City of Mt. Juliet

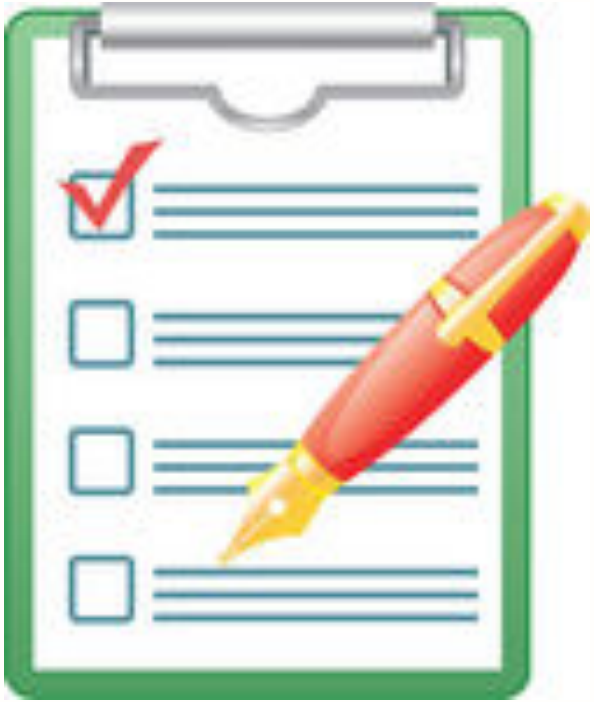
Stormwater Program Evaluation and Utility Implementation Kickoff Workshop

November 19, 2021

CDM Smith

This Morning's Agenda

- Introductions
- Stormwater Program Assessment and Funding Evaluation Roadmap
- Project Scope of Work
- Wrap-Up & Questions



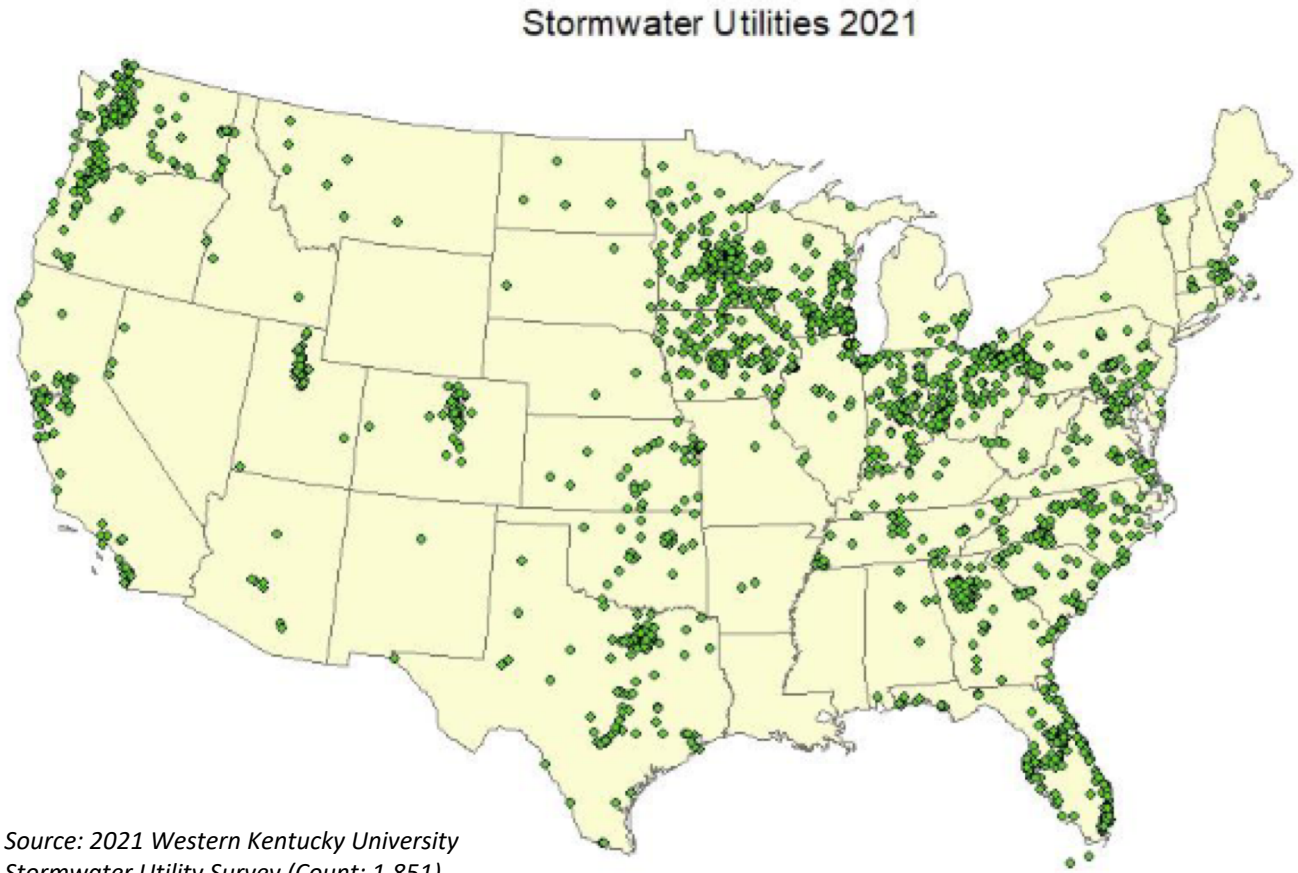
CDM Smith Project Team Introductions

- David Mason, Project Manager
- Zack Daniel, Client Service Leader
- Aaron Rogge, Staff Engineer

City Staff Introductions

1. Name
2. Title/Role with the City
3. How you or your department touches stormwater
4. Something you're hoping to get out of this presentation or project

Stormwater Utilities are Common in Tennessee and Across the Country



Source: 2021 Western Kentucky University Stormwater Utility Survey (Count: 1,851)

Roadmap for Successful Stormwater Program Funding Projects

- **Phase I – Stormwater Program Assessment**
  - Cost and Level of Service Analysis
  - Land Use/Parcel Analysis
  - Rate Structure & Billing Alternatives
  - Implementation Planning
- **Phase II – Implementation**
  - Impervious Area Measurement
  - Billing File Development
  - Public Outreach
  - Policy Development

What is the First Step in the Process?

