

PREPARING FOR AND PASSING THE ANNUAL OR PRE-OCCUPANCY STORMWATER SYSTEM INSPECTION

OUR MISSION

Inspire change by preserving
and protecting our most precious
natural resource: water





Annual Stormwater System Inspections are required for EVERY stormwater system. The Inspection consists of a comprehensive review of all aspects of your stormwater management program and confirms to your local regulatory body that your stormwater system is well maintained, and functions as designed.

Pre-Occupancy Inspections take place at the time of transition from the general contractor to the property owner. Commonly called Key Turnover Inspections, this Inspection guarantees that the stormwater system being delivered by your general contractor is equivalent to or better than the stormwater system that was originally designed.

Both Inspection services deliver a comprehensive report, a site plan markup, and photo documentation of existing conditions.

Inspections in the stormwater management industry serve to confirm that the stormwater management system is functioning as designed. Inspections typically fall into two areas:

The pre-occupancy, also known as, key turnover or notice of termination (NOT), inspection is for the benefit of the property owner or manager, and is conducted at the time of transition from the general contractor, who constructed the structure and site plan, to the property owner. This can occur the day of and up to one year after, the complete construction of the site. This inspection examines the operation of the system and creates a “punch list” for the general contractor to complete prior to the property owner assuming responsibility for the stormwater system. In many instances, a property owner will hire a stormwater management company, like AQUALIS, to conduct the inspection on their behalf. Furthermore, this becomes even more beneficial when the same company is also going to be managing the stormwater system. The pre-occupancy inspection report is typically submitted to the property owner.

The annual inspection is conducted to support federal, state, and local regulations requiring that the stormwater system continue to be operated as designed. A certified stormwater inspector examines all facets of the stormwater system and develops action plans in the event of system failure due to improper maintenance that will require either rehabilitative or restorative repairs. The annual inspection report is typically submitted to the local regulatory body.

This whitepaper will discuss both types of inspections in detail. For the annual inspections, this document will focus on the necessary steps, for each SCM type, to pass the annual stormwater inspection.

Pre-Occupancy / Notice of Termination (NOT) Inspections

As noted, the pre-occupancy, or pre-NOT inspection, is the transition between the design and construction phases of a site, to the post-construction operation of a site. It is the turnover from the contractor to the owner.

Typically, the Construction Project Manager organizes a Pre-NOT inspection onsite and the Inspection Participants should include:

- Owner or a representative (often a Stormwater Maintenance Contractor like AQUALIS)
- General Contractor
- Engineer of Record
- Third Party Inspector

The construction Project Manager prepares and submits a Pre-NOT Inspection report based upon inspection findings. At the same time, the owner or their representative (AQUALIS) documents the existing conditions of the facility with photos and inspection checklists. The checklist and any deficiencies within the system are provided to the General Contractor, and the General Contractor then performs the outstanding punch-list tasks identified in the inspection. This must be completed in order to file the Notice of Termination (terminating the NPDES permit and beginning the post-construction phase of the site stormwater management). Upon NOT filing and acceptance, the owner is then responsible for the maintenance of the stormwater system, and in most instances contracts with a specialized stormwater management contractor, such as AQUALIS. The purpose of the “turnover” meeting is twofold:

- To ensure compliance of the site, by the General Contractor, in order to file NOT and terminate NPDES coverage
- Owner and Stormwater Maintenance Contractor acceptance of site

After the assumption of the site by the owner, post-construction stormwater management commences, with subsequent annual inspections.





Annual Inspection - SCM Specific Inspection Areas

Stormwater Control Measures (SCMs), are engineered systems designed to limit the damaging effects of stormwater runoff that results from increased land development. SCMs are designed to maintain or improve the pre-developed conditions for water quality and quantity downstream of a property. An SCM is designed to improve water quality, reduce downstream flooding and erosion, and promote groundwater recharge. SCMs can also be an aesthetic asset to a property. In order to provide quality and quantity benefits to a watershed, a system is engineered to perform based on the needs of the site, or watershed.

