

TP223 - Forestry operations in the Auckland region

A guideline for erosion and sediment control

REFERENCES & DEFINITIONS



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References

1. Storm Sediment Yields from Basins with Various Landuses in Auckland Area, ARC Technical Publication 51, 1994
2. New Zealand Forest Service: Water Table and Culvert Spacings Graph for Lean Clays (Civil Engineering Bulletin No 4, August 1980).

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Definitions

Aggregate

Crushed rock or gravel screened to sizes for use in road surfaces, concrete or bituminous mixes.

(AEP) Annual Exceedance Probability

A statistic term defining the probability of an event occurring annually. Expressed as a percentage and generally used in hydrology to define rainstorm intensity and frequency. For example, a 5% AEP event has a 5% chance of being exceeded in any one year. This has replaced the return period concept. A 5% AEP event expresses the 20 year return period in probability terms.

Antiseep Collar

An impermeable barrier, usually of concrete, constructed at intervals within the zone of saturation along the conduit of a primary outlet pipe to increase the seepage length along the conduit and thereby prevent piping or seepage in the compacted fill material along the outside of the pipe.

Aquatic

Living or found in water

Area of Disturbance

Refer to definition for Disturbed Area.

Baffles

Semi-permeable or solid barriers placed in a sediment retention pond to deflect or regulate flow and effect a more uniform distribution of velocities, hence creating better settling conditions.

Batter

A constructed slope of uniform gradient.

Bed

(Part 1, Section 2, Resource Management Act 1991) Means

- (a) In relation to any river –
 - (i) For the purpose of esplanade reserves, esplanade strips, and subdivision, the space of land which the waters of the river cover at its annual fullest flow without overtopping its banks;
 - (ii) In all other cases, the space of land which the waters of the river cover at its fullest flow without overtopping it banks and
- (b) In relation to any lake, except a lake controlled by artificial means –
 - (i) For the purpose of esplanade reserves, esplanade strips, and subdivision, the space of land which the waters of the lake cover at its annual highest level without exceeding its margin;
 - (ii) In all cases, the space of land which the waters of the lake cover at its highest level without exceeding its margin; and
- (c) In relation to any lake controlled by artificial means, the space of land which the waters of the lake cover at its maximum permitted operating level; and
- (d) In relation to the sea, the submarine areas covered by the internal waters and the territorial sea.

BPO (Best Practicable Option)

(Section 2, Resource Management Act 1991) in relation to a discharge of a contaminant or an emission of noise, means the best method of preventing or minimising the adverse effects on the environment having regard, among other things, to –

- (a) the nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and
- (b) The financial implications, and the effects on the environment, of that option when compared with other options; and

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- (c) The current state of technical knowledge and the likelihood that the option can be successfully applied.

Catchment

A geographical unit within which surface runoff is carried under gravity by a single drainage system to a common outlet or outlets. Also commonly referred to as a Watershed or Drainage Basin.

Category 1 (Perennial) Watercourse

A river or stream which meets any one or more of the following criteria:

- (a) has continual flow; or
- (b) has natural stable pools having a depth at their deepest point of not less than 150 millimetres and a surface area of not less than 0.5 square metres present throughout the period commencing 1 February and ending 30 April of any year; or
- (c) has any of the following aquatic biota at any time of year: (eels, kokopu, crayfish, mayflies, stoneflies, caddisflies, oxygen weed species *Elodea* sp., *Egeria* sp., *Lagarosiphon* sp. And pondweed species *Potamogeton* sp.).

Note that this definition does not include:

- a. *any artificial watercourse (including an irrigation canal, water supply race, canal for the supply for electricity power generation, and farm drainage canal); or*
- b. *any stream which does not meet criterion (a) or (b) of the definition and which only meets criterion (c) because there is a dam or artificial pond (on a stream) containing any of the listed fauna and flora.*

Note: the above definition is from the Proposed Auckland Regional Plan: Air, Land & Water (June 2005) and at the time of writing of TP223, this plan was subject to appeal. It is recommended you refer to this plan for the current definition.

Category 2 (Ephemeral) Watercourse

Any stream that is not a Category 1 stream.

Note this definition does not include any artificial watercourse (including and irrigation canal, water supply race, canal for the supply for electricity power generation, and farm drainage canal).

Refer to the definition in the regional plan for confirmation.

