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WORKSHOP SUMMARY

TO: Fran Castro, Kaitlin Mattos, and Clarissa Bearden, CNMI BECQ

FROM: Anne Kitchell, HW

DATE: July 29, 2015

RE: Summary of Pacific Island Watershed Institute II: Managing Your Drainage Infrastructure

This memorandum provides a summary of the second Pacific Islands Watershed Institute (PIWI2) held May 20-22, 2015 at the Susupe Multi-Purpose Center on Saipan, CNMI. The PIWI2 was a three-day training workshop sponsored by the CNMI Bureau of Environmental and Coastal Quality (BECQ) and NOAA and conducted by Horsley Witten Group (HW) and the Center for Watershed Protection (CWP), with support from CUC. PIWI2 included hands-on training focused on illicit discharge detection and elimination (IDDE), stormwater BMP tracking and maintenance, and drainage improvements for unpaved roads. Most of the course was spent in the field.

PIWI2 offered opportunities for inter-island sharing, such as BECQ staff explaining to Guam CMP staff how to use this Conductivity/PH meter (photo: John Fraser).

The purpose of the PIWI2 was to: 1) dig into the weeds of why watershed infrastructure matters; 2) understand the mapping, monitoring, maintenance, and design needs of stormwater systems and unpaved road networks; and 3) provide a forum of networking and technical collaboration for island watershed practitioners.

In addition, products from the PIWI2 included transfer of 2 ammonia field meters to BECQ, updates to drainage mapping and additional water quality data for a portion of Garapan's drainage network, elimination of at least one illicit discharges, new mapping of stormwater BMPs around the Saipan; completed maintenance inspections of 5 individual BMPs, raingarden maintenance, and concept designs for stabilizing GapGap Rd. and the Dive Site in the LaoLao Bay watershed.

There were 36 participants on average each day of the Institute representing territorial and federal agencies, engineering firms, and consultants from CNMI, Guam, and Pohnpei. Each

participant was provided a PIWI2 folder that included a copy of the daily agendas, a registrant's list, evaluation form, and hand outs for each of the field activities. A hard copy of the *2014 Stormwater Management in Pacific and Caribbean Islands: A Practitioner's Guide to Implementing LID.* In an effort to reduce paper/printing, copies of slideshows were not included in the workshop materials, but are posted, along with digital copies of handouts and other resources on the PIWI2 webpage for individual download (see http://www.horsleywitten.com/PIWI2/.

A number of local individuals provided information and data, as well as planning and coordination assistance to make this event possible: Kaity Mattos, Clarissa Bearden, Carlos and other BECQ staff; Brian Bearden, CUC; Derek Chambers, BECQ; Tim Lang; James Ripple, DPW; and Dana Okano, NOAA.

This memo is further organized as follows:

PIWI2 included both classroom sessions and field trainings each day.

1.0 Day 1 Illicit Discharge Investigations & Drainage Mapping

Day 1 involved a classroom presentation on the programmatic and technical elements of an IDDE program including mapping and prioritizing target areas and outfalls, field screening, investigations, compliance & elimination of pollutants from system, as well as field procedures and safety, and key screening factors and equipment.

Outfalls were sampled using the field equipment, however submerged and clogged conditions make detecting the sources of discharges challenging (Photo: John Fraser).

Participants were then divided into four groups and sent out into pre-designated areas of Garapan to use simple field test kits, smokers, and other methods to investigate the drainage system and detect illicit discharges. Field maps were provided with preliminary drainage infrastructure (Figure 1). Teams walked the streets, opened manholes and inlet grates, where feasible, and collected water samples at outfalls, drain inlets, open water features for the following parameters: ammonia, bacteria, conductivity, temperature, and pH (Figure 2). Information on pipe sizes, elevations, and condition was also collected for structures. Potential stormwater hotspots were identified and mapped.

Water samples were taken to a mobile field lab set up in the American Memorial Park parking lot, where Ammonia tests could be completed and bacteria samples collected for transfer to BECQ's lab for analysis.

In addition, CUC set up a demonstration of a smoke test in closest drain line to the AMP. In advance of the workshop, a number of optical brightener tests were deployed in the field as an experiment (Figure 3). These were retrieved and returned to the Multi-Purpose Center for drying and evaluation using a black light. Findings from the water quality sampling were presented to group on the last day of the PIWI2 and included some of the following results:

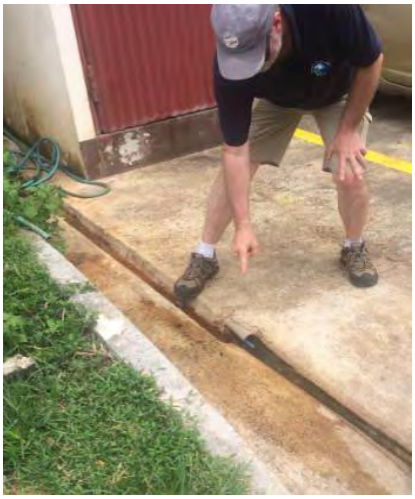
- The system was flooded, which makes it hard to do an analysis using the IDDE procedures demonstrated; however,
- We indentified a few hotspots, including an active illicit discharge that was reported and rectified while we were doing the training;
- Ammonia samples were indicative of chronic sewage leakages throughout the system. Samples collected nearest to the outfalls in the Dai-Ichi channel had the lowest ammonia levels (~1 ppm or less), and these levels increased as we moved higher in the system. This is likely due to more dilution with seawater and groundwater as you moved down towards the ditch. The inlets near the Paseo had the highest readings (2-2.5 ppm). In fact, one sample collected at Kinpachi on Plumeria Ave. had to be diluted three times in order to be read by the Ammonia meter!

- Bacteria samples were extremely variable; however, many exceeded water quality thresholds.
- Optical brighteners were not conclusive, given that they were bleached, hard to deploy, and compromised in a flooded system.
- A large number of staff were trained on using the equipment and how to properly collect samples.
- Many of the drainage structures were hard to get into, which means that it is hard to provide adequate maintenance at those locations.
- Preliminary drainage maps need to be revised to reflect field findings. All field maps were turned over to BECQ.

Figure 1. *Field maps with preliminary drainage infrastructure were used to pre-select areas for investigation and to provide ID #s for outfalls and drain inlets. CUC and BECQ provided most of the basemap layers. Drain inlets were previously mapped by BECQ as park of the stormdrain marking campaign. The preliminary pipe network was based on a review of Winzler and Kelly stormwater assessment plans.*

Figure 2. *Participants were divided into three groups to collect water quality samples, complete data sheets, measure pipe inverts, obtain results at the mobile lab, and observe smoke test demonstrations.*

***Figure 3**. PIWI participants represented a number of the Pacific Islands*



***(Left)** location of sample at Kinpachi on Plumeria Ave that required three dilutions in order to be read by the Ammonia Kit.*

***(Right)** An active illicit discharge was identified during the field training, it was called in and repaired by the end of the day.*

2.0 Day 2 Managing Your Stormwater Infrastructure

The objectives of Day 2 included visiting a variety of existing stormwater BMPs, discussing the pros and cons of different design features, and learning how to evaluate performance and maintenance needs. The morning classroom sessions were dedicated to post-construction stormwater program elements of the NPDES program and an introduction to the application of LID and green infrastructure in the islands based on the 2014 Island BMP Guide.

Participants were divided into three groups to tour five existing stormwater BMPs, including a constructed wetland at AMP, a rain garden at San Vicente Elementary School, a newly constructed organic filter at the Kagman Joeten, a newly constructed multi-celled ponding basin at the Micronesian Brokers, and a detention (ponding) basin at the Kagman Mobil station (Figure 4). Both ponding basins included an underground oil/water separator device as pre-treatment. Participants were provided a preliminary map showing locations of known BMPs on Saipan, as well as excerpts from design plans as a reference for design discussions (Figure 6).

Maintenance inspection forms were completed for each of the BMPs. A demonstration was provided on the use of handheld, mobile, data collection devices, (e.g., iPAD).

