



Cost-Effective Wet Weather Controls Through Coordinated Investments

NACWA Workshop, Newark, NJ
December 10, 2015

Carter H. Strickland, Jr.



DRIVERS FOR WET WEATHER DISCHARGE CONTROL

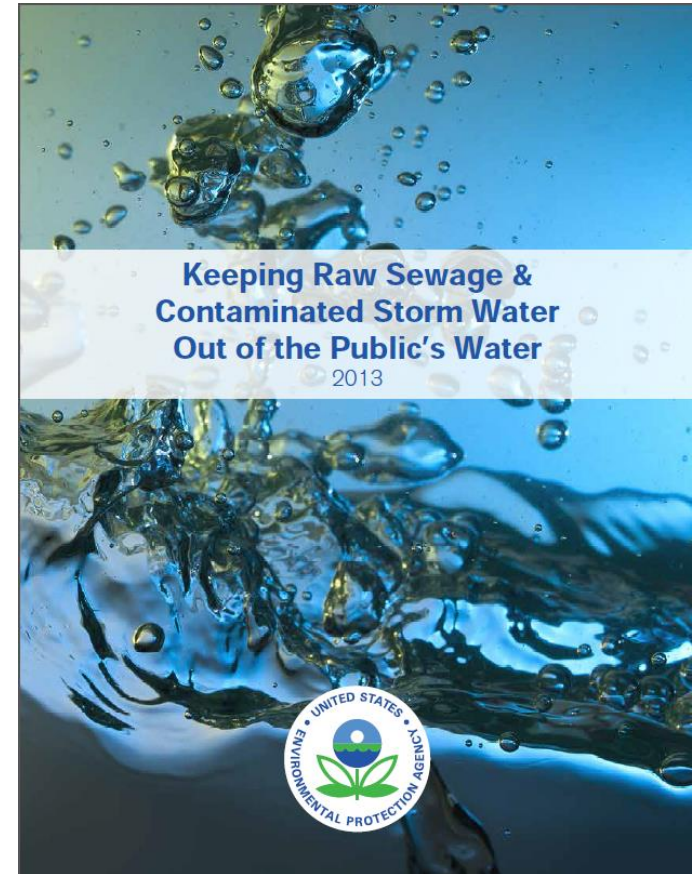
Regulatory

- Clean Water Act's "fishable swimmable" goals and 85% secondary removal standard
- Water Quality Standards
- EPA CSO Policy
- NJ SPDES CSO Permits
- MS4 Permits

Non-regulatory

- Flooding
- Waterfront Development
- Recreational Use of Water
- Public Awareness
- More Wet Weather

EPA Region 2 Report



OTHER DRIVERS: FLOODING AND RESILIENCY

Approaches

- Sewer separation
- Stream daylighting
- Green Infrastructure
- Design elevations
- Sediment controls

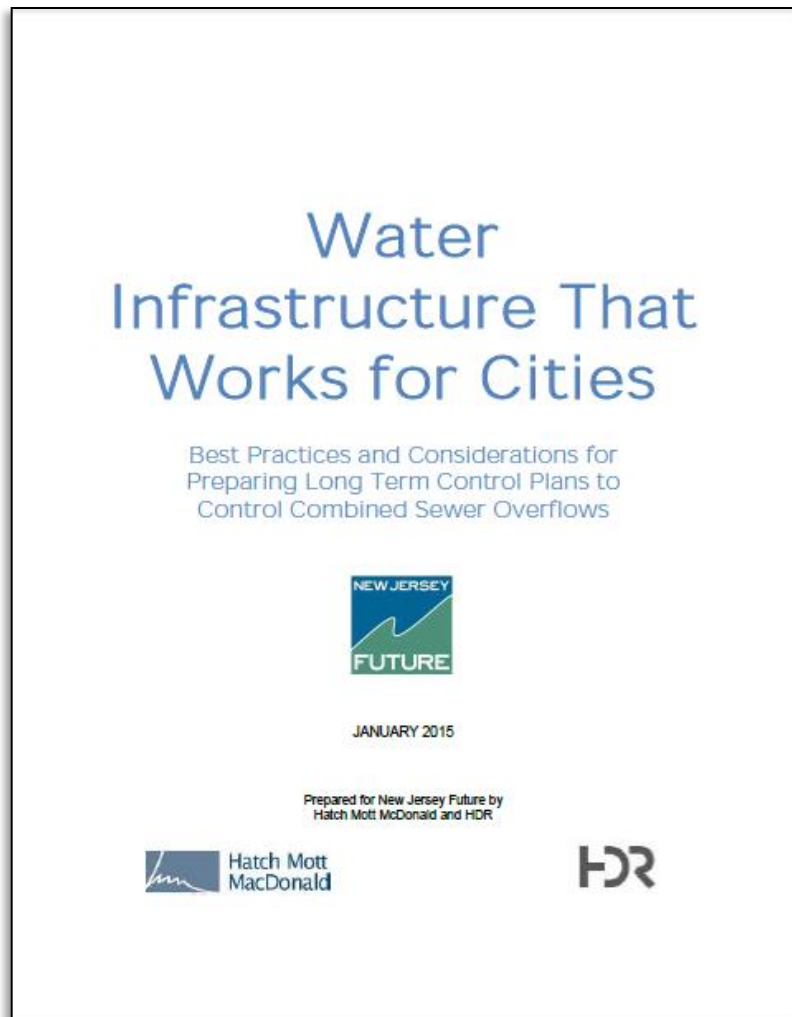


PLANNING FOR A WETTER FUTURE

New York City Panel on Climate Change Predictions (Feb. 2015)

	Baseline (1971-2000)	2050s	2080s
Average Temperature	54°F	+4.1 to 5.7 (F)	+ 5.3 to 8.8 (F)
Precipitation	50.1 in.	+4 to 11 (%)	+5 to 13 (%)
Sea Level Rise	0	+11 to 21 (in.)	+18 to 39 (in.)

BEST PRACTICES TO MAXIMIZE BENEFITS, SPREAD COSTS, OBTAIN PUBLIC SUPPORT



- Phased Implementation
- System Optimization
- Water Conservation
- Green Infrastructure
- Coordination Across Agencies
- Coordination with Planned Work
- Storage and Treatment
- Regional Solutions
- Public Participation

Control stormwater at the source:

-



COORDINATION ACROSS AGENCIES: SCHOOLS

- Coordinate construction across agencies
- Included needed CSO elements, including enhanced retention, within construction planned for other primary purposes