Channel

That part of a watercourse system where normal flow is contained. The channel is generally incised into the flood plain and for many of the stable stream systems in New Zealand can be defined in capacity as being just able to accommodate the annual return period flow (100% AEP) without overtopping.

Also refers to an artificial conduit such as a ditch excavated to convey water.

Channel Stabilisation

Stabilisation of the channel profile by erosion control and/or velocity distribution through reshaping, the use of structural linings, mass blocks, vegetation and other measures.

Clay

A group of microcrystalline secondary minerals consisting of hydrous aluminium silicates that have sheet-like structures. Mineral particles are less than 0.002 mm in equivalent diameter.

Clay-rich Soils

A fine grained soil (including topsoil) that contains a high clay content (>35% finer than 0.002mm) and displays a typical clay behaviour when wet (*ie* it has cohesion, plasticity and is not dilatant).

Clean Water

Any water that has no visual signs of suspended solids, e.g. overland flow (sheet or channelled) originating from stable well-vegetated or armoured surfaces.

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Clean Water Diversion

A runoff control measure to convey cleanwater to an erosion proof outlet.

Compaction

For construction work in soils, engineering compaction is any process by which the soil grains are rearranged to decrease void space and bring them into closer contact with one another, thereby increasing the weight of solid material per unit of volume, increasing their shear and bearing strength and reducing permeability.

Concentrated Flow

The accumulation of sheet flow into discrete rills, gullies or channels, significantly increasing erosive forces.

Conduit

Any channel intended for the conveyance of water, whether open or closed.

Construction Staging – The phasing of earthworks to minimise the area of bare earth exposed at any one time.

Contaminant

Includes any substance (including gases, liquids, solids and micro-organisms) or energy (excluding noise) or heat, that either by itself, or in combination with the same, similar or other substances, energy or heat;

- (a) when discharged into water, changes or is likely to change the physical, chemical or biological condition of the water; or
- (b) when discharged onto or into land or into air, changes or is likely to change the physical, chemical or biological condition of the land or air onto or into which it is discharged.

Contour

A line across a slope connecting points of the same elevation.

Contributing Catchment Area

All of that drainage area that contributes to the flow into a treatment device. A contributing drainage area can include both clean and

sediment-laden water flows. Commonly referred to as the catchment area.

Note: the catchment area is generally calculated from a scaled map or plan and will comprise the total horizontal area. Care is therefore needed in steep terrain to ensure that the contributing catchment area does not exceed the design standard for the treatment device.

Critical 20 Year Return Period Storm

A rainfall event that has a 5% Annual Exceedance Probability (AEP) and a duration equal to the Time of Concentration.

Cumulative Effect

The combination of discrete isolated effects, the sum of which can have a major long term detrimental impact.

Decanting Earth Bund (DEB)

A completed earth bund with perforated decant device, stabilised outlet and spillway for areas less than 3,000m²

Decant Rate

The rate at which surface water is decanted from a sediment retention pond, decanting earth bund or similar device.

Deposition

The accumulation of material that has settled because of reduced velocity of the transporting agent (water or wind).

Dewatering

The removal of impounded water, generally by pumping.

Disturbed Area

An area of exposed soil created by either/or: blading, contouring, ripping, moving, removing, hauling, placing or replacing soil or earth, or by excavation, or by cutting or filling operations.

Diversion

A channel or bund constructed to convey concentrated flow.

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Drainage

The removal of excess surface water or groundwater from land by means of surface or subsurface drains.

Earthworks

The disturbance of land surfaces by blading, contouring, ripping, moving, removing, hauling, placing or replacing soil or earth, or by excavation, or by cutting or filling operations.

Emergency Spillway

A Sediment Retention Pond or Dam spillway designed and constructed to discharge flow in excess of the structure's primary spillway design discharge.

End Hauling

Removal of all excavated material off-site while road construction is being carried out. The material is normally carted back down the newly formed carriageway as the road is being constructed.

Energy Dissipator

A designed device such as an apron of rip-rap or a concrete structure placed at the end of a water conduit such as a pipe, paved ditch or flume for the purpose of reducing the velocity and energy of the discharged water.

Ephemeral Watercourse (Category 2 Stream)

Refer to definition of Category 2 Watercourse

Erodable

An erodable soil is a soil that is readily entrained (moved) by actions such as rain drop impact, overland flow or wind.

