Twenty-Fifth Annual
ADEM Nonpoint Source Conference
22 January 2014

City of Montgomery

Phase I Municipal Separate Storm Sewer System (MS4) Program

By:
Dewayne Smith, P.E., CPESC, CPSWQ
Hydro Engineering Solutions
A Division of Trimble

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What is an MS4?

- **M**unicipal **S**eparate **S**torm **S**ewer **S**ystem (MS4)
- Phase I MS4
  - Medium and Large Municipalities
  - Population >100,000
- Phase II MS4
  - Small Municipalities
  - Urbanized Area
  - Population Density > 1,000 / square mile

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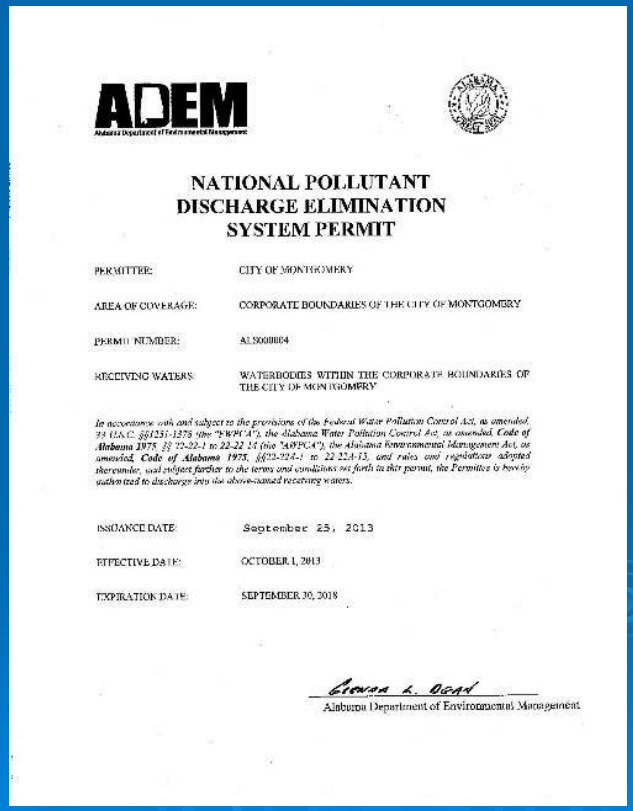
Montgomery MS4 Permit

- NPDES Permit No. ALS000004
  - Initial Permit 1 October 1995
  - Old Permit 1 October 2001
  - New Permit **1 October 2013**

    Over a Decade

- How a decade of expectations, knowledge and technology can influence MS4 Programs
  - Post Construction
  - Monitoring
  - Illicit Discharge



ADEM

Alabama Department of Environmental Management

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

PERMITTEE:	CITY OF MONTGOMERY
AREA OF COVERAGE:	CORPORATE BOUNDARIES OF THE CITY OF MONTGOMERY
PERMIT NUMBER:	ALS000004
RECEIVING WATERS:	WATERBODIES WITHIN THE CORPORATE BOUNDARIES OF THE CITY OF MONTGOMERY

In accordance with and subject to the provisions of the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§1251-1376 (the "FWPCA"), the Alabama Water Pollution Control Act, as amended, Code of Alabama 1975, §§ 22-22-1 to 22-22-14 (the "AWPCA"), the Alabama Environmental Management Act, as amended, Code of Alabama 1975, §§22-22A-1 to 22-22A-15, and rules and regulations adopted thereunder, and subject further to the terms and conditions set forth in this permit, the Permittee is hereby authorized to discharge into the above-named receiving waters.

ISSUANCE DATE:	September 25, 2013
EFFECTIVE DATE:	OCTOBER 1, 2013
EXPIRATION DATE:	SEPTEMBER 30, 2018

Alabama Department of Environmental Management

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Post Construction Program

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Post Construction

Objectives

- Mimic pre development hydrology
- Minimize impervious surfaces
- Preserve and protect ecological sensitive areas
- Provide vegetated buffers along waterways
- Protect trees and native soils
- Minimize topsoil stripping

Low Impact Development

- Design the site to fit the land
- Conservation
- BMPs
  - Pervious Pavement
  - Green Roofs
  - Rain Barrel
  - Rain Gardens

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BMP Design Criteria

- **Part II.B.5.a.2.**

  "Require landowners and developers to develop and maintain best management practices to ensure, to the maximum extent practicable, that post-construction runoff mimics pre-construction hydrology of the site. A 1.1 inch rainfall over a 24-hour period preceded by a 72-hour antecedent dry period shall be the basis for the design and implementation of post construction BMPs;"

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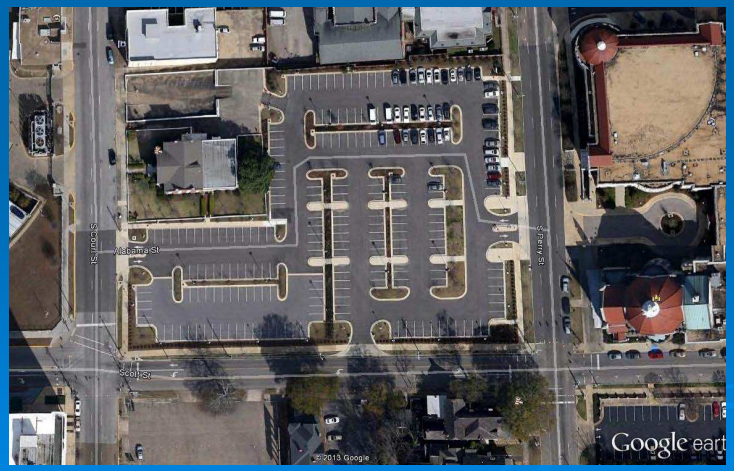
Pervious Pavement

