

# CLEAN WATER PROGRAM MAYOR'S TASK FORCE MEETING #3

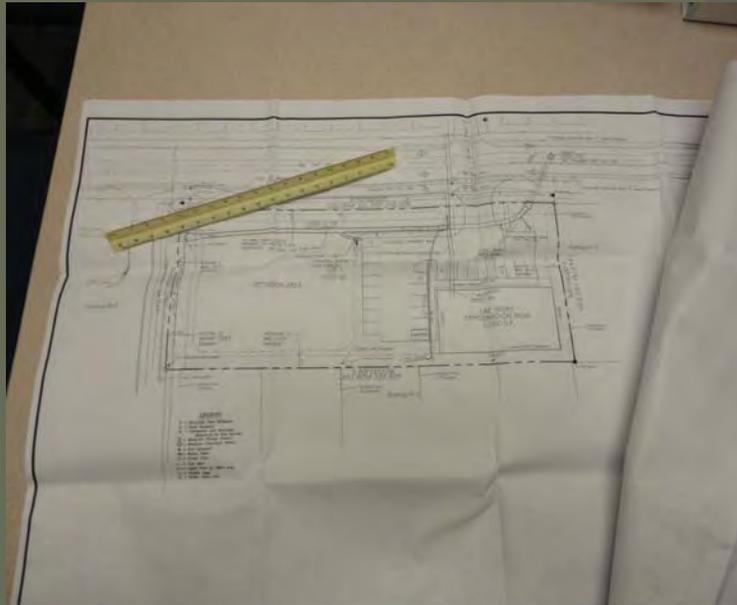


Presented by:  
WSM  
LPSNRD

## HOW LINCOLN STORMWATER QUALITY REQUIREMENTS WOULD WORK

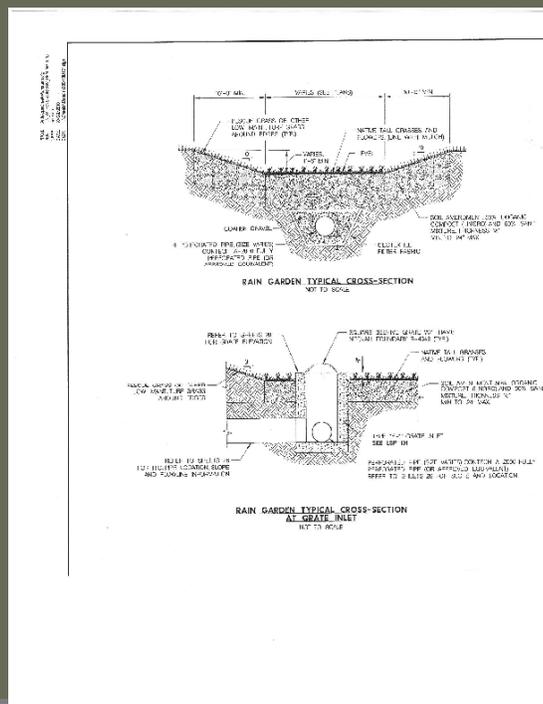


- Developer submits plan



- Water Quality standards required if greater than X square feet (or X acres)
  - New Development
  - Redevelopment
- Cost share considered at concept stage

- Plan reviewed through existing Planning Process
- BMPs reviewed by Watershed Management



- Process similar to existing review for detention ponds
- Plan review done by existing staff
- Surety assessed as with other infrastructure
- Maintenance agreement

- Owner responsibility for maintenance
- Surety for construction and vegetative establishment
- Four-year inspection program by City
- Eventual compliance protocol through Law Department if failure to maintain



# Maintenance Agreement

## Delivery and Storage of Plants

- i. Required watering of stored and permanently installed materials per standard specifications shall be considered incidental to the unit item.

## Plant Establishment Period

- i. CONTRACTOR shall be responsible for maintenance work and care for plants installed during the Plant Establishment Period. The Plant Establishment Period shall be 2 calendar years from the date of final job acceptance.
- ii. Maintenance includes:
  - a. Keeping plant in a healthy growing condition.
  - b. Repairing or replacing, as necessary, mulch and soil amendment.
  - c. Removing all weed growth in and three feet around all mulched areas.
  - d. Furnishing and installing replacement plants as needed, including new mulch and planting soil.