Identify the Drivers for the Program

- Identify all stormwater-related services performed by your program
- Estimate costs to provide these services
- Identify the benefits gained by the community as a result of these services

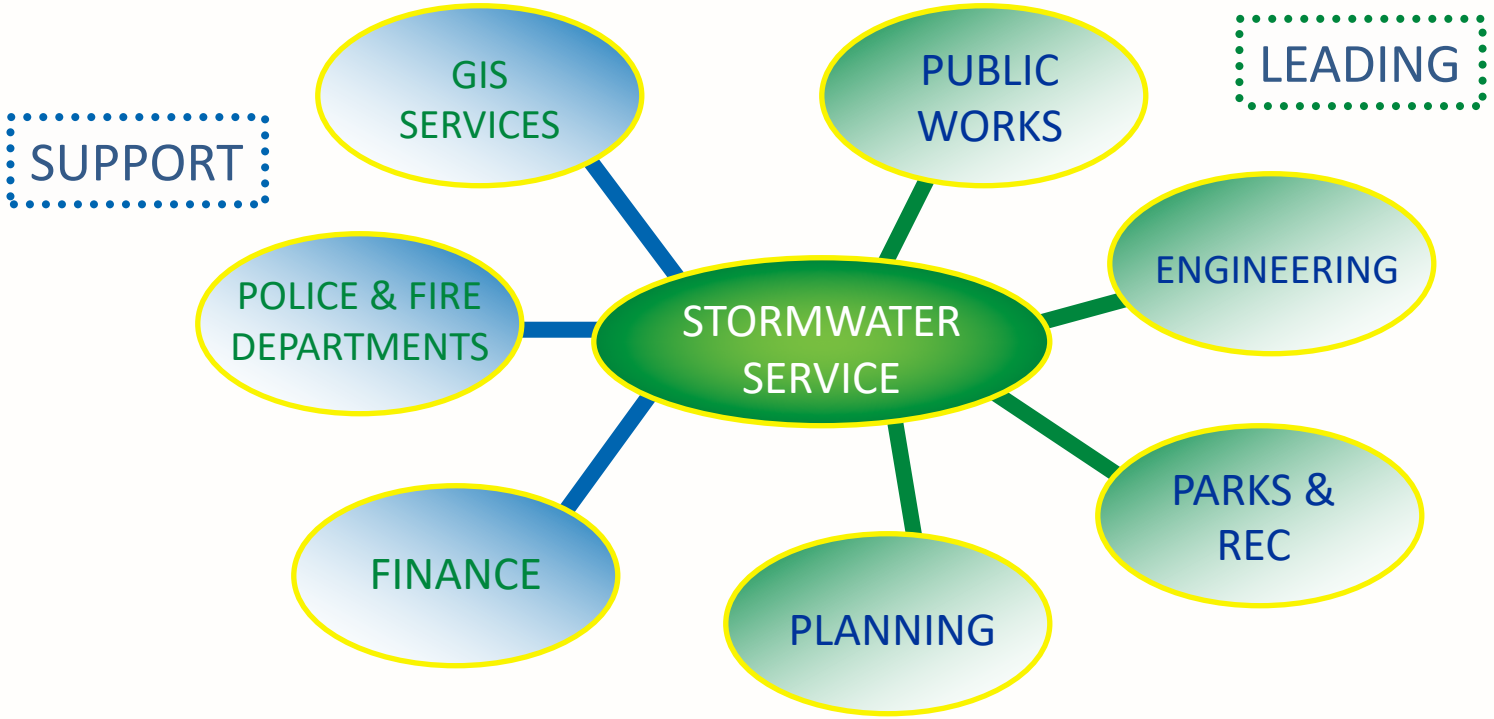
Picture courtesy of @MtJulietPolice

Stormwater Management Functional Areas

Simplifying the Complexities

PROGRAM MANAGEMENT	REGULATORY COMPLIANCE
• Master planning • Complaint response • Development review	• NPDES (6 minimum measures) • TMDL compliance
OPERATIONS AND MAINTENANCE	**CAPITAL IMPROVEMENT PROJECTS**
• Storm sewer cleaning • Culvert cleaning and repair	• Storm system upgrades & replacement • Stream restoration

Stormwater Services – A City-Wide Function



How Do We Quantify These Services & Costs?

- **Interview staff in all departments**
  - What stormwater services are provided
  - What staff/equipment is utilized to perform the services
  - How effective are the services

- **Review annual budgets and reports**
  - Identify appropriate budget line items
  - Apply information learned from interviews

Summarize the Cost of Service By the Four Functional Areas

Department	Program Management	Regulatory Compliance	Operations and Maintenance	Capital Improvements	Average Annual Program Costs
Development and Engineering Services - Administration	$ 25,000				$ 25,000
Development and Engineering Services - Engineering	$ 45,000				$ 45,000
Development and Engineering Services - Stormwater		$ 225,000			$ 225,000
Development and Engineering Services - Building		$ 12,000			$ 12,000
Public Works - Administration	$ 45,000				$ 45,000
Public Works - Labor			$ 317,000		$ 317,000
Public Works - Maintenance Materials			$ 96,000		$ 96,000
Public Works - Small Construction - Materials			$ 46,000		$ 46,000
Capital Improvements Projects				$ 185,000	$ 185,000
TOTAL	**$ 115,000**	**$ 237,000**	**$ 459,000**	**$ 185,000**	**$ 996,000**

Example: City of Cleveland, TN Existing Stormwater Program Cost Summary

What Does This Cost of Service Provide for Your Community?

- Erosion
- Water Quality
- Flood protection
- Safety
- Aesthetics

Important Questions Regarding Stormwater Level of Service

1. Citizens' choice, but how much $$?
2. Regulations define the minimum, but should we do more?

- NPDES
- 303d List
- TMDLs
- FEMA Floodplain

What Does This Cost of Service Provide for Your Community?

Level of Service	Program Management	Regulatory Compliance	Operation and Maintenance	Capital Improvement Projects
5	Comprehensive Planning & Full Implementation Capabilities	Exemplary Permit Compliance	Fully Preventative/ 100% Routine	Prioritized / Fully-Funded
4	Pro-Active Planning & Systematic CIP Implementation Capabilities	Pro-Active Permit Compliance	Mixture of Routine and Inspection Based	Phased Implementation / Allocated Budgets
3	Priority Planning & Partial CIP Implementation Capabilities	Minimal Permit Compliance	Mixture of Inspection and Responsive Based	Complaint, Inspection-Based / Moderate Budget
2	Reactionary Planning & Minimal CIP Implementation Capabilities	Below Minimum Permit Compliance	Primarily Responsive	Critical Needs Only / Minimum Budget
1	No Planning & No CIP Implementation Capabilities	Non-Compliance	Non-Responsive	No Planning / No Budget

Note: ▭ *denotes independent level of service determination for given program area*

