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EROSION AND SEDIMENT CONTROL PLAN

Concrush Resource Recovery Facility Expansion

FINAL

May 2020

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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Concrush

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
1	Chris Bonomini	28 May 2020	Kevin Thomson	28 May 2020

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1.0 Introduction

1.1 Background

Concrush Pty Ltd (Concrush) received development consent (the Project Approval) to increase the processing and storage capacity of the existing resource recovery facility (State Significant Development (SSD) 8753) located on part of Lot 2 DP 220347 at 21 Racecourse Road, Teralba, New South Wales (NSW) on 27 March 2020 under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for which the Minister for Planning is the consent authority. Condition B22 of the Project Approval requires that:

> *Prior to the commencement of any construction or other surface disturbance the Applicant must install and maintain suitable erosion and sediment control measures on-site, in accordance with the relevant requirements of the Managing Urban Stormwater: Soils and Construction - Volume 1: Blue Book (Landcom, 2004) guideline and the Erosion and Sediment Control Plan included in the CEMP required by condition C2.*

This ESCP has been prepared in accordance with the requirements of the Project Approval and *Managing Urban Stormwater Soils and Construction Volume 1* (Landcom, 2004) and *Volume 2* (DECC, 2008) (hereafter Volumes 1 and 2 are referred to as the 'Blue Book'). This ESCP should be read in conjunction with the Construction Environmental Management Plan, Acid Sulphate Soils Management Plan, Remedial Action Plan, Water Discharge Management Plan and surface water management system engineering design specifications.

1.2 Purpose and Scope

This ESCP specifies erosion and sediment controls (ESCs) for all stages of the alterations and expansions to the existing facility.

The purpose of this ESCP is to:

- identify site constraints associated with the existing soil and water environment
- specify the appropriate design standard for erosion and sediment controls based on the anticipated soil, weather and construction conditions
- ensure erosion and sediment control requirements, site constraints and key environmental issues are considered and managed for the Project
- enable soils to be managed appropriately during the construction of the Project to mitigate potential environmental impacts from erosion and sedimentation
- ensure chemicals (e.g. hydrocarbons) and other potential pollution sources (e.g. concrete agitator washout) are managed to minimise the risk of release/spills to the environment
- be flexible and adaptive to ensure accommodate any changes in site conditions and address any ESCs found to be ineffective in meeting performance standards

Progressive erosion and sediment control plan (ESCP) drawing is attached in **Appendix A** and provide detailed ESCs for all Project stages.

2.0 Existing Environment and Constraints

2.1 Catchment, Topography and Drainage

The Project site is situated in the suburb of Teralba, within the Lake Macquarie LGA with the existing Concrush operation covering an area of approximately 2.4 hectares (ha) and the expanded Project to cover a total area of 4.8 ha. The Project site is bound to the west by the Main North Rail Line and to the east by Racecourse Road and Cockle Creek. The land uses surrounding the Project site include a wrecker's yard, a scrap metal recycling yard to the south and Teralba Colliery and Macquarie Coal Preparation Plant to the west. The proposed Bunderra residential estate is located approximately 200 m to the east of the Project site. Access to the Project site is via a driveway on Racecourse Road.

The northern portion of the Project site is predominantly devoid of vegetation while the southern portion is dominated by exotic vegetation that has invaded previously disturbed areas. There are trees planted along parts of the existing site boundaries which act as a wind break and visual screen for adjacent properties.

2.1.1 Surface Hydrology

The Project site is located in the Cockle Creek Estuary catchment that forms part of the broader Lake Macquarie catchment and is classified as having a high flood risk based Lake Macquarie City Council (LMCC) flood risk mapping. The Project site is flat with the majority of stormwater runoff draining to the west by overland flow or via the Central Drainage Pit. The Central Drainage Pit flows to a vegetated surface drain running along the northern site boundary to discharge into a drainage depression at the north eastern corner of the Project site which in turn drains to the north prior to discharging into Cockle Creek approximately 250 m downstream. A relatively smaller section at the eastern end of the site catchment currently drains to the local stormwater system along Racecourse Road.

Following implementation of Stage 1, all surface runoff (excluding the Green Waste catchment) will drain to sediment basins at the north western and south western corners of the site. Any spills from the sediment basin in the north western corner of the site, (Sediment Dam 1) will drain to the north prior to discharging into Cockle Creek approximately 250 m downstream (refer to **Figure 2.1**). Any spills from the from the sediment basin in the south western corner of the site (Sediment Basin 2) will drain to the south prior to discharging into Cockle Creek approximately 1.5 km downstream (refer to **Figure 2.1**). Further detail regarding the Project WMS is presented **Section 3.0**.

The Project site is situated in the Lower Cockle Creek Floodplain (the Floodplain) with lower portions of the Project site within the 1% Average Exceedance Probability (AEP) flood extent as determined by the Winding Creek and Lower Cockle Creek Floodplain Risk Management Study and Plan (BMT WBM, 2016).

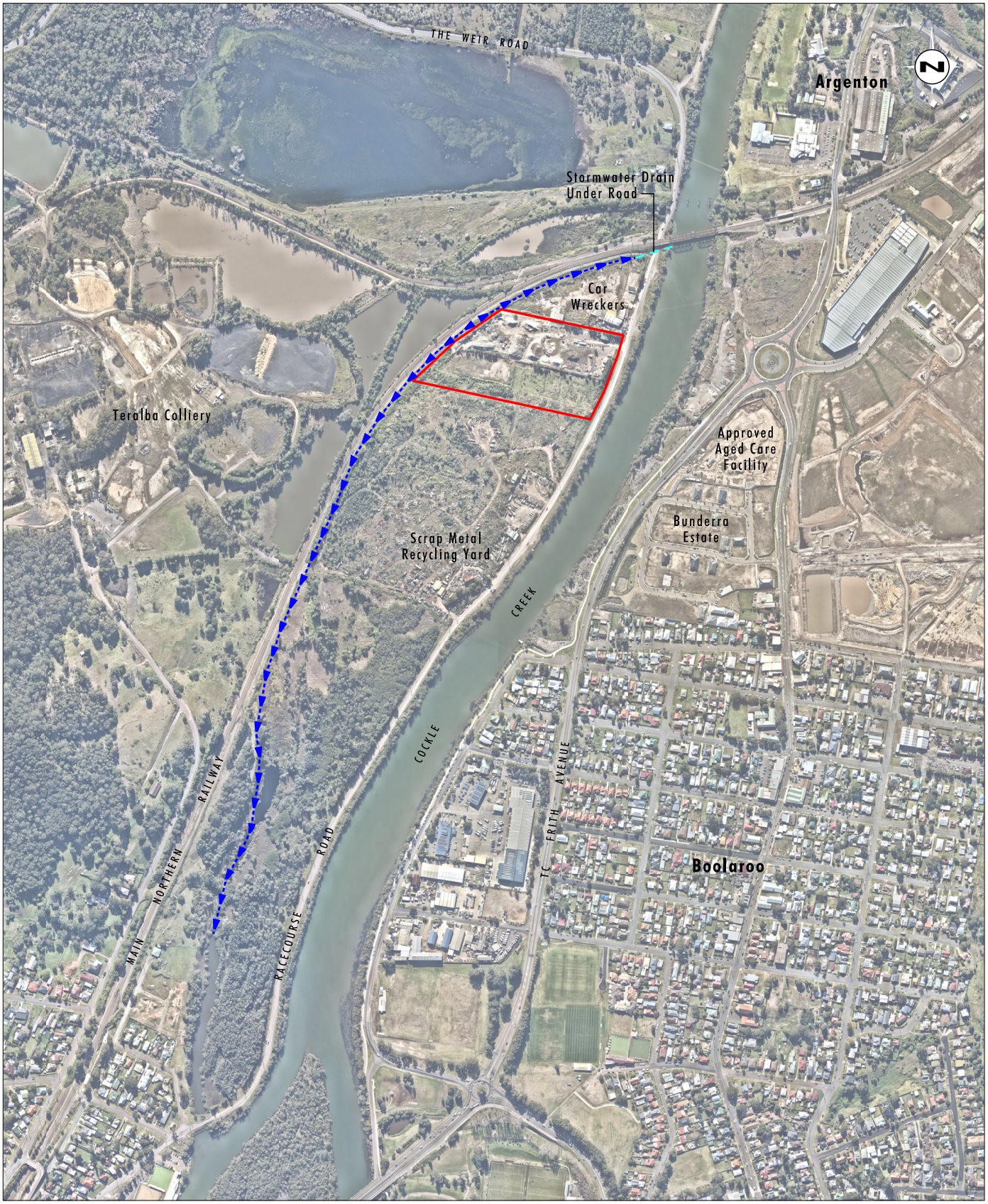


Image Source: Nearmap (Jun 2018)
Data Source: RCA Acoustics (2018)

0 100 250 500m
1:10 000

Legend

- Project Site
- Drainage Depression
- Stormwater Drain Under Road

FIGURE 2.1

Local Off-site Drainage

2.2 Soils

Soils underlying the hardstand on the existing site and soils on the southern extension area are mapped as the Cockle Creek soil landscape (9232cc) on the Office of Environment and Heritages (OEH) online mapping tool eSpade. Soils that are likely to be encountered during construction include:

- cc1, brownish black sandy loam topsoil with neutral to slightly acid pH and moderate to high erodibility,
- cc2, dull yellowish brown bleached sandy clay loam topsoil with strong acidity and moderate to high erodibility, and
- cc3, dull yellowish brown pedal clay subsoil strong acidity and moderate to high erodibility.