There are multiple types of SCMs implemented to satisfy the needs of a site. Successfully passing a stormwater inspection requires that your system and its SCM(s) are performing as originally designed. Inspectors will look for several elements specific to each SCM that will tell them if the system is working. Understanding and being aware of these elements is critical to passing the inspection.

Bioretention System

A Bioretention System is an engineered system typically designed with beneficial plants and an engineered media designed to assist in pollutant removal by filtering pollutants suspended in the stormwater while promoting nutrient uptake.

How it works

A depression is constructed in the landscape with an underground soil media designed to support a variety of vegetation. Stormwater filters through the soil media and commonly exits through an underdrain. This process is known as exfiltration and effectively removes sediment, heavy metals, nutrients, etc.

Inspection Checklist

- Excess sediment removal from inlet areas
- Remove trash and debris
- Replace deceased or dying plants with new healthy ones
- Removed seasonal weeds and other invasive vegetation
- Inspect underdrain and jet the lines if necessary
- Freshen up top mulch layer and ensure there is at least 3” of depth throughout
- Ensure good coverage of vegetation on side slopes of basin
- Collect all maintenance records to be presented with the inspection.
- If your system is not currently maintained by a trained and qualified company, contact AQUALIS to secure a maintenance plan quickly to ensure compliance.





Wet Detention Basin (Retention Pond, Wet Pond)

A Wet Detention Basin is a vegetated system designed to hold a permanent volume of water with additional storage capacity during and immediately following a rain event.

How it works

Stormwater is collected by the Wet Detention Basin and mixes with the permanent pool of water, which dilutes runoff from storm events. Pollutants are removed by settling of sediment particles and consumption by plants. Stormwater is released over a period of a few days, depending on the specific rain accumulation.

Inspection Checklist

- Ensure access to the stormwater facility
- Cut all vegetation around the slopes of the basin to a height of 4-6"
- Remove trash and debris from the water
- Remove debris from Low-Flow orifice at the riser to ensure proper holding elevations in the basin
- Cut down all woody vegetation on the dam slope
- Remove sediment accumulation from the inlets to the basin
- Cut all vegetation, clean up trash, and remove sediment at the Discharge
- Treat any algae or invasive species with approved aquatic herbicide
- Ensure good coverage of vegetation on side slopes of basin
- Check sediment levels in the forebay and holding areas of the basin
- Collect all maintenance records to be presented with the inspection.
- If your system is not currently maintained by a trained and qualified company, contact AQUALIS to get a maintenance plan in place quickly to ensure compliance.

Dry Detention Basin (Dry Pond)

