

Sediment Control Classification System

SEDIMENT CONTROL TECHNIQUES



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Photo 1 – Sediment basin (Type 1 system) Photo 2 – Rock filter dam (Type 2 system)

Sediment controls can be grouped into four categories based on their ability to trap a specified grain size. The adopted classifications are Type 1, Type 2, Type 3 and 'supplementary' sediment traps.

Type 1 sediment traps are designed to collect sediment particles smaller than 0.045mm. These sediment traps include sediment basins and some of the more sophisticated filtration systems used in de-watering operations.

Type 2 sediment containment systems are designed to capture sediments down to a particle size of between 0.045 and 0.14mm. Type 2 sediment traps include rock filter dams, sediment weirs and filter ponds.

Type 3 sediment containment systems are primarily designed to trap sediment particles larger than 0.14mm. These systems include sediment fences, buffer zones and some stormwater inlet protection systems.

Some sediment traps, such as grass filter strips and most kerb inlet sediment traps, have such limited effectiveness that they can only be classified as *supplementary* systems. Even though these sediment traps have a relatively low effectiveness, their use throughout most construction sites is still considered to be a component of best practice sediment control.

Table 1 summarises the adopted sediment trap classification system and the critical particle sizes associated with each classification.

Table 1 – Classification of sediment traps

Classification	Minimum particle size	Typical trapped particles
Type 1	< 0.045mm	Clay, silt & sand
Type 2	0.045 – 0.14mm	Silt & sand ^[1]
Type 3	> 0.14mm	Sand
Supplementary	> 0.14mm	Sand

[1] Technically, silt particles have a grain size of 0.002 to 0.02mm, which means that only Type 1 sediment traps are likely to capture silt-sized particles. However, for general discussion purposes, it can be assumed that Type 2 systems capture a significant proportion of silt-sized particles.

Tables 2 and 3 outline the default classification of various sediment control techniques. The classification of a sediment control technique within a given set of site conditions must, wherever practicable, be based on the following classification system.

Classification of sediment traps

The classification of sediment control techniques presented in Tables 2 and 3 has been based on observations and experience rather than field or laboratory evaluation.

Manufacturers/distributors of specific sediment control systems wishing to have their systems re-categorised can do so using the following classification system. All performance claims must be demonstrated based on at least one of the following:

- NATA certified laboratory analysis;
- field analysis and evaluation certified by an independent, Certified Professional in Erosion and Sediment Control (CPESC); or
- field analysis and evaluation conducted as part of appropriately supervised Ph.D. research.

Type 1 Sediment Trap:

1. Under typical flow conditions (discharge and suspended sediment concentration), is capable of capturing and holding at least 90% of material larger than 0.045mm in equivalent diameter.
2. Sufficient sediment retention capacity (volume) to capture and hold one (1) month's sediment runoff from the catchment in question under average annual conditions.
3. Is capability of sustaining its hydraulic and structural integrity under normal site conditions. A sediment trapping system that has even a minor risk of experiencing performance-affecting damage within a given work site due to such things as vandalism, and foot or construction traffic, cannot be classified as a Type 1 sediment trap.

Type 2 Sediment Trap:

1. Under typical flow conditions (discharge and suspended sediment concentration), is capable of capturing and holding at least 90% of material larger than 0.14mm (No. 100 sieve) in equivalent diameter.
2. Sufficient sediment retention capacity (volume) to capture and hold one (1) month's sediment runoff from the catchment in question under average annual conditions.
3. Has an acceptable capability to sustain its hydraulic and structural integrity under normal site conditions. A sediment trapping system that is highly likely to experience performance-affecting damage within a given work site due to such things as vandalism, and foot or construction traffic, cannot be classified as a Type 2 sediment trap.

Type 3 Sediment Trap:

1. Under typical flow conditions (discharge and suspended sediment concentration), is capable of capturing and holding 90% of material greater than 0.42mm (No. 40 sieve) in equivalent diameter.
2. Sufficient sediment retention capacity (volume) to capture and hold one (1) month's sediment runoff from the catchment in question under average annual conditions.
3. Has an acceptable capability to sustain its hydraulic and structural integrity under normal site conditions. A sediment trapping system that is highly likely to experience performance-affecting damage within a given work site due to such things as vandalism, and foot or construction traffic, cannot be classified as a Type 3 sediment trap.

