Most Common Stormwater Control Measures (SCMs)

Select your SCM(s) below to learn more.

• Detention (dry) & Retention (wet) Ponds (Quantity Credits)
• Dry & Wet Extended Detention Ponds (Quantity & Quality Credits)
• Underground Detention Systems (Quantity and/or Quality Credits)
• Bioretention Cells (Quality Credits)
• Porous/Permeable Pavement (Quantity and/or Quality, and Reduction in Impervious Surface Credits)

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Detention & Retention Ponds
(Quantity Credit)

Find the full maintenance manual at neorsd.org/scm

Description for this SCM: Page #9
Maintenance plan for this SCM: Page #33
Inspection checklist/form: Appendix 2, page 49
Examples of Detention Ponds
Detention Pond Design Features

- Completely drains between rain events
- Inlets: pipes and open swales
- Main pool/storage volume area
- Outlet structure and orifices (typically 2-stage)
- Emergency spillway & outlet pipe
Ensure inlet pipes and open swales are structurally intact and free of any obstructions.
Ensure the main pool and storage volume is not filled with excessive accumulations of sediment. Vegetative growth within the basin is generally not a problem, although it can serve as a breeding ground for mosquitoes.
Ensure the outlet structure (typically 2 stages) is structurally intact & the orifices are free of blockages. Remove vegetative growth in the immediate area of the orifices.
Ensure the emergency spillway & outlet pipe are structurally intact and free of blockages.

Emergency spillway (often made of stone or grass-lined)
Examples of Retention Ponds
Retention Pond Design Features

• The water level fluctuates during significant rain events, but a permanent pool remains
• Inlets: pipes and open swales
• Main pool/storage volume area
• Outlet structure and orifices (typically 2-stage)
• Emergency spillway & outlet pipe
Ensure inlet pipes and open swales are structurally intact and free of any obstructions.
Ensure the main pool and storage volume is not filled with excessive accumulations of sediment. Dredging is warranted when islands begin to form above the normal waterline. Vegetative growth within the basin is generally not a problem, although it can serve as a breeding ground for mosquitos.
Ensure the outlet structure (typically 2 stages) is structurally intact & the orifices are free of blockages. Remove vegetative growth in the immediate area of the orifices.
Ensure the emergency spillway & outlet pipe are structurally intact and free of blockages.
Dry & Wet Extended Detention Ponds

Find the full maintenance manual at neorsd.org/scm

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Examples of Dry Extended Detention Ponds
Dry Extended Detention Pond
Design Features

- Completely drains between rain events, but often have a forebay at the base of each inlet and a micropool at the outlet, both of which have a permanent pool of water.
- Inlets: pipes and open swales
- Forebays and micropools
- Outlet structure and orifices (typically 3-stage)
- Emergency spillway & outlet pipe
Ensure inlet pipes and open swales are structurally intact and free of any obstructions.
Ensure the forebay(s) and the micropool are not filled with excessive accumulations of sediment. Vegetative growth within the basin is generally not a problem, although it can serve as a breeding ground for mosquitoes.
Ensure the outlet structure (typically 3 stages) is structurally intact & the orifices are free of blockages. Remove vegetative growth in the immediate area of the orifices. The Stage 1 orifice is typically less than 3-inches in diameter and is usually fitted with an anti-clog device. It is often found on the inside of the outlet structure.
These details show commonly utilized outlet structures for dry and wet extended detention basins, including the anti-clog mechanism for the smallest orifice (Stage 1…a 6-inch pipe with smaller hole drilled into cap). The right side detail shows the setup for an interior weir wall.
Examples of anti-clog devices protecting the stage 1 orifice.
Ensure the emergency spillway & outlet pipe are structurally intact and free of blockages.
Examples of Wet Extended Detention Ponds
Wet Extended Detention Pond Design Features

- The water level fluctuates during significant rain events, but a permanent pool remains. An optional forebay may be located at the base of each inlet pipe.
- Inlets: pipes and open swales
- Main pool/storage volume area
- Outlet structure and orifices (typically 3-stage)
- Emergency spillway & outlet pipe
Ensure inlet pipes and open swales are structurally intact and free of any obstructions.
Ensure the forebays are not filled with excessive accumulations of sediment. Vegetative growth within the basin is generally not a problem.
Ensure the outlet structure (typically 3 stages, but not always) is structurally intact & the orifices are free of blockages. Remove vegetative growth in the immediate area of the orifices. The Stage 1 orifice is typically less than 3-inches in diameter and is usually fitted with an anti-clog device. It is often found on the inside of the outlet structure.
These details show commonly utilized outlet structures for dry and wet extended detention basins, including the anti-clog mechanism for the smallest orifice (i.e., Stage 1…a 6-inch pipe with smaller hole drilled into cap). The right side detail shows the setup for an interior weir wall.
Examples of anti-clog devices protecting the stage 1 orifice.

