



LEXINGTON

**Lexington-Fayette Urban County Government
Workshop with the Development and Construction Industry**

**Municipal Separate Storm Sewer System (MS4) Permit,
Construction Site Stormwater Runoff Control, and
Post-Construction Stormwater Management
Fayette County Cooperative Extension Service**

December 15, 2017

Agenda

8:30-9:00	Registration
9:00-9:10	Opening Comments – Richard Walker, Tetra Tech, MS4 Program Manager
9:10-9:30	New Development Overview – Doug Burton, Director of the Division of Engineering
9:30-10:00	Overview of LFUCG’s Stormwater Program – Jennifer Carey, Division of Water Quality
10:00-10:30	Southland Drive Stormwater Project – Greg Lubeck, Division of Water Quality
10:30-10:45	Break
10:45-11:15	Construction Site Stormwater Runoff Controls – Barry Toning, Tetra Tech <ul style="list-style-type: none">• What works, What doesn’t• Areas Needing Improvement
11:15-11:45	Technical Review Committee – Greg Lubeck, Division of Water Quality <ul style="list-style-type: none">• Common Maintenance, Drainage, and Floodplain Issues
11:45-12:15	2016 Stormwater Manual – Richard Walker, Tetra Tech
12:15	Adjourn – <i>Fill Out and Return the Evaluation Forms!</i>

DIVISION OF ENGINEERING

Doug Burton, P.E.

Director



LEXINGTON

Division of Engineering



Common Design Issues – Early Stages

- Incomplete submissions
 - Missing forms
 - Executive Summary
 - Downstream drainage studies
 - Lack depth/breadth to verify capacity
 - Site plans
 - No stormwater designs

- Misunderstanding of process
 - Engineering only one of many divisions involved

Common Design Issues – Early Stages

- Public infrastructure
 - Provide plan/profile
 - Surety/minor plats associated
- Public vs private infrastructure
 - Label clearly on plans
- Subject to development plan
 - Let us know asap to expedite process

Common Design Issues – Early Stages

- Internal drops
 - Not permitted in sanitary sewers
- Entrance apron
 - Use LFUCG standard detail
- Commercial Laterals
 - Must be 6" diameter
- Water quality features
 - If using infiltration, must provide test (ASTM D3385)

Common Design Issues – Late Stages

- As-builts
 - Don't match field conditions
 - Example...Grading issues that lead to drainage issues
- Detention Basin Certification
 - Can't close LDP or sign off on CO until complete
- Surety creation
 - Recommend punchlist walk-thru with Engineering
- Revisions (design/construction)
 - Must be submitted to Engineering

Common Construction Issues

- Expansion joints
 - Full depth
- Offset storm structures
 - Should've been caught by owner's inspector
- Sidewalk ramps
 - Review updated standard drawing
- Sanitary sewer cleanouts
 - Rolled per LFUCG detail
 - Not installed in 12:00 position

Common Construction Issues

- Inspections
 - Engineering inspectors are acting as on-site inspectors
 - Finding issues that should've been caught during installation
 - EOR as inspector vs owner's inspectors
 - More communication needed with owner
 - Owner
 - Have inspectors onsite during installation
 - Submit inspector reports/certifications

How we can help

- NOV form
 - New version relates to Engineering specific issues
 - Help you understand what needs fixed
- Website
 - Submission checklist
 - Consolidate manuals somewhat
 - Better organize website
 - Group relevant info
- Staffing
 - Josh Dezarn
 - Commercial
 - Currently down 1 person
 - Hope to fill in January

Questions?



OVERVIEW OF LFUCG'S STORMWATER PROGRAM

Jennifer M. Carey, P.E.
MS4 / Water Quality Section Manager



LFUCG's Stormwater Program



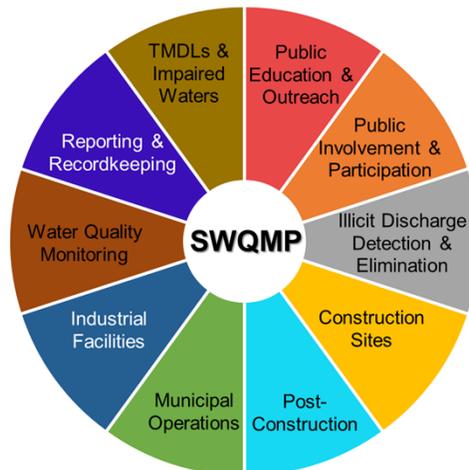
LFUCG's Stormwater Program

■ Stormwater Quality Management Program

- MS4 Permit Requirement
- 10 Sections
 - 9 Program Elements
 - 1 Narrative Section

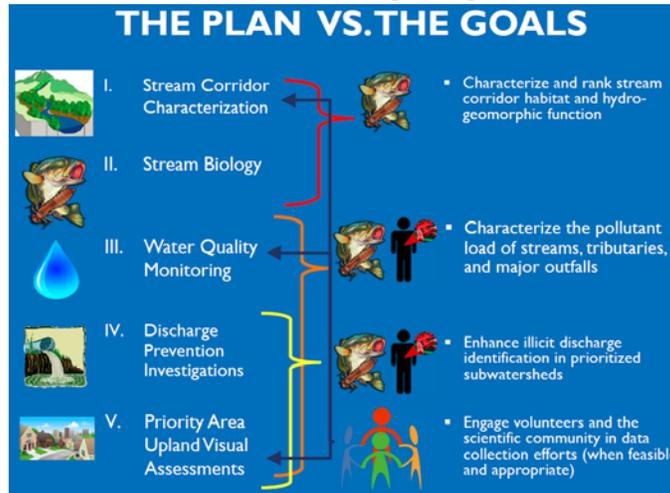
■ 2017 Highlights

- MON
- TMDLs/IWs + PI
- PC



Water Quality Monitoring

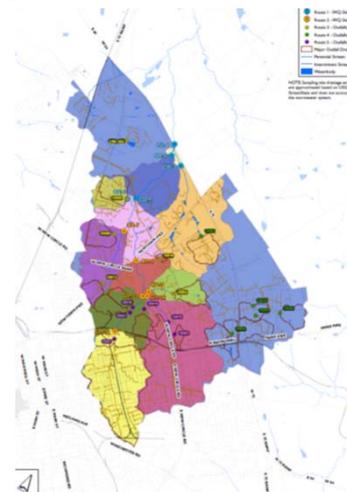
Watershed-Focused Monitoring Program



Water Quality Monitoring

Watershed-Focused Monitoring Program – Cane Run

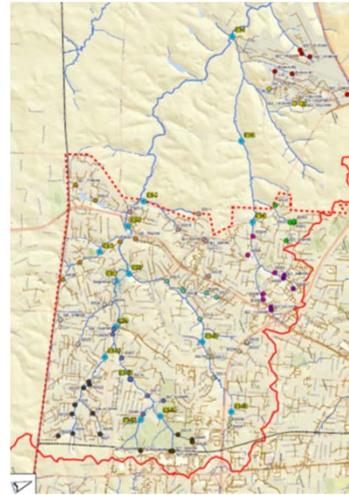
- 2 Phase 1 Screening Trainings
 - August 2016 (33)
- 2 Phase 1 Screenings
 - September 2016 (15) & October 2016 (19)
- 1 Phase 2 Screening Training
 - May 2017 (5 new)
- 10 Phase 2 Screenings
 - May to September 2017 (avg. 15)

