

# Clean Water Program



Draft Recommendations for Post  
Construction Ordinances

# April 17, 2012 Agenda

- Review of previous task force meetings
- Draft Task Force recommendations

# Charge Statement

## CLEAN WATER TASK FORCE

### CHARGE STATEMENT

The goal of the Mayor's Clean Water Task Force is to formulate recommendations for post-construction best management practices (BMPs) for new development and redevelopment projects by August 2012. These recommendations should aim to address both the increased pollutant loads to local water ways as a result of urbanization as well as the increased quantity of water delivered to a water body during a storm event. It is important to also consider business, environmental and neighborhood interests, recognizing the need to sustain long-term economic and development opportunities in the City of Lincoln.

Post-construction BMPs are implemented to prevent flooding, reduce erosion and sedimentation, increase base flows in streams, filter impurities in stormwater runoff to decrease pollutant levels, reduce algae blooms in water bodies, support riparian and aquatic habitats, promote biodiversity, provide open space and areas for outdoor recreation, promote sustainability and increase aesthetics.

Federal and State Law require that the City of Lincoln:

- 1) Develop and implement strategies which include structural and non-structural best management practices;
- 2) Have an ordinance or other regulatory mechanism requiring the implementation of post-construction runoff controls;
- 3) Ensure adequate long term operation and maintenance of controls; and
- 4) Determine the appropriate best management practices and goals for a post-construction stormwater program.

The objective of the Mayor's Clean Water Task Force is to formulate recommendations for a Post-Construction Program that meet the requirements set forth above.

Public Works Memorandum re Post-Construction Best Management Practices

Miki Esposito

Date: August 26, 2011

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**Issue:** Whether the City of Lincoln is required by federal and state law to *implement* a Post-Construction BMP program.

**Short Answer:** Pursuant to the 2008 MS4 Permit, the City is required to "finalize recommendations" for post-construction best management practices by August 2012. The NDEQ has expressed that in the next permit cycle (2012-2017), the City will be required to "implement and enforce" a post-construction program.

**Rules:** Federal Clean Water Act, 33 U.S.C. §1251 *et seq.* (as amended); 40 C.F.R. §122.26 regulating storm water discharges (applicable to State NPDES programs); Nebraska Environmental Protection Act, Neb. Rev. Stat. § 81- 1501 *et seq.* (as amended); Nebraska Administrative Code, Title 119 (as amended).

**Analysis:** The Federal Clean Water Act (CWA) provides that the discharge of any pollutant by any person shall be unlawful without a permit. 33 USC §1311(a). As such, 33 USC §1342(p) requires municipal separate storm sewers systems (MS4s) to be permitted under the National Pollutant Discharge Elimination System (NPDES) of the CWA.

# EPA/NDEQ Requirements

- Develop and implement strategies for best management practices
- **Have an enforceable ordinance requiring the implementation of post-construction standards**
- Ensure long term operation and maintenance of best management practices
- Determine Best Management Practices and goals for a Post Construction program

# January 17th (1<sup>st</sup>) Meeting

## ■ Overview

- Lincoln has a state and federal required stormwater permit
- With urbanization, pollutants don't have as much of a chance to be treated as with natural systems
- All of us contribute to rainfall runoff and everyone is effected by drainage
- Current trends are to implement Best Management Strategies in a more natural and sustainable manner by limiting runoff and treating stormwater where it falls or as soon as possible

