

GLOSSARY OF TERMS

For the purpose of this Handbook, the following definitions and abbreviations shall apply. Although all of the definitions and abbreviations listed below may have not been used in this Handbook, the additional terminology is provided to assist the user of Handbook in understanding technical terminology associated with Drainage Improvement Projects and the associated regulations. Program-specific terms have been defined separately for each program and are contained in pertinent sub-sections of Section 2 of this handbook.

ACRONYMS

ASTM	American Society for Testing Materials
CBBEL	Christopher B. Burke Engineering, Ltd.
COE	United States Army Corps of Engineers
EPA	Environmental Protection Agency
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
NRCS	USDA-Natural Resources Conservation Service
SWCD	Soil and Water Conservation District
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

DEFINITIONS

AASHTO Classification. The official classification of soil materials and soil aggregate mixtures for highway construction used by the American Association of State Highway and Transportation Officials.

Abutment. The sloping sides of a valley that supports the ends of a dam.

Acre-Foot. The volume of water that will cover 1 acre to a depth of 1 ft.

Aggregate. (1) The sand and gravel portion of concrete (65 to 75% by volume), the rest being cement and water. Fine aggregate contains particles ranging from 1/4 in. down to that retained on a 200-mesh screen. Coarse aggregate ranges from 1/4 in. up to 1½ in. **(2)** That which is installed for the purpose of changing drainage characteristics.

Alluvial Soils. Soils developed from transported and relatively recently deposited material (alluvium) characterized by a weak modification (or none) of the original material by soil-forming

processes.

Alluvium. A general term for all detrital material deposited or in transit by streams, including gravel, sand, silt, clay, and all variations and mixtures of these. Unless otherwise noted, alluvium is unconsolidated.

Anti-Seep Collar. A device constructed around a pipe or other conduit placed through a dam, levee, or dike for the purpose of preventing soil movement and piping failures.

Anti-Vortex Device. A facility placed at the entrance to a pipe conduit structure, such as a drop inlet spillway or hood inlet spillway, to prevent air from entering the structure when the pipe is flowing full.

Apron. A pad of non-erosive material designed to prevent scour holes developing at the outlet ends of culverts, outlet pipes, grade stabilization structures, and other water control devices.

Aquifer. An underground porous, water-bearing geological formation. The term is generally restricted to materials capable of yielding an appreciable supply of water.

ASTM. American Society for Testing Materials, an association that publishes standards and requirements for materials used in the construction industry.

Backwater. The rise in water surface elevation caused by some obstruction such as a narrow bridge opening, buildings or fill material that limits the area through which the water shall flow.

Barrel. A conduit placed through a dam, levee, or dike to control the release of water.

Base Flood. See "Regulatory Flood".

Base Flood Elevation (BFE). The water surface elevation corresponding to a flood having a one percent probability of being equalled or exceeded in a given year.

Base Flow. Stream discharge derived from groundwater sources as differentiated from surface runoff. Sometimes considered to include flows from regulated lakes or reservoirs.

Bearing Capacity. The maximum load that a material can support before failing.

Bedrock The more or less solid rock in place either on or beneath the surface of the earth. It may be soft, medium, or hard and have a smooth or irregular surface.

Benchmark. A marked point of known elevation from which other elevations may be established.

Bentonite. A highly plastic clay consisting of the minerals, montmorillonite, and beidellite that swell extensively wet. Often used to seal soil to reduce seepage losses.

Berm. A narrow shelf or flat area that breaks the contiguity of a slope.

Best Management Practices. Design, construction, and maintenance practices and criteria for

stormwater facilities that minimize the impact of stormwater runoff rates and volumes, prevent erosion, and capture pollutants.

Borrow Area. A source of earth fill material used in the construction of embankments or other earth fill structures.

Capacity of a Storm Drainage Facility. The maximum flow that can be conveyed or stored by a storm drainage facility without causing damage to public or private property.

Capillary Action. The tendency of drier soil particles to attract moisture from wetter portions of soil.

Catch Basin. A chamber usually built at the curb line of a street for the admission of surface water to a storm sewer or subdrain, having at its base a sediment sump designed to retain grit and detritus below the point of overflow.

Centerline of Channel. The middle point or baseline of a channel.

Channel. A portion of a natural or artificial watercourse which periodically or continuously contains moving water, or which forms a connecting link between two bodies of water. It has a defined bed and banks which serve to confine the water.

Channel Improvement. Alteration, maintenance, or reconstruction of the channel area for the purpose of improving the channel capacity or overall drainage efficiency. The noted "improvement" does not necessarily imply water quality or habitat improvement within the channel or its adjacent area.

Channel Stabilization. Protecting the sides and bed of a channel from erosion by controlling flow velocities and flow directions using jetties, drops, or other structures and/or by fining the channel with vegetation, riprap, concrete, or other suitable lining material.

Channelization. Alteration of a stream channel by widening, deepening, straightening, or paving certain areas to improve flow characteristics.

Chicken Wire. A woven wire fabric with an opening size of about 1½ in.

Chute. A high-velocity, open channel (usually paved) for conveying water down a steep slope without erosion.

