

Glossary of Terms used in the Stormwater Industry

Term	Code	Definition
Q	Hyd	The symbol for discharge, typically appears with units of L/s or m ³ /s.
q	Hyd	The symbol for discharge per unit length, typically appears with units of L/s/m, m ³ /s/m or m ² /s.
Rain	Gen	Precipitation in the form of liquid water drops, either as drops of appreciable size or of smaller widely scattered drops. Rain can be characterised as either intermittent, continuous or showers.
	Met	Precipitation in the form of a liquid that exceeds a rate of 0.8 mm per hour.
Raindrop impact erosion	Esc	The splattering of soil particles caused by the impact of raindrops on the soil surface. The loosened particles may or may not be subsequently removed by runoff. Raindrop impact erosion is a component of sheet erosion. Also known as SPLASH EROSION.
Raindrop splash	Esc	The result of the violent break up and dispersion of raindrops when they hit the ground surface. If the surface is not protected soil particles might be dislodged and spattered a considerable distance by the energy of the raindrop's impact.
Rainfall	Gen	1. An episode of rain precipitation. The spatial distribution of rainfall events can be described using the following terms: Few: Showers that are widely separated, and not occurring often. Isolated: Showers that are well separated in location during a given period. Local: Showers restricted to certain, usually relatively small, areas. Patchy: Precipitation occurring irregularly throughout an area or district. Scattered: Showers that are not widespread but which occur widely throughout an area. Denotes a slightly greater incidence than 'isolated'. Sporadic: Occasional or isolated rainfall events. Widespread: Precipitation occurring extensively throughout an area.
	Gen	2. The amount of water falling as rain, snow, or similar, within a given time and area, ordinarily expressed as a hypothetical depth of coverage over the catchment.
Rainfall excess	Hyd	The rainfall that is neither retained on the land surface nor infiltrated into the soil.
Rainfall intensity	Hyd	The average rate of rainfall over a given time interval, ordinarily expressed in millimetres per hour (mm/hr).

Rainfall losses	Hyd	The volumetric difference between the observed total rainfall hyetograph and the rainfall excess hydrograph.
Rain garden	Sto	A bioretention-based stormwater treatment system integrated into an urban environment. Also known as BIORETENTION SYSTEMS.
Rainwater	Gen	Water that has fallen as rain.
Rainwater harvesting	Sto	The capture and storage of rainfall for later usage, but not rainfall which is captured and released as part of a detention/retention system where the water performs no other function or usage.
Rainwater tank	Sto	A tank, above or below ground, used to collect and store rainfall from roofs and other relatively clean surfaces.
Ramsar wetland	Res	A wetland identified as internationally important for the protection of migrating birds by the Ramsar Convention on Wetlands of 1971 held in the Iranian town of Ramsar which resulted in a United Nations treaty enacted in 1975.
Range	Hyd	Maximum measured or predicted stream flow rate minus the minimum measured or predicted flow rate.
Rapidly varied flow	Hyd	A condition of free surface flow where the streamlines are either not near-horizontal, near-parallel, or are heavily curved. Rapidly varied flow is normally associated with an abrupt change in water depth and/or channel width, e.g. flow conditions associated with a sharp-crested weir, sluice gate, or hydraulic jump.
Rare flood	Hyd	Arbitrary adopted as a flood with an exceedance probability greater than 1 in 100.
RAS	Hyd	Abbreviation of the U.S. Army Corps of Engineers' River Analysis System as used in the numerical model HEC-RAS.
Rating curve	Hyd	The numerical or graphical relationship between the water surface elevation and its associated discharge at a given location along an open channel or stream. Also known as the STAGE-DISCHARGE CURVE.
Rational formula	Hyd	A formula for estimating peak discharge of runoff from a given catchment area. $Q = CIA/360$ (SI units) Where: Q = peak discharge [m^3/s]; C = runoff coefficient [non-dimensional]; I = the rainfall intensity [mm/hr] for the selected return period [yrs] and storm duration equal to the time of concentration for the catchment; and A = the catchment area [ha].
Rational Method	Hyd	A hydrologic procedure involving use of the Rational formula.
Raw water	Res	1. Water which has received no treatment.
	Res	2. Water entering a plant for further treatment.

