boulder wall near pool for turnaround, use area where excavator goes up as rest of road; • Should have saved topsoil during excavation; municipal compost/soil topper would be great to have because right now won't be able to plant as they eliminated all topsoil and are at bare rock (will be extremely costly to restore area to grade and vegetate).
Temporary management of runoff during construction	• Excavate sediment traps or employ other detention device, such as storage tanks, or dewatering bags, to collect runoff and allow for settling of particulates (**Figure 5A/B**). Consider using septic tank (cleaned) as a settling chamber for forebay of two-celled sediment trap at base of construction entrance. Consider terraced detention option with gabion baskets in flat area below retaining wall where old structure was located; • Provide stabilized ditch system along construction road to convey runoff non-erosively to sediment detention areas (**Figure 6**). Pitch road surface accordingly. Consider concrete swales or excavating infiltration swale along one-side of entrance road (filling with riprap); • If necessary, use waterbars or cross-drains across road surface to outlets where water can be piped down the slope into detention practices. It may be possible to use gravel cross-drains that can be driven over. • Pave the construction road and abandon proposed driveway. • Need stabilization of entrance, but difficult given grade. Perhaps use geoweb system to hold gravel, which could function as a construction entrance (**Figure 7**). • Include a concrete berm at bottom of entrance to further prevent sediment on road; daily sweeping/ shoveling where tracking is evident on road • Stabilize all erodible slopes with geotextile fabric and/or hydroseeding (**Figure 8**);
Long-term stormwater management	• Use pervious concrete pavers on road with at least 5 culverts incorporated in it • Use site on hill to make treatment wetlands in terraced area as a permanent post-construction solution to handle stormwater; could have terraces now but as troughs with small bridges as crossings, line troughs with rocks, place switchbacks with rock troughs at each bend with drop boxes for sediment; requires maintenance to clean sediment • Gabion baskets and gravel to slow down water and filter stormwater

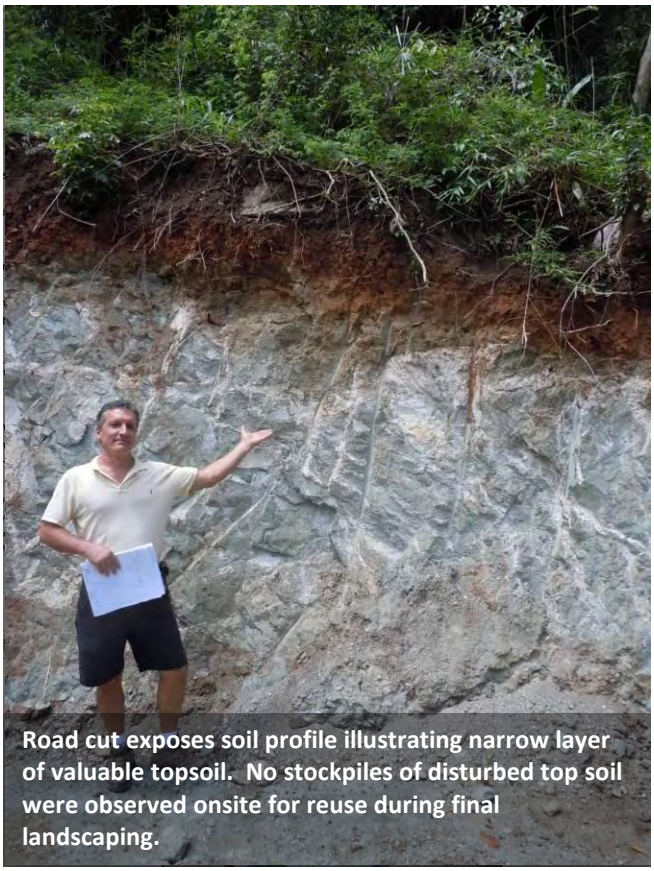
Figure 4A. Field Trip to Upper Peter Bay Construction Site

Clearing of the site and grading portion where retaining wall. This will be back filled with stockpile material.

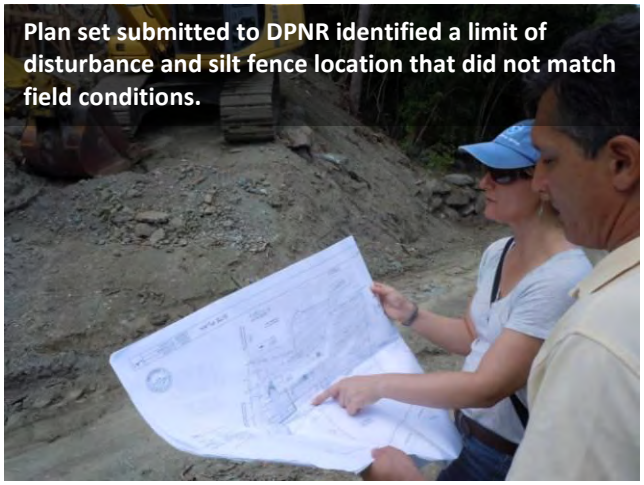
Steep access road exposes erodible soils with no measures in place to prevent erosion. This road is not intended to be the main driveway to the house.

Lower portion of entrance road is concrete. Sediment has accumulated on public roadway at base and downhill from entrance. Tracking of sediment evident along road.

Figure 4B. Field Trip to Upper Peter Bay Construction Site



Road cut exposes soil profile illustrating narrow layer of valuable topsoil. No stockpiles of disturbed top soil were observed onsite for reuse during final landscaping.



Plan set submitted to DPNR identified a limit of disturbance and silt fence location that did not match field conditions.

Exposed septic tank was found beneath contractor/worker vehicle parked on access road near entrance.

In small groups, workshop participants brainstormed options for managing stormwater runoff.

Unconsolidated material pushed down slope without protective sediment barriers called for on site plan.

Figure 5A. Examples of sediment traps and dewatering basin.