Classified Filter Strip. A parcel of land that has been or will be classified as filter strip for the purpose of property assessment and taxation. The details of the associated procedures and criteria are contained in IC 6-1.1-6.7 . See also Filter Strip.

Clay. (1) Soil fraction consisting of particles less than 0.002 mm in diameter. (2) A soil texture class that is dominated by clay or at least has a larger proportion of clay than either silt or sand.

Cohesion. The capacity of a soil to resist shearing stress, exclusive of functional resistance.

Cohesive Soil. A soil that, when unconfined, has considerable strength when air-dried and

significant strength when saturated.

Companion (nurse) Crop. A crop sown with another crop that will germinate quickly and provide a protective vegetative cover until the preferred species can become established. The crop, usually small grain, is sown with a legume or perennial grass species.

Compost. Organic residue (or a mixture of organic residue and soil) that has undergone biological decomposition until it has become relatively stable humus.

Contour. An imaginary line on the surface of the earth connecting points of the same elevation.

Contour Line. Line on a map which represents a contour or points of equal elevation.

Control Structure. A structure designed to control the rate of flow that passes through the structure, given a specific upstream and downstream water surface elevation.

County Surveyor. A constitutional officer of the county, elected to a 4-year term from the county at large. Primary duties of the surveyor includes maintaining annexation descriptions, legal survey book, and section corner record book. Surveyor is also an ex-officio member of the County Drainage Board and the technical authority on the construction, reconstruction, and maintenance of all regulated drains or proposed regulated drains in the county. Other major responsibilities of the surveyor includes administering filter strip programs, membership in the County Plan Commission, and certification to the Indiana Alcoholic Beverage Commission.

Crown of Pipe. The elevation of the top of pipe.

Cross-Section. A graph or plot of ground elevation across a stream valley or a portion of it, usually along a line perpendicular to the stream or direction of flow.

Cultipacker Seeder. A seeder equipped with an attachment that will firm the seedbed to increase seed-to-soil contact.

Culvert. A closed conduit used for the conveyance of surface drainage water under a roadway, railroad, canal or other impediment.

Cut. (1) A portion of land surface or area from which earth has been removed or will be removed by excavating. (2) The depth below the original ground surface to the excavated surface.

Cutoff Trench. A long, narrow excavation (keyway) constructed along the center line of a dam, dike, levee, or embankment and filled with relatively impervious material intended to reduce seepage of water through porous strata.

Cutting. A detached leaf stem or piece of root that is encouraged to form roots. A greenwood cutting is made during the period of active growth. A hardwood cutting is made during the dormant season.

Cut-and-Fill. The process of earth grading by excavating part of a higher area and using the excavated material for fill to raise the surface of an adjacent lower area.

Dam. A barrier to confine or impound water for storage or diversion, to prevent gully erosion, or to retain soil, sediment, or other debris.

Datum. Any level surface to which elevations are referred, usually using Mean Sea Level.

Design Life. The period of time for which a facility is expected to perform its intended function.

Design Storm. A selected storm event, described in terms of the probability of occurring once within a given number of years, for which drainage or flood control improvements are designed and built.

Desilting Area. An area of grass, shrubs, or other vegetation used for inducing deposition of silt and other debris from flowing water. Located above a stock tank, pond, field, or other area needing protection from sediment accumulation.

Detention. Managing stormwater runoff by temporary holding and controlled release.

Detention Storage. The temporary detaining of storage of stormwater in storage facilities, on rooftops, in streets, parking lots, school yards, parks, open spaces or other areas under predetermined and controlled conditions, with the rate of release regulated by appropriately installed devices.

Detention Time. The theoretical time required to displace the contents of a tank or unit at a given rate of discharge (volume divided by rate of discharge).

Dewatering. The removal of water temporarily impounded in a holding basin.

d₅₀. A term used to define rock gradations. In a representative sample, 50% of the rock fragments will have a diameter larger than the d₅₀ size and 50% will be smaller.

Dibble Bar. A heavy metal tool with a blade and foot pedal used to open holes for planting seeds, sprigs, cuttings or seedlings.

Dike. An embankment to confine or control water. Often built along the banks of a river to prevent overflow of lowlands; a levee.

Discharge. Usually the rate of water flow. A volume of fluid passing a point per unit time commonly expressed as cubic feet per second, cubic meters per second, gallons per minute, or millions of gallons per day.

Ditch. A man-made, open drainageway in or into which excess surface water or groundwater drained from land, stormwater runoff, or floodwaters flow either continuously or intermittently.

Diversion. A channel with a supporting ridge on the lower side constructed at the top, across, or bottom of a slope for the purpose of controlling surface runoff.

Diversion Dike. A barrier built to divert surface runoff.

Divide (drainage). The boundary between watersheds.

Drain. A buried slotted or perforated pipe or other conduit (subsurface drain) or a ditch (open drain) for carrying off surplus groundwater or surface water.

Drainage. The removal of excess surface water or groundwater from land by means of ditches or subsurface drains. Also see Natural drainage.