In general, most of the BMPs were in good condition and appeared to be functioning as designed. Table 1 summarizes some of the maintenance issues that were identified:

Table 1. Summary of BMP Maintenance Issues

BMP	Maintenance Issues	Priority for Action
Organic filter at the Kagman Joeten	Some erosion at pipe inlet carrying roof runoff into main filter area. Use stone to stabilize. There is some sediment accumulation. Keep an eye on this site as Phase II develops and ponding basin the rear comes on-line. The underdrain system was not built according to plans and may be challenging to inspect and clean.	Low
Multi-celled ponding basin at the Micronesian Brokers	Don't need to mow/bushcut as frequently as they appear to be doing. Want to allow vegetation to establish on the side slopes (2:1 slopes are very steep and have bare spots).	Low
Ponding basin at the Kagman Mobil	Outlet pipe showing signs of piping under embankment, which will ultimately lead to embankment failure.	High
Rain garden at San Vicente Elementary School	Clean inlet and overflow outlet. Keep an eye on the embankment near the outlet because it appears that the facility is a little undersized	Low
Constructed Wetland at AMP	• Dredge the basin. Cleaning out sediment accumulation upstream of at weir wall may not be important since the weir elevation is set on tides; • Install containment system in grass area or in parking lot for drying of dredged materials. Dewater, for example in a truck container with silt sock around it. • Dispose of dry material as cover at landfill. The Park service concerned about stockpiling on site, maybe access by the pump stations • More revegetation of stream. • Removing invasives and replant for stabilization • Redesign with sediment forebays, concrete boxes for easy maintenance	Medium

Figure 4. (*From top left to bottom right). Mobil Kagman pretreatment and ponding basin, Organic filter at Kagman Joeten, Constructed wetland at American Memorial Park, rain garden at San Vicente Elementary School, and multi-celled ponding basin at Micronesian Brokers.*

Additional questions arose at the AMP wetland regarding endangered species habitat and health issues (Figure 6). Maintenance activities are temporary, so time them around when the endangered birds are not utilizing the BMPs for nesting or foraging. Health issues with maintenance activities can be addressed by wearing proper protective gear, and disposing of material at the landfill. This is a good example of why operations and maintenance plans should be established for each BMP. For future retrofit efforts, it will be critical to obtain an MOA between parties that spells out ownership, liability issues, and addressed operation considerations.

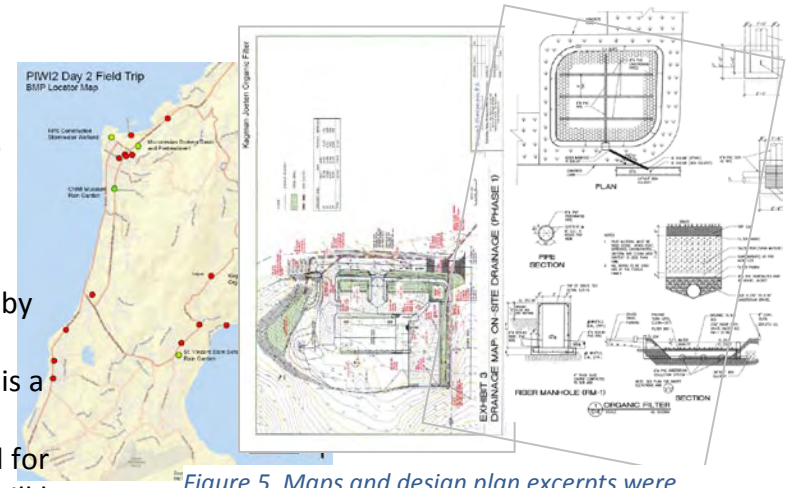


Figure 5. Maps and design plan excerpts were provided for each BMP.

At the end of the Day, participants were invited to a maintenance party at the Rain Garden installed at that CNMI Museum. Over 20 volunteers showed up to help in the maintenance work (Figure 7).

Figure 6. *A redesign of the constructed wetland is recommended to include concrete-box sediment forebays at the two primary inlet locations to ease maintenance burden.*

Figure 7. Rain garden maintenance party at the CNMI Museum.

3.0 Day 3 Managing Unpaved Roads

The last day of the PIWI2 was dedicated to techniques to evaluate and stabilize unpaved roads to prevent erosion and sedimentation. Unpaved roads continue to be a significant source of sediment loads in islands and are therefore an important component of overall watershed restoration and protection planning.

Using Gap Gap and LaoLao Bay Roads as demonstration sites, participants were shown examples of various techniques for stabilizing roads in the classroom, then went into the field to observe recent drainage improvements on Lao Lao Rd. We discussed planning and design for new unpaved roads, as well as the structural methods for preventing erosion (e.g., water bars, paved crossings, check dams, strategic paving, geogrids, and other technologies).

Case studies of watershed-scale road restoration projects in USVI and Puerto Rico were provided as well as resources related to construction costs and long-term maintenance considerations. Derek Chambers with BECQ presented videos, plans, and cost information for the Lao Lao Bay Rd. projects and in the field, provided commentary on lessons learned.

Each group was provided a plan set to mark up in the field showing existing conditions as well as the proposed paved option for Gap Gap Rd.

An overall objective of this day's training was to solicit concepts Gap Gap Rd. improvement alternatives and options for stabilizing the popular Dive Site. Participants were each given handouts that showed locations and design excerpts for LaoLao Bay Road improvements. Each group was also provided 24"x36" existing conditions plan for the Dive Site and for Gap Gap Rd.

While in the field, participants were divided into three groups to rotate around three stations (Figure 8):

1) Review design plans and tour the recently completed Lao Lao Bay Rd. improvement project to see how strategic paving, cross-drains, sediment traps, grid pavers, and other drainage improvements were installed to reduce road erosion. Discuss how they function and construction and maintenance lessons learned.
2) Develop a restoration plan in small groups for the Dive Site parking area to reduce the impact of runoff and pedestrian traffic to the beach.
3) Develop alternative design plans for an unpaved Gap Gap Rd. using techniques discussed in class.

Sediment traps in November (recon visit) vs in May (training).

Recommendations discussed by groups for restoration and stabilization of the dive site include (see Attachment C):

- Catching offsite runoff from LaoLao Rd. and conveying into a rain garden adjacent to the parking area
- Formalizing the traffic flow by creating one entrance, establishing vegetated islands, and revegetating some non-traffic areas
- Revegetation of area between parking lot and beach with native plants, using boulders or other bollards to designate 2-3 trails to beach
- Installing pervious pavers (like at other beach access area) in parking stalls, potentially pitching parking area to a common discharge location
- Installing a gazebo/covered picnic table and grill at existing concrete pad in back.
- One-way driveway at divesite with angled parking spaces

Recommendations for retaining an unpaved Gap Gap Rd. include (see Attachment C):

- Diversion at the top of road (e.g., depressed gutter line or speed bump) to prevent water from paved road from coming down Gap Gap Rd.
- Maintain ditch on the paved road to continue to convey flows down paved road.
- Install diversion structure near top of hill to reduce off-site runoff issues.
- Use waterbars and dips at strategic locations, regrading of road, and with a lined drainage ditch on inslope or changing the cross slope to direct water into existing gulch
- Use an intercepting drainage ditch to prevent off-site runoff from coming down hill
- Continue using proposed road alternate due to property issue constraints.

Figure 8. *(From top left to bottom right). Participants observed upper Lao Lao Bay Rd. improvements and discussed lessons learned; saw how the beach access lot was stabilized with permeable pavers; walked Gap Gap Rd., and generated design ideas for stabilizing the Dive Site parking lot.*

Attachment A

Agenda and Sign-in sheets

Pacific Island Watershed Institute II

Managing Your Watershed Drainage Infrastructure

Susupe Multi-Purpose Center, Beach Road, Saipan, CNMI

May 20-22, 2015

Day 1 AGENDA

Wednesday, May 20, 2015
Illicit Discharge Investigations & Drainage Mapping

Description: Hands-on demonstration of techniques to map drainage systems and to detect illicit discharges. Use the streets of Garapan as a living laboratory to learn how to use simple field test kits, smokers, and other methods to investigate the drainage system and detect illicit discharges. Discuss the key regulatory and programmatic requirements needed to effectively eliminate discharges**. You will need your own transportation to American Memorial Park.** We will be walking streets, popping manholes, and investigating outfalls. Bring clip boards. Lunch will be provided.