Example of a sediment trap from Whispering Hills residential construction site on St. Thomas used to capture runoff from construction access road.

Small sediment trap at base of steep construction road in Coral Bay, St. John.

Sediment basin with overflow pipe at construction site in Coral Bay, St. John.

Example of pipe slope drain to convey runoff down a steep slope into a sediment trap with rock reinforced overflow spillway.

Example of design with dewatering pipe and gravel stone base.

Figure 5B. Potential options for sediment trapping devices and conveyance structures (not all are needed).

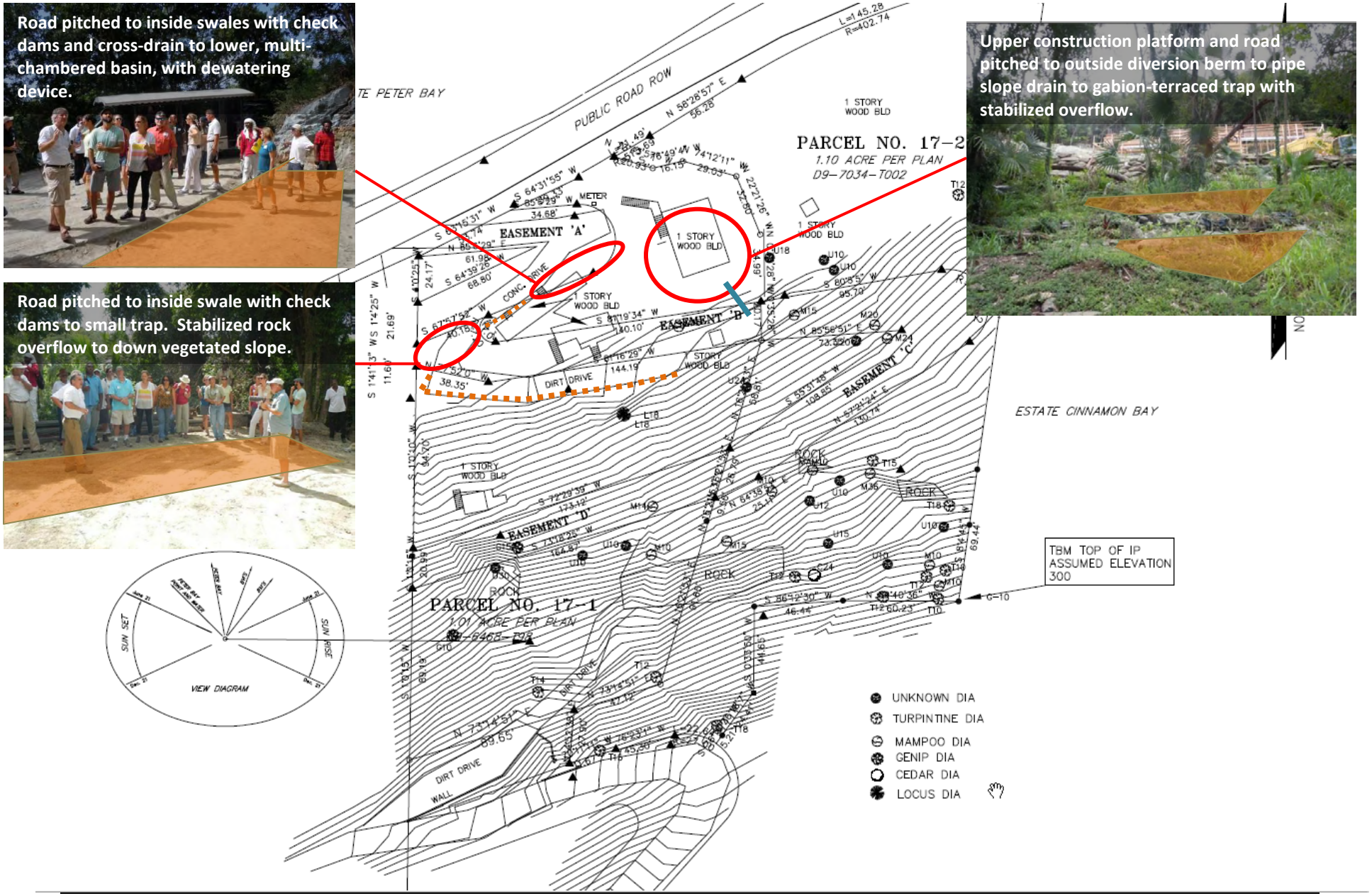


Figure 6. Examples of road-side conveyance systems.

Figure 7. Example of stabilized construction entrance and Geoweb® application for unpaved roads in St. John.

Figure 8. Example of materials that can be used to stabilize slopes.

Synthetic erosion control matting used to stabilize a channel bottom in Coral Bay.

Coir fiber erosion control blanket used to stabilize slopes and exposed soils at the Grandview construction site on St. Thomas.

Attachment A:

Workshop Packet Materials

Agenda
Evaluation Form
Participants List
IGBA Flyer
Green Certification Checklist (non-brochure format)
Native Landscaping Handout
DVD Users Guide

Green Construction Training

Tuesday, July 16, 2013
Cruz Bay, St. John, USVI

Agenda

Tuesday, July 16, 2013

8:30 **Registration/Sign In**

9:00-9:30 **Welcome** *(Lisamarie Carrubba, NOAA Fisheries/Bill Willigerod, IGBA)*
What is "green building" and the USVI Green Construction Training project? What resources are available and how do we access them? What does IGBA have to offer local practitioners?

9:30-10:15 **Building Green in the USVI** *(Doug White, Architect)*
What are the key tenets of building design that can reduce energy costs, utilize more sustainable construction materials, and minimize impacts on the environment. How can this be accomplished in the USVI?