Table 2.1 presents relevant modelled soil properties sourced from eSpade (OEH, 2020).

Table 2.1 Project Site Soil Properties

Parameter	Value
Soil Erodibility (as used in the Revised Universal Soil Loss Equation (RUSLE))	0.05 to 0.07
Exchangeable Sodium Percentage (ESP)	>2-4% (0 – 30 cm depth) >4 – 6% (30 – 100 cm depth)
Clay Percentage	>20 – 25% (0 – 5 cm depth) >15 – 20% (0 – 30 cm depth) >30 – 40% (30 – 100 cm depth)
Silt Percentage	>10 – 15% (0 – 100 cm depth)

Based on the data in **Table 2.1** the Project site soils are considered to be non-dispersive (as the ESP is less than 6%) but fine, i.e. Type F (as the percentage of clay and silt is >30%).

During the approvals phase of the Project RCA Australia (RCA) prepared the *Baseline Contamination Assessment, Proposed Concrush Facility Expansion, Racecourse Road, Teralba* (2018) report which identified contamination on site and the presence of potential acid sulphate soils (PASS). The identified contamination included asbestos within bonded material fragments but no asbestos fibres were identified in the soil, benzo(a)pyrene in one bore hole above ecological screening levels and zinc above ecological screening levels in one bore hole and four test pits.

2.3 Climate

Lake Macquarie has a humid subtropical climate typical of the eastern Australia coastline. Summers are typically warm and humid with occasional periods of very hot and dry weather resulting from hot westerly and north westerly winds. Rainfall is highest in late autumn to early winter with the second half of the year typically drier. Winters are cool and on average drier than Summer. The region can also experience east coast lows with extremely high rainfall and winds in excess of 100 km/h.

Table 2.2 presents the average monthly rainfall depths for the Project site. Rainfall data was sourced from the Bureau of Meteorology (BoM) website for the Edgeworth Wastewater Treatment Works (WWTW) (Station 061393) which is the closest (approximately 1.5 km to the north) BoM station to the Project site.

Table 2.2 Average Monthly Rainfall

Month	Average Rainfall Depth (mm)[1]
January	93.0
February	146.3
March	126.3
April	124.5
May	92.2
June	120.5
July	54.2
August	52.0
September	68.5
October	73.3
November	96.5
December	86.9
Annual	**1134.2**

Notes: [1] Source: Edgeworth Wastewater Treatment Works BoM Station 061393 Climate Statistics (1990 – 2020)

Table 2.3 presents the 1987 Australian Rainfall and Runoff Intensity Frequency Duration (IFD) rainfall intensities sourced from the BoM website for the Project site.

Table 2.3 Project Site Intensity Frequency Duration Rainfall Intensities (mm/h)

Duration	1 Year	2 years	5 years	10 years	20 years	50 years	100 years
5 min	84.7	109	138	155	178	208	230
6 min	79.4	102	130	146	167	195	216
10 min	64.9	83.2	106	119	137	160	177
20 min	47.2	60.6	77.2	86.8	99.6	116	129
30 min	38.4	49.3	62.8	70.6	81.1	94.6	105
1 h	26.1	33.5	42.8	48.2	55.4	64.7	71.8
2 h	17.1	22.1	28.3	32	36.8	43.2	48
3 h	13.3	17.1	22.1	25	28.8	33.9	37.7
6 h	8.57	11.1	14.4	16.4	18.9	22.3	24.9
12 h	5.6	7.26	9.5	10.8	12.6	14.9	16.6
24 h	3.73	4.84	6.36	7.27	8.45	10	11.2
48 h	2.46	3.2	4.22	4.83	5.63	6.68	7.5
72 h	1.87	2.44	3.22	3.69	4.31	5.12	5.75

2.4 Site Constraints

The two primary constraints associated with the Project site are the potential for contamination in site soils and the presence of potential acid sulphate soils (PASS) as identified in *Baseline Contamination Assessment, Proposed Concrush Facility Expansion, Racecourse Road, Teralba* (RCA, 2018).

Potential contamination will be managed in accordance with a Remedial Action Plan which must be approved by the Planning Secretary prior to the commencement of Stage 1 construction. PASS will be managed in accordance with an Acid Sulphate Soil Management Plan (ASSMP) which must be approved by the Planning Secretary prior to the commencement of Stage 1 construction.

3.0 Design Standard

3.1 Erosion Controls

3.1.1 Erosion Hazard Assessment

An erosion hazard assessment has been undertaken in accordance with Chapter 4.4.1 of Volume 1 of the 'Blue Book'. The R-factor (rainfall erosivity) for the site was calculated using Equation (2) in Appendix A of Volume 1 of the 'Blue Book':

$$R = 164.74 \times 1.1177^{S} \times S^{0.6444}$$

where

S	is the 2 year, 6 hour duration storm event intensity (refer to **Table 2.3**)	9.32 mm/h

$$R = 164.74 \times 1.1177^{11.1} \times 11.1^{0.6444}$$

$$\boldsymbol{R = 2,672}$$

Plotting the site slope (an average slope of approximately 1%), and R-factor on Figure 4.6 from Volume 1 of the 'Blue Book' determines whether the site has a high or low erosion hazard. **Figure 3.1** presents the erosion hazard assessment plot which demonstrates that the site has a low erosion hazard. As such, enhanced erosion control measures are not required.

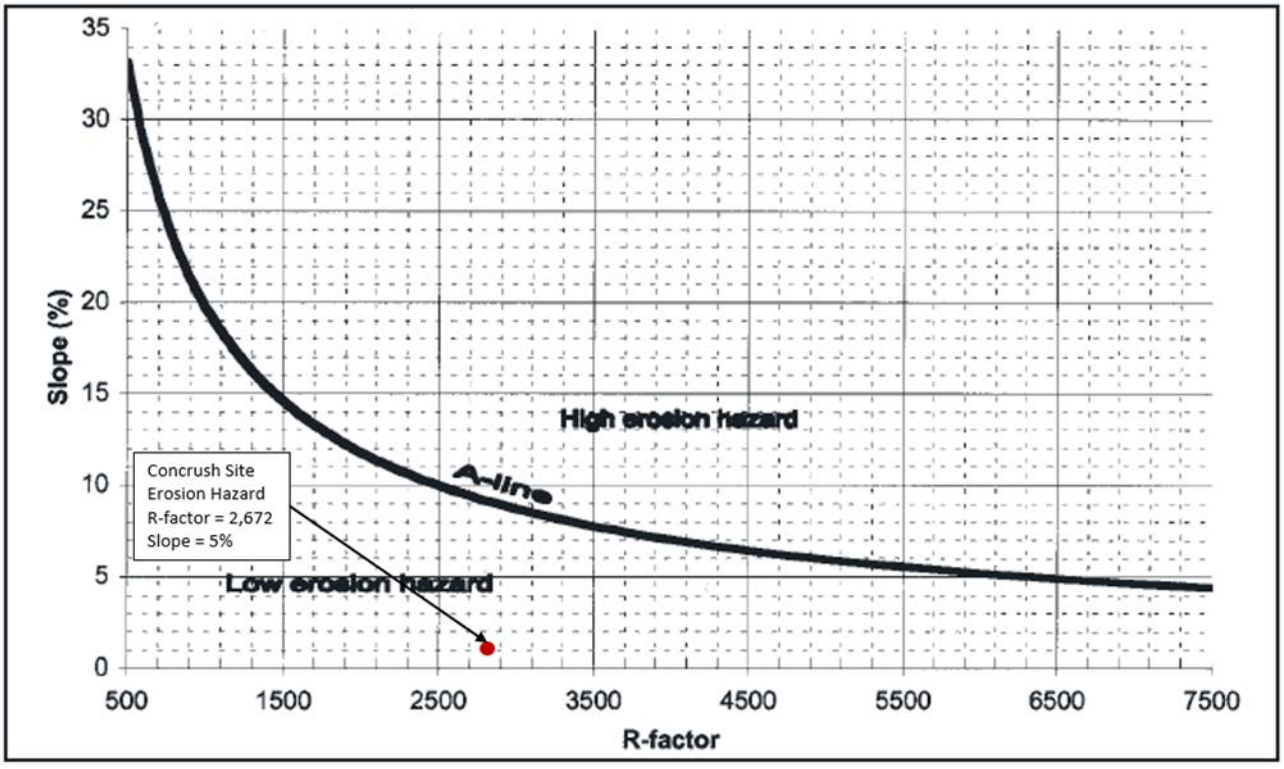


Figure 3.1 Erosion Hazard Assessment Plot

3.1.2 Soil Loss Class

While the erosion hazard assessment indicates that the site has a low erosion hazard, an assessment of soil loss class based on the annual Project site soil loss as calculated using the Revised Universal Soil Loss Equation (RUSLE) and Table 4.2 of Volume 1 of the 'Blue Book' has been undertaken to determine whether timing restrictions should apply to any of the construction works. The annual Project site soil loss has been estimated using RUSLE as follows:

$$A = R \times k \times LS \times C \times P$$

where:

