NOTES

Administration & General

1. This progressive plan is to be read in conjunction with the CEMP, relevant specifications, and procedures.
2. All necessary licences, permits and approvals required by legislation will be obtained prior to works commencing.
3. All works and site activities will comply with the explicit requirements of any relevant licence, permit or approval.
4. Erosion and sediment control planning is required prior to the commencement of works. The approved CEMP is supplemented by the concept Progressive Erosion & Sediment Control Plans (PESCP's).
5. All erosion and sediment controls generally to be constructed in accordance with `Blue Book' specifications & standard drawings, Guidelines and specifications being:
   - 'Managing Urban Stormwater – Soils & Construction – 4th Edition' - Landcom - March 2004,
   - 'Managing Urban Stormwater – Soils & Construction – Volume 2a – "Installation of Services' – NSW DEC 2008.
   - Best Practice Erosion and Sediment Control (IECA 2008);
   - 'Technical guidance for achieving Wianamatta–South Creek stormwater management targets' - NSW DPHIE 2022;
   - 'Mamre Road Precinct – Development Control Plan -November 2021', specifically 'Section 4.4.2 – Erosion & Sediment'
6. The CEMP & construction PESCP's may be supplemented by site-specific Environmental Management Plans (EMP's) which would be developed in response to a significant environmental issue emerging. The EMP's would outline the relevant environmental risks and issues, mitigation of potential risks, and detail strategies for remediation and/or management.

Personnel & Training

7. The induction of employees and contractors to include a component promoting environmental awareness, legislative requirements & penalties, and basic erosion and sediment control tasks.
8. Toolbox talks will regularly focus on specific works, associated risks, potential impacts, and mitigation measures. Specific erosion and sediment control awareness training and workshops will be undertaken by personnel with direct involvement with erosion and sediment control.
9. Personnel constructing controls to have demonstrated competence and experience.

Planning & preparation

10. Works programming to maximise the mitigation of erosion by the early implementation of permanent drainage measures, temporary and permanent soil surface stabilisation measures, and minimising the area and duration of soil disturbance.
11. Promote planning for seasonal restrictions for high-risk areas and/or activities (i.e., risk of late summer/autumn rainfall events for in-stream works or cold winter temperatures affecting revegetation).
12. The plan is to be revised as necessary (i.e., progression of works, altered site conditions or weather). **The controls depicted are subject to staging and the controls may be progressively implemented or removed according to progression of works.**
13. **Substitute materials may be utilised in the construction of erosion or sediment controls where functionality is not affected, i.e., compacted mulch bunds in place of sediment fences, stabilised earth berms in place of excavated drains near underground services or timber pegs in place of star pickets where electrical or gas hazards exist.**

Clearing, site establishment, topsoil stripping & stockpiling

14. All existing vegetated or undisturbed areas outside of the works area to be regarded as Exclusion zones and to be delineated with fencing, tape, or other markers, as required. All site personnel to be instructed to avoid Exclusion zones or damaging installed controls.
15. Temporary fencing or barricading such as parawebbing or perimeter tape is to be utilised on the cleared perimeter with accompanying signage as required. Site inductions and toolbox meetings should include the importance of observing exclusion zones, particularly in areas near any identified sensitive area.
16. Areas of proposed works with identified noxious weed infestations to be treated with appropriate herbicide, in accordance with product directions. The weed treatment will occur in sufficient time prior to disturbance to ensure complete 'die back' prior to topsoil handling.
17. In areas requiring weed control, spray drift will be mitigated by conducting spraying activities in calm weather and application by hand sprayer unit where practical.
18. The extent of earthworks and formation stripping will be demarcated to the footprint necessary for the proposed works. Disturbance outside the earthwork's footprint will be limited to necessary operations such as stockpiling, lay downs, etc.
19. Early establishment of suitable stockpiling and processing areas will be prioritised to reduce unnecessary soil disturbance from double handling of soil by machinery in the early works phase.
20. Appropriate sediment tracking controls such as an aggregate/geotextile apron, shaker grid, etc. with a minimum length of 15m will be installed at exit points from the site. Personnel to monitor roadways & tracked sediments to be removed as required.
21. Construct erosion resistant access routes, site access/egress points, and compounds. Access roads to be formed and stabilised as early works. Car parking areas and frequently utilised areas should be stabilised (e.g., geotextile with asphaltic millings, rock aggregate overlay, bitumen chip seal or similar) to prevent soil churning, where required. Any rock or aggregate required for vehicle access should be clean and free from soil or other contaminants.
22. Design and construction of site exit gates and temporary watercourse crossings as per Blue Book 2D as a minimum requirement.
23. Vegetation will be progressively cleared to minimise disturbance by area and duration. Cleared vegetation to be windrowed parallel to the contour until mulching/removal to control flows across cleared areas