# Other Benefits

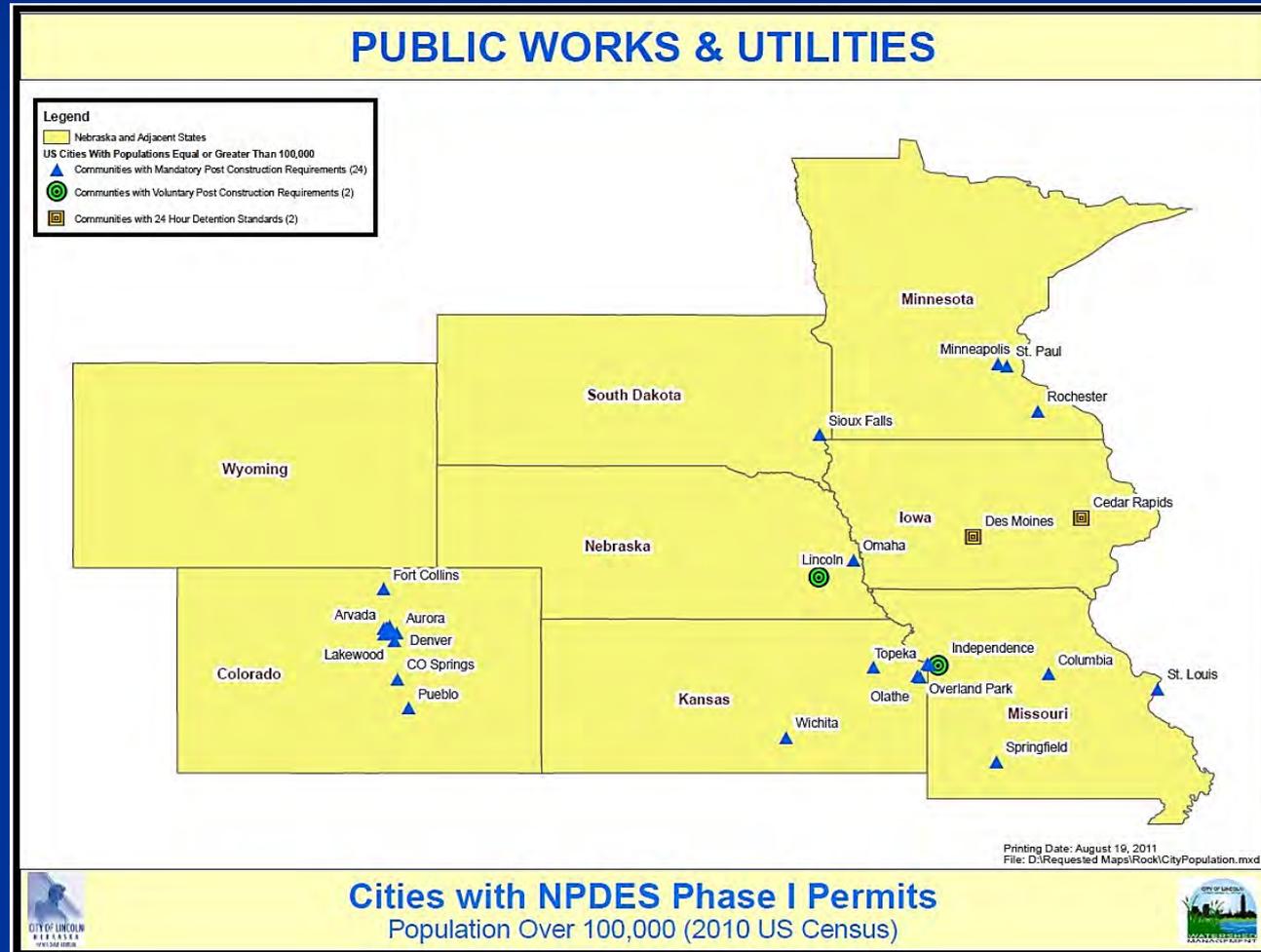
- reduce stream bank erosion
- reduce localized flooding
- increase base flows
- more biodiversity



- sustainable practice
- healthy lifestyle
- less maintenance
- promote aquatic & riparian habitats

# January 17<sup>th</sup> Meeting

NDEQ  
Presentation  
- The Post  
Construction  
requirement is  
not unique to  
Lincoln, it is a  
standard  
requirement for  
all MS4 permits