The Bar Has Been Set

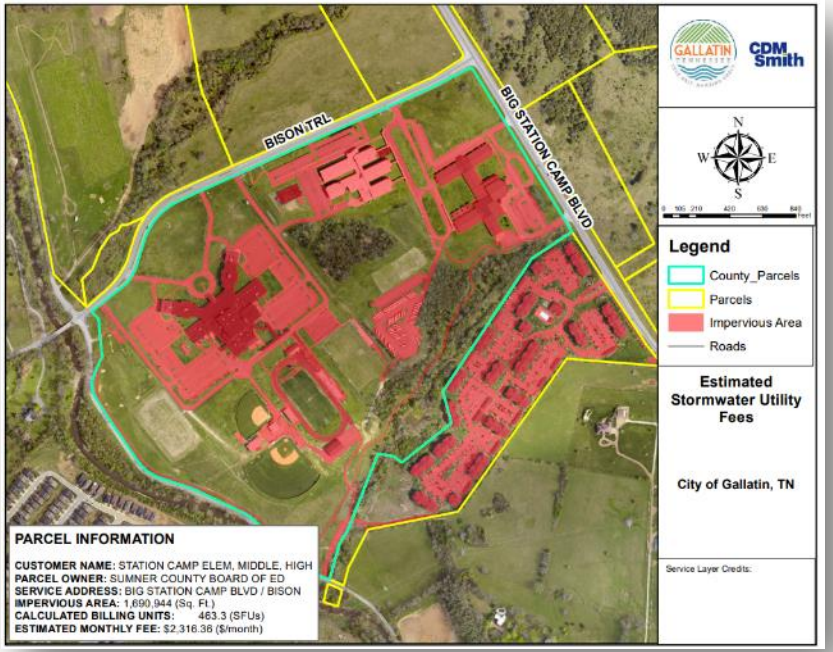
Where Do We Go From Here?

Level of Service	*Program Management*	*Regulatory Compliance*	*Operation and Maintenance*	*Capital Improvement Projects*	*Total Program Cost*
5	$465,000	$381,000	$1,000,000	$885,000	$2,731,000
	Comprehensive Planning & Full Implementation Capabilities	Exemplary Permit Compliance	Fully Preventative/ 100% Routine	Prioritized / Fully-Funded	
4	$315,000	$336,000	$850,000	$535,000	$2,036,000
	Pro-Active Planning & Systematic CIP Implementation Capabilities	Pro-Active Permit Compliance	Mixture of Routine and Inspection Based	Phased Implementation / Allocated Budgets	
3	$215,000	$240,000	$569,000	$435,000	$1,459,000
	Priority Planning & Partial CIP Implementation Capabilities	Full Permit Compliance	Mixture of Inspection and Responsive Based	Complaint, Inspection-Based / Moderate Budget	
Existing LOS (2.5)	$115,000	$237,000	$459,000	$185,000	$996,000
	Adequate Staffing for Today Minimal Long Range Planning	Minimum Permit Compliance Pending New Regulations	Partially Dedicated Crews Reactive-Based System Maintenance	Critical Needs Only / Minimum Budget	

Example: City of Cleveland, TN Existing Stormwater Program Cost Summary

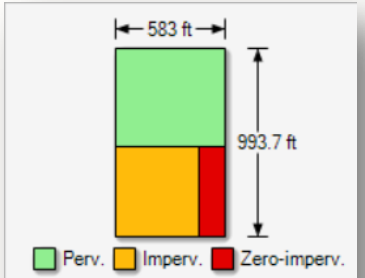
Stormwater Master Plan - Scope Overview

- Develop hydrology for 2 basins (Cedar and Stoners)
- Develop hydraulic network from city and state data
- Assess flooding and capacity constraints
- Up to 8 improvement strategies in areas of concern



Parameters Example – Medium Density Residential

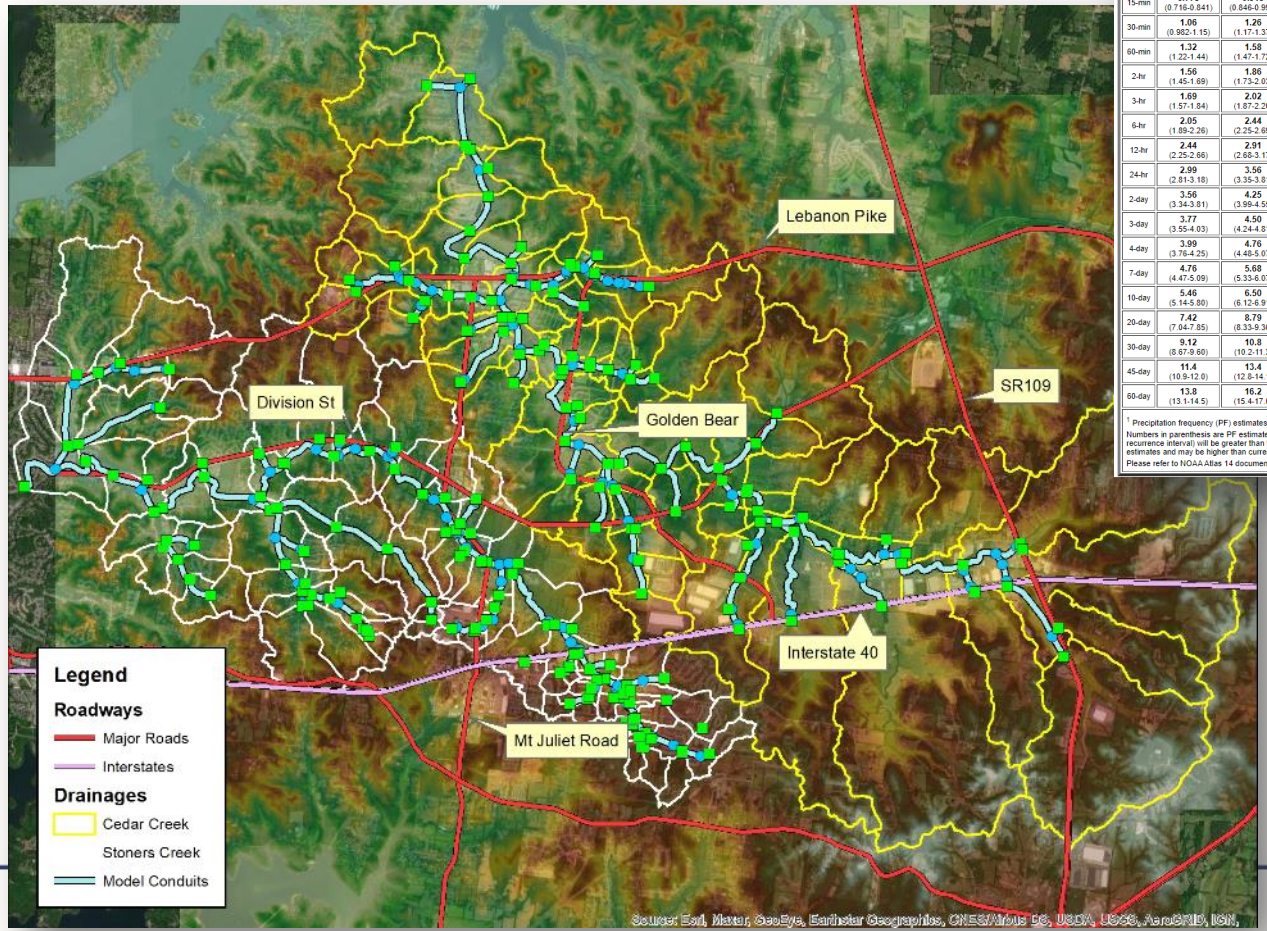
- From Land Use: 35%
- From GIS: 48.4%
- Soil data taken from only pervious area



