

BREEN RESOURCES KURNELL PROJECT

Erosion and Sediment Control Plan

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Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Project Manager Final Approval
A	08/05/2025	50% Draft	GF	JL	GN
B	11/12/2025	Final	GF	JL	GN
C	19/02/2026	Updates to address DPHI comments	JT	JL	GN

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1 Introduction

A conceptual erosion and sediment control was prepared as part of the Surface Water Management Assessment (Cardno, 2021) prepared to support state significant development (SSD) 10412.

A more detailed erosion and sediment control Managing *Urban Stormwater: Soils and Construction - Volume 1: Blue Book* (Landcom, 2004) (the Bluebook) is required to approximately size sediment basins and flow diversion structures to support the detailed design.

2 Method

2.1 Revised Universal Soil Loss Equation

The Revised Universal Soil Loss Equation (RUSLE) equation is applied to estimate sediment basin sizing in accordance with the Bluebook.

The factors applied to the calculations are summarised in Table 2-1.

Table 2-1 RUSLE equation factor

Factor	Value adopted	Reference
Rainfall erosivity factor	2858	Calculated using 0.5 exceedance per year (EY) 6 hour storm intensity
Soil erodibility factor	0.042	Appendix C of the Blue book
Erosion control practice factor	1.3	Table A2 of Blue book
Ground cover and management factor.	1	Default assumed for stripped topsoil
Soil hydrological group	A – moderate to rapid infiltration rate and low runoff potential	Appendix C of the Blue book
Sediment type	C – Coarse sediment	Appendix C of the Blue book

Temporary diversion structures have been designed to convey the 10% annual exceedance probability event.

2.2 Catchment delineation

Construction sub-catchments have been approximately delineated based on the staging areas to size sediment basins and diversion structures. However, it is noted that the erosion and sediment control plan would be progressively reviewed during construction to ensure structures are adequately sized based on current site topography.

The indicative construction sub-catchments and concept basin locations (shaded blue) are shown in Figure 2-1.