Drainage (soil). As a natural condition of the soil, drainage refers to both the frequency and duration of periods when the soil is free of saturation. Soil drainage conditions are defined as:

- *Well-drained*--Excess water drains away rapidly, and no mottling occurs within 36 in. of the surface.
- *Moderately well drained*--Water is removed from the soil somewhat slowly resulting in small but significant periods of wetness, and mottling occurs between 18 and 36 in.
- *Somewhat poorly drained*--Water is removed from the soil slowly enough to keep it wet for significant periods but not all of the time, and mottling occurs between 8 to 18 in.
- *Poorly drained*--Water is removed so slowly that it is wet for a large part of the time, and mottling occurs between 0 and 8 in.
- *Very poorly drained*--Water is removed so slowly that the water table remains at or near the surface for the greater part of the time; there may also be periods of surface ponding; the soil has a black to gray surface layer with mottles up to the surface.

Drainage Area. The area draining into a stream at a given point. It may be of different sizes for surface runoff, subsurface flow and base flow, but generally the surface runoff area is considered as the drainage area.

Drainage Board. A board consisting of three to five persons including the county executive (commissioners) or members appointed by the executive body (at least one of the Board member must be a county executive). The County Surveyor serves on the Board as an ex-officio, non-voting member. In a county having a consolidated city, the department of public works of the consolidated city comprises the drainage board. The Board is responsible for adopting drain classifications and a long-range plan, and for making decisions regarding the design, construction, reconstruction, and/or maintenance of regulated drains in the county.

Drainage Improvement. An activity within or adjacent to a natural stream or a man-made drain primarily intended to improve the flow capacity, drainage, erosion and sedimentation control, or stability of the drainageway.

Drainage Shed. See Drainage Area.

Drainageway. A natural or artificial stream, closed conduit, or depression that carries surface water. This term has been used throughout the Handbook as a neutral term applying to all types of drains and watercourses, whether man-made or natural.

Drawdown. Lowering of the water surface in an open channel or lake or groundwater.

Drop Inlet. A structure in which water drops through a vertical riser connected to a discharge conduit or storm sewer.

Drop Spillway. A structure in which the water drops over a vertical wall onto an apron at a lower elevation.

Drop Structure. A structure for dropping water to a lower level and dissipating its surplus energy without erosion.

Duration. The time period of a rainfall event.

Earth Dam. A dam constructed of compacted suitable soil materials.

Earth Embankment. A man-made deposit of soil, rock, or other material often used to form an impoundment.

Emergency Spillway. Usually a vegetated earth channel used to safely convey flood discharges around an impoundment structure.

Energy Dissipater. A device used to reduce the energy of flowing water to prevent erosion.

Environment. The sum total of all the external conditions that may act upon a living organism or community to influence its development or existence.

Erodibility. Susceptibility to erosion.

Erosion. The wearing away of the land surface by water, wind, ice, gravity, or other geological agents. The following terms are used to describe different types of water erosion:

- *Accelerated erosion*--Erosion much more rapid than normal or geologic erosion, primarily as a result of the activities of man.
- *Channel erosion*--An erosion process whereby the volume and velocity of flow wears away the bed and/or banks of a well-defined channel.
- *Gully erosion*--An erosion process whereby runoff water accumulates in narrow channels and, over relatively short periods, removes the soil to considerable depths, ranging from 1-2 ft. to as much as 75-100 ft.
- *Rill erosion*--An erosion process in which numerous small channels only several inches deep are formed; occurs mainly on recently disturbed and exposed soils (see Rill).
- *Splash erosion*--The spattering of small soil particles caused by the impact of raindrops on wet soils; the loosened and spattered particles may or may not be subsequently removed by surface runoff.
- *Sheet erosion*--The gradual removal of a fairly uniform layer of soil from the land surface by runoff water.

Excess Rainfall. The amount of rainfall that runs directly off an area.

Farm or Field Tile. A small diameter clay pipe installed in an agricultural area to allow drainage of farmland.

Filter Blanket. A layer of sand and/or gravel designed to prevent the movement of fine-grained soils.

Filter Fabric. See Geotextile Fabric.

Filter Strip. Usually a long, relatively narrow area (usually, 20-75 feet wide) of undisturbed or planted vegetation used to retard or collect sediment for the protection of watercourses, reservoirs, or adjacent properties. See also Classified Filter Strip.

Flapgate. A device that allows liquids to flow in only one direction in a pipe. Backflow preventers are used on outlet pipes to prevent a reverse flow during flooding situations.

Flood or Flood Waters. A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow, the unusual and rapid accumulation, or the runoff of surface waters from any source.

Flood Frequency. A statistical expression of the average time period between floods equaling or exceeding a given magnitude. For example, a 100-year flood has a magnitude expected to be equaled or exceeded on the average of once every hundred years; such a flood has a one-percent chance of being equaled or exceeded in any given year. Often used interchangeably with "recurrence interval".

Flood Peak. The highest stage or greatest discharge attained by a flood event, thus peak stage or peak discharge.

Flood Stage. The stage at which overflow of the natural banks of a stream begins.