Subcatchment: A1450

Infiltration: Modified Green-Ampt	
Suction Head (in)	6.6
Conductivity (in/hr)	0.27
Initial Deficit (frac.)	0.17
Attributes	
Name	A1450
X-Coordinate	766884.61
Y-Coordinate	315171.182
Description	obs. flooding
Tag	14
Rain Gage	BE
Outlet	668607
Area (ac)	13.3
Width (ft)	583
Flow Length (ft) *fx*	993.736
Slope (%)	2.151
Imperv. (%)	48.4
N Imperv	0.015
N Perv	0.25
Dstore Imperv (in)	0.1
Dstore Perv (in)	0.25
Zero Imperv (%)	25
Subarea Routing	PERVIOUS
Percent Routed (%)	25

Behind the Scenes



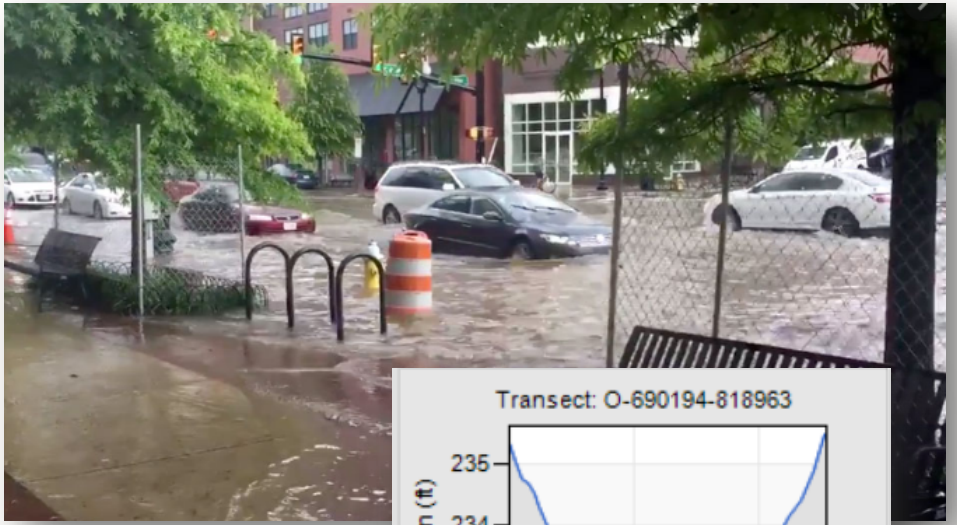
PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.387 (0.359-0.421)	0.454 (0.421-0.495)	0.524 (0.483-0.570)	0.579 (0.534-0.630)	0.648 (0.594-0.705)	0.700 (0.638-0.761)	0.751 (0.679-0.817)	0.800 (0.718-0.872)	0.861 (0.764-0.941)	0.908 (0.798-0.997)
10-min	0.619 (0.573-0.673)	0.727 (0.673-0.791)	0.838 (0.774-0.913)	0.926 (0.854-1.01)	1.03 (0.947-1.12)	1.12 (1.01-1.21)	1.19 (1.08-1.30)	1.27 (1.14-1.38)	1.36 (1.21-1.49)	1.43 (1.26-1.57)
15-min	0.773 (0.716-0.841)	0.913 (0.846-0.995)	1.06 (0.979-1.16)	1.17 (1.08-1.27)	1.31 (1.20-1.43)	1.41 (1.29-1.54)	1.51 (1.37-1.64)	1.60 (1.44-1.74)	1.72 (1.52-1.87)	1.80 (1.58-1.97)
30-min	1.06 (0.982-1.15)	1.26 (1.17-1.37)	1.51 (1.39-1.64)	1.70 (1.56-1.85)	1.94 (1.78-2.11)	2.13 (1.94-2.31)	2.31 (2.09-2.51)	2.49 (2.24-2.71)	2.73 (2.42-2.98)	2.91 (2.55-3.19)
60-min	1.32 (1.22-1.44)	1.58 (1.47-1.72)	1.93 (1.78-2.10)	2.21 (2.04-2.40)	2.58 (2.37-2.81)	2.88 (2.62-3.13)	3.18 (2.88-3.46)	3.49 (3.14-3.81)	3.92 (3.47-4.28)	4.25 (3.73-4.66)
2-hr	1.56 (1.45-1.69)	1.86 (1.73-2.03)	2.26 (2.09-2.46)	2.58 (2.38-2.80)	3.02 (2.77-3.28)	3.38 (3.08-3.66)	3.74 (3.39-4.07)	4.12 (3.70-4.48)	4.64 (4.12-5.07)	5.06 (4.44-5.53)
3-hr	1.69 (1.57-1.84)	2.02 (1.87-2.20)	2.45 (2.26-2.67)	2.80 (2.58-3.05)	3.29 (3.00-3.57)	3.68 (3.34-4.00)	4.09 (3.69-4.45)	4.51 (4.04-4.92)	5.10 (4.50-5.58)	5.57 (4.87-6.11)
6-hr	2.05 (1.89-2.26)	2.44 (2.25-2.69)	2.96 (2.72-3.26)	3.40 (3.11-3.73)	4.01 (3.64-4.40)	4.51 (4.07-4.96)	5.05 (4.50-5.54)	5.60 (4.95-6.17)	6.39 (5.57-7.06)	7.03 (6.05-7.78)
12-hr	2.44 (2.25-2.66)	2.91 (2.68-3.17)	3.52 (3.25-3.85)	4.04 (3.71-4.41)	4.76 (4.34-5.20)	5.36 (4.85-5.84)	5.99 (5.38-6.54)	6.66 (5.91-7.27)	7.59 (6.63-8.31)	8.34 (7.20-9.18)
24-hr	2.99 (2.81-3.18)	3.56 (3.33-3.81)	4.34 (4.08-4.63)	4.97 (4.67-5.30)	5.85 (5.47-6.24)	6.56 (6.11-6.99)	7.30 (6.77-7.77)	8.06 (7.45-8.59)	9.13 (8.37-9.72)	9.97 (9.09-10.6)
2-day	3.56 (3.34-3.81)	4.25 (3.99-4.55)	5.20 (4.88-5.56)	5.97 (5.60-6.37)	7.07 (6.60-7.53)	7.96 (7.40-8.48)	8.89 (8.24-9.48)	9.88 (9.09-10.5)	11.3 (10.3-12.0)	12.4 (11.2-13.2)
3-day	3.77 (3.55-4.03)	4.50 (4.24-4.81)	5.49 (5.16-5.86)	6.29 (5.91-6.70)	7.40 (6.93-7.88)	8.31 (7.74-8.83)	9.24 (8.58-9.83)	10.2 (9.44-10.9)	11.6 (10.6-12.3)	12.6 (11.5-13.5)
4-day	3.99 (3.76-4.25)	4.76 (4.48-5.07)	5.79 (5.45-6.16)	6.61 (6.21-7.03)	7.74 (7.26-8.22)	8.65 (8.09-9.18)	9.59 (8.93-10.2)	10.6 (9.78-11.2)	11.9 (10.9-12.6)	12.9 (11.8-13.8)
7-day	4.76 (4.47-5.09)	5.68 (5.33-6.07)	6.92 (6.48-7.38)	7.92 (7.40-8.43)	9.31 (8.67-9.91)	10.4 (9.66-11.1)	11.6 (10.7-12.4)	12.9 (11.8-13.7)	14.6 (13.3-15.5)	16.0 (14.4-17.0)
10-day	5.46 (5.14-5.80)	6.50 (6.12-6.91)	7.83 (7.36-8.32)	8.88 (8.34-9.44)	10.3 (9.66-11.0)	11.5 (10.7-12.2)	12.6 (11.7-13.4)	13.8 (12.8-14.6)	15.4 (14.2-16.4)	16.6 (15.2-17.7)
20-day	7.42 (7.04-7.85)	8.79 (8.33-9.30)	10.4 (9.83-11.0)	11.6 (11.0-12.2)	13.1 (12.4-13.9)	14.3 (13.5-15.1)	15.5 (14.6-16.4)	16.6 (15.6-17.6)	18.1 (16.9-19.2)	19.2 (17.8-20.3)
30-day	9.12 (8.67-9.60)	10.8 (10.2-11.3)	12.6 (11.9-13.2)	13.9 (13.2-14.6)	15.7 (14.9-16.5)	17.1 (16.1-18.0)	18.4 (17.3-19.4)	19.7 (18.5-20.7)	21.4 (20.0-22.5)	22.6 (21.1-23.9)
45-day	11.4 (10.9-12.0)	13.4 (12.8-14.1)	15.5 (14.7-16.3)	17.0 (16.2-17.9)	19.0 (18.0-20.0)	20.5 (19.4-21.6)	21.9 (20.7-23.1)	23.3 (21.9-24.5)	25.0 (23.5-26.4)	26.2 (24.6-27.8)
60-day	13.8 (13.1-14.5)	16.2 (15.4-17.0)	18.5 (17.6-19.4)	20.2 (19.3-21.2)	22.4 (21.3-23.5)	24.0 (22.8-25.2)	25.5 (24.2-26.7)	26.8 (25.4-28.2)	28.5 (26.9-30.0)	29.7 (28.0-31.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
Please refer to NOAA Atlas 14 document for more information.