- Common setup outside the outlet structure (gravel covering a perforated pipe)
- Common setup inside the outlet structure (stage 1 orifice is drilled into the cap on a pipe)
- A “hood” protects the small (<3”) stage 1 orifice from getting clogged with floating debris
- A downturned elbow prevents floating debris from blocking the stage 1 orifice
Ensure the emergency spillway & outlet pipe are structurally intact and free of blockages.
Underground Detention Systems

Find the full maintenance manual at neorsd.org/scm

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Examples of Underground Detention Systems
Underground Detention Design Features

• Isolator row with diverter (optional)
• Main pool/storage volume area (chambers or pipes)
• Outlet structure and orifices (typically multi-stage)
Runoff can first enter an isolator row (if present), which is a portion of the system completely wrapped in filter fabric. It is designed to capture the bulk of sediments entering the system. A weir wall typically diverts flow into the isolator row. Ensure the weir wall is structurally sound and that accumulated sediments are removed on a regular basis.
Ensure the isolator row (if present), chambers and storage volume are not filled with excessive accumulations of sediment.
Ensure the outlet structure (typically multi-stage) is structurally intact & any orifices on the weir wall are free of blockages.
Bioretention Cells

Find the full maintenance manual at neorsd.org/scm

Description for this SCM: Page #7
Maintenance plan for this SCM: Page #32
Inspection checklist/form: Appendix 2, page 49
Examples of Bioretention Cells
Bioretention Cell Design

Features

• Pre-treatment (optional)
• Inlets: pipes and open swales
• Planting/infiltration bed (main storage volume area)
• Overflow/outlet structure and underdrains
Ensure the pre-treatment design feature is structurally intact and not clogged with sediment.

A gravel verge is often used with curb cuts.

A grass filter

Catch basin inserts are often used on storm sewers that discharge directly into a bioretention cell.
Ensure there is no erosion occurring at the base of inlets (curb cuts and storm sewers).
The planting/infiltration bed: ensure the mulch layer is replenished as needed (maintain a 2-3 inch layer), and ensure dead, dying or diseased plants are removed to allow healthy plants to thrive.
The planting/infiltration bed: standing water 24-hours after the rain has stopped is an indication the top layer of soil needs to be removed and replaced (clogged from accumulation of sediments).

Note the eroding in-flow channel, which can clog the bed with sediment.
Ensure overflow structure outlet joints are properly sealed and free of blockages. Also ensure the underdrains, including cleanout ports, are free of any blockages.

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Porous/Permeable Pavement

Find the full maintenance manual at neorsd.org/scm

Description for this SCM: Page #15
Maintenance plan for this SCM: Page #35
Inspection checklist/form: Appendix 2, page 49
Examples of Permeable Pavement Systems

- Grass Pavers
- Permeable Pavers
- Porous Asphalt
- Porous Concrete
Porous/Permeable Pavement Design Features

• Permeable surface (e.g., concrete, asphalt, pavers, etc.)
• Bedding layer (typically pea gravel)
• Choker layer (commonly comprised of driveway gravel)
• Reservoir layer (comprised of larger stone, with or without underdrains)
Ensure the top permeable surface is kept clean throughout the year to prevent clogging of the pores on concrete & asphalt, or the gaps between paver blocks.
Although not visible on a completed project, the bedding layer and/or the choker layer (“open-graded base reservoir”) can become clogged with sediments as well.
Ensure the underdrains (if present) are free of any blockages. Underdrains typically terminate at a storm drain catch basin, where they can be observed. Observation ports (cleanouts) may be present to monitor water levels on systems that are designed to infiltrate water into the underlying soils.