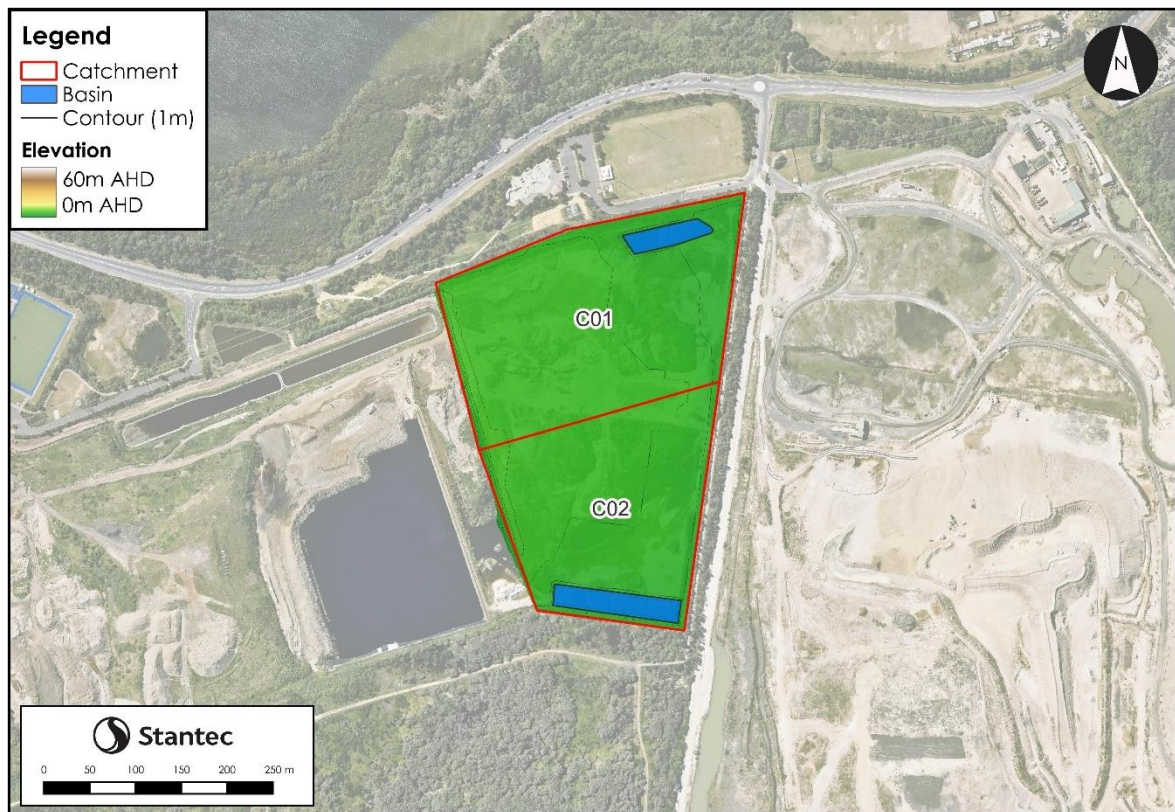


Figure 2-1 Indicative construction sub-catchments

The catchment areas and details are summarised in Table 2-2

Table 2-2 Catchment details

Catchment name	Area (ha)	Average slope
C01	6.195	2
C02	4.755	2

3 Erosion and sediment control

3.1 General controls

All catchments are to be developed with standard erosion and sediment controls including:

- Limiting length of slopes to less than 80m
- Install silt fences and diversion drains along all site boundaries
- Apply sound material management practices in relation to the storage and handling. Sound practices include storing materials in designated locations, installing secondary containment bunds, regularly inspecting storage areas and training site personnel in correct practices. Procedures should also be established to clean up any spills correctly and considerate of the appropriate legislation.
- Control discharge of sediment and/or other pollutants from dewatering (site pump-out) activities. Polluted water may need to be treated on-site before being discharged to the stormwater system. Special care is needed where groundwater is or could be contaminated;
- Maintain erosion and sediment control measures until all earthwork activities are completed and the site rehabilitated.
- Audit measures weekly and immediately following rainfall events that cause runoff.
- Discharge from site is not to exceed 50 milligrams per litre of suspended solids in the design rainfall event (the 4EY)
- Construct additional erosion and/or sediment control works as might become necessary to ensure the desired protection is given to downslope lands and waterways, i.e., make ongoing changes to the Plan.

3.2 Erosion control

For all catchments it is assumed that the ground cover factor will be 1 which is representative of disturbed soil on construction sites. For locations where appropriate sediment controls are not feasible to install then temporary erosion control will be installed. The proposed erosion control is a spray on hydromulch product (Figure 3-1). The hydromulch is to be applied to achieve a cover factor of 0.01 in accordance Table A3 of the Blue Book.



Figure 3-1 Hydromulch application (Catchments & Creeks Pty Ltd, 2010)

An accepted standard for hydromulching is the *Light mulching* fact sheet (Catchments & Creeks Pty Ltd, 2010). The following applies:

1. **Mulch specification**

- a. to the maximum degree practical the mulch shall be free of weed species especially prohibited noxious weed seed. Do not use woody or other heavy materials than may interfere with the emergence of seedlings.

2. **Application (General)**

- a. Refer to approved plans for location, extent, and application details. If there are questions or problems with the location, extent, or method of application contact the engineer or responsible on-site officer for assistance.
- b. Ensure the surface is free of deep track marks of other features that may result in flow concentration down the slope. Where necessary, establish up-slope drainage controls to limit run-on water that may disturb the mulch.
- c. Spread enough mulch to completely cover the surface of the soil at the density or thickness specified in the approved plans, but not greater than 50mm.
- d. Machine applications shall comprise a minimum of two passes in opposite directions unless otherwise specified.

- e. During application, all reasonable efforts shall be taken to avoid spray onto roads, pathways, drainage channels not intended for application, and existing vegetation.
- f. Suitable anchorage of the mulch must be accomplished immediately after the mulch has been placed.
- g. Ensure the mulch is restrained from excessive movement by wind or stormwater runoff by the appropriately application of an approved tackifier. On flat or gentle slopes, straw mulch may be fixed to the soil by mechanical crimping.
- h. If the treated area was seeded, continue to water after mulching in accordance with weather conditions, or as required to obtain suitable germination and plant establishment.
- i. Application (spraying) of a tackifier must not be performed during periods of windy conditions that would prevent the proper placement of adhesive.
- j. The contractor must take appropriate steps to protect all traffic, signs, structures, and other objects from being marked or disfigured by the tackifier material.