Clearing, site establishment, topsoil stripping & stockpiling

24. Where feasible, the soils should not be handled & stockpiled when they are very wet or dried, preferably being sufficiently moist to avoid damage to the soil structure.
25. During grubbing and topsoil stripping provide short term, temporary topsoil windrows as upper and mid-slope controls to control 'clean' flows until stabilised 'clean' water berms or drains are installed.
26. Where practicable, cut stump clearing will be undertaken to retain tree stumps in situ when clearing vegetation on steep embankments and near waterways.
27. Where beneficial, topsoil testing and vegetation assessment may be conducted prior to stripping to allow for targeted stripping and subsequent re-use in landscaping and stabilisation.
28. Temporary drains, banks or diversions are to be formed and stabilised to divert concentrated 'clean' flows around disturbed works areas.
29. The installation of preliminary sediment controls such as perimeter sediment fencing, compacted topsoil berms, windrowed vegetation/mulch, excavated sediment traps, check dams, coir log/straw bale filters, etc, will be implemented prior to soil surface disturbance within the catchment.
30. Strip any viable topsoil in the required locations and stockpile locally where possible. The topsoil will be handled and stored in the correct manner necessary for successful rehabilitation.
31. Any viable stripped topsoil to be stored in stockpiles less than two metres in height where possible. The stockpile locations are to avoid concentrated surface flows or areas subject to inundation during wet weather.
32. The long-term soil stockpile locations are to be located 5 metres away from concentrated water flows and at least 10m from any waterway. The stockpiles will not be established in areas subject to concentrated surface flows, waterlogging or prolonged inundation during wet weather.
33. Short term on-site stockpiles (<5 days) to be located away from drains and flow lines and be controlled with sediment fence. Storm covers to be deployed prior to the onset of significant rainfall evets of periods of strong & gusty winds. Plastic covers should only be utilised for short term cover for wind or storm protection for topsoil stockpiles.
34. Stockpiles should be stabilised if they are to remain in place for more than 20 days. Rolled Erosion Control Products (RECP's such as geotextile, jute mesh, coco fibre mat, etc) or soil binders can be used on smaller stockpiles, however, larger stockpiles should be formed into crowned structures to minimise erosion and be subsequently stabilised with cover crop seeding or applied geobinders.
35. The use of existing, available materials on-site (i.e., soils, rock, etc) to be salvaged and stored where it can be utilised for temporary or permanent works (where practical) to reduce import requirements.

Earthworks

36. Prioritise planning for early and rapid cut-to-fill earthworks in periods of seasonal risk and/or other high-risk areas.
37. Where practical, cut earthworks should be staged from the upslope approaches to control dirty water within the excavation (i.e., the excavation proceeds downslope whilst maintaining unexcavated remnant earth as a control bund).
38. Subgrade excavations and engineered fill formations at risk of temporary inundation during rain events may be stabilised with moisture-repelling soil binders.
39. As the earthworks progress, areas of fill should generally be graded to shed flows away from the edges of fill batters to sediment controls where possible.
40. Progressively form and maintain lip berms and batter chutes with velocity dams on fill formations.
41. Maintain minor benches or contour berms on fill batter formations until profiling for topsoiling is imminent.
42. Any significant (long & steep) cut/fill batters should be progressively overlaid with geotextile, RECPs, Organic Fibre Mulches (OFM's) or geobinders to reduce erosion and rilling, prior to permanent stabilisation with cover crops, mulching or other long-term surface protection.
43. Temporary scour protection lining should be installed for major 'dirty' drains, or for steep or long drains to sediment basins or other controls.
44. Access to the works area, and movements on the site during construction will be limited to the defined access and project areas, where possible. Minimise vehicle movements & speed on unsealed areas and access tracks.
45. Earthworks and hauling, and vehicular movements to be limited in wet conditions.
46. Appropriate sediment tracking controls such as an aggregate/geotextile apron, shaker grid, wheel washes, etc will be installed at exit points from the site.
47. The adjoining local road network to be regularly monitored for tracked sediments with affected areas cleaned as soon as possible in a safe manner.
48. Vehicles transporting bulk materials such as soils and fill are to correctly cover loads to prevent loss of load and/or dust generation on public roads.
49. Imported quarry product and fill materials required for construction are to be clean, and free of contaminants (i.e.. weeds, waste, liquids, etc).
50. Water carts are to regularly spray access tracks, works areas, & temporary stockpiles, during dry weather conditions.
51. Bunded or controlled areas for refuelling, material stockpiling, (and contaminated soil treatment area if required) are to be formed prior to commencement of those works in the relevant risk areas.
52. The progress of earthworks will minimise slope lengths and gradients where practical utilising contour berms, batter berms, diversion banks, etc.

