

Drainage Criteria Manual

[GLOSSARY](#)

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Abutment - A wall supporting the end of a bridge or span, and sustaining the pressure of the abutting earth.

Apron - A floor or lining of concrete, timber, or other suitable material located at the inlet or discharge side of hydraulic structures (box culverts, spillways, etc.) designed to protect the waterway from erosion from falling water or turbulent flow.

Backwater - The rise of the water level upstream due to an obstruction or constriction in the channel.

Backwater Curve - The term applied to the longitudinal profile of the water surface in an open channel when flow is steady but non-uniform.

Baffle Chute - A drop structure in a channel or outlet of a pond with baffles for energy dissipation to permit the lowering of the hydraulic energy gradient in a short distance to accommodate topography.

Baffles - Deflector vanes, guides, grids, gratings, or similar devices constructed or placed in flowing water to: (1) cause a more uniform distribution of velocities; (2) dissipate energy; (3) divert, guide, or agitate the flow; and (4) mitigate eddy currents.

Calibration - Process of checking, adjusting, or standardizing operating characteristics of instruments and model appurtenances on a physical model or coefficients in a mathematical model. The process of evaluating the scale readings of an instrument in terms of the physical quantity to be measured.

Channel Roughness - The estimated measure of texture at the perimeters of channels and conduits. Usually represented by the Manning coefficient "n" used in the Manning Equation.

Chute - An inclined conduit or structure used for conveying water to a lower level.

Concentrated Flow - Stormwater runoff that moves through an open waterway or channel that is bounded by banks or walls, such as a swale, ditch, creek, river, or open pipe or culvert.

Conduit - Any open or closed device for conveying flowing water.

Criteria - A standard or rule on which a judgment or decision is based.

Critical Flow - The state of flow for a given discharge at which the specific energy is a minimum with respect to the bottom of the conduit.

Critical Slope - The minimum slope of a conduit which will produce critical flow

Crown - (1) The highest point on a transverse section of a conduit.
- (2) The highest point of a roadway cross section.

Culvert - Pipe or other conduit through which flow passes under a road or street.

Curb - A vertical or sloping structure located along the edge of a roadway, normally constructed integrally with the gutter, which strengthens and protects the pavement edge and clearly defines the pavement edge to vehicle operators.

Dam - A barrier constructed across a watercourse for the purpose of either temporarily or permanently impounding water.

Design Storm or Flood - The storm or flood which is used as the basis for design, i.e., against which the structure is designed to provide a stated degree of protection or other specified result.

Detention - The storage of storm runoff for a controlled release during or immediately following the design storm.

1. Off-site detention - A detention pond located outside the boundary of the area it serves.
2. On-site detention - A detention pond which is located within the specific site or subdivision it serves.
3. On-stream detention - The temporary storage of storm runoff behind embankments or dams located in a channel.
4. Regional detention - Detention facilities provided to control excess runoff based on a watershed-wide hydrologic analysis.

Drainage Area - The area contributing storm runoff to a stream or drainage system at a particular point.

Drop Structures - The function of a drop structure is to reduce channel velocities by allowing for flatter upstream and downstream channel slopes

Engineer - Shall mean a person who is duly licensed and registered to engage in the practice of professional engineering in the State of Texas.

Energy Grade Line - A line representing the energy in flowing water. The elevation of the energy line is equal to the summation of elevation of the flow line plus the depth, velocity head, and the pressure head.

Entrance Head - The head required to force flow into a conduit or other structure; it includes both entrance loss and velocity head.

Entrance Loss - Head lost in eddies or friction at the inlet to a conduit, headwall or structure.

Flood Control - The elimination or reduction of flood losses by the construction of flood storage reservoirs, channel improvements, dikes and levees, by-pass channels, or other engineering works.

Floodplain - Geographically the entire area subject to flooding.

Freeboard - The distance between the calculated water surface elevation and the

maximum physical elevation of the channel or pond, which is provided as an additional factor of safety.

Frequency (of storms, floods) - Average recurrence interval of events, over long periods of time. Mathematically, frequency is the reciprocal of the exceedance probability.