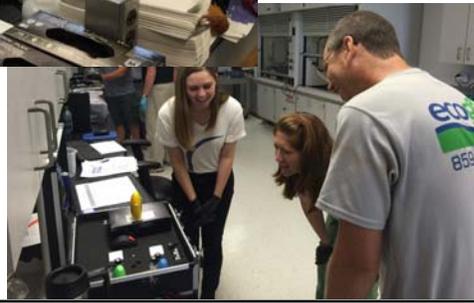


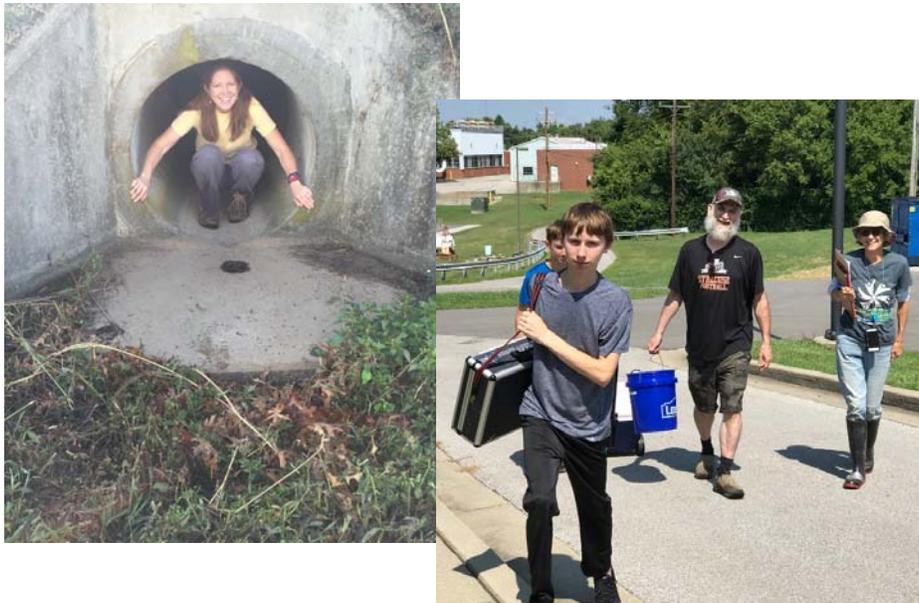
Water Quality Monitoring

■ Watershed-Focused Monitoring Program – S. Elkhorn

- 2 Phase 1 Screening Trainings
 - August 2017 (14 new)
- 2 Phase 1 Screenings
 - September 2017 (23) & October 2017 (15)
- 1 Phase 2 Screening Training
 - Spring 2018
- 10 Phase 2 Screenings
 - May to September 2018









TMDLs and Impaired Waters + Public Involvement and Participation

- Approved Pathogen TMDLs for
 - Cane Run
 - North Elkhorn
 - South Elkhorn
 - Town Branch
 - Wolf Run
- TMDL Implementation Strategy
 - What?
 - How?

Lexington-Fayette Urban County Government
MS4 Program
 Stormwater Stakeholder Advisory Committee

Informal Survey Regarding Bacteria Sources to Our Creeks & Streams

The table below lists bacteria sources in Fayette County. LFUCG is required to address these sources to comply with its KDOW-issued stormwater discharge permit. Please fill out the two columns on the right, using your best judgment.

- For the middle column, please provide your estimates on the relative contributions of the various bacteria sources to Fayette County's waterways. You may have different allocations than at the beginning of today's meeting.
- In the column on the right, please indicate the percentage of available LFUCG resources you think should go towards addressing the various bacteria sources.

For both columns, the percentages you enter should add up to 100%. Please check your math! Thanks.

Sources of Bacteria to Fayette County's Creeks and Streams	Relative % Contribution of Source	% of Available Resources to Allocate to Address Source*
Human Sources		
Sanitary Sewer System		
Private Sanitary Sewer Lateral Lines		
Septic Systems / Package Plants / Other		
Human Waste		
Animal Sources		
Domestic Pets		
Urban Waterfowl		
Other Urban Wildlife (e.g., feral cats, raccoons)		
Livestock		
Environmental / Other Sources		
Litter and Dumpsters		
Stream Bed Sediments / Pipe Slimes / Biofilms		
Totals	100%	100%

*Exclude resources already planned to complete the \$590M Remedial Measures Plan projects pertaining to the Sanitary Sewer System.

Post-Construction Stormwater Management

- Workshop Held for Design Professionals in February
 - Excellent Presentations
 - Excellent Attendance
 - Plenty of PDHs/CEUs for FREE
 - FREE lunch

- What can we provide for the Development and Construction Industry in 2018?

Questions?

Southland Area Storm Drainage Project Wolf Run Watershed

December 15, 2017

Department of Environmental Quality & Public
Works
Division of Water Quality



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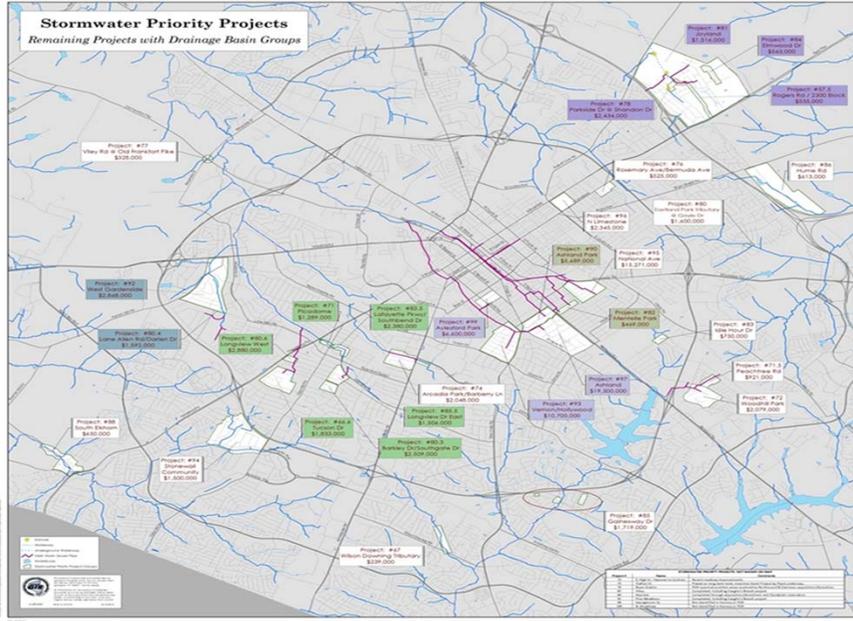
Southland/Wolf Run Project



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This project was undertaken in connection with the settlement of an enforcement action under the Clean Water Act, United States et al, v. Lexington-Fayette Urban County Government, brought on behalf of the U.S. Environmental Protection Agency. This project is a Supplemental Environmental Project ("SEP") to be funded by LFUCG as part of the Consent Decree entered on January 3, 2011 styled United States & Commonwealth of Kentucky v. Lexington-Fayette Urban County Government, United States District Court for the Eastern District of Kentucky, Civil Action No. 5:06-cv-386-KSF (the "Consent Decree").

Southland/Wolf Run Project



Southland/Wolf Run Project



WATER COURSE TRIBUTARY TO BEACON HILL DRIVE.