Development of 10-year Capital Plan

- Recommended projects will be placed in short, near, and long-term priorities
- Growth related impacts will be assessed
- Planning level costs will be provided
- Costs will inform the revenue requirements and rate structure analysis for the utility



If Improved Services Are Desired, What Can We Do to Close the Funding Gap?

- **Primary Funding**
  1. General Fund
  2. User Fee-Based Fund (Enterprise Fund)
- **Secondary Funding**
  1. Use Grants and Loans
  2. Issue Bonds
  3. Levy Special Assessments
  4. Assess Development / Impact Fees
  5. Others

Comparison: Tax Based vs User Fee Funding Advantages and Disadvantages

Tax Based Systems

- Advantages
  - Billing System Already In Place
  - Easier to Collect and Administer (Tax Collector)
  - Can Be Sufficient for All Services
- Disadvantages
  - Not Equitable
  - Typically Not Dedicated
  - Requires Increase in Real Property Tax

User Fee Based Systems

- Advantages
  - Equitable (i.e., Fee Related to Service Provided)
  - Stable & Dedicated Funding for All Program Services
  - Incentivizes Good Practices On-Site
- Disadvantages
  - Potential Startup Costs
  - New Funding Mechanism and Associated Fee

Stormwater Utility 101

What is It? How Does It Work?

- Enterprise Fund Similar to Water, Wastewater, Electric Utilities
- Dedicated Funding through User Fee
- Fee Related to Needs or Services Provided

If it walks like a duck…

Service Need = Charge

- Management of Runoff Serves Owners and Tenants
- Service Related to Property's Contribution to the Problem (Runoff Burden)
- Fee Relates to Runoff
- Common Proxy for Runoff is Impervious Area

Customer receives services from the utility in direct measure to the runoff burden

Impervious Area is a Good Proxy for Stormwater Runoff

Service Need = Fair Share = Runoff

Runoff = Function of

- **Impervious/Pervious Areas**
- **Soils**
- **Vegetative Cover**
- **Antecedent Moisture**
- **Connectivity**
- **Topography**
- **Rainfall**

Equivalent Residential Unit (ERU) Basis is the Simplest Methodology

Single-Family
Multi-Family
Condominiums
Mobile Homes

= Flat Fee for Each Dwelling Unit ≤ 1 ERU

Governmental
Commercial
Institutional
Industrial

$$\frac{\text{Parcel Impervious Area}}{\text{ERU (3,000 Sq. Ft.)*}} = \text{Units}$$

*Example: Based on Statistical Sampling of Local Community

A Base Residential Unit Charge is Developed By Which All Other Properties are Compared

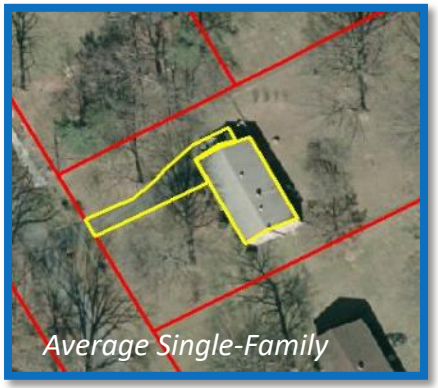
Example Residential Average Impervious Area (3,000 sq. ft.)