1st Baptist Church



Hutchinson Missionary Baptist Church

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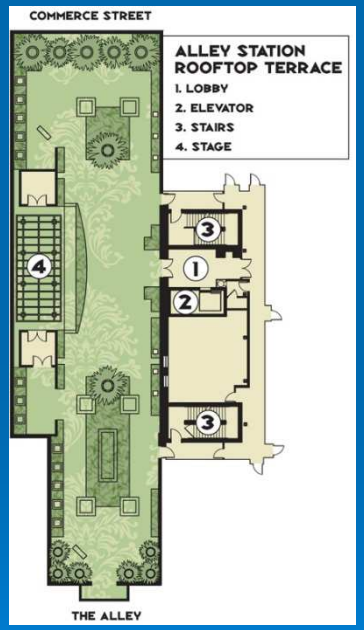
Green Roofs

Alabama Association of Realtors

Alley Station



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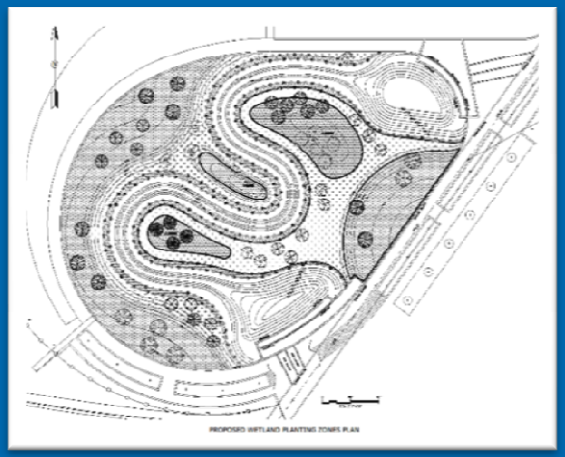
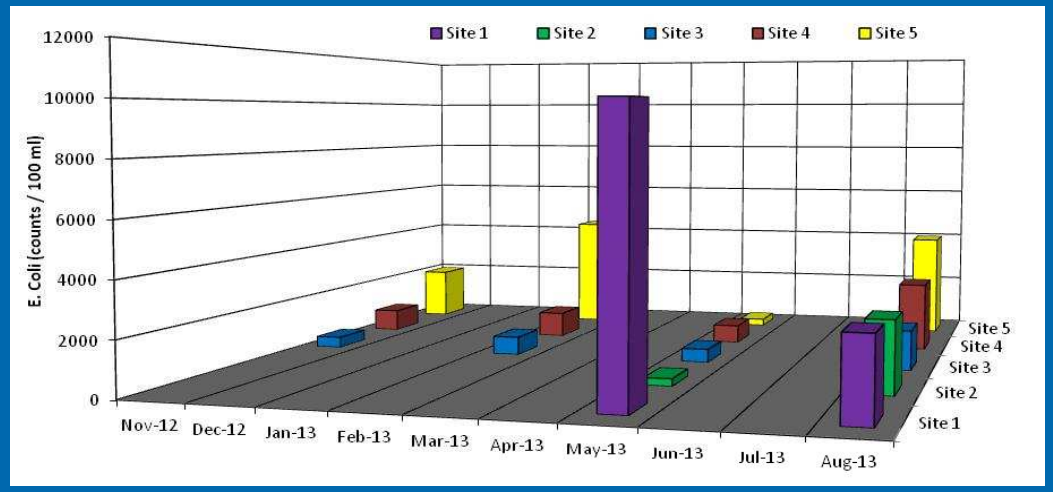
Constructed Wetland





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Other Green Projects

Bioretention Basin

Stream Restoration

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Monitoring Program

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Old Permit

- Flow Composite Samples (1 / Year)
- Storm Event Criteria
  - Rainfall > 0.10 inch
  - Dry Period > 72 Hours