10:15-10:30 **Break**

10:30-11:15 **The Reality of Going Green** *(Jonathan Smalls, DPNR/Anne Kitchell, HW)*
Ask the experts during a facilitated group discussion about the feasibility of implementation. Who are the professionals that can design and build green? What are the sources and cost of green construction materials from solar panels to sustainably harvested or recycled products? Are there permitting issues? What are available incentive programs?

11:15-12:00 **Landscaping for the Landscape** *(Gary Ray, Virgin Forest Nursery)*
Plant protection, selection, and layout tips to maximize the benefit and aesthetics of your vegetation, minimize maintenance, and discourage the spread of invasive species.

12:00-1:00 **Lunch**

1:00-4:00 **Green Construction Practices Field Trip** *(Dave Rosa, DPNR and others)*
Travel by safari to local construction sites to evaluate the application of green construction practices on site, inspect BMP implementation and maintenance, and discuss permitting and regulatory requirements.

Please wear clothing and safety equipment appropriate for being on construction sites!!

Green Construction Training
July 16, 2013
EVALUATION FORM

1. Please rate your agreement with the following statements. Circle your response.

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, NA = does not apply.

I understand the basic principles of green building design.	1	2	3	4	5	NA
I have a better understanding of how to implement green design principles.	1	2	3	4	5	NA
I know the basic steps for protecting and creating a "green" landscape.	1	2	3	4	5	NA
I could evaluate a site to determine if "green" construction practices are applied.	1	2	3	4	5	NA
I am likely to join IGBA or use some of their services or other resources.	1	2	3	4	5	NA

2. Strengths and Weaknesses:

Which aspects of the workshop did you consider most beneficial?

_____

Which aspects of the workshop did you consider least beneficial?

_____

3. Did this workshop meet your expectations? O Yes O No

4. Overall rating of the entire workshop:

Poor		Good		Excellent
1	2	3	4	5

5. What future training topics related to Green Building would you recommend:

_____

_____

Other comments:

THANK YOU FOR COMPLETING THIS FORM!

USVI Green Construction Training
Cruz Bay, St. John
July 16, 2013

Participants List

Rick Barksdale
The Summer's End Group, LLC
5000 Estate Enighed #63
St. John, VI 00830
340-777-9075
rickbarksdale@gmail.com

Gregg Bernstein
Asolare
917-232-6317
asolareusvi@gmail.com

Rafe H. Boulon
Retired DPNR/NPS - Consultant
5000 Estate Enighed, PMB#68
St. John, VI 00830
340-693-8524
rboulon@gmail.com

Colleen R. Brooker
Passiflora Designs
16213 Spring Garden
St John, VI 00830
340-513-1416
storytellervi@hotmail.com

Dan Carlsen
IGBA
5511 Upper Carolina
St John, VI 00830
340-201-6660
dac1943@hotmail.com

Lisamarie Carrubba
NOAA Fisheries Service
P.O. Box 1310
Boqueron, PR 00622
787-851-3700
lisamarie.carrubba@noaa.gov

Sabrina J. Castle
5000 Estate Enighed #530
St John, VI 00830
340-998-4808
s.castlelynn@gmail.com

Kevin Curtright
Passiflora Designs
16213 Spring Garden
St John, VI 00830
340-513-1416
storytellervi@hotmail.com

White Doug
dougkwhite@gmail.com

Mary Gallagher
IGBA
marydgallagher@gmail.com

Edgar W. Garcia
US Army Corps of Engineers
400 Fenandez Juncos Avenue
San Juan, PR 00901
787-729-6905
edgar.w.garcia@usace.army.mil

Ray Gary
virginforestvi@gmail.com

Parrilla Jayson
VIWMA
941-946 Williams Delight
Fredriksted, VI 00840
954-243-6596
jparrilla@viwma.org

Anne Kitchell
Horsley Witten
90 Route 6A
Sandwich, MA 02563
508-833-6600
akitchell@horsleywitten.com

Benita Martin
We Grow Food
STT, VI 00803
340-344-9118
Wgfi_vi@yahoo.com

Erin Moon
Design Per Square Inch
7015 Bordeaux
St. John, VI 00831
407-417-7945
moon.ec@gmail.com

Herishetapaheru P. Neb Ka RA
NBQD, LLC & PAI, INC
176-C WHIM ESTATES
FREDERIKSTED, ST. CROIX, US 00851
340-643-6273
nbkara@gmail,com

Glenis M. Padilla Plaza
CRCP NOAA
Carr 301 Km 5.1
Boqueron, PR 00622
787-851-3700
glenis.padilla@noaa.gov

Irene S. Patton
Friends of the VI National Park
509 Mongoose Junction
St. John, VI 00830
340-779-4816
i@pattongold.com

Leonardo Perez
Design Per Square Inch
7015 Bordeaux
St. John, VIi 00831
407-417-7944
ldpereza@gmail.com

Clemenceau Perry
340-771-1995
dalisnet@gmail.com

Gary Ray
Native Plant Specialist

Patricia C. Reed
Coral Bay Community Council
9901 Emmaus
St John, VI 00830
340-776-2099
triciareed@coralbaycommunitycouncil.org

David S. Rosa
DPNR - CZM
DPNR Office
St. John, VI 00830
340-693-8735
david.rosa@dpnr.vi.gov

Elissa R. Runyon
Mail 5000 Estate Enighed #116,
St. John, VI 00830
340-693-7488
bushwacker@viaccess.net

Allison Schenider
Guinea Grass Ventures, Trust
Estate Adrian
St. John, VI 00820
340-774-6683
calbrowne@aol.com

Emmaline Simmonds
Virgin Islands Waste
Management Authority
941-946 Est. Williams Delight
Frederiksted, St. Croix Virgin
Islands, US 00840
3240-712-498
esimmonds@viwma.org

Jonathan Small
DPNR CZM
Frederiksted, St. Croix
773-1082 Ext. 2229
jonathan.small@dpnr.vi.gov