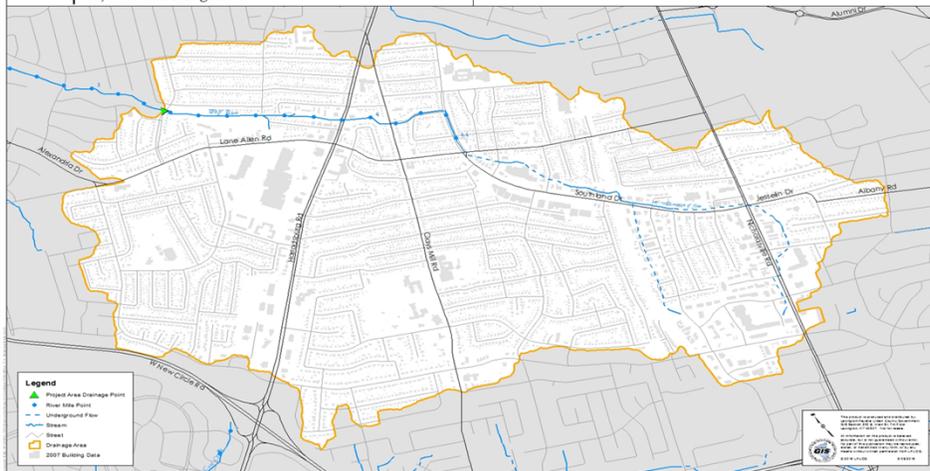


SOUTHLAND AREA PRIORITY SW PROJECTS

Ranking	Project Name	Watershed	Estimated Cost
66.6	Tucson Drive	WR	\$1,833,000
71	Picadome	WR	\$1,289,000
80.3	Barkley / Southgate	WR	\$2,509,000
80.6	Longview Drive West	WR	\$2,880,000
85.5	Longview Drive East	WR	\$1,506,000

\$10,017,000

Exhibit 1: Southland Stormwater Project
Project Area Drainage Basin



PROJECT GOALS

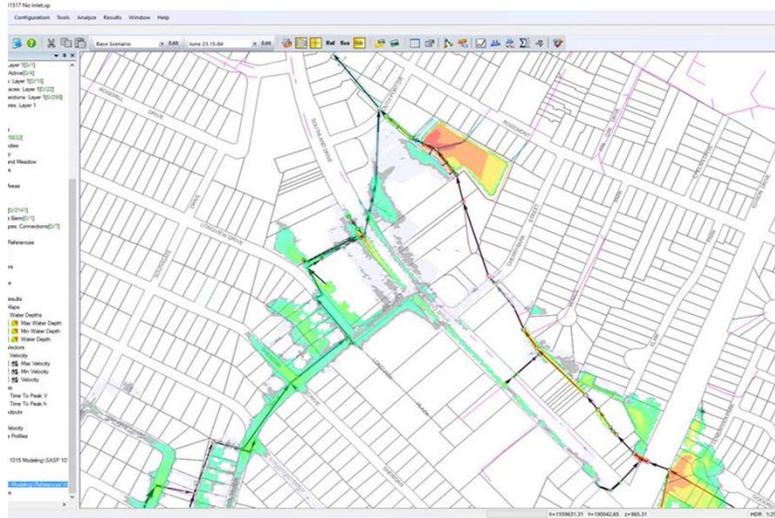
- Reduce flooding for target design storm.
- Benefit in-stream water quality.
- Tangential benefits (traffic management, quality of life).
- Sanitary sewer impacts:
 - Sump pump redirections – concurrent with stormwater project
 - Capital project impact (2020 – 2024 construction window)

Project Overview

Likely project challenges / hurdles

- Management of public expectations will be an ongoing challenge. Flood mitigation projects often perceived by public as an “I’ll never flood again” solution – which obviously isn’t the case.
- Once alternative flood mitigation solutions are developed, buy-in by affected property owners will likely be a hurdle for implementation. Properties that flood are usually at the bottom of a hill, most infrastructure related solutions to that flooding are typically somewhere up the hill, where property owners don’t perceive themselves as having a problem.

Existing Condition Model Results



Southland/Wolf Run Project



Southland/Wolf Run Project



DISCUSSION



Construction Stormwater Management

**2017 Update:
What Works, What Doesn't, and
Areas Needing Improvement**



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Lexington-Fayette Urban County Government

Why construction sites are inspected

Activity Required

The permittee shall conduct monthly inspections of at least seventy (70%) percent of active construction sites with reasonable potential to discharge pollutants to the MS4 by following the construction site inspection and enforcement procedures and the current inspection checklist.

The permittee shall review and update, as needed, protocols for targeting active construction sites for additional inspections based on, but not limited to, nature of construction site, complaints, proximity to water bodies, the uses of the receiving water body, topography, characteristics of soils on site, types of chemicals and processes being used during construction.

The permittee shall conduct twice monthly inspections of at least seventy (70%) percent of the targeted active construction sites.

The permittee shall conduct inspections until site has stabilized.

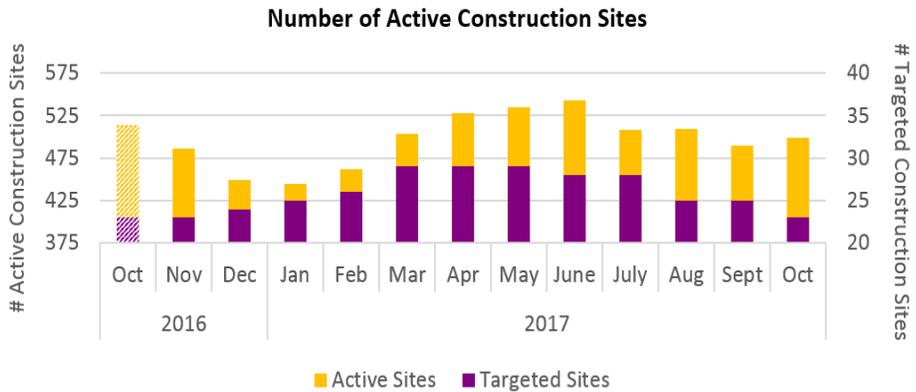
The permittee shall continue to track active construction sites and inspections in Accela (or equivalent), and shall continue to track and document enforcement actions.

From LFUCG's MS4 Permit, issued by the Kentucky Division of Water

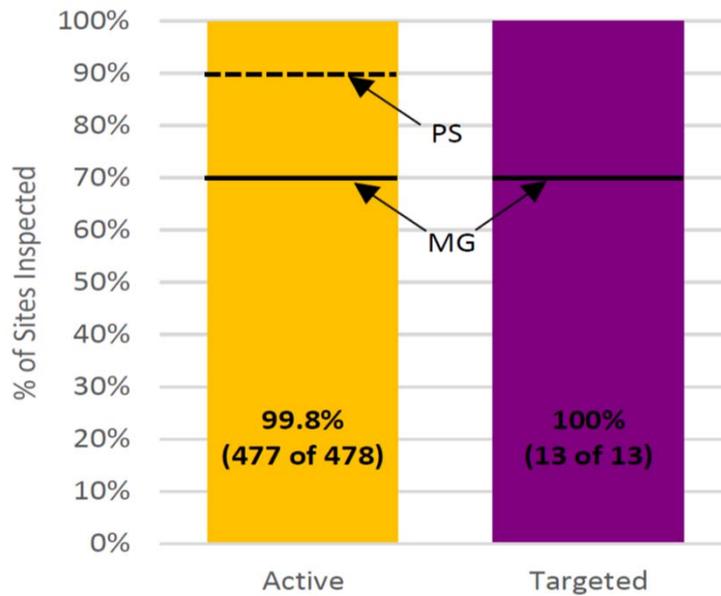
Lexington takes these legal requirements seriously