Reach	Sto	The smallest subdivision of the drainage system consisting of a length of near uniform open channel.
	Wwy	A discrete portion of a river, stream or creek between bends.
Reaction rate equations	Sci	A measure of how rapidly a particular component (e.g. BOD, SS, N) either forms or disappears in a given environment as a function of the conditions (e.g. temperature, mixing) there.
Receiving water	Sto	The body of water into which runoff or effluent is discharged
Recharge	Res	Water that infiltrates through the soil surface to the watertable.
Recharge area	Res	An area in which there is a net downward movement of water into the aquifer.
Recharge basin	Res	A basin provided to increase infiltration for the purpose of replenishing groundwater supply.
Recharge capability	Res	The quantitative ability of the soils and underlying material to allow precipitation and runoff to infiltrate and reach the aquifer.
Recharge well	Res	A stormwater infiltration device that disposes of stormwater directly into the subsurface via a perforated vertical pipe or porous well.
Reclaimed water	Res	Contaminated water collected and treated to a useable form.
Recreational use of water	Wwy	Primary contact recreational use of a water body, or secondary contact recreational use, or visual recreational use.
Rectangular flume	Hyd	<p>A curved horizontal constriction (choke) within an open channel, with a horizontal flat bed, that hydraulically functions as a broad-crested weir allowing critical depth to occur at the choke.</p> <p>As a flow-measuring device, Rectangular flumes provide the advantage of allowing the near-free passage of bed sediments thus allowing flume to remain generally free settled sediment.</p> <p>See also FLUME.</p>
Recurrence interval	Hyd	The average interval of time within which the magnitude of a hydrologic event will be equalled or exceeded at least once on average.
Recycle	Gen	To treat materials so that new products can be manufactured from them, for example, wastewater being treated so that it can be used for irrigation, industrial, or domestic purposes.
Recycled water	Res	Treated stormwater, grey water or black water suitable for a range of uses including toilet flushing, irrigation and industrial processing. May also apply to the treatment of wastewater to drinking water standard.
Recycling of waste water	Res	The process of reusing water discharged from a process or property.
Redox	Sci	The potential of a soil to oxidise or reduce chemical substances.
Redox potential	Sci	The measurement of the state of oxidation of a system.
Reduce	Gen	To lower the demand on a substance, such as potable water, or to lower the degree or intensity of an effect such as flooding.

Reduced conditions	Sci	The removal of oxygen, or the addition of hydrogen from a substance, or more generally, any reaction in which an atom accepts an electron.
Reduced level (RL)	Eng	The elevation of a point or mark relative to a given datum.
Reduction	Sci	The process of chemical removal of oxygen, addition of hydrogen ions, or addition of electrons, by a reducing agent.
Redundancy in design	Eng	A design process that ensures that failure of a single component of the system does not result in the failure of the entire system.
Referable dam	Eng	Any artificial barrier, temporary or permanent, including related works, which does or could impound, divert or control water, other liquids, silt, debris or other liquid-borne material that complies with or exceeds a set of minimum criteria usually specified by a State agency.
Regional flood frequency analysis	Hyd	<p>The long-term statistical analysis of either peak flood discharge or peak water level, at a given location, usually expressed as an annual exceedance probability based on an annual series data set (i.e. a data set consisting of the highest discharge or water level in each year of record). The year may be a calendar year or water year.</p> <p>Flood frequency analysis based on a partial series data set is normally expressed as in terms of an average recurrence interval (ARI).</p> <p>Also known as FLOOD FREQUENCY ANALYSIS.</p>
Regional flood model	Hyd	A numerical flood routing model that has been calibrated to best represent the type of stream and catchment conditions associated with a given region.
Regional hydrographic equation	Hyd	A hydrographic (rainfall-runoff) equation that has been calibrated to best represent those catchment conditions and stream response times most commonly associated with a given climatic or geographic region.
Regional hydrographic model	Hyd	A numerical hydrographic model that has been calibrated to best represent those catchment conditions most commonly associated with a given region.
Regional skew	Hyd	1. Methodology where the assessed skew of a statistical analysis is improved by weighting from pooled information for other sites in the region.
	Hyd	2. The skew of a statistical analysis based on data collected from a region rather than a single recording station.
Regular pattern	Lfm	<p>A particular layout of the branches of a major watercourse as viewed in plan form, where the branches and main channel are primarily straight and generally intersect at approximately 90 degrees, but adjacent watercourses are not necessarily parallel to each other.</p> <p>Typically occurs in faulted areas where streams follow a more easily eroded fractured rock in fault lines.</p>