TRANSPORTATION



TRANSPORTATION: SPECIALIZED APPLICATIONS



Bike Share



Select Bus Service

PARKS

Fourth Ward Park, Atlanta, GA



SANITATION



Floatables Control



Street Sweepers



Catch Basin Cleaning



Source Control Campaign

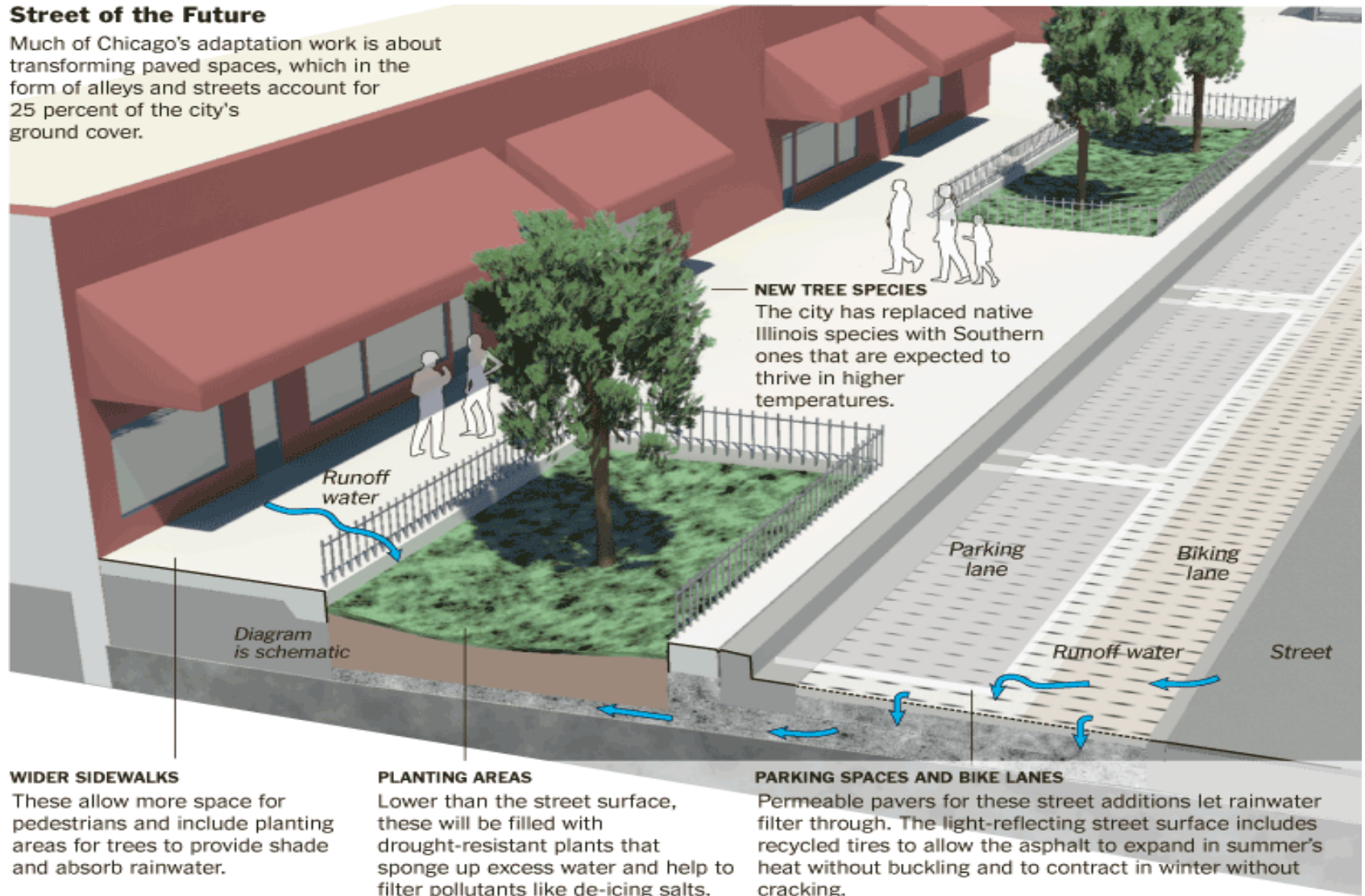
SMALL BUSINESSES



DEVELOPERS

Street of the Future

Much of Chicago's adaptation work is about transforming paved spaces, which in the form of alleys and streets account for 25 percent of the city's ground cover.



Sources: City of Chicago; Wight & Company

PERFORMANCE STANDARDS

NYCDEP's STORMWATER PERFORMANCE STANDARD

Affecting New/Redevelopment

- Effective July 4, 2012 as amendment to Chapter 31, Title 15 of Rules of the City of New York
- Decrease the “allowable” flow rate of to the city’s combined sewer system for new and existing development, as part of sewer availability and connection approvals
- Provides incentives for green infrastructure, including recycling and infiltration systems



PUBLIC ENGAGEMENT AND COMMUNICATION

Informational Meetings



Community Planting



Notification



DEVELOPING REGIONAL SOLUTIONS FOR CSOS

LTCP development

- Public participation
- Public notification system
- Area-wide receiving waters characterization (monitoring)
- Water quality modeling
- System modeling – same platform, modeling parameters
- Update cost/performance control alternatives
- Financial capability analysis
- Green Infrastructure pilot programs, monitoring

LTCP Implementation

- CSO reduction opportunities across municipal boundaries
- Maximize flow to local sewage treatment plant
- Consolidate secondary treatment
- Regional GI solutions

SHARED WET WEATHER CONTROL REQUIREMENTS

CSOs

Nine Minimum Controls

1. Proper O&M Programs for all CSS Components
2. Maximum use of the Collection System for Storage
3. Review and Modify Pretreatment Requirements
4. Maximization of Flow to the POTW for Treatment
5. Prohibition of CSOs during dry weather
6. Control of Solid and Floatable Materials in CSOs
7. Pollution Prevention
8. Public Notification Receiving Water Impacts from CSOs
9. Characterization of CSS and Receiving Waters

LTCP:

Public participation and other requirements

Stormwater

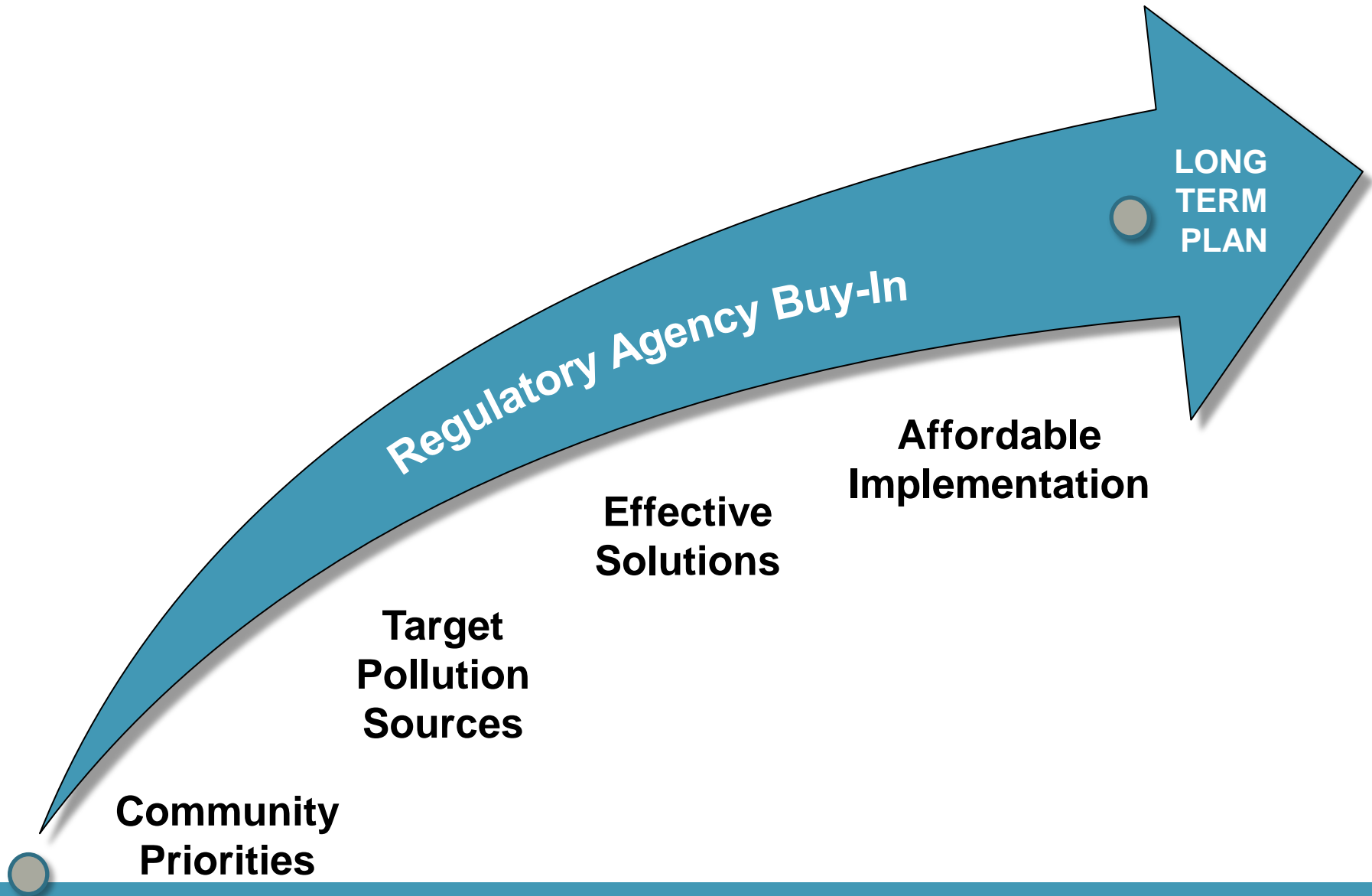
MS4 Minimum Control Measures (MCMs)