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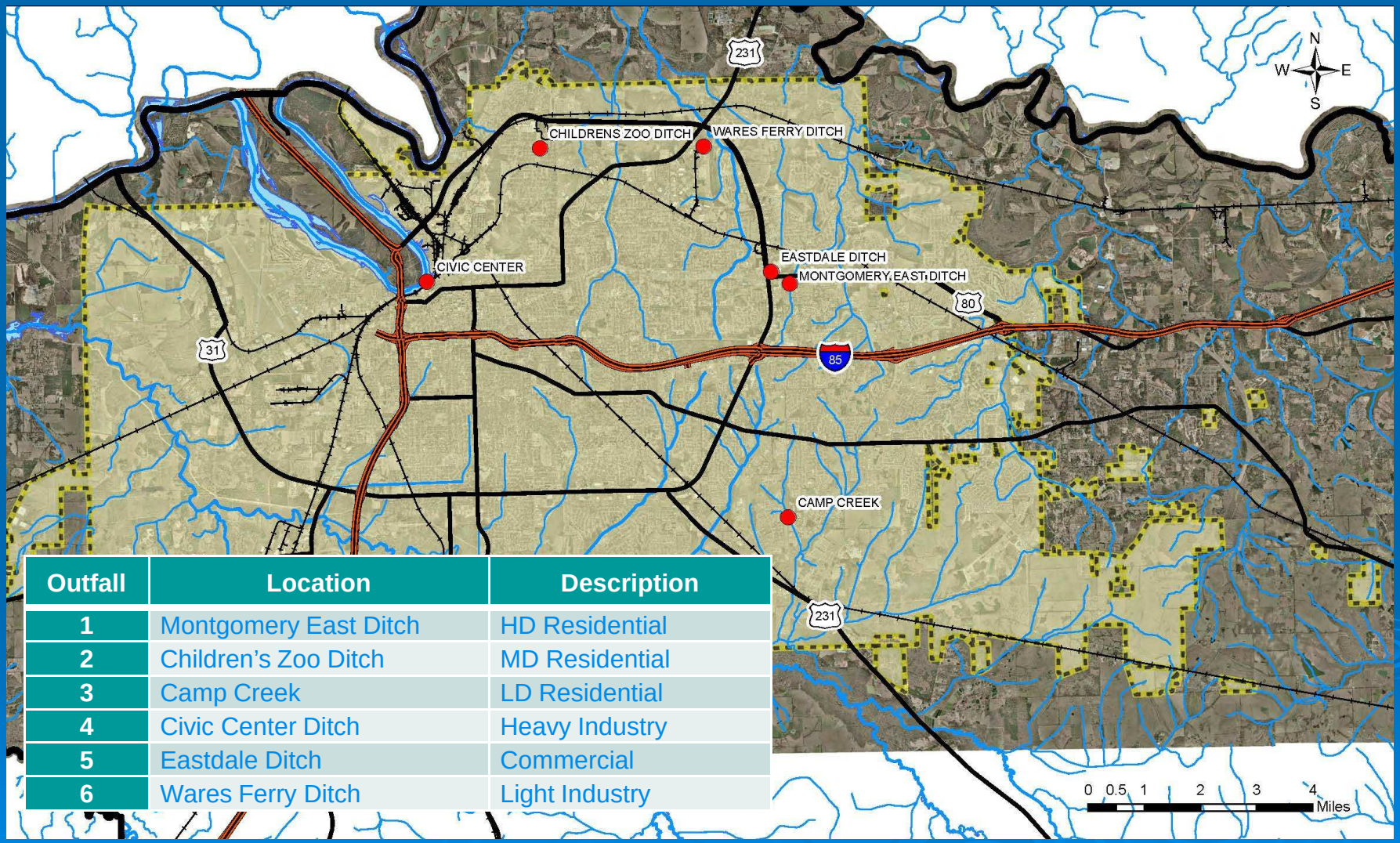
Old Monitoring Sites



Outfall	Location	Description
1	Montgomery East Ditch	HD Residential
2	Children's Zoo Ditch	MD Residential
3	Camp Creek	LD Residential
4	Civic Center Ditch	Heavy Industry
5	Eastdale Ditch	Commercial
6	Wares Ferry Ditch	Light Industry

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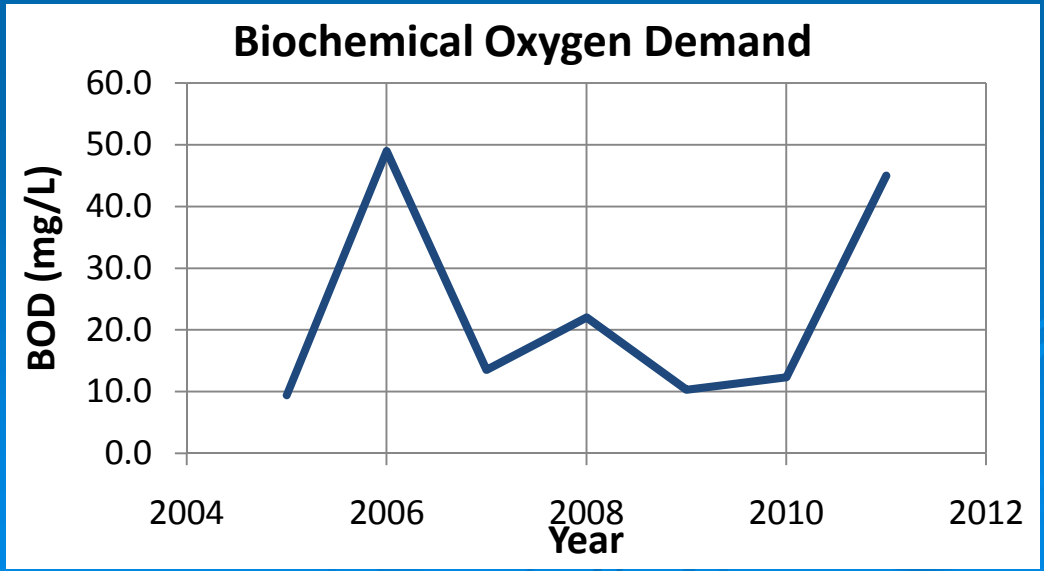
Data Analysis