# January 17<sup>th</sup> Meeting

- Post Construction BMP Standards
  - Integrate post construction standards for stormwater management into the initial design of a project
  - Key element of upcoming EPA proposed rule is the establishment of performance standards based on a Water Quality Control Volume
    - based on a specific percentile storm event (for example 90% of the storm events in Lincoln are 1.25 inches or less)

# February 21<sup>st</sup> (2<sup>nd</sup>) Meeting

- Technical Memo #1, Rainfall Frequency Curve for Lincoln
- Technical Memo #2, Ordinance Comparison
- Major issues covered by proposed Post Construction Standards
  - Applicable to what areas, criteria, exceptions, maintenance
- Existing Voluntary Water Quality Standards
  - Stevens Creek Master Plan

# Technical Memo #1



## Precipitation in Lincoln, NE

Daily precipitation data of the Lincoln Municipal Airport weather station was obtained through the High Plains Regional Climate Center (HPRCC) for the purpose of conducting this rainfall analysis. The records are also kept by the National Weather Service through the National Climatic Data Center. The Lincoln Airport station (COOP 254795) is part of the National Weather Service (NWS) Cooperative Station Network. NWS Cooperative Summary of the Day, DS3200 was used as it contains 24-hour precipitation totals consistently back to September of 1972. For this analysis daily precipitation totals from 1973 to 2011 were used to develop a precipitation frequency relationship.

## Rainfall Analysis

A rainfall frequency analysis was conducted using procedures from the EPA (*Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act, 2009*). The 24-hour daily precipitation totals represent precipitation events. These precipitation events were then summarized to only include those that produce runoff. First, rainfall events of 0.1 inches or less were excluded since these small events generally do not produce any measurable runoff. Similarly, days that had recorded snowfall were eliminated from the analysis as snowfall does not produce immediate runoff. The figure below shows the results of the analysis. The graph describes the relationship between the rainfall depth and corresponding percentage of rainfall events that don't exceed it for the time period. The

90<sup>th</sup> percentile rainfall depth was derived from these results.

## 90<sup>th</sup> Percentile Rainfall Depth

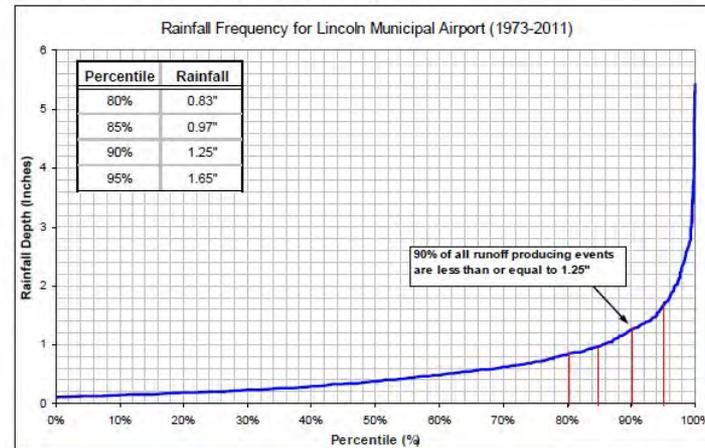
The 90<sup>th</sup> percentile rainfall depth represents the depth of rainfall which is not exceeded in 90 percent of all runoff producing rainfall events within the time period analyzed. In other words 90 percent of the rainfall storm events that produce runoff will be less than or equal to this depth. It was found for Lincoln the 90<sup>th</sup> percentile rainfall depth is 1.25 inches, similarly the 95 percent rainfall depth is 1.65 inches. The rainfall depth corresponds directly to rainfall volume (not the same as runoff volume) when applied over an area. For example the 90% rainfall depth applied over 100 Acres equates to 10.4 Acre-Feet.