Example Non-Residential Impervious Area (30,000 sq. ft.)

In this example, the non-residential customer pays approximately 10 times the amount as the residential customer

Most of Our Recent Clients Prefer the Fairness of a Tiered Residential Rate Structure

< 1,293 Sq. Ft. = 0.5 SFU

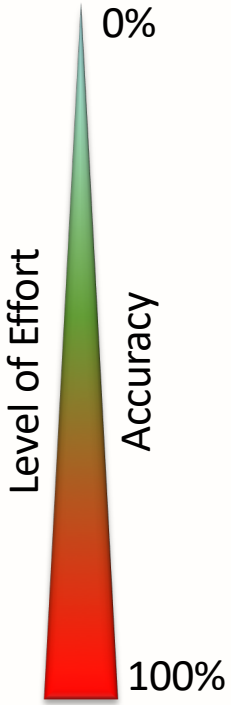


1,294 to 4,257 Sq. Ft. = 1.0 SFU

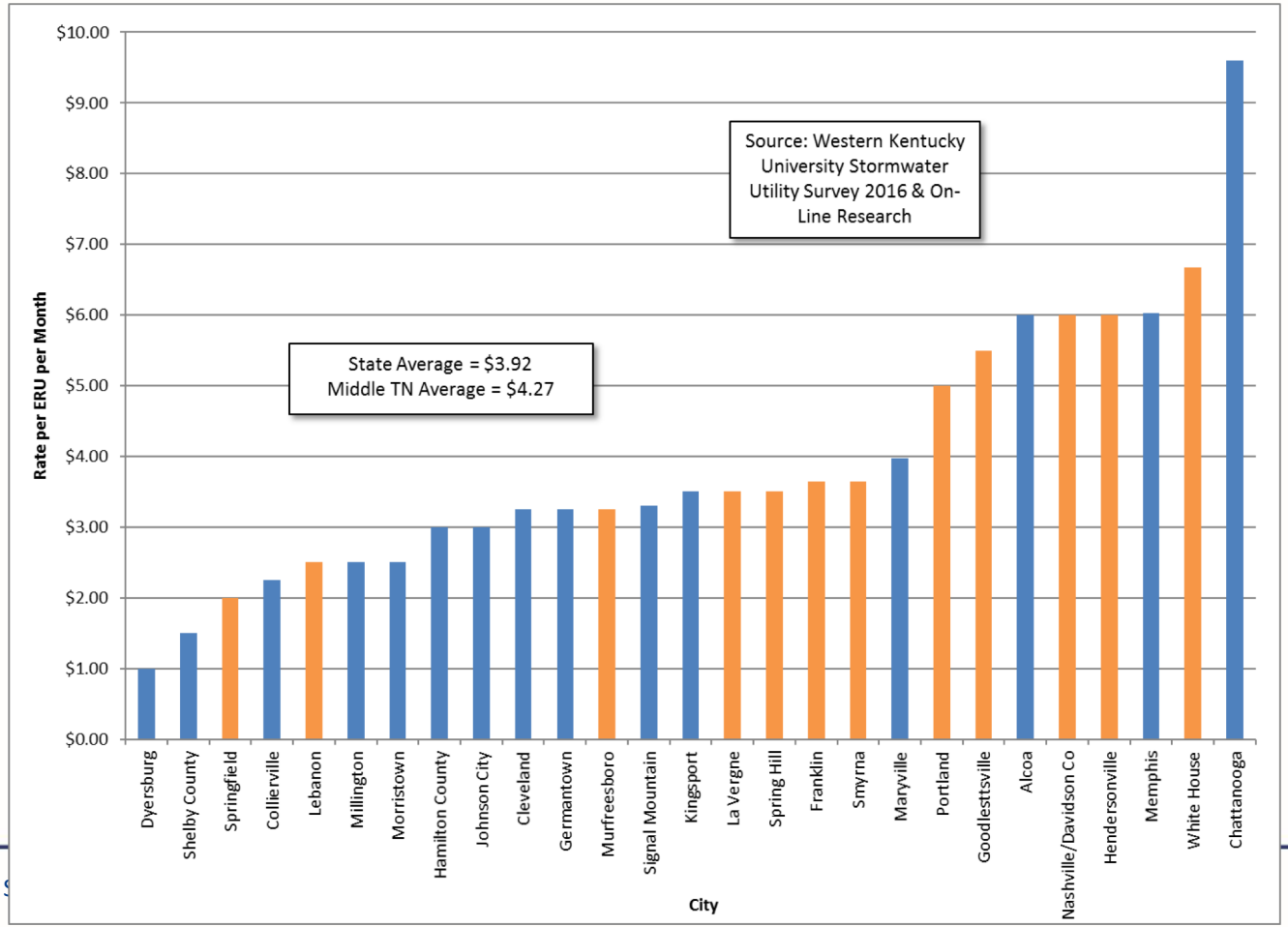
> 4,258 Sq. Ft. = 1.5 SFU

Evaluation of Stormwater Rate Structure Options

- Flat Fee
- Runoff Coefficient
- Intensity of Development Factor
- Residential Flat Fee
  - **Equivalent Residential Unit (ERU)**
  - **Single Family Unit (SFU)**
- **Tiered Residential Fee**
- Level-of-Service / Geography Base
- Impervious Area Measurements (all properties)



Summary of Stormwater Utility Fees in TN



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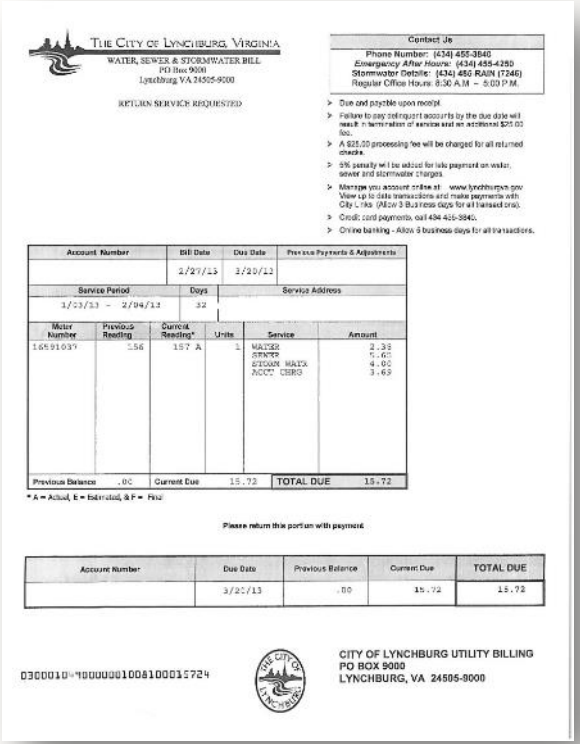
Important Message: Know Your State Law

- Fees shall be reasonable in amount
- Each user or user class shall only be required to pay its proportionate share
- The user's contribution shall be based on factors such as the amount of impervious area utilized by the user, the water quality of user's storm water runoff or the volume or rate of storm water runoff

Potentially Your Most Important Decision

How Are We Going to Bill This?