Friction Slope - The friction head or loss per unit length of channel or conduit. For uniform flow the friction slope coincides with the energy gradient, but where a distinction is made between energy losses due to bends, expansions, impacts, etc., a distinction must also be made between the friction slope and the energy gradient. The friction slope is equal to the bed or surface slope only for uniform flow in uniform open channels.

Froude Number - A flow parameter, which is a measure of the extent to which gravitational action affects the flow. A Froude number greater than 1 indicates supercritical flow and a value less than 1 subcritical flow.

Gabion - A wire basket containing rocks which is placed uniformly with others to provide protection against erosion.

Grade - The inclination or slope of a channel, conduit, or natural ground surface, usually expressed in terms of the ratio of vertical rise to horizontal distance.

Gutter - A shallow concrete waterway adjacent to a curb for conveying street flow.

Headwall - The normal functions of properly designed headwalls and endwalls are to anchor the culvert in order to prevent movement due to hydraulic and soil pressures, to control erosion and scour resulting from excessive velocities and turbulence and to prevent adjacent soil from sloughing into the waterway opening.

Headwater - (1) The upper reaches of a stream near its sources; (2) the region where ground waters emerge to form a surface stream; and (3) the headwater depth on the upstream side of a structure. (See Entrance Head)

Hydraulic Gradient - A hydraulic profile of the piezometric level of the water, representing the sum of the depth of flow and the pressure head. In open channel flow, it is the water surface.

Hydraulic Jump - The hydraulic jump is an abrupt rise in the water surface which occurs in an open channel when water flowing at supercritical velocity transitions to subcritical velocity. The transition through the jump results in a marked loss of energy, evidenced by turbulence of the flow within the area of the jump. The hydraulic jump is sometimes used as a means of energy dissipation.

Hydraulics - A branch of science that deals with practical applications of the mechanics of water movement.

Hydrograph - A graph or table showing discharge versus time at a given point on a stream or conduit.

1. Synthetic Hydrograph - Runoff or unit hydrographs which are devised by empirical means (as opposed to derivation based upon natural, measured data).

2. **Unit Hydrograph** - The direct runoff hydrograph resulting from one inch of precipitation excess distributed uniformly over a watershed for a specified duration.

Hydrology - The science that deals with the processes governing the depletion and replenishment of the water resources of the earth.

Hyetograph - A histogram or graph of rainfall intensity versus time for a storm.

Impervious - A term applied to a material through which water cannot pass, or through which water passes with great difficulty.

Infiltration - The absorption of water by the soil, either as it falls as precipitation, or from a stream flowing over the surface.

Inlet - The inflow point for a storm sewer system which is usually associated with streets (e.g., curb opening inlets, grate inlets, etc.).

Intensity - See Rainfall Intensity.

Invert - The floor, bottom, or lowest portion of the internal cross section of a conduit. Used particularly with reference to sewers, tunnels, and drains.

Lag Time - In hydrograph analysis lag time is the time from the centroid of the mass of excess rainfall to the peak of the runoff hydrograph.

Manning Coefficient - The coefficient of roughness used in the Manning Equation.

Manning Equation - A uniform flow equation used to relate velocity, hydraulic radius and the energy gradient slope.

May - A permissive condition. No requirement for design or application is intended.

Must - This is a mandatory condition. Where certain requirements in the design or application of the guidelines are described with the "must" stipulation, it is mandatory that the requirements be met.

One Hundred (100) Year Storm - Size of storm equaled or exceeded on the average once in one hundred (100) years (with given duration), or that storm having a one (1) percent chance of occurring in any given year.

One Hundred (100) Year Flood - Size of flood which might be expected to be equaled or exceeded once in one hundred (100) years on the average, or has a one (1) percent chance of occurring in any given year. Usually associated with the one hundred (100) year storm.

Orifice - An opening with closed perimeter, and of regular form in a plate, wall, or partition, through which water may flow.

Overland Flow - Runoff which is not considered concentrated. Other term is sheet flow.

Peak Flow (Peak Rate of Runoff) - the maximum rate of flow past a particular point for a given storm.

Policy - A definite course or method of action selected to guide and determine present and future decisions.

Precipitation - Any moisture that falls from the atmosphere, including snow, sleet, rain and hail.