## Acceptance of Work

- i. ENGINEER will inspect the project and notify the contractor of any defects
- ii. CONTRACTOR will replace all defective work immediately on or at the beginning of the next growing season if directed by ENGINEER.
- iii. Only plants with two full growing seasons (June 1- October 1) of care will be subject to acceptance.
- iv. No payment will be made for unacceptable plantings

## Construction Observation (responsibility of developer)



- Completion of BMP Construction

- Built correctly
- Owner contacted as needed



- Establishment of BMP vegetation (1–3 yr)

- Total surety to be released upon establishment



- Follow-up visits by City every X Years
  - Check to see if BMP functional
  - Check for any needed maintenance

J.B. Dixon, Stormwater Specialist, Lower Platte South NRD

## **Maintenance of BMPs**

# Current Trends in Stormwater Maintenance

- Typical elements in successful maintenance programs
  - Ability to track responsible parties
  - Dedicated staff
  - Compliance & enforcement authority
  - Owners aware of their maintenance responsibilities
  - Owner maintenance education program

# Maintenance Program Considerations

- Extent of maintenance task
- Maintenance responsibilities
- Current compliance mechanisms



# Maintenance Program Considerations

- Responsibility for repair vs routine maintenance
- Maintenance compliance, also tracking and verifying



## Maintenance Vs. Repair

An Important Distinction



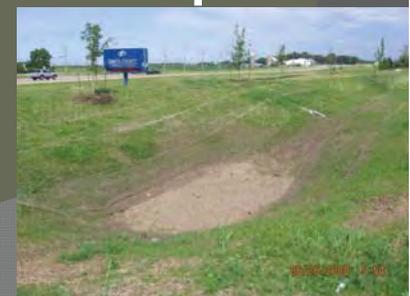
**Needs  
Maintenance**



**Patched But  
Not Fixed**



**Needs  
Repair**



# The Private Maintenance Approach



September 2006

# The Private Maintenance Approach

- Legal & program elements
  - Ordinance
  - Maintenance agreement
  - Easements
  - Compliance tools (performance bond, etc.)
- Typical Funding Mechanisms
  - General Fund
  - Plan review/Inspection fees
  - Maintenance bonds or escrow accounts

# Hybrid Approach: Blend of Public & Private Maintenance

- City/NRD maintenance on Public land and cost-share program for major structural issues on private facilities
- Owners Responsible for:
  - Routine Maintenance
  - Periodic Inspections
  - Reports to the City
- City to have less frequent inspections than owner

**COMPLIANCE**

# Compliance

- Compliance similar to that currently used for detention/retention structures



# Compliance

- Provide periodic education to property owners on inspection and maintenance of Best management Practices
  - Guidance Documents
  - Checklists and/or pre-written inspection forms
  - Operation & Maintenance Plans

# Compliance

- Periodic Compliance Site Visits
  - Initial inspection either:
    - After completion and receipt of as-builts.
    - If not completed correctly:
      - Contact owner and coordinate correction
      - Potential use of surety

# Compliance

- Yearly Inspections during establishment period (2 to 3 years)
  - Inspect for appropriate vegetation and maintenance per Operations & Maintenance Plan
  - If not maintained:
    - Contact owner and coordinate vegetation or maintenance
    - Potential use of surety

# Compliance

## Periodic Paperwork Review

- Check periodically that owner inspection reports are being received
- If not received, contact owner and coordinate

**Bioretention Facility - Inspection and Maintenance Checklist**  
 This inspection report shall be used for all bioretention facilities.  
 Bioretention Facility Name/Number: \_\_\_\_\_ Rainfall Date: \_\_\_\_\_  
 Bioretention Facility Location: \_\_\_\_\_ Time (in hours): \_\_\_\_\_

Party	Inspector: Date #1: Inspector: Name #1:	Maintainer: City/Location:
All other items	Inspector: Date #2: Inspector: Name #2:	Maintainer: City/Location:

Inspection Frequency	Inspection Items:	0 = "yes"	Inspection
	1. <b>Vegetated Filter Strip:</b> Are there any problems with: a. Weeds or volunteer woody vegetation? b. Sedimentation? c. Erosion or gulches?		
	2. <b>Rock Filter Traps:</b> Are there any problems with: a. Crust or layer of fine sediment on the surface of the filter? b. Visible sediment around the rock after using a shovel to remove upper few inches? c. Is water characterized prior to entering the filter strips/tranches?		
	3. Do the trees and shrubs on the side slopes and within basins show signs of stress?		
	4. Is there erosion or gulching of the side slopes?		
	5. Are there any spots >1 sq ft that are barren of vegetation on the side slopes or within the basin?		
	6. Is there undesirable vegetation growth, such as: a. Young, volunteer trees or shrubs? b. Invasive species on point slopes? c. Weeds in mulched areas? d. Invasive aquatic species?		
	7. For bio-retention, is the height of the vegetation grass enough to impede flow? a. Is there trash or debris within the basin or on the side slopes?		
	8. Does sediment depth measure more than 2" in depth over 25% or more of the basin? Bioretention areas should be inspected for sand build-up on the surface following the raining time.		
	9. Is there standing water in the basin more than 48 hours after a rainfall event due to sediment crust on top of the bioretention soil?		