- Facilitate a meeting with finance and billing staff to discuss options
- Primary options to consider:
  - On a customer's monthly or bi-monthly utility bill
  - As a fee on a property owner's annual property tax bill
  - On a separate, stormwater bill
  - Combination



THE CITY OF LYNCHBURG, VIRGINIA
WATER, SEWER & STORMWATER BILL
PO Box 9000
Lynchburg VA 24505-9000

RETURN SERVICE REQUESTED

Contact Us
Phone Number: (434) 455-3640
Emergency After Hours: (434) 455-4250
Stormwater Details: (434) 455 RAIN (7246)
Regular Office Hours: 8:30 A.M. – 5:00 P.M.

- Due and payable upon receipt.
- Failure to pay delinquent accounts by the due date will result in termination of service and an additional $25.00 fee.
- A $25.00 processing fee will be charged for all returned checks.
- 5% penalty will be added for late payment on water, sewer and stormwater charges.
- Manage you account online at www.lynchburgva.gov View up to date transactions and make payments with City Links (Allow 3 Business days for all transactions).
- Credit card payments, call 434 455-3640.
- Online banking - Allow 5 business days for all transactions.

Account Number	Bill Date	Due Date	Previous Payments & Adjustments
	2/27/13	3/20/13	

Service Period	Days	Service Address
1/23/13 - 2/04/13	32	

Meter Number	Previous Reading	Current Reading*	Units	Service	Amount
16691039	156	157 A	1	WATER	2.38
				SEWER	5.65
				STORM WATR	4.00
				ACCT CHRG	3.69

Previous Balance	Current Due	TOTAL DUE
.00	15.72	15.72

* A = Actual, E = Estimated, & F = Final

Please return this portion with payment

Account Number	Due Date	Previous Balance	Current Due	TOTAL DUE
	3/20/13	.00	15.72	15.72