8:00 **PIWI Registration**

8:30-9:00 **Welcome and Overview** (Fran Castro and Anne Kitchell)

9:00-11:00 **Programmatic and Technical Elements of an IDDE Program:** Mapping and prioritizing target areas and outfalls, field screening, investigations, compliance & elimination of pollutants from system. Field procedures and safety. Key screening factors and equipment. Overview of field exercise, data sheets. (Dave Hirschman)

11:00–11:30 **Split into Groups and Prepare for Field Work:** Review the Garapan Field Map. Identify your area, outfalls, and drains. Fill in data sheets with ID#s from the map.

- Outfalls: OT-1 – OT-7
- Drains: Each drain has a unique #. Your data sheet also has places to add additional data
- Water Feature: ditches or open water that you would like to test. Add your own # to the data sheet and map (W-group #-location #). For instance, W-2-3 = water features - group 2 - 3rd water feature for group.
- Potential Stormwater Hotspots: You will also have to add unique #s to the data sheet and mark on your map: H-group-hotspot #. For instance: H-4-1 = Hotspot - group 4 - 1st hotspot for group.

Divide your team into roles. Plan for each person in the group to get a turn with each role.

(1) Manhole/grate pullers: open drains/structures for those that can be opened.
(2) Sampling team: collect water samples, transport to mobile lab.
(3) Data sheet/map team: fill out data sheet, mark on map, take photos.
(4) Hotspot team: look for potential hotspots as group moves along. Fill out hotspot data sheet & take photos.

12:00-2:00 **Field Trip: Garapan Drainage Investigation** Carpool to American Memorial Park for lunch and to begin investigations. **Park in the main parking lot. Lunch will be provided.** Cover your drainage area on foot, starting at presumed low spot (outfalls) and working your way up the presumed drainage system (see map of sub-areas).

- The data sheet/map team will fill out the appropriate data sheets, except for testing results on the right-hand side of each sheet. These will be filled in later for all sites where a sample is collected. Mark the map with a Sharpie, including arrows indicating pipes coming into and out of drains that can be opened.
- On data sheet for accessible drain structures, note approximate depth to invert, pipes coming in and out (ON MAP, mark approximate sizes & arrows showing presumed flow direction), accumulated debris, standing water, presumed flow direction, and other conditions, as prompted by the data sheet.
- The hotspot team should have their own copy of the data sheet to fill out @ potential hotspot locations. As the group moves up the drainage system, look around for dumping, oil and other stains on pavement, evidence of washwater/wastewater/debris in inlets & trench drains, odors, and other evidence of potential stormwater contamination. Mark these on map AND data sheet.
- At each spot that can be sampled (flowing outfall, inlet with water, open water in ditch, etc.), collect (with Nasco Swing Sampler or Nasco Whirlpack sampler, as needed): (1) a sterile sample in bottle or Whirlpack bag (do NOT rinse bottle before taking sample), (2) non-sterile sample in bottle (rinse bottle 3X with water that is present – these are for use with meters @ mobile lab location). Put all samples into cooler with ice pack. WEAR LATEX GLOVES TO COLLECT SAMPLES.

For ALL samples, mark map AND bottle with ID# from data sheet. Make sure to mark the sterile bottle with *"bacteria sample"* (Whirlpack bags assumed to be sterile).

2:00-3:00 **Mobile Lab and Smoke Testing Demonstration** (Brian Bearden)
All groups return to Memorial Park parking lot. Some of your group should take samples to mobile lab to test for Ammonia, temperature, pH, conductivity. Mark results on your data sheet. Put sterile samples in large cooler for lab test of bacteria. The rest of the group can observe the smoke/dye testing demonstration. Switch off after 30 minutes.

3:00-3:15 **Return to Susupe Multi-Purpose Center**

3:15-4:00 **Debrief and Data Cleanup**

Complete any Ammonia tests that you didn't get to. Debrief, questions, make sure maps and sample bottles are properly marked with ID# and sample locations. Make sure data sheets are completed with sample results (Ammonia) to line up with map. Document any follow-up work recommended. Brief Q&A.

4:00 **Wrap Up and Prep for Next Day (Anne Kitchell)**

7:00 **Naked Fish**

Pacific Island Watershed Institute II

Managing Your Watershed Drainage Infrastructure

Susupe Multi-Purpose Center, Beach Road, Saipan, CNMI

May 20-22, 2015

Day 2 AGENDA

Thursday, May 21, 2015
Managing Your Stormwater Infrastructure

Description: Visit a variety of existing stormwater management facilities, discuss pros and cons of different design features and learn how to evaluate performance and maintenance needs. Discuss mapping and tracking of infrastructure (culverts, catch basins, pipes, and BMPs) and how to align your stormwater program with your island's needs and resources. You will be touring island BMPs in the field, which involves walking down slopes, following drainage paths, and perhaps, climbing through vegetation to inspect structures. Bring water and clipboards. **We will provide group transportation and box lunches.**

8:00 **Building a Better Stormwater Program:** Discuss programmatic and technical elements of Post-Construction Stormwater Programs including regulations, design standards, permitting, inspections, and maintenance. (Rich Claytor)

9:00-10:00 **Envisioning LID:** Discuss methods for improving stormwater management at new development, redevelopment, and retrofit projects. Specifically, how to integrate stormwater into hardscapes, utilizing landscaped features, and upgrading existing facilities. (Anne Kitchell and Rich Claytor)

10:00–3:00 **Field Activity:** Explore various stormwater BMPs around the island including multi-celled ponding basins, constructed wetlands, biofilters (including rain gardens) and more. Identify key design features observed at each type of BMP and how the BMP works. Discuss pros/cons of design alternatives. Learn how to inspect BMPs and evaluate their long-term performance. Complete maintenance inspection forms at each BMP. **Box lunch will be provided.**

Return to Susupe

3:15-4:00 **BMP Maintenance:** Group discussion on maintenance issues observed. Brainstorm methods for establishing BMP inspection and maintenance tracking systems as part of post-construction stormwater programs.

4:00 **Wrap Up and Prep for Next Day** (Anne Kitchell)

5:00-7:30 **Not your average Garden Party!** Join us for food, beers, music, and a little rain garden maintenance at the CNMI Museum.

Field/Van Site Tour Schedule

Approx. Time	RICH's Group	DAVE's Group	BRIAN's Group
10:15-11:00	Micronesian Brokers- multi-celled basin with underground pretreatment	National Park Service- constructed wetland	Elementary School- rain garden
11:15-12:00	National Park Service- constructed wetland	Micronesian Brokers- multi-celled basin with underground pretreatment	Kagman Joeten minimart- organic filter
12:15-1:00	Kagman Joeten minimart- organic filter	Elementary School- rain garden	Kagman Mobile Station- basin with riser
1:15-2:00	Kagman Mobile Station- basin with riser	Kagman Joeten minimart- organic filter	Micronesian Brokers- multi-celled basin with underground pretreatment
2:15-3:00	Elementary School- rain garden	Kagman Mobile Station- basin with riser	National Park Service- constructed wetland
3:15	Back at Susupe	Back at Susupe	Back at Susupe

Joeten Kagman- Organic Filter

Micronesian brokers. Two-celled ponding basin with underground O/W separator.

Constructed wetland at American Memorial Park (NPS)

St. Vicente Elementary School Rain garden.

Pacific Island Watershed Institute II

Managing Your Watershed Drainage Infrastructure

Susupe Multi-Purpose Center, Beach Road, Saipan, CNMI

May 20-22, 2015

Day 3 AGENDA

Friday, May 22, 2015
Managing Unpaved Roads

Description: Discuss techniques to evaluate and stabilize unpaved roads to prevent erosion and sedimentation. Use Gap Gap and LaoLao Bay Roads as demonstration sites. Observe recent drainage improvements on Lao Lao Road. Develop concepts for Gap Gap Road improvement alternatives and Dive Site projects. **Group transportation and lunch will be provided.** You will be walking up steep, unpaved roads and developing conceptual plans in small groups. You will also be observing new practices that were installed along LaoLao Bay Road. We will **eat lunch at the Dive Site overlooking LaoLao Bay**. There will be shade and a portable toilet. Please bring water and a hat, as it will likely be warm.