		Value	Units
A	is the annual soil loss rate	to be calculated	tonnes/ha/year
R	is the annual average rainfall erosivity calculated based on the 2 year, 6 hour duration ARI storm event intensity (refer to **Section 3.1.1**)	2,672	-
k	is the soil erodibility (refer to **Table 2.1**)	0.07	-
LS	is the slope length gradient factor sourced from Table A1 of *Managing Urban Stormwater Volume 1* (Landcom, 2004) and is dependent on the maximum slope length (use 80 m) and gradient (1%, refer to **Section 3.1.1**)	0.19	-
C	is the ground cover factor sourced from Figure A5 of *Managing Urban Stormwater Volume 1* (Landcom, 2004) (no ground cover in this case)	1.0	-
P	is the erosion control practise factor sourced from Table A2 of *Managing Urban Stormwater Volume 1* (Landcom, 2004) and is dependent on level of compaction and roughness of the disturbed surface (assume Compacted and smooth)	1.3	-

$$A = 2{,}672 \times 0.07 \times 0.19 \times 1.0 \times 1.3$$

$$\boldsymbol{A = 46.2 \frac{tonnes}{ha.year}}$$

According to Table 4.2 of Volume 1 of the 'Blue Book' the Project site has a soil loss class of 1 and has a low to moderate erosion hazard. Figure 4.9 of Volume 1 of the 'Blue Book' (Landcom, 2004) shows that the Project site is located in rainfall distribution zone 1. Table 4.3 of Volume 1 of the 'Blue Book' indicates that no construction works timing restrictions apply for sites in rainfall distribution zone 7 with soil loss class 1.

3.1.3 Drainage Controls

The anticipated Project construction duration is up to 6 months. For a disturbance duration of 6 months, the Blue Book requires that temporary drainage controls be designed to be stable in a 5 year ARI critical duration storm event for a sensitive receiving environment.

Any drains that will form part of the permanent site Water Management System will be designed to be stable in a 20 year ARI critical duration storm event for a sensitive receiving environment. Permanent drains are subject to detailed engineering design.

3.2 Sediment Controls

The 'Blue Book' requires that sediment basins are used when the soil loss rate exceeds 200 T/ha/year as for the total area to be disturbed. The total disturbance area for the Project site will be approximately 4.6 ha. Based on a soil loss rate of 46.2 tonnes/ha/year estimated using the RUSLE (refer to **Section 3.1.2**) the soil loss rate is estimated to be approximately 212.5 tonnes/year and therefore sediment basins are required.

The anticipated Project construction duration is approximately 6 to 12 months. For a disturbance duration of up to 6 months, the Blue Book requires that Type F or D sediment basins be sized to accommodate runoff from a 5 day 80th percentile rainfall event for a sensitive receiving environment. The sediment basins approved for the operational phase of the Project are required to accommodate runoff from a 5 day 90th percentile rainfall event. As such, the construction phase sediment basins will be sized to accommodate runoff from a 5 day 90th percentile rainfall event and remain as the operational sediment basins at the completion of the construction phase. Sediment zone storage capacity is to be determined based on 2 months of soil loss as calculated using the RUSLE. Design capacities for the two Project sediment basins (Sediment Dam 1 and Sediment Dam 2, refer to **Appendix A**, Figure A.1) based on anticipated Project site catchments (final design capacities subject to final Project site catchments for each sediment basin) and the design parameters in **Section 3.3** are presented in **Table 3.1**.

Table 3.1 Preliminary Sediment Basin Capacities

Sediment Basin	Catchment (ha)	Settling Zone Capacity (m^3)	Sediment Zone Capacity (m^3)	Total Capacity (m^3)
Sediment Dam 1	2.4	920	14	934
Sediment Dam 2	2.2	843	13	856

For a sediment basins that will remain operational for a period of greater than 3 years, the Blue Book requires that emergency basin spillways be designed to be stable in a 100 year ARI critical duration storm event for a sensitive receiving environment.

For a disturbance duration of up to 6 months, the Blue Book requires that temporary sediment control measures be designed to be stable in a 10-year ARI critical duration storm event for a sensitive receiving environment.

3.3 Design Standard Summary and Site Rainfall and Hydrology Parameters

Table 3.2 presents a summary of the ESC design standards for Project construction. **Table 3.3** presents the base rainfall and hydrology parameters to be used for the design of the Project ESCs.

Table 3.2 Erosion and Sediment Controls Design Standard

Control	Design Standard
Temporary drainage controls	To be stable in a in a 5 year ARI critical duration storm event
Temporary sediment controls	To be stable in a 5 year ARI critical duration storm event
Sediment Basin Capacity	Settling zone capacity to accommodate a 5 day 90th percentile rainfall event Sediment zone capacity to accommodate 6 months of soil loss as calculated by the RUSLE (refer to **Section 3.1.2** for RUSLE input parameters)
Sediment Basin Emergency Spillway	To be stable in a 100 year ARI critical duration storm event

Table 3.3 Rainfall and Hydrology Parameters

Parameter	Value	Source/Comments
Rainfall Erosivity	2,627	Refer to **Section 3.1.1**
10 year 1 hour duration rainfall intensity	48.2 mm/h	Refer to **Table 2.3**
Soil Hydrologic Group	D	Assumed worst case
Peak Flow Runoff Coefficient, C10	0.89	*Table F3* of *Managing Urban Stormwater Volume 1* (Landcom, 2004) for a 10 year 1 hour duration rainfall intensity of 48.2 mm/h and soil hydrologic group D
5 day 90th percentile rainfall event depth	51.8 mm	*Table 6.3a* of *Managing Urban Stormwater Volume 1* (Landcom, 2004)
Volumetric Runoff Coefficient, Cv - for the 5 day 90th percentile rainfall event	0.74	*Table F2* of *Managing Urban Stormwater Volume 1* (Landcom, 2004) for soil hydrologic group D

4.0 Works Staging

Project construction will occur over to broad stages: Stage 1 and Stage 2. Following completion of Stage 1, the operational site WMS will, for the most part, serve the erosion and sediment control requirements of Stage 2 construction activities. Construction works for Stage 1 of the Project construction will generally be staged as presented in **Table 4.1**. While **Table 4.1** presents general ESCs to be applied further detail on ESC measures is provided in **Section 5.0** and **Appendix A**.

Table 4.1 Construction Works Staging

Stage	Activities	General Erosion and Sediment Controls
Early Works	Install sediment basins (Sediment Dam 1 (SD1) and Sediment Dam (SD2)) and associated drains Clear waste stockpiles and vegetation from southern section of Project site Establish Leachate Dam, Constructed Wetland and concrete washout bay	Sediment fences to be installed in accordance with 'Blue Book' standard drawing SD 6-8 and/or SD 6-9 (refer to **Appendix B**) around perimeter of disturbance boundary prior to commencement of ground disturbing activities. Establish stabilised site access in accordance with 'Blue Book' standard drawing SD 6-14 (refer to **Appendix B**) Spoil stockpiles to be managed in accordance with 'Blue Book' standard drawing SD 4-1 (refer to **Appendix B**). Stockpiles of potentially contaminated material/soil and PASS to be managed in accordance with the Remedial Action Plan and ASSMP respectively.
Bulk Earthworks	Trenching works for electrical distribution to lights and irrigation systems Establish flood mitigation bund and landscaping mounds Establish site landform and grades Install capping layer over potentially contaminated soils Establish hardstand areas	ESCs from Early Works stage to be maintained. Flood mitigation bund and landscaping mounds to be revegetated promptly following construction.
Construction works and Road Stabilisation	Re-configure weighbridge Install additional water storage tanks Install wheel wash Install concrete washout bay Widen site access Establish retail sales area Relocate maintenance shed and amenities Seal internal roads	ESCs from Early Works stage to be maintained. All temporary ESCs are to remain functional until the operational water management system is fully functional and construction activities completed.

5.0 Erosion and Sediment Controls

Supervisory staff involved in the works are to ensure that all employees and contractors working on the Project understand and follow the requirements of this ESCP.

5.1 General Conditions

Erosion and sediment control measure locations are displayed on the figure contained within **Appendix A** (referred to as ESCP figure). Additional ESCP figures will be prepared if required.

All erosion and sediment controls (ESC's) are to be installed, managed and maintained in accordance with Landcom (2004), the 'Blue Book', to:

- Prevent sediment moving off-site and sediment laden water entering any watercourse, drainage line, or drain inlet.
- Reduce water velocity and capture sediment on site.
- Minimise the amount of material transported from site to surrounding pavement surfaces.
- Divert clean water around site where possible.

Additional ESC measures must be implemented and a revised ESCP must be submitted for approval in the event that site conditions change significantly from those considered within this ESCP or the implemented works fail to achieve the desired objective of preventing environmental harm.