NOTES

Earthworks (Cont'd)

53. Due to the potential for the occurrence of dispersible soils, earthworks should be scheduled to minimise the disturbance duration and soil surfaces should be temporarily stabilised for extended site shutdown or where significant wet weather is anticipated.
54. Personnel to ensure visual dust monitoring is maintained during works, and dust suppression is undertaken regularly
55. Minimise earthworks, soil handling and general disturbance during periods of strong and/or gusty winds.
56. Apply water sprays for dust suppression where works, soil handling and/or potentially contaminated soils are generating dust.

Drainage and construction

57. Works in high-risk zones are to be conducted in low rainfall periods, supported by positive 3-day weather forecasts for the anticipated scope of works.
58. Construct diversion drains or banks upslope of proposed works to direct off-site water flows to existing drainage, adequately stabilised areas, or vegetated areas.
59. Maximise the interception and diversion of 'clean' (off site water) away from works areas. The 'clean' flows to be conveyed in stabilised drainage lines to suitable discharge points. The flows to be discharged to off-site areas at non-erosive velocities with adequate diffusers, level spreaders, etc. Ensure drainage paths and controls are adjusted as required to maximise the separation of 'clean' (off site) and 'dirty' (on site) water flows through/off site.
60. The formation and stabilisation of permanent drains will be prioritised to minimise the requirement for temporary drains. Any temporary drain designs to ensure adequate capacity and cross-sectional volumes are achieved.
61. Permanent storm water drains, and outlet structures will be stabilised as soon as possible following completion.
62. Immediately line any constructed 'clean' water diversion with appropriate RECP's, OFM's and/or geobinders. Temporary spillways and associated structures to be suitably stabilised for the volume and turbulence of flows.
63. Temporary 'dirty' water drainage will be adjusted progressively to maximise flows to sediment control devices.
64. Check dams are to be constructed from geotextile/aggregate bags, sandbags, staked coir logs/straw bales or loose rock formations to reduce flow velocities in unlined drains and other areas of concentrated flow (i.e., against diversion banks). Check dams are to be installed at the required intervals in drains with the frequency of the dams increasing as the grade increases.
65. Sheet flows in work areas have erosion measures such as surface roughening, scribed drains and/or contour banks to reduce slope lengths. Flows from diversions to have velocities controlled and directed to sediment controls.
66. Trenching works on grade will be controlled with methods detailed in the 'Blue Book' – Volume 2A' - Section 6

Water management

(For further specific information please refer to the 'Sediment Basin Management & Dewatering Procedure at 'Appendix A')

67. Flooded excavations, ponded water, etc will be extracted as required and utilised for construction purposes or treated to achieve acceptable water quality prior to discharge.
68. The use of reclaimed water will be prioritised for construction uses where possible to minimise potable water usage. The use of reclaimed water will comply with the requirements of TfNSW 'Environmental Direction 19: Use of Reclaimed Water'.
69. Flooded excavations and groundwater encountered in ASS areas or potentially contaminated areas will be pH tested and visually assessed and extracted for treatment, & subsequent discharge, or conveyed to a licensed liquid waste facility.
70. Accumulated water in sediment traps/sumps cannot be pumped, discharged, or released from site without completing a dewatering checklist.
71. Site water that is to be discharged directly to a flow line, drain, watercourse, etc, will be tested, treated, and where acceptable water quality parameters achieved, the testing results recorded prior to discharge.
72. Water quality should meet the following minimum criteria prior to discharge:
    - Total suspended solids (TSS) – less than 50 mg/L
    - pH – 6.5 to 8.5
    - oil and grease – not visible and less than 10 mg/L
73. Accumulated water in sediment traps/sumps cannot be pumped, discharged, or released from site without completing a dewatering checklist
74. Dewatering devices or transfer pumps will be positioned to ensure that settled sediments are not disturbed or extracted. Discharge of concentrated, treated flows to lands will occur in well vegetated areas with diffusers or level spreaders to prevent erosion. Flows transferred from in-stream works to downstream areas be released in a diffused manner.
75. The appearance of water quality at the discharge outlet will be regularly monitored for any increase in turbidity, and dewatering suspended until acceptable water quality levels are regained.
76. Adequately designed and constructed concrete washout facilities will be constructed in a suitable location away from drainage lines. Concrete wash down to occur directly into lined receptacles or formed washouts.

Sediment Control

77. Commonly used sediment control devices have construction detail described in the Standard Drawings included in this PESCP. Alternative controls or methods may be employed in certain circumstances for practicality or efficiency purposes. Alternative controls or methods must demonstrate efficacy and be in accordance with the intent and objectives of the 'Blue Book' & 'White Book'.
78. Sediment fencing, non-woven geotextile, or compacted mulch bunds, etc, will be installed on down slope work boundaries, down slope of stockpiles, cut/fill batters, access tracks, etc, to filter sheet flows.