8:00-8:30 **Report Out IDDE Results from Day 1** (Dave Hirschman)

8:30–9:00 **Why Do Unpaved Roads Matter?** (Anne Kitchell)
Discuss the importance of road stabilization in overall watershed restoration and protection planning.

9:00-10:30 **Techniques for Stabilizing Unpaved Roads:** Discuss planning and design for new unpaved roads as well as the structural methods for preventing erosion. Use examples to illustrate the use of water bars, paved crossings, check dams, strategic paving, geogrids, and other technologies Provide examples of watershed-scale road restoration projects in Saipan, USVI and Puerto Rico. Discuss how to incorporate other stormwater management practices such as rain gardens and permeable pavers. Include discussion of lessons learned, construction costs and long-term maintenance considerations**.** (Brian Kuchar, Derek Chambers, and Anne Kitchell)

10:30-10:45 **Introduction to Field Trip** (Brian Kuchar)

11:00-2:30 **LaoLao Bay Field Trip:** Review design plans and tour the recently completed Lao Lao Bay Road improvement project to see how strategic paving, cross-drains, sediment traps, grid pavers, and other drainage improvements were installed to reduce road erosion. Discuss how they function and construction and maintenance lessons learned. Develop a restoration plan in small groups for the Dive Site parking area to reduce the impact of runoff and pedestrian traffic to the beach. Apply techniques discussed in the classroom and observed on Lao Lao Bay Road to the steep and eroding Gap Gap Road **In between the field trips, we will stop for lunch overlooking LaoLao Bay (Lunch will be provided).**

Field Site Agenda

Approx. Time	Group 1	Group 2	Group 3
11:00-12:00	Start at top of Lao Lao Bay Road - stop at practices on way to dive site	Start at top of Gap Gap Road walk down	Go directly to Dive Site to do concept design
12:00-12:30	Lunch at dive site	Lunch at dive site	Lunch at dive site
12:30-1:30	Walk up to Gap Gap Road (or drive to top) walk back down.	Dive site redesign	Drive out Lao Lao Bay Road, stop at each practice on way out
1:30-2:30	Dive site concept design	Drive out Lao Lao Bay Road, stop at each practice on way out	Go to top of Gap Gap Road walk down

Return to Susupe Multi-Purpose Center

3:00-4:00 **Report out Design Concepts**
Each group will report out the design concepts that were developed for the Dive Site and Gap Gap Road

4:00 **PIWI2 Wrap Up and song by Dave**

Pacific Islands Watershed Institute II

Managing Your Watershed Drainage Infrastructure

May 20-22, 2015

Saipan

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Pacific Islands Watershed Institute May 20-22, 2015

Friday Day 3 Roads Sign-in-sheet

First Name	Last Name	Agency	Signature
Jonathan	Arriola	CNMI Bureau of Environmental & Coastal Quality	
Brenda Ann	Atalig	Bureau of Statistics & Plans- Guam Coastal Management Program	
Merrill	Ayuyu	CNMI Bureau of Environmental & Coastal Quality	
Clarissa	Bearden	BECQ-DCRM	
Brian	Bearden	US Public Health Services-CUC	
Jason	Beatty	NPS	
Emanuel	Borja	CNMI Bureau of Environmental & Coastal Quality	
Jihan	Buniag	BECQ	
Gus	Camacho	BECQ Wastewater Earthmoving & Erosion Control	
Derek	Chambers	BECQ	VMPM FIELD TRIP LEADER
Reynaldo	Cing	Department of Public Lands-Tinian	
Rich	Claytor	Horsley Witten Group	here
Dennis	Davis	Department of Public Works-Division of Roads & Grounds	
John	Fraser		
John	Furey	Furey and Associates	
Mike	Gawel	NATIONAL PARK SERVICE	
Robert	Hadley	Pohnpei Utilities Cooperation/ Nett Water Fund	
Avra	Heller	CNMI Bureau of Environmental & Coastal Quality	
David	Hirschman	Center for Watershed Protection	here
Jonathan	Ibajan	Hofschneider Engineering Corporation	here
Joe	Ito	CNMI Bureau of Environmental & Coastal Quality	
Steven	Johnson	CNMI Bureau of Environmental & Coastal Quality	
Betty	Johnson	Hofschneider Engineering Corporation	
Joe	Kaipat	BECQ-SDWP	
Carlos (Munch)	Ketebengang	CNMI Bureau of Environmental & Coastal Quality	
Anne	Kitchell	Horsley Witten Group	here
Andre	Kozij	Furey and Associates	
Brian	Kuchar	Horsley Witten Group	here

Adrienne	Loerzel	NOAA - OCM	
Tina	Mafnas	Bureau of Statistics and Plans	
James	Manglona	Rota Forestry	
Kaitlin	Mattos	CNMI Bureau of Environmental & Coastal Quality	
Max	Muna	Rota Forestry	
Dana	Okano	NOAA CRCP	
Joel	Puyat	DPW	
Edwin	Reyes	Guam Coastal Management Program	
Agnes (Sam)	Sablan	BECQ-DCRM	
Amy	Sanchez	BECQ-DCRM	
Stanley	Santos	CNMI Bureau of Environmental & Coastal Quality	
Esther Marie	Taitague	Bureau of Statistics & Plans, Guam Coastal Management Program	
Olivia	Tenorio	CNMI Bureau of Environmental & Coastal Quality	
Francisco	Villagomez	DFW	
Aldan	Rosario	BECQ	
Geri	DelaCruz	DPW	
James	Ripple	DPW	
Rachel	Rogu	DPL	
Erin	Duncan	BECQ	

Pacific Islands Watershed Institute May 20-22, 2015

Thursday Day 2 BMPs Sign-in-sheet

First Name	Last Name	Agency	Signature
Jonathan	Arriola	CNMI Bureau of Environmental & Coastal Quality	
Brenda Ann	Atalig	Bureau of Statistics & Plans- Guam Coastal Management Program	
Merrill	Ayuyu	CNMI Bureau of Environmental & Coastal Quality	
Clarissa	Bearden	BECQ-DCRM	
Brian	Bearden	US Public Health Services-CUC	
Jason	Beatty	NPS	
Emanuel	Borja	CNMI Bureau of Environmental & Coastal Quality	
Jihan	Buniag	BECQ	here
Gus	Camacho	BECQ Wastewater Earthmoving & Erosion Control	
Derek	Chambers	BECQ	
Reynaldo	Cing	Department of Public Lands-Tinian	
Rich	Claytor	Horsley Witten Group	here
Dennis	Davis	Department of Public Works-Division of Roads & Grounds	
John	Fraser	self	
John	Furey	Furey and Associates	
Mike	Gawel	NATIONAL PARK SERVICE	
Robert	Hadley	Pohnpei Utilities Cooperation/ Nett Water Fund	
Avra	Heller	CNMI Bureau of Environmental & Coastal Quality	
David	Hirschman	Center for Watershed Protection	here
Jonathan	Ibajan	Hofschneider Engineering Corporation	here
Joe	Ito	CNMI Bureau of Environmental & Coastal Quality	
Steven	Johnson	CNMI Bureau of Environmental & Coastal Quality	
Betty	Johnson	Hofschneider Engineering Corporation	here - AM/pm
Joe	Kaipat	BECQ-SDWP	
Carlos (Munch)	Ketebengang	CNMI Bureau of Environmental & Coastal Quality	
Anne	Kitchell	Horsley Witten Group	here
Andre	Kozij	Furey and Associates	
Brian	Kuchar	Horsley Witten Group	here