Floodplain. The channel proper and the areas adjoining the channel which have been or hereafter may be covered by the regulatory or 100-year flood. Any normally dry land area that is susceptible to being inundated by water from any natural source. The floodplain includes both the floodway and the floodway fringe districts.

Floodway. The channel of a river or stream and those portions of the flood plains adjoining the channel which are reasonably required to efficiently carry and discharge the peak flow of the regulatory flood of any river or stream.

Flume. A constructed channel lined with erosion-resistant materials used to convey water on steep grades without erosion.

Foundation Drain. A pipe or series of pipes that collects groundwater from the foundation or footing of structures to improve stability.

Freeboard. A vertical distance between the elevation of the design high-water and the top of a dam, diversion ridge, or other water control device.

French Drain. A drainage trench backfilled with a coarse, water-transmitting material; may

contain a perforated pipe.

Gabion. A wire mesh cage, usually rectangular, filled with rock and used to protect channel banks and other sloping areas from erosion.

Gauge. (1) A device for measuring precipitation, water level, discharge, velocity, pressure, temperature, etc. (2) A measure of the thickness of metal.

Gauging Station. A selected section of a stream channel equipped with a gauge, stage recorder, or other facilities for determining stream stage and discharge.

Geotextile Fabric. A woven or non-woven, water-permeable synthetic material used to trap sediment particles, prevent the clogging of aggregates with fine grained soil particles, or as a separator under road aggregate..

Geotextile Liner. A synthetic, impermeable fabric used to seal impoundments against leaks.

Grab Strength. A measure of the tensile strength for geotextiles, in elongation, as defined in ASTM-4632.

Gradation. The distribution of the various sized particles that constitute a sediment, soil, or other material, such as riprap.

Grade. (1) The slope of a road, a channel, or natural ground. (2) The finished surface of a canal bed, roadbed, top of embankment, or bottom of excavation; any surface prepared to a design elevation for the support of construction, such as paving or the laying of a conduit. (3) To finish the surface of a canal bed, roadbed, top of embankment, or bottom of excavation, or other land area to a smooth, even condition.

Grade Stabilization Structure. A structure for the purpose of stabilizing the grade of a gully or other watercourse, thereby preventing further head-cutting or lowering of the channel bottom.

Gradient. (1) A change of elevation, velocity, pressure, or other characteristics per unit length. (2) Slope.

Grading. The cutting/or filling of the land surface to a desired slope or elevation.

Grass. A member of the botanical family Graminae, characterized by blade-like leaves that originate as a sheath wrapped around the stem.

Grassed Waterway. A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses and used to safely conduct surface water from an area.

Ground Cover (horticulture). Low-growing, spreading plants useful for low-maintenance landscape areas.

Habitat. The environment in which the life needs of a plant or animal are supplied.

Hardware Cloth. A welded wire fabric, typically with square openings of 1 in. or less.

Head. (1) The height of water above any plane of reference. (2) The energy, either kinetic or potential, possessed by each unit weight of a liquid, expressed as the vertical height through which a unit would have to fall to release the average energy possessed. Used in various compound terms, such as pressure head or velocity head.

Head Loss. Energy loss due to friction, eddies, changes in velocity, elevation, or direction of flow.

Headwater. (1) The source of a stream. (2) The water upstream from a structure or point on a stream.

Hydrograph. A graph showing for a given point on a stream the discharge, stage (depth), velocity, or other property of water with respect to time.

Hydrologic Cycle. The circuit of water movement from atmosphere to earth back to the atmosphere through various stages or processes, such as precipitation, runoff, infiltration, percolation, storage, evaporation, and transpiration.

Hydrology. The science of the behavior of water in the atmosphere, on the surface of the earth, and underground. A typical hydrologic study is undertaken to compute flowrates associated with specified flood events.

Hydromulching. The process of applying mulch hydraulically in a water medium.

Hydroseeder. The machine/equipment used to disseminate seed hydraulically in a water medium. Mulch, lime, and fertilizer can be incorporated into the sprayed mixture.

Impervious. Not allowing infiltration.

Impoundment. Generally, an artificial water storage area, such as a reservoir, pit, dugout, sump, etc.

INDOT. Indiana Department of Transportation. Generally used here to refer to specifications contained in the publication "INDOT Standard Specifications."

Infiltration. Passage or movement of water into the soil.

Inoculum. A culture of microorganisms intentionally introduced into a medium, such as seed, soil, or compost.

Invert. The inside bottom of a culvert or other conduit.

Keyway. A cutoff trench dug beneath the entire length of a dam to cut through soil layers that may cause seepage and possible dam failure.

Lag Time. The interval between the center of mass of the storm precipitation and peak flow of the resultant run-off.

Laminar Flow. Flow at relatively slow velocity in which fluid particles slide smoothly along straight

lines everywhere parallel to the axis of a channel or pipe.

Land Capability. The suitability of land for use. Land capability classification involves consideration of: (1) the risks of damage from erosion and other causes and. (2) the difficulties in land use owing to physical land characteristics, including climate.

Land Surveyor. A person licensed under the laws of the State of Indiana to practice land surveying.

Land Use Controls. Methods for regulating the uses to which a given land area maybe put, including such things as zoning, subdivision regulation, and floodplain regulation.

