



## Phase II Stormwater Program Overview

Madison County, MS

January 17, 2017

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### Why Manage Stormwater?



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### Regulatory History

- 1988 EPA Report to Congress
  - Stormwater is the leading cause of water quality impairment in the U.S.



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### Congressional Response

- 1987 amendment to the Clean Water Act
  - Phase I promulgated on November 16, 1990
  - Phase II promulgated on December 8, 1999
    - First Permitting Cycle – March 10, 2003
    - Second Permitting Cycle – 2009 – 2013
    - **Third Permitting Cycle – 2017 – 2021 (MDEQ issued new permit on March 18, 2016)**

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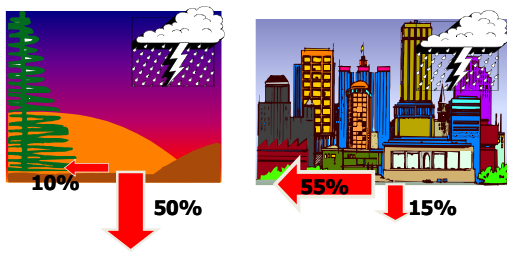
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### As Development Intensity Increases, so does the Potential for Water Quality Concerns



The diagram illustrates the impact of development intensity on water runoff and infiltration. On the left, a rural landscape with trees and a field shows 10% runoff and 50% infiltration. On the right, an urban landscape with buildings and paved areas shows 55% runoff and 15% infiltration. Red arrows indicate the percentage of runoff and infiltration for each scenario.

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### As Development Intensity Increases, so does the Potential for Water Quality Concerns



Madison County, 1997

Google Earth

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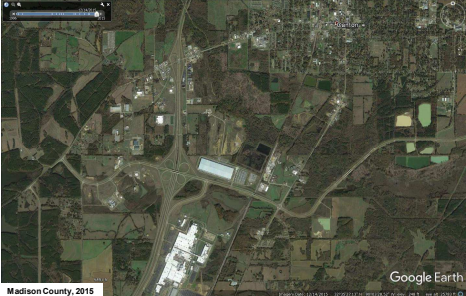
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### As Development Intensity Increases, so does the Potential for Water Quality Concerns



Madison County, 2015

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### Mississippi Regulated Entities

- Bay St. Louis
- Biloxi
- Brandon
- Byram
- Clinton
- D'Iberville
- De Soto County
- Flowood
- Forrest County
- Gautier
- Gulfport
- Hancock County
- Harrison County
- Hattiesburg
- Hernando
- Hinds County
- Horn Lake
- Jackson County
- Jackson, the city
- Lamar County
- Long Beach
- Madison
- **Madison County**
- Moss Point
- Ocean Springs
- Olive Branch
- Passcagoula
- Pass Christian
- Pearl
- Petal
- Rankin County
- Richland
- City of Ridgeland
- Southaven
- Waveland
- Keesler Air Force Base
- SeaBee Base, Gulfport
- University of Southern Mississippi
- Mississippi Department of Transportation

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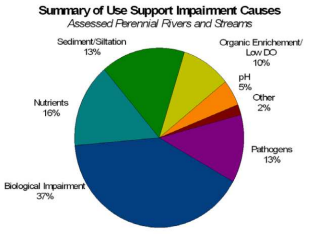
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### Water Quality Problems in MS Rivers and Streams

Summary of Use Support Impairment Causes  
Assessed Perennial Rivers and Streams



Impairment Cause	Percentage
Biological Impairment	37%
Nutrients	16%
Pathogens	13%
Sediment/Siltation	13%
Organic Enrichment/Low DO	10%
pH	5%
Other	2%

State of Mississippi Water Quality Assessment 2014 Section 305(b) Report

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### Erosion and Sediment's Effects on Aquatic Life

Loose soil flows into waterway

Cloudy water slows feeding, breeding

Silt smothers bottom dwellers

Fine Sediment clogs gills

Growth rate reduced

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### Local Programming Requirements

- Development of a local Stormwater Management Plan
  - Implemented through five-year permit cycles
  - Implement various BMP's for each of the six minimum measures
- Annual Reporting to MDEQ
  - Due by January 28<sup>th</sup> of the following year

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### Program Minimum Measures

- Public Education and Outreach
- Public Involvement
- Illicit Discharge Detection and Elimination
- Construction Stormwater Controls
- Post-Construction Stormwater Controls
- Municipal/County Pollution Prevention and Good Housekeeping

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 **Construction Program Requirements**



Failure to maintain adequate Erosion and Sediment Control measures can lead to sedimentation in local streams as can be seen on the next slide.

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 **Construction Program Requirements**



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 **Construction Program Requirements**

- Land Disturbance Activities (Construction)
  - >1 Acre to <5 Acres – Local Permitting
  - >5 Acres – Permitted directly through MDEQ
- Both scenarios require development and submittal of a construction stormwater pollution prevention plan (SWPPP) and notice of intent

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### Construction Program Requirements - Developer

- Copy of SWPPP on-site
- Installation and maintenance of Best Management Practices (BMPs)
- Retain sediments on-site
- Control waste on-site
- Provide sanitary facilities
- Routine inspections and maintenance of an inspection log
- Final stabilization of all disturbed soils

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### Construction Program Requirements - Developer

- Construction permitting requires submittal of a site-specific Stormwater Pollution Prevention Plan
  - The SWPPP details in narrative and graphic form Best Management Practices (BMPs) to be incorporated into the construction process to control erosion and off-site sediment transfer.
  - Contractors are required to implement the SWPPP and conduct regular (weekly) inspections of installed BMPs.
  - Contractors are also required to maintain inspection logs on-site.