Where there is a high probability that serious or material environmental harm may occur as a result of sediment leaving the site, a new or amended ESCP must be submitted for approval. Only those works necessary to minimise or prevent environmental harm shall be conducted on-site prior to approval of the new or amended ESCP.

In circumstances where it is considered necessary to prepare an amended ESCP, and where the delivery of such an amended ESCP is not imminent, then all necessary new or modified erosion and sediment control works must be in accordance with the Blue Book (Landcom 2004). Upon approval of the amended ESCP, all works must be implemented in accordance with the amended plan.

5.2 General Site Management

1. To minimise ground disturbance, construction activities including vehicle and machinery movements, stockpiling, temporary vehicle parking and material laydown will be restricted to designated work areas where possible.
2. Vehicles are to be parked at designated parking areas that will avoid vegetated areas.
3. Vehicle wash down and/or concrete truck washout is to occur in a designated bunded area and potable water is to be used. This bunded area is to be located at least 5 m from any on-site table drain. Excess debris from cleaning and washing is to be removed using hand tools.
4. All hydrocarbons, chemicals and liquids are to be stored in an impervious bunded area, a minimum of 50 m away from:
    - rivers, creeks or any areas of concentrated water flow

- flooded or poorly drained areas.
- slopes above 10%.

5. Refuelling of plant and equipment is to be undertaken in an impervious bunded area located a minimum of 50 m from drainage lines or waterways.

6. Emergency spill kits are to be kept on site at all times. All workers are to be made aware of the location of the spill kits and trained in their use.

7. Site spoil must be lawfully disposed of in a manner that does not result in ongoing soil erosion or environmental harm. Any potentially contaminated spoil or PASS will be managed in accordance with the Remedial Action Plan or the ASSMP respectively.

8. Stage the construction and extension of drainage infrastructure to maintain existing drainage capacity while new drainage structures are brought online.

5.3 Soil and Stockpile Management

1. Where material is suspected of contamination managed in accordance with the Remedial Action Plan.

2. Any PASS material will be managed in accordance with the ASSMP respectively

3. Spoil is to be placed in designated stockpile locations within the project disturbance boundary at locations determined by the site superintendent. Stockpiles are to have sediment fencing installed on the downslope side and a clean water diversion bund installed on the upslope side as per Standard Drawing SD4-1 Stockpiles (refer to **Appendix B**) to protect from run-on water.

4. Excess soil and vegetation debris is to be disposed of at a suitable licensed waste facility.

5. Ensure stockpiles of erodible material that have the potential to cause environmental harm if displaced are:
   - Appropriately protected concentrated surface flow and excessive up-slope stormwater surface flows.
   - Constructed greater than 40 m away from the top of bank of drainage lines where practicable.
   - Stabilised (provided with an appropriate protective cover (synthetic, mulch, or vegetative)) if they are to be in place for more than 10 days.

5.4 Drainage and Erosion Controls

1. Wherever reasonable and practicable, “clean” surface waters must be diverted away from sediment control devices and any untreated, sediment-laden waters.

2. Limit construction equipment activity to disturbed areas. Minimise disturbance and retain as much existing ground cover as practicable. The disturbance boundary is to be clearly delineated with construction fencing or barrier tape.

3. Refer to the figures within **Appendix B** for appropriate wet weather erosion control provisions.

5.5 Sediment Control

1. All runoff from the works is to be passed through sediment controls.

2. Sediment traps should be located as close to the source of the sediment as practicable.

3. Sediment removed from any trapping device is to be disposed of in locations where further erosion and consequent pollution to downslope lands and waterways will not occur.

4. Temporary soil and water management structures are to be removed only after the Project site is stabilised appropriately and the operational WMS is fully functional.

5. Sediment control devices must be de-silted and made fully operational as soon as reasonable and practicable after a sediment-producing event.

6. Materials, whether liquid or solid, removed from sediment control devices during maintenance or decommissioning, must be disposed of in a manner that does not cause ongoing soil erosion or environmental harm.

5.6 Trenching

1. Avoid trenching in areas where water flow is likely to concentrate. Alternatively, schedule work during periods when rainfall erosivity is low.

2. Ensure trench widths and depths are the minimum necessary. Limiting the width of the disturbed area within the easement is an important management tool, particularly in sensitive environments.

3. Divert surface water away from trench openings.

4. Use sandbags as plugs or bulkheads across trench inverts to shorten the length of sediment-laden water flow in the trench.

5. Leave excavations open for the minimum practical time (try to limit the time trenches are left open to fewer than three days). Avoid opening trenches whenever the risks of storms are high.

6. Organise service installations to enable progressive backfilling.

7. Ensure plugs, collars or trench stops are employed to control tunnel erosion after backfilling is completed (refer to **Figure 5.1**).

8. Provide an appropriate allowance for settling of uncompacted backfill material (e.g. 10%) (refer to **Figure 5.1**).

9. After backfilling, remove excess or unsuitable spoil from the site. Then, replace topsoil and vegetate/stabilise to match surrounding ground levels and vegetation species (if area is to be stabilised with vegetation) as soon as possible.

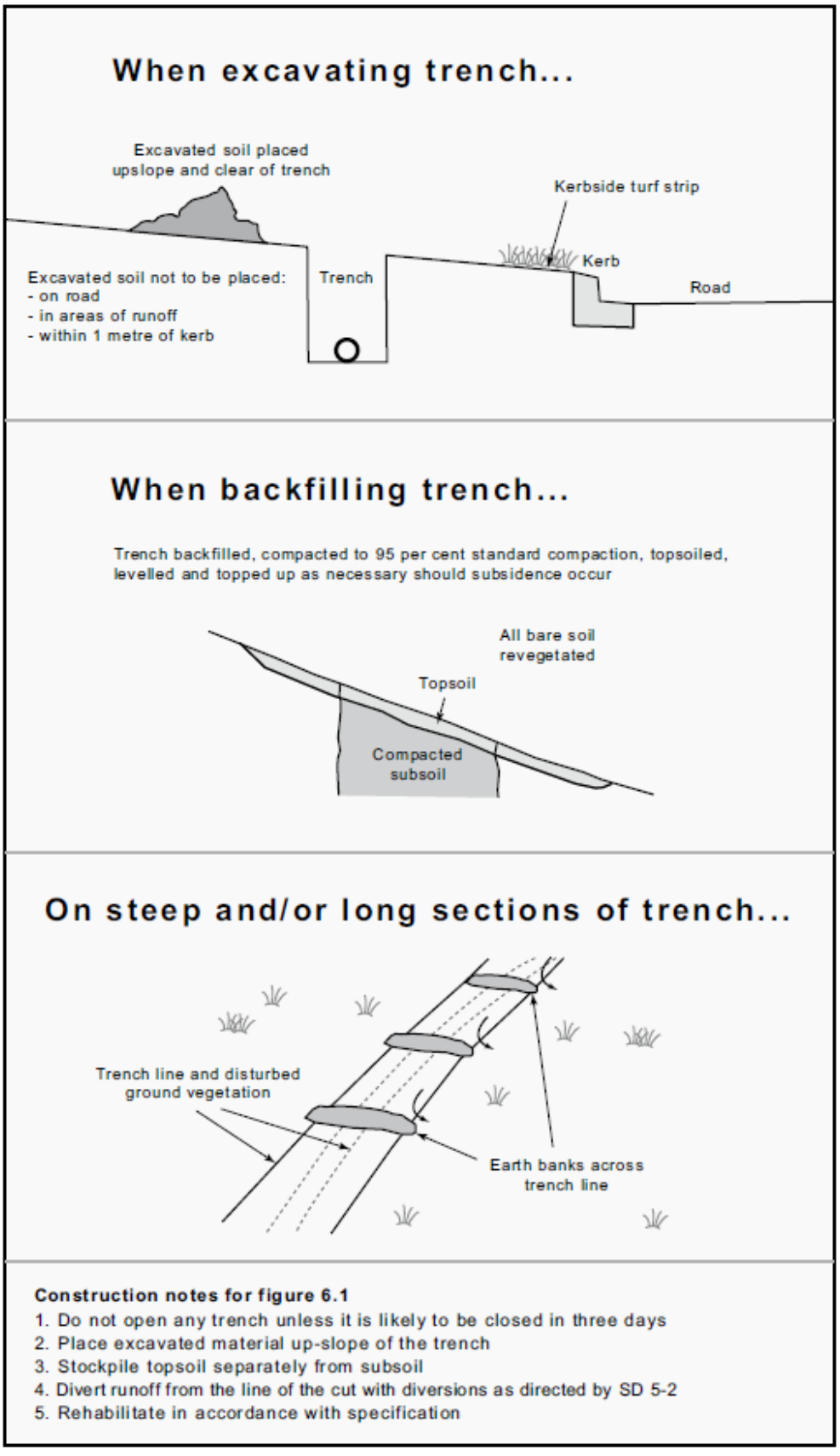


Figure 5.1 Erosion and Sediment Control During Trenching

Source: Managing Urban Stormwater Volume 2A Installation of Services (DECC, 2008)

5.7 Dust Suppression

1. Where construction works generate dust, all reasonable and practicable measures are to be undertaken to prevent dust.

2. Areas are to be stripped progressively and only where it is necessary for works to occur.

3. Disturbed areas are to be stabilised as soon as practical.

4. Disturbed areas are to be dampened with a light water spray as required.

5. Exposed soil surfaces are to be roughened where practical.

6. All stockpiles are to be covered and located where they are protected from the wind as much as practical.

7. Vehicle movements are to be restricted to designated access roads.

8. All loads are to be covered when transporting material where practical.

9. Landscaping buns and mounds are to be revegetated and stabilised immediately following construction to inhibit the generation of dust.