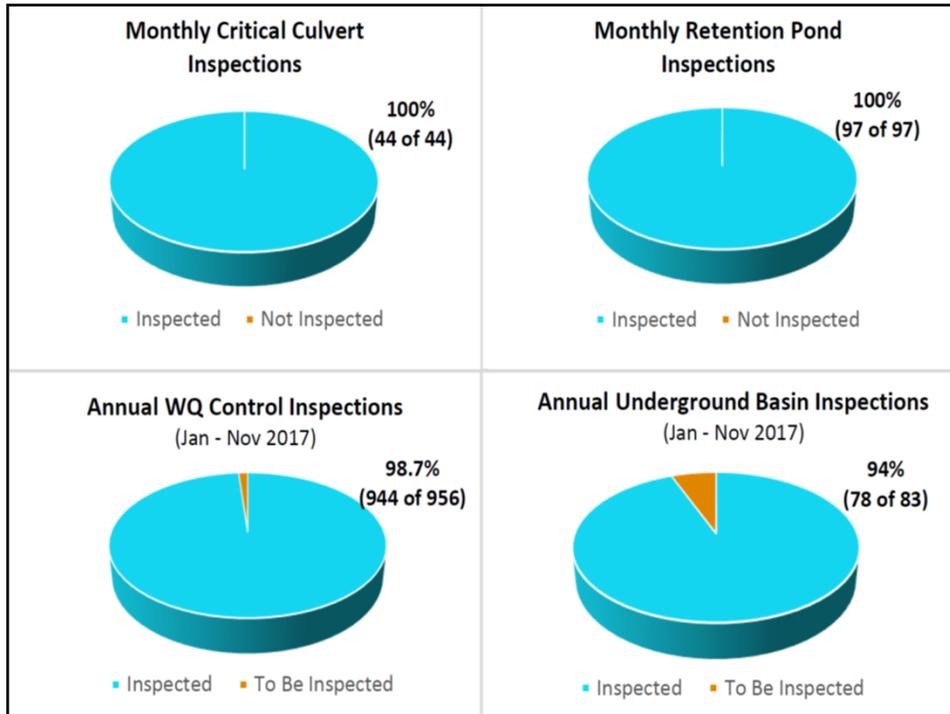
October 2017

Performance Standard / Measurable Goal Dashboard



Monthly Construction Site Inspections





What's working:

- Most developers and contractors understand the need for erosion and sediment controls
- Most construction sites comply with most requirements most of the time
- Most informal violation notices and NOV's are addressed in a timely manner (sometimes with a friendly reminder!)



What's not working . . . ???



Let's take a little tour of some construction sites.

June 2017: 614 Inspections, 502 Violations

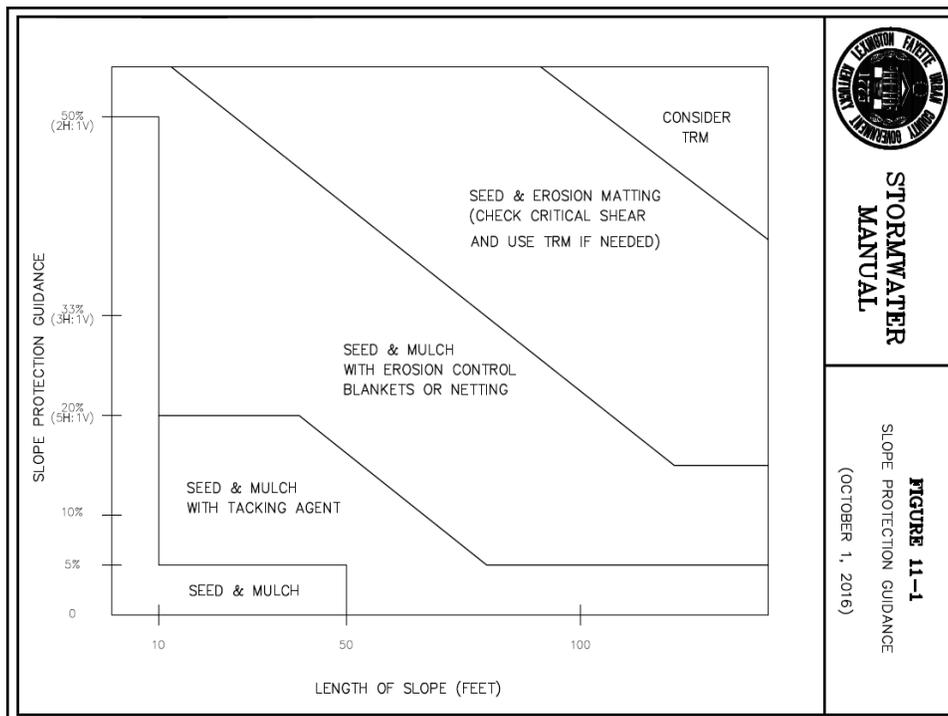
Number	Type of NOV and/or Verbal Warning
2	Check dams not installed / maintained
14	Concrete washout not maintained
19	Trash not properly stored / maintained
30	Inactive disturbed areas not stabilized
33	Inlets not protected
46	Construction / parking area not stabilized
51	Soil and mud not being kept off streets
60	Plan not onsite / being followed
89	Inspection reports not onsite
158	Silt fence not installed / maintained

Stabilization: seeding and mulching



Protect your investment!

- Apply seed/mulch/sod ASAP
- Keep a small working footprint
- Disk/punch in straw if needed
- Use blankets and mats for ditches and long steep slopes



Silt fences: getting better . . .



Still a few challenges out there



Silt Fences

- When can I remove a silt fence?
 - Section 11.5.4 of the Stormwater Manual: "Silt fences shall be removed when they have served their useful purpose, **but not before the upslope area has been permanently stabilized.**"

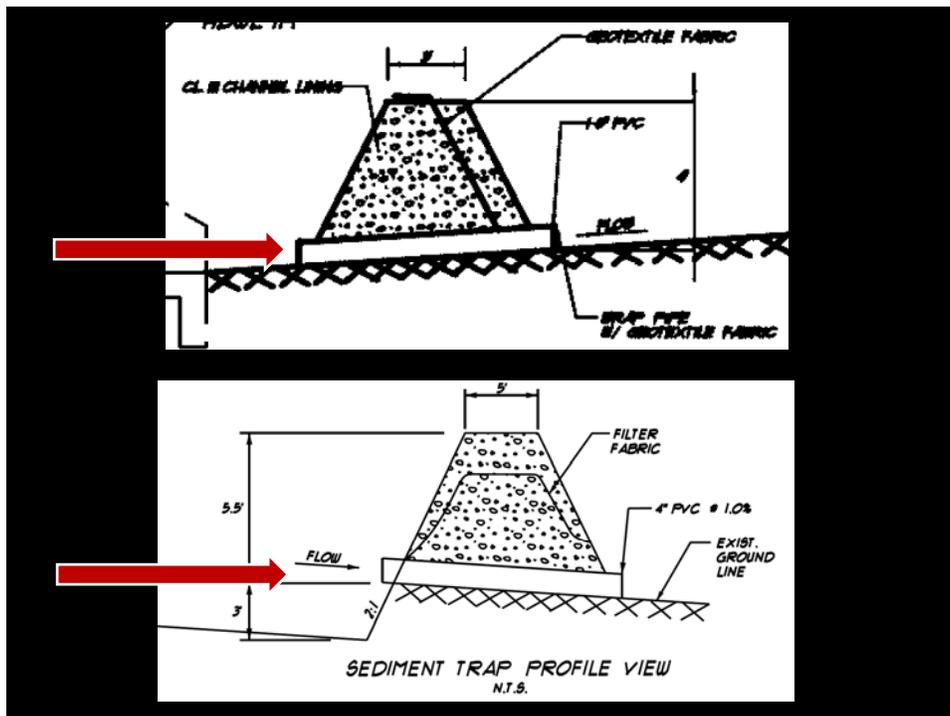
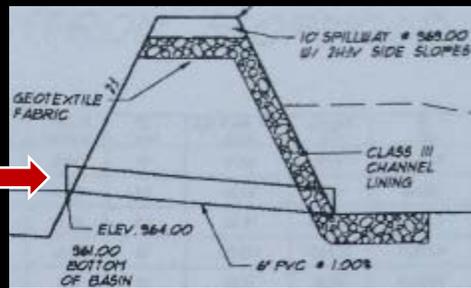