Heidi Stout
6513 susanaberg
St. John, VI 00830
340-344-4056
Hstoutvi@gmail.com

Chaliese Summers
The Summer's End Group, LLC
5000 Estate Enighed #63
St. John, VI 00830
340-777-9075
chaliesesummers@gmail.com

David Turnbull
CAC member of the VIWMA
po box 10379
St. Thomas, VI 00801
340 513 7295
tbullbam@gmail.com

Adson Walwyn
340-771-1995
dalisnet@gmail.com

Doug White
Architect

Laurie L. Williams
Virgin Islands Waste management
Authority
941-946 Williams Delight
Frederiksted, VI 00840
340-690-4216
lwilliams@viwma.org

William Willigerod
16213 Spring Garden
St John, VI 00830
340-643-5313
william@willigerod.com

Winston C. Wilson
INDIGO ENGINEERING GROUP
CARIBBEAN LTD.
LUMBERYARD ST. JOHNS
CRUZ BAY, FL 33411
561-906-6542
NOSLIW1@GMAIL.COM

1.5 Waste Minimization & Recycling –

Develop a process to minimize waste during the construction phase and on-going building operations.

- Design for efficient use of materials during construction.
- Reuse onsite fill material and stone for landscaping.
- Salvage and reuse construction materials when remodeling.
- Design space for onsite composting of kitchen and garden waste.

1.6 Light Pollution –

Design an exterior lighting system that minimizes the amount of ambient light visible from outside the property.

- Eliminate outwardly shining lights on buildings, patios and decks.
- Use downward facing light fixtures on decks, pools and patios.
- Use ground level fixtures for driveways, paths and landscape lighting.

1.7 Visual Pollution –

Ensure that the visual impact of the building is in harmony with the surrounding community.

- Design structures in harmony and balance with the natural environment.
- Retain vistas on owner's property and respect adjacent property vistas.
- Preserve the visual privacy of the property, adjacent properties and those across a valley.
- Create landscaped screens to hide onsite parking areas for structures and roads.

1.8 Landscaping, Green Belts & Native/Natural Vegetation –

The preservation of the existing natural vegetation of a site is the simplest and most cost effective form of landscaping. This vegetation is already well-established onsite and will survive in our extreme environment without constant irrigation.

- Use native xeriscopic landscaping (plants that will survive in a dry climate) wherever practical.
- Carefully consider and plan for the effective use of imported exotic tropical vegetation which is not self sustaining (requiring continuous watering). It may be invasive, crowd out native species and carry diseases and pests which kill native vegetation. The native century plant, *agave missionium*, is currently being devastated on St. John by a non-native beetle, probably imported in an exotic agave.
- If imported tropicals are used in landscaping, it is suggested that their use be concentrated around buildings where the most environmental disruption has taken place during construction. In this way, the perimeter greenbelt around the property can remain undisturbed natural/native vegetation.
- Owners are encouraged to try to minimize the use of chemical fertilizers, herbicides and pesticides that will leach into the substrata and eventually into the ocean. Natural and organic remedies are recommended.

ISLAND GREEN BUILDING ASSOCIATION

IGBA, c/o Friends of V.I. National Park, P.O. Box 811, St. John, VI 00831-0811

Telephone: 340-779-4940 • Fax 340-693-9973

e-mail: info@igba-stjohn.org • www.igba-stjohn.org

Brochure printing funded by: Water Resources Research Institute, University of the Virgin Islands

U.S. Geological Survey, Water Resources Institute

Island Green Building Association

IGBA

www.igba-stjohn.org

St. John, U.S. Virgin Islands

Promoting Responsible and Sustainable Development on St. John, USVI

Island Green Building Association

The Island Green Building Association (IGBA) was established in 2004, by a group of concerned construction industry professionals and island residents. Our organization, with a perspective on the fragile nature of our environment, is concerned that road and building construction have adversely affected our island's natural ecological resources. We believe this environmental degradation is worsening and places the quality of life and the economic well-being of the island at great risk.

Growth is inevitable. Members of IGBA believe that the loss and compromise of our environmental and cultural resources are not. When planned and completed in a sustainable and environmentally responsible way, residential, commercial and infrastructure development can help preserve and protect the spectacular beauty and natural diversity that provide ecological health, sense of community and the unique quality of life found on St. John.

Environment, Culture, and Community

The quality of our lives is dependent on the quality of our surroundings, our culture and our community. When we embrace and celebrate our relationship to the natural world and our neighbors, we create a sustainable and thriving community.

Like other small mountainous Islands of the Caribbean region, St. John is endowed with an **environment** of natural beauty, great weather and priceless biological diversity from ridge top to coral reef. However, the lush cover of our island masks many intrinsic challenges to responsible development. Steep slopes, shallow, erodable soils and drenching rainfall combine to create site conditions requiring special considerations in order to reduce erosion, pollution and destruction of marine and terrestrial communities. With only 5% of the island developed and more than three-quarters with slopes greater than 35%, special care must be used in planning and constructing buildings and roads. IGBA's intent is to promote the use of development practices that reduce or eliminate these negative impacts on our land and sea resources.

IGBA MISSION STATEMENT

IGBA members provide leadership by example, advice, and counsel on sustainable and environmentally responsible development and are committed to practicing these ***Guiding Principles***.

- TO PROMOTE the construction of roads, buildings and other structures in harmony and balance with the fragile ecosystems and priceless natural beauty of St. John by providing practical recommendations to owners and builders on environmentally appropriate design, materials and site development practices.
- TO HELP preserve the native vegetation, traditional cultures and lifestyles of St. John by placing environmental and social sustainability at the core of practices and professional responsibilities.
- TO DEVELOP and continually improve practices, procedures, products, services and standards for tropical green building design and construction to create healthy environments.
- TO EDUCATE the building industry, clients and the general public about the importance of sustainable green building design and construction.
- TO WORK to change policies, regulations and standards in government and commerce so that sustainable green building design and construction become fully supported standard practices.
- TO BRING the existing built environment up to green building standards.
- TO ACHIEVE definable, measurable green building results within each project undertaken.

