ADVANCED DESIGN WORKSHOPS

1. Basin Delineation & BMP Selection
   May 31, 2017

2. Enhanced Dry Swale Design
   July 12, 2017

3. Bioretention Basin Design
   August 9, 2017

4. Following PDP and PPG for MS4
   September 6, 2017

5. Filter Strip and Bioslope Design
   TBD
FOLLOWING THE PDP AND PPG FOR MS4

Aynsley O’Brien, PE
Stormwater Engineer
Aynsley.OBrien@aecom.com
to discuss how MS4 permit post-construction stormwater requirements fit into the GDOT PDP process and design plans
The Plan Development Process (PDP) Manual provides guidance for completing a GDOT project from the conceptual stage to final acceptance.
PLAN DEVELOPMENT PROCESS (PDP)

- Manual Updates in Fall 2016
  - Chapter 5: Concept Stage
  - Chapter 6: Preliminary Design
  - Chapter 7: Final Design
Section 5.13: MS4

- Provides MS4 Overview
- Introduces MS4 PDP Process Chart
- References Chapter 10 of GDOT Drainage Manual
Section 5.17: Concept Team Meeting

- Items discussed at Meeting should include:
  
  • MS4 Project Level Exclusion
  
  • Concept Level Post-Construction BMP Development
Section 5.4: Project Design Data Book

- Contents should include:
  - Project Level Exclusion
  - MS4 Concept Level Design Spreadsheets, if sufficient information is known
    - BMP Locations
    - Required ROW for each BMP
    - Cost of BMP
2012 or 2017 MS4 Permit?

- Based on Concept approval date
- Concept approval received January 3, 2018 or later → 2017 MS4 Permit
Chapter 6: Preliminary Design

- Review Assumptions/Design Standards from Concept Phase:
  - Design Year Traffic Forecast
  - Proposed Typical Section
  - Design Criteria
  - MS4 Requirements
Section 6.3.3: MS4 Soils Report (Stormwater BMP Infiltration Report)

- Applicable for Infiltration Post-Construction Stormwater BMPs
- Separate from Soil Survey Report - Timing Outlined in MS4 PDP Flowchart
- Reference Appendix J of GDOT Drainage Manual
Section 6.4.1: Roadway Design

Roadway Design Activities should include:

- Outfall Evaluation
- Outfall Level Exclusion Determination
- BMP Feasibility Analysis
- BMP Sizing
- Post-Construction Stormwater Report Preparation and Submittal
PLAN DEVELOPMENT PROCESS (PDP)

- **Section 6.4.10: MS4 and Maintenance Office Coordination**
  - Discuss BMP maintenance accessibility
  - Discuss BMP maintenance responsibility
Section 6.5.3: Preliminary Field Plan Review

- Post-Construction Stormwater Report submittal to ODPS required 8 weeks prior to PFPR Request
Section 7.3.4: MS4 Design

- Discusses submittal of Post-Construction Stormwater Report (PCSR) to EPD
- Introduces PCSR Addendum Process Requirements
- Final BMP details submitted as part of the FFPR Request package
**PDP FLOWCHART**

**Concept Phase**

- PLE Determination
- MS4 Concept Report Summary
- MS4 Concept Level Design Spreadsheet (optional)
- Concept Level MS4 BMP Cost Estimate

---

**Project Level Exclusion**

1. Start
2. Determine if PLE applies using MS4 Concept Report Summary
   - Yes: Document PLE in Concept Report Summary
   - No: Does a PLE apply?
     - No: No further action
     - Yes: Document PLE evaluation in Concept Report Summary
3. Complete MS4 concept level design spreadsheet for each major outfall
4. Include Concept Report Summary & estimated MS4 BMP costs in Concept Report
5. Identify location of MS4 outfalls in project
6. Verify that flows do not exceed 50% of BMP capacity and there is an appropriate buffer downstream

**Responsible Offices**

- Design Phase Leader
- GDOT PM
- GDOT ODPS Water Resources Group
- Geotechnical
Preliminary Plan Phase

- Outfall Basin Delineation
- Downstream Analysis
- Outfall Level Exclusion Determination
- Feasibility Analysis
- Infiltration Testing Applicability
- Post-Construction Stormwater Report Preparation
Final Plan Phase

- ODPS Review of Post-Construction Stormwater Report
- Address Report Comments
- Final Approval by ODPS
- EPD Review of Post-Construction Stormwater Report (if applicable)
PDP FLOWCHART
Final Plan Review

- Revise Post-Construction Stormwater Report, if necessary
- ODPS Review of Final BMP Design
- Address Plan Comments
- Project Letting
3 scenarios that could trigger need for an addendum

- Only address revised drainage basins
- Resubmittal to ODPS and EPD
July 2017 MS4 Manual Updates

- Chapter 2: Construction Section Presentation
  - Added MS4 and Post-Construction Stormwater BMP Information

- Chapter 3: Right of Way Section Presentation
  - Added Post-Construction Stormwater BMP Information
Section 4: General Notes

- Include General Note: THIS PROJECT CONTAINS POST-CONSTRUCTION STORMWATER (PERMANENT) BMPS. REFER TO SECTION 38 FOR SPECIFIC REQUIREMENTS.