3. **Application (hydromulching)**

- a. Refer to approved plans for location, extent, and application details. If there are questions or problems with the location, extent, or method of application contact the engineer or responsible on-site officer for assistance.
- b. Ensure the surface is free of deep track marks of other features that may result in flow concentration down the slope. Where necessary, establish up-slope drainage controls to limit run-on water that may disturb the mulch.
- c. Prior to application, roughen the soil surface and fill areas by rolling with a crimping or punching type roller, or by track walking where practical.
- d. If the soil is dry, water the treatment area before hydroseeding to increase penetration of the adhesive and fertiliser additives.
- e. Add straw, wood or paper cellulose fibre mulch to the slurry at the specified rate, otherwise at a rate of 2 to 3 tonnes per hectare.
- f. Machine applications shall comprise a minimum of two passes in opposite directions unless otherwise specified.
- g. During application, all reasonable efforts shall be taken to avoid spray onto roads, pathways, drainage channels not intended for application, and existing vegetation.
- h. The contractor must take appropriate steps to protect all traffic, signs, structures, and other objects from being marked or disfigured by the mulch and/or associated tackifier.
- i. Continue to water after allowing 24 hours drying time. Water in accordance with the weather conditions, or as required to maintain suitable germination and plant growth. The wood-fibre should be kept moist until germination occurs.

4. **Maintenance**

- a. Inspect all mulches fortnightly and after runoff-producing rainfall and strong winds.
- b. Check for rill erosion, or dislodgment of the mulch.
- c. Replace any displaced mulch to maintain the required coverage.
- d. If stormwater runoff displaces more than 10% of the mulch, then investigate the need for additional drainage controls to prevent further displacement.
- e. Continue inspections until vegetation is suitably established or erosion control is no longer required.
- f. If the mulching is not effective in containing the soil erosion it should be replaced, or an alternative erosion control procedure adopted.

4 Sediment control

4.1 Sediment basin sizing

Sediment basins and diversion structures were sized for each catchment in accordance with the Blue book. For sediment basins a Type C basin is assumed with a settling depth of 0.6m and an area factor of 4100. A typical section for a Type C basin is shown as Figure 4-1.