Regular storm event	Sto	A storm event that is expected to be equalled or exceeded on a regular basis. Ordinarily assumed to have a frequency of less than a 1 in 3-month or 1 in 1-year event.
Regulated	Wwy	A river or creek in which water is released from storage to meet diversion requirements downstream, or to reduce flooding.
Rehabilitate	Gen	To restore to a condition appropriate for the desired ongoing land use, and sufficiently stable to achieve the desired discharge water quality objectives.
Rehabilitation	Wwy	The process of improving the geomorphological and ecological conditions of a waterway to those more closely resembling natural conditions. This includes channel enhancement to minimise erosion and siltation, stream bank protection and revegetation of the waterway channel and corridor.
Reinforced-grass	Esc	A turfing application based on pre-grown grass reinforced with a geosynthetic mat or mesh. The reinforcing may consist of surface-laid webbing placed over newly seeded topsoil; a geotextile mat placed beneath turf strips; or a three-dimensional cellular grid system that is topsoiled and seeded or turfed.
Release net	Sto	A litter collection net attached to the end of a stormwater pipe outlet used to filter gross pollutant, excluding sediment, from passing stormwater. A release system allows the net to break free of the pipe outlet in the case of extreme flows or excessive hydraulic pressure caused by debris blockage of the net.
Remediation	Wwy	The act of enhancing the ecological condition, landscape, open space, and recreational values of a watercourse. The aim might not necessarily be achieving a pre-impact condition.
Remobilisation	Sci	The process of transforming sedimented pollutants by microbial or chemical processes into a dissolved form and transfer by diffusion from the sediment pore water into the water column.
Reno mattress	Eng	A commercial brand of a ROCK MATTRESS.
Reservoir	Res	1. An artificial dam, lake, pond or basin for storage, regulation or control of water, silt, debris or other liquid or liquid-carried material.
	Res	2. The water impoundment behind a barrier constructed across a natural waterway or on the periphery of a reservoir.
Reservoir capacity	Res	The total storage capacity up to 'full supply level', but not up to maximum flood level.
Residence time	Sto	The average length of time that water stays in a defined body such as a lake or wetland. Also known as RETENTION TIME.
Residual moisture content	Sol	The soil moisture content after it has been thoroughly drained.
Residual risk	Eng	The risk remaining after implementation of an action plan for controlling the level of risk.
Residue	Wat	The constituents in a water sample that are retained on a specific filter medium.

		Also known as the SUSPENDED CONSTITUENT.
Restoration	Wwy	The process of restoring original (natural) values and structure, such as returning a waterway ecosystem back to a pre-impact condition.
Re-suspension	Sto	The process of remobilising particles by wind or the physical entrainment of settled particles by hydraulic turbulence, or as a result of sediment bio-turbation. Typical water pollutants affected by re-suspension include sediments, hydrocarbons and metals.
Retardation basin	Sto	A stormwater detention, extended detention or retention basin.
Retardation storage	Sto	The maximum design storage volume of any drain, channel, tank, pond or basin designed to delay the passage of water beyond that required to allow the efficient transportation of the water.
Retardation system	Sto	Any detention, extended detention or retention system, including on-site detention systems and rainwater tanks.
Retention	Sto	A reduction in flow volume by long-term storage or discharge to an alternative outlet such as evaporation or infiltration.
Retention basin	Sto	A large, open basin designed to retain a portion of the stormwater inflow either for water quality treatment benefits, or to assist in reducing the volume of runoff discharged from the basin. The upper, free-draining portion of the basin may be designed to operate as a traditional detention or extended detention system.
Retention pond	Sto	A stormwater or flood retention system based around the controlled operation of a pond or lake.
Retention practices	Sto	Stormwater detention systems that incorporate a permanent pool of water, detain and release runoff over five days or even longer, and allow sedimentation, flocculation, and chemical and biological processes to occur, reducing stormwater pollutants. During and immediately after storms, runoff is temporarily stored above the permanent water pool. Also known as WET DETENTION PRACTICES.
Retention system	Sto	Any stormwater collection systems that retains a portion of the stormwater inflow either for water quality treatment benefits, or to assist in reducing the volume of runoff discharged from the basin.
Retention time	Sto	The average length of time that water stays in a defined water body such as a lake or wetland. Also known as RESIDENCE TIME.
Retro-fit	Wwy	To modify or rehabilitate a system such that it integrates into the existing infrastructure and surrounding environment.
Return flow litter basket	Sto	A stormwater treatment system comprising of an inlet area with weir, leading to a labyrinth litter basket assembly. These devices use the force of return-flow water leaving the collection basket to produce a hydraulically driven barrier to divert incoming water into the collection basket.