Legume. Any member of the pea or pulse family, which includes peas, beans, peanuts, clover, alfalfa, sweet clover, lespedeza, etch, black locust, and kudzu. Practically all legumes are nitrogen-fixing plants.

Liquid Limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. A soil textural classification in which the proportions of sand, silt, and clay are well balanced. Loams have the best properties for cultivation of plants.

Mean Depth. (1) Average depth. (2) Cross-sectional area of a stream or channel divided by its surface or top width.

Mean Velocity. Average velocity of a stream flowing in a channel or conduit at a given cross-section or in a given reach. It is equal to the discharge divided by the cross-sectional area of the reach.

Mulch. A natural or artificial layer of plant residue or other materials covering the land surface which conserves moisture, holds soil in place, aids in establishing plant cover, and minimizes temperature fluctuations.

Mullen Burst Test. A standardized test used to test the strength of geotextile fabrics to bursting pressures.

Mutual Drain. A drain that: (1) Is located on two or more tracts of land that are under different ownership; (2) Was established by the mutual consent of all the owners; and (3) Was not established under or made subject to any drainage statute.

National Geodetic Vertical Datum of 1929 (NGVD 1929). The nationwide, Federal Elevation datum used to reference topographic elevations to a known value.

Natural Drainage. The flow patterns of stormwater run-off over the land in its pre-development state.

Nitrogen Fixation. The conversion of atmospheric nitrogen into stable compounds usable by plants. Carried out by bacteria that colonize the roots of most legumes.

Node (botany). The point on a plant stem at which a leaf or leaves arise. Creeping stems (i.e.,

rhizomes and stolons), and in some plants the upright stems, produce roots at the nodes.

Nonpoint Source Pollution. Pollution that enters a water body from diffuse origins on the watershed and does not result from discernable, confined, or discrete conveyances.

Normal Depth. Depth of flow in an open conduit during uniform flow for the given conditions.

Nutrient(s). (1) A substance necessary for the growth and reproduction of organisms. (2) In water, those substances (chiefly nitrates and phosphates) that promote growth of algae and bacteria.

One-Sided (or Single-Sided) Construction. a project involving construction on only one (1) side of a channel limiting the work to the entire area below the top of the banks and within the drainage easement on one (1) side of the stream or open drain.

Open Drain. A natural watercourse or constructed open channel that conveys drainage water.

Outfall. The point, location, or structure where wastewater or drainage discharges from a pipe or open drain to a receiving body of water.

Outlet. The point of water disposal from a stream, river, lake, tidewater, or artificial drain.

Outlet Channel. A waterway constructed or altered primarily to carry water from man-made structures, such as smaller channels, tile lines, and diversions.

Outside Valley. The spacing or width of corrugations for corrugated metal pipe.

Overland Flow. Consists of sheet flow, shallow concentrated flow and open channel flow.

Peak Discharge. The maximum instantaneous flow from a given storm condition at a specific location.

Percolation. The movement of water through soil.

Percolation Rate. The rate, usually expressed as inches per hour or inches per day, at which water moves through the soil profile.

Perennial Stream. A stream that maintains water in its channel throughout the year.

Permeability (soil). The quality of a soil that enables water or air to move through it. Usually expressed in 'inches per hour or inches per day.

Permeability Rate. The rate at which water will move through a saturated soil. Permeability rates are classified as:

- *Very slow*--Less than 0.06 in./hr.
- *Slow*--0.06 to 0.20 in./hr.
- *Moderately slow*--0.20 to 0.63 in./hr.
- *Moderate*--0.63 to 2.0 in./hr.

- *Moderately rapid*--2.0 to 6.3 in./hr.
- *Rapid*--6.3 to 20.0 in./hr.
- *Very rapid*--More than 20.0 in./hr.

Permittivity. The volumetric flow rate of water per unit cross-sectional area per unit head under laminar flow conditions, in the normal direction generally through a geotextile.

Pervious. Allowing movement of water.

Pesticides. Chemical compounds used for the control of undesirable plants, animals, or insects. The term includes insecticides, herbicides, algicides, rodenticides, nematocides, fungicides, and growth regulators.

pH. A numerical measure of hydrogen ion activity, the neutral point being 7.0. All pH values below 7.0 are acid, and all above 7.0 are alkaline.

Phosphorus (available). Inorganic phosphorus that is readily available for plant growth.

Physiographic Region (province). Large-scale unit of land defined by its climate, geology, and geomorphic history, and therefore uniform in physiography.

Piping. The formation of "pipes" by underground erosion. Water in the soil carries the fine soil particles away, and a series of eroded tubes or tunnels develop. These openings will grow progressively larger and can cause a dam failure.

Plastic Limit. The moisture content at which a soil changes from a semi-solid to a plastic state.

Plasticity Index. The numerical difference between the liquid limit and the plastic limit of soil. The range of moisture content within which the soil remains plastic.

Plunge Pool. A basin used to dissipate the energy of flowing water. Usually constructed to a design depth and shape. The pool may be protected from erosion by various lining materials.