Inspection Frequency Legend  
 0 = Inspected in an Exact Basin (as indicated by the owner)  
 1 = Inspect yearly  
 2 = Inspect every 2 years  
 3 = Inspect every 3 years  
 4 = Inspect every 4 years  
 5 = Inspect every 5 years

# Compliance

## Periodic Inspections by City/NRD Staff

- Current inspection period for detention/retention structures is every four years
- Check maintenance per Operation & Maintenance Plan
- If not maintained:
  - Contact owner & coordinate maintenance
  - Do work and assess owner
  - Fines/Liens

## Costs

## Costs

- Two Current Examples Specific to Lincoln
  - Stevens Creek Master Plan
    - \$210/acre cost to incorporate Best Management Practices
  - Olsson Associates Report
    - \$150 to \$570/acre

# Costs

- Cost Appropriation
  - Cost for offsetting impacts of urban development historically have been the burden of the developer
- Cost-share
  - Current Urban Water Quality BMP Cost-Share program with LPSNRD
  - Current case-by-case cost-share with the City

# Post Construction Stormwater Management



City of Omaha - 2010



Post Construction Stormwater Management

## Ordinances & PCSMP

### Ordinances:

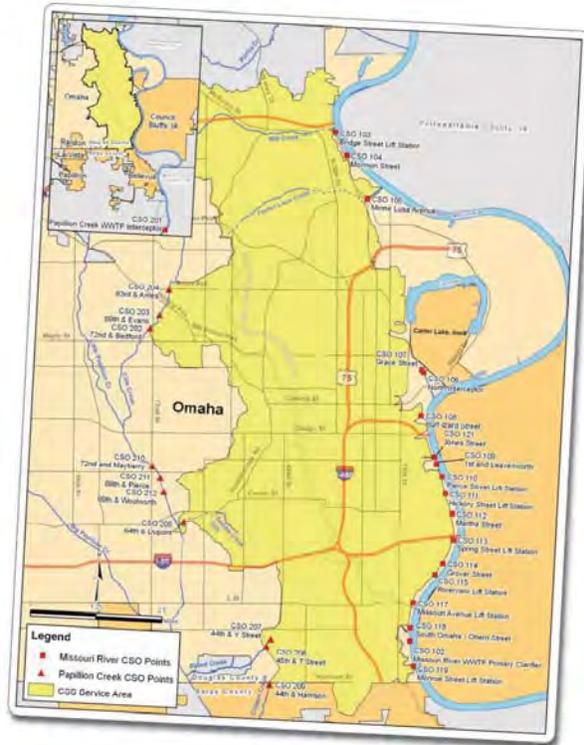
#### *Chapter 32 – Stormwater Management Ordinance*

- Article V. Post Construction Stormwater Management
- Article VII. Papillion Creek Watershed



# Two Stormwater Permits

- **MS4 Permit**
- **CSO Permit**



City of Omaha - 2010



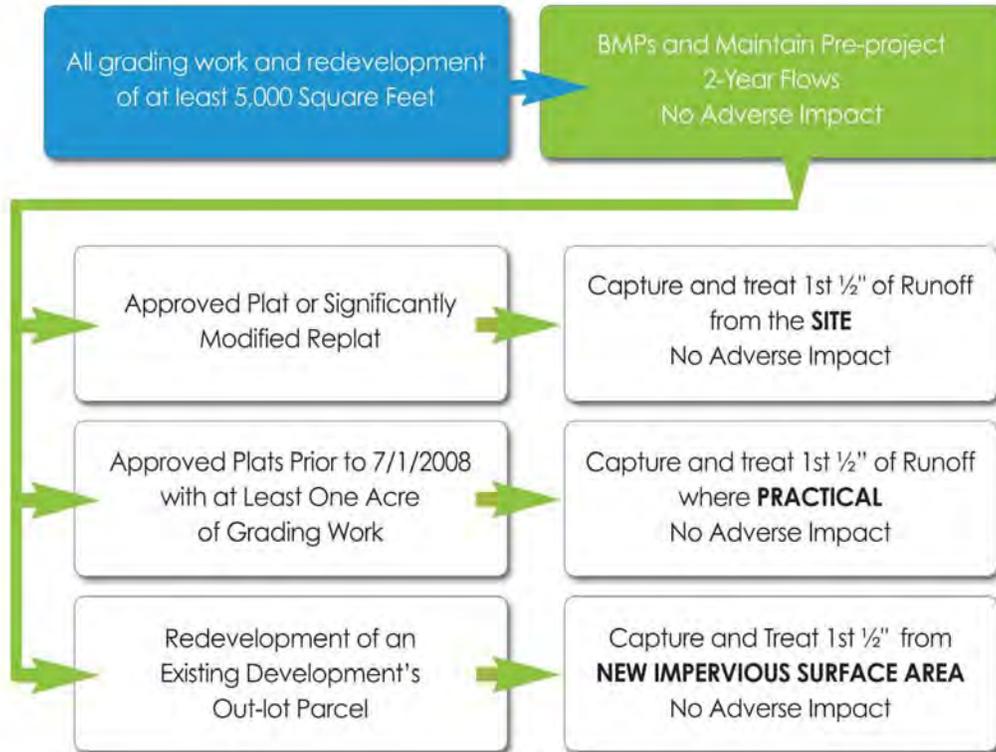
# Different Requirements

## **CSO Permit Area**

Treat the first 1/2", and maintain 2-, 10- and 100-year pre-project runoff conditions