Return period	Hyd	The average period between occurrences of an event or one greater than it, or the expected value of the recurrence interval.
Reuse	Gen	To use a product, with little or no treatment or modification, for a second or subsequent time for the same purpose as its original use.
Revegetation	Esc	The process of re-establishing plants on an area of ground depleted or devoid of vegetation in order to protect the ground against erosive agents; improve the nutrient and sediment interception and filtration capacity; and to provide improved fauna habitat.
Reverse osmosis	Wat	An advanced method used in water and wastewater treatment that relies on a semi-permeable membrane to separate the water from its impurities.
Revetment	Eng	A facing of stone, riprap or other erosion-resistant material placed on a sloping face of earth such as the edge of stream channel or shoreline, to stabilise the bank and protect it from the erosive action of water.
Revetment mattress	Eng	A hard surface armouring formed by using pocketed pervious fabric filled with concrete (grout). Ordinarily used for scour control.
Revised Universal Soil Loss Equation (RUSLE)	Sol	A numerical soil loss model used to predict the long-time (average) soil loss rates resulting from sheet and rill erosion, but not wind or gully erosion. The model is a revision of the Universal Soil Loss Equation (USLE). Often referred to as the UNIVERSAL SOIL LOSS EQUATION.
Reynolds number	Hyd	Dimensionless number proportional to the ratio of the inertial force over the viscous force. The Reynolds number provides an indication of the degree of turbulence of a flow.
Rhizosphere	Bot	The chemical sphere of influence of plant roots in soils.
Riffle	Wwy	A shallow area of a river where water flows rapidly and often turbulently over stones or gravel.
Right bank	Hyd	The right bank of a watercourse or the right channel wall when looking downstream.
Rigid lining (channel)	Eng	A non-flexible surface lining of an open channel that does not allow minor shifting or adjustments in the channel cross-section or elevation without causing catastrophic failure. Rigid channel linings include concrete, grouted riprap, stone masonry and asphalt.
Rill	Esc	A small channel, cut by concentrated runoff, through which water flows during and immediately after rain. Rills typically form as a result of the action of heavy rainfall on exposed soil surfaces such as recently tilled land or constructed batters. They might be up to 30cm deep but can be largely obliterated by tillage operations. This distinguishes them from gullies.
Rill erosion	Esc	The process of removal of soil by runoff from the land surface whereby numerous small channels, generally up to 30cm deep, are formed.