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### Construction Program Requirements – Madison County

- Inspections
- Enforcement
- Record-Keeping
- Management of County Projects
- Reporting to MDEQ
- Enforcement of Federal and State Regulations
- Enforcement of local ordinances

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### DEQs Regulatory Perspective

- MDEQ has indicated that they intend to increase the frequency of inspections on construction sites
  - Inspected sites without a SWPPP and complete inspection logs on-site are subject to an automatic fine that could be compounded if other issues or concerns are noted.
- Greater emphasis on green infrastructure

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Phase II Municipal Separate Storm Sewer System Overview

### MDEQ NEW MS4 GENERAL PERMIT

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### ACT5(5)(E)

- Develop site design standards for all new and redevelopment projects and require, in combination or alone, management measures that are designed, built and maintained to infiltrate, evapotranspire, harvest and/or use, at a minimum the first inch of every rainfall event preceded by 72 hours of no measurable precipitation. For all new and redevelopment on private property, the MS4 may opt to have controls installed on that private property, in the public right-of-way, or a combination of both. Post-construction BMPs would include, but are not limited to: grass swales for runoff conveyance, filter strips and bioretention systems for filtration of sediment, runoff control using dry/wet retention/detention basins, and buffer zones for stream protection. Please refer to the Mississippi Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas for more information.

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Green Infrastructure 101

## TREATMENT TRAIN APPROACH

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### ACT5(5)(C) – Treatment Train Approach

- Within one year of obtaining permit coverage, the permittee shall review local codes and ordinances. Newly-designated and currently permitted MS4s shall update codes and ordinances, if necessary, within 4 years of coverage under this permit. Currently permitted MS4s shall continue to implement their existing permanent Stormwater Management Programs until the codes and ordinances review and update are completed. The permittee should consider making revisions to address post-construction runoff from publicly-owned and privately-owned new development and redevelopment projects to the extent allowable under State or local law. Existing ordinances and new (draft) ordinances addressing post-construction stormwater management shall be submitted to MDEQ for compliance review with the SWMP. In addition, the regulated entity must develop a regulatory mechanism (e.g. a post-construction ordinance) to allow inspections of post-construction BMPs for private development and redevelopment projects within the MS4. New (draft) ordinances shall be submitted to MDEQ for review 30 days before proposed adoption. The ordinance or regulatory mechanism shall not limit the post-construction minimum measure to a single type of best management practice. MDEQ recommends that post-construction stormwater control and treatment systems be implemented through a **treatment train approach** (see Definitions) which would incorporate more than one BMP.

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Construction, Post-Construction, & Green Infrastructure 101

## GREEN INFRASTRUCTURE CONCEPTUAL DESIGN – LIVINGSTON PARK – JACKSON, MS

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 **Examples of Green Infrastructure**

- Green Street Planters



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 **Examples of Green Infrastructure**

- Rain Garden



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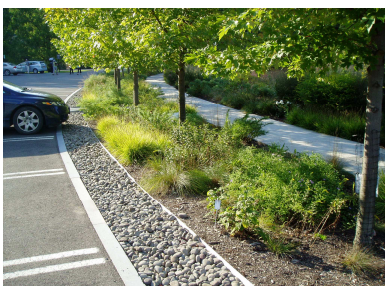
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 **Examples of Green Infrastructure**

- Rain Garden



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 **Examples of Green Infrastructure**

- Infiltration Trench – Roadway Median



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 **Examples of Green Infrastructure**

- Infiltration Trench – Parking Lot



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 **Examples of Green Infrastructure**

- Bioretention Area



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 **Examples of Green Infrastructure**

- Bioswale



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 **Examples of Green Infrastructure**

- Bioswale with Concrete Weirs



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 **Examples of Green Infrastructure**

- Parking lot Islands



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## Examples of Green Infrastructure

- Green Roofs




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Green Infrastructure

## CASE STUDY COST INFORMATION LOW IMPACT DEVELOPMENT VS CONVENTIONAL DEVELOPMENT

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## Conventional vs. LID

<http://www.arc.govt.nz/albany/fms/main/Documents/Plans/Technical%20publications/Technical%20reports/2009%201-50/TR2009-045%20-%20Low%20Impact%20Design%20vs%20Conventional%20Development.pdf>

**Table 1**  
Summary of cost comparisons between conventional and LID site development.

Project	Country	Conventional development costs (\$)	LID cost (\$)	Cost differential (\$)	Percent difference (%)
Heron Point	New Zealand	1,844,000	1,590,000	254,000	14
Palm Heights	New Zealand	7,218,000	5,936,000	1,282,000	18
Wairori Downs	New Zealand	5,963,000	4,478,000	1,485,000	25
Chapel Run	USA	2,450,200	888,735	1,561,465	64
Southington Green	USA	641,400	199,892	441,508	69
Thorp Knoll	USA	561,650	338,715	222,935	39
Pleasant Hill Farm	USA	1,284,100	728,035	556,065	43
Gap Creek	USA	4,620,800	3,942,100	678,700	15
Auburn Hills	USA	2,350,385	1,598,985	751,400	32

Table 2 presents the gross realisation results for the three Auckland sites. These sites were all developed using a conventional approach subsequently, using site development information an LID approach was used to determine the costs and profit margins and whether there would be a more desirable outcome using an LID approach.

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### Conventional vs. LID Auburn Hills Subdivision, WI



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### Key Takeaway

- MDEQ issued new Storm Water Permit on March 18, 2016.
- Madison County submitted a revised Storm Water Management Plan on April 31, 2016.
- Currently awaiting comments from MDEQ.
- New 1" requirement under Post-Construction will impact developers moving forward.
- County will likely start implementing new storm water management plan at the beginning of 2017.
- Allen Engineering and Science is assisting the County in meeting various components of the Stormwater Program.

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### QUESTIONS

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