RASA, Pat Rasa

Adrienne	Loerzel	NOAA - OCM	
Tina	Mafnas	Bureau of Statistics and Plans	
James	Manglona	Rota Forestry	
Kaitlin	Mattos	CNMI Bureau of Environmental & Coastal Quality	
Max	Muna	Rota Forestry	
Dana	Okano	NOAA CRCP	
Joel	Puyat	DPW	
Edwin	Reyes	Guam Coastal Management Program	
Agnes (Sam)	Sablan	BECQ-DCRM	
Amy	Sanchez	BECQ-DCRM	
Stanley	Santos	CNMI Bureau of Environmental & Coastal Quality	
Esther Marie	Taitague	Bureau of Statistics & Plans, Guam Coastal Management Program	
Olivia	Tenorio	CNMI Bureau of Environmental & Coastal Quality	
Francisco	Villagomez	DFW	
Susana	De Guerrero	DPL/Real Estate	
Atdao	Rosario	BECQ	
Buniag	Jihan	BECQ	
Rasa	Pat	DPL	
Erin	Denham	BECQ	

Pacific Islands Watershed Institute May 20-22, 2015

Wednesday Day 1 IDDE Sign-in-sheet

First Name	Last Name	Agency	Signature
Jonathan	Arriola	CNMI Bureau of Environmental & Coastal Quality	
Brenda Ann	Atalig	Bureau of Statistics & Plans- Guam Coastal Management Program	
Merrill	Ayuyu	CNMI Bureau of Environmental & Coastal Quality	
Clarissa	Bearden	BECQ-DCRM	
Brian	Bearden	US Public Health Services-CUC	✓ PM DEMO
Jason	Beatty	NPS	
Emanuel	Borja	CNMI Bureau of Environmental & Coastal Quality	
Jihan	Buniag	BECQ	
Gus	Camacho	BECQ Wastewater Earthmoving & Erosion Control	
Derek	Chambers	BECQ	✓
Reynaldo	Cing	Department of Public Lands-Tinian	
Rich	Claytor	Horsley Witten Group	here
Dennis	Davis	Department of Public Works-Division of Roads & Grounds	
John	Fraser	SELF	
John	Furey	Furey and Associates	
Mike	Gawel	NATIONAL PARK SERVICE	
Robert	Hadley	Pohnpei Utilities Cooperation/ Nett Water Fund	
Avra	Heller	CNMI Bureau of Environmental & Coastal Quality	
David	Hirschman	Center for Watershed Protection	here
Jonathan	Ibajan	Hofschneider Engineering Corporation	
Joe	Ito	CNMI Bureau of Environmental & Coastal Quality	
Steven	Johnson	CNMI Bureau of Environmental & Coastal Quality	
Betty	Johnson	Hofschneider Engineering Corporation	
Joe	Kaipat	BECQ-SDWP	
Carlos (Munch)	Ketebengang	CNMI Bureau of Environmental & Coastal Quality	
Anne	Kitchell	Horsley Witten Group	here
Andre	Kozij	Furey and Associates	
Brian	Kuchar	Horsley Witten Group	here

Adrienne	Loerzel	NOAA - OCM	
Tina	Mafnas	Bureau of Statistics and Plans	
James	Manglona	Rota Forestry	
Kaitlin	Mattos	CNMI Bureau of Environmental & Coastal Quality	
Max	Muna	Rota Forestry	
Dana	Okano	NOAA CRCP	
Joel	Puyat	DPW	
Edwin	Reyes	Guam Coastal Management Program	
Agnes (Sam)	Sablan	BECQ-DCRM	
Amy	Sanchez	BECQ-DCRM	
Stanley	Santos	CNMI Bureau of Environmental & Coastal Quality	
Esther Marie	Taitague	Bureau of Statistics & Plans, Guam Coastal Management Program	
Olivia	Tenorio	CNMI Bureau of Environmental & Coastal Quality	
Francisco	Villagomez	DFW	
Rosario	Atdao	BECQ-DCRM	
Yuk		BECQ	
Rachel		DPL	

Attachment B

Existing BMP Inspection Summaries

Horsley Witten Group
Sustainable Environmental Solutions
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Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com

STORMWATER BMP INSPECTION REPORT

BMP ID: #001	
Site Name: San Vicente Elementary School	
Site Owner: Public Schools	
Inspection Date/Arrival Time: May 20, 2015, 8:45 PM	
Weather: Clear	
Report by: PIWI2 Participants	

BMP TYPE: ☐ Ponding Basin ☐ Constructed Wetland ☐ Bioretention/Organic Filter ☒ Rain Garden ☐ Swale ☐ Underground Detention ☐ Infiltration Chambers ☐ Separators ☐ Permeable Pavement ☐ Other: _____

BMP COMPONENTS EVALUATED:

Embankment	n/a	**Inlets**	YES	**Vegetation**	YES
Riser/main outlet	n/a	**Pretreatment/ Forebay**	N/A	**Manholes/ Pipes**	n/a
Spillway	YES	**Temp. Ponding Area**	YES	**Drainage Area**	YES
Outfall Pipe	n/a	**Permanent Pool (wet)**	n/a	**Other**	

OBSERVATIONS AND COMMENTS:
Looks fantastic. Remove tangan tangan. Remove trash. Plant height and composition is close to original planting plan. Swale looks good, clean debris collecting at inlet.

RECOMMENDED ACTIONS TO BE TAKEN:
Do another round of plant maintenance, weeding. Clean inlet. Check erosion on erosion downhill side as part of future inspections.

This inspection report is provided as a courtesy by BECQ to stormwater management practice owners and operators. .

Signature: _____ Date: 7/29/15

Anne Kitchell, LEED-AP
Horsley Witten Group, Inc.

PHOTOS

Large drainage area to practice ratio, and practice may be slightly undersized. DA includes basketball court.

Educational signage posted along fence to show how the rain garden functions.

Plants look good, keep up the weeding as needed.

Horsley Witten Group
Sustainable Environmental Solutions
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STORMWATER BMP INSPECTION REPORT

BMP ID: #002	
Site Name: Joeten Minimart- Kagman	
Site Owner: Joeten	
Inspection Date/Arrival Time: May 20, 2015, 9:34 PM	
Weather: Clear	
Report by: PIWI2 Participants	

BMP TYPE: ☐ Ponding Basin ☐ Constructed Wetland ☒ Bioretention/Organic Filter ☐ Rain Garden ☐ Swale ☐ Underground Detention ☐ Infiltration Chambers ☐ Separators ☐ Permeable Pavement ☐ Other: _____

BMP COMPONENTS EVALUATED:

Embankment	n/a	**Inlets**	YES	**Vegetation**	YES
Riser/main outlet	YES	**Pretreatment/ Forebay**	n/a	**Manholes/ Pipes**	n/a
Spillway	n/a	**Temp. Ponding Area**	YES	**Drainage Area**	YES
Outfall Pipe	n/a	**Permanent Pool (wet)**	n/a	**Other**	UNDERDRAIN

OBSERVATIONS AND COMMENTS:
Minor erosion at inlet to organic filter from the roof leaders. Grass and side slopes in good condition, no bare spots evident in main filter area.

RECOMMENDED ACTIONS TO BE TAKEN:
Add riprap at inlet from rooftop into filter. Clean site free of trash and debris. Clean out culvert under entrance road. No evidence of filter surface clogging. Get as builts. Roof drain is different. Organic filter underdrain not installed as designed.

This inspection report is provided as a courtesy by BECQ to stormwater management practice owners and operators. .

Signature: _____ Date: 7/29/15

Anne Kitchell, LEED-AP
Horsley Witten Group, Inc.

PHOTOS

The underdrain system was installed differently than designed, but appears to be functioning.

Grass system is eay to maintain; however consider adding trees that could also provide shade for parking spaces and increase evapotranspiration rates.

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STORMWATER BMP INSPECTION REPORT

BMP ID: #003	
Site Name: Kagman Mobil Gas Station	
Site Owner: Mobil Gas	
Inspection Date/Arrival Time: May 20, 2015, 11:12 PM	
Weather: Clear	
Report by: PIWI2 Participants	

BMP TYPE: ☒ Ponding Basin ☐ Constructed Wetland ☐ Bioretention/Organic Filter ☐ Rain Garden ☐ Swale ☐ Underground Detention ☐ Infiltration Chambers ☒ Separators ☐ Permeable Pavement ☐ Other: _____

BMP COMPONENTS EVALUATED:

Embankment	YES	**Inlets**	YES	**Vegetation**	YES
Riser/main outlet	YES	**Pretreatment/ Forebay**	YES	**Manholes/ Pipes**	n/a
Spillway	YES	**Temp. Ponding Area**	YES	**Drainage Area**	YES
Outfall Pipe	NO	**Permanent Pool (wet)**	YES	**Other**	

OBSERVATIONS AND COMMENTS:
Overall appears to be mowed/maintained, however piping was observed in the embankment over the the outlet pipe leaving the riser structure. If no anti-seep collar was provided during installation, water in the basin will seep along the outside of the pipe and erode the surrounding embankment. Slumping of the embankment is noticeable and should be addressed immediately. Pretreatment OW Separator looked ok.