Stabilized construction site exits

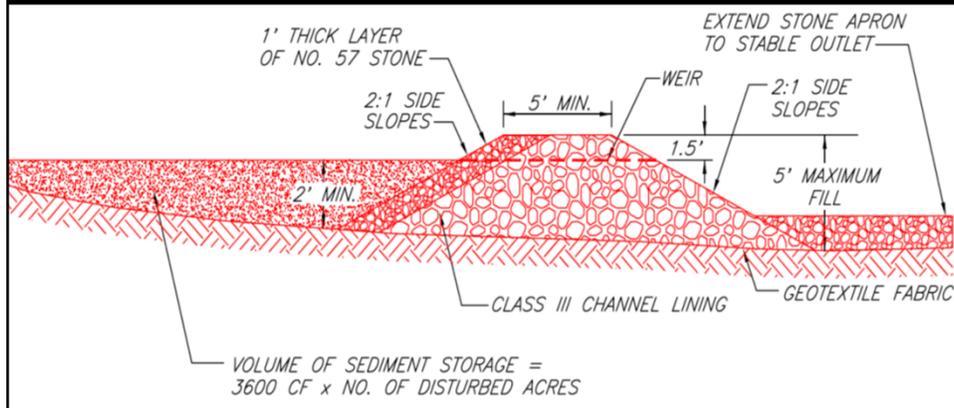


Rock checks / sediment traps

- Maximize distance upstream of culvert
- Face with small rock or filter fabric
- Do not include underdrain pipe



Kentucky ESC BMP Technical Manual Sediment Trap Drawing



http://www.kyt2.com/assets/files/uploads/09bmpmanual_final.pdf

Protecting post-construction BMPs

- Identify any post-construction BMPs on ESC plan sheets
 - Location, type, installation date
- Use a series of protective BMPs for infiltration sites
 - Do not compact the soils!
 - Divert flows around the site
 - Stabilize upslope area quickly
 - Use multiple silt fences

	EXISTING	PROPOSED
STORM SEWER	----	=====
STORM UNDERDRAIN	----	-----
ROOF DRAIN		
STORM INLET	⊕	⊕
STORM MANHOLE	⊙	⊙
STORM CLEAN OUT		⊕
STORM OUTLET	⊕	⊕
DRAINAGE DITCH	----	-----
MAJOR CONTOUR LINE	----	-----
MINOR CONTOUR LINE	----	-----
MAJOR CONTOUR TEXT	1030	1030
SANITARY SEWER	----	-----
SANITARY MANHOLE	⊙	⊙
SANITARY CLEAN OUT		⊕
WATER MAIN	----	-----
WATER VALVE	WV	WV
WATER METER	WM	WM
FIRE HYDRANT	FH	FH
RAIN GARDEN (BOTTOM OF SLOPE IS DASHED)		
GRASS SWALE		
STORMWATER RUNNEL (SEE LANDSCAPE SHEETS FOR DETAILS)		

Land Disturbance Permits

- Permittee is responsible for site ESC compliance at all times
- Ongoing discussions regarding permittee issues

LFUCG LAND DISTURBANCE PERMIT APPLICATION AND ESC PLAN CHECKLIST NEW DEVELOPMENT

Owner/Developer Name: _____ Date: _____ Time: _____
 Address: _____ City: _____ State: _____
 Project Name, Project Address: _____

Item	Y	N	NA	Other	Notes
ESC PLAN REQUIREMENTS					
1. Plans prepared by licensed professional engineer					
2. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
3. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
4. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
5. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
6. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
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14. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
15. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
16. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
17. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
18. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
19. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					
20. Plans include: <ul style="list-style-type: none"> a. Erosion Control Plan b. Sedimentation Control Plan c. Stormwater Management Plan d. Site Stabilization Plan 					

LFUCG USE ONLY: Review Date: _____ Status: Complete Additional Info Needed

Prepared By: _____ Department: _____

Comments: (See Remarks or Attachments) _____

Issue/Revision Date: January 10, 2011

LDP Permitting Procedure

- Permittee develops SWPPP / ESC Plan
- Permittee applies for LDP
- LFUCG DOE reviews plan
- DOE accepts plan, convenes meeting, and OKs initial BMPs
- DWQ inspects BMPs and OKs LDP issuance by DOE

Lebanon Planning Office County Government

LEBANON

Permitting, Inspection, and Enforcement Procedures for Erosion and Sediment Control on Development Projects, Division of Water Quality, Compliance and Monitoring Staff

ESC Plan Reviewer: DOE New Development - Virginia Rubin (rubin@lebanon-nj.gov), Josh Deane (deane@lebanon-nj.gov), Troy Woodard and Hilary Stronach (stronach@lebanon-nj.gov)
 ESC Compliance Inspector: DWQ Compliance and Monitoring - Richard Lacey & staff
 ACCESS Data Entry: DWQ Compliance and Monitoring - Richard Lacey
 Permittee: Contractor, Homebuilder, or Owner

Permitting Procedures

1. Permittee shall develop a Stormwater Pollution Prevention Plan (Erosion and Sediment Control Plan (SWPPP/ESC Plan)). A SWPPP/ESC Plan template and a plan checklist is on the LFUCG website at <http://www.lebanon-nj.gov/development>.
2. On some projects, the Improvement Plans may contain a SWPPP/ESC Plan prepared by the design engineer. If the Permittee chooses to use the SWPPP/ESC Plan to obtain the required permits, the Permittee takes sole responsibility for the content of the SWPPP/ESC Plan and the implementation of the SWPPP during construction.
3. Permittee must submit an application for a Land Disturbance Permit to the LFUCG Division of Engineering before beginning construction. The SWPPP/ESC Plan must be completed prior to applying for the LDP. A permit application can be reviewed on the LFUCG website at <http://www.lebanon-nj.gov/new-development>. To submit an application, please visit <http://lebanon-nj.gov/development>. Permit applications must be completed online.
4. For projects with a disturbed area of 1/4 acre, including those in a common plan of development (CPD) sites, the permittee must submit a Notice of Intent (NOI) to the NJ Division of Water (DWC) and obtain a NJDES Permit coverage before beginning construction (<http://www.nj.gov/dwc>) on the site. The NOI can be submitted electronically at <http://www.nj.gov/dwc/development/development/NOIUpload.asp>.
5. Permittee cannot start construction work until they have completed the SWPPP/ESC Plan and obtained the LFUCG Land Disturbance Permit and a NJDES Permit coverage (if applicable - see above).
6. DOE reviews the SWPPP/ESC Plan for completeness and compliance with the Stormwater Manual, and verifies that the Permittee has obtained a NJDES Permit coverage.
7. After the SWPPP/ESC plan is accepted, DOE conducts a pre-construction meeting with the Permittee and DWQ and advises the Permittee to install the initial BMPs.
8. DWQ inspects the installation of the initial BMPs and notifies DOE to issue the Land Disturbance Permit if BMPs are approved.