The people, social customs, traditions and activities of daily life form a **culture** unique to each geographical place. The Caribbean, a blend of many cultures, is teeming with music, literature, art, architecture, flavors, dress and language. This culture is reflected in the style, structure and layout of Caribbean homes and Community buildings. These vernacular design elements are both pleasing and practical in our tropical environment. IGBA's intent is to promote the use of these design elements wherever practical.

Those who call St. John home, have a special feeling of place, **community** and a pace of life slower, more respectful and polite than the bustling mainland. While St. John's landscape is changing, its cultural foundation is solid and diverse. IGBA's intent is to help preserve this cultural foundation by respecting our neighbors, our heritage and the way of life of our many different communities.

The Green Building Guidelines that follow are presented to help reduce the negative impacts of building construction practices on our natural environment, especially the impacts due to loss of natural vegetation cover and sedimentation.

If you are a builder or property owner and are planning to have a building, driveway or roadway constructed, you can help by making certain that you and all of the contractors that you hire agree to follow these guidelines. With your help, we can make a difference, a huge difference in protecting our resources and our quality of life.

GUIDELINES of SUSTAINABLE GREEN BUILDING DESIGN & CONSTRUCTION:

– BUILDING CONSTRUCTION –

1.1 Site Planning and Design –

Design the site to achieve the functional requirements of the development with minimum site disturbance and maximum environmental protection.

- Make every effort to retain native/natural vegetation on the site by clearly delineating the areas of the property to be left undisturbed.
- Utilize building setbacks as green belt areas along roads and property lines.
- Develop surfaced onsite parking areas to minimize runoff and eliminate on road parking.
- Develop an excavation, storm water drainage and erosion control plan to minimize site run off and pollution of the environment. Maximize collection and retention of storm water on the property through the use of berms, swales, settlement terraces and landscape irrigation. Systems should be designed to handle very heavy rainfall.
- Use cleared brush for down slope diversion berms. Compost on site, rather than burn the remaining cleared brush.

1.2 Building Structure –

Design the building to be responsive to and reflective of tropical architectural design considerations, including trade winds and sun paths.

- Developments within low density development areas (such as the National Park) should be respectful of the areas' rural character and construct low-profile structures that blend into the extent possible.
- Use renewable, recyclable, local, sustainably produced, non-toxic materials.
- Design for protection against hurricanes and earthquakes.
- Use Caribbean (vernacular) architectural design elements.
- Design for lifecycle cost considerations with quality, low maintenance materials and systems.

1.3 Water Management –

Develop a water management and conservation plan for each building or structure.

- Use an ecologically balanced onsite sewage disposal system (where not connected to a municipal sewer system).
- Develop rain water and gray water collection systems to maximize retention on site and minimize runoff.
- Use non-potable (gray) water for landscape irrigation.

1.4 Energy Conservation & Management –

Design an energy system that maximizes the use of renewable energy.

- Use solar hot water heating.
- Include photovoltaic (solar) and wind energy systems for auxiliary electric power where practical.
- Minimize the need for air conditioning by using a building orientation that takes maximum advantage of trade winds and minimizes heat gain within the structure from solar radiation.
- Design energy efficient, sealed, insulated building envelopes for climate-controlled spaces, when air conditioning is required.

The Island Green Building Association:

Become a member of IGBA today and learn more about our organization at **www.igbavi.org**

- *Hosts Green Thursdays seminars on topics like recycling and renewable energy*
- *Encourages green development with various programs, including educational outreach and green building certifications*

ReSource Depot

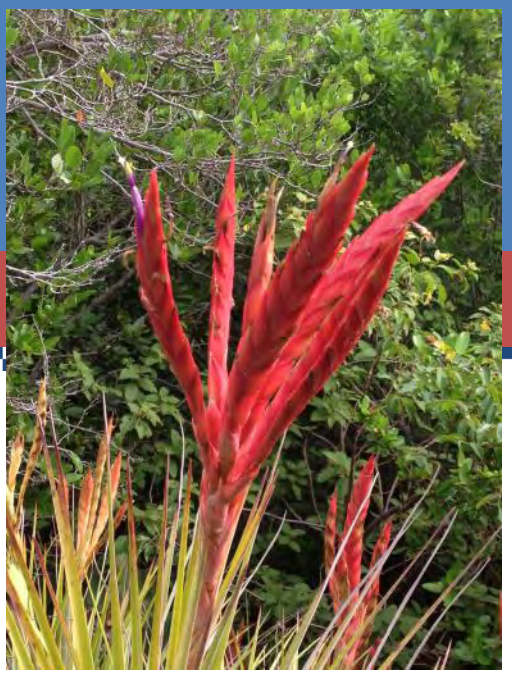
Open Sat. 8 a.m. to noon / Mon. & Thurs. 7:30 a.m. to noon
Located at Gifft Hill & Centerline, across from the Transfer Station

- *Buy new and gently used building materials, home decor and furnishings at a fraction of the cost*
- *Donate goods for a tax write-off*
- *Help us continue to divert thousands of pounds of waste from local landfills!*

Keep up with sales and events at www.facebook.com/IslandGreenBuildingAssociation

Natural Communities as Landscaping

Training Workshop on Sustainable Building and Landscaping



Native Plants are Replacing Imports

Principles of Native Landscaping

1. Contact a local botanist to conduct a pre-shovel vegetation inventory of site to search for rare & valuable plant species and get siting advice to protect valued natives and natural habitats

2. Minimize natural vegetation removal when excavating

3. Barricade important plants to protect priceless specimens

4. Remove carefully important plants within building footprints (with minimal root damage) for rescue propagation and re-use in landscaping

5. Find a propagator for *locally produced* natives for final landscaping

Native bromeliad “blood sword” (*Tillandsia fasciculata*) is hardy and charismatic

Integrating natural plant communities into the residential design adds priceless passive landscaping

Protect our natural heritage by selecting locally produced native plants for landscaping.