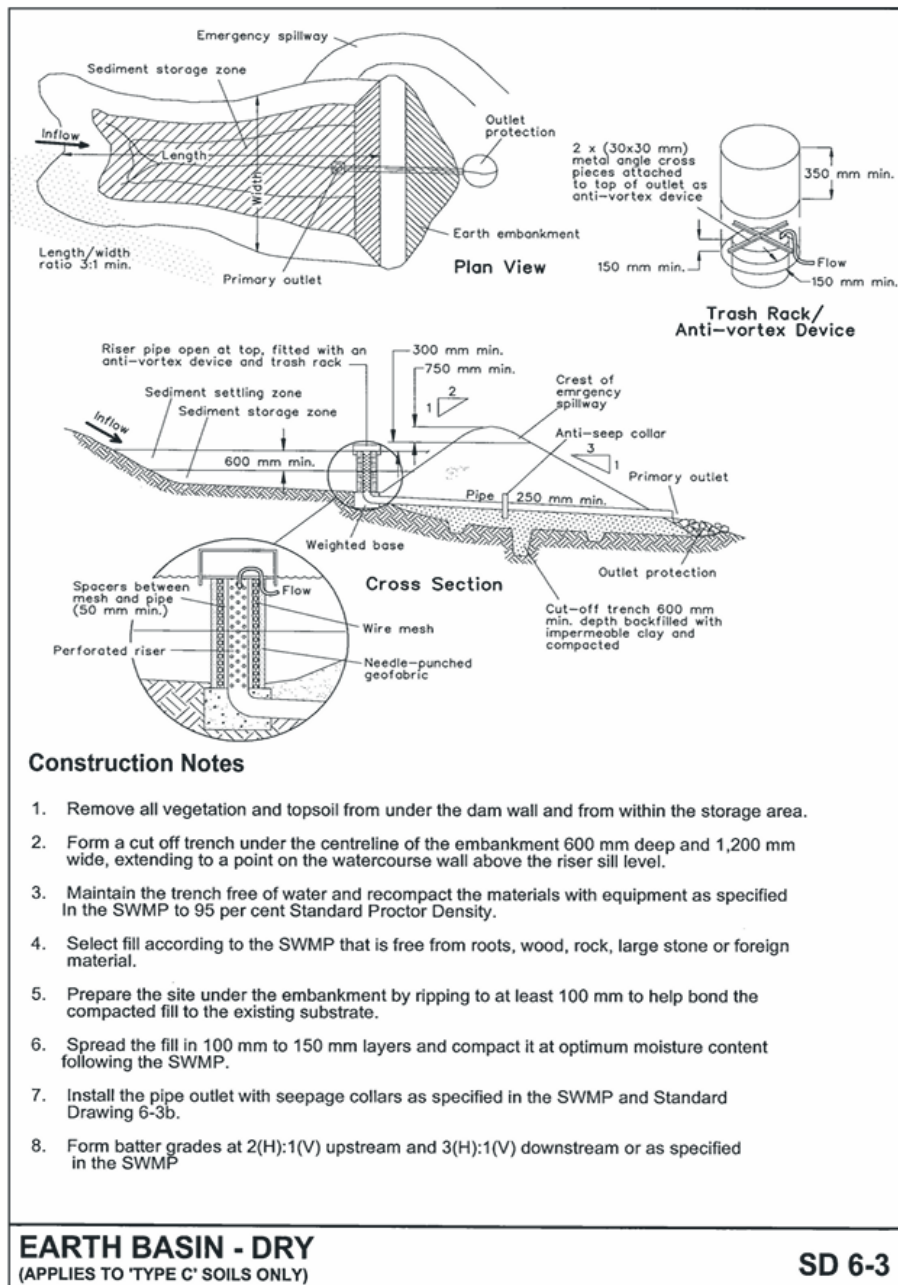


Figure 4-1 Type C sediment basin

The indicative sizing of the sediment basins to capture soil loss and the 4EY are summarised in Table 4-1.

Table 4-1 Sediment basin sizing

Structure Name	C01	C02
Catchment Area (ha)	6.195	4.755
Sediment type (C, F or D)	C	C
Design rainfall event	4EY	4EY
Flow volume (m ³ /s)	0.141	0.264
Area Factor	4100	4100
Depth of settling (water zone) (m)	0.6	0.6
Volume		
Basin Surface Area (m ²)	807.7	619.1
Settling (water) zone volume (m ³)	484.6	371.5
Storage (soil) zone volume (m ³)	73.7	50.6
Total basin volume (m ³)	558.3	422.1
Size		
Length: width ratio	3	3
Length (m)	49.2	43.1
Width (m)	16.4	14.4

Emergency spillways should be designed to safely convey the 10% AEP flowrates.

4.2 Flow diversion structures

Flow diversion structures are required to divert water to the sediment basins and should be sized to safely convey the 10% AEP. The cross sectional area of flow diversion structures required to safely convey the 10% AEP at a velocity of 0.5 m/s are summarised in Table 4-2.

Table 4-2 10% AEP flowrate calculation

Catchment name	C01	C02
Catchment Area (ha)	6.195	4.755
Time of concentration (tc)	16	14
10% AEP, 15 minute rainfall intensity (mm/hour)	108	108
C10 runoff coefficient	0.75	0.75
10% AEP, 15-minute duration flowrate (m ³ /s)	1.395	1.071
Allowable velocity (m/s)	0.5	0.5
Require cross sectional area of flow diversion structure to safely convey flowrate (m ²)	2.79	2.142

Flow diversions will be confirmed following detailed civil design of the site. Low flow diversions (Figure 4-2) can be used where needed to ensure catchment slopes do not exceed 80m in length.

