Working Towards Better Private SMP Maintenance:

Lessons Learned in Philadelphia

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Overview

1. Inspection and Enforcement Program
2. Enforcement Successes
3. Maintenance Limitations
4. Lessons Learned
Private Post-Construction Maintenance Inspection Program

- Private SMP Program - Industrial, Commercial, Residential
- Philadelphia Water Department (PWD) Private site stormwater regulations since 2006
- Completed projects are inspected by PWD once every 4 years
- Stormwater Credits Incentives
- Grant-Funding Program
- Over 1000 Total Complete and Verified Private Project Sites
  - Includes ~2400 Total SMPs

Philadelphia consists of 142.7 sq mi including 7 watersheds
Complete/Verified Private SMPs in Philadelphia

- Subsurface Basin: 1114 (46%)
- Surface/Bio-Infiltration/Bio-Retention: 432 (18%)
- Porous Pavement: 360 (15%)
- Disconnections: 260 (11%)
- Green Roof: 173 (7%)
- WQ Treatment Device: 47 (2%)
- Cistern: 14 (1%)
- Blue Roof: 6 (0%)
Private Post-Construction Inspection & Enforcement Program

- Routine Inspection Conducted by PWD
- Post-Construction Inspection Report
  - Maintenance Conducted by Property Owner
  - Re-inspection Conducted by PWD
  - Compliant Letter
    - Compliant
    - Re-compliant

10 Days
60 Days
Private Post-Construction Inspection & Enforcement Program

1. Routine Inspection Conducted by PWD
   - Non-Compliant
      - Post-Construction Inspection Report
        - Maintenance Conducted by Property Owner
          - Compliant
            - Compliant Letter
              - Compliant
2. Pre-Enforcement Letter (PEL)
   - Maintenance Conducted by Property Owner
   - Resistant to Complete Required Actions
     - Notice of Violation (NOV)
6. Notice of Violation (NOV)
   - Maintenance Conducted by Property Owner
     - Re-inspection Conducted by PWD
6. Re-inspection Conducted by PWD
   - Re-inspection Conducted by PWD
   - Referral to Enforcement
     - Non-Compliant
5. Post-Construction Inspection Report
   - Maintenance Conducted by Property Owner
     - Pre-Enforcement Letter (PEL)
   - Unresponsive
4. Routine Inspection Conducted by PWD
   - Non-Compliant
Closed Enforcement Projects: SMP Type

- Subsurface Basin: 66%
- Porous Pavement: 6%
- Surface/Bio-Infiltration/Bio-Retention: 23%
- Green Roof: 1%
- Disconnection: 1%
- Cistern: 0%
- WQ Treatment Device: 3%

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Length of Enforcement for SMPs in Closed Status

- **Surface/Bio-Infiltration/Bio-Retention**
- **WQ Treatment Device**
- **Cistern**
- **Disconnection**
- **Porous Pavement**
- **Green Roof**
- **Subsurface Basin**
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Typical Enforcement: Subsurface Components
Typical Enforcement: Porous Pavement Vacuum Cleaning

Before Enforcement

After Enforcement
Case Study 1: Retrofit Success

Subsurface Infiltration Basin Area
Case Study 1: Retrofit Success

- Trap Box Manhole
- Permanent standing water observed in trap box
- Upstream outlet structure water elevation permanently at top of weir
Case Study 1: Retrofit Success

- Infiltration basin converted into detention basin
- Low flow orifice installed on weir wall
- Proper traps in place in trap box
- Basin can now be effectively maintained
- Basin once again meeting water quality regulations
Case Study 2: Unapproved Conveyance

- Subsurface Infiltration Basin with arched chambers
- DMH-4: Pretreatment manhole for building’s roof drainage
Case Study 2: Unapproved Conveyance

- Unknown sheen observed in manhole – referred to PWD Industrial Waste Unit for sampling
- Outlet pipe missing trap/hood
- Sampling determined sanitary waste was being incorrectly plumbed to Manhole DMH-4/stormwater basin

Interior of Manhole DMH-4
Case Study 2: Unapproved Conveyance

Manhole DMH-4 vacuum cleaned

Hood installed over outlet pipe
Case Study 2: Unapproved Conveyance

Left: Capping of existing/incorrect sanitary plumbing to stormwater system

Above: Redirecting sanitary plumbing to on-site sanitary sewer
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Maintenance Limitation Categories by SMP Type

- Lack of Cleanout Access
- Requires Special Maintenance Techniques
- Covered or Sealed Components
- Inaccessible for Maintenance Vehicles
- Heavily Trafficked
- Overgrown Vegetation

- Subsurface Basin
- Surface/Bio-Infiltration/Bio-Retention
- Green Roof
- Porous Pavement
- Disconnection
- Cistern
Case Study 4: Lack of Cleanout Access
Case Study 4: Lack of Cleanout Access

- SUBSURFACE BASIN
- ACCESSIBLE PIPE RUN
- INACCESSIBLE PIPE RUN
- INLET
- MANHOLE
- OUTLET STRUCTURE
Case Study 5: Covered or Sealed Components
Case Study 5: Covered or Sealed Components

BURIED EXISTING JUNCTION MANHOLE
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Lessons Learned

• Guidance manual updates facilitate better design to eliminate maintenance limitations for future projects
Lessons Learned

- Standardized terminology results in safer and more effective maintenance activities
- Post-con SMP inspection reports reduce enforcement referral
Lessons Learned

• Educational visits increase SMP awareness and maintenance frequency

• Maintenance guides to assist property owners and maintenance providers
QUESTIONS OR COMMENTS?