Erosion & Sediment Control Plan (ESCP)

A detailed plan setting out the control measures to be used to minimise erosion and off site sedimentation.

Erosion Matting

A manufactured matting of either synthetic or natural fibre used to minimise surface erosion and in some cases, promote revegetation.

Erosive

Refers to the ability of erosional agents such as wind or water to cause erosion. Not to be confused with erodible, as a quality of soil.

Erosive Velocities

Velocities that are high enough to wear away the land surface. Exposed soils erode faster than stabilised soils. Erosive velocities vary according to the soil type, slope, and structural or vegetative stabilisation used to protect the soil.

Fill

Earth placed (normally under a strict compaction regime) to raise the land surface.

Fire Breaks

Specific deforested strips within a forest to act as a barrier in the event of fire.

Flocculation

The process whereby fine particles suspended in the water column clump together and settle. In some instances this can occur naturally, such as when fresh clay-laden flows mix with saline water, as occurs in estuaries. Flocculation can be used to promote rapid settling in sediment retention ponds by the addition of flocculating chemicals (flocculants).

Flume

A high-velocity, open channel for conveying water to a lower level without causing erosion. Also referred to as a chute.

Geosynthetic Erosion Control Systems (GECS)

The artificial protection of erodible channels and slopes using artificial erosion control material such as geosynthetic matting, geotextiles or erosion matting.

Geotextile Fabric

A woven or non-woven, impermeable or semi-permeable material generally made of synthetic products such as polypropylene and used in a variety of engineering, stormwater management, and erosion and sediment control applications.

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Grade

The slope of a road, channel or natural ground.

The finished surface of a channel bed, road bed, top of embankment or bottom of excavation. Any surface prepared for the support of construction like paving or for laying conduit.

To finish the surface of a channel bed, road bed, top of embankment or bottom of excavation.

Harvest Management Plan (or Harvest Plan)

A plan detailing how the forest is to be harvested. Often incorporated within the harvest plan are earthwork plans defining the construction of roads, landings and tracks necessary to support the harvesting operation.

Headwater

The source of a watercourse. The water upstream of a structure or point on a watercourse.

Hydroseeding

The spraying of a slurry of seed, fertiliser and paper or wood pulp over a surface to be revegetated.

Landing (or skid)

An area where logs are brought from the harvesting site for sorting, processing, loading or stockpiling.

Level Spreader

A device used to convert concentrated flow into sheet flow.

Mitigation

Measures taken to off-set adverse environmental effects caused by Land Disturbing Activities.

Mulch

Cover on surface of soil to protect it and enhance certain characteristics, such as protection from rain drop impact and improving germination.

Overland Flow Path

The natural flow path of stormwater over the ground.

Perennial Stream (Category 1 Stream)

Refer definition for Category 1 Streams.

Permitted Activity

Section 77B(1) of the Resource Management Act states that *"if an activity is described in this Act, regulations, or a plan or proposed plan as a permitted activity, a resource consent is not required for the activity if it complies with the standards, terms or conditions, if any, specified in the plan or proposed plan"*. These thresholds will be outlined in the various district and regional plans.

Primary Spillway

The riser inlet within a Sediment Retention Pond.

Rainfall Intensity

The volume of rainfall falling in a given time. Normally expressed as mm/hour.

Rehabilitation

Restoration to as near to pre-disturbance conditions as possible. This may entail such measures as revegetation for erosion control, enhancement planting, modification and armouring of watercourses.

Return Period

The statistical interpretation of the frequency of a given intensity and duration rainstorm event. Refer AEP.

Revegetation

The establishment of vegetation to stabilise a site.

Riparian Protection Area

An area adjacent to a watercourse designated as a non-disturbance zone to provide a buffer between receiving environments (e.g. watercourses) and the area of operation.

Rip

To break up compacted ground with heavy tines mounted on earthmoving machines.

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Rip-Rap

Rock placed on streambanks or in stream channels to control fluvial erosion.

Riser

In a Sediment Retention Pond, a vertically placed pipe to which decant pipes are attached, which forms the inlet to the primary spillway.

Runoff

That part of rainfall which is not absorbed by the ground and flows over its surface.

Scarified

Shallow subsurface disturbance with a fine implement to provide surface roughening. Utilised before topsoiling and revegetation.