Representative Monitoring
2011 Analytical Data Summary

Outfall: 01 Montgomery East Ditch HD Residential

Permit Year	TSS	TDS	BOD	COD	TKN	Total N	Dissolved Phosphorus	Total Phosphorus	Oil and Grease	pH
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
2005	9.0	70.0	6.0	45.0	<1.0	<1.0	<0.5	<0.5	0.8	7.65
2006	22.5	224.0	28.0	192.0	2.0	2.4	<0.5	<0.5	<0.5	NA
2007	50.5	19.0	8.5	38.0	<1.0	3.4	<0.5	<0.5	4.2	7.45
2008	16.4	97.0	1.0	17.0	1.0	1.0	<0.5	<0.5	<0.5	7.01
2009	8.5	91.0	28.0	72.0	2.3	4.0	<0.5	<0.5	2.8	6.73
2010	21.0	7.0	22.5	50.0	<1.0	<0.5	<0.5	<0.5	0.6	6.44
2011	15.2	5.0	8.0	21.3	1.3	<0.5	<0.5	<0.5		6.86



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New Permit

- Continuous Monitoring

In-Situ Troll 9500

Level
Dissolved Oxygen
Turbidity
Pressure
pH / ORP
Temperature
Specific Conductance

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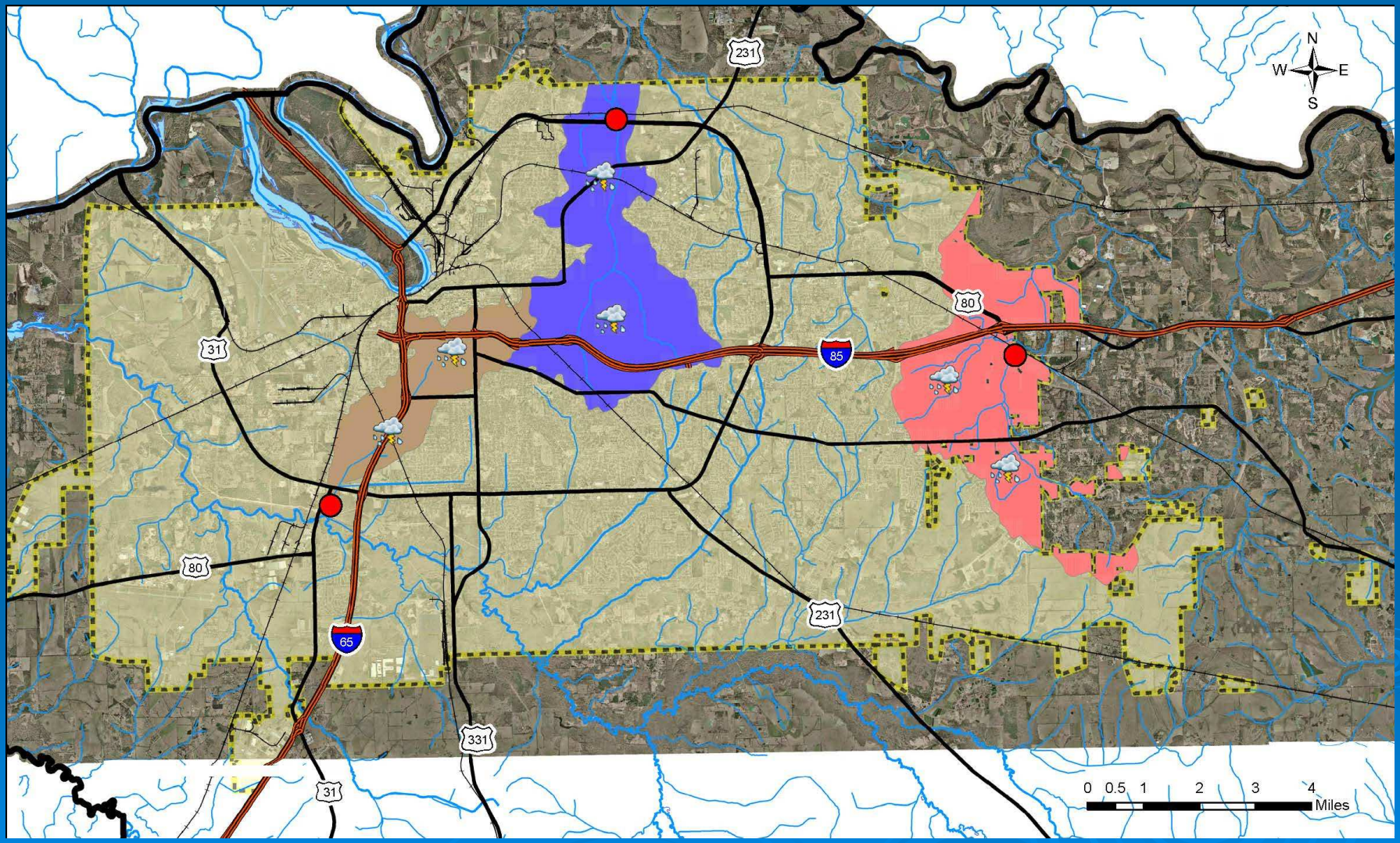
New Monitoring Sites