## Summary

One possibility is that a volume based storm event equal to the 90<sup>th</sup> percent rainfall depth of 1.25 inches be used as the Water Quality Control Volume (WQCV) threshold to capture and treat water quality in stormwater runoff. This approach is simple to understand and easily implemented. It ensures the majority of runoff volume from 90 percent of the storms consists of cleaner water for the site and downstream resources in the short and long term. The 90 percent depth is commonly recognized to maximize the cost of control and water quality benefits, as graphically portrayed by the upward inflection of the curve. The rainfall based criteria also incentivizes limiting impervious areas and promotes green infrastructure.

## Other References

- EPA's Section 438 Technical Guidance (2009) recommends control of the 95<sup>th</sup> percentile storm.
- The Stevens Creek Watershed Masterplan (2005) calculated the 90 percent rainfall depth to be 1.3 inches and subsequently recommended its use for calculating the Water Quality Control Volume for structural BMP's.



# Stevens Creek Master Plan

- Approved in 2005
  - Two alternative approaches: Regional based Best Management Practices (BMPs) and Site Specific Best Management Practices
    - Citizen Advisory Committee and subsequently the Master Plan recommended Site Specific BMPs
      - Improve integrity of natural streams
      - Preserve water quality
      - Can be integrated into the City's current development standards
  - Master Plan recommended design of BMPs be based on capturing percentage of rainfall events (Master Plan recommended 90% rainfall)

# February 21<sup>st</sup> Meeting

Section 7  
Drainage Criteria Manual Review

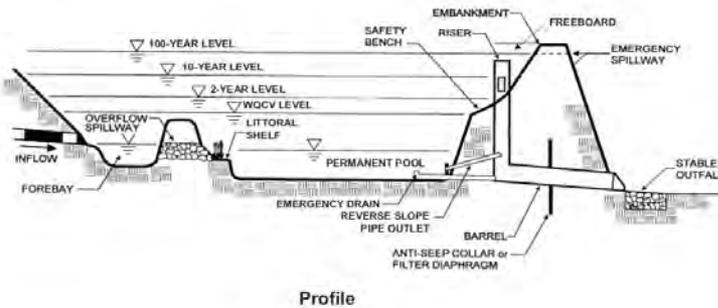
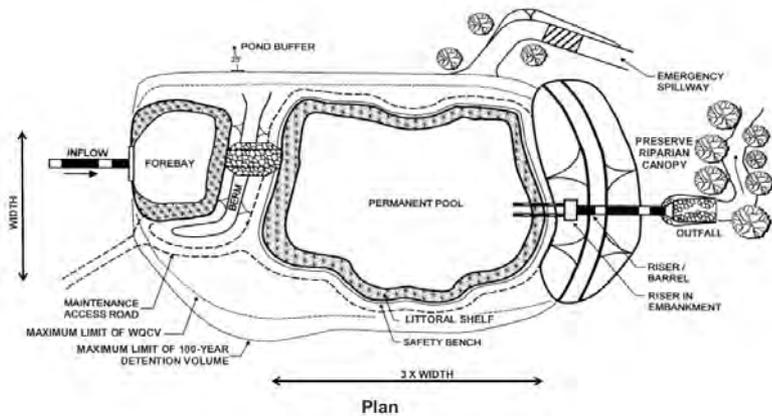
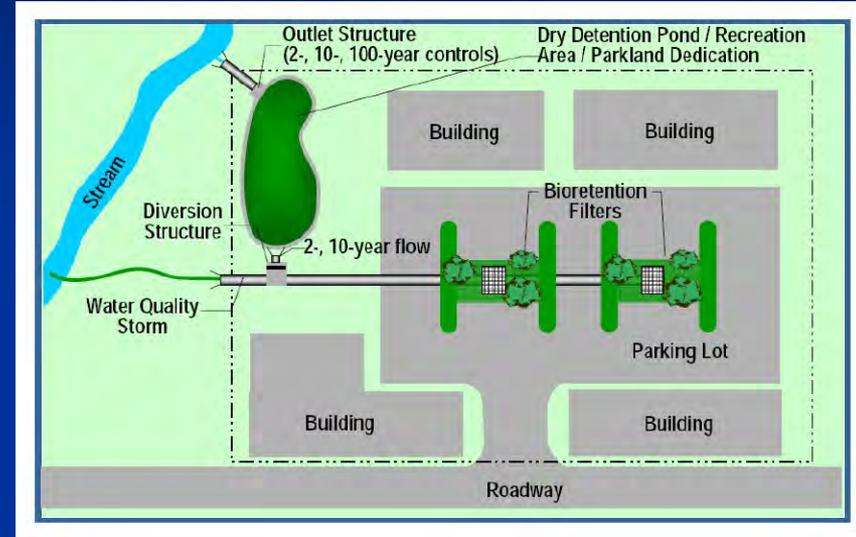