1. **Public education & outreach**
2. **Public involvement & participation**
3. Illicit discharge detection & elimination
4. Construction site runoff control
5. Post-construction stormwater management in new development & redevelopment
6. Pollution prevention/good housekeeping for municipal operations & maintenance

Stormwater Pollution Prevention

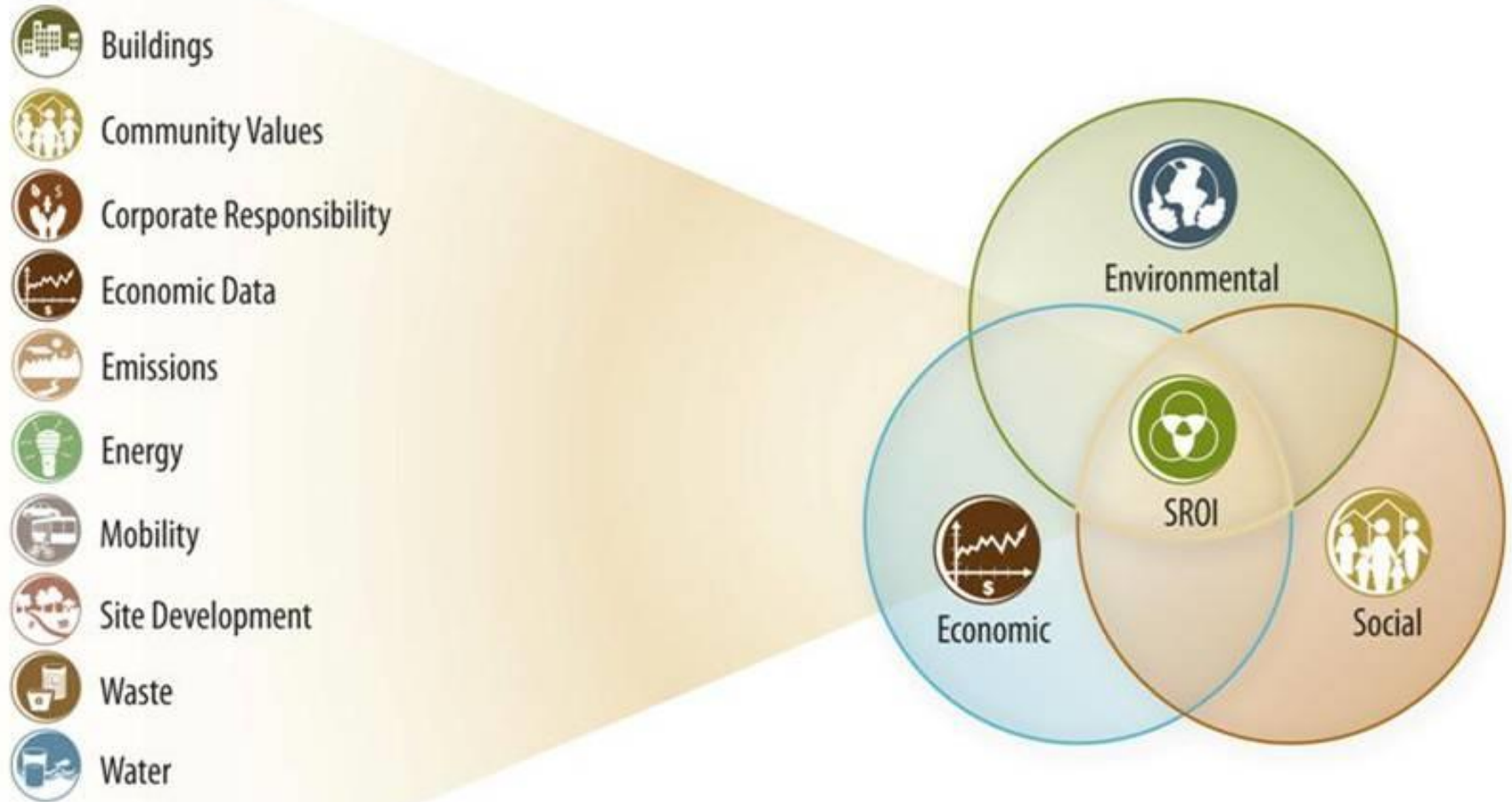
Plan: **Monitoring**, permit review, and other requirements

INTEGRATED PLANNING APPROACH



PRIORITIZE SOLUTIONS

Sustainable Return on Investment approach to capture the triple bottom line



CASE STUDY: SPRINGFIELD, MISSOURI

Drivers

- Stormwater Detention Basin Retrofits
- PAH Reduction Measures
- Southwest Clean Water Plant Enhanced Nutrient Removal
- SSO Control