Keys to a Natural and Sustainable Landscape

- Preserving existing natural vegetation of a site is the simplest and most cost effective form of landscaping – saving water, minimizing erosion and weed infestations.
- Natural vegetation, if not severely disturbed, is gorgeous and it will survive in our droughty environment without irrigation.
- Native trees and shrubs should be used to re-vegetate and stabilize slopes and cut banks; native plants can work with biodegradable geo-fabrics.
- Bare soils should be mulched or re-seeded as soon as possible.
- If exotic ornamentals are used, selecting species that are **non-invasive** is ecologically and economically crucial in the long run.
- International shipping of nursery plants has added

Our Islands Our Future

USVI Green Building Training

In response to the growing recognition that conventional development practices in the USVI have led to natural resource impacts and water quality impairments, NOAA, DPNR and the Island Green Building Association (IGBA) have teamed up to provide:

- Guidance on practical siting, design, and construction practices to improve energy efficiency, conserve valuable soils and vegetation, and reduce impacts of erosion and stormwater runoff;
- Technical materials directed towards engineers, architects, builders, heavy equipment operators, agencies, and homeowners;
- Hands-on training planned for St. John, St. Thomas, and St. Croix; and
- Free memberships and other incentive packages from IGBA.

For more information on green building practices in the USVI and upcoming training workshops, go to:
www.igbavi.org

Or Contact:

Lisamarie Carrubba, NOAA Fisheries
lisamarie.carrubba@noaa.gov (p) 787-851-3700

Anne Kitchell, Horsley Witten Group
akitchell@horsleywitten.com (p) 508-833-6600

How do I Use Available Training Materials?

NOAA and other local partners have prepared educational materials that you can access to learn more about green building design and construction techniques or use to provide instruction to others. Specifically, these materials include slideshows and videos that can be used in a classroom setting, or viewed on your personal computer. Supplemental field manuals are also provided that can be used to guide hands-on learning activities.

Step 1. Verify that your computer software is compatible. These materials are currently in .ppsx format and require Microsoft Powerpoint 2007 or a more recent version. Free universal file viewers are available for download on the internet. Note that the slideshows contain embedded videos. The videos are in Quicktime (.mov file extension) and can be viewed with most media players.

Each slideshow is organized by Lessons and can be viewed at your own pace.

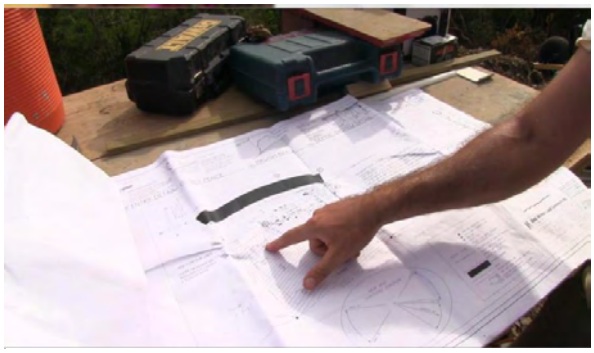
Step 2. Materials are divided by user category: designers, implementers (contractors, heavy equipment operators), agency personnel, and homeowners and others. Determine which interests you and select the appropriate slideshow or field manual from the DVD provided, or by going to IGBA's website (click on the Resources tab from the homepage and select "training slideshows" from the drop down menu) at http://www.igbavi.org.

Note that some of the information is the same in each set of modules while some is more detailed based on the intended audience.

Five videos are available starring local architects, native plant specialists, and government employees.

Step 3. If you are self-educating, each slideshow begins with an introduction that explains the goals and learning objectives of the material that will be presented. Go through the slideshows at your own pace. Each slideshow is divided into the following lessons:

Lesson 1: Guide to Green Design
Lesson 2: Guide to Site Assessment & BMP Selection
OR
Homeowners Guide to Choosing the Best Site
Lesson 3: Guide to Managing the Construction Process
Lesson 4: Guide to Green Landscaping



Field manuals give instruction for hands-on activities that can be used to reinforce classroom lessons.

Step 4. If you are looking for someone to provide training, contact IGBA or Jonathan Small at DPNR CZM 302-773-1082 Ext. 2229 or jonathan.small@dpnr.vi.gov.

Attachment B:

Sign in sheet
Final Participants List
Evaluation Form Summary

Green Construction Training
July 16, 2013
EVALUATION FORM

N=12

1. Please rate your agreement with the following statements. Circle your response.

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, NA = does not apply.

	1	2	3	4	5	NA	AVG
I understand the basic principles of green building design.	8%			50%	42%		**4.2**
I have a better understanding of how to implement green design principles.	8%			67%	25%		**4.0**
I know the basic steps for protecting and creating a "green" landscape.	8%			67%	25%		**4.0**
I could evaluate a site to determine if "green" construction practices are applied.		8%	18%	33%	33%	8%	**4.0**
I am likely to join IGBA or use some of their services or other resources.	8%	8%		25%	50%	8%	**4.1**

2. Strengths and Weaknesses:

Which aspects of the workshop did you consider <u>most</u> beneficial?

- Lectures (2)
- Presentations and tour
- All excellent (3)
- Design and construction (2)
- Field trip (2)
- Group discussion

Which aspects of the workshop did you consider <u>least</u> beneficial?

