



Stormwater Detention Ponds & Retention Ponds

What is the difference?



Stormwater detention and retention ponds are necessary in civil construction and urban development for several critical reasons, including: flood control, water quality improvement, erosion control, and regulatory compliance. In essence, stormwater detention and retention ponds help manage the effects of urbanization on the natural water cycle.

Both detention ponds and retention ponds are used to manage stormwater runoff, but they serve different purposes and operate differently:

Stormwater Detention Pond

Purpose: Temporarily holds stormwater runoff and releases it at a controlled rate. The main goal is to reduce the peak flow of stormwater entering downstream water bodies or storm sewer systems.

Design: Typically dry except during and immediately after a storm event. Water is stored for a short period and then gradually released through an outlet structure.

Use Case: Commonly used in urban areas to prevent flooding, reduce erosion, and protect downstream areas from sudden surges in water flow.

Key Feature: Does not maintain a permanent pool of water; designed to empty out between storm events.

Stormwater Retention Pond

Purpose: Holds stormwater runoff permanently, allowing it to infiltrate, evaporate, or be used for other purposes. It is designed to improve water quality by allowing sediments and pollutants to settle.

Design: Typically has a permanent pool of water that varies in size depending on the amount of runoff. Water levels rise during storm events and gradually return to the normal level.

Use Case: Often used in areas where water quality improvement is needed, such as near residential developments, commercial areas, or environmentally sensitive zones.

Key Feature: Maintains a permanent pool of water, which can support aquatic life and provide aesthetic or recreational benefits.

FUNCTIONS

Flood Control

Detention Ponds: These ponds temporarily store excess stormwater runoff during heavy rain events and release it at a controlled rate, preventing the immediate surge of water into downstream areas. This helps mitigate the risk of flooding in urban and suburban areas where impervious surfaces like roads and buildings prevent natural infiltration.

Retention Ponds: By permanently holding water, retention ponds also reduce the volume of water that could contribute to flooding, especially in areas prone to high rainfall.

Water Quality Improvement

Detention Ponds: Although their primary purpose is flood control, detention ponds can also help improve water quality by allowing sediments and some pollutants to settle out of the water before it is released downstream.

Retention Ponds: These ponds are particularly effective at improving water quality. They allow sediments, nutrients, and pollutants to settle out of the water column, and they provide time for biological processes to break down contaminants. This reduces the amount of pollutants that enter natural water bodies like rivers, lakes, and streams.

Erosion Control

Detention Ponds: By slowing down the release of stormwater, detention ponds reduce the potential for downstream erosion. Sudden surges of water can cause significant erosion, damaging infrastructure, and degrading habitats.

Retention Ponds: The permanent water storage in retention ponds helps to moderate the flow of water into downstream areas, contributing to erosion control as well.

OTHER ASPECTS

Aquatic and Ecological Benefits

Retention Ponds: These ponds often create habitats for aquatic life, birds, and other wildlife, contributing to biodiversity in urban areas. The permanent water body can become a valuable ecological feature, supporting a variety of species and promoting a healthier environment.

Aesthetic and Recreational Value

Retention Ponds: Beyond their functional benefits, retention ponds can enhance the aesthetic appeal of a community or development. They can be incorporated into parks or green spaces, providing recreational opportunities such as fishing, bird watching, or simply enjoying the natural scenery.

Regulatory Compliance

Many jurisdictions require the use of stormwater management systems, including detention and retention ponds, as part of environmental regulations. These ponds help developers meet legal requirements for controlling stormwater runoff and protecting natural water bodies from pollution and degradation.