CASE STUDY: SPRINGFIELD, MISSOURI

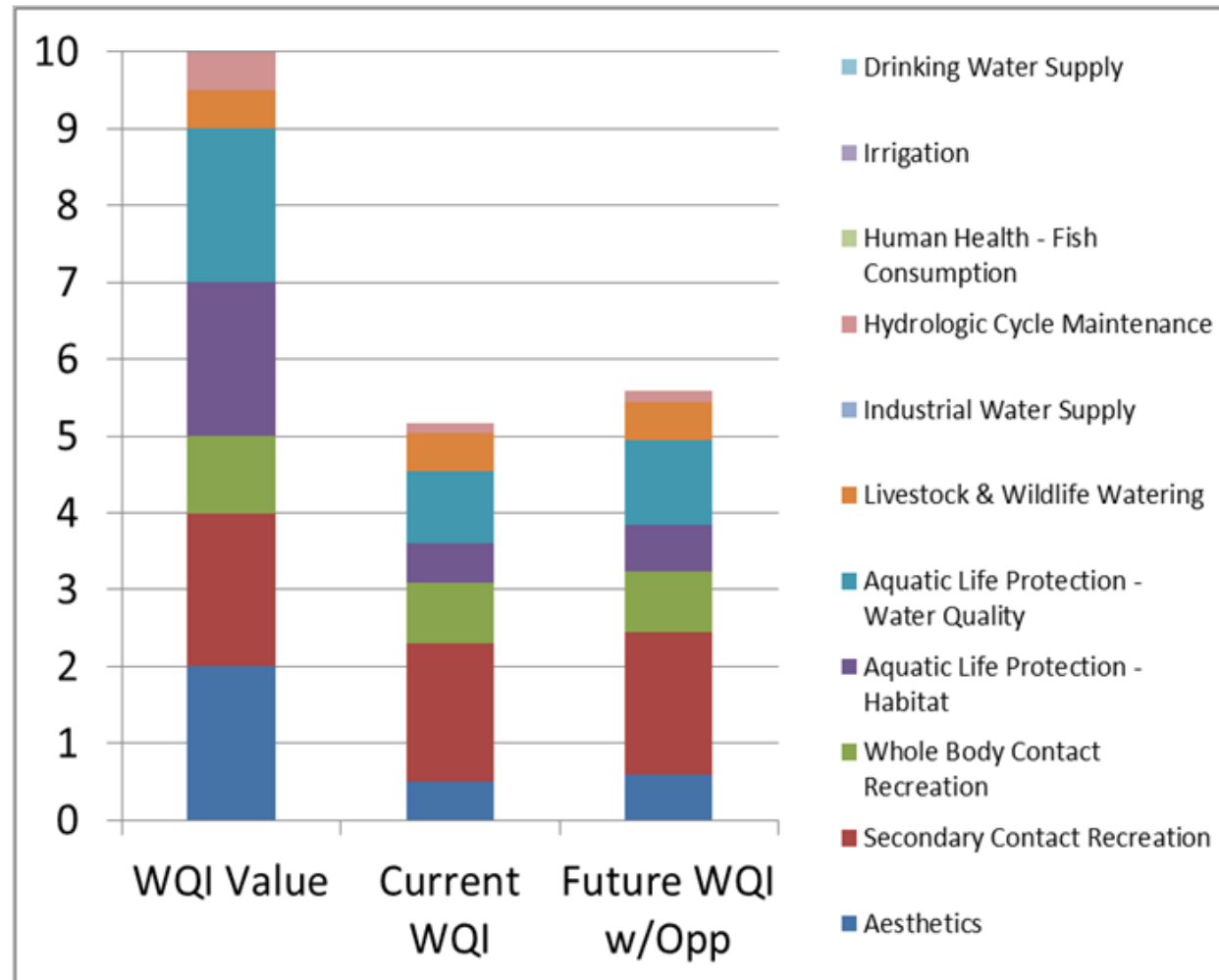
Solution:

WQ Index Valuation

- Sustainable Return on Investment (SROI)
- Quantify Change in WQ
- Determine Users/Non Users Impacted
- Monetize the Change

Result:

Prioritization of
Infrastructure Strategies
and Investment



Springfield – Greene County, Mo Integrated Plan for the Environment

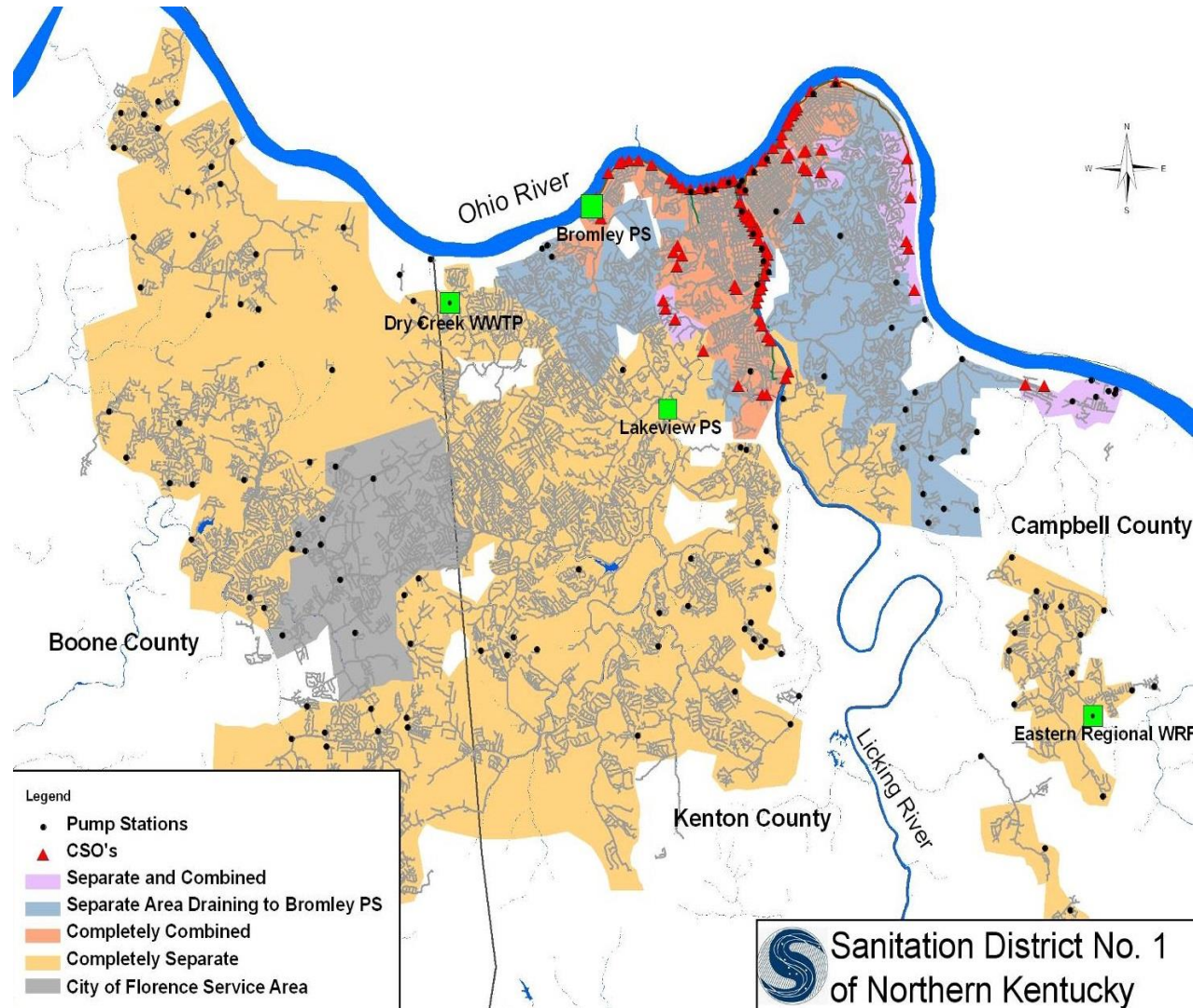


A dark blue silhouette of a city skyline with various buildings and a water tower. The foreground is filled with dark blue raindrops of varying sizes. The text 'A citizen-focused approach.' is written in a white, handwritten-style font across the bottom right.