- Last house at Peter Bay
- Group discussion in the classroom
- Nothing (2)
- permitting
- would like an outline or brief handout; include a list of contacts
- First house on field trip
- Lengthy presentations

3. Did this workshop meet your expectations? ○ Yes ○ No

100% 0%

4. Overall rating of the entire workshop:

Poor		Good		Excellent	**AVG**
1	2	3	4	5	
		8%		92%	**4.8**

5. What future training topics related to Green Building would you recommend:

- Hands-on landscaping (2)
- Sewage treatment planning
- DPNR requirements and Army Corps regulations
- Constructed wetlands
- Runoff natural and manmade
- Structural, finishes, alternative energy
- Composting
- Recycling
- Pass sustainable design strategies
- Site prep and mitigation

Other comments:

- Thanks! excellently managed
- Thank you
- Keep up the good work
- Thank you for lunch
- Very well planned, great speakers and slideshows

USVI Green Construction Training
Cruz Bay, St. John
July 16, 2013

FIELDTRIP WAIVER

Last Name	First Name	Agency	Sign In	Sign Out	Lunch Choice
Barksdale	Rick	The Summer's End Group, LLC		✓	STJ CUBAN #28
Bernstein	Gregg	Asolare			
Boulon	Rafe H	Retired DPNR/NPS - Consultant		✓	— #28
Brooker	Colleen R	Passiflora Designs	Colleen Brooker	✓	#2
Carlsen	Dan	IGBA	Dan Carlsen	✓	#12
Carrubba	Lisamarie	NOAA Fisheries Service		✓	tuna melt with cheddar #16
Castle	Sabrina J			✓	#12
Curtright	Kevin	Passiflora Designs	Kevin Curtright	✓	#7
~~Doug~~	~~White~~	PEND			
Gallagher	Mary	IGBA			#14
Garcia	Edgar W	US Army Corps of Engineers		✓	
Gary	Ray			✓	#2
Jayson	Parrilla	VIWMA			
Kitchell	Anne	Horsley Witten	Anne Kitchell	✓	tuna melt #16
~~Martin~~ CELAIRE	~~Benita~~ Bowchi	We grow food	Bolaw	✓	
Moon	Erin	design per square inch	Erin Moon	✓	
Neb Ka RA	Herishetapaheru P	NBQD, LLC & PAI, INC	HERE	✓	
Padilla Plaza	Glenis M	CRCP NOAA	GlenisPP	✓	#12 Smoked turkey
Patton	Irene S	Friends of the VI National Park	Irene Patton	✓	OK
Perez	Leonardo	design per square inch		✓	
Perry	Clemenceau				

Greek Salad ✓

#2 ✓
#3 ✓

#4 ✓

Last Name	First Name	Agency	Sign In	Sign Out	Lunch Choice
Reed	Patricia C	Coral Bay Community Council	HERE	✓	
Rosa	David S	DPNR - CZM	DS Rosa	✓	#12 ✓
Runyon	Elissa R			✓	#3 hummus & veggies (not sourdough pita) ✓
X Schenider	Allison	Guinea Grass Ventures, Trust			
X Simmonds	Emmaline	Virgin Islands Waste Management Authority			
Small	Jonathan	DPNR CZM	HERE		
Stout	Heidi			✓	#12 ✓
Summers	Chaliese	The Summer's End Group, LLC		✓	#13 ✓
Turnbull	David	CAC member of the VIWMA		✓	#16 ✓
X Walwyn	Adson				
X Williams	Laurie L	Virgin Islands Waste management Authority			
Willigerod	William	William Willigerod, P.C.		✓	#13 ✓
Wilson	Winston C	INDIGO ENGINEERING GROUP CARIBBEAN LTD.		✓	#14 ✓
Hibbert	Marlon	NOAA CRCP		✓	11 #29. ✓
Mulder	Cherie			✓	
WHITE	DOUG	(6B)7		✓	#2. ✓
STELZER	WILLIAM	VIDEO		✓	#12. ✓
Nelson	Gabrielle	Dr. Cool		✓	
Downing	Alexis	DPNR-Parks		✓	
Ellenton	Maynard	" "		✓	#12 ✓
HANK	KRISTIN	—		✓	#12 ✓
COLDREN	SHARON	Coral Bay Com Council		✓	#12 ✓
VAHLING	KAREN	Friends of VINP		✓	#3 ✓ #13 ✓
Joseph	Daniel	Energy Office			