Sediment Control (Cont'd)

79. Sediment filters will be formed from straw bales, aggregate & geotextile filter bags, coir logs, etc, to control concentrated on-site water flows as required.
80. Excavated sediment traps may be utilised at critical locations at the toe of the contributing catchment. They will be desilted at 40% capacity and are to be dewatered prior to the onset of further rainfall.
81. The excavated sediment traps should be regarded as a secondary control, relying on retention of coarse sediment in upslope controls within the construction area.
82. Aggregate filter bags or sandbag inlet traps are to be deployed on roadside pit inlets or other inlets to the drainage system.
83. Where possible, provide sandbag or other bunding controls at on-site collection points & pit inlets to prevent flows bypassing controls to downslope areas.
84. Gully pit inlets will be protected with filter inlet controls formed from sediment fence, filter bags, straw bales & geotextile, coir logs, etc
85. In-stream works to be controlled with turbidity curtain, installed parallel to the embankment. Installation across the watercourse streambed is acceptable in circumstances that entail the use of in-stream coffer dams.
86. Hydrocarbon booms to be deployed on the surface of watercourses at an appropriate distance from the works to capture leaks or pressurised release of liquid contaminants.
87. The sediment captured by control devices is to be removed when 40% of capacity is reached. Regular desilting is also to maintain catchment and settling capacity, and to reduce re-entrainment of settled materials in subsequent rain events.

Contamination

88. Excavation of sub-soils to be inspected and monitored as works proceeds, to identify potential contamination. Any potentially contaminated soils to be stripped or excavated separately and transported directly to the designated stockpile, treatment area or licensed waste facility.
89. Potentially contaminated soils are to be stored within an appropriately bunded area and covered with heavy grade plastic or other impermeable covers for the duration of rainfall.
90. Potentially contaminated excavated material that are required to be removed from site are to be assessed and classified in accordance with the Protection of the Environment Operations Act 1997 and '*Waste Classification Guidelines: Parts 1 and 2* (DECC 2008)'.
91. Excavated soils and materials (that have been assessed, classified, treated, and re-assessed on site) will be re-used as fill material on site where appropriate.
92. Vehicles transporting potentially contaminated soils both on internal access tracks and public roads will correctly cover loads to mitigate dust generation or spillage.
93. Ground disturbance and machinery/vehicle movements in potentially contaminated areas will be minimised to essential works.
94. Earthworks, soil handling and general disturbance in potentially contaminated areas are to be avoided during periods of strong and/or gusty winds.
95. Water sprays are to be utilised to mitigate dust from contaminated soils in works areas, contaminated soil handling or temporary stockpile areas.

Soil & Water pollution control

96. All waste will be handled, stored, and disposed of in accordance with the '*Waste Classification Guidelines: Parts 1 and 2* (DECC 2008)'.
97. Waste construction materials such as steel, concrete, etc will be removed to an appropriate recycling facility, to a suitable location for appropriate re-use, or to a licensed waste disposal facility.
98. All putrescible, construction, and food wastes are to be immediately captured and stored correctly, prior to removal to a licensed waste facility. Putrescibles and food wastes will be removed from site on at least a weekly basis.
99. The effluent from concrete wash down is to be captured by an excavated wash out pit lined with an impervious membrane at least 50 metres away from any waterway or major drainage lines. The pit is to be protected by a diversion bund to prevent entry of site run-off that may subsequently displace alkaline water/slurry. Concrete washouts to be covered for the duration of significant or prolonged rainfall.
100. The water levels in concrete washout pits will be monitored and dewatered regularly. The water pH will be tested and treated where it is outside the parameters of pH 6.5-8.5. Where suitable pH is attained, the water can then be used site purposes.
101. The site machinery 'lay-up' area, refuelling areas and chemical storage areas are to be located outside the dripline of retained trees, at least 5 meters from native vegetation and, and 20 metres away from any waterway or major drainage lines.
102. The refuelling and servicing of machinery is to be undertaken at approved premises off-site where possible. Onsite refuelling and servicing only to occur with appropriate spill control measures at hand, or where established or temporary bunded areas are available.
103. Vehicle wash down will be preferably undertaken at an appropriate area offsite, or otherwise at a designated and controlled area onsite.
104. Mobile plant, machinery and vehicles are to be regularly inspected and maintained to manufacturer's specifications.