A citizen-focused approach.

CASE STUDY: N. KENTUCKY SD1

- 3 counties
- Total service area
~ 229 sq miles
- CSO area 12 sq
miles
- >1,600 miles of
sewers
- 134 pump stations
- 3 regional treatment
facilities
- 102,000 wastewater
accounts
- 94,500 stormwater
accounts



CASE STUDY: N. KENTUCKY SD1

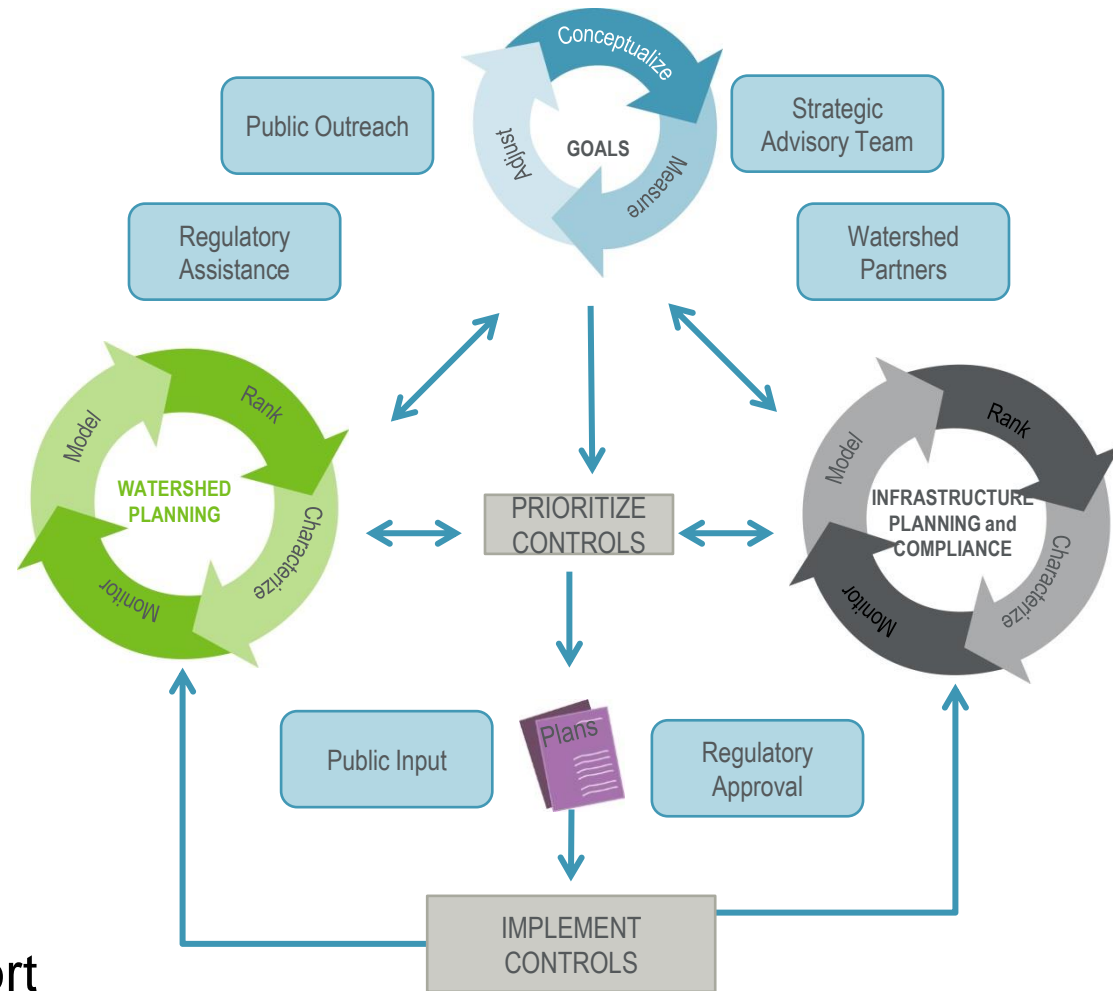
- CSOs
 - 95 CSO locations
 - 1.8 billion gallons annually
- SSOs
 - 166 SSO locations
 - 200 MG annually
- Stormwater Runoff (MS4 & NPS)
 - Flooding
 - Hydromodification
- Impaired Waters
 - Primary pollutants of concern (bacteria, solids and nutrients)



CASE STUDY: N. KENTUCKY SD1

Planning Process

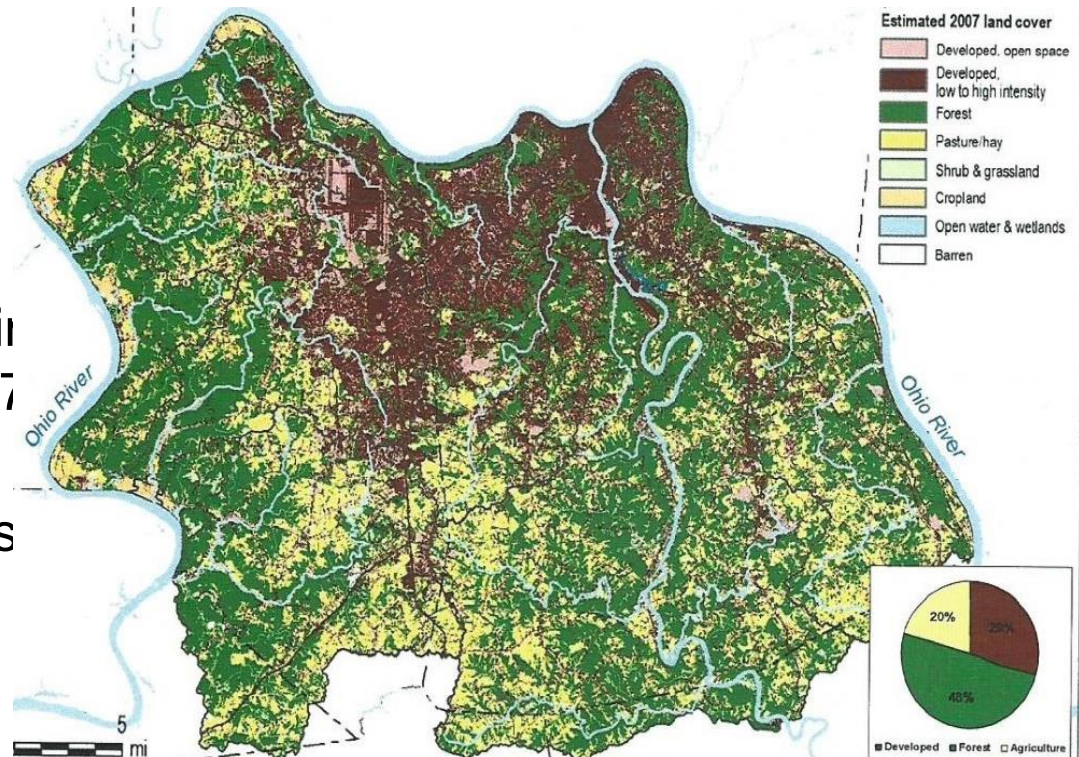
- Process to control highest regional priorities first
- Integrated approach to address wet and dry weather sources
- Additional benefits to the community such as air quality, wildlife habitat, urban beautification, and economic development
- Funding to projects that provide the greatest benefits
- Public input process to support financial investment



