



# Using Software to Manage the MS4 Permit IAFSM – March 2011

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# HAVE YOU EVER?

- Lost a piece of paper that was important? **YES**
- Not saved an important file or deleted a file that you need? **YES**
- Misplaced an important file or report? **YES**
- Crashed - lost everything on a computer because the hard disk failed? **YES**



## Types of MS4 Operators and MS4 Software Users:

- Counties
- Cities (Phase I and Phase II MS4s)
- Department of Transportation Districts (DOT)
- Utility Districts and Drainage Districts
- State Universities
- Prisons
- Military Bases



## Purpose of Using Software

- Centralized/Organized record keeping (Server/Web)
- Standardization of Site Inspection/Follow Up Actions and Procedures
- Preparedness for Regulatory Audits (data, files, photos, maps, etc.)
- Easily Prepare/Print Annual Report



## Solutions to Documentation Problems

- Document your compliance efforts with a network or online database that is routinely duplicated in order to have a **BACKUP COPY**.
- If your data is only on your hard drive, it is NOT secure! COPY your files to a server!
- Ask yourself or IT personnel: How secure is my data?; How often is a **BACKUP** copy made?
- If you only have paper records, and to ensure you will not lose them, SCAN them and LINK them to your database.



## Database Possibilities

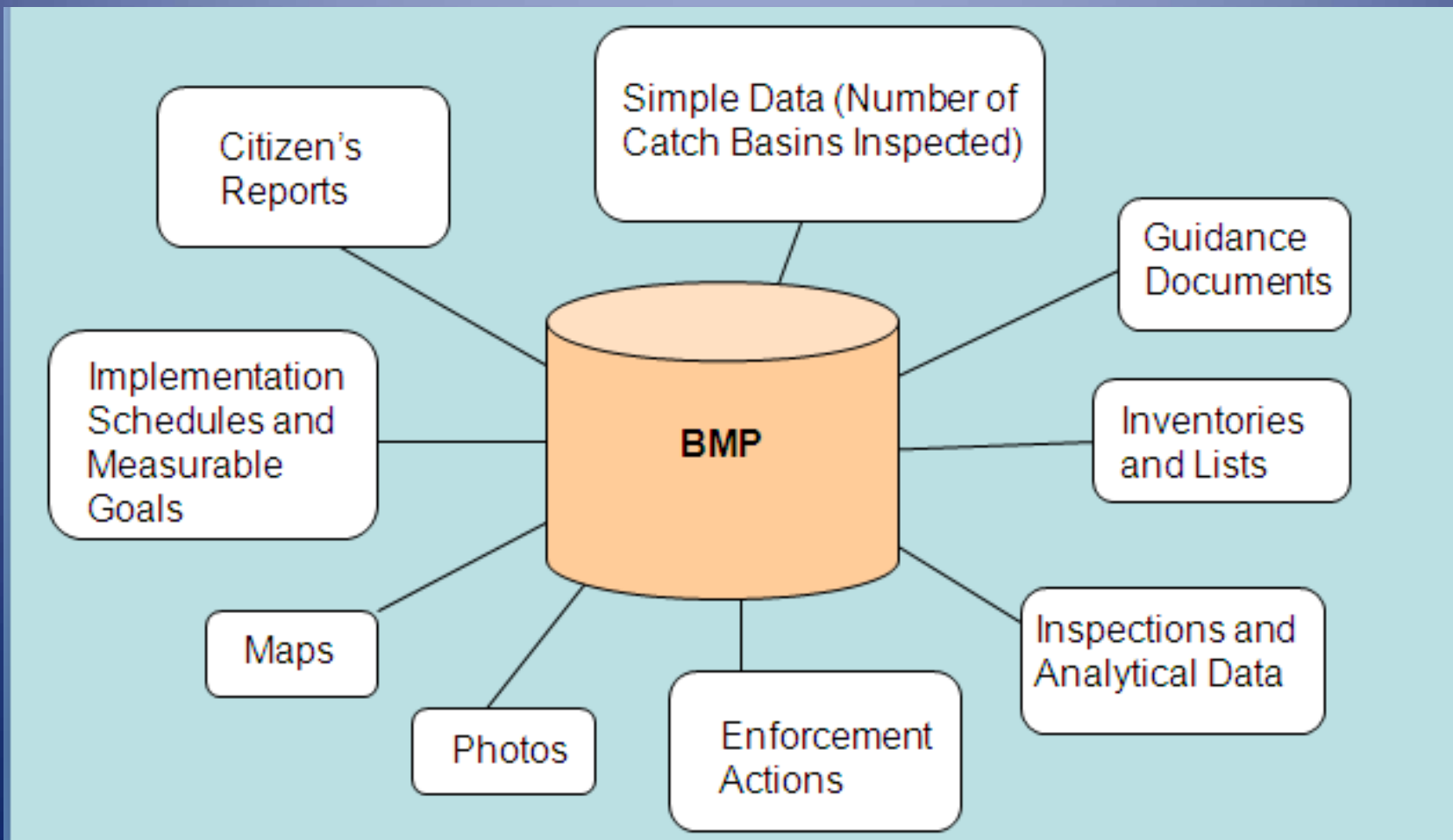
- Customized Databases:
  - Very Expensive
  - Complicated to create
- Commercial Applications :
  - MS4 Permit Manager™ Version 6.0
  - MS4 Web™
  - Other applications that are desktop and web-based.