Sediment

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

Sediment Control Protection Area

The area 50m landward of the edge of a watercourse or wetland of 1000m² or more, or 100m either side of a foredune, or 100m landward of the coastal marine area (which ever is the more landward of mean high water springs). Inside this area and on hills with slopes greater than 15°, earth disturbance over areas of 0.25ha's or greater or 100m of tracking or trenching requires a resource consent from the Auckland Regional Council.

Sediment Retention Pond

An impounding pond with floating decant outlets and other specific technical specifications for areas less than 5ha.

Sediment Yield

The quantity of sediment discharged from a particular site or catchment in a given time, measured in dry weight or by volume. When erosion and sediment control measures are in place, sediment yield is the sediment discharged from the site after passing through those measures.

Settling

The downward movement of suspended solids through the water column.

Sheet Flow

Shallow dispersed overland flow.

Sheet Erosion

Erosion (often initiated by splash erosion) in which thin layers of surface material are gradually removed more or less evenly from an extensive area of sloping land.

Silt

A fine soil textural class consisting of particles between 0.05 and 0.002mm in equivalent diameter. A silt will display specific properties including: little plasticity and marked dilatancy, slightly granular or silky to touch and disintegrates/slakes in water. A silty soil will comprise > 35% silt.

Silt Fence

A fence constructed from geotextile fabric, installed to impound flows before discharging over stabilised ground, generally for areas less than 0.3ha.

Slash

Branches trimmed from production logs.

Slash Bund

Temporary barrier comprised of slash used to intercept and divert site runoff.

Soil

The unconsolidated mineral and organic material on the surface of the earth that serves as a natural medium for the growth of land plants.

Earth and rock particles resulting from the physical and chemical disintegration of rocks, which may or may not contain organic matter. Includes fine material (silts and clays), sand and gravel.

Note: For purposes of clarification, the terms "exposed earth" and "bare soil" refer to soil that has been earthworked or otherwise disturbed and is currently unstabilised.

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Soil Texture

The relative proportions of various particle sizes in a soil material.

Spreader (Hydraulics)

A device for distributing water uniformly in or from a channel.

Stabilisation

Providing a protective cover of vegetation, vegetative material, rock or synthetic material over exposed soil that will minimise erosion.

Note: for an area to be considered stabilised, a specific standard of cover must be attained and is dependant on the method of stabilisation.

Splash Erosion

The erosion caused by rainfall impact which causes the initial dispersion of soil particles.

Stabilised Area

An area sufficiently covered by erosion-resistant material such as a good cover of grass, or paving by asphalt, concrete or aggregate, in order to prevent erosion of the underlying soil.

Subsoil

The B horizons of soils with distinct profiles. In soils with weak profile development, the subsoil can be defined as the soil below the ploughed soil (or its equivalent of surface soil), in which roots normally grow.

Surface Runoff

Rain that runs off rather than being infiltrated or retained by the surface on which it falls.

Suspended Solids

Solids either floating or suspended in water.

Temporary Watercourse Crossing

A stable watercourse crossing that is installed for the duration of an operation and is removed in its entirety at the completion of the operation.

Tensile Strength

Resistance to elongation and tearing.

Time of Concentration

The time for runoff to flow from the most remote part of the drainage area to the outlet.

Toe (of Slope)

Where the slope stops or levels out. Bottom of the slope.

Waahi Tapu

A place sacred to Maori in the traditional, spiritual, religious, ritual, or mythological sense.

Water Body

Any type of surface water such as watercourses, lakes and wetlands.

Water Table Drain

A drain that parallels a carriageway to drain surface and subsurface water from the road formation.

Windrow

Slash, stumps, logs or debris piled in a row by machine

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ARC Technical Publications & Plans

1. Auckland Regional Council Technical Publication No 90, Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland region, (April, 1999) (TP90)
2. Auckland Regional Council Technical Publication No 10, Stormwater Management Devices: Design Guidelines Manual (TP10)
3. Auckland Regional Council Technical Publication No 108, Guidelines for Stormwater Runoff Modelling in the Auckland Region (TP108)
4. Auckland Regional Council Technical Publication No 131, Guidelines for Fish Passage in the Auckland Region (TP131)
5. Auckland Regional Plan Sediment Control (November 2001) (ARP:SC)
6. Proposed Auckland Regional Plan: Air, Land & Water (October 2001) (PARP:ALW)