CASE STUDY: N. KENTUCKY SD1

Solution

- Watershed-based approach
- Consider pollution sources beyond sewer overflows
- Iterative Assessment Process
- Consent Decree was entered in Federal Court on April 18, 2007
 - Requires SD1 to improve water quality, eliminate SSOs and comply with the CSO Policy by 2025
 - Watershed management approach allows SD1 to revise watershed plans every 5 years



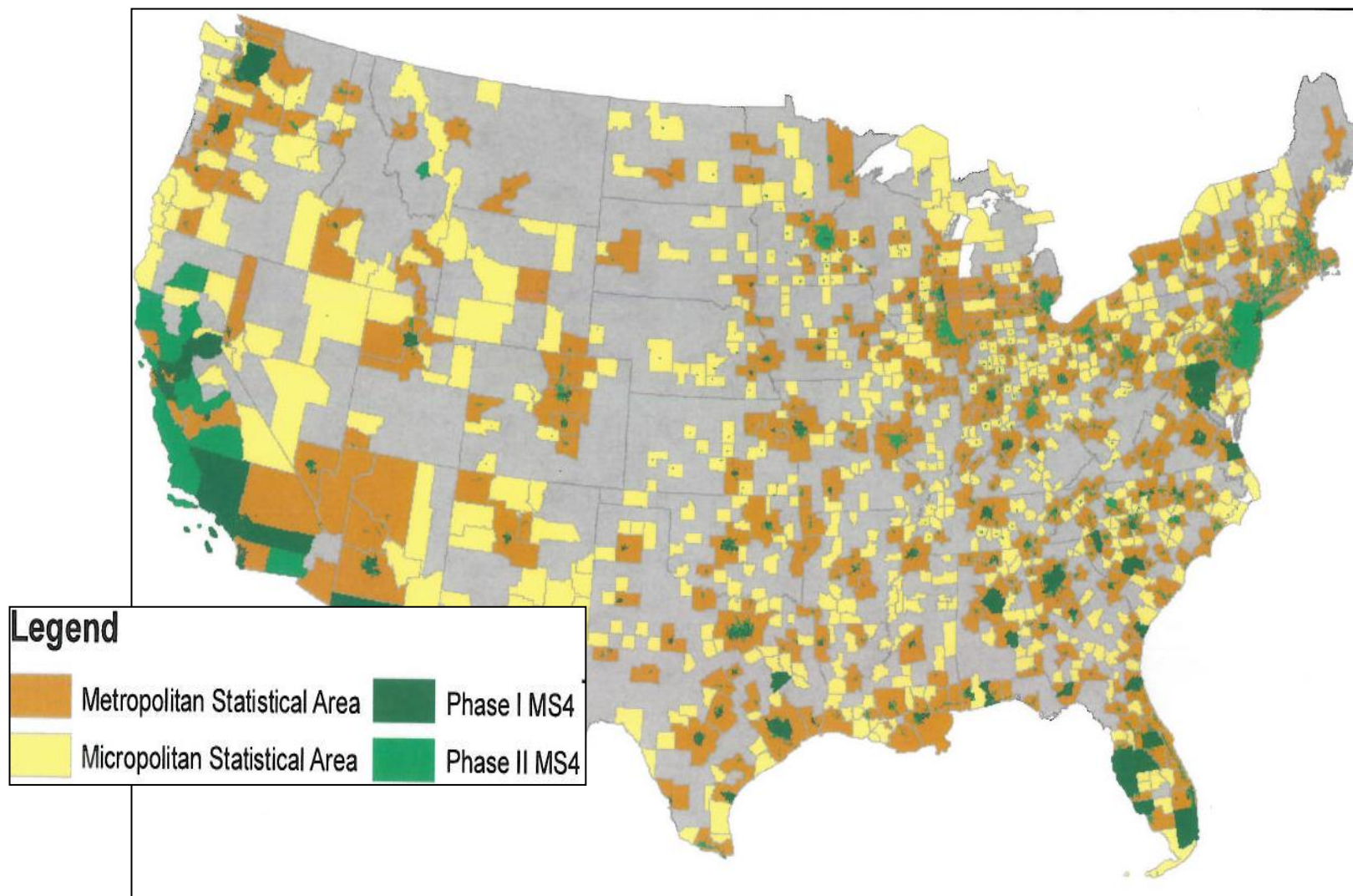
QUESTIONS

Carter Strickland

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EXTRA SLIDES

MS4 Regulated Areas



2010 Combined Statistical Areas & Regulated MS4s

Stormwater Rulemaking Deferred Indefinitely

2014 Update from the U.S. EPA

- “EPA is now pursuing **a suite of immediate actions** to help support communities in addressing their stormwater challenges...
- ...EPA will leverage existing requirements to **strengthen municipal stormwater permits.**”
- Implications for municipalities and utilities:
 - **Funding and technical assistance** available for green infrastructure and Integrated Planning
 - Permit updates to include **numeric standards**
 - More **audits of existing programs** and potential NOV's anticipated



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

MAR 14 2014

OFFICE OF
COMPLIANCE AND ENFORCEMENT

Reply to OCE-133

NOTICE OF VIOLATION

Christie True, Director
King County Department of Natural Resources and Parks
201 S. Jackson Street, Suite 600
Seattle, Washington 98104-3855

Re: King County, Washington
Municipal Separate Storm Sewer System
NPDES Permit Number: WAR04-4501

Dear Ms. True:

On July 17-18, 2013, representatives from the United States Environmental Protection Agency, Region 10 (EPA) and PG Environmental, LLC, an EPA contractor, conducted an inspection of the King County (County) Phase I Municipal Separate Storm Sewer System (MS4), including the County's stormwater management program (SWMP), to evaluate compliance with Washington's Phase I Municipal Stormwater Permit, Permit Number WAR04-4501 (Permit). The Permit establishes minimum requirements for an MS4 SWMP to address the water quality impacts from stormwater and allowable non-stormwater discharges. The EPA inspection included a review of documents, interviews with County program managers and staff, and field verification inspections. I would like to express my appreciation for your time and cooperation during the inspection. A copy of the inspection report is enclosed with this letter.

A review of the inspection report and available files revealed the following violations and areas of concern:

Violations

I. Source Control Program for Existing Development: Lack of Written Documentation of Training

Section S5.C.7.b.v of the Permit requires the County's SWMP staff whose primary job duties include implementing the source control program be trained to conduct those activities. The Permittee shall document and maintain records of the training and names of the staff trained.

At the time of the inspection, the inspectors reviewed the training documents and noted that some departments did not have complete records for training activities conducted in recent years (i.e., 2011, 2012, or 2013). It is important to retain records showing that training was provided for all applicable staff. This is a violation of Section S5.C.7.b.v of the Permit.

