

ETOBICOKE WATERFRONT STORMWATER MANAGEMENT FACILITIES STUDY

Stormwater Management Methods: End-of-Pipe (EOP) Controls

WET POND



Description

Wet ponds are constructed detention basins designed to capture and treat stormwater runoff through gravitational setting until it is displaced by runoff from the next storm. They maintain a permanent pool of water throughout the year, which allows for pollutants to settle. Aquatic plants, algae and bacteria in the water help to consume the pollutants carried by the stormwater.

Features

- Sloped edges, landscaped
- Can be easily designed to incorporate landscaping and recreational amenities
- Recreational amenities, such as walking trail, benches, lookout can be incorporated

Operation & Maintenance *

Wet ponds are typically inspected each year for damage, amount of sediment, proper operation of inlet and outlet structures, repair of eroded areas as needed and cleared of debris. Normally sediments are removed every 10 to 20 years.

Implementation Considerations

- Blends in with natural environment
- Attractive to wildlife habitat
- Very cost-effective
- Relatively low capital cost
- Relatively low operation and maintenance costs
- Requires large space
- Maintenance activities may cause habitat disruption

Level of pollutant removal

- Total Suspended Solids** - High
- E.Coli*** - High

CONSTRUCTED WETLAND



Description

Constructed wetlands are constructed shallow marsh systems. The depth of water is typically less than 300 mm. As stormwater runoff flows through the wetland facility, the wetland helps to remove pollutants by allowing them to settle and be removed by wetland plants. A continuous flow of water is needed for the aquatic plants.

Features

- Sloped edges, landscaped
- Can be easily designed to incorporate landscaping and recreational amenities
- Recreational amenities, such as walking trail, benches, and lookout can be incorporated

Operation & Maintenance

Similar to wet pond, wetland vegetation must be monitored and replaced as necessary.

Implementation Considerations

- Blends in with natural environment
- Attractive to wildlife habitat
- Very cost-effective
- Relatively low capital cost
- Relatively low operation and maintenance costs
- Requires large space (more than wet pond)
- Maintenance activities may cause habitat disruption

Level of pollutant removal

- Total Suspended Solids - High
- E.Coli - High

* The general practice for operations & maintenance (O&M) are outlined above. Each constructed facility will have a specific O&M schedule.

** Total Suspended Solids: A measure of the solid particles mixed in water.

*** E-coli: (Escherichia coli) is a bacteria and indicator organism used in water quality testing.

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HYBRID POND/WETLAND



Description

This system consists of both a wet pond and constructed wetland. The wet pond traps sediments and slows runoff before stormwater enters the wetland where it receives additional treatment.

Features

- Sloped edges, landscaped
- Can be easily designed to incorporate landscaping and recreational amenities.
- Recreational amenities, such as walking trail, benches, and lookout can be incorporated.

Operation & Maintenance

See constructed wetland.

Implementation Considerations

- Easily blends in natural environment
- Attracts wildlife habitat
- Relatively medium capital cost
- Relatively medium operation and maintenance costs
- Needs large space (in between wet pond and wetland)
- Maintenance activities may cause habitat disruption
- Needs continuous baseflow for viable wetland

Level of pollutant removal

- Total Suspended Solids – High
- E.Coli – High

FLOW BALANCING SYSTEM



Description

Located in a body of water such as a Lake, a flow balancing system takes stormwater through a series of cells made up of screen-like curtains suspended from floating pontoons. The curtains cause sediment and pollutants to settle to the bottom of the cells improving water quality.

Features

- Edges may be landscaped
- Incorporate aquatic plants to improve treatment
- Can be designed to incorporate landscaping and recreational amenities including walking trail

Operation & Maintenance

Flow balancing systems are typically inspected each year for damage, sediment accumulation, and proper operation of inlet and outlet structures. The floating pontoons and curtains are also inspected for needed repairs. Normally sediments are removed every 10 to 20 years.

Implementation Considerations

- No loss of land
- Requires an open body of water that is sheltered at least on two sides
- Can be costly to construct if the body of water is unsheltered
- Can impact aquatic habitat

Level of pollutant removal

- Total Suspended Solids – High
- E.Coli – High

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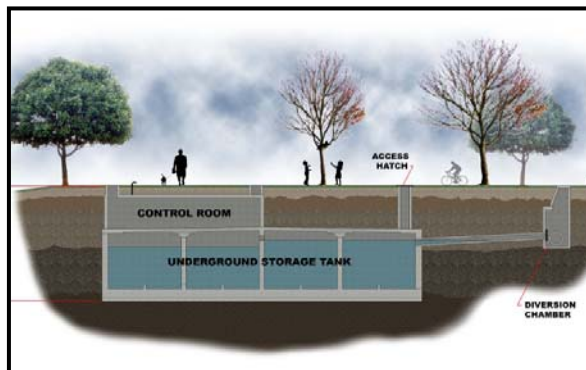
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UNDERGROUND STORAGE TANK



Description

An underground storage facility provides for the temporary storage of stormwater. Water then slowly drains out to the storm sewer after the storm when there is capacity in the sewer system.

Features

- Tank is located entirely below ground.
- Can have a permanent pool of water inside the structure
- A flushing system may be installed within the tank to remove sediments that settle to the bottom
- Pump equipment may also be installed to help remove sediment

Operation & Maintenance

Underground tanks are typically inspected every year and cleaned as needed.

Implementation Considerations

- Because they are built underground, these facilities provide minimal social/environmental impacts except for short term disturbances during construction
- Once constructed, surface can be utilized
- Costly to construct
- Medium to high operation and maintenance costs

Level of pollutant removal

- Total Suspended Solids – Medium to High
- E.Coli – Vary

VERTICAL STORAGE SHAFT



Description

An underground deep storage structure that stores and treats stormwater. Pollutant removal is achieved through settling.

Features

- Tank is located entirely below ground
- A flushing system and pump equipment are required to remove sediments that settle to the bottom

Operation & Maintenance

Vertical storage shafts are typically inspected each year and cleaned as needed.

Implementation Considerations

- Because they are built underground, these facilities provide minimal social/environmental impacts except for short term disturbances during construction
- May require less land than an underground tank
- Costly to construct
- High operation and maintenance costs

Level of pollutant removal

- Total Suspended Solids – Medium to High
- E.Coli – Vary

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OIL/GRIT SEPARATOR



Description

An underground structure designed to remove solids, oil and grease and other debris from stormwater through gravitational settling and trapping of pollutants.

Features

- Structure is located entirely below ground
- Permanent pool of water inside the structure

Operation & Maintenance

Oil/grit separators are typically inspected every six months for sediment accumulation, oil and grease, and other floatables. They are cleaned as needed.

Implementation Considerations

- Because they are built underground, these facilities provide minimal social/environmental impacts except for short term disturbances during construction
- Suitable for space constrained areas
- Frequent maintenance required
- Suitable for small drainage area only

Level of pollutant removal

- Depends on design and frequency of maintenance

HIGH RATE TREATMENT



Description

A technology that has the capability to treat stormwater or combined sewer overflow quickly through the use of chemicals that assist in settling.

Features

- Technology can be housed in an above or underground building
- Requires pump equipment and chemical supply

Operation & Maintenance

High rate treatment facilities are typically inspected monthly. Maintenance of pump equipment is performed, as well as ensuring adequate chemical supplies and delivery system as needed.

Implementation Considerations

- Costly to construct
- High operation and maintenance costs
- Require special skill to handle chemicals

Level of pollutant removal

- Total Suspended Solids - High
- E.Coli - Medium to High

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