5.8 Site Stabilisation

1. Disturbed areas are to be stabilised as soon as practicable following completion of construction works.

2. For areas subject to revegetation, and where topsoil has been set aside for reuse, topsoil is to be replaced in accordance with standard drawing SD 4-2 Replacing topsoil (refer to **Appendix B**) and is to be stored separately to subsoil and used to rehabilitate disturbed land.

3. Following completion of construction activities, areas subject to revegetation should achieve a C-factor of 0.1 (i.e. 60% ground cover) within 20 working days and a program of works set in motion to reduce the C-factor permanently to less than 0.05 (i.e. 70% ground cover) within a further 60 days.

4. Lands recently established with vegetation are to be watered regularly until an effective cover has been properly established and plants are growing vigorously. Further application of seed or tube stock planting is to be employed later in areas of inadequate vegetation establishment.

5. Where practical, foot and vehicular traffic is to be kept away from all recently vegetated areas.

6. All erosion and sediment control measures shall be maintained in a functioning condition are to be removed only after the Project site is stabilised appropriately and the operational WMS is fully functional.

6.0 Inspection and Maintenance

6.1 Site Monitoring

Site and receiving water quality monitoring is to be undertaken in accordance with the site WDMP.

All ESCs are to be inspected:

- weekly
- prior to forecasted rainfall events greater than or equal to 10 mm in a 24-hour period
- after rainfall events greater than or equal to 10 mm in a 24-hour period.

All inspections are to be documented on a check sheet and all actions identified are to be closed out within a reasonable and practical time frame. The check sheet is to include:

- recording the condition of every sediment control employed
- recording maintenance requirements (if any) for each sediment control
- recording the volumes of sediment removed from sediment retention systems, where applicable
- recording the site where the sediment is disposed
- provide a signed duplicate of completed check sheet to the construction site manager for their information.

6.2 Site Maintenance

All ESCs, including drainage control measures, must be maintained in proper working order at all times during their operational lives. All erosion and sediment control measures shall be maintained in a functioning condition during construction until all construction activities are completed, the Project site is stabilised appropriately, and the operational WMS is fully functional.

Sediment removed from sediment traps and places of sediment deposition must be disposed of in a lawful manner that does not cause ongoing soil erosion or environmental harm.

Required repairs to all controls are to be undertaken immediately where practical. Ensure controls are put back in place if they are moved for any reason.

All sediment fences and detention systems are to be kept in good working condition. In particular, attention is to be given to:

- recent works to ensure they have not resulted in diversion of sediment laden water away from them
- degradable products (e.g. sediment fence) to ensure they are replaced as required
- sediment removal as required.

7.0 Revision and Update of ESCP

This ESCP and the ESCP figure (refer to **Appendix A**) is to be updated as required if the site conditions change or if installed controls are not operating effectively. Additional erosion and/or sediment control works are to be constructed as may become necessary to ensure the desired protection is given to downslope lands and waterways, i.e. making ongoing changes to this ESCP where it proves inadequate in practice or is subject to changes in conditions at the work site or elsewhere in the catchment.

8.0 References

Managing Urban Storm Water – Soils and Construction Volume 1, Landcom, 4th Edition, 2004

Managing Urban Storm Water – Soils and Construction Volume 2, DECC, 2008

Best Practice Erosion and Sediment Control, International Erosion Control Association (Australasia), 2008

Baseline Contamination Assessment, Proposed Concrush Facility Expansion, Racecourse Road, Teralba, RCA Australia, 2018

APPENDIX A

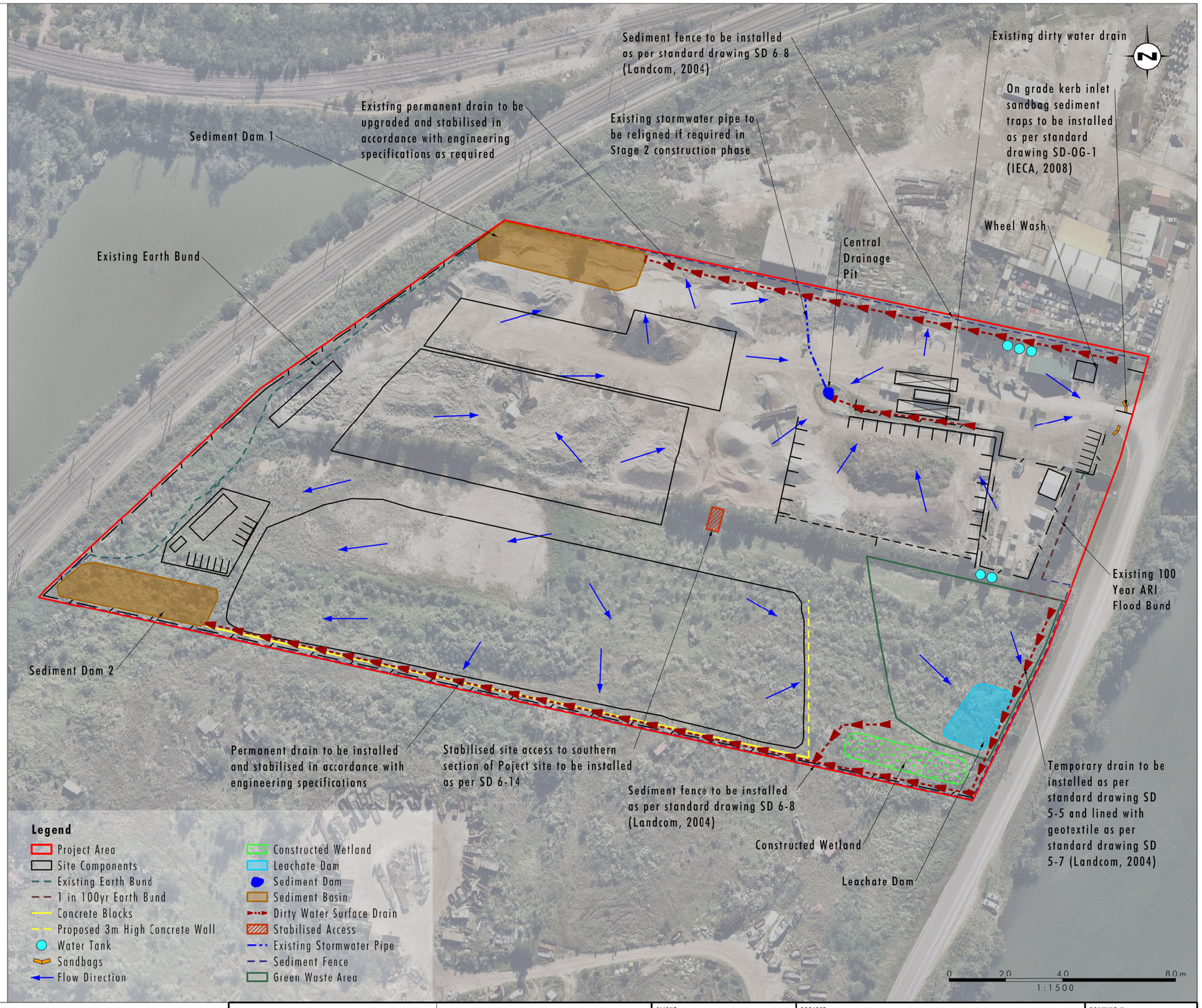
SWMP Figure

ESCP Figure A.1 General Notes

1. This progressive plan is to be read in conjunction with the Primary ESCP, Construction Environmental Management Plan, Acid Sulphate Soils Management Plan, Remedial Action Plan, Water Discharge Management Plan and surface water management system engineering design specifications.
2. This plan is to be updated as required if the site conditions change or if installed controls are not operating effectively.
3. Temporary controls in addition to those shown may be required as worksprogress and/or due to weather conditions.
4. All erosion and sediment controls to be constructed and maintained in accordance with referenced *Managing Urban Stormwater Volume 1* (Landcom, 2004) and *Volume 2* (DECC, 2008) and *Best Practice in Erosion and Sediment Control* (IECA, 2008) specifications and standard drawings and other referenced drawings. Substitute materials may be used where functionality is not affected. Key standard drawings include, but are not limited to:
   - SD 4-1 Stockpiles (Landcom, 2004)
   - SD 6-8 Sediment Fence (Landcom, 2004)
   - SD 6-9 Alternative Sediment Fence (Landcom, 2004)
   - SD 6-14 Stabilised Site Access (Landcom, 2004)
   - SD-OG-1 On Grade Kerb Inlet Sediment Trap (IECA, 2008)
5. Personnel installing controls are to have demonstrated competence and experience.
6. All controls to be inspected regularly with maintenance and repairs as required.
7. Disturbed areas to be minimised as far as practicable to the areas essential for construction work only.
8. Disturbance is to be limited to nominated disturbance boundary. Undisturbed areas outside of the work zone to be regarded as exclusion zones, delineated with fencing or tape as required. All personnel to be instructed to avoid exclusion zones or damaging installed controls.
9. All disturbed areas to drain to an appropriate sediment control at all times.
10. No tracking of machinery through drainage lines is to occur.
11. No tracking of material onto roadways. Sediment to be removed from roadways as required.
12. Stockpiles are to be managed as per SD 4-1 including a sediment fence installed on the downslope side, clean water diversion upslope and covered to prevent dust generation and dirty water runoff.
13. Dust to be managed on site, particularly during dry, gusty weather conditions.
14. Site stabilisation is to be undertaken as soon as practicable following completion of construction activities.
15. Erosion and sediment controls are to be maintained in proper working and retained until the site has been adequately stabilised.