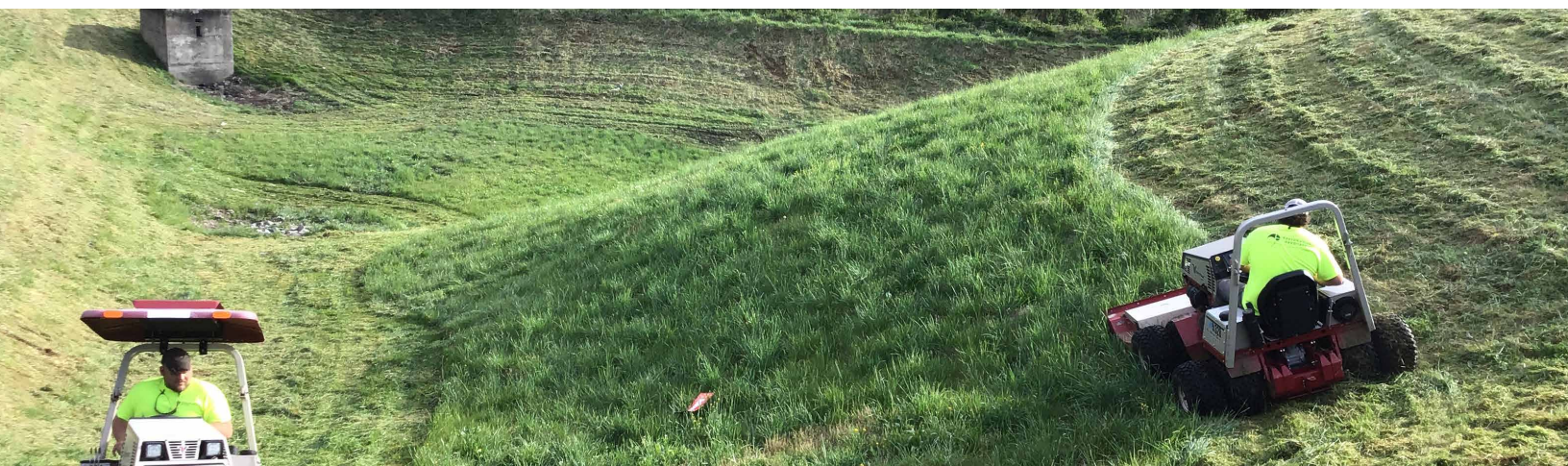
A Dry Detention Basin is a vegetated system designed to hold a volume of water only during and up to 48-hours after a rain event.

How it works

Stormwater enters a vegetated basin and discharges at a designed rate from an outlet control structure. Pollutants are removed by settling of sediment particles and consumption by plants. Infiltration is limited with this designed stormwater management system.

Inspection Checklist

- Ensure access to the stormwater facility
- Cut all vegetation throughout the basin to a height of 4-6”
- Remove trash and debris from entire area
- Remove debris from Low-Flow orifice at the riser to ensure proper function of the outlet device
- Cut down all woody vegetation on the dam slope
- Remove sediment accumulation from the inlets to the basin
- Cut all vegetation, clean up trash, and remove sediment at the Discharge
- Treat any invasive species with aquatic herbicide
- Ensure good coverage of vegetation on side slopes of the basin
- Check sediment levels in the forebay and holding areas of the basin, if applicable.
- Collect all maintenance records to be presented with the inspection.
- If your system is not currently maintained by a trained and qualified company, contact AQUALIS to get a maintenance plan in place quickly to ensure compliance.





Swale

A Swale is a channel typically vegetated or constructed with non-erodible materials and designed to facilitate drainage while promoting infiltration.

How it works

Stormwater daylights from a pipe or flume and drains across a vegetated or rock-lined channel which dissipates energy and promotes infiltration. Swales have a holding capacity during rain events and achieve a small credit for water quality.

Inspection Checklist

- Cut all vegetation around the slopes of the basin to a height of 4-6", where applicable
- Remove trash and debris
- Replace displaced energy dissipation
- Remove sediment accumulation from the inlets to the basin
- Cut all vegetation, clean up trash, and remove sediment at the Discharge
- Treat any invasive species with aquatic herbicide
- Ensure good coverage of vegetation on side slopes and channel bottom
- Check sediment levels throughout
- Collect all maintenance records to be presented with the inspection.
- If your system is not currently maintained by a trained and qualified company, contact AQUALIS to secure a maintenance plan quickly to ensure compliance.

Infiltration System

An Infiltration system is a vegetated system designed with highly permeable soils. The system fills with stormwater and water then exits by infiltrating into the soil.

