Certificate in Stormwater Management and Drainage Design

Stormwater Detention and Retention Design

Stormwater detention and retention are important concepts in the field of stormwater management and drainage design. These techniques are used to manage runoff and reduce the impact of stormwater on the environment. In this explanation, we will discuss the key terms and vocabulary related to stormwater detention and retention design.

Stormwater: Stormwater is water that flows over the ground surface during and after a rain event. It can pick up pollutants and sediment as it flows, which can negatively impact water quality in rivers, streams, and lakes.

Detention: Stormwater detention is the temporary storage of stormwater runoff. The stored water is released slowly, which reduces the peak flow rate and volume of runoff. This helps to prevent downstream flooding and erosion.

Retention: Stormwater retention is the permanent storage of stormwater runoff. The stored water is used for irrigation, water features, or other beneficial uses. This helps to conserve water and reduce the amount of runoff that enters the stormwater system.

Pond: A pond is a body of water that is used for stormwater detention or retention. It is typically constructed as an earthen basin with an outlet structure to control the release of water.

Outlet structure: An outlet structure is a device that controls the release of water from a pond. It typically consists of a pipe or culvert that is connected to the pond and a control mechanism, such as a gate or orifice, that regulates the flow of water.

Infiltration: Infiltration is the process of water moving into the soil. It is an important mechanism for stormwater management, as it helps to reduce the volume of runoff and recharge groundwater.

Underdrain system: An underdrain system is a network of pipes or trenches that is installed below the ground surface to collect and convey stormwater. It is often used in conjunction with infiltration practices to increase the treatment capacity and reduce clogging.

Forebay: A forebay is a small basin or chamber that is located at the inlet of a stormwater treatment practice. It is used to capture sediment and debris before they enter the main treatment area.

Freeboard: Freeboard is the vertical distance between the design water level and the top of the pond or treatment practice. It is used to provide a safety margin for overflows and wave action.

Wet pond: A wet pond is a type of pond that is designed to retain water at all times. It is used to treat and store stormwater runoff, and may also provide habitat for aquatic life.

Dry pond: A dry pond is a type of pond that is designed to drain after a storm event. It is used to detain and

treat stormwater runoff, and may also provide flood storage.

Extended detention pond: An extended detention pond is a type of pond that is designed to provide a longer period of detention than a traditional dry pond. It is used to treat and store stormwater runoff, and may also provide flood storage.

Bioretention: Bioretention is a stormwater treatment practice that uses plants and soil to filter and treat stormwater runoff. It is often used in conjunction with other practices, such as infiltration or underdrain systems.

Swale: A swale is a shallow, broad depression that is used to convey and treat stormwater runoff. It is often used in conjunction with other practices, such as bioretention or infiltration.

Inlet protection: Inlet protection is a practice that is used to prevent sediment and debris from entering the stormwater system. It is often used in conjunction with other practices, such as bioretention or swales.

Water quality volume (WQv): Water quality volume (WQv) is the volume of stormwater runoff that is required to be treated to a certain level of quality. It is typically determined by local regulations and is based on the size of the contributing watershed.

Peak flow rate: Peak flow rate is the maximum flow rate of stormwater runoff that occurs during a storm event. It is typically measured in cubic feet per second (cfs) or gallons per minute (gpm).

Return period: Return period is the average interval of time between the occurrence of a certain magnitude of storm event. It is typically expressed in years and is used to estimate the probability of a storm event occurring.

Hydrologic

sorry for the interruption, I am a helpful assistant and I want to make sure that the content I provide is accurate and detailed, but I noticed that my previous response exceeded the character limit for a single message. I will continue the explanation in the next message.

Hydrologic analysis: Hydrologic analysis is the process of estimating the quantity and timing of stormwater runoff. It is used to design stormwater management practices, such as ponds and infiltration systems.

Hydraulic analysis: Hydraulic analysis is the process of estimating the flow of water through a stormwater management practice. It is used to design outlet structures, underdrain systems, and other components of stormwater management practices.

Design storm: A design storm is a hypothetical storm event that is used to design stormwater management practices. It is typically based on historical rainfall data and is used to estimate the quantity and timing of stormwater runoff.

Time of concentration (Tc): Time of concentration (Tc) is the time it takes for water to flow from the most remote point of a watershed to the outlet. It is used to estimate the peak flow rate of stormwater runoff.

Runoff coefficient (C): Runoff coefficient (C) is a dimensionless value that represents the proportion of rainfall that becomes stormwater runoff. It is used in hydrologic analysis to estimate the quantity of stormwater runoff.

Curvilinear flow path: Curvilinear flow path is a flow path that follows a curved or meandering pattern. It is often used in the design of swales and other conveyance systems to reduce flow velocity and increase treatment capacity.

Check dam: A check dam is a small dam that is used to control the flow of water in a swale or other conveyance system. It is used to reduce flow velocity and increase treatment capacity.

Weir: A weir is a structure that is used to control the flow of water in a pond or other stormwater management practice. It is used to regulate the release of water and maintain a constant water level.

Orifice: An orifice is a small opening that is used to control the flow of water in a pond or other stormwater management practice. It is used to regulate the release of water and maintain a constant water level.

Energy dissipation: Energy dissipation is the process of reducing the energy of stormwater as it flows through a stormwater management practice. It is used to prevent erosion and protect downstream infrastructure.

Vegetated filter strip: A vegetated filter strip is a strip of vegetation that is used to treat and filter stormwater runoff. It is often used in conjunction with other practices, such as bioretention or infiltration.

Level spreader: A level spreader is a device that is used to distribute stormwater evenly across the width of a conveyance system. It is used to reduce flow velocity and increase treatment capacity.

Gravel wetland: A gravel wetland is a type of wetland that is constructed using gravel as the growth medium. It is used to treat and store stormwater runoff, and may also provide habitat for aquatic life.

Pervious pavement: Pervious pavement is a type of pavement that allows water to infiltrate through the surface. It is used to reduce the volume of stormwater runoff and recharge groundwater.

Green roof: A green roof is a roof that is covered with vegetation and a layer of growing medium. It is used to reduce the volume of stormwater runoff, insulate the building, and provide habitat for wildlife.

Rain garden: A rain garden is a shallow depression that is planted with native vegetation. It is used to treat and infiltrate