Wet Weather Provisions

1. The daily rainfall forecast is to be monitored and wet weather provisions enacted where more than 80% of greater than or equal to 10 mm of rainfall is predicted.
2. Erosion and sediment controls to be inspected daily and repaired as required prior to and during the onset of rain.
3. Temporary off site water diversions to be enabled and temporary on site water diversions (drains, sandbag berms etc) installed to reduce slope lengths and direct flows to staged controls.
4. Site access points to be fenced or taped to prevent unauthorised vehicle disturbance.
5. Active site entrances to be monitored and sediment removed as required.



REV	DATE	DRAWN	CHECKED	APPR'D	REVISIONS
AAA	88-88-88	MO	IK	PJ	88

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SIGNED	DATE	NPER No.
ENGINEER	CB	26.5.2020
DRAWN	IK	26.5.2020
DESIGNED	CB	26.5.2020
CHECKED	?	26.5.2020
APPROVED	?	26.5.2020
DATUM		AHD
PROJECTION/ZONE		MGA56

CLIENT: concrush reduce. re-use. recycle.

PROJECT: **Concrush Resource Recovery Facility Expansion**

TITLE: Erosion and Sediment Control Plan

DRAWING No.: R02/4987_006

REVISION A

SHEET 1 OF 1

DATE 26.5.2020

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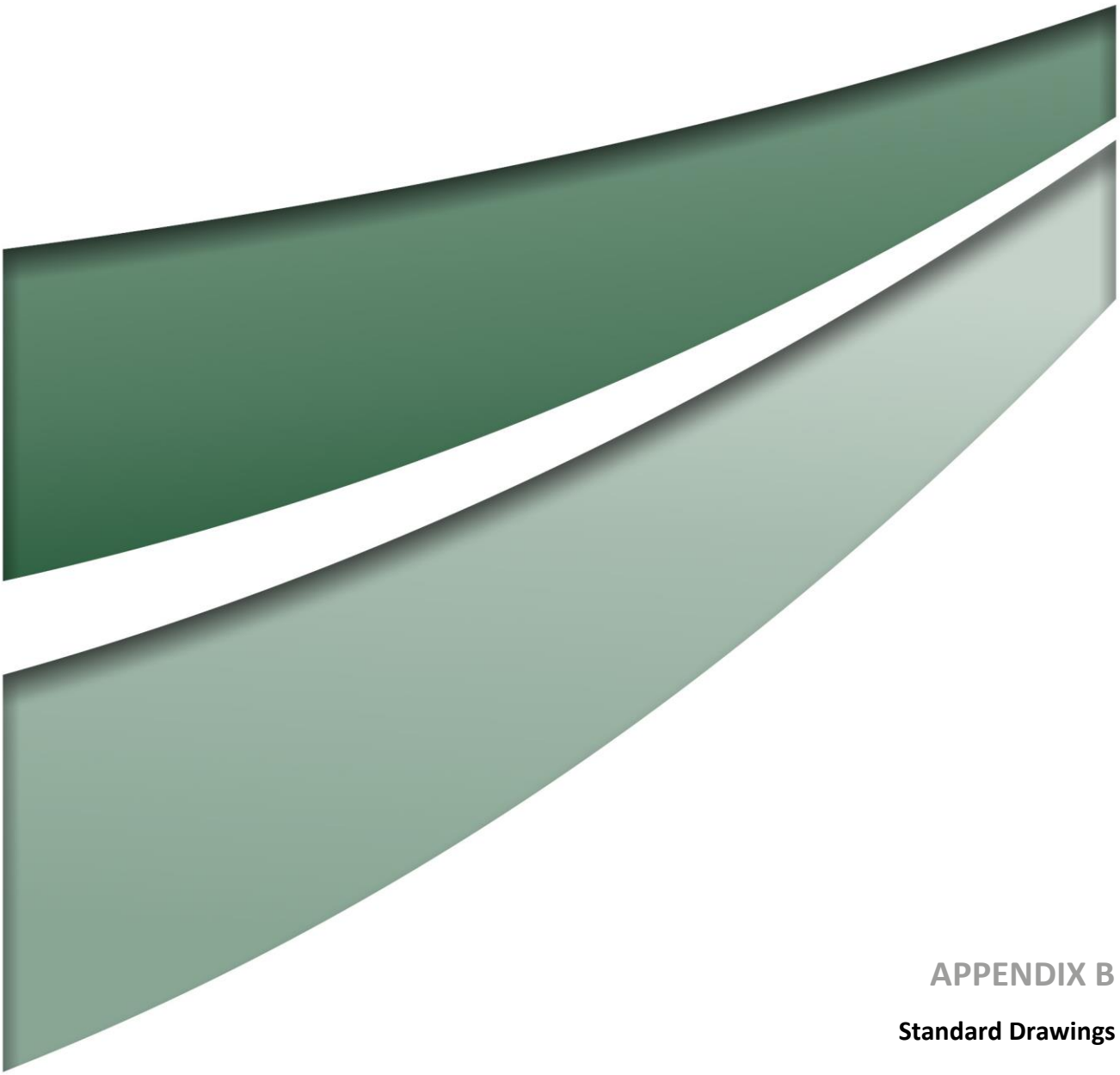
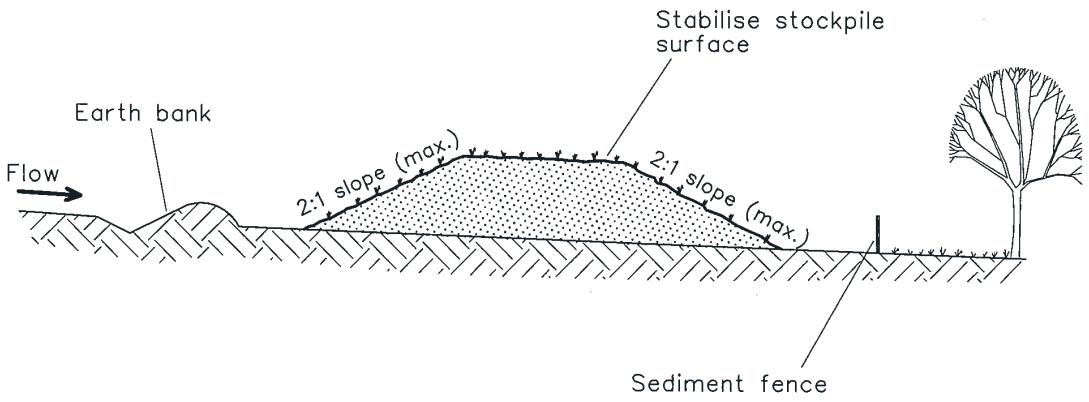