- Include a table with post-construction BMP types and locations similar to ERIT.
Section 5: Typical Sections

- Include note specifying station range of BMPs affecting typical section (i.e. bioslope, filter strip) and reference to BMP detail sheet(s).

- Include note with station range of OGFC that has been specified for MS4 permit compliance.
Section 6: Summary of Quantities

- Post-Construction Stormwater BMPs:
  - BMP Type
  - Structure ID (from post-construction stormwater report)
  - Drainage Area ID (from post-construction stormwater report)
  - Location
  - Side of Roadway
Section 13: Mainline Roadway, Crossroad, Side Street, Frontage Road and Ramp Plan Drawings

- Post-Construction Stormwater BMPs:
  - Outline (BMP footprint)
  - Label BMP Type (i.e. bioretention, infiltration trench, etc.)
  - Begin/End Stations
  - Reference Special Detail Sheet(s)
  - Maintenance access features (i.e. access road, fence)
–Section 22: Drainage Profiles

• Tie-in points from drainage system to post-construction stormwater BMPs with reference to BMP detail sheet(s)
Section 23: Cross-Sections

- Post-construction stormwater BMP finished grade elevations or reference to other plan section containing this information
Section 38: Special Construction Details

- Post-Construction Stormwater BMPs:
  - BMP Details
  - Special Grading Sheets
POST-CONSTRUCTION BMP DETAILS

- Outlet Structure
  - Bioretention Basin
  - Dry Detention Basin
  - Enhanced Dry Swale
  - Enhanced Wet Swale
  - Sand Filter
  - Wet Detention Pond

- Bypass Structure
- Check Dam
- Planting Detail
- Riprap Forebay
- Underdrain Outlet
- Underdrain System
- Bioslope
# POST-CONSTRUCTION BMP DETAILS

Located on R.O.A.D.S.

## Roadway

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<th>Revised</th>
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POST-CONSTRUCTION BMP
SPECIAL GRADING SHEETS

- Bioretention Basin
- Bioslope
- Dry Detention Basin
- Enhanced Dry Swale
- Enhanced Wet Swale
- Sand Filter
- Wet Detention Pond (Micropool)
- Wet Detention Pond (Standard)
- Wet Detention Pond (Extended Detention)
EDG does not include MS4 revisions to PPG

Specific Guidance provided in Post-Construction Stormwater BMP Details and Special Grading Plans
Forebay
Underdrain
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STRUCTURE INVERT ELEV. = 969.6
OUTLET PIPE DIA. = 18 IN
OUTLET PIPE LENGTH = 53 FT
OUTLET PIPE HEADWALL = GDOT STD 1120
AVERAGE PONDING DEPTH (h,) = 0.5 FT

STRUCTURE TOP ELEV. = 975.3
OUTLET PIPE SLOPE = 1.51%
OUTLET PIPE INVERT = 968.8
100-YR, 24-HR WSE = 974.5
SOIL MIX DEPTH (d,) = 2.0 FT

### OUTLET STRUCTURE AS-BUILT DATA

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OUTLET PIPE DIA. =
OUTLET PIPE LENGTH =
OUTLET PIPE HEADWALL =
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38.001 General
Special Construction Details are used to clarify project specific construction elements within a
set of plans. Special Construction Details should be developed for specific construction
items that are not included in the Department’s Standards or Construction Details, including
Post-Construction Stormwater BMPs (grading plans and BMP details).

38.002 Required Information
• The special construction details should be listed on the index by a descriptive title of
  the special construction detail and creation date or latest revision date
• Include all dimensions, views, and clearances necessary to clearly depict
  the construction element
• Site Source components should not be a part of the detail. Do not specify a
  manufacturer’s items; list only the general construction item.
• For each item, any general notes, and any specific construction method required.
  General notes should be referenced on the right side of the plan drawing.