NOTES

Soil & Water pollution control (Cont'd)

105. Appropriate spill kits are to be always kept on site and any spillage is to be immediately cleaned up. In the event of a large or hazardous spill, contact will be made with emergency and relevant authorities, where required.
106. All site personnel will be instructed about emergency spill procedures, spill kit locations and requirements. The location of spill response kits will be established close to works or operations areas.
107. Storage of liquid construction materials (chemicals, fuels, oils, etc) will be provided in appropriately bunded areas on site to prevent leaching into soils, leaking or other transfer of material into waterways. Storage areas to be at least 50 metres from creeks and other waterways, and on slopes with a gradient of less than 10 per cent.
108. Containment bunds are to be monitored regularly, and captured materials removed as required to ensure bund capacity is maintained.
109. Bunded areas will satisfy requirements of the relevant Australian Standards and 'Bunding and Spill Management (DEC, 1997)'.
110. The requirements of the Australian Dangerous Goods Code will be observed for storage and transport of any hazardous materials. The compatibility of all chemicals, pesticides and fuels transported and stored will be assessed to avoid potential risk from reactions, explosion, etc.
111. All chemicals, pesticides and fuel will be stored and transported in approved containers. Chemicals, pesticides and fuels are to be labelled correctly and clearly, including using approved warning symbols etc.
112. A MSDS register and will be maintained and be readily accessible on site for all hazardous chemicals transported, handled, or applied.
113. An adequate record or log of all environmentally hazardous chemicals received, used and/or disposed of will be maintained.
114. Substitution of less hazardous materials or chemicals or modifying methods of use/storage etc. will be implemented where possible.
115. The quantities of hazardous materials and chemicals stored or used will be minimised as far as practical.
116. The application methods and dilution ratios specified in manufacturer's directions and/or associated MSDS will be observed by personnel.

Stabilisation

117. Promote efficient staging planning for early stabilisation of perimeter or completed areas. (i.e., stabilisation of permanent drains, culvert outlets, diffusers, and decommissioning of temporary controls).
118. Stabilisation of areas is to occur progressively in conjunction with the completion of earthworks.
119. Suitable design and construction techniques are to be selected for stabilisation of relevant areas such as drain linings, batter treatments, allotments, etc.
120. Completed earthworks areas will be backfilled and compacted in a staged manner as soon as possible. Adjacent disturbed areas will be suitably trimmed and stabilised as required.
121. Erosion and sediment controls are to be maintained until the relevant catchments are stabilised, re-vegetated, or sealed adequately to achieve soil surface protection factors as per the 'Blue Book' requirements.
122. Compounds, lay down areas and other areas of heavy construction impact to be restored to an acceptable condition. Destocking, waste removal & cleaning to be followed by scarification, topsoiling and stabilisation.
123. Any aggregate placed for vehicle access or as a work platform should be removed to a suitable location for recycling, appropriate re-use, or to a licensed waste disposal facility.
124. Any areas subject to heavy compaction and disturbance from vehicle movements and machinery will be subject to surface roughening and scarification (up to 300mm) to reduce compaction of the upper layer of soil.
125. Topsoil to be re-used locally within the precincts, with batters prioritised for topsoil application and timely application of soil stabilisers where applicable.
126. The remaining stored topsoil should be utilised to topsoil disturbed areas, rehabilitate compounds, and haul roads, or be spread to a uniform depth over the disturbed non-structural areas that are of low gradients.
127. Determine the cover crop mix seed blend suitable to the site & seasonal conditions to provide adequate protection until final landscaping commences.
128. Lands recently stabilised with cover crops will not be regularly watered except for initial germination or during prolonged hot & dry conditions. During milder seasons the cover crop will be monitored as received precipitation should be adequate.
129. Further application of seed may be necessary in latter stages in areas of inadequate vegetation establishment. Pedestrian and vehicular traffic will be restricted from all recently stabilised areas.

Inspection and Maintenance

130. A self-auditing program will be established for erosion and sediment control based on a check sheet developed for the site. A site inspection using the developed check sheet will be undertaken by relevant Project personnel:
    - At least weekly
    - Immediately before extended site shut down
    - Following rainfall events greater than 10 mm over 24 hours, or prolonged rainfall events:
        - as soon as practicable but within 3 hours (during normal work hours and days)
        - or within 24 hours (outside normal work hours and days, including industry rostered days off and public holidays).

Inspection and Maintenance (Cont'd)

131. The self-audit will include:
    - Noting the condition of installed erosion and sediment controls onsite
    - Detailing maintenance requirements (if any) for installed erosion and sediment controls
    - Recording the volumes of sediment removed from sediment controls and sediment traps, where applicable
    - Recording the location to where extracted sediments are disposed.
132. Recordings and data from site inspections, testing, audits, and monitoring will be retained, with associated documentation maintained to demonstrate remedial action/s have occurred.