APPENDIX B

Standard Drawings

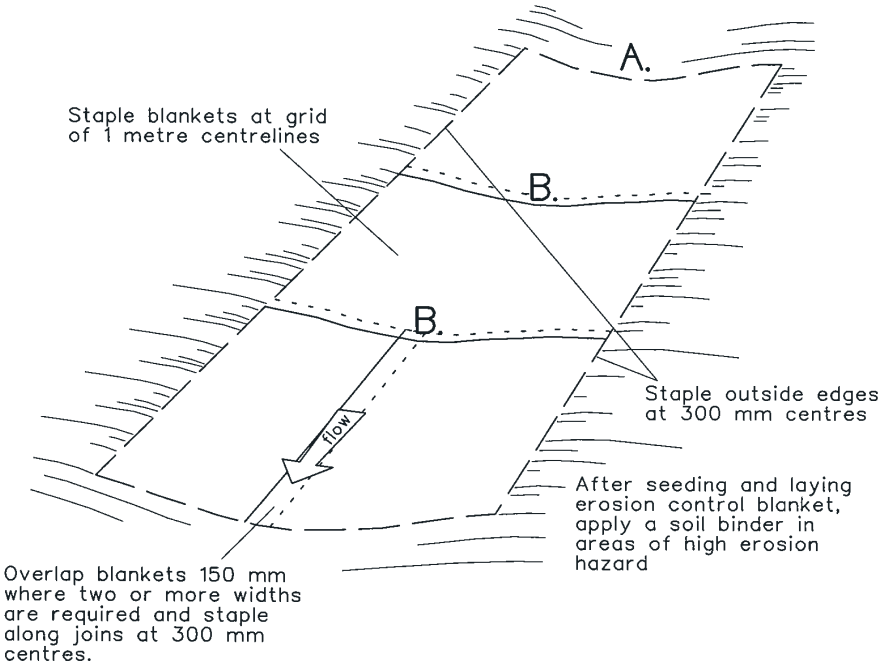


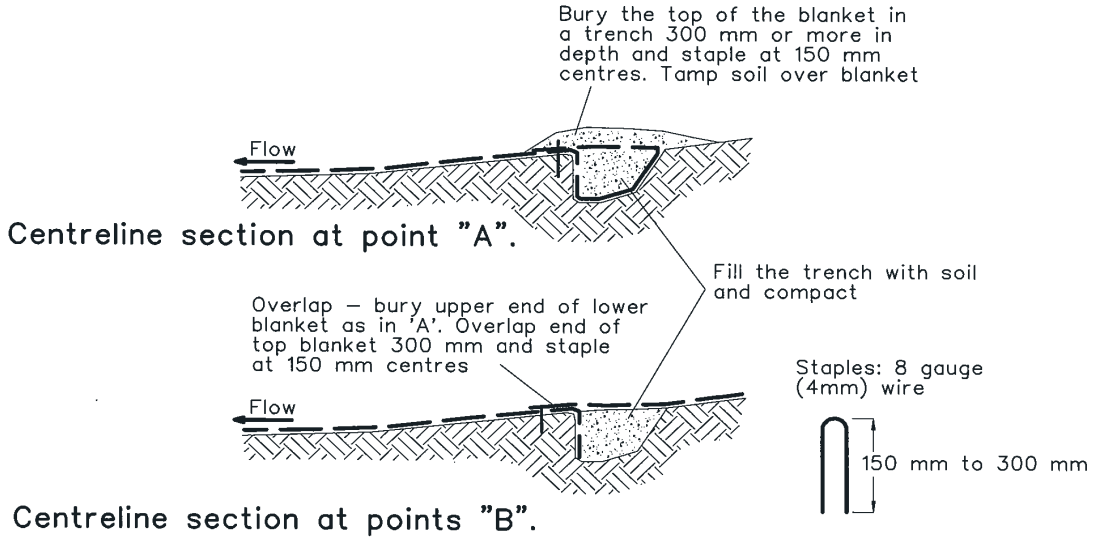
Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

STOCKPILES

SD 4-1

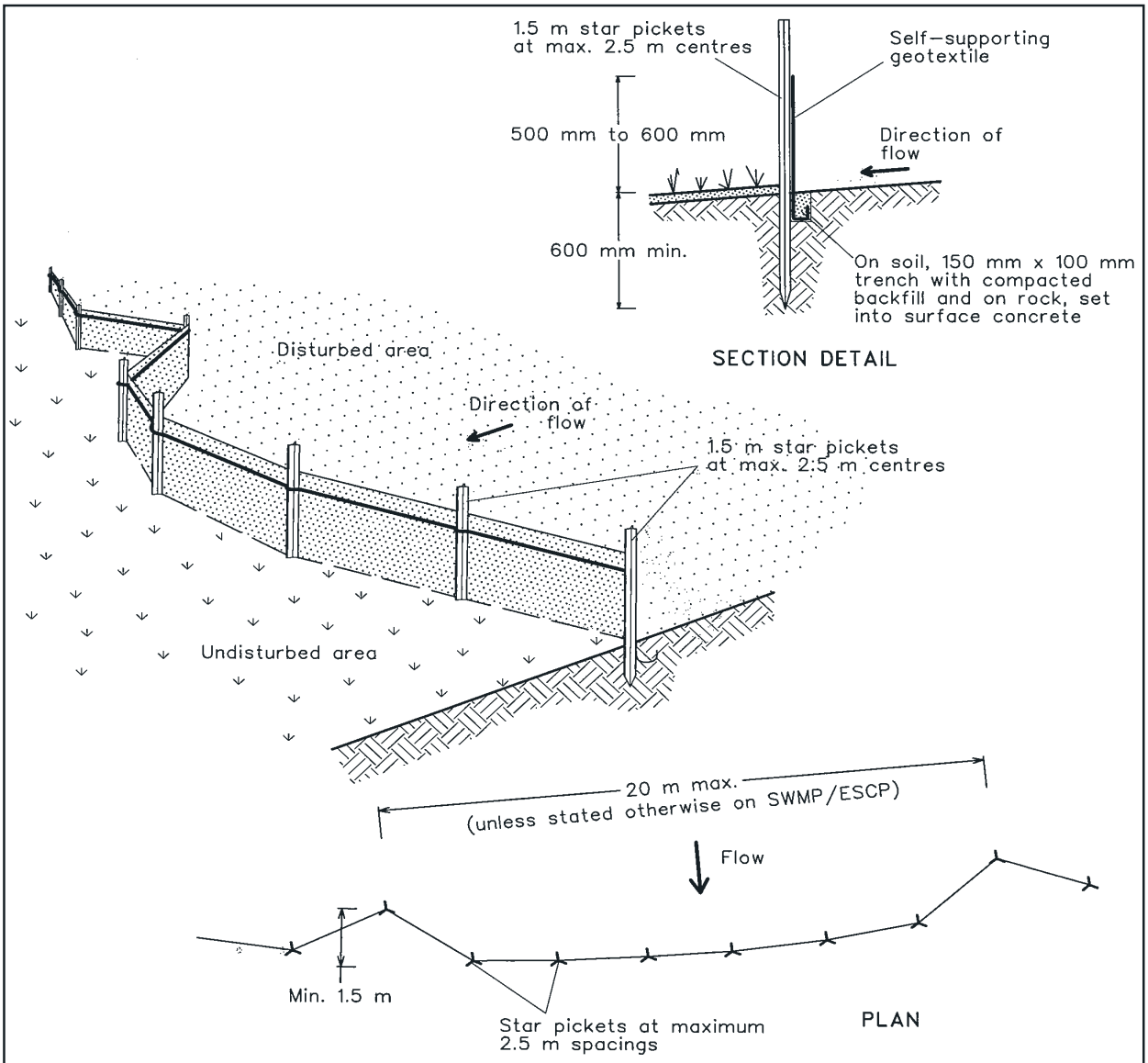




Construction Notes

1. Remove any rocks, clods, sticks or grass from the surface before laying matting
2. Ensure that topsoil is at least 75 mm deep.
3. Complete fertilising and seeding before laying the matting.
4. Ensure fabric will be continuously in contact with the soil by grading the surface carefully first.
5. Lay the fabric in "shingle-fashion", with the end of each upstream roll overlapping those downstream. Ensure each roll is anchored properly at its upslope end (Standard Drawing 5-7b).
6. Ensure that the full width of flow in the channel is covered by the matting up to the design storm event, usually in the 10-year ARI time of concentration storm event.
7. Divert water from the structure until vegetation is stabilised properly.