Point Source. Any discernible, confined, and discrete conveyance including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or maybe discharged (P.L. 92-500, Section 502[14]).

Porosity. The volume of pore space in soil or rock.

Principal Spillway. A dam spillway generally constructed of permanent material and designed to regulate the normal water level, provide flood protection, and/or reduce the frequency of operation of the emergency spillway.

Private Drain. A drain that: (1) Is located on land owned by one person or by two or more persons jointly; and (2) Was not established under or made subject to any drainage statute.

Professional Engineer. A person licensed under the laws of the State of Indiana to practice professional engineering.

Rainfall Intensity. The rate at which rain is falling at any given instant, usually expressed in inches per hour.

Rational Method. A means of computing storm drainage flow rates (Q) by use of the formula $Q = CIA$, where C is a coefficient describing the physical drainage area, I is the rainfall intensity and A is the area.

Reach. The smallest subdivision of the drainage system, consisting of a uniform length of open channel. Also, a discrete portion of river, stream or creek. For modeling purposes, a reach is somewhat homogeneous in its physical characteristics.

Receiving Stream. The body of water into which runoff or effluent is discharged.

Recharge. Replenishment of groundwater reservoirs by infiltration and transmission from the outcrop of an aquifer or from permeable soils.

Recharge Basin. A basin provided to increase infiltration for the purpose of replenishing groundwater supplies.

Recurrence Interval. A statistical expression of the average time between floods equalling or exceeding a given magnitude.

Regulated Drain. A drain, either open channel or closed tile/sewer, subject to the provisions of the Indiana Drainage Code, I.C.-36-9-27.

Regulatory Flood. The discharge or elevation associated with the 100-year flood as calculated by a method and procedure which is acceptable to and approved by the Indiana Department of Natural Resources and the Federal Emergency Management Agency. The "regulatory flood" is also known as the "base flood".

Reservoir. A natural or artificially created pond, lake or other space used for storage, regulation or control of water. May be either permanent or temporary. The term is also used in the hydrologic modeling of storage facilities.

Retention. The storage of stormwater to prevent it from leaving the development site. May be temporary or permanent.

Retention Facility. A facility designed to completely retain a specified amount of stormwater runoff without release except by means of evaporation, infiltration or pumping. The volumes are often referred to in units of acre-feet.

Revetment. Facing of stone or other material, either permanent or temporary, placed along the edge of a stream to stabilize the bank and protect it from the erosive action of the stream. Also see Revetment riprap.

Rhizome. A modified plant stem that grows horizontally underground. A rhizomatous plant spreads (reproduces) vegetatively and can be transplanted with rhizome fragments.

Rill. A small intermittent watercourse with steep sides, usually only a few inches deep.

Riparian. Of, on, or pertaining to the banks of a stream, river, or pond.

Riparian Rights. A principle of common law requiring that any user of waters adjoining or flowing through his lands must use and protect them in a manner that will enable his neighbor to utilize the same waters undiminished in quantity and undefiled in quality.

Riprap. Broken rock, cobble, or boulders placed on earth surfaces, such as the face of a dam or the bank of a stream, for protection against the action of water (waves). Revetment riprap is material graded such that: (1) no individual piece weighs more than 120 lbs. and (2) 90-100% will pass through a 12-inch sieve, 20-60% through a 6-inch sieve, and not more than 10% through a 1½-inch sieve.

Riser. The inlet portions of a drop inlet spillway that extend vertically from the pipe conduit barrel to the water surface.

Riverine. Relating to, formed by, or resembling a stream (including creeks and rivers).

River Restoration. Restoring the channel of a stream or ditch to its perceived original, non-obstructed capacity by means of clearing & snagging, obstruction removal, and inexpensive streambank protection measures. The term "restoration", as noted, does not necessarily imply restoration or improvement of water quality or habitat within the channel or its adjacent area.

Runoff. That portion of precipitation that flows from a drainage area on the land surface, in open channels, or in stormwater conveyance systems.

Sand. (1) Soil particles between 0.05 and 2.0 mm in diameter. (2) A soil textural class inclusive of all soils that are at least 70% sand and 15% or less clay.

Saturation. In soils, the point at which a soil or aquifer will no longer absorb any amount of water without losing an equal amount.

Scour(ing). The clearing and digging action of flowing water, especially the downward erosion caused by stream water in seeping away mud and silt from the stream bed and outside bank of a curved channel.

Sediment. Solid material (both mineral and organic) that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface.

Sediment Delivery Ratio. The fraction of the soil eroded from upland sources that actually reaches a stream channel or storage reservoir.

Sediment Discharge. The quantity of sediment, measured in dry weight or by volume, transported through a stream cross-section in a given time. Sediment discharge consists of both suspended load and bedload.

Sediment Pool. The reservoir space allotted to the accumulation of sediment during the life of the structure.

Sedimentation. The process that deposits soils, debris and other materials either on the ground surfaces or in bodies of water or watercourses.

Seedbed. Soil prepared by natural or artificial means to promote the germination of seed and the growth of seedlings.

Seedling. A young plant grown from seed.