# Desirable Database Features

- Track 6-11 Control Measures (or MCMs)
- Track BMPs (for each MCM)
  - Measurable Goals & Implementation Schedules
- Document/Detail Outfalls & Illicit Discharges
- Create an Inventory of Construction Sites
- Link Unlimited Photos and Files
- Export all data to MS Excel at the User level
- Built-in GIS Mapping Component
- Edit/Print Summary and Annual Reports



# BENEFIT-Record Linking in Software!







# Annual Reports (Phase I & II MS4's)

## Challenges:

- Collecting data from multiple departments
- Finding all of the compliance records
- Creating a format that demonstrates compliance
- Complicated annual report questions
- Bringing many Data Types together into one report

Solution: Use Software!



## Software Components

- **SWMP - 6 MCMs + BMPs + Implementation Tasks + Measurable Goals (Phase I's add 5 more Control Measures)**
- **Outfalls + Inspections**
- **Illicit Discharges + Inspections**
- **Construction Sites + Inspections + Enforcement Actions**
- **Post Construction Controls + Inspections + Enforcement Actions**
- **Citizen's Reports + Training Records**
- **State Specific Annual Reports**
- **Phase I – Facilities + Representative Monitoring**

# SWMP + BMP Screen Sample

MS4 Permit Manager 5.0 - [SWMP: Best Management Practices (BMPs)]

File Data Path Data Collection Mode Help GIS State Specific Annual Reports

Current Data Path C:\6209\outfalls Network Data Collection Mode

MS4 Permit Manager 4

- Settings
- SWMP
  - Control Measures
  - BMPs
  - SWMP Reports
- BMP Data
- Outfalls
- Illicit Discharges
- Construction Sites
- Post-Construction Controls
- Facilities
- Citizen's Reports
- Training Records
- Representative Monitoring
- Annual Report
- Log off

SWMP: Best Management Practices

Control Measures: Public Education and Outreach

BMPID	BMP	BMP Selected
1-1	Storm Water Website	Yes
1-2	Flyers and Brochures	Yes
1-3	Water Utility Bill Inserts or Messages	Yes
1-4	Public Service Announcements	Yes

BMP Details Implementation Tasks Measurable Goals BMP Data Types and Report Settings

BMP Title: Flyers and Brochures

Description: Development of Flyers for the purpose of educating the public on storm water quality issues.