Riparian	Wwy	Relating to the bank of a river or other body of water. Ordinarily used to describe the rights of access to a river via its banks, and the vegetation that occurs along the riverbanks.
Riparian vegetation	Wwy	Vegetation that occurs from normal river level to the edge of the floodplain, and has a direct association/link with the watercourse.
Riparian zone	Wwy	That part of the landscape adjacent to a watercourse that influences, and is influenced by, watercourse processes. Usually includes the instream habitats, beds, banks and floodplains of watercourses, or their parts.
Riprap	Eng	Loose, medium to large rock or stone used to protect earth surfaces against erosion by flowing water or wave action, as in a revetment.
Risk	Gen	<p>The chance of something happening that will have undesirable effects or an impact on objectives. Often specified in terms of an event or circumstances and the consequences that may flow from it.</p> <p>Risk is measured in terms of a combination of the consequences of an event and their likelihood of occurrence. Risk may have a positive or negative impact.</p> <p>Estimates of risk may be expressed in absolute or relative terms. Absolute risk is the excess risk due to exposure. Relative risk is the ratio of the risk in the exposed population to the risk in the unexposed population.</p>
Risk analysis	Gen	The systematic process undertaken to understand the nature of potential risks and the level of risk.
Risk assessment	Gen	The overall process of risk identification, risk analysis and risk evaluation.
Risk-based design	Eng	The design of urban stormwater management facilities on the basis of local standards and also on the basis of the risk (cost) of the flow exceeding a selected design.
Risk criteria	Gen	The terms of reference by which the significance of risk is assessed. It may include associated costs and benefits, legal and statutory requirements, socioeconomic and environmental aspects, the concerns of stakeholders, priorities and other inputs to the assessment.
Risk evaluation	Gen	The process of comparing the level of risk against a given risk assessment criteria.
Risk identification	Gen	The process of determining what, where, when, why and how something could happen.
Risk management	Gen	The culture, processes and structures that are directed towards realising potential opportunities at the same times as managing adverse effects.
Risk reduction	Gen	The act of lessening the likelihood, and/or negative consequences associated with a risk.
Risk treatment	Gen	The process of selection and implementation of measures to modify risk.

River	Wwy	A major watercourse relative to other streams within a given region, ordinarily with a high natural sediment flow, a near constant base flow and with sufficient bed width to result in an open canopy. Bed vegetation is normally sparse and usually does not usually play a significant role in channel stability due to the disturbing influence of the high sediment load.
River basin	—	See CATCHMENT.
Riverhead	Wwy	The source of a river.
River reach	Wwy	A discrete portion of a river between two bends.
Riverine	Wwy	Relating to rivers and their floodplains.
Riverside	Wwy	The bank of a river
Rivulet	Wwy	A very small stream.
Roadside pollution containment system	Sto	A pollution trap designed to capture and hold a given volume of fluid released from a road surface. The units are designed to capture oil, fuel or chemical spills from traffic accidents, and/or a specified depth of runoff (first flush) from the connected catchment. Water quality treatment may or may not occur within the system. Ordinarily the captured pollution is pumped from the basin and treated at an off-site location.
Rock	Gen	A large single mass of stone, or mineral matter of various composition.
Rock beaching	Wwy	A protective layer of loose stones placed against a slope to protect it against wave action or other water erosion. Also known as BEACHING.
Rock filter dam	Esc	A sediment trap consisting of a rock embankment lined with aggregate and/or filter cloth on the upstream face. The embankment provides structural support while the aggregate and/or filter cloth acts as both a filter medium and flow control system.
Rock mattress	Eng	A low profile flexible rock-filled basket with a length and width significantly greater than its depth thus forming a 'mattress' like structure. Ordinarily used for scour protection in areas of high flow velocity and/or turbulence. The multi-celled wire mattresses are usually heavily galvanised and coated with PVC to extend their design life within aquatic environments.
Rockfill	Eng	Material composed of large rocks or stones loosely placed.
Rockfill dam	Eng	An embankment dam in which more than 50 per cent of the total volume comprises compacted or dumped pervious natural stones.
Roller	Hyd	A large-scale turbulent eddy, such as that found in some hydraulic jumps.
Roofwater	Sto	Stormwater runoff released from elevated, relatively 'clean' surfaces, such as roofs, that has not passed over the ground or within a ground-level drain.