RECOMMENDED ACTIONS TO BE TAKEN:
Address piping issue at the outlet pipe to prevent embankment failure during large storm event.
Reduce frequency of mowing to prevent bare spots. Clean out inlet flume.

This inspection report is provided as a courtesy by BECQ to stormwater management practice owners and operators.
.

Signature: _____ Date: 7/29/15

Anne Kitchelly LEED-AP
Horsley Witten Group, Inc.

PHOTOS

Piping is visible on the embankment. Holes are visible where the base of the pipe enters the embankement.

Clean sediment from concrete inlet flume

Access to O/W separator was maintained.

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STORMWATER BMP INSPECTION REPORT

BMP ID: #004	
Site Name: Micronesian Brokers	
Site Owner: Micronesian Brokers	
Inspection Date/Arrival Time: May 20, 2015	
Weather: Clear	
Report by: PIWI2 Participants	

BMP TYPE: ☒ Ponding Basin ☐ Constructed Wetland ☐ Bioretention/Organic Filter ☐ Rain Garden ☐ Swale ☐ Underground Detention ☐ Infiltration Chambers ☒ Separators ☐ Permeable Pavement ☐ Other: _____

BMP COMPONENTS EVALUATED:

Embankment	YES	**Inlets**	YES	**Vegetation**	YES
Riser/main outlet	n/a	**Pretreatment/ Forebay**	YES	**Manholes/ Pipes**	n/a
Spillway	YES	**Temp. Ponding Area**	YES	**Drainage Area**	YES
Outfall Pipe	n/a	**Permanent Pool (wet)**	n/a	**Other**	

OBSERVATIONS AND COMMENTS:
This is a multi-celled ponding basin with a sediment pretreatment forebay prior to infiltration bed, as well as an oil/grit separator at the head of the system. The BMP is relatively new, and looks to be maintained in good working condition. No signs of significant erosion, overflow, or other issues.

RECOMMENDED ACTIONS TO BE TAKEN:
Want to allow vegetation to establish on the side slopes (2:1 slopes are very steep and have bare spots). Do not cut vegetation so short to avoid bare spots. Vegetation in practice is good to reduce erosion, but also to increase evapotranspiration processes.

This inspection report is provided as a courtesy by BECQ to stormwater management practice owners and operators.
.

Signature: _____ Date: 7/29/15

Anne Kitchell, LEED-AP
Horsley Witten Group, Inc.

PHOTOS

Bare spots on steep side slopes and in weir. Try to keep vegetated to improve stability.

Oil/Grit separator provides additional pretreatment for BMP.

Drainage area to BMP collects sediment and other materials which are conveyed into O/G separator.

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STORMWATER BMP INSPECTION REPORT

BMP ID: #005	
Site Name: American Memorial Park	
Site Owner: National Park Service	
Inspection Date/Arrival Time: May 20, 2015, 11:12 PM	
Weather: Clear	
Report by: PIWI2 Participants	

BMP TYPE: ☐Ponding Basin ☒ Constructed Wetland ☐ Bioretention/Organic Filter ☐ Rain Garden ☐ Swale ☐ Underground Detention ☐ Infiltration Chambers ☐ Separators ☐ Permeable Pavement ☐ Other: _____

BMP COMPONENTS EVALUATED:

Embankment	NO	**Inlets**	YES	**Vegetation**	YES
Riser/main outlet	n/a	**Pretreatment/ Forebay**	n/a	**Manholes/ Pipes**	NO
Spillway	NO	**Temp. Ponding Area**	n/a	**Drainage Area**	YES
Outfall Pipe	n/a	**Permanent Pool (wet)**	YES	**Other**	WEIR IN STREAM

OBSERVATIONS AND COMMENTS:
This is a constructed wetland that was a stormwater retrofit to provide water quality treatment for drainage from Garapan. It was completed in conjunction with a channel/stream restoration project to plant vegetation and improve habitat. Lack of maintenance of the facility has reduced its aesthetics and recreational use. The BMP has been overgrown with water hyacinth and other invasive plants and has lost capacity due to sediment and organic deposition. Consider redesigning the areas around the two main inlet pipes with a formal concrete forebay for ease of future maintenance/clean out.

RECOMMENDED ACTIONS TO BE TAKEN:
Dredge the basin. Cleaning out sediment accumulation upstream of the weir wall may not be important since the weir elevation is set on tides. Install containment system in grass area or in parking lot for drying of dredged materials. Dewater, for example, in a truck container with silt sock around it. Dispose of dry material as cover at landfill. Remove invasives and replant for stabilization. More re-vegetation along stream corridor.

This inspection report is provided as a courtesy by BECQ to stormwater management practice owners and operators.
.

Signature: _____ Date: 7/29/15

Anne Kitchell, LEED-AP
Horsley Witten Group, Inc.

PHOTOS

Sediment and debris deposition at one of the inlet pipes. This is a location where a concrete box/forebay structure would help ease future maintenance burden.

Remove invasives and re-establish open water system.

Replant along the stream corridor.

Attachment C

Concept Designs for Dive Site and Gap Gap Rd.

GROUP 2 (FRIDAY)

BM–1 PKNAIL
N 164681.7410
E 183043.4430
EL. 253.555'

PUBLIC LAND R–W

N164,600
E183,100

EDGE OF ROCK OUTCROP

E183,000

CORAL ROAD

(VARIABLE WIDTH)
GAPGAP ROAD

EDGE OF ROCK OUTCROP

E183,100
N164,200

CORAL ROAD

(VARIABLE WIDTH)
GAPGAP ROAD

EDGE OF ROCK OUTCROP

E183,000
N164,000

CORAL ROAD

(VARIABLE WIDTH)
GAPGAP ROAD

E183,000
N163,800

MATCH LINE "A"

EA 160–REM

E182,900

N163,700
E183,200

E183,200

N163,700

E183,100
N163,400

E183,000
N163,500

E183,100
N163,300

MATCH LINE "A"

MATCH LINE "B"

GRAPHIC SCALE
0 30 60 90
1 INCH = 30 FEET

E182,900
N163,200

E182,900

N163,200

MATCH LINE "B"

CORAL ROAD

EDGE OF VEGETATION

EDGE OF VEGETATION

E182,800
N163,400

E182,800
N163,300

(VARIABLE WIDTH)
GAPGAP ROAD

INVERT
EL 15.61

INVERT
EL 14.30

NOTES :

1. HORIZONTAL AND VERTICAL CONTROL SURVEYS WERE BASED FROM SCS–3A WITH A RECORD POSITION OF 167,201.929 FEET NORTH, 185,122.366 FEET EAST, AND AN ELEVATION OF 213.94 FEET AND MONUMENT SCS–4A–1 WITH A POSITION OF 165,726.975 FEET NORTH, 182,146.209 FEET EAST AND ELEVATION OF 358.78 FEET.
2. ELEVATIONS ARE REFERENCED FROM MEAN SEA LEVEL (MSL) DATUM.
3. ALL UNITS ARE IN FEET AND DECIMAL THEREOF UNLESS OTHERWISE NOTED.
4. SURVEY WAS CONDUCTED USING AN ELECTRONIC TOTAL STATION.
5. CONTOUR LINES WERE GENERATED USING EAGLE POINT SOFTWARE.
6. ALL TREE SYMBOLS ARE TWICE (2X) THE ACTUAL TRUNK SIZE.