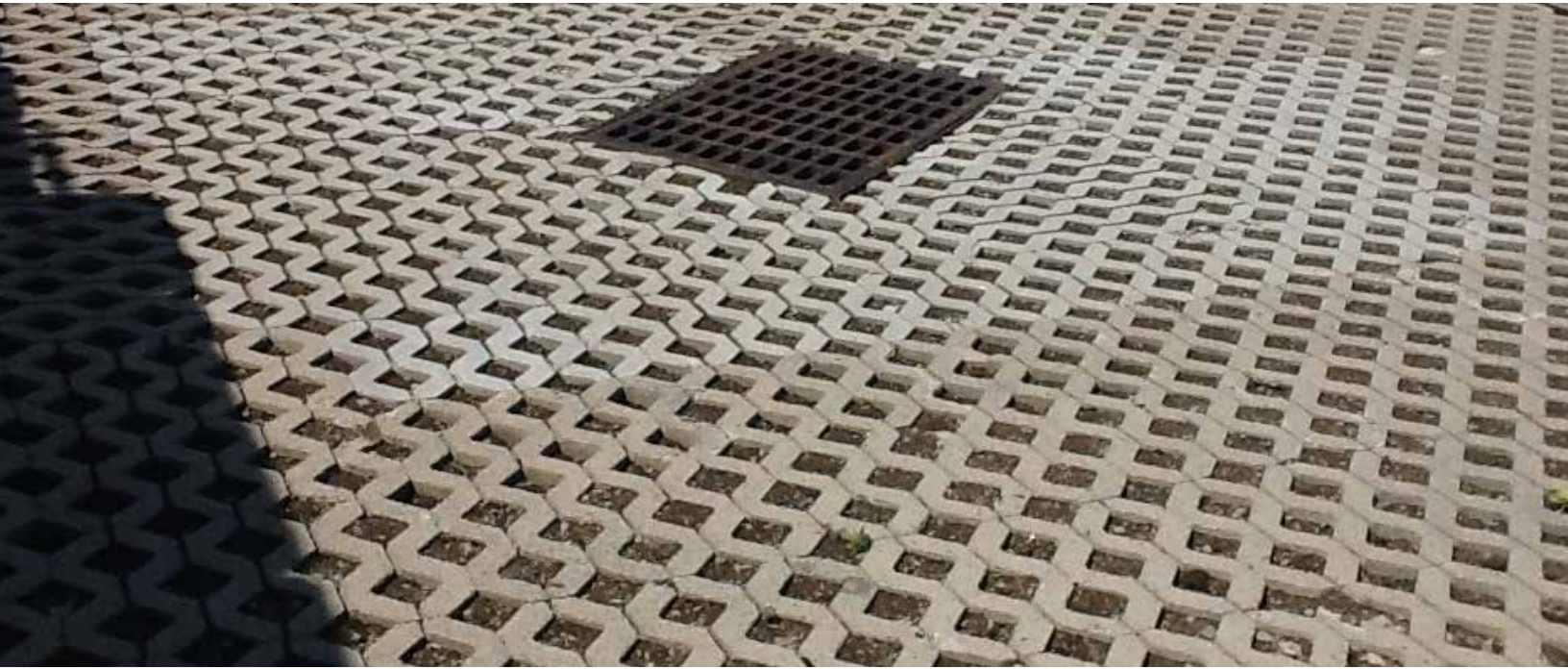
How it works

Stormwater collects in constructed trench devices or in a retention basin where it can soak into the underlying soils over time. Infiltration devices reduce runoff, remove pollutants, and recharge groundwater. They are suitable in permeable soils only.

Inspection Checklist

- Excess sediment removal from inlet areas
- Remove trash and debris
- Cut down all vegetation around the basin to a height of 6”
- Ensure good coverage of vegetation on the bottom and side slopes of basin
- Cut all vegetation, clean up trash, and remove sediment at the discharge
- Collect all maintenance records to be presented with the inspection.
- If your system is not currently maintained by a trained and qualified company, contact AQUALIS to get a maintenance plan in place quickly to ensure compliance.





Permeable Pavement

Permeable Pavement is a product installed to replace asphalt or concrete in order to decrease surface runoff volumes; it is typically implemented in watersheds with soils that have high infiltration rates.

How it works

Permeable Pavement reduces the impervious acreage of a site and allows infiltration of a portion of rain during storm events.