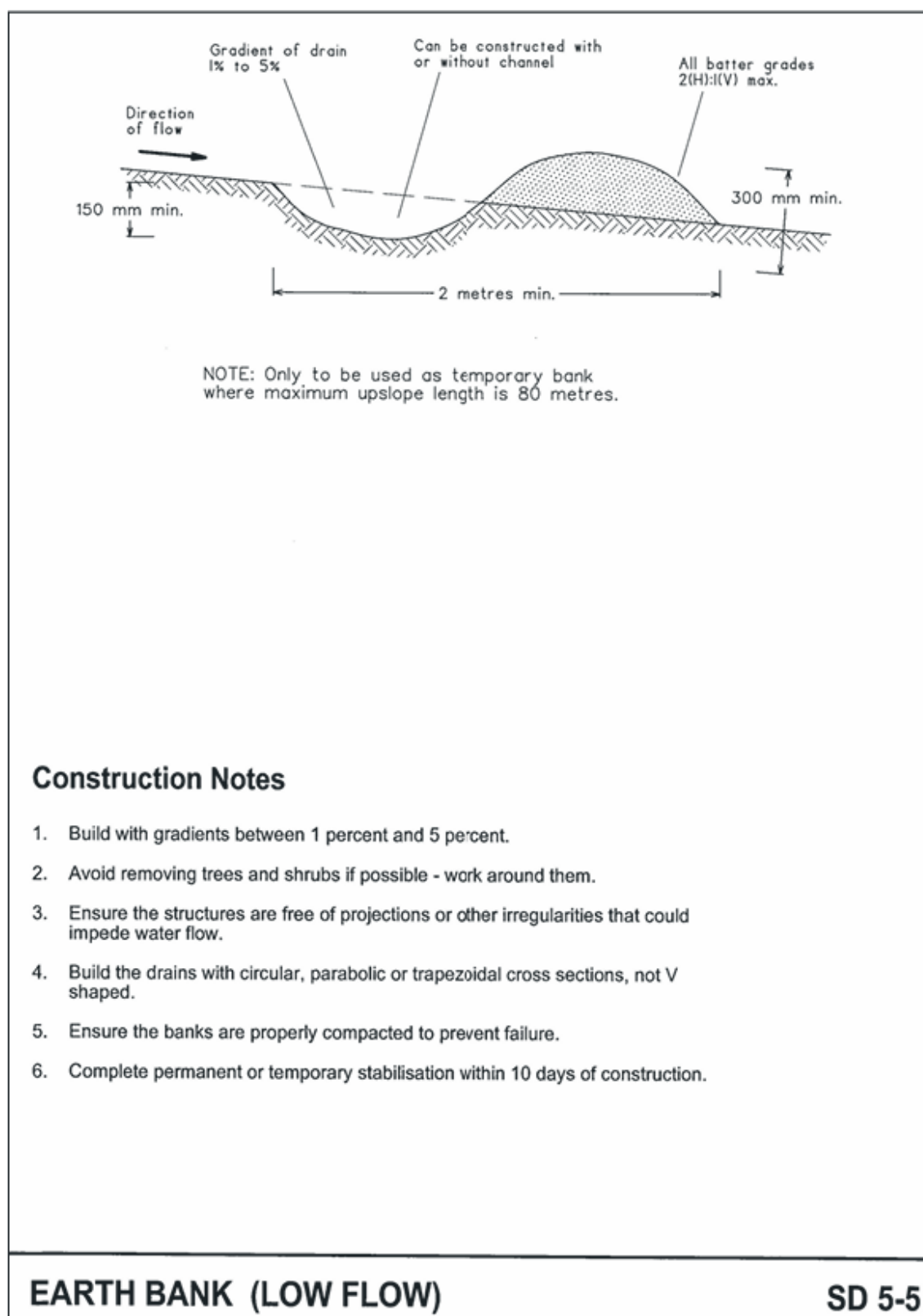


Figure 4-2 Low flow typical detail

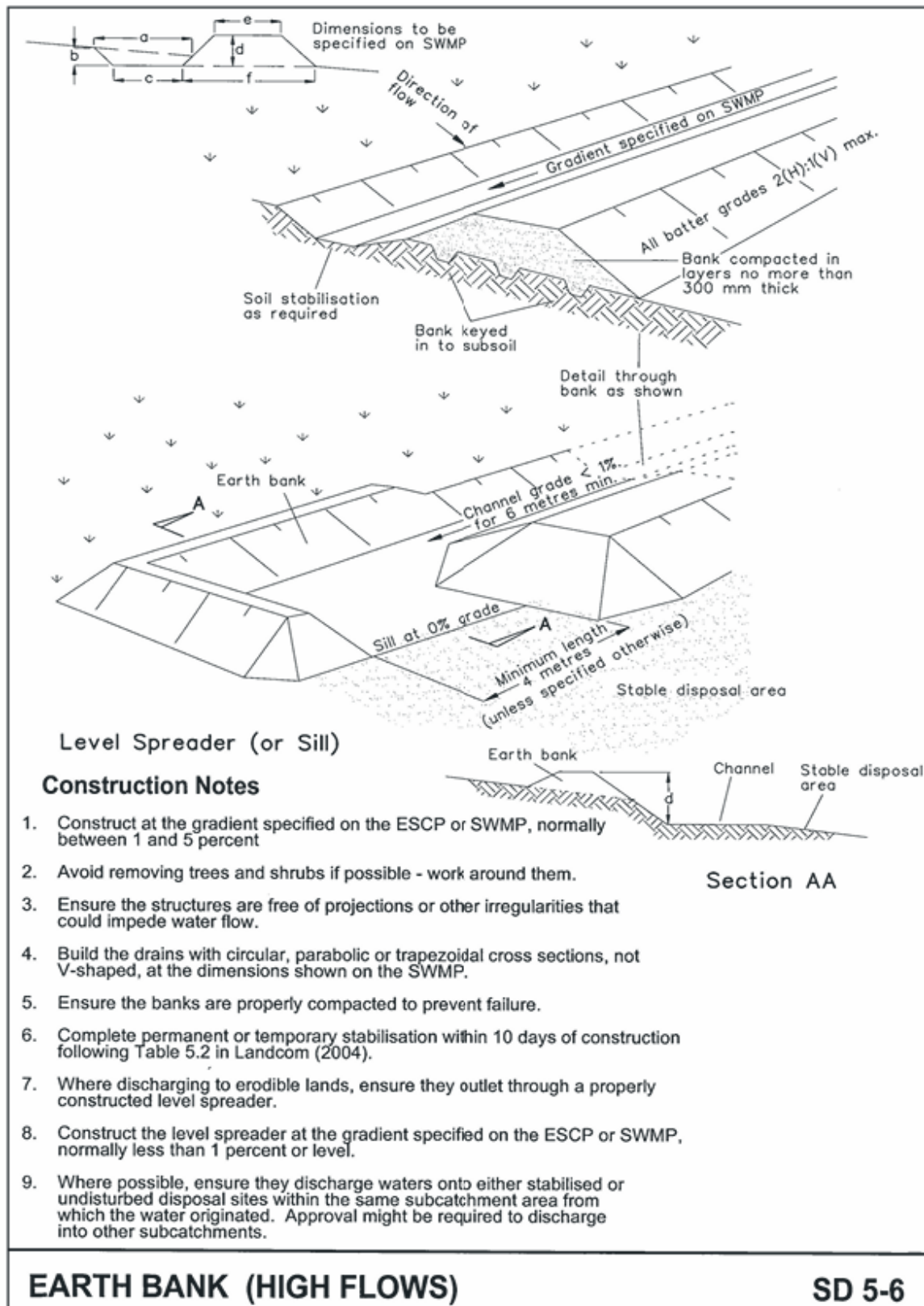


Figure 4-3 High flow typical detail

4.2.1 Sediment fences

Sediment fences are to be installed downslope of all catchments along the bottom contour. The typical sediment fence detail is shown as Figure 4-4. The layout and detail of sediment fences will be confirmed following detailed civil design of the site.