Department: Coalition

Implementation Date: 5/ 7/2009

Selected: Yes

Implemented: Yes

Display Only Selected BMPs

# BMP Data Entry

MS4 Permit Manager 5.0 - [BMP Data Entry]

File Data Path Data Collection Mode Help GIS State Specific Annual Reports

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MS4 Permit Manager 4

- Settings
- SWMP
- BMP Data
  - BMP Data Entry
  - BMP Photos
  - BMP Files
  - BMP Data Reports
- Outfalls
- Illicit Discharges
- Construction Sites
- Post-Construction Controls
- Facilities
- Citizen's Reports
- Training Records
- Representative Monitoring
- Annual Report
- Log off

**BMP Data Entry** [Close]

Control Measures: **Public Education and Outreach**

	BMP ID	BMP	BMP Description	BMP Selected
	1-1	Storm Water Website	Develop, publish and mai...	Yes
▶	1-2	Flyers and Brochures	Development of Flyers for...	Yes
	1-3	Water Utility Bill Inserts or ...	Distribute storm water qu...	Yes
	1-4	Public Service Announce...	Development and broadc...	Yes
	1-5	Lawn and Garden Brochu...	Acquire or develop and di...	Yes

1 of 25

	Date	Activity	Location	Data Type	Quantity	Units
▶	12/3/...	Flyer ...	City Li...	After t...	200	Flyers
	1/26/...	Flyer ...	City Li...	Flyers...	25	Flyers
	2/4/2...	Flyer ...	City Li...	After t...	100	Flyers
	2/4/2...	Flyer ...	City Li...	After t...	100	Flyers
	2/5/2...	Flyer ...	City Li...	After t...	100	Flyers
	2/18/...	Flyer ...	Base ...	After t...	100	Flyers
	2/19/...	Flyer ...	City Li...	After t...	100	Flyers
	3/2/2...	Flyer ...	City Li...	Auto...	200	Numb...

BMPID: 1-2

Date: 12/31/2008

Activity: Flyer Distribution

Location: City Library

Data Type: After the Storm Brochures Distributed

Quantity: 200

Cost: 400.35

Description: EPA recommended brochures with the

Units: Flyers

# Link BMP Photos

MS4 Permit Manager 5.0 - [BMP Photos]

File Data Path Data Collection Mode Help GIS State Specific Annual Reports

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SWMP: Best Management Practices Report Close

Control Measures: Public Education and Outreach

BMP ID	BMP	Description
1-1	Storm Water Website	Develop, publish and maintain a we...
1-2	Flyers and Brochures	Development of Flyers for the purpo...
1-3	Water Utility Bill Inserts or Messages	Distribute storm water quality inserts ...
1-4	Public Service Announcements	Development and broadcasting of p...
1-5	Lawn and Garden Brochures	Acquire or develop and distribute br...

**CITY OF BRIDGEVILLE - WATER QUALITY**

When a road runs down a storm drain, it goes...

Not to the fish!

Learn how you can prevent water pollution from entering our creeks, rivers and lakes:

- Do not litter. Dispose of household wastes in correct manner.
- Handle chemicals, automotive fluids and other materials responsibly.
- Volunteer to cleanup yards or participate in other community events to maintain the City's beautiful Branch Run system.
- Report spills, leaks or illicit discharges to the Water Quality Division at (714) 414-...

Date	File Path
8/29/2008	C:\Network\Photos\B...
6/10/2009	C:\6209\outfalls\Phot...
6/10/2009	C:\6209\outfalls\Phot...

1 of 3

Image No: 21

Date: 8/29/2008

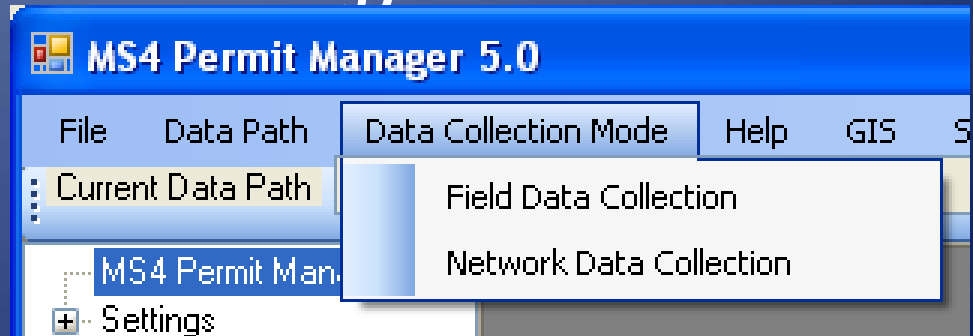
Description:

File Path: Browse C:\Network\Photos\BMPPPhotos

# Collecting Field Data

## Challenges:

- Handheld devices have screens that are too small and are not as productive as laptop computers.
- Linking photos, repeating file names, embedding images makes databases SLOW and LARGE.
- Synchronizing multiple inspectors without overwriting records and allowing proper renumbering as well as maintaining linkages.
- Smooth synchronizations technology.



# Built-In GIS Map




The screenshot displays the MS4 Permit Manager 5.0 software interface. The title bar reads "MS4 Permit Manager 5.0 - [MS4 Map]". The menu bar includes "File", "Data Path", "Data Collection Mode", "Help", "GIS", and "State Specific Annual Reports". The "Current Data Path" is set to "C:\6209\outfalls" and the mode is "Network Data Collection Mode".

The left sidebar contains a tree view with the following items:

- MS4 Permit Manager 4
  - Settings
  - SWMP
    - Control Measures
    - BMPs
    - SWMP Reports
  - BMP Data
  - Outfalls
    - Outfall Inventory
    - Map
    - Reports
  - Illicit Discharges
  - Construction Sites
  - Post-Construction Controls
  - Facilities
  - Citizen's Reports
  - Training Records
  - Representative Monitoring
  - Annual Report
  - Log off

The main map area shows a geographic view with roads labeled "Baker Road", "Oyster Creek Dr", "Westflower St", and "W Way St". Highway shields for 332 and 288 are visible. Numerous outfall points are marked with colored squares and numbered: 033, 037, 039, 042, 044, 046, 047, 048, 049, 051, 052, 053, 054, 055, 056, 058, 059, 060, 062, 063, 064, 066, 067, 068, 069, 070, 071, 072. One outfall, 056, is highlighted in red, indicating an illicit discharge. All other outfalls are highlighted in green, indicating they are screened. The map includes navigation controls like zoom in/out, pan, and a scale bar.

**Map Legend**

	Outfalls		Outfalls with Illicit Discharges
	Screened Outfalls		



## What are some Web-based Features?

- Real time inspection recordkeeping
- Web-access field computers – Tablet PCs and Tuff Book style computers
- 3<sup>rd</sup> Party Data Entry (i.e., Consultants, Construction Contractors, etc.)
- Enhanced Security Settings; Role-based Security
- Unlimited Photos/File linkage
- Built-in GIS Map functionality and map printing



# Map Outfalls and Photos

MS4 Permit Manager 5.0 - [Outfall Photos]

File Data Path Data Collection Mode Help GIS State Specific Annual Reports

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Outfall ID: 105 Outfall Photos Close

File ID	Database Outfall ID	Date	Comment	File Path
61	105	6/10/2009		brazoria outfalls 07...

1 of 1



File ID: 61

File Path: Browse brazoria outfalls 076-61.jpg

Comment:

Date Entered: Wednesday, June 10, 2009

Open File

Field Collected

# Construction Sites + Inspections

MS4 Permit Manager 5.0 - [ ]

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- Outfalls
  - Outfall Inventory
  - Map
  - Reports
- Illicit Discharges
- Construction Sites
  - Site Inventory
  - Map
  - Reports
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Construction Site Details

1 of 1 Linked Files/Photos

Database ID: 315 Tracking ID: 045678

Data Entry Date: 8/18/2008 Owner Type: Non-municipal

Site Name: 115 Main Site Location: Phase I Deerfield Subdivision

Owner Name: Rick Masters Operator Name: John Concienne

Address: Address:

City/State/Zip City/State/Zip

Contact: Contact:

Phone: 681 0673 Phone:

Fax: Fax:

Cell Phone: 893 1493 Cell Phone: 720 8818

Expected Start Date: 8/18/2008 Expected Completion Date: 8/18/2009

Total Site Area: 1.25 Land Disturbance: 1.25

Permits Approved:  GPS Site Active:  Site Complete:  Field Verify:

Latitude: Longitude: X: Y:

Date Reviewed: 8/18/2008 Date Approved: 8/18/2008

Plan Comment:

Subdivision: Deerfield Project Type:

Community: Watershed:

Subwatershed: Receiving Water:

NPDES: State401: USACE404: USACENWP:

Permit Status: Compliant Enforcement Status: Compliant

Associated Inspection Records

Record ID	Date	Inspector	Site Active	Site Permitted	Plan On-site	Records	Conversati	Comment	Enforceme	Date Resolved	Cor. Actions	Next Inspect
1023	8/18/20...	Rick Ma...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Silt Fenc...				

# Advantages of Electronic MS4 Documentation

- Audit preparation time is reduced greatly.
- Annual reports are easier to produce from a centralized database.
- Databases on servers are copied routinely for backup purposes.
- Field inspection productivity can increase dramatically; dry weather screening = 120 outfalls in one day and the records can be all collected electronically in the field.
- Comply with centralized record keeping requirements.

# MS4 Help for a Troubled Campus

Adolfo Varela, Stormwater Specialist for **Texas Tech University** reports that when it does rain, 1 -1.5 inches/Hour is not uncommon. There is impact of 30,000 students, with 50,000 people on campus during a football game.

“We had 15,000 cars when Bobby Knight broke the record for the most wins in basketball. When it rains, the university can be inundated with runoff from off campus coming on campus.

The 40-year-old stormwater system for the nearly 2,000-acre campus consists of less than 5 miles of pipe, with the main pipe measuring 18 inches in diameter. “We track different activities to consider their impact on the university, especially the parking lot. The parking lots get hot in the summer, which results in potholes, and even a broken pipe now and then.

Varela credits software for making it possible to increase program efficiency. He reports it was easy to understand, with a two-day seminar and helping him find faster solutions to reoccurring problems.  
(Stormwater Magazine 2008)

# Auditors at Texas Tech Univ.

Varela adds that he had special visitors on campus in 2005: the EPA. “They saw that we met all the requirements for NPDES and gave us a good grade.”

The EPA didn't find any problems with construction, education, flood control, or grounds maintenance.

He adds, “When people ask a few questions about our stormwater control, I now have the answers.”

# Baytown, Texas – Phase 2

- Baytown, TX, with 65,000 residents, initiated a stormwater program. Data management software helped town officials handle the requirements.
- “We do construction-site inspections, public education, public involvement, and good housekeeping without any ordinances,” says Rory Lang, Stormwater Coordinator.
- To that end, Baytown uses MS4Web software. The software helps organize and manage stormwater program implementation tasks, collects and manages program data, automatically reports program status, and automatically produces a draft of annual reports.  
*(Stormwater Magazine 2006)*

# How Software helped Baytown

- “It’s been really great as far as the construction sites,” Lang says. “It helps us track the construction sites and also maintains the schedule of when inspections need to be done for the sites.” Lang says the software also helps organize photos and documents sent to site operators based on inspections.
- “In addition, it’s helping us keep track of the various things we do, such as the events we hold and the brochures we hand out,” she says.
- Previous to using the MS4 software, Baytown tracked its stormwater efforts using Excel spreadsheets. “This is far easier; it’s more manageable and gives us way more information and scheduling ability,” Lang says.

# Baytown Advice to Municipalities

- Lang advises municipalities to seriously consider incorporating software into their stormwater programs. “Software will help you manage all of this, especially for those municipalities that aren’t going to be able to have a large staff to help manage it, input it, file it, track it, and keep it for the life of the permit in case you get audited,” she says.
- **“The software is definitely the way to go. Don’t try to do it with Excel spreadsheets or a simple database,”** she adds. “Definitely get something that will help track everything you need to track, because it is easy to forget small pieces of what’s going on.”