Inspection Checklist

- Perform a simple infiltration test to portions of your pervious pavement to ensure water does not pool
- If pooling is prevalent, schedule a sweeping service for the area
- Remove trash and debris
- Visually inspect structural condition and gradation of pavers
- Collect all maintenance records to be presented with the inspection.
- If your system is not currently maintained by a trained and qualified company, contact AQUALIS to get a maintenance plan in place quickly to ensure compliance.

Level Spreader

A Level Spreader is a device which reduces the energy level in high-velocity flow by converting it into sheet flow.

How it works

Stormwater runoff is conveyed to a blind swale, as the blind swale fills, flow diffuses along the length of the level spreader. Infiltration of stormwater and removal of particulate pollutants are expected as runoff flows through the riparian buffer or vegetative filter strip downslope of the level spreader.

Inspection Checklist

- Remove excess sediment from inlet areas and from the holding areas
- Ensure no areas of erosion or channelization has occurred
- Remove trash and debris
- Make sure that the dam is level and clear of woody vegetation
- Collect all maintenance records to be presented with the inspection
- If your system is not currently maintained by a trained and qualified company, contact AQUALIS to get a maintenance plan in place quickly to ensure compliance.





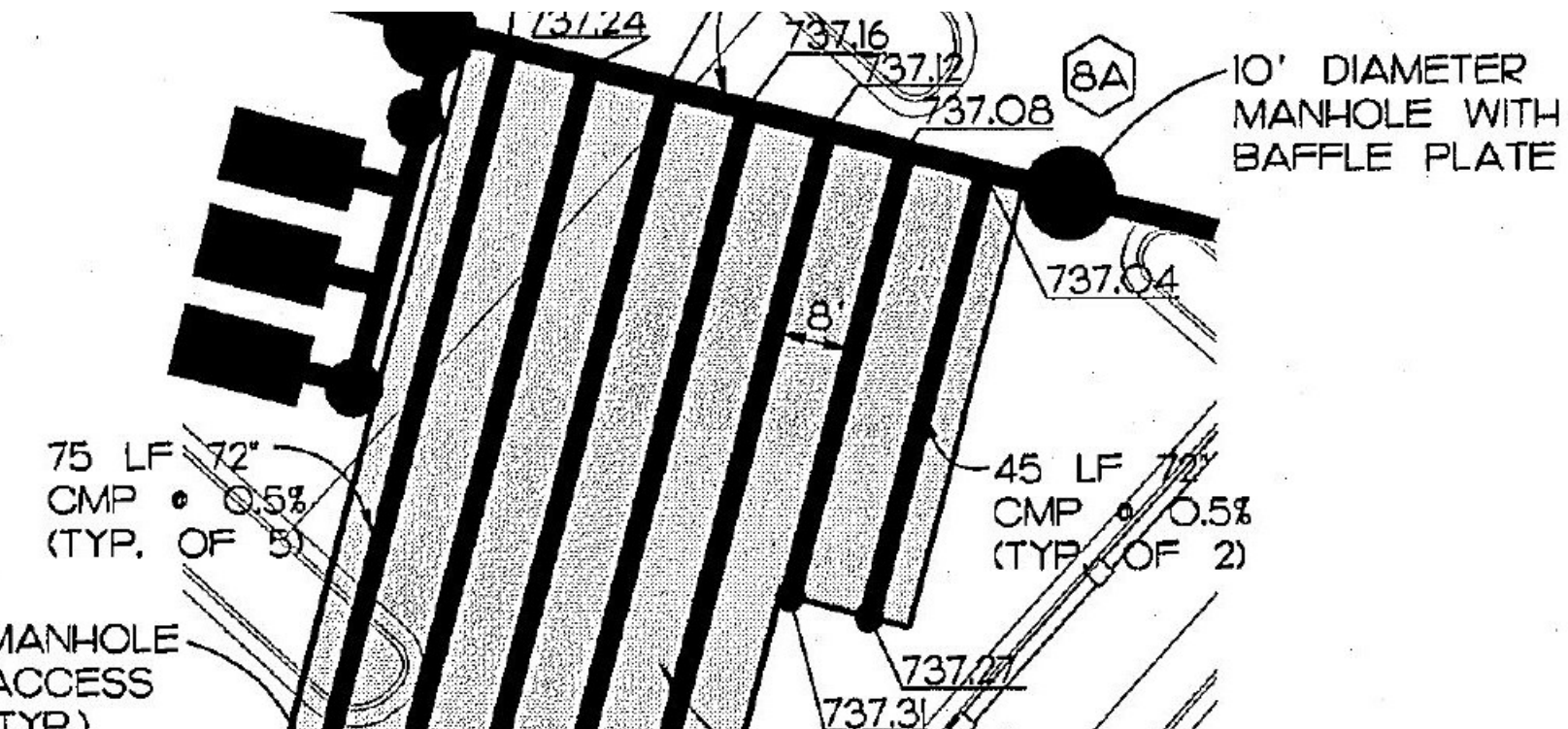
Sand Filter

A Sand Filter is a system that facilitates the passage of stormwater through a sand media designed to assist in pollutant removal by filtering suspended solids, oils and debris.

How it works Runoff is directed to a surface or subsurface device which contains a sand media whereby pollutants are filtered. Treated effluent is then discharged or infiltrated.

Inspection Checklist

- Pull covers off and remove the top sediment layer from the sand media
- Rake out and disturb the sand media to reverse the compaction that has occurred
- Clean debris from the inlet area and the underdrain discharges
- Collect all maintenance records to be presented with the inspection
- If your system is not currently maintained by a trained and qualified company, contact AQUALIS to get a maintenance plan in place quickly to ensure compliance.



Manufactured (Underground) Systems

A manufactured underground system is a product often retrofitted into a storm sewer system with storage and pollutant removal capabilities. They are commonly used when space is at a premium (and where aboveground SCM's may therefore be too costly). These systems are also commonly known as Proprietary Systems.