Permitting and Enforcement - 01/10/2011

Page 3 of 3

Land Disturbance Permittees:

- Shall submit a Notice of Termination to DOE when final stabilization has been achieved
- Shall maintain an active Land Disturbance Permit until all portions of the development are complete and the Surety posted with the LFUCG Division of Engineering is released by the DOE

 Lexington Fayette Urban County Government	Land Disturbance Permit (LDP) - Residential Construction Equal to or greater than one acre
	LDP Permit#
	Project Name
	Project Address: [REDACTED] HUNTINGTON, KY
Department of Planning, Preservation and Development,	Date Issued: [REDACTED]
Division of Engineering	Expiration Date: [REDACTED]
Contractor [REDACTED]	Owner [REDACTED]
Watershed Project is located in: undefined	Zoning: undefined
Land disturbance area (ac)	Proposed Building Area (sq ft)
Permit Conditions: 1. The permittee shall comply with Section 26.02 of Article 1 of Chapter 26 of the LFUCG Code of Ordinances and this permit. Issuance of this permit shall not relieve the permittee from obtaining general authorization to discharge stormwater from the Kentucky Division of Water under KYRCR 220.010, PERMIT FOR STORMWATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES (KRCR 220.010) or an individual storm permit prior to commencing activities, where applicable. 2. The permittee shall provide the LFUCG Division of Engineering (DOE) with a copy of a written authorization to discharge under KYRCR 220.010 or individual storm permit prior to commencing activities, where applicable. 3. The permittee shall also comply with all terms and conditions of KYRCR, except as modified by Section 26.02 of Article 1 of Chapter 26 of the LFUCG Code of Ordinances. All requirements of KYRCR are incorporated by reference into the Land Disturbance Permit. Approval of activities provided in Section 26.02 of Article 1 of Chapter 26 of the LFUCG Code of Ordinances. 4. Issuance of this permit does not release the permittee from the responsibility of obtaining any other permits or licenses required by the Urban County Government or other state or federal agencies. 5. The permittee shall implement the Stormwater Pollution Prevention Plan (SWPPP) submitted to / accepted by DOE. The permittee shall notify the DOE in writing of any necessary changes to the SWPPP during construction to minimize impacts to stormwater runoff. 6. The permittee shall conduct regular inspections as required by KYRCR. 7. The permittee shall conduct soil stabilization within 14 days after land disturbing activities have permanently or temporarily ceased as required by KYRCR. 8. The permittee shall protect curb and surface inlets from sediment. 9. The permittee shall maintain construction entrances to prevent tracking of mud onto public streets. 10. The permittee shall submit a Notice of Termination to DOE when final stabilization has been achieved as defined in KYRCR. 11. A copy of this permit shall be posted at the job site. 12. Non-compliance with this permit shall subject the permittee to enforcement actions pursuant to Article 1 of Chapter 26 of the LFUCG Code of Ordinances. 13. Developer shall maintain an active Land Disturbance Permit until all portions of the development is complete and the Surety posted with the LFUCG Division of Engineering is released by the DOE. 14. Developer responsibilities as defined in the LFUCG Procedures Manual for infrastructure development apply.	
Issued by: Vaughan Adkins	LFUCG Division of Engineering

Land Disturbance Permits

- The only way an active LDP can be canceled or otherwise terminated before stabilization is complete and temporary BMPs are removed would be in cases where the named permittee **did not apply for** the permit
 - Permit was requested and acquired by a third party
 - Unknowing permittee requests that permit be canceled
 - In those cases the site would be operating without a permit, after the fraudulent permit was cancelled
 - Existing protocols for enforcement for those situations

LDP Closeout Requirements

- Site and soil stabilization
 - **Stormwater Manual Section 11.4.3:** If vegetative cover is not established within 21 days, the area shall be reseeded. If less than 70 percent groundcover is established, seed and fertilize, using half of rates originally applied, and mulch. If less than 40 percent groundcover occurs, follow original seedbed preparation methods, seeding and mulching recommendations, and apply lime and fertilizer as needed according to soil tests.
 - **KYR10:** Uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% or more of the natural background vegetative cover

Land Disturbance Permits

- Permits can be terminated when the site is stabilized (i.e., 70% uniform vegetated cover, stable ditches, temporary BMPs removed, site cleaned up, etc.)
- Permits that expire prior to site stabilization are considered expired permits, with responsibility for site conditions assigned to the expired permittee
 - These would be considered as sites operating without a permit
 - The expired permittee would be expected to renew the permit and keep up with permit responsibilities (e.g., BMP maintenance, inspections, etc.), or face enforcement action

Desired construction site condition at final project close-out

- Site is stabilized
- Temporary BMPs have been removed
- Drainage system is stable
- Final housekeeping tasks are completed
- Sediment ponds that will become stormwater ponds have been cleaned out; drainage system is ready to go

And now, it's time to play . . .

True or False!

True or False

- The project engineer is required to train construction site personnel and subcontractors on ESC plan requirements.

True!

- **Stormwater Manual**

- 11.3.7 Education/Training

- *The education and training requirements for implementation of the plan shall be accomplished by the Engineer, who shall provide for initial training and continuing education for all construction employees and subcontractors of the contractor to inform them of the plan requirements.*

True or False?

- ESC plans are required to have a schedule for the inspection of BMPs identified in the plan.

True!

- **Stormwater Manual**

- 11.3.5 O&M Plan

- *An operation and maintenance (O & M) plan shall be developed which provides a schedule for inspection, maintenance, and repair of BMPs during construction activities.*

True or False?

- There are a number of non-enforceable guidelines for designing sediment control BMPs, but there are no hard and fast rules about the amount of rain they must handle.

False!

- **Stormwater Manual**

- 11.2.4 Structural Practices

- for Sediment Control

- *The design storm for sediment control shall be the 2-year 24-hour storm.*

True or False?

- Silt fence posts can be spaced out up to 10 feet, depending on the type of silt fence fabric and posts being used.

False!

- **Stormwater Manual**
- 11.5.4 Silt Fence
 - *Posts shall be spaced a maximum of 6 feet apart at the barrier location and driven securely into the ground (minimum of 12 inches).*

True or False?

- Land disturbance permittees are required to control dust on haul roads across their sites.

True!

- **Stormwater Manual**
- 11.4.7 Dust Control
 - *Construction roads shall be watered as needed to minimize dust.*

True or False?

- There is no requirement for maintaining a 50 ft buffer between soil disturbance activities and streams, wetlands, sinkholes, etc. if the disturbed area is less than 5,000 sq ft.

False!