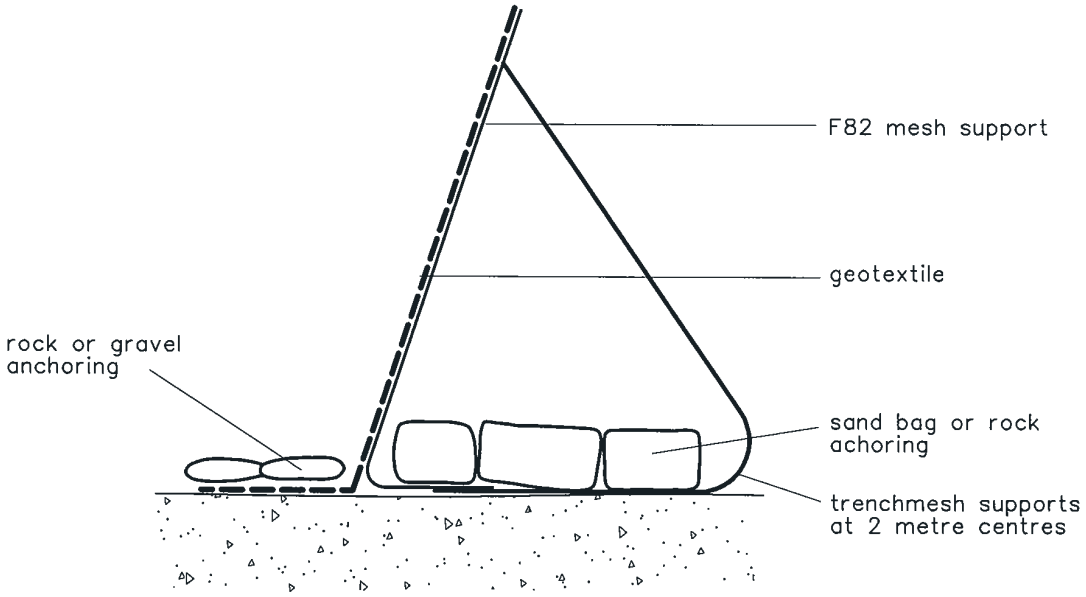
RECP : CONCENTRATED FLOW — SD 5-7



Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

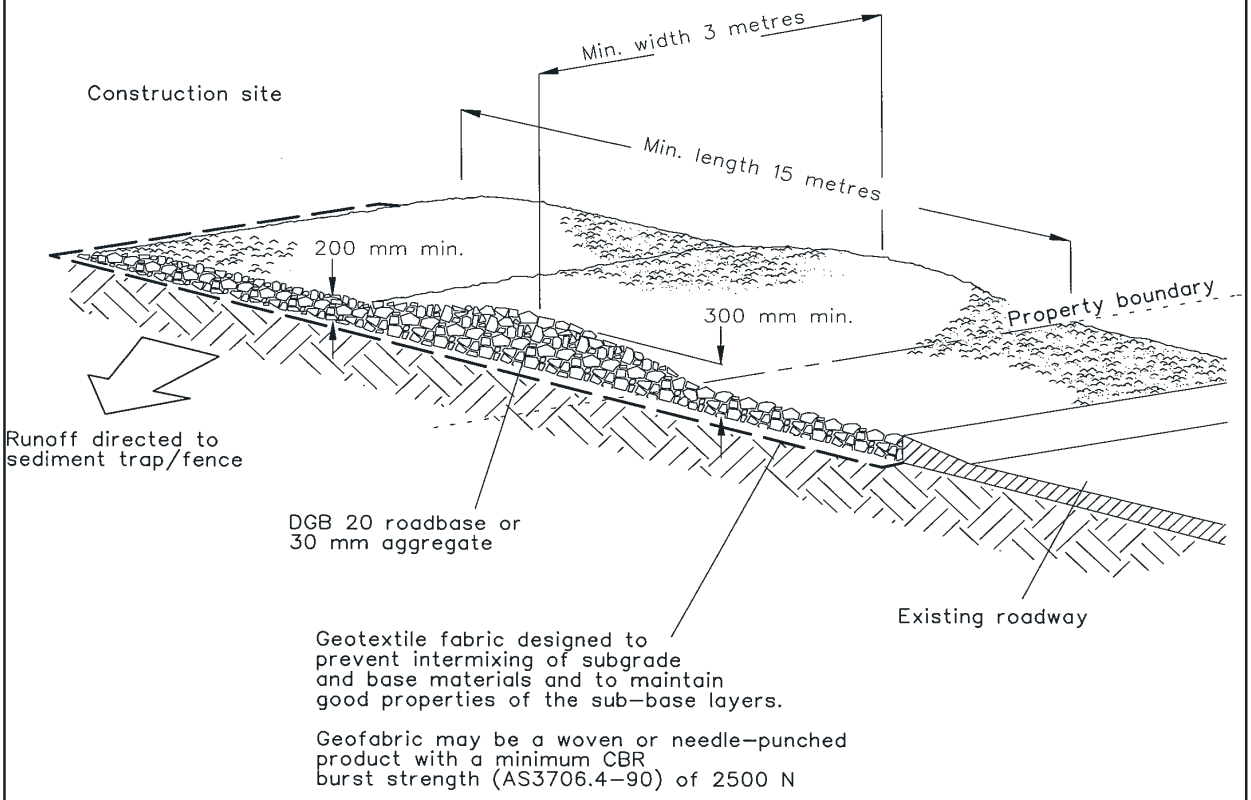
SEDIMENT FENCE — SD 6-8



Construction Notes

1. Install this type of sediment fence when use of support posts is not desirable or not possible. Such conditions might apply, for example, where approval is granted from the appropriate authorities to place these fences in highly sensitive estuarine areas.
2. Use bent trench mesh to support the F82 welded mesh facing as shown on the drawing above. Attach the geotextile to the welded mesh facing using UV resistant cable ties.
3. Stabilise the whole structure with sandbag or rock anchoring over the trench mesh and the leading edge of the geotextile. The anchoring should be sufficiently large to ensure stability of the structure in the design storm event, usually the 10 year event.

ALTERNATIVE SEDIMENT FENCE SD 6-9



Construction Notes

1. Strip the topsoil, level the site and compact the subgrade.
2. Cover the area with needle-punched geotextile.
3. Construct a 200-mm thick pad over the geotextile using road base or 30-mm aggregate.
4. Ensure the structure is at least 15 metres long or to building alignment and at least 3 metres wide.
5. Where a sediment fence joins onto the stabilised access, construct a hump in the stabilised access to divert water to the sediment fence

STABILISED SITE ACCESS SD 6-14

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. ENSURE THAT THE INSTALLATION OF THE SEDIMENT TRAP WILL NOT CAUSE UNDESIRABLE SAFETY OR FLOODING ISSUES.

3. INSTALL SEDIMENT TRAP IN ACCORDANCE WITH STANDARD DRAWING SUPPLIED WITH THE APPROVED PLAN, OR AS DIRECTED BY THE SITE SUPERVISOR.

4. ENSURE THE SEDIMENT TRAP IS CONSTRUCTED UP-SLOPE OF AN ON-GRADE KERB INLET. THE SEDIMENT TRAP MUST NOT SURROUND THE KERB INLET UNLESS SPECIFICALLY DIRECTED BY THE SITE SUPERVISOR.

5. IF NECESSARY, INSTALL ADDITIONAL SEDIMENT TRAPS UP-SLOPE OF THE KERB INLET TO ADEQUATELY RETAIN THE EXPECTED QUANTITY OF SEDIMENT RUNOFF.

6. TAKE ALL NECESSARY MEASURE TO MINIMISE THE SAFETY RISK CAUSED BY THE STRUCTURE.

MAINTENANCE

1. INSPECT ALL SEDIMENT TRAPS DAILY AND IMMEDIATELY AFTER RUNOFF-PRODUCING RAINFALL. MAKE REPAIRS AS NEEDED.

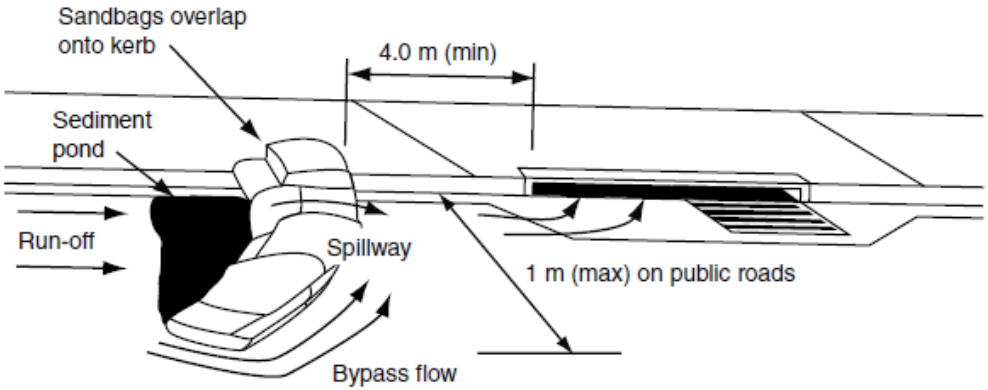
2. REMOVE COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. ENSURE SEDIMENT DOES NOT ENTER THE STORMWATER DRAIN DURING DE-SILTING OPERATIONS AND MAINTENANCE OF THE TRAP.

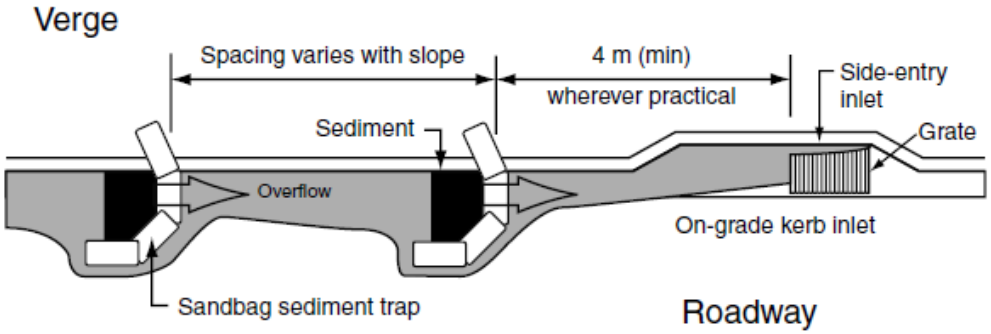
4. SEDIMENT ON THE ROAD MUST BE REMOVED IMMEDIATELY IF IT REPRESENTS A SAFETY HAZARD.

REMOVAL

1. WHEN THE UP-SLOPE DRAINAGE AREA HAS BEEN STABILISED, REMOVE ALL MATERIALS INCLUDED DEPOSITED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.



(a) Sandbag sediment collection dam



(b) Typical layout of on-grade kerb inlet sediment traps

Drawn:	Date:		
GMW	Dec-09	On-Grade Kerb Inlet Sediment Trap	OG-01

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