Last Name	First Name	Agency	Street	City	State	Zip	Day Phone	Organization	Email	IGBA Member	Depot	Pro Member	Green Leaf I	Certificat	Consultation
Barksdale	Rick	The Summer's End Group, LLC	5000 Estate Enighed #63	St. John	VI	00830	(340) 777-9075	other	rickbarksdale@gmail.com	X				X	
Bernstein	Gregg	Asolare					(917) 232-6317		asolareusvi@gmail.com				X		
Bowchi	Celaire	We grow food	Po box 307225	STT	Vi	00803	(340) 344-9118	other	Wgfi_vi@yahoo.com			X			
Boulon	Rafe H	Retired DPNR/NPS - Consultant	5000 Estate Enighed, PMB#68	St. John	VI	00830	(340) 693-8524	other	rboulon@gmail.com				X		
Brooker	Colleen R	Passiflora Designs	16213 Spring Garden	St John	VI	00830	(340) 513-1416	Landscaper	storytellervi@hotmail.com			X			
Carlsen	Dan	IGBA	5511 Upper Carolina	St John	VI	00830	(340) 201-6660	other	dac1943@hotmail.com	X	X		X		
Carrubba	Lisamarie	NOAA Fisheries Service	P.O. Box 1310	Boqueron	PR	00622	(787) 851-3700	other	lisamarie.carrubba@noaa.gov						
Castle	Sabrina J		5000 Estate Enighed #530	St John	VI	00830	(340) 998-4808	Architect	s.castlelynn@gmail.com		X	X			
Coldren	Sharon	Coral Bay Community Council	9901 Emmaus	St John	VI	00830	(340) 776-2099	other	coralbaycommunitycouncil@hotmail.com						
Curtright	Kevin	Passiflora Designs	16213 Spring Garden	St John	VI	00830	(340) 513-1416	Landscaper	storytellervi@hotmail.com						X
Daniel	Joseph	Energy Office	4605 Tutu Park Mall Suite 231	St. Thomas	VI	00802		Agency	joseph.daniel@eo.vi.gov						
Doward	Alexis	DPNR-Building Permits	#45 Mars Hill	FREDERIKSTED, ST. CROIX	VI	00840		Agency	alexis.doward@dpnr.vi.gov						
Gallagher	Mary	IGBA							marydgallagher@gmail.com				X		
Garcia	Edgar W	US Army Corps of Engineers	400 Fenandez Juncos Avenue	San Juan	PR	00901	(787) 729-6905	other	edgar.w.garcia@usace.army.mil						
Hawk	Kristin		9901 Emmaus	St John	VI	00830	(910) 547-8688		kristin.elaine.hawk@gmail.com				X		
Hibbert	Marlon	NOAA CRCP	Almeric Christian Federal Building 3	Christiansted, St Croix,	VI	00820-42	340-244-2339	Agency	marlon.hibbert@noaa.gov						
Jayson	Parrilla	VIWMA	941-946 Williams Delight	Fredriksted	VI	00840	(954) 243-6596	Engineer	jparrilla@viwma.org			X			
Kitchell	Anne	Horsley Witten	90 Route 6A	Sandwich	MA	02563	(508) 833-6600	other	akitchell@horsleywitten.com						
Maynard	Ellerton	DPNR-Building Permits	#45 Mars Hill	FREDERIKSTED, ST. CROIX	VI	00840		Agency	ellerton.maynard@dpnr.vi.gov						
Moon	Erin	design per square inch	7015 Bordeaux	St. John	VI	00831	(407) 417-7945	Architect	moon.ec@gmail.com		X				X
Mulder	Cherie		1401 McLean Mews Ct.	McLean	VA	22101	(703) 618-4300	other	cmulder26@cox.net				X		
Neb Ka RA	Herishetapaheru P	NBQD, LLC & PAI, INC	176-C WHIM ESTATES	FREDERIKSTED, ST. CROIX	US	00851	(340) 643-6273	Contractor	nbkara@gmail,com			X			
Nelson	Gabrielle	Dr. Cool A/C & Appliances	5000 Estate Enighed PMB #31	St. John	VI	00830-10	(340) 693-9071	Design	gabrielle@drcool.com			X			
Padilla Plaza	Glenis M	CRCP NOAA	Carr 301 Km 5.1	Boqueron	PR	00622	(787) 851-3700	other	glenis.padilla@noaa.gov						
Patton	Irene S	Friends of the VI National Park	509 Mongoose Junction	St. John	VI	00830	(340) 779-4816	other	i@pattongold.com	X	X				X
Perez	Leonardo	design per square inch	7015 Bordeaux	St. John	Vi	00831	(407) 417-7944	Architect	ldpereza@gmail.com		X				X
Perry	Clemenceau						(340) 771-1995		dalisnet@gmail.com						
Ray	Gary	Virgin Forest Restorations	9901 Emmaus	St. John	VI	830	(340) 514-0457	Landscape	virginforestvi@gmail.com	X	X				
Reed	Patricia C	Coral Bay Community Council	9901 Emmaus	St John	VI	00830	(340) 776-2099	other	triciareed@coralbaycommunitycouncil.org		X		X		
Rosa	David S	DPNR - CZM	DPNR Office	St. John	VI	00830	(340) 693-8735	other	david.rosa@dpnr.vi.gov		X				
Runyon	Elissa R		Mail 5000 Estate Enighed #116,	St. John	VI	00830	(340) 693-7488	other	bushwacker@viaccess.net		X	X			
Schenider	Allison	Guinea Grass Ventures, Trust	Estate Adrian	St. John	VI	00820	(340) 774-6683	other	calbrowne@aol.com				X		
Seltzer	Bill	Videographer	pobox 354	St. John	VI	00831		other							
Simmonds	Emmaline	Virgin Islands Waste Management Authority	941-946 Est. Williams Delight	Frederiksted, St. Croix Virgi	US	00840	(324) 071-2498	Landscaper	esimmonds@viwma.org			X			
Small	Jonathan	DPNR CZM	#45 Mars Hill	Frederiksted, St. Croix Virgi	US	00840	(340) 773-1082	agency	jonathan.small@dpnr.vi.gov						
Stout	Heidi		6513 susanaberg	St. John	Vi	00830	(340) 344-4056	other	Hstoutvi@gmail.com		X		X		
Summers	Chaliese	The Summer's End Group, LLC	5000 Estate Enighed #63	St. John	VI	00830	(340) 777-9075	other	chaliesesummers@gmail.com	X		X			
Turnbull	David	CAC member of the VIWMA	po box 10379	St. Thomas	VI	00801	(340) 513-7295	Contractor	tbullbam@gmail.com				X		
Vahling	Karen	Friends of the VI National Park	16805 Freemans Ground	St. John	VI	00830		other							
Walwyn	Adson						(340) 771-1995		dalisnet@gmail.com				X		
White	Doug	Doug White Architect	11317 Hansen Bay	St. John	VI	00830	340-690-0217	Architect	dougkwhite@gmail.com	X	X				
Williams	Laurie L	Virgin Islands Waste management Authority	941-946 Williams Delight	Frederiksted	VI	00840	(340) 690-4216	Engineer	lwilliams@viwma.org			X			
Willigerod	William	William Willigerod, P.C.	16213 Spring Garden	St John	VI	00830	(340) 643-5313	Architect	william@willigerod.com	X	X				
Wilson	Winston C	INDIGO ENGINEERING GROUP CARIBBEAN L	LUMBERYARD ST. JOHNS	CRUZ BAY	FL	33411	(561) 906-6542	Engineer	NOSLIW1@GMAIL.COM	X	X	X			
											Total	11	11	1	4
organizers															
did not sign in/sign release form															