Wet Weather Contingency & Management

133. Training sessions will be conducted with Supervisors, Foreman, Environmental Work Crew, and relevant personnel. The training will address
    - Weather forecast monitoring procedures and interpretation of forecasting by Bureau of Meteorology (BOM) and other sources
    - Site erosion and sediment control status and high-risk areas
    - Roles and responsibilities for wet weather preparation
    - Temporary measure selection for augmentation or additional ERSED measures
    - Pre & post-rainfall inspections and recording
    - Dewatering requirements, methods, and recording
    - Identification of stabilisation and rectification works required.
134. The daily BOM forecast for the Project area is issued each morning and late afternoon. The forecasts will be monitored daily, at the start of the shift and prior to shut down. The BOM five-day forecast outlook will be reviewed daily.
135. BOM forecasts indicating a high likelihood of storm fronts or rainfall events of >10mm with an occurrence probability of more than 50% will be regarded as a potential rainfall event.
136. In periods of forecast storm weather or likely rainfall events, the tracking and intensity of approaching weather fronts is to be monitored regularly (where possible) to anticipate the time of the onset of wet weather.
137. Where a potential rainfall event is deemed likely in the BOM three-day outlook, Project personnel are to review the scope and progress of existing and imminent site works to determine high risk areas and prioritise works to stabilise the nominated areas. High risk works include culvert works, scour protection installation, permanent drainage installation, trenching on grade, and sediment basin construction or maintenance.
138. The high-risk work areas that are identified will be managed by:
    - Completion and temporary/permanent stabilisation of the high-risk work areas where time & resource constraints allow, prior to the onset of the potential rainfall event.
    - Re-allocating resources from low-risk activities to assist with completion of high risk works prior to the onset of a rainfall event.
    - Implementation of erosion controls in high-risk areas to minimise sediment control requirements. Erosion controls will be employed such as:
        - temporary geotextile linings or soil binders will be installed around culverts, scour protection works and drain junctions,
        - sandbag check dams, rock baffles, trench stops, etc will be utilised in open trenching on grade, temporary diversion drains, or concentrated flow paths over unstabilised areas.
139. The site sediment controls, and sediment basins are to be inspected, and any necessary rectification works undertaken such as;
    - Sediment basins are to be managed in accordance with Sediment Basin Management Procedure to regain the maximum runoff capacity parameters, where possible,
    - Sediment traps and filters to be desilted where more than 40% storage capacity is exceeded,
    - Spillways and discharge points from sediment traps to be inspected and reinstated as required.
    - Sediment fences, mulch bunds, earth berms to be inspected and repairs or reinstatement implemented as required.
140. The chemical, fuel and other hazardous material storage areas to be inspected to ensure their location is protected from the ingress of rainfall or concentrated overland flows. Bund controls to be inspected and accumulated liquids or other residues removed to a controlled waste location on site or for offsite disposal at licensed premises.
141. Following the onset of a significant storm event or rainfall event, the site controls to be inspected as soon as site conditions and safety requirements allow. The inspection is to focus on high-risk areas to review the function and status of the installed erosion and sediment controls.
142. A Post Rainfall Inspection will be conducted in accordance with Note 131 above. The identified high-risk areas will be prioritised for any rectification or maintenance works, followed by areas with lower risk.
143. Records detailing the necessary works to reinstate the controls will be conducted in accordance with Note 132 above.
144. High risk work areas that are inundated will be prioritised for dewatering by:
    - Dewatering to a sediment basin where sufficient capacity is available,
    - Flocculated in-situ and discharged at a licensed discharge point when NSW EPA water quality parameters are attained,
    - Dewatered by water cart and utilised for construction purposes.
145. Repair and reinstatement of erosion and sediment controls to be implemented as site conditions allow, proceeding from high-risk areas to lower risk areas on site.

Document Authorship Information

Project	Edge Estate - Warehouse & Distribution Centre, 155-251 Aldington Road, Kemps Creek NSW 2178
Document Type	Technical Drawing
Document	Progressive Erosion and Sediment Control Plan
Document Author	Andrew Littlewood – Senior Soil Conservationist
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Relevant Training	• SEEC and IECA (Australasia) – 'Water Management on Construction sites' & 'Preparing and Reviewing Plans for Soil and Water Management' – 2009 • University of Western Sydney and Hawkesbury Global Ltd - Certificate of Attainment in Soil and Water Management for Urban Development - 2000
Experience – Years	25 years (2000 – 2025)
Current Employment	Director & Principal - Rubicon Enviro Pty Ltd (2016-2021)
Previous Employment	Senior Soil Conservationist & CPESC – TREES Pty Ltd (2008-2016)
Previous Employment	Erosion and Sediment Control Officer - Lake Macquarie City Council (2000 – 2007)
Professional Affiliations	Member of International Erosion Control Association (Australasia)

Statement of Compliance

Statement of Compliance
This plan has been developed, and is certified by, an appropriately qualified and experienced professional in erosion and sediment control. The plan and associated documents, calculations, and drawings, have been prepared to a standard which if implemented correctly, will achieve the water quality objectives in compliance with: Conditions B24 - B27 and B49 & B50 of the Development Consent for SSD-17552047 – NSW DPHI, '*Technical guidance for achieving Wianamatta–South Creek stormwater management targets'* - NSW DPHIE 2022, and '*Managing Urban Stormwater – Soils & Construction*' Volumes 1 & 2 – NSW Landcom 2006 & NSW DECC 2008. All erosion and sediment control measures are designed to be in accordance with the requirements of the aforementioned documents, and the '*Mamre Road Precinct – Development Control Plan -November 2021*, specifically '*Section 4.4.2 – Erosion & Sediment*'. Signed: _____ Andrew Littlewood - CPESC No. 5988 Date: 7th November 2025