Figure 7-3  
Schematic of an Extended Wet Detention Basin  
(Adapted from Maryland Department of Environment, 2000)



# Stevens Creek Master Plan

- Citizens Advisory Committee concluded that each private development should bear the cost of offsetting impacts to water quality and stream stability
  - Similar to the common practice for offsetting flooding impacts caused by the development
- Volunteer BMP program

# February 21<sup>st</sup> Meeting

- Presentation by Olsson Associates
  - BMPs in Lincoln
  - Federal requirements
  - Other Benefits
    - Increased land values and sale-ability of land
  - Costs are less when considered with initial design and more for retrofit projects

# March 20<sup>th</sup> (3<sup>rd</sup>) Meeting

- Technical Memo #3, Volume & Land Use Comparisons
- Technical Memo #4, Costs
- Post Construction Processes
  - Submittal/Review of plans
  - Maintenance/Inspections
  - Compliance
  - Current NRD cost share program

# March 20<sup>th</sup> Meeting

- Group discussion based on major post construction standard issues
  - Water quality standards applicable to:
  - Exceptions
  - Criteria
  - Maintenance/Inspections
  - Compliance
  - Missing Issues

# March 20<sup>th</sup> Meeting

- Presentation by City of Omaha on their Post Construction Standards
- Omaha standards applicable to:
  - New developments and redevelopments greater than 5,000 square feet
  - Criteria based on first half inch of runoff
  - Maintenance agreement recorded, maintenance responsibility of owner
    - For Sanitary Improvement Districts (SID), Omaha is responsible once SID brought into the City
- Omaha recommended that Lincoln adopt a rate and volume criteria (e.g. Percentile of rainfall events)

# Technical Memo #5

## Water Quality

- List of impaired water bodies
- Antelope Creek Watershed Basin Plan
- Pollutants and pollution sources

# April 17<sup>th</sup> (4<sup>th</sup>) Meeting

## ■ Issues to Discuss Today

### ■ Draft Ordinances

- New Development Standard Criteria, Redevelopment Standard Criteria, Standards applicable to, Exceptions, Waivers, Effective date of ordinance, Requirements for owner inspection of Best Management Practices

### ■ Draft Programs

- Education Program, Training Program, Cost Share Program

### ■ Policies

- Construction/Maintenance
- Compliance

# April 17<sup>th</sup> Meeting

- Discussion of Draft Post Construction Ordinances and Programs
- Discussion Format:
  - Issue
  - Peer group city information
  - Recommendation
  - Polling of Issue
    - Agree, Disagree, I agree if \_\_\_\_\_, Need more information or more discussion

# Water Quality Ordinance

- 1. New Development Standard criteria based on:
  - Other Cities
    - First half inch of runoff (Omaha, St. Paul)
    - Reduction of 85% suspended solids (Wichita)
    - 1.25 inch rain event (Des Moines)
    - BMP Selection based on level of service (Overland Park)
    - 80% reduction suspended solids (Madison)
    - 80% rainfall event (Sioux Falls)
    - Expected EPA criteria is 90% of rainfall event
  - Lincoln Recommendation
    - 1.25 inches of rainfall or less, equivalent to the 90% rainfall event on the 90% storm event (detained over a 40 hour period)