SYMBOLS AND ABBREVIATIONS:

- EDGE OF CORAL ROAD
- EDGE OF VEGETATION
- EXPOSED PVC WATERLINE (SEE PLAN FOR PIPE SIZE)
- FOUND #4 REBAR WITH CAP MARKED #10
- TREE (SEE PLAN FOR TYPE AND TRUNK SIZE)
- COCONUT

RCP REINFORCED CONCRETE PIPE

PIWI2 Field Trip
Gap Gap Road

PROJECT: SAIPAN GAPGAP ROAD

CONTENTS: TOPOGRAPHIC SURVEY MAP

SURVEYED BY: FBS	DATE: 09/20/2010	
COMPUTED BY: EMP	DATE: 10/05/2010	
DRAWN BY: EMP	DATE: 10/06/2010	
SUPERVISED BY: NCI	DATE: 10/06/2010	
CHECKED BY: NCI	DATE: 10/05/2010	
PROJECT NO. GP08–04	CAD FILE: SPN–GAPGAP.DWG	

SHEET NUMBER
HP
SHT. 1 OF 1

RAINGARDEN

BROAD-BASED DIP

BROAD-BASED DIP

ANGLED FRONT-END PARKING

ONE-WAY

LANDSCAPED ISLAND

TWO-WAY

APPROXIMATE EDGE OF PARKING

ISLAND

PARKING AREA BEACH SAND PAVERS

FRONT END OR BACK END VAN PARKING (EX. CONCRETE)

APPROXIMATE EDGE OF PARKING

TABLES/BENCHES

CONC. SLAB

BOLLARDS

STEEL POST

CONC. PEDESTAL

COVERED PAVILION & GRILL

ANGLED BACK-IN VAN PARKING (PAVERS)

RE-VEG AREA

PATH

REVEG AREA

CONC. BASE

DEDICATED ACCESS PATH

BEACH SAND

DEDICATED ACCESS PATH

R.G.

ECR

BURIED STEEL DRAINPIPE

12.381' ⌀ CL-DRAINPIPE

CONC. BASE

9.371' ⌀ GROUND

TEL. BOX

CORAL ROAD

CORAL ROAD

UNAI BAPUT TOURIST DIVE SITE

SCALE:1"=20

SCALE
0' 20' 40' 60'
1" = 20'

Revisions

Rev.	Date	By	Appr.	Description
1				
2				
3				
4				
5				
6				

Horsley Witten Group, Inc.
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508-833-6600 voice
508-833-3150 fax

Designed By: ---
Drawn By: ---
Checked By: ---
Date: MAY 2015

Plan Set: PIWI 2 DIVE SITE ----

Plan Title: FIELD TRIP WORKSHEET

Prepared For: ----- Phone: ----- Fax: -----

Survey Provided By: ----- Phone: ----- Fax: ----- Dated: -----

Registration:

Project Number: 14133

Sheet : 1 of **

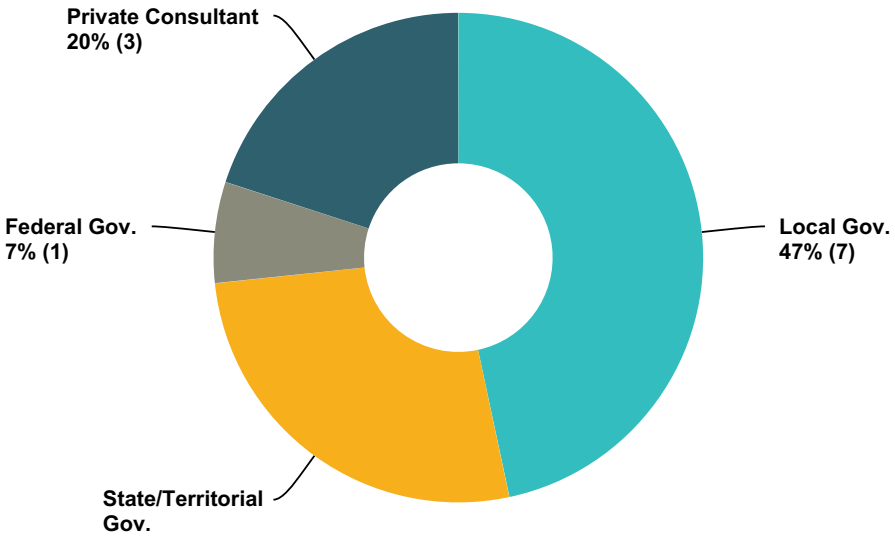
Sheet Number: C - 1

Attachment D

Evaluation Form Summary

Q2 Your organization type:

Answered: 15 Skipped: 0

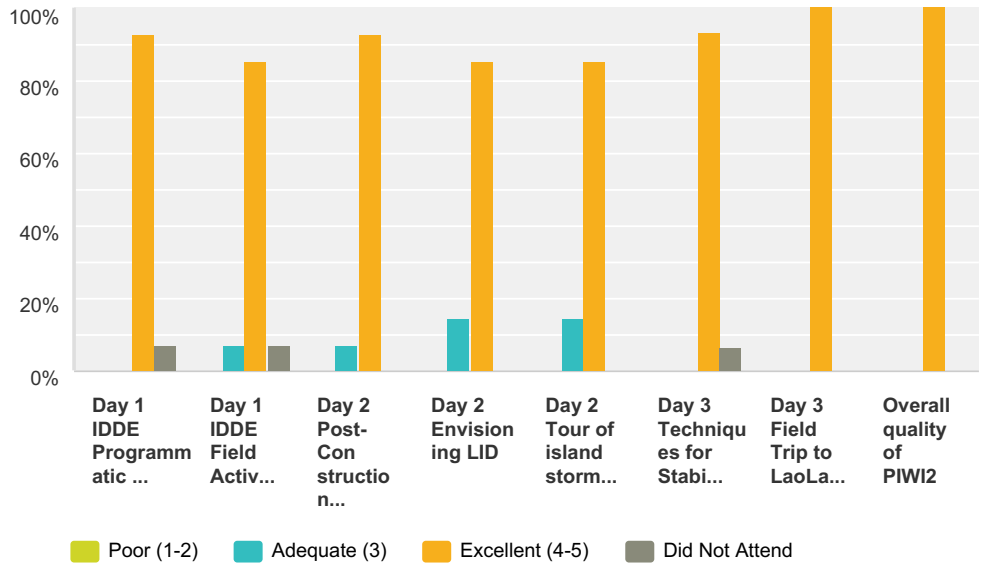


Answer Choices	Responses	
Non-profit	0%	0
Local Gov.	47%	7
State/Territorial Gov.	27%	4
Federal Gov.	7%	1
Private Consultant	20%	3
Academic	0%	0
Total		15

#	Other (please specify)	Date
	There are no responses.	

Q3 Sessions: Please rate the quality of the information presented during each institute session.

Answered: 15 Skipped: 0



	Poor (1-2)	Adequate (3)	Excellent (4-5)	Did Not Attend	Total
Day 1 IDDE Programmatic and Technical Elements	**0%** 0	**0%** 0	**93%** 13	**7%** 1	14
Day 1 IDDE Field Activity: Garapan Blitz	**0%** 0	**7%** 1	**86%** 12	**7%** 1	14
Day 2 Post-Construction Stormwater Programs	**0%** 0	**7%** 1	**93%** 13	**0%** 0	14
Day 2 Envisioning LID	**0%** 0	**14%** 2	**86%** 12	**0%** 0	14
Day 2 Tour of island stormwater BMPs	**0%** 0	**14%** 2	**86%** 12	**0%** 0	14
Day 3 Techniques for Stabilizing Roads	**0%** 0	**0%** 0	**93%** 14	**7%** 1	15
Day 3 Field Trip to LaoLao Bay	**0%** 0	**0%** 0	**100%** 15	**0%** 0	15
Overall quality of PIWI2	**0%** 0	**0%** 0	**100%** 14	**0%** 0	14

Q4 Favorite or most useful session(s) attended, site visit, or information discussed?