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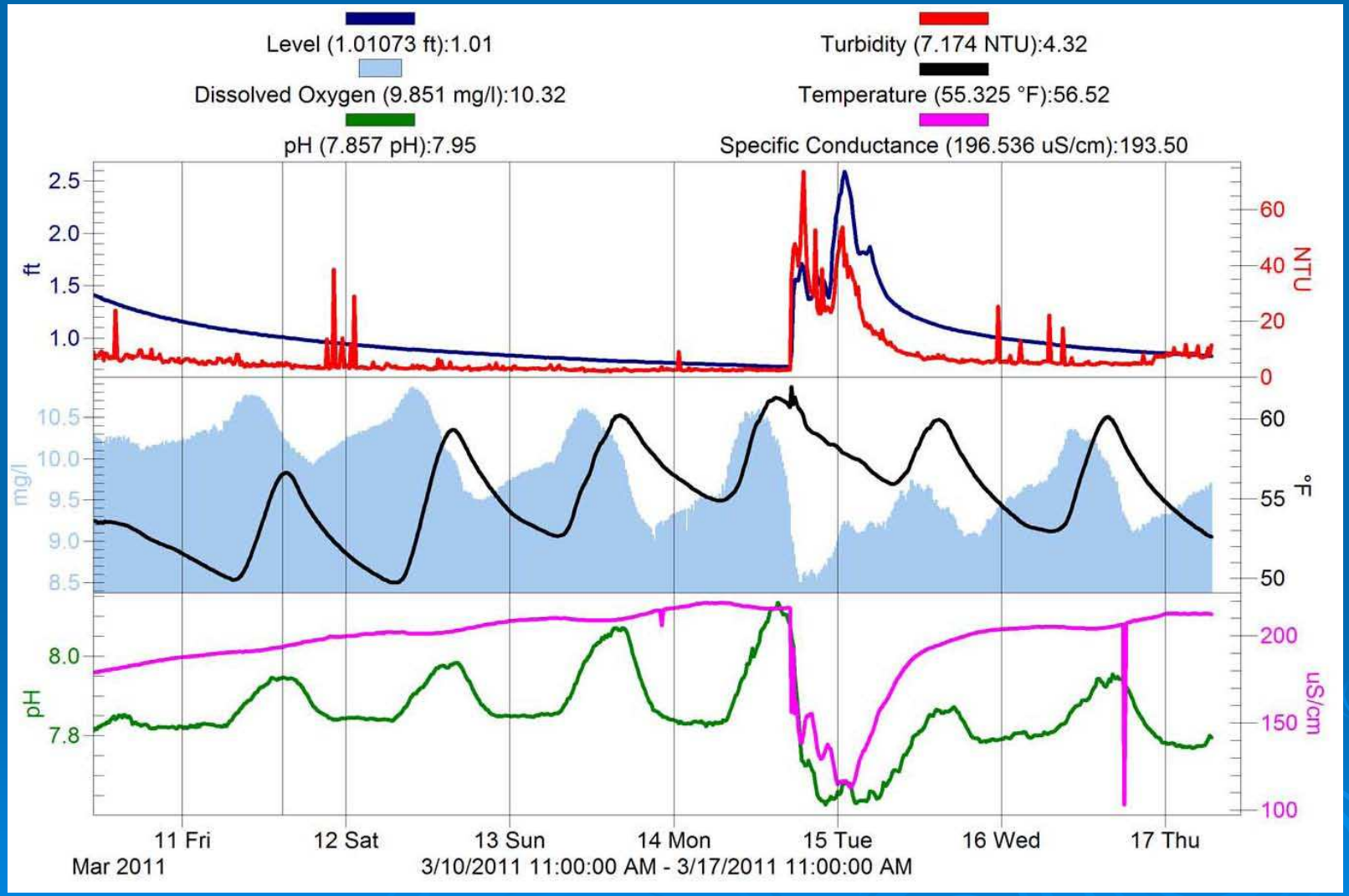
Monitoring Data



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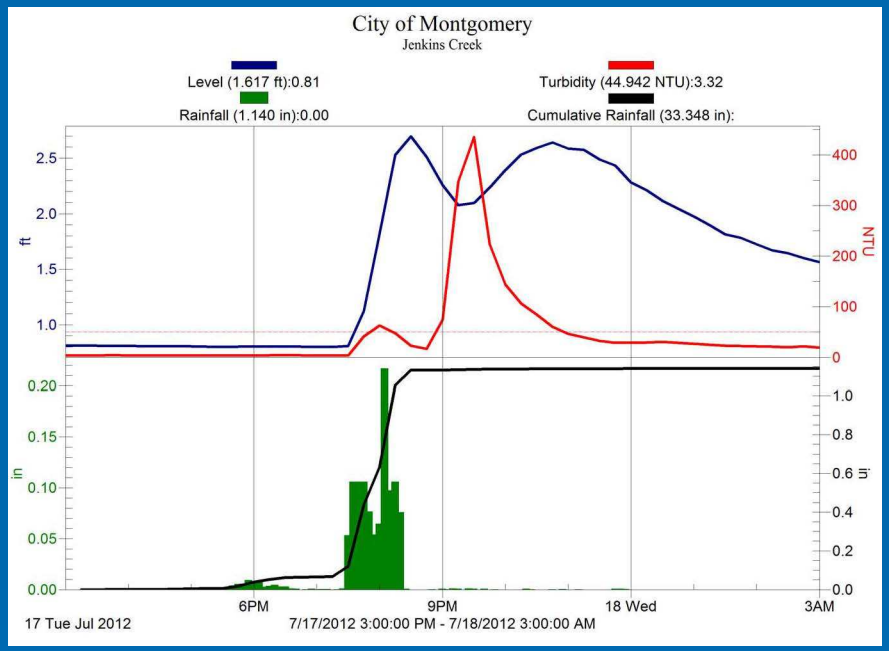