# Managing Military Data

Earth Tech in San Antonio, TX handles reporting requirements for 7 Air Force bases for their Air Education and Training Command (2005).

Two different permits are issued to the bases, located in Texas, Louisiana, and Arkansas. One is the MS4 municipal permit with its annual reporting requirement; it has six minimum measures. The other is a general industrial permit.

To fulfill reporting requirements each base must include quarterly digital monitoring of water quality, based on a selected event, such as rainfall with a measurable quantity. **CBI Systems assisted Earth Tech in developing the software, which Earth Tech installed at each Air Force base on the mainframe computer systems.**

Collen Brownlow, an Earth Tech engineer adds that the computer software generates the annual report, based on data input. (*Stormwater Magazine 2005*)

# Other Military Bases

- Quantico Marine Corp (Quantico, VA)
- Malmstrom AFB (Montana)
- Tinker AFB (Oklahoma)
- Goodfellow AFB (San Angelo, TX)
- Peterson AFB (Colorado)
- Randolph AFB ( TX)
- Lackland AFB (TX)

# Universities

- Texas Tech University
- University of TX
- University of KY
- Western KY University
- Memphis University
- Univ of TN (future)

# Pennsylvania State-wide

- The PEC (Pennsylvania Environmental Council) has evaluated and selected MS4Web software for PA state-wide.
- 7 municipalities in Philadelphia using the MS4Web.
- The PA EPA is also reviewing the MS4 software with the PA Annual Report.
- See [www.StormwaterPA.org](http://www.StormwaterPA.org) (under Regulations).



# Tennessee Stormwater Association

- Working with the Tennessee Stormwater Association (TNSA) to provide desktop and web-based software state-wide.
- Incorporating the Tennessee Annual Report form into the software.
- Working with Phase 1 Cities/Counties, Phase 2 Cities, and Universities in TN.

# EPA Region 6 MS4 Conference

- EPA Region 6 provides a yearly MS4 Operator's 3-day Conference - Yearly.
- Since 1999, an annual conference of MS4 operators has been held in EPA Region 6 (AR, LA, NM, OK & TX).
- This conference brings representatives from municipalities, federal facilities, States, and EPA to learn about new regulatory developments and share ideas and experiences in developing/implementing storm water management programs.
- <http://www.epa.gov/region6/water/npdes/sw/ms4/conference.htm>



# What Will I Need to Start?

- Network Server or Web Server
- Software (Database, GIS Software)
- Desktop and Laptop Computers (client computers)
- Air Cards (online systems)
- Digital Camera (take low resolution photos)
- Handheld GPS (Garmin for Desktop software with USB cord)



# MS4 Desktop Software

- DVD format (SQL Server)
- Up to 20 users on the Server.
- Synchronization – One Click Sync.
- Version Upgrades Yearly.
- Additional Map file provided for state roads.
- Annual Report form imported into the software.





# MS4 Web-based Software

## Per capita/per year/entity

- Unlimited Users
- Allows consultants to enter data over the internet
- Includes yearly ESRI – ARC GIS - GIS built-in mapping connection with default layers.

# Self-Hosting MS4 Web Software

- IT Departments are choosing to self-host the software to interface with already existing ESRI ArcGIS mapping software
- Allows importing and exporting of data.
- Software implementation fee is the disadvantage but the advantage is that the price is drastically reduced by 65% yearly.
- ArcGIS Server License is needed.



# Software Training Class

## Onsite Training Class:

- One Day Hands-on Class with step-by-steps
- Training Manuals for trainees
  - Approx 12 attendees/class.
  - Classroom provided by Client with computers or personal laptops (Max 2 people per computer)
  - Laptops can be rented.



# Implementation Services

- Enter Customized SWMP + BMPs, etc.
- Import Legacy Data – GIS Layers including
  - Past Outfalls
  - Construction Sites, etc.
- Custom software solution development for your specific permit compliance needs



THANK YOU!!

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