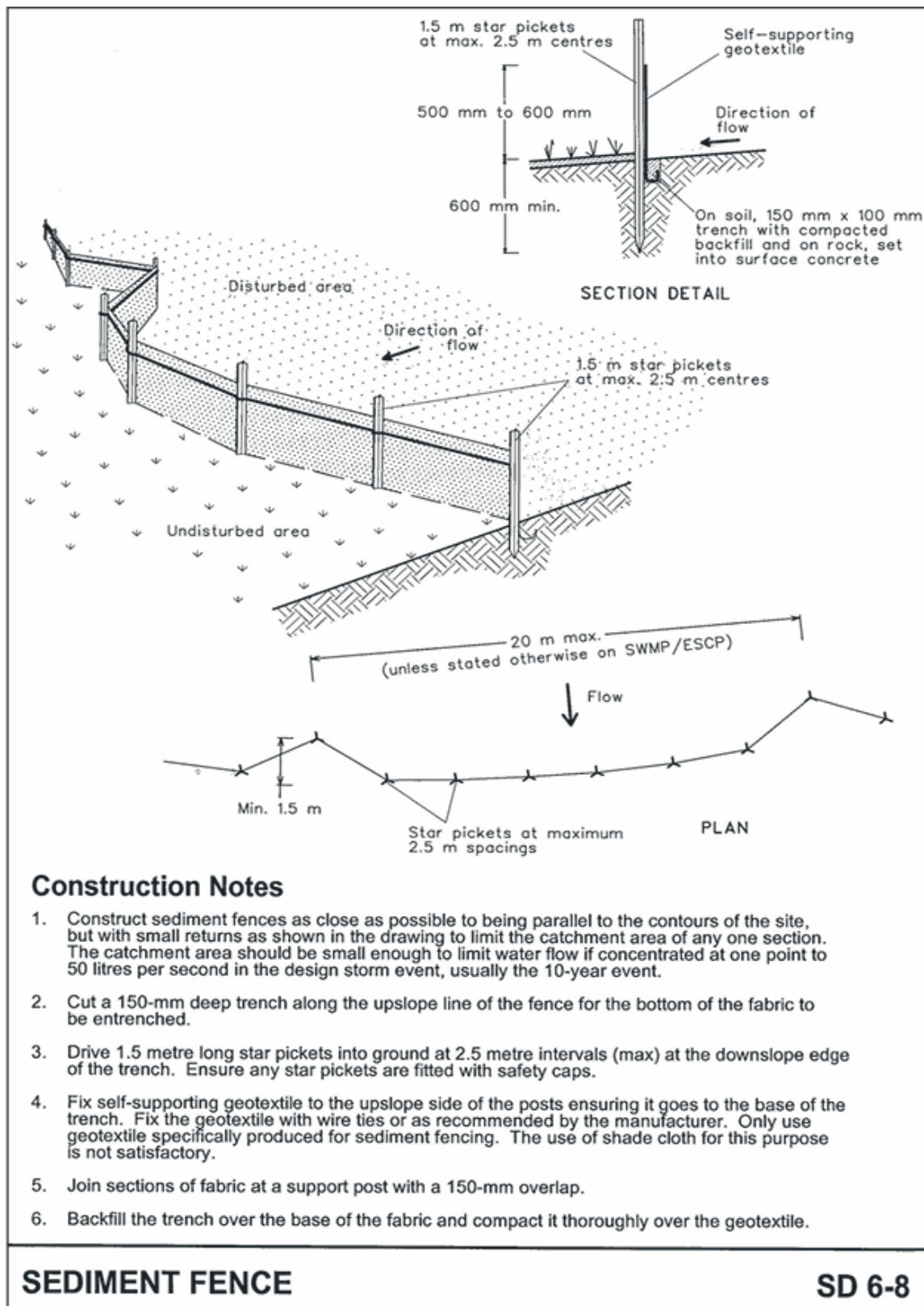


Figure 4-4 Sediment fence detail

5 Conclusions and Recommendations

In conclusion, indicative sediment basins and flow diversion structures have been sized in accordance with the Bluebook.

The sizing is indicative and may change during construction stages, and it is the responsibility of the contractor to confirm erosion controls are adequately sized and positioned based on the construction site conditions.

The calculation spreadsheet is provided as Appendix A and is to be issued to the contractor for use in stage specific erosion control plans. RUSLE calculation factors should be retained, however catchment areas, slope, cover factors and safe velocity of diversion structures can be changed to represent staged construction sub catchment conditions or proposed controls.

6 References

Catchments & Creeks Pty Ltd. (2010). *Light mulching*. Retrieved from <https://catchmentsandcreeks.com.au/fact-sheet/light-mulching/>

Landcom. (2004). *Managing Urban Stormwater: Soils and Construction* (4th ed.).



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