Bioretention Basin Plan Required Information
The existing information shown should include:
• Large roadway signs
• Roadway items
• Drainways (with existing materials)
• Buildings / Structures
• Drainage (including streams, ponds, lakes, ditches, special ditches, and storm drain
  pipes all with size, material type, and flow arrows)
• Above ground utility features including utility structure and appurtenance locations (i.e.
  poles, valves, manholes/vaults, telephone pedestals)
• Retaining walls
• Other paved areas
• Gravel surfaces
• Fences
• Bridges
• Wooded areas (including tree lines or obscured areas)
• Rumes (specific to parcel or design issues)
• Underground storage tank caps within the limits of the topographic survey
• Groundwater wells with indication to be plugged or remain in service
• Existing right-of-way and easement lines with labels
• Property lines with labels
• Land District lines with labels
• Georgia Milita District (GMD) lines with labels

Railroads
• Right of way lines with labels
• Tracks
• Names
• Mileposts
• Warning devices
• Crossing ID numbers
• Utility easement lines with labels
• Existing LIA - Limit-of-Access lines with labels (Begin (B LIA) and End (E LIA) if
  applicable)
• Wetlands
• Historic boundaries
• Existing contour lines with labels
• NOTE: Existing contours should be shown screened back and dashed
• Waters of the U.S
• All environmentally sensitive areas (ESA) including, but not limited to, stream buffers,
  wetland boundaries, historical boundaries. TAE habitats, archaeological resources,
  hazardous materials, and environmental justice areas shall be denoted on all plan
  drawings (roadway plan drawings, utility plan drawings, erosion control plan drawings,
  etc) with a Diamond Line Code. Areas requiring no entry by any personnel shall be
delineated with Orange Barrier Fence with a Solid Circle Line Code.
• ESA lines labeled as “ESA – See General Notes “Environmental Resources Impact
  Table” for construction restrictions”
• All other pertinent physical features (i.e. property owner entrance signs, business/residential
  signs, etc.)

The proposed information shown should include:
• Alignments
  • Stations progressing from west to east and from south to north
  • Road Names
  • Stations and primary to marks every 500 feet and secondary tie marks every
    100 feet (frequency can be increased) for 1’=50’ to the even station (i.e. 12’=30’)
  • Stations and primary tie marks every 100 feet and secondary to marks every
    50 feet for 1’=20’ to the even station (i.e. 12’=30’)
  • Stations where centerline crosses county boundaries

Bioretention Basin
• Outlet control structure (include MS4 Post-Construction Stormwater Report ID)
• Forebay/prefiltration and outlet protection
• Reference special detail sheet(s)
• Design tables
• Underdrain System
• Maintenance access (i.e. access road, fences)
• All other pertinent physical features (i.e. slopes, embankments, spot
  elevations, etc.)
• Drainage
  • Structures
  • Storm drain (size and direction)
  • Side drains
  • Culverts
  • Permanent erosion features (i.e. type of rip-rap, concrete aprons, concrete
    sleeves)
  • Ditches
  • Inlet/Outlet structures
• Roadway Items
  • Edges of pavement
  • Curb and gutter
  • Sidewalk
  • Paved shoulder
  • Ditches
  • Guardrail/Barriers
  • Walls
  • Noise barriers
  • Bridges
  • Approach slabs
  • Driveways
• Proposed Right-Of-Way Features
  • Required right-of-way
  • Required easement lines and associated patterns
  • Proposed right-of-way markers at locations where RW direction changes
    (Including PC/PT locations)
**POST-LETTING**

Prior to BMP Construction

- MS4 discussion at Transition Conference, if required
- MS4 discussion at Pre-Construction Conference
- Verify BMP can be built within tolerances
- Process for design revisions during construction
CEI verification that BMP was built within tolerances

Submission of as-built documentation

POST-LETING
BMP Construction Verification
POST-LETTING

**GDOT Acceptance**

- MS4 lessons learned discussed at PCE meeting, if required
- BMP GPS data collection per SP 156
- GDOT acceptance

---

**Flowchart Description**

- **Maintain BMF(s) during construction**
  - Per the GDOT J&M Manual.
- **Complete Section V of the BMP CEI Checklist**
  - Verify Contractor has maintained the BMP(s)
- **Collect GPS data for BMF(s)**
- **Final Acceptance**

- **Does the project need a PCE meeting?**
  - Yes: ES provides MS4 lessons learned feedback to ODPS
  - No: Complete Final Inspection

- **Refer to Spacial Provision 156 and GIS Inventory Scheme and Metadata information. PM is responsible for uploading data through the ProjectWise Deliverables Management System.**

---

**Legend**

- B
- No
- Final Acceptance
- Collect GPS data for BMF(s)
- Does the project need a PCE meeting?
- Complete Final Inspection
- Maintain BMF(s) during construction
- ES provides MS4 lessons learned feedback to ODPS
- Responsibility of DME/DCE/AM. This could be full project acceptance or partial maintenance acceptance of BMF.
Handoff to maintenance

Maintenance provides lessons learned feedback to DCM Committee
Any Questions?
Please complete the course feedback forms before leaving so this course can continue to be improved!
CONTACT INFORMATION

Brad McManus, PE
MS4 Program Manager
Office of Design Policy and Support
bmcmanus@dot.ga.gov