Document Control History

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01	A. Littlewood	07/11/2025			
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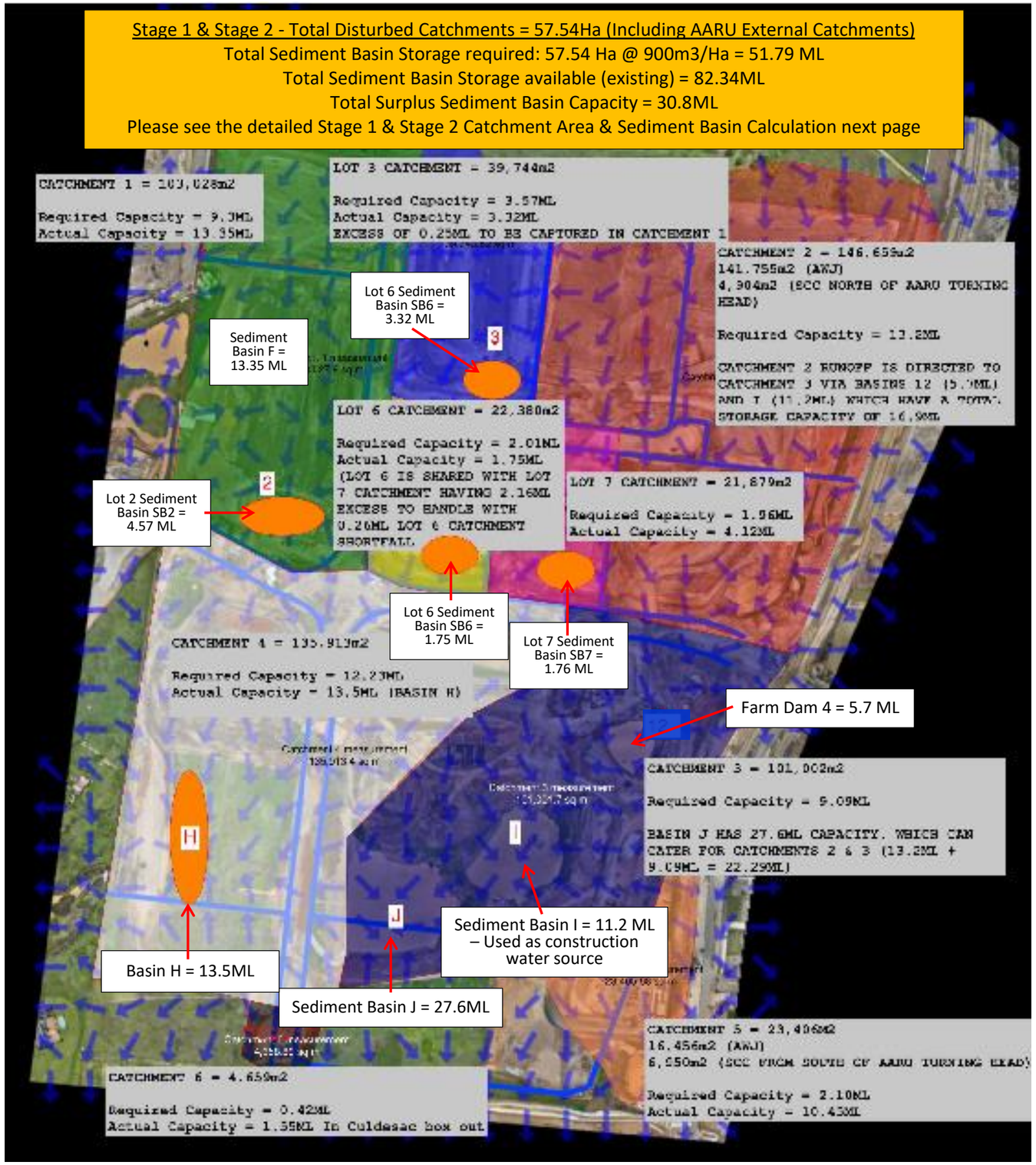
03	A. Littlewood	20/02/2026			
04	A. Littlewood	26/02/2026			
05	A. Littlewood	19/03/2026			

Updated Catchment Plans - Stage 1 & Stage 2 – Topsoil stripping, earthworks and roads