Washington DC MS4 Permit

- Anacostia River Watershed Trash TMDL
 - Remove 103,188 lbs. of trash annually
- Consolidated TMDL Implementation Plan – 16 TMDLs
 - Establishes enforceable permit terms
 - Compliance schedule specifying numeric benchmarks and annual pollutant load reductions
 - Demonstrate through modeling that WLAs will be attained by controls
 - Adaptive implementation following data collection

NPDES Permit No. DC0000221

**AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
MUNICIPAL SEPARATE STORM SEWER SYSTEM PERMIT**

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §§ 1251 *et seq.*

Government of the District of Columbia
The John A. Wilson Building
1350 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

is authorized to discharge from all portions of the municipal separate storm sewer system owned and operated by the District of Columbia to receiving waters named:

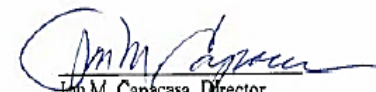
Potomac River, Anacostia River, Rock Creek and stream segments
tributary to each such water body

in accordance with the Stormwater Management Program(s) dated February 19, 2009, subsequent updates, and related reports, strategies, effluent limitations, monitoring requirements and other conditions set forth in Parts I through IX herein.

The effective issuance date of this permit is: October 7, 2011.

This permit and the authorization to discharge shall expire at midnight, on: October 7, 2016

Signed this 30th day of September, 2011.


Jon M. Capacasa, Director
Water Protection Division
U.S. Environmental Protection Agency
Region III

San Diego Region MS4 Permit – May 2013

- (i) Discharges from the MS4s containing indicator bacteria densities that do not exceed the following effluent limitations by the compliance dates under Specific Provision 5.b.(1) will not cause or contribute to exceedances of the receiving water limitations under Specific Provision 5.b.(2)(a):

Table 5.3a

Final Effluent Limitations as Expressed as Bacteria Densities in MS4 Discharges to the Water Body

Constituent	Effluent Limitations	
	Single Sample Maximum ^{1,2}	30-Day Geometric Mean ²
Total Coliform	10,000 MPN/100mL	1,000 MPN/100mL
Fecal Coliform	400 MPN/100mL	200 MPN/100mL
<i>Enterococcus</i>	104 MPN/100mL	35 MPN/100mL

Notes:

1. During wet weather days, only the single sample maximum effluent limitations are required to be achieved.
2. During dry weather days, the single sample maximum and 30-day geometric mean effluent limitations are required to be achieved.

St. Louis Draft Bacteria TMDLs

- Aggressive TMDLs coupled with MS4 TMDL Requirements pose significant potential impact

Table 8. Needed load reductions to achieve water quality standards in Watkins Creek*

<i>Percentile Flow Exceedance</i>	<i>Flow (cfs)</i>	<i>Observed Load (counts/day)</i>	<i>TMDL (counts/day)</i>	<i>Load Reduction (counts/day)</i>	<i>Percent Reduction (%)</i>
95	0.2	1.90E+08	8.22E+08	-6.3E+08	0 %
75	0.6	4.39E+09	2.97E+09	1.4E+09	32.2 %
50	1.4	2.29E+10	6.95E+09	1.6E+10	69.6 %
25	3.6	1.14E+11	1.83E+10	9.6E+10	83.9 %
5	35.1	4.15E+12	1.77E+11	4.0E+12	95.7 %

* Based on geomeans of observed bacteria data within specific flow conditions (i.e., high flows)

Boise, ID – New Combined Sewer Community?

“Projects with potential for excessive pollutant loading(s) that cannot implement adequate preventive or water quality treatment measures to ensure compliance with Idaho surface water standards must properly convey storm water to an NPDES permitted wastewater treatment facility ...”

– USEPA Issued MS4 Permit



MS4 Trends

- MS4 requirements and permit updates will result in **significant program implementation costs** for communities
- Future permit cycles will include **numeric standards** to attain water quality standard
- A sound business case can be made for **Integrated Planning** to leverage various water quality / quantity controls in an affordable manner
- Communities will need to evaluate **staffing needs**
- **Sound data** is needed to compare control measures to the costs and effectiveness of various water quality / quantity controls



MS4 Trends

- Baseline **flow and water quality models** need to be developed to measure success
- Post-construction BMPs including **green infrastructure** must be tailored to local context and conditions
- Development of effective **stakeholder engagement**, structured to be proactive and preclude litigation



INTEGRATED PLANNING DRIVERS



I'm making a large investment in **CSO reduction** but other investments may have a greater impact on water quality.

How will our community be impacted if we're in **Ozone Non-Attainment?**

We may not be able to afford the next **Consent Judgment?**

I'm concerned about ongoing water quality pressure on our **source waters.**

My stormwater and wastewater programs are addressing **water quality issues** but are not coordinated.

I need to provide **flood protection** for my community


Regulatory driven requirements and aging infrastructure could compete for limited capital.

EPA'S INTEGRATED PLANNING FRAMEWORK

History and Issues

- U.S. Conference of Mayors
- NACWA
- EPA Memo: "Achieving Water Quality Through Municipal Stormwater and Wastewater Plans" Oct 27, 2011
 - Facilitate use sustainable and comprehensive solutions, including green infrastructure to improve water quality

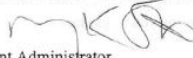
EPA Framework June 5, 2012


 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN - 5 2012

MEMORANDUM

SUBJECT: Integrated Municipal Stormwater and Wastewater Planning Approach Framework

FROM: Nancy Stoner 
Acting Assistant Administrator
Office of Water

Cynthia Giles 
Assistant Administrator
Office of Enforcement and Compliance Assurance

TO: EPA Regional Administrators
Regional Permit and Enforcement Division Directors

In recent years, EPA has increasingly embraced integrated planning approaches to municipal wastewater and stormwater management. EPA further committed to work with states and communities to implement and utilize these approaches in its October 27, 2011 memorandum "Achieving Water Quality Through Municipal Stormwater and Wastewater Plans." Integrated planning will assist municipalities on their critical paths to achieving the human health and water quality objectives of the Clean Water Act by identifying efficiencies in implementing requirements that arise from distinct wastewater and stormwater programs, including how to best prioritize capital investments. Integrated planning can also facilitate the use of sustainable and comprehensive solutions, including green infrastructure, that protect human health, improve water quality, manage stormwater as a resource, and support other economic benefits and quality of life attributes that enhance the vitality of communities.