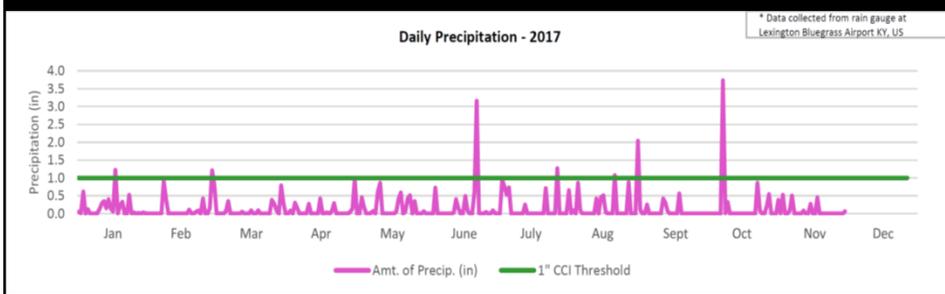
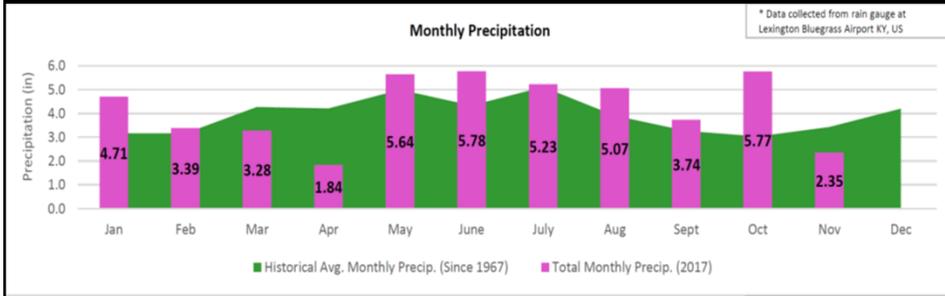
- **LFUCG Code of Ordinances**
- Sec. 16-103. - Erosion control standards for land disturbance of less than five thousand square feet.
 - *A fifty (50) foot vegetated buffer shall be maintained between the land disturbance activities and the edge of any perennial or intermittent stream, wetland, sinkhole, or municipal storm sewer inlet. If a fifty (50) foot vegetated buffer is not feasible due to the nature or purpose of the activity, a protective alternate erosion control or management practice shall be used.*

Bonus Question:

- The average two-year, 24 hour storm depth in our current location is:
 - a. 1.41 inches
 - b. 1.86 inches
 - c. 2.37 inches
 - d. 3.03 inches

Rainfall depth over 24 hours, with a recurrence interval of two years, based on frequency analysis of partial duration series, with a confidence interval of 90%

2017 was a little wetter than normal



2016 STORMWATER MANUAL

LESSONS LEARNED

*Construction Industry Workshop
December 15, 2017*

*BY: Richard Walker, P.E., Tetra Tech
LFUCG MS4 Program Manager*

2016 Stormwater Manual

Overview

- Background
- Key Aspects of the 2016 Manual
- Addendum No. 1 (6/8/17)
- Other Proposed Changes for Amendment No. 1

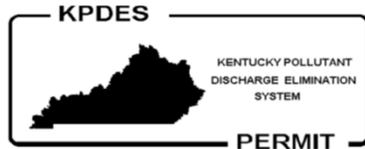


Stormwater Manual

Lexington-Fayette Urban County Government
Lexington, Kentucky

October 1, 2016

Municipal Separate Storm Sewer (MS4) Permit



PERMIT No.: KES000002
AS No.: 74551

AUTHORIZATION TO DISCHARGE UNDER THE KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

Pursuant to Authority in KRS 224,
Lexington-Fayette Urban County Government (LFUCG)
200 East Main Street
Lexington, Kentucky 40507

is authorized to discharge stormwater runoff from a large municipal separate storm sewer system (MS4) to receiving waters of the Commonwealth in accordance with the monitoring requirements and other conditions set forth in PARTS I, II, III, and IV hereof. The permit consists of this cover sheet, a table of contents, and PART I, 4 pages, PART II 29 pages, PART III 4 pages, PART IV 1 page.

This permit shall become effective on June 1, 2015.

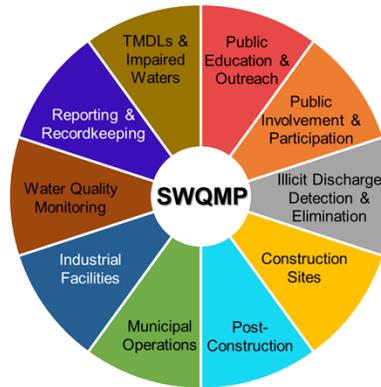
This permit and the authorization to discharge shall expire at midnight, May 31, 2020.

May 1, 2015

Date Signed

Handwritten signature of Peter T. Goodman in cursive.

Peter T. Goodman, Director
Division of Water



Background on the Stormwater Manual

- First edition in 2001, along with 6 other Manuals.
- Updates in 2002, 2004, 2005, 2009, 2011, and 2016.
- Contains the design and construction standards for stormwater infrastructure in new development and redevelopment.



Purpose of the Stormwater Manual

- Prevent new flooding problems as a result of new development
- Reduce pollution in stormwater runoff
- Establish uniform design and construction standards
 - Detention basins
 - Water quality BMPs
 - Erosion and sediment control



Stakeholder Process - Internal

- Group was comprised of staff from DOE, DWQ, & DES
- Met monthly for a year starting in 2014
- Comprehensive review / clarify content
 - Addressed “lessons learned” over the last 15 years
- Group discussed and resolved issues related to:
 - Redevelopment
 - Green Infrastructure
 - Underground Detention
 - EPA / FEMA / Kentucky Division of Water Regulations

Stakeholder Process - External

- Group formed in 2015
- 25 stakeholders comprised of:
 - Staff from Planning, DOE, DWQ, & DES
 - Home Builders Association of Lexington
 - Commerce Lexington
 - Engineering Firms
 - Stormwater Stakeholder Advisory Committee
- Group met five times from September '15 to March '16
- Stakeholder input was instrumental and essential

Chapters in the Manual

Chapter 1 – Stormwater Management Requirements (for new development and redevelopment, does not apply to capital projects)

Chapter 2 – Permits

Chapter 3 – Watershed Studies

Chapter 4 – Design Documentation

Chapter 5 – Hydrology

Chapter 6 – Inlets/Storm Sewers/Manholes

Chapter 7 – Culverts and Bridges

Chapter 8 – Constructed Channels

Chapter 9 – Streambank Stabilization

Chapter 10 – Post-Construction Stormwater Controls

Chapter 11 – Erosion and Sediment Control

Chapter 12 – Maintenance

* Most of the changes were in Chapters 1 and 10

Stream Buffer Width

- Increased stream buffer width from 25 feet to 50 feet
 - The 50-foot buffer can be an average over the project, with a minimum of 25 feet
 - Current requirement in Kentucky's general construction permit for streams with sediment impairments
 - Based on streams as defined by the Corps of Engineers
 - Mirrors requirements in Ohio and Tennessee



Green Infrastructure

- Required by MS4 permit
- Promotes infiltration
- Reduces runoff volume



Manufactured Devices

- Established a uniform design standard
- Must be certified by New Jersey DEP

Stormwater Management Manufactured Treatment Devices Certified by NJDEP	MTD Laboratory Test Certifications	Field Test Certifications	Superseded Certifications	Certified TSS Removal Rate	Maintenance Plan
AquaFilter Filtration Chamber by AquaShield, Inc.		Certification	Superseded	80%	Plan
Aqua-Swirl Concentrator By Aqua-Shield, Inc.		Certification	Superseded	50%	Plan
Continuous Deflective Separator (CDS) Unit by CONTECH Stormwater Solutions, Inc.	Certification	Certification	Superseded	50%	Plan
Downstream Defender by Hydro International, Inc.	Certification		Superseded	50%	Plan
Dual Vortex Separator by Oldcastle Stormwater Solutions	Certification			50%	Plan

Rainfall Data

- Analyzed historical rainfall data
- Updated design storms and the rainfall depth used to size stormwater infrastructure
- Added the September 23, 2006 storm event to the set of storm events to be analyzed during design
 - 6.8 inches in 24 hours

Lessons Learned

Lessons Learned

- Addendum No. 1 - Runoff Reduction Requirements

Green Infrastructure practices can be located and sized to meet the requirements in Section 1.7.4 without having to provide a Green Infrastructure practice for each individual drainage area. The total volume provided by all of the Green Infrastructure practices on the site must equal 0.8 inches multiplied by the total impervious area on the site, which will satisfy the runoff reduction criteria.