Answered: 14 Skipped: 1

#	Responses	Date
1	Gapgap Rd walk with Brian	6/9/2015 2:01 AM
2	Popping manholes for testing and Ann's famous POROUS CONCRETE site visit	6/3/2015 6:26 PM
3	Both are very useful and very much essential in learning. This is the way to go PIWI2.	6/1/2015 3:43 PM
4	Garapan blitz and dive site planning	6/1/2015 3:39 PM
5	techniques for stabilizing unpaved roads.	6/1/2015 3:35 PM
6	Unpaved roads field trip. Its a serious issue locally.	6/1/2015 3:33 PM
7	garapan stormwater site visit and smoke detection and WQ sampling	6/1/2015 3:30 PM
8	IDDE presentation useful for work and investigative complaints; BMPS useful for work when inspecting construction projects; unpaved roads presentation made me understand about how it erodes.	6/1/2015 3:12 PM
9	Stabilizing of unpaved roads	6/1/2015 3:05 PM
10	They were all great!	6/1/2015 3:02 PM
11	Learning about Storm Waters, and how to prevent Erosion.	6/1/2015 1:30 AM
12	All sessions - IDDE, stormwater BMPs, and road stabilization - were beneficial and will be applied to projects reviewed.	6/1/2015 12:47 AM
13	Each presentation and field activity was informative and a learning experience in its own and I had favorite parts in each.However, I would say the most useful session would be Day 2 and learning/critiquing different BMPs because depending on the use a stormwater facility might be as simple as looking at mothernature's landscape or as difficult as coming up with different cambers, separators, and multi-celled basins.	5/31/2015 6:43 PM
14	Field trip on 3rd day	5/31/2015 6:17 PM

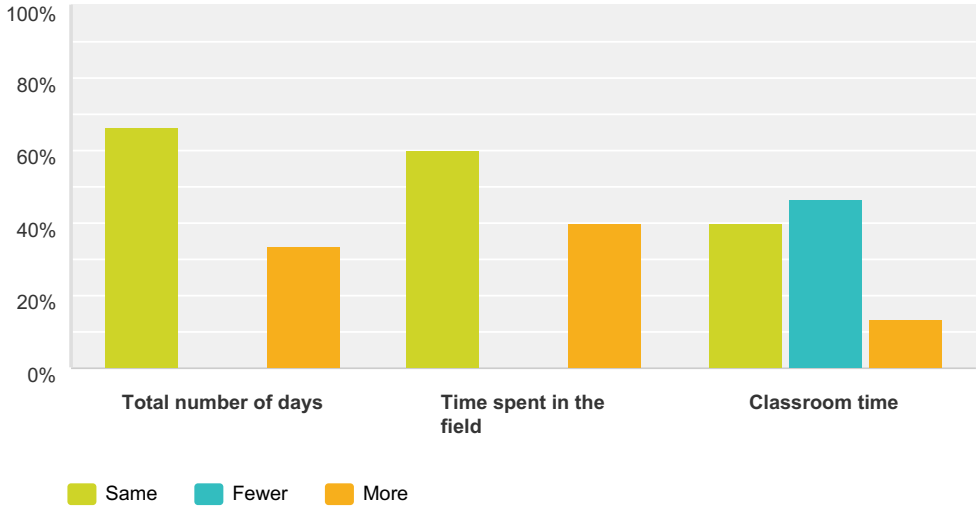
Q5 Least beneficial of the sessions attended, site visit, or information discussed?

Answered: 10 Skipped: 5

#	Responses	Date
1	Needed more time at each site on all three days to really process all this information!	6/9/2015 2:01 AM
2	None	6/3/2015 6:26 PM
3	N/A, but to me, doing water quality is not my area, but necessary to know the basics.	6/1/2015 3:43 PM
4	tour of stormwater BMPs- mostly due to dynamics of presenter	6/1/2015 3:39 PM
5	Post-construction BMPs. would have likes to instead identify areas in Garapan for more BMPs.	6/1/2015 3:35 PM
6	stabilizing unpaved roads	6/1/2015 3:30 PM
7	n/a	6/1/2015 3:05 PM
8	Although I found the smoke tests and water sampling to be valuable and educational, they were least beneficial as my organization networks with regulatory agencies that are responsible for conducting these activities.	6/1/2015 12:47 AM
9	N/A	5/31/2015 6:43 PM
10	None	5/31/2015 6:17 PM

Q6 Recommendations for next time:

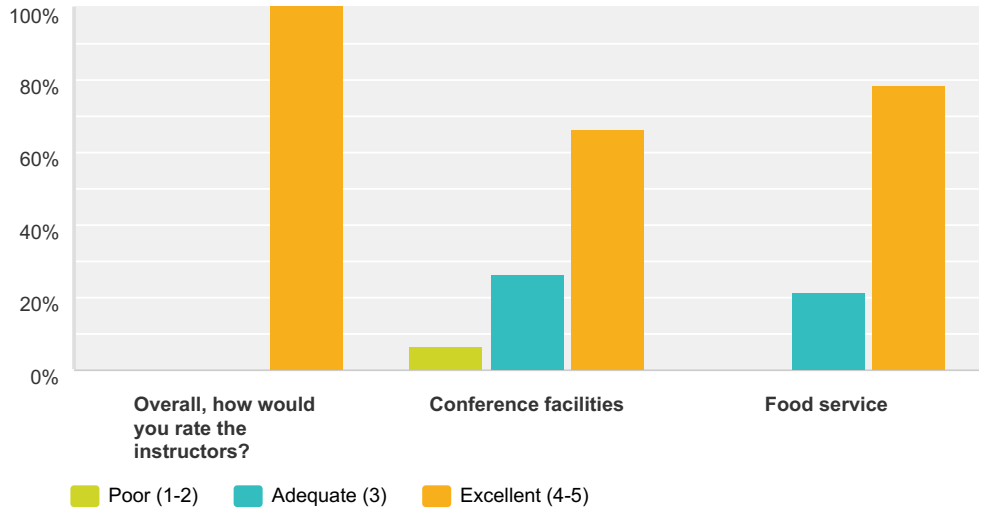
Answered: 15 Skipped: 0



	Same	Fewer	More	Total
Total number of days	**67%** 10	**0%** 0	**33%** 5	15
Time spent in the field	**60%** 9	**0%** 0	**40%** 6	15
Classroom time	**40%** 6	**47%** 7	**13%** 2	15

Q7 Please rate the following:

Answered: 15 Skipped: 0



	Poor (1-2)	Adequate (3)	Excellent (4-5)	Total
Overall, how would you rate the instructors?	**0%** 0	**0%** 0	**100%** 15	15
Conference facilities	**7%** 1	**27%** 4	**67%** 10	15
Food service	**0%** 0	**21%** 3	**79%** 11	14

Q8 Additional Comments?

Answered: 13 Skipped: 2

#	Responses	Date
1	Thank you and looking forward to PIWI3!	6/9/2015 2:01 AM
2	By far the most interesting and well organized training/workshop with delicious lunch I've ever attended. Thank you guys!	6/3/2015 6:26 PM
3	Provide information to participants on steps forward in addressing and applying the important knowledge and information into reality, at least getting one project implemented.	6/1/2015 3:43 PM
4	Thank you! Overall really interesting, but some jargon/design concepts were outside of my expertise/scope of work.	6/1/2015 3:39 PM
5	The total duration of the sessions is good, but perhaps outdoor sessions could be broken into more separate sessions. The time outdoors was hot and brutal. The van A/C's need to be stronger.	6/1/2015 3:33 PM
6	The bbq dog ribs were too tough! Field work should be early in cool hours; classroom should be in midday heat.	6/1/2015 3:30 PM
7	very informative and useful as a wastewater, earthmoving, and erosion control env. officer. PIWI3 on Guam or Pohnpei.	6/1/2015 3:12 PM
8	excellent workshop materials	6/1/2015 3:05 PM
9	Thanks. You rock.	6/1/2015 3:02 PM
10	PIWI3 in Guam sounds good to me.	6/1/2015 1:30 AM
11	1. Debriefing and data finalizing could have been completed in the field rather than having to return to the workshop venue. 2. Consider heat temperatures. 3. Bathroom facilities were lacking - unable to flush tissue; fortunately, the hotel I was staying in was nearby.	6/1/2015 12:47 AM
12	Horsley and BECQ did an outstanding job, both content and logistics to make this a wonder experience. Having the training so close, made it possible for a greater number of staff to attend. Thanks for helping build our capacity in watershed management.	5/31/2015 10:17 PM
13	Perhaps extent conference opportunity to Rota & Tinian in the coming years	5/31/2015 6:17 PM