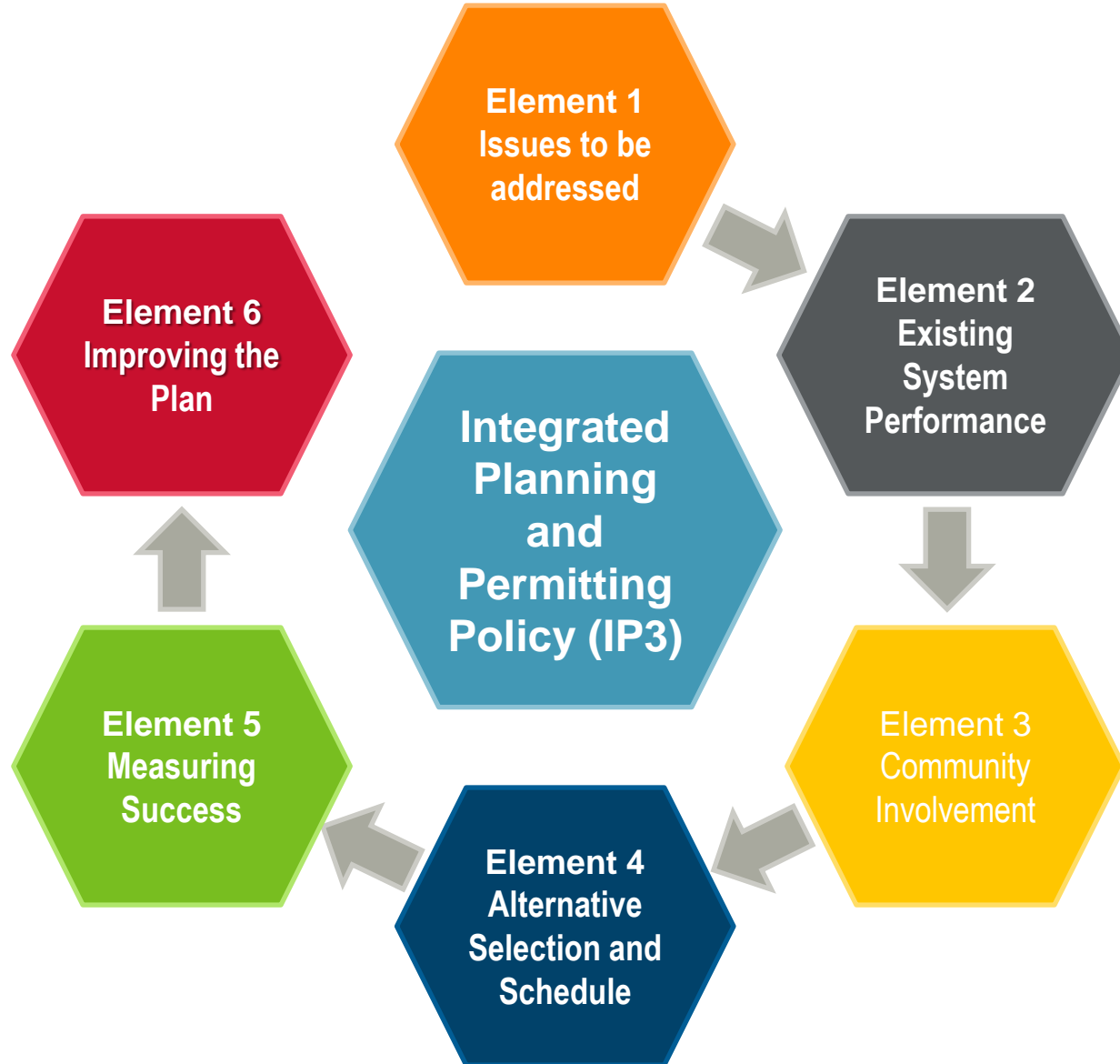
To provide further guidance on developing and implementing effective integrated plans under this approach, we have developed, with extensive public input, the attached Integrated Municipal Stormwater and Wastewater Planning Approach Framework document. We are posting the framework document on our website and, as they become available, will provide practical examples of how municipalities are implementing this approach. We would like to thank Regions 2, 4, 5, 7 and 10 for their assistance in conducting public workshops to gain input on the draft framework. We encourage all Regions to work with their States to identify

INTEGRATED PLANNING APPROACH

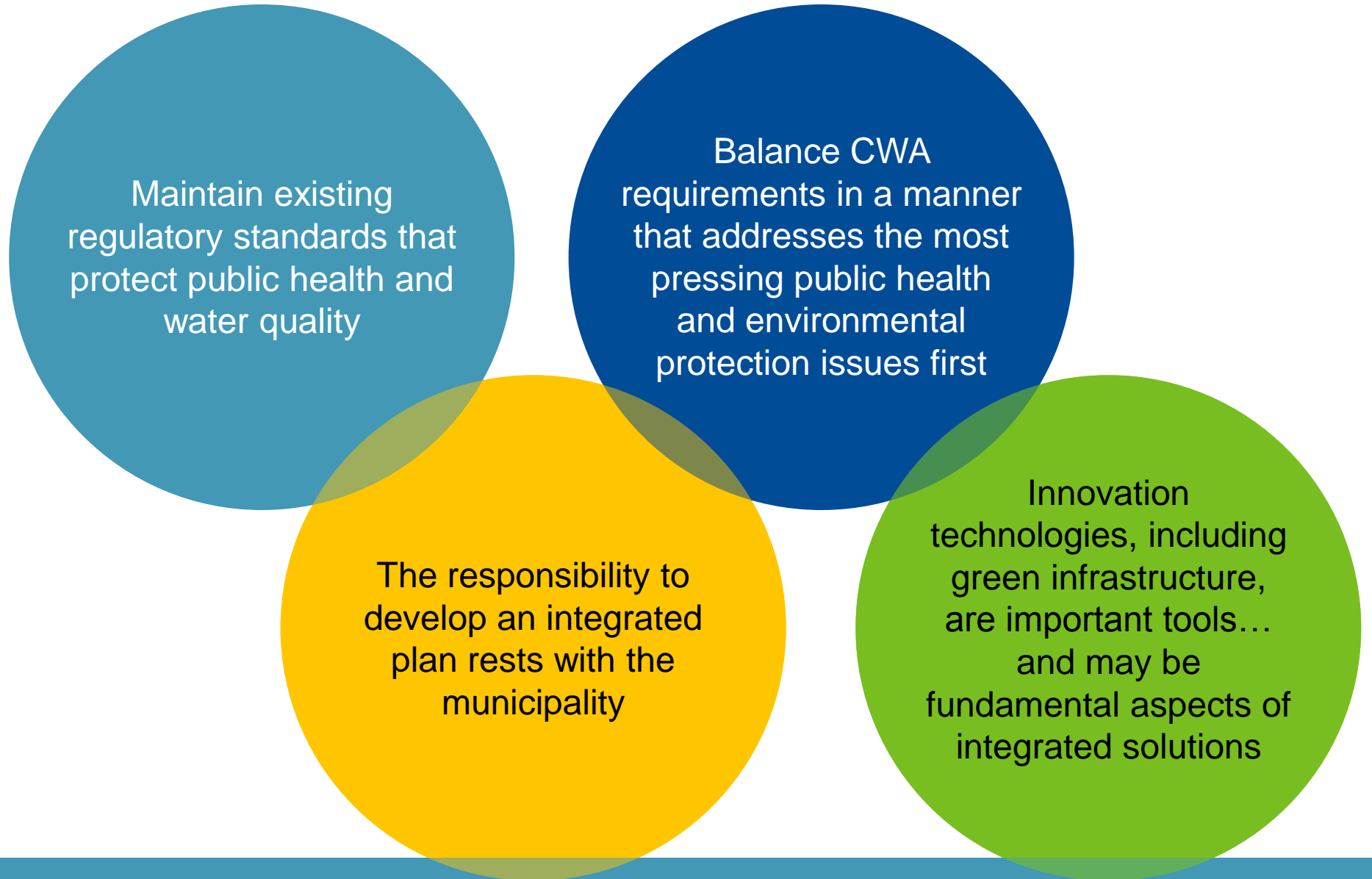
- Integrates planning for regulatory obligations into a **unified strategic plan** so that they can be **balanced and prioritized**
- Emphasis on empowering **local** stakeholders to set priorities
- Highlights the issue of **affordability and financial capability**
- Offers a bridge to **full implementation**



INTEGRATED PLANNING: ELEMENTS



INTEGRATED PLANNING: OVERARCHING PRINCIPLES



Maintain existing regulatory standards that protect public health and water quality

Balance CWA requirements in a manner that addresses the most pressing public health and environmental protection issues first

The responsibility to develop an integrated plan rests with the municipality

Innovation technologies, including green infrastructure, are important tools... and may be fundamental aspects of integrated solutions