Appendix: definition of basin for storm water management

The detention basin (or **detention basin storage**): this is a work which catches and holds different waters (storm water essentially) for a moment. It can be an infiltration basin, a storm basin, a pollution basin…
Detention basins / ponds can range from small, closed grass channel structures within residential blocks to major flood storage reservoirs servicing an entire catchment. They comprise a stormwater impoundment created by an embankment or excavation with a restricted outlet flow capacity. The figure below illustrates some of the basic characteristics of a detention basin.

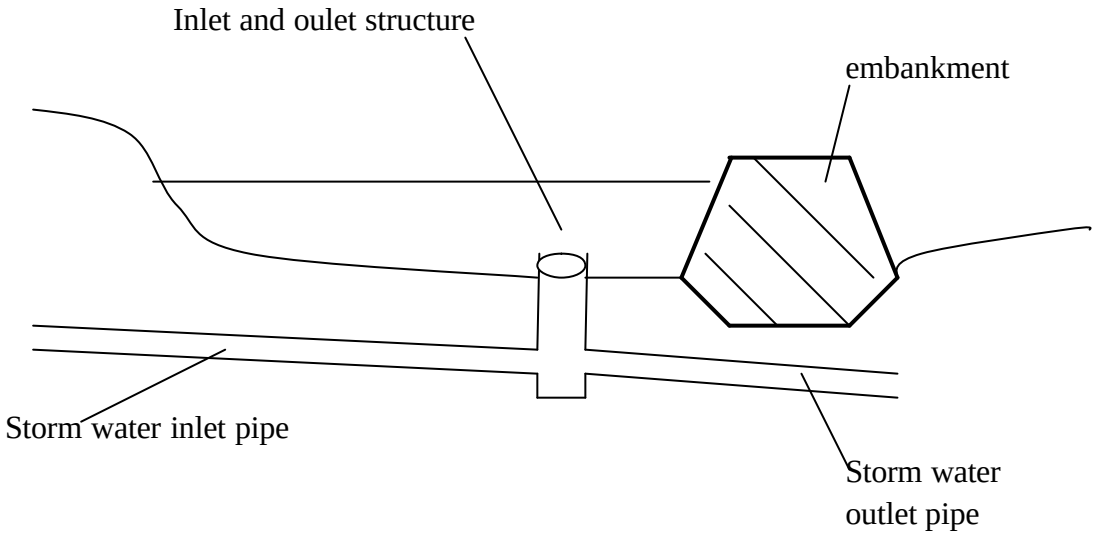

Fig: Detention Basin

Their prime function is to attenuate (or shave) the incoming flood peak to a flow that can be accepted within banks by the downstream channel or within downstream sewage network and delay the timing of the flood so that its volume is discharged over a longer time interval. Their effective use for stormwater pollution control requires extended detention storage (24 to 48 hours) to enable sedimentation of suspended solids and associated nutrients, oxygen demanding substances, organic matter and bacteria. In this respect, their design for stormwater pollution control and treatment should be essentially based on capturing the initial flow volumes and / or storms of high frequency and low magnitude (less than the annual event) in comparison to the target design criteria for flood attenuation which requires "peak shaving" of low frequency, high magnitude storm events. There has been widespread adoption of both wet and dry stormwater detention basins, mainly associated with new urban developments within catchments in which there are downstream hydraulic constraints through established urban areas. Detention can also reduce the extent of major infrastructure augmentation works downstream. Detention basins are also being adapted (often retrospectively) for water quality enhancement using oil traps or interceptors, sediment

forebays and aquatic planting to achieve improved pollutant capture and as part of a wider pollution control treatment train

dry ponds / basins : are detention storage systems that are normally dry, filling only during periods of effective runoff or sustained rainfall. They are typically adopted in conditions of:

- attenuation or retardation of peak storm flow (See Detention storage)
- creation or maintenance of ephemeral ponds or wetlands where the frequency of inflows is insufficient to maintain a permanent water body.

A dry pond can also be managed as an amenity in the form of parkland, playing fields, tennis courts etc., but some storage capacity may be lost if the bed has to be graded for drainage purposes. Extending the detention time of dry ponds (extended detention ponds) can provide an effective, low-cost means of achieving pollutant removal as well as offering a control over downstream bank erosion.

Wet ponds / basins (or retarding basins): are systems in which the ponding of water is maintained as a permanent feature and are typically adopted where:

- the topography and geology maintains a natural ponding within the drainage line
- a permanent water feature is required for landscape, recreation and / or water supply purposes
- the creation of a flood storage or pollution control facility is required to protect downstream drainage and water quality.

Such wet (retention) basins can provide an extremely effective quality polish for urban stormwater and if properly designed, sized and maintained, can achieve high removal rates of sediment, organic materials, nutrients, metals and oil. Lack of sediment forebay or grit chambers as well as poor mixing characteristics are undoubtedly primarily responsible for poor basin performance and must therefore be given careful consideration at the design stage.