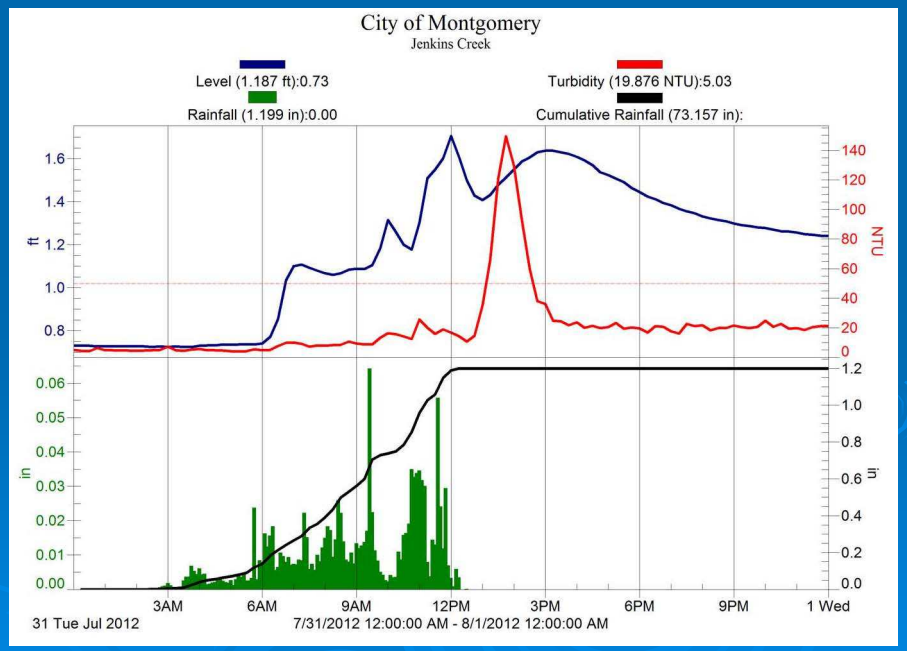

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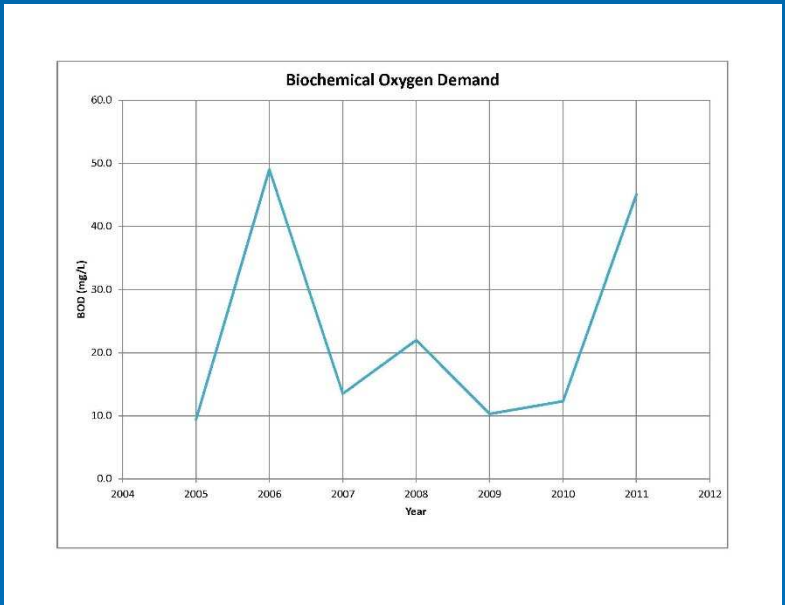
Old vs New

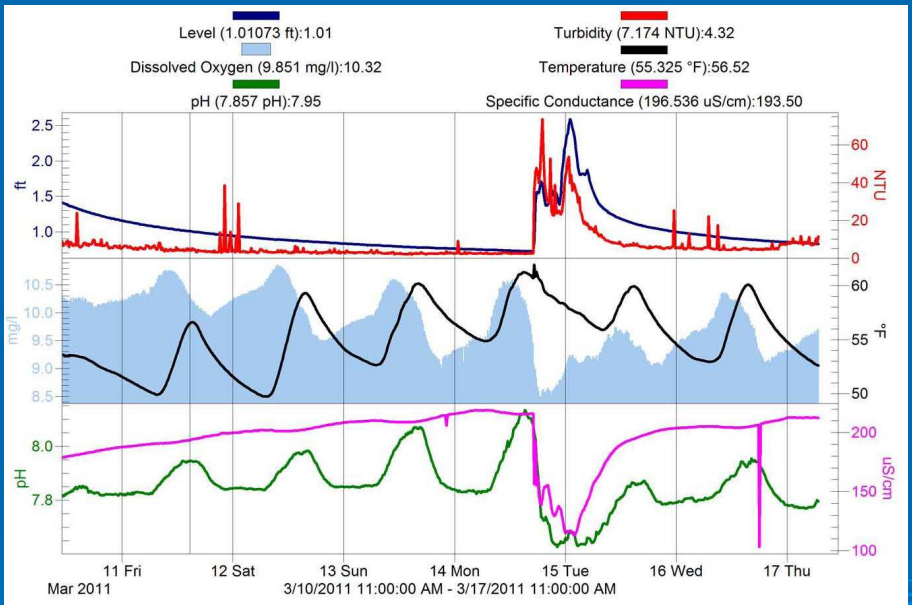
Old



7 Years of Data

7 Data Points / Parameter

New



1 Week of Data

672 Data Points / Parameter

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Technology Benefits

- Old Monitoring Program
  - 1 sample / year
  - Only provides a snap shot of water quality
- New Monitoring Program
  - Watershed focused
  - 24 / 7 / 365
  - 8,760 data points / parameter
  - Real time access to data
  - Pollutant source identification (Alerting Capabilities)
  - Cost effective tool