Table 2 – Default classification of sediment control techniques^[1]

Type 1	Type 2	Type 3
Sheet flow treatment techniques		
<ul style="list-style-type: none"> • Buffer Zones capable of infiltrating 100% of stormwater runoff or process water^[2,3] • Infiltration basins or sand filter beds capable of infiltrating 100% of flow 	<ul style="list-style-type: none"> • Buffer Zone^[3] capable of infiltrating the majority of flows from design storms • Block & Aggregate Drop Inlet Protection • Compost/Mulch Berms • Filter Socks • Filter Sock Drop Inlet Protection • Mesh & Aggregate Drop Inlet Protection • Rock & Aggregate Drop Inlet Protection 	<ul style="list-style-type: none"> • Buffer Zones^[3] • Excavated Drop Inlet Protection^[3] • Fabric Drop Inlet Protection • Fabric Wrap Field Inlet Sediment Traps • Filter Fence • Modular Sediment Traps • Straw Bale Barriers • Sediment Fence
Concentrated flow treatment techniques		
<ul style="list-style-type: none"> • Sediment Basins (sized in accordance with design standard) 	<ul style="list-style-type: none"> • Filter Tube Dams • Rock Filter Dams • Sediment Basins (smaller than the design standard) • Sediment Trenches • Sediment Weirs 	<ul style="list-style-type: none"> • Coarse Sediment Traps • Modular Sediment Traps • U-Shaped Sediment Traps
De-watering sediment control techniques (selection not based on soil loss rate)		
<ul style="list-style-type: none"> • Type F/D Sediment Basins • Stilling Ponds 	<ul style="list-style-type: none"> • Filter Bag or Filter Tube • Filter Ponds • Filter Tube Dams • Portable Sediment Tank^[3] • Settling Ponds^[3] • Sump Pits 	<ul style="list-style-type: none"> • Filter Fence^[3] • Grass Filter Beds^[3] • Hydrocyclone^[3] • Portable and Truck-Mounted Sediment Tanks^[3] • Sediment Fence
Instream sediment control techniques (selection not based on soil loss rate)		
<ul style="list-style-type: none"> • Pump sediment-laden water to an off-stream Type F or Type D Sediment Basins or high filtration systems 	<ul style="list-style-type: none"> • Filter Tube Barriers • Modular Sediment Barriers^[5] • Rock Filter Dams • Sediment Weirs 	<ul style="list-style-type: none"> • Modular Sediment Barriers^[3] • Sediment Filter Cage

[1] Classification is based on the technique being sized in accordance with best practice standards, otherwise the technique attracts a lower classification.

[2] Buffer zone must be able to infiltrate all inflow into the ground such that there is no surface discharge from the buffer zone. The term 'process water' refers to 100% of runoff from cleaning operations, or such things as runoff from water cooling from cutting tools.

[3] Classification depends on design details.

Supplementary sediment traps, such as grass filter strips and most kerb inlet sediment traps, are not effective enough to be classified as Type 3 systems. Even though these sediment traps are relatively ineffective, their incorporation into most Erosion and Sediment Control Plans (ESCPs) is considered a relevant part of the best practice sediment control; however, it is not sufficient for a sediment control scheme to rely solely on supplementary sediment traps.

Table 3 – Supplementary sediment control techniques

Flow condition	Sediment control technique
Sheet flow treatment techniques	<ul style="list-style-type: none"> Grass Filter Strips Fibre Rolls Stiff Grass Barriers
Concentrated flow treatment techniques	<ul style="list-style-type: none"> Check Dam Sediment Traps Kerb Inlet Sediment Traps (on-grade and sag inlet traps, including Gully Bags) Straw Bale Barriers
Other sediment control systems	<ul style="list-style-type: none"> Construction Exits (Rock Pads, Vibration Grids, Wash Bays)
De-watering sediment control techniques	<ul style="list-style-type: none"> Grass Filter Beds ^[1]
Instream sediment control techniques	<ul style="list-style-type: none"> Straw Bale Barriers (short-term device only)

[1] Classification depends on design details

Table 4 outlines the default sediment control standard presented in *Best Practice Erosion and Sediment Control*, International Erosion Control Association (Australasia) 2008.

Table 4 – Sediment control standard (default) based on soil loss rate

Area limit (m ²)	Soil loss rate limit (t/ha/yr)			Soil loss rate limit (t/ha/month)		
	Type 1	Type 2	Type 3	Type 1	Type 2	Type 3
250	N/A	N/A	[1]	N/A	N/A	[1]
1000	N/A	N/A	All cases	N/A	N/A	All cases
2500	N/A	> 75	75	N/A	> 6.25	6.25
>2500	> 150	150	75	> 12.5	12.5	6.25

[1] Refer to the relevant regulatory authority for assessment procedures.



Photo 3 – Sediment fence (Type 3 system)



Photo 4 – Filter sock sag inlet sediment trap (supplementary system)