Roofwater harvesting	Sto	The process of collecting and storing stormwater runoff from roofs for later on-site use.
Roughness (base)	Hyd	<p>The channel roughness that would exist if the channel was straight and uniform in cross section.</p> <p>The base roughness depends on the material form of the channel (i.e. cohesive earth, sand, gravel, cobbles, boulders, or bedrock) and the type and density of vegetation cover. The stability of the channel material and the degree of natural sediment flow significantly influence the base roughness of the channel.</p>
Roughness (bed form)	Hyd	<p>Channel roughness directly related to the type of exposed bed material and the degree of irregularity in the bed form where such irregularity is minor compared to the size and irregularity of the channel cross section within a given reach.</p> <p>Bed form roughness is a function of flow, grain size, bed shear and water viscosity (i.e. water temperature).</p>
Roughness (channel)	Hyd	The overall hydraulic roughness of a channel, including base roughness, channel irregularity, channel meander, channel cross-sectional variation, channel vegetation and channel obstructions.
Roughness (channel irregularity)	Hyd	<p>Channel roughness directly related to either unusual roughness irregularities (eg. a large, isolated, in-bank tree) or cross-sectional irregularities (eg. scalloped bank) where such irregularities are significant compared to the width of the channel.</p> <p>The effects of channel irregularity on channel roughness are usually only significant when the ratio of channel width to depth is small.</p>
Roughness (channel meander)	Hyd	Channel roughness directly relating to the hydraulic effects of channel meanders.
Roughness (channel variation)	Hyd	Channel roughness directly relating to the effects of changes in cross-sectional shape or size within a given reach of a channel.
Roughness (cross section)	Hyd	Channel roughness relating only to those factors associated with the channel as opposed to those factors relating to the floodplain.
Roughness (form)	Hyd	Channel roughness affecting the stream flow that results from medium-scale irregularities in the bed and banks of a channel, including dunes and ripples on the bed of an alluvial channel.
Roughness (hydraulic)	Hyd	A property of the surface roughness or channel form that directly affects the flow properties of a conduit, channel or overland flow path. The flow properties of specific interest include turbulence, average flow velocity and the variation of flow velocity within a section of flow.
Roughness (material)	Hyd	Hydraulic roughness directly related to the type of exposed material. Material roughness is a function of flow, grain size, bed shear and water viscosity (i.e. water temperature).
Roughness (obstruction)	Hyd	Channel roughness directly relating to irregular channel obstructions such as logs, large boulders, pipe crossings and bridge piers.

Roughness (surface)	Hyd	<p>Hydraulic roughness directly related to the type of surface material and the degree of irregularity in the surface where such irregularity is minor compared to the size and irregularity of the flow cross section.</p> <p>Surface roughness is a function of flow, grain size, bed shear and water viscosity (i.e. water temperature).</p>
Roughness (vegetation)	Hyd	Channel roughness directly relating to the type and density of vegetation contained within the flow.
Roughness coefficient	Hyd	<p>A factor describing the roughness (irregularities) of surfaces in relation to energy loss in flows passing over the surface. Most commonly used as a coefficient within hydrodynamic equations.</p> <p>Common hydraulic roughness coefficients include Manning's 'n', and the Chezy 'C'.</p>
Routing	Hyd	<p>The process of determining the time and magnitude of flow (i.e. hydrograph) at a point on a watercourse from known or assumed hydrographs at one or more points upstream.</p> <p>It includes the numerical simulation of the passage of a flood wave through a reservoir.</p> <p>Also known as FLOOD ROUTING.</p>
Rubble	Eng	Material consisting of stone of irregular shapes and sizes, broken brick or the like, used to provide a stable or permeable filling.
Rubble drain	Sto	<p>An excavated trench either filled or partially filled with selected rubble, broken stone, or gravel through which water can percolate either longitudinally along the trench and/or laterally into the adjacent soil.</p> <p>Also known as a SPALL DRAIN.</p>
Runoff	Hyd	<p>That part of rainfall, snow or hail not lost to infiltration, evaporation, transpiration or depression storage that flows from the catchment area past a specified point.</p> <p>It includes that portion of precipitation that appears as flow in streams; and drainage or flood discharges that leave an area as surface flow or as pipeline flow, having reached a channel or pipeline by either surface or sub-surface routes.</p>
Runoff routing	Hyd	The process of determining the time and magnitude of flow (i.e. hydrograph) at a point on a catchment from known or assumed hydrographs at one or more points up-slope.
Run-on	Hyd	Surface water flowing onto an area as a result of runoff occurring higher up the slope. Commonly used in an urban context as a contributing factor to increased erosion hazard.
	Rur	Surface water flowing onto an area as a result of runoff occurring higher up the slope, or surface water that is diverted from sloping country onto flatter land to achieve increased agricultural production from such land.
Rural catchment	Hyd	A drainage catchment consisting predominantly of rural or rural-residential lands.

Ryzner stability index (RSI)	Eco	A number used to provide an extra margin of safety beyond the known or estimated sensitivities of aquatic organisms. Often applied when sufficient information about the toxicity, particularly the chronic toxicity, of a particular substance is not well known.
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