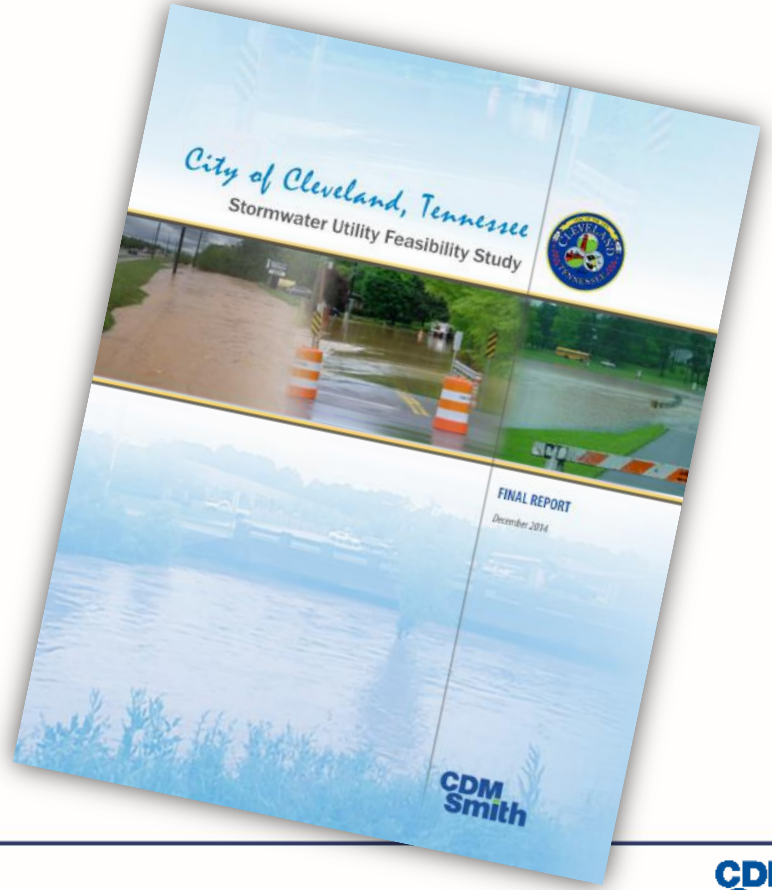
D300010=1000000100810001572#

CITY OF LYNCHBURG UTILITY BILLING
PO BOX 9000
LYNCHBURG, VA 24505-9000

Stormwater Program Assessment Deliverable

Summary Report & Council Presentation

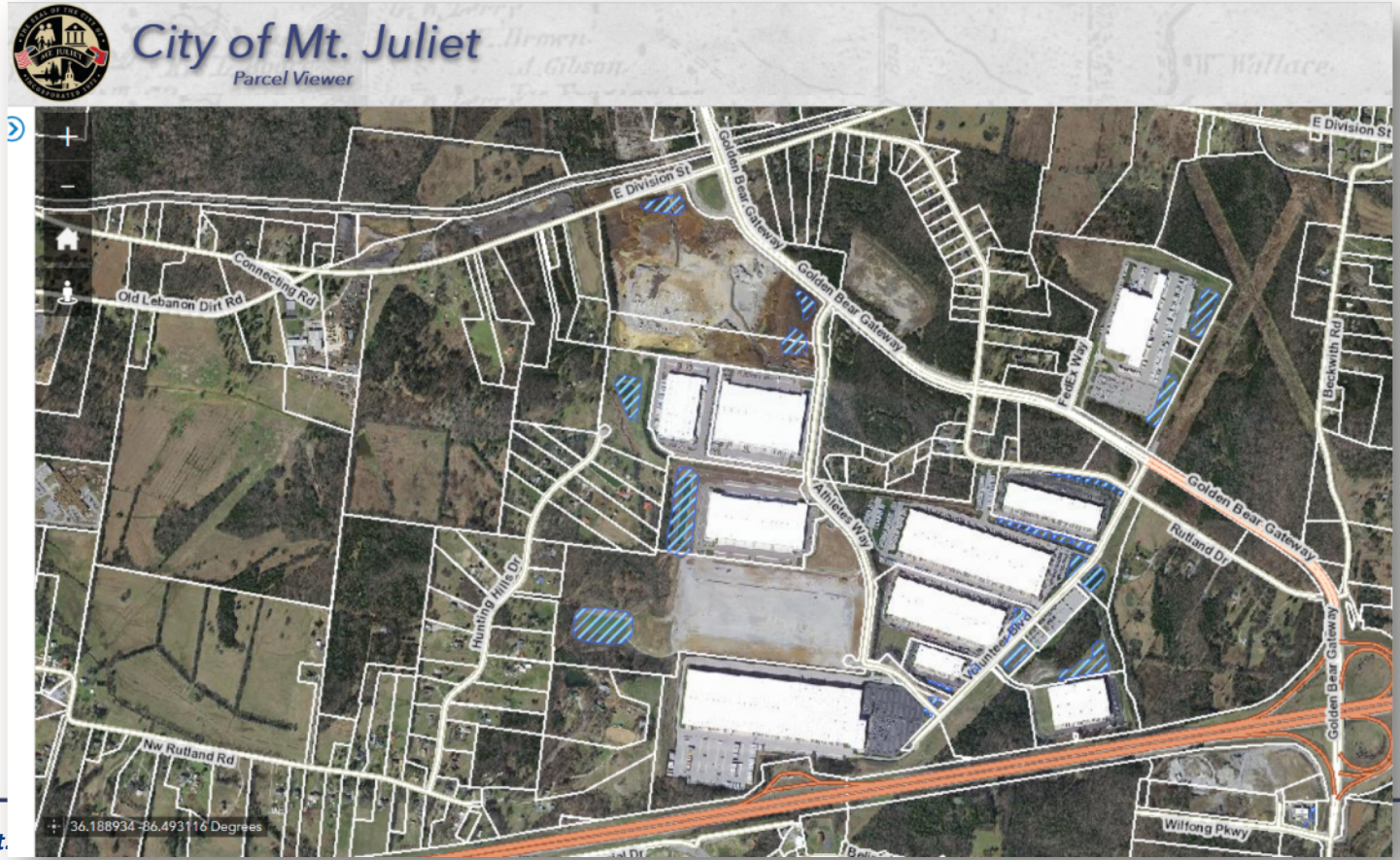
1. Program Drivers
2. Existing Program Cost of Service
3. Independent Level of Service Assessment
4. Potential Future Program Costs
5. Summary of Path Forward



Phase 2 - Stormwater Utility Implementation

- Measurement of Impervious Areas for All Non-Residential Properties
- Assignment of Charges for Residential Customers
- Development of a Stormwater Utility Billing File
- Public Outreach and Education
- Credit Manual and Policy Development
- Stormwater Utility Ordinance Development
- Staff Training

Measurement of Non-Residential Impervious Areas



CDM Smith

Fee Credits Must Be Offered to Customers that Reduce Their Burden on the System

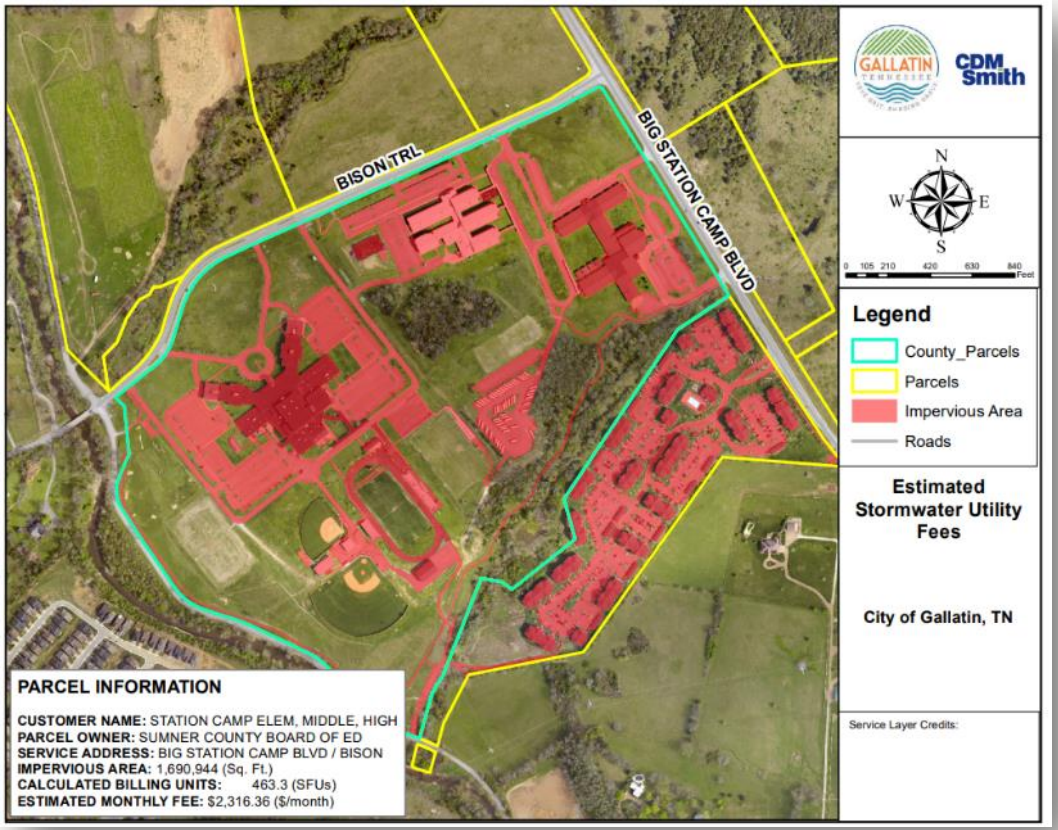
Credits Can Be Offered for Structural or Non-Structural Controls

- Structural Stormwater Controls
  - Onsite Water Quantity Controls
    - Ponds, wetlands, etc.
- Onsite Water Quality Controls
  - Low Impact Development (LID), vegetation, infiltration, etc.

- Non-Structural Controls
  - NPDES Permit Holders
  - Education Support
  - Lawn Care Management
  - Stream Clean-up
  - Parking Lot Clean-up

Public Outreach and Education Effort

- Presentations to City Elected Officials
- Development of a Standard Presentation to be used by City staff
- Brochures and/or billing inserts (3)
- Meetings with large fee payers
- Direct mailings to Top 50 customers



Vision for the Rest of the Day

- Staff Meetings
  - Public Works
  - Parks
  - Planning
  - Finance
  - GIS
  - Sewer Billing
- Meeting Goals
  - Honest dialogue about what's working and what's not
  - Vision for the future of stormwater services in the City
  - Identification of potential pitfalls (political or operational)

Thank You for Your Time and Attention!

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