Seepage. The passage of water or other fluid through a porous medium, such as the passage of water through an earth embankment.

Settling Basin. An enlargement in the channel of a stream to permit the settling of debris carried in suspension.

Shoot. The above-ground portion of a plant.

Silt. (1) Soil fraction consisting of particles between 0.002 and 0.05 mm in diameter. (2) A soil textural class indicating more than 80% silt.

Silt Fence. A fence constructed of wood or steel supports and either natural (e.g. burlap) or synthetic fabric stretched across area of non-concentrated flow during site development to trap and retain on-site sediment due to rainfall runoff.

Slope. Degree of deviation of a surface from the horizontal, measured as a numerical ratio or percent. Expressed as a ratio, the first number is commonly the horizontal distance (run) and the second is the vertical distance (rise)--e.g., 2:1. However, the preferred method for designation of slopes is to clearly identify the horizontal (H) and vertical (V) components (length (L) and Width (W) components for horizontal angles). Also note that according to international standards (Metric), the slopes are presented as the vertical or width component shown on the numerator--e.g., 1V:2H. Slope expressions in this handbook follow the common presentation of slopes--e.g., 2:1 with the metric presentation shown in parenthesis--e.g., (1V:2H). Slopes can also be expressed in "percents". Slopes given in percents are always expressed as $(100 \cdot V/H)$ --e.g., a 2:1 (1V:2H) slope is a 50% slope.

Soil. The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. Also see alluvial soil, Clay, Cohesive soil, Loam, Permeability (soil), Sand, Silt, Soil horizon, Soil profile, Subsoil, Surface soil, Topsoil.

Soil and Water Conservation District (SWCD). A public organization created under state law as a special-purpose district to develop and carry out a program of soil, water, and related resource conservation, use, and development within its boundaries. A subdivision of state government with a local governing body.

Soil Horizon. A horizontal layer of soil that, through processes of soil formation, has developed characteristics distinct from the layers above and below.

Soil Profile. A vertical section of the soil from the surface through all horizons.

Soil Structure. The relation of particles that impact to the whole soil a characteristic manner of

breaking--e.g., crumb, block, platy, or columnar structure.

Soil Texture. The physical structure or character of soil determined by the relative proportions of the soil separates (sand, silt, and clay) of which it is composed.

Specific Gravity. The ratio of (1) the weight in air of a given volume of soil solids at a stated temperature to (2) the weight in air of an equal volume of distilled water at a stated temperature.

Spillway. (1) A passage, such as a paved apron or channel, for surplus water over, around, or through a dam or similar structure. (2) An open or closed channel, or both, used to convey excess water from a reservoir. It may contain gates, either manually or automatically controlled. to regulate the discharge of excess water. Also see Emergency spillway, Principal spillway.

Sprig. Section of plant stem material (rhizome, shoot, or stolon) used in vegetative planting.

Stolon. Modified plant stem that grows horizontally on the soil surface.

Storm Duration. The length of time that water may be stored in any stormwater control facility, computed from the time water first begins to be stored.

Storm Event. An estimate of the expected amount of precipitation within a given period of time. For example, a 10-yr. frequency, 24-hr. duration storm event is a storm that has a 10% probability of occurring in any one year. Precipitation is measured over a 24-hr. period.

Storm Frequency. The time interval between major storms of predetermined intensity and volumes of runoff--e.g., a 5-yr., 10-yr. or 20-yr. storm.

Stormwater Runoff. The water derived from rains falling within a tributary basin, flowing over the surface of the ground or collected in channels or conduits.

Storm Sewer. A sewer that carries stormwater, surface drainage, street wash, and other wash waters but excludes sewage and industrial wastes. Also called a storm drain.

Stream. See Intermittent stream, Perennial stream, Receiving stream.

Streambanks. The usual boundaries (not the flood boundaries) of a stream channel. Right and left banks are named facing downstream.

Stream Gauging. The quantitative determination of stream flow using gauges, current meters, weirs, or other measuring instruments at selected locations (see Gauging station').

Stream Length. The length of a stream or ditch, expressed in miles, from the confluence of the stream or ditch with the receiving stream to the upstream extremity of the stream or ditch, as indicated by the solid or dashed, blue or purple line depicting the stream or ditch on the most current edition of the seven and one-half (7½) minute topographic quadrangle map published by the United States Geological Survey, measured along the meanders of the stream or ditch as depicted on the map.

Subarea/Subbasin. Portion of a watershed divided into homogenous drainage units which can

be modeled for purposes of determining runoff rates. The subareas/subbasins have distinct boundaries, as defined by the topography of the area.

Subsoil. The B horizons of soils with distinct profiles. In soils with weak profile development, the subsoil can be defined as the soil below which roots do not normally grow.

Subsurface Drain. A pervious backfield trench, usually containing stone and perforated pipe, for intercepting groundwater or seepage.

Subwatershed. A watershed subdivision of unspecified size that forms a convenient natural unit. See also Subarea.

Surface Runoff. Precipitation that flows onto the surfaces of roofs, streets, the ground, etc., and is not absorbed or retained by that surface but collects and runs off.