## **MS4 Permit Area**

Treat the first 1/2", maintain the 2-year pre-project runoff and **“No Adverse Impact”**



## Documentation



[www.omahastormwater.org](http://www.omahastormwater.org)

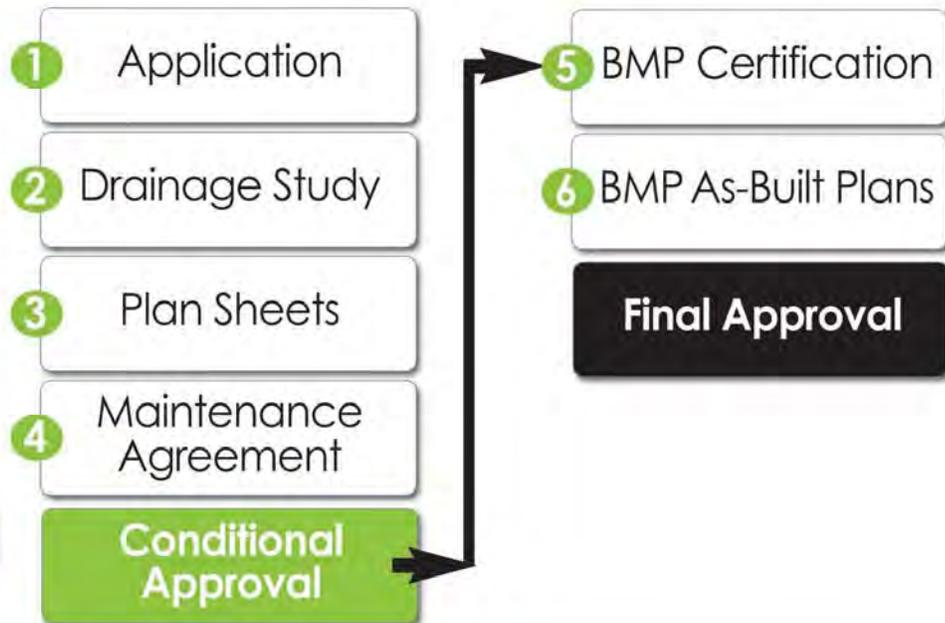
PCSMP Guidance Document Updated March 2010

[www.papiopartnership.org](http://www.papiopartnership.org)





# Submittal Process



# BMPs

In Order Of Preference





# Infiltration

(rain gardens, swales, green space)



Orchard Park • 66th & Hartman Avenue



- Sod on fill does not count
- If using green space, **test permeability of soil!**





# Water Quality Detention

(24 – 40 hour drawdown)

Rockbrook  
Shopping Center

108th & Center

Photo courtesy of  
Lamp Ryneason and  
Associates



# Green Roof

Gallup Building

Photo courtesy of Kent  
Holm, Douglas County  
Environmental Services





# Pervious Pavement/Pavers

Zorinsky Lake  
Aquatic Center

3808 So. 156th St



City of Omaha - 2010



# Subsurface Storage

Stormtech System  
at UNMC

Photo courtesy of  
Dan Slavin with ADS



City of Omaha - 2010



# Hydrodynamic Separators

Bayseparator  
Installation At  
Aksarben Village

Photo courtesy of  
Dan Slavin with ADS



City of Omaha - 2010



# Inlet Filters



City of Omaha - 2010



## ***General Design Guidelines:***

- **Omaha Regional Stormwater Design Manual**
  - *Chapter 8, Stormwater Best Management Practices (Update – Summer 2012)*



## ***General Design FAQ's:***

- **Hydrodynamic Separator:** 80% TSS removal efficiency
- **Water Quality Basin:** 24 – 40 Hour Drawdown
- **Bioretention/Rain Garden:** “Bioretention Gardens” by Ted Hartsig and Steven Rodie
- **Rate based BMP's:** 1.5 cfs/acre ( $t_c < 10$  min)





## ***General Design FAQ's:***

- **Void Space Available for Storage:**
  - Rock – 40% of total volume
  - Conditioned Soil – 20% of total volume



## ***Remember Long Term Maintenance!***

- Maintenance agreement and easement is a recorded document
- Maintenance is responsibility of owner – don't make it difficult
- City of Omaha has authority to charge owners for maintenance costs



# Questions?