Prismatic Channel - A channel built with unvarying cross section and constant bottom slope.

Probable Maximum Flood (PMF) - The flood that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in the region.

Probable Maximum Precipitation - The critical depth-duration-area rainfall relationship which would result from a storm containing the most critical meteorological conditions considered probable of occurring.

Rainfall Duration - The length of time over which a discrete rainfall event lasts.

Rainfall Frequency - The average recurrence interval of rainfall events, averaged over long periods of time.

Rainfall Intensity - The rate of accumulation of rainfall, usually in inches per hour.

Rational Formula - A traditional means of relating runoff from an area and the intensity of the storm rainfall ($Q = CiA$).

Reach - Any length of river or channel. Usually used to refer to sections which are uniform with respect to discharge, depth, area or slope, or sections between gaging stations.

Recommended - A condition which should be met if it is physically and economically reasonable to do so.

Required - This is a mandatory condition. Where certain requirements in the design or application of the guidelines are described with the "required" stipulation, it is mandatory that they be met.

Recurrence Interval - The average interval of time within which a given event will be equaled or exceeded once. For an annual series (as opposed to a partial duration series) the probability of occurrence in any one (1) year is the inverse of the recurrence interval. Thus a flood having a recurrence interval of one hundred (100) years has a one (1) percent probability of being equaled or exceeded in any one year.

Return Period - See Recurrence Interval.

Right-of-way - Land dedicated by a plat or separate instrument to and for use as a public roadway.

Riprap (Revetment) - Forms of bank protection, usually using rock. Riprap is a term applied to stone which is dumped rather than placed more carefully. In Austin concrete is often called riprap.

Routing - Routing is a technique used to predict the temporal and spatial variations of a flood wave as it traverses a river reach or reservoir. Generally, routing techniques may be classified into two categories - hydrologic routing and hydraulic routing.

Runoff - That part of the precipitation which reaches a stream, drain or sewer.

Runoff Coefficient (C) - A decimal number used in the Rational Formula which defines the runoff characteristics of the drainage area under consideration. It may be applied to an entire drainage basin as a composite representation or it may be applied to a small individual area such as one residential lot.

Sediment - Material of soil and rock origin transported, carried, or deposited by water.

Shall - This is a mandatory condition. Where certain requirements in the design or application of the guidelines are described with the "shall" stipulation, it is mandatory that the requirements be met.

Sheet Flow - Stormwater runoff that flows downslope over relatively smooth surfaces in the form of a thin, continuous layer that does not vary in depth in a direction perpendicular to the direction of flow.

Should - An advisory condition. Where the word "should" is used, it is considered to be advisable usage, recommended but not mandatory.

Soffit - The bottom of the top of a pipe. In a sewer pipe, the uppermost point on the inside of the structure. In contrast, the crown is the uppermost point on the outside of the pipe wall.

Soil Conservation Service (SCS) Runoff Curve Number (CN) - Index number used by the SCS as a measure of the tendency of rainfall to run off into streams rather than evaporate or infiltrate.

Steady Flow - Open channel flow is said to be steady if the depth of flow does not change or if it can be assumed to be constant during the time interval of consideration.

Stilling Basin - Pool of water conventionally used, as part of a drop structure or other structure, to dissipate energy.

Tailwater - The depth of flow in the stream immediately downstream of a hydraulic structure.

Time of Concentration - The time associated with the travel of runoff from an outer point which best represents the shape of the contributing area.

Total Head - In the flow process, the total energy for a given point is represented by the summation of $V^2/2g$, p/ρ and z . The units for these three (3) items are foot-pounds force per pound force. It is common practice to lump all these three (3) items together as total head in feet. The item of $V^2/2g$ is called velocity head (in feet) and p/ρ is the pressure head (in feet).

Trunk Line - The primary collector line of a storm sewer system

Uniform Channel - A channel with a constant cross section and roughness.

Uniform Flow - Open channel flow is said to be uniform if the depth of flow is the same at every section of the channel, for a constant flow.

Unit Hydrograph - See Hydrograph.

Watershed - The total area contributing storm runoff to a stream or creek.

Weir - A weir is a notch of regular form through which water flows.