# Water Quality Ordinance

- 2. Redevelopment Standard criteria based on:
  - Other Cities
    - First half inch of runoff (Omaha, St. Paul)
    - Reduction of 85% suspended solids (Wichita)
    - 1.25 inch rain event (Des Moines)
    - BMP Selection based on level of service (Overland Park)
    - 40% reduction suspended solids (Madison)
    - 80% rainfall event (Sioux Falls)
  - Lincoln Recommendation
    - 0.83 inches or less, equivalent to the 80% storm event for Lincoln (detained over a 40 hour period)

# Water Quality Ordinance

- 3. Standards applicable to New Development and Redevelopment for areas equal to or greater than:
  - Other Cities
    - 5,000 Square Feet (Omaha, Madison)
    - 10,890 Square Feet, a quarter of an acre (St. Paul)
    - 20,000 Square Feet (Madison)
    - 43,560 Square Feet, an acre (Wichita, Des Moines, Overland Park)
  - Lincoln Recommendation
    - 43,560 square feet (an acre) or more (for redevelopments this is the area disturbed; e.g. demolition, grading, new impervious area, etc)

# Water Quality Ordinance

## ■ 4. Exceptions:

### ■ Other Cities

- All peer cities have an exception for single family dwellings not part of a new subdivision, or the minimum square footage is high enough to cover the vast majority of single family dwellings

### ■ Lincoln Recommendation

- Single family dwellings not part of a new subdivision

# Water Quality Ordinance

- 5. Waivers:
  - Other Cities
    - Both Des Moines and Sioux Falls allow for waivers
  - Lincoln Recommendation
    - Allow for waivers

# Water Quality Ordinance

- 6. Effective date of ordinance:
  - Other Cities, ordinance not applicable for plans approved within X months of ordinance adoption:
    - Date of ordinance (Des Moines, Madison, Sioux Falls, St. Paul)
    - Within two months of ordinance adoption (Wichita)
    - Within 15 months of ordinance adoption (Overland Park)
    - Within 2 years of ordinance adoption (Omaha)
  - Lincoln Recommendation
    - Effective date of this ordinance is immediate, except for those projects currently in the planning process and that obtain Planning Commission approval within 90 days of ordinance adoption

# Water Quality Ordinance

- 7. Requirements for owner inspection of Best Management Practices:
  - Other Cities, requirements to inspect and submit periodic inspection reports to the City
    - No inspection reports required (Des Moines, St. Paul)
    - Annual inspection reports required (Omaha, Madison, Sioux Falls)
    - Inspection reports required every two years (Wichita, Overland Park)
  - Lincoln Recommendation
    - Owner inspection and inspection report required annually

# Water Quality Program

- A. Education Program
  - Lincoln Recommendation
    - Set up a homeowner education program, e.g.
      - Active email list
      - Email reminders
      - Newsletter
      - Website
      - Landscape contractor/inspector list

# Water Quality Program

- B. Training Program

- Lincoln Recommendation

- Training program for contractors, inspectors, engineers, developers
      - Training opportunities on the many BMP options available to meet Post Construction Standards

# Water Quality Program

- C. Cost Share Program
  - Lincoln Recommendation
    - Cost share program for Best Management Practices that go beyond set standards and for major repair (not maintenance) of Best Management Practices

# Policies

- X. Construction/Maintenance
  - Design, installation, operations and maintenance will be the developers responsibility similar to the manner in which detention ponds and erosion & sediment control are required in order to offset the impact of the development

# Policies

## ■ Y. Compliance

- Compliance program to be similar to current city programs for other private improvements (also similar to other cities)
- In order of preference
  - Work with owners
  - Sureties
  - Do work and assess owner
  - Enforcement through the City's Law Department