How it works

In chambered devices, runoff passes through several chambers where settling of sediment and flotation of hydrocarbons occurs. Hydrodynamic devices provide a swirling motion which facilitates sediment removal. Some devices provide filtration utilizing filter cartridges or media, thereby removing some of the solid pollutants. These systems are designed and built by a variety of companies and range in scope and function; each system is unique and requires a specific maintenance plan.

Inspection Checklist

- Determine manufacturer of the device and what its designed purpose is and then create a specialized maintenance plan for the facility.
- Collect all maintenance records to be presented with the inspection
- If your system is not currently maintained by a trained and qualified company, contact AQUALIS to get a maintenance plan in place quickly to ensure compliance.

With the stormwater regulatory changes of the last decade, owners and property managers of properties with more than one acre roofed or paved have a clear and direct responsibility relative to stormwater management. In addition to this legal responsibility, taking care of the surrounding environment is also the right thing to do and is good for business. However clear and direct this legal responsibility is, the various requirements, rules, regulations and nuances of stormwater management can lead to an arduous and confusing undertaking. AQUALIS is the nation's industry leader for stormwater management and we take pride in providing our clients with expert knowledge and execution of stormwater inspections, maintenance and repairs.

We hope that this whitepaper has provided the reader with an overview of the basics of stormwater management, including the definition of stormwater, the various methods (SCMs) by which stormwater is managed, and what is involved in a complete stormwater management program.

AQUALIS Stormwater Management is a full service post-construction stormwater management company. We take care of all of our clients' stormwater management needs. Our services include inspections, maintenance, repair, emergency response, underground camera inspections and consulting. We invite you to consider AQUALIS for comprehensive stormwater program management, and we are ready to answer any questions about how to get started. Please visit www.aqualisco.com for more information and request a free consultation.



AQUALIS
STORMWATER MANAGEMENT

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