Permit Year	1	2	3	4	5	Total
Existing Permit	$ 41,433	$ 28,113	$ 28,113	$ 28,113	$ 28,113	**$ 153,885**
Proposed Permit	$ 37,492	$ 39,223	$ 42,931	$ 19,054	$ 19,054	**$ 157,754**

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Illicit Discharge Program

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Technology Advancements

- Smart Phones
- Tablets
- Field Computers

Capabilities

- Cameras
- GPS
- Mobile Apps

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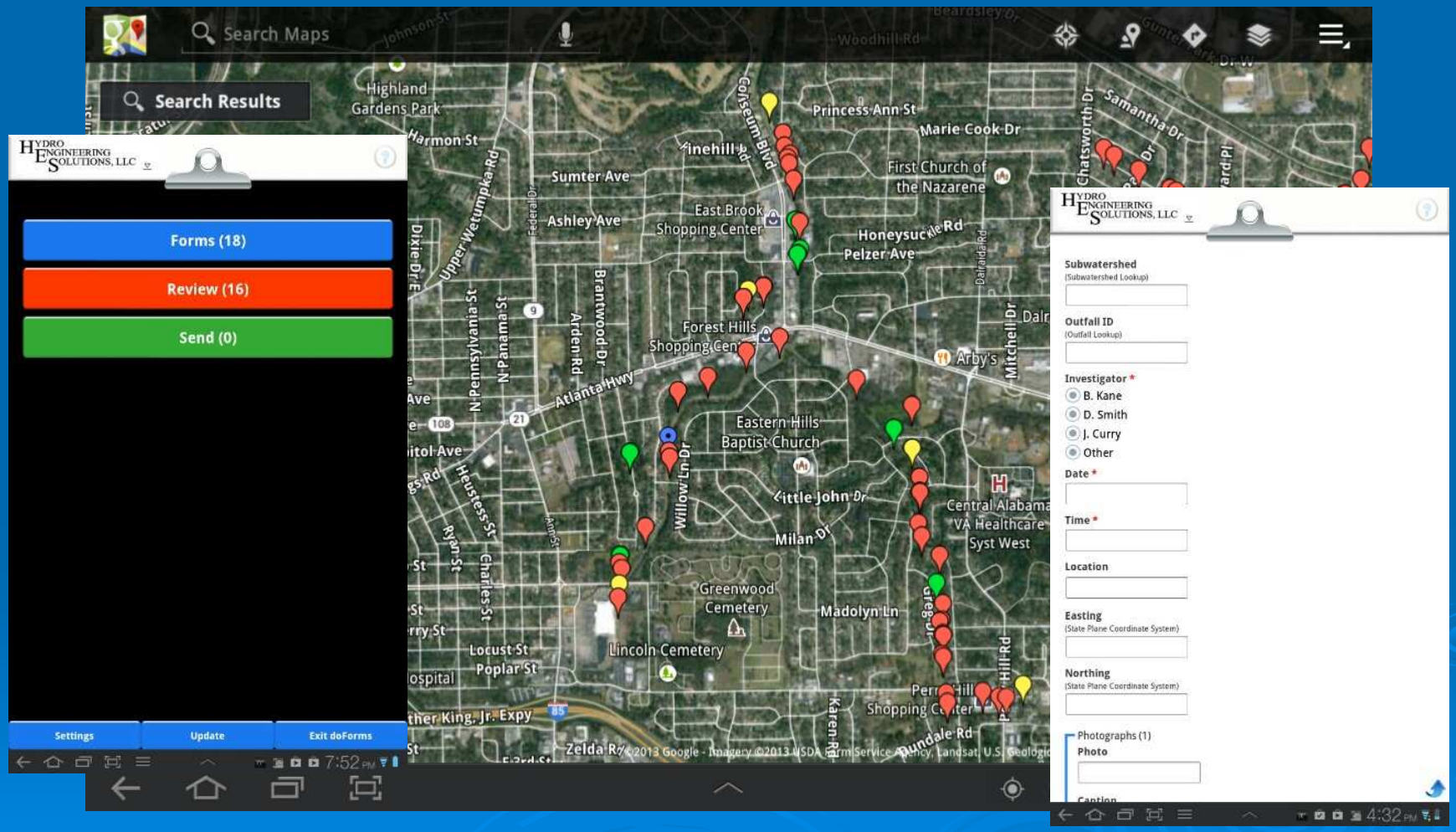
Mobile Applications