Surface Soil. The uppermost part of the soil ordinarily moved in tillage or its equivalent in an uncultivated soil. Frequently referred to as the plow layer, the Ap layer, or the Ap horizon. Surface soil is usually darker in color due to the presence of organic matter.

Suspended Solids. Solids either floating or suspended in water.

Swale. An elongated depression in the land surface that is at least seasonally wet, is usually heavily vegetated, and is normally without flowing water. Swales conduct stormwater into primary drainage channels and may provide some groundwater recharge.

Tackifier. An adhesive material sprayed on top of mulch to hold it in place.

Tailwater. The water surface elevation at the downstream side of a hydraulic structure (i.e. culvert, bridge, weir, dam, etc.).

Tile Drain. Pipe made of perforated plastic, burned clay, concrete, or similar material, laid to a designed grade and depth, to collect and carry excess water from the soil.

Tile Drainage. Land drainage by means of a series of tile lines laid at a specified depth, grade, and spacing.

Time of Concentration (t_c). Is the travel time of a particle of water from the most hydraulically remote point in the contributing area to the point under study. This can be considered the sum of an overland flow time and times of travel in street gutters, , storm sewers, drainage channels, and all other drainage ways.

Toe of Dam. The base or bottom of the sloping faces of a constructed dam at the point of intersection with the natural ground surface--normally a much flatter slope. A dam has an inside toe (the impoundment or upstream side) and an outside toe (the downstream side).

Toe of Slope. The base or bottom of a slope at the point where the ground surface abruptly changes to a significantly flatter grade.

Topographic Map. Graphical portrayal of the topographic features of a land area, showing both

the horizontal distances between the features and their elevations above a given datum.

Topography. The representation of a portion of the earth's surface showing natural and man-made features of a give locality such as rivers, streams, ditches, lakes, roads, buildings and most importantly, variations in ground elevations for the terrain of the area.

Topsoil. (1) The dark-colored surface layer, or A horizon, of a soil; when present it ranges in depth from a fraction of an inch to 2-3 ft. (2) Equivalent to the plow layer of cultivated soils. (3) Commonly used to refer to the surface layer(s), enriched in organic matter and having textural and structural characteristics favorable for plant growth.

Toxicity. The characteristic of being poisonous or harmful to plant or animal life. The relative degree or severity of this characteristic.

Trap Efficiency. The capability of a reservoir to trap sediment.

Trash Rack. A structural device used to prevent debris from entering a pipe spillway or other hydraulic structure.

Tributary. Based on the size of the contributing drainage area, a smaller watercourse which flows into a larger watercourse.

Turbidity. (1) Cloudiness of a liquid, caused by suspended solids. (2) A measure of the suspended solids in a liquid.

Turf. Surface soil supporting a dense growth of grass and associated root mat.

Ultra-Violet Radiation Stability. Resistance to degradation from ultraviolet rays. Most synthetic fabrics and plastics, without special treatment, will quickly lose strength when exposed to sunlight.

Underdrain. A small diameter perforated pipe that allows the bottom of a detention basin, channel or swale to drain.

Unified Soil Classification System (USCS). A system of classifying soils that is based on their identification according to particle size, gradation, plasticity index, and liquid limit.

Uniform Flow. A state of steady flow when the mean velocity and cross-sectional area remain constant in all sections of a reach.

Vegetative Stabilization. Protection of erodible or sediment producing areas with: permanent seeding (producing long-term vegetative cover), short-term seeding (producing temporary vegetative cover), or sodding (producing areas covered with a turf of perennial sod-forming grass)

Water Quality. A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.

Water Resources. The supply of groundwater and surface water in a given area.

Water Table. (1) The free surface of the groundwater. (2) That surface subject to atmospheric pressure under the ground, generally rising and falling with the season or from other conditions such as water withdrawal.

Watercourse. Any river, stream, creek, brook, branch, natural or man-made drainageway in or into which stormwater runoff or floodwaters flow either continuously or intermittently.

Watershed. The region drained by or contributing water to a specific point that could be along a stream, lake or other stormwater facilities. Watersheds are often broken down into subareas for the purpose of hydrologic modeling.

Watershed Area. All land and water within the confines of a drainage divide. See also Watershed.

Weep Holes (engineering). Openings left in retaining walls, aprons, linings, or foundations to permit drainage and reduce pressure.

Weir. A channel-spanning structure for measuring or regulating the flow of water.

Weir Notch. The opening in a weir for the passage of water.

Wetlands. Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions and/or those wetland areas that are under the COE jurisdiction.

Windthrow. (1) Uprooted by the wind. (2) A tree or trees so uprooted.

Zoning Ordinance. An ordinance based on the police power of government to protect the public health, safety, and general welfare. It may regulate the type of use and intense type of development of land and structures to the extent necessary for a public purpose. Requirements may vary among geographically defined areas ("zones"). Regulations generally cover such items as height and bulk of buildings, density of dwelling units, off-street parking, control of signs, and use of land for residential, commercial, industrial, or agricultural purposes. A zoning ordinance is one of the major methods for implementation of a comprehensive plan.

Last Print/Revision Date: October 13, 1996