WQV Calculations for Commercial and Industrial Projects, and Residential Projects with Lots Less than 6000 sf - DRAFT

Project Name:		Area [ft ²]	Area [%] of Total
1. Proposed Land Use			
Impervious	2000	2.00	40.0%
Roofs	2000	2.00	40.0%
Driveways, Sidewalks, Parking Lots	2000	2.00	40.0%
Total	6000	6.00	100.0%
2. Water Quality Design Requirements			
Water Quality Volume: WQV [ft ³]			
7500 [Equals 1" of a area of the roofs, streets, sidewalks, and parking lots.]			
Runoff Reduction Volume: RRV [ft ³]			
8000 [Equals 0.8" of a area of the roofs, streets, sidewalks, and parking lots. The RRV equals the total WQV requirement.]			
3. Proposed WQV			
Impervious Area 1		Impervious Area 2	
Impervious Area [ft ²]	Runoff [ft ³]	Impervious Area [ft ²]	Runoff [ft ³]
2000	2000	2000	2000
Proposed Stormwater Control Detail		Proposed Stormwater Control Detail	
Area [ft ²]		Area [ft ²]	
2000		2000	
Depth [ft]		Depth [ft]	
0.10		0.10	
Void Ratio		Void Ratio	
0.50		0.50	
RRV [ft ³]		RRV [ft ³]	
1000		1000	
4. Green Infrastructure RRV			
Impervious Area Runoff [ft ³]		Impervious Area Runoff [ft ³]	
2000		2000	
To Development Green Space		To Development Green Space	
Area [ft ²]	Depth [ft]	Area [ft ²]	Depth [ft]
2000	0.10	2000	0.10
Void Ratio		Void Ratio	
0.50		0.50	
RRV [ft ³]		RRV [ft ³]	
1000		1000	
Surface Paving		Surface Paving	
Area [ft ²]	Depth [ft]	Area [ft ²]	Depth [ft]
2000	0.10	2000	0.10
Void Ratio		Void Ratio	
0.50		0.50	
RRV [ft ³]		RRV [ft ³]	
1000		1000	
Permeable Pavement Storage			
Surface Paving		Surface Paving	
Area [ft ²]	Depth [ft]	Area [ft ²]	Depth [ft]
2000	0.10	2000	0.10
Void Ratio		Void Ratio	
0.50		0.50	
RRV [ft ³]		RRV [ft ³]	
1000		1000	
RRV Reduction Totals			
Surface Paving		Surface Paving	
Area [ft ²]	Depth [ft]	Area [ft ²]	Depth [ft]
2000	0.10	2000	0.10
Void Ratio		Void Ratio	
0.50		0.50	
RRV [ft ³]		RRV [ft ³]	
1000		1000	

Lessons Learned

- Need to clarify a few things
- Need to change a few design requirements

Process for Making Future Changes

- Code of Ordinances
- **Sec. 16-85. - Stormwater manual incorporated.**

The urban county government stormwater manual, as revised, modified, or amended from time to time, is incorporated herein by reference provided that in the event of any conflict between the manual and this article the provisions of this article shall apply.

Proposed Changes (draft)

- Definition of a Stream
- Allowable Uses in the Vegetative Buffer Zone
- Where a floodplain analysis will be required
- Where detention will not be required
- Where MTDs will be allowed
- Feasibility of Runoff Reduction
- Corrugated Plastic Pipe
- Underground Detention
- Erosion and Sediment Control

Proposed Definition of “Stream”

- The word stream “*shall mean any river, creek or channel, having well defined banks, in which water flows for substantial periods of the year to drain a given area, or any lake or other body of water in the Commonwealth*” (KRS 151.100).
- Same definition as in the LFUCG Procedures Manual for Infrastructure Development

Allowable Uses in the Vegetative Buffer Zone

- Proposed change to allow invasive species to be removed and replaced with native species.



Where a Floodplain Analysis will be required.

- For development projects greater than 5 acres or 50 lots that contain a stream in Zone A or Zone X (shaded or unshaded)



Where Detention will not be required.

Detention will not be required if:

1. Project is part of a masterplan
2. Project adds less than 1 acre of impervious surfaces and the inlet/storm sewer system has sufficient capacity
3. Undetained runoff from the project will not increase flood elevations in streams
4. The project adds less than 1 acre of impervious surfaces and discharges directly to a mapped FEMA floodplain
5. Detention would increase flood levels downstream

Where MTDs will be allowed

- Proposed change to remove the word “infill”

*Stormwater manufactured treatment devices (MTDs) remove pollutants from stormwater runoff. MTDs may be used as the sole stormwater quality control **only** in the following situations:*

- *redevelopment projects, or*
- ~~*infill development projects, or*~~
- *new development projects where Green Infrastructure is not feasible*

Runoff Reduction Criteria

- Proposed change to define feasibility

Runoff reduction is not required if the Engineer can demonstrate that all of the following conditions are present:

- *the soil infiltration rate is less than 0.5 inches per hour. Infiltration rates shall be determined in accordance with ASTM D3385 - Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer*
- *subdrains cannot be designed for the practices in Table 1-6 because the subdrain cannot freely discharge to a storm sewer or open channel*
- *no other green infrastructure practices in Table 1-6 are technically feasible based on information provided by the Engineer and acceptable to the Division of Engineering.*

Corrugated Plastic Pipe (when used for public infrastructure)

The following changes are proposed:

- Soil tight joints (instead of water tight joints)
- Maximum deflection of 7.5% (instead of 5%)
- Minimum cover of 18 inches (instead of 24 inches)
- Only No. 9 stone is allowed for bedding
- Engineer shall, a minimum of 30 days after installation, certify the installation of CPP.

Underground Detention

The following changes are proposed:

- Geogrid will be allowed instead of filter fabric at the soil/stone interface
- Permeable Pavement that uses the stone voids as storage will be required to increase the design volume by 10% to account for sediment deposition

Erosion and Sediment Control

- Land Disturbance Permit – Who is the permittee?
 - Entity with operational control
- Sediment controls must remain in place until the site is stabilized with seed/mulch
- Rock-filled bags and geotextile filters on frames may be used for drop inlet filters
- Geotextile filters, rock-filled tubes, and rock-filled bags may be used for curb inlet filters
- Fiber logs or wattles may be used in lieu of silt fence

Next Step

- Meet with the external work group to review the proposed changes.
- Finalize the proposed changes.

Questions?