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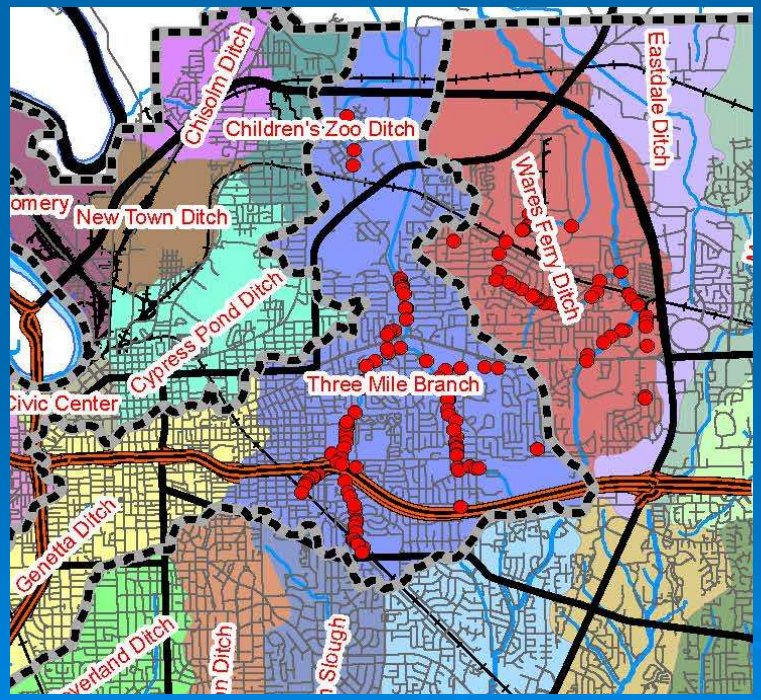
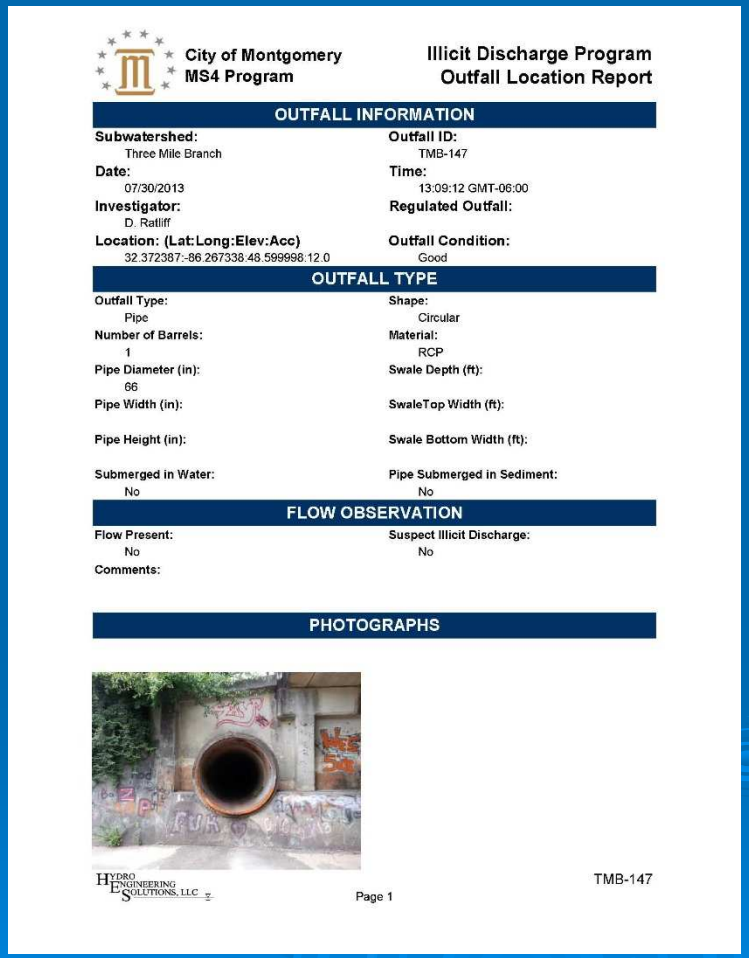
Output

- Screening Report
- GIS Data





City of Montgomery
MS4 Program

Illicit Discharge Program
Outfall Location Report

OUTFALL INFORMATION

Subwatershed: Three Mile Branch	**Outfall ID:** TMB-147
Date: 07/30/2013	**Time:** 13:09:12 GMT-06:00
Investigator: D. Ratliff	**Regulated Outfall:**
Location: (Lat:Long:Elev:Acc) 32.372387:-86.267338:48.599998:12.0	**Outfall Condition:** Good

OUTFALL TYPE

Outfall Type: Pipe	**Shape:** Circular
Number of Barrels: 1	**Material:** RCP
Pipe Diameter (in): 66	**Swale Depth (ft):**
Pipe Width (in):	**SwaleTop Width (ft):**
Pipe Height (in):	**Swale Bottom Width (ft):**
Submerged in Water: No	**Pipe Submerged in Sediment:** No

FLOW OBSERVATION

Flow Present: No	**Suspect Illicit Discharge:** No

Comments:

PHOTOGRAPHS

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Page 1

TMB-147

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Summary

- Montgomery's MS4 Program
  - Includes increased expectations for Post-Construction
  - Incorporates the evolution of technology

Better Information to Make Better Decisions

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QUESTIONS

Catoma Creek

Three-Mile Branch

Jenkins Creek

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