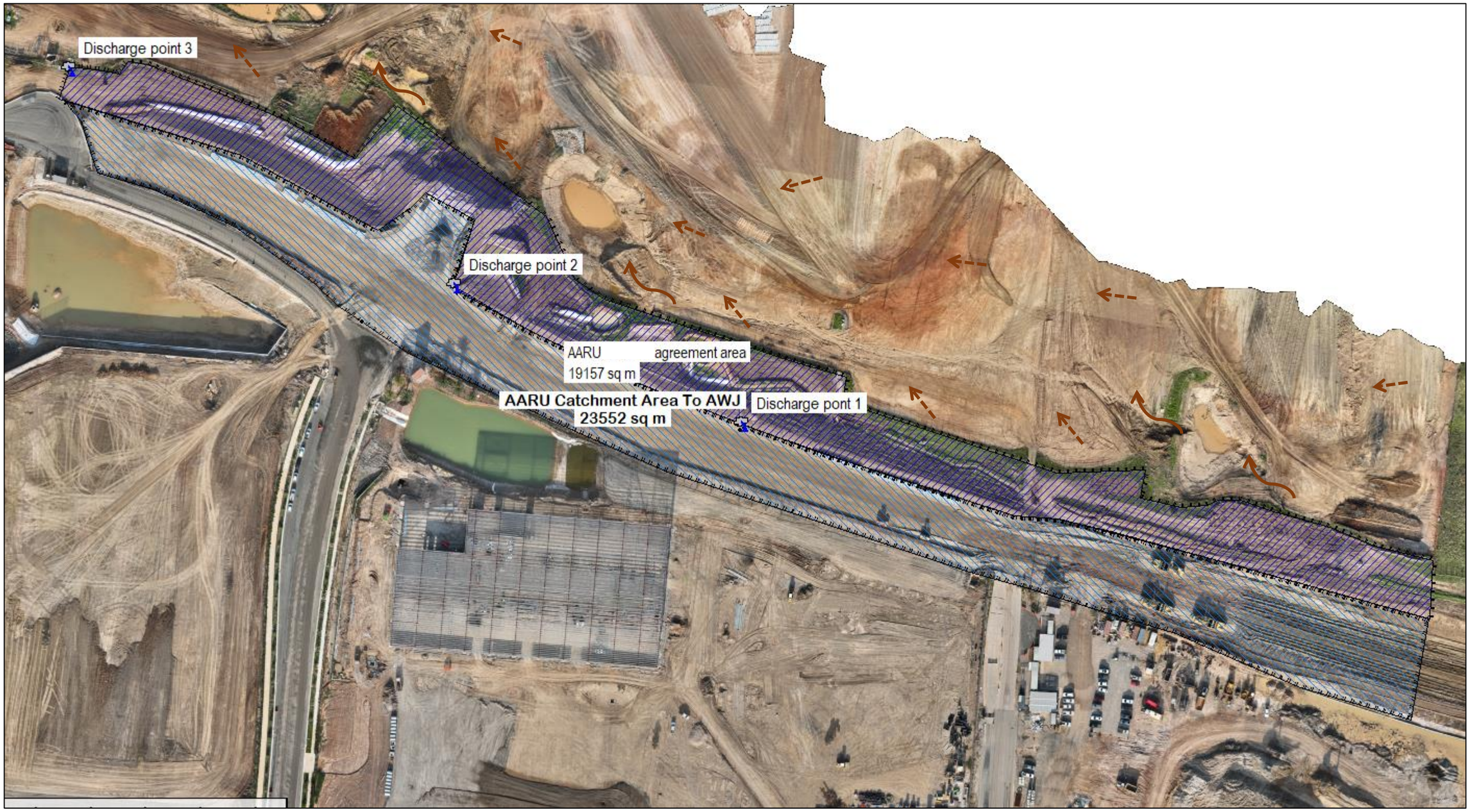
Stage 1 & Stage 2 Catchment areas (Excluding AARU Temporary Occupation area)

Basin Name/Number	Catchment # combined	Catchment area combined - Ha	Catchment capacity (ML) required combined	Surveyed capacity total (ML)	Under/Over capacity (ML)
Basin F	Catchment 1 (Lot 1 & 2)	10.3	9.3	12.0	2.7
On lot Basin 2					
Basin on Lot 2 in between Basin F dam walls					
On lot Basin 3	Lot 3	3.98	3.58	3.32 (-0.26)	-0.26
Basin C	Catchment 2 (Lot 4, 5 & part Lot 8)	14.67	13.2	18.5	5.3
Dam 4					
Basin D					
Basin J	Catchment 3 (Lot 12 & part Lot 13)	10.1	9.09	27.6	18.5
On lot Basin 6 & On lot basin 7 as per design (Shared catchments)	Lot 6 catchment	2.23	2.01	1.75 (-0.26)	2.16
	Lot 7 catchment	2.19	1.96	4.12	
Basin H	Catchment 4	13.6	12.23	13.5	1.27
N/A	Catchment 6	0.47	0.42	1.55	1.13
	TOTAL	57.54	51.79	82.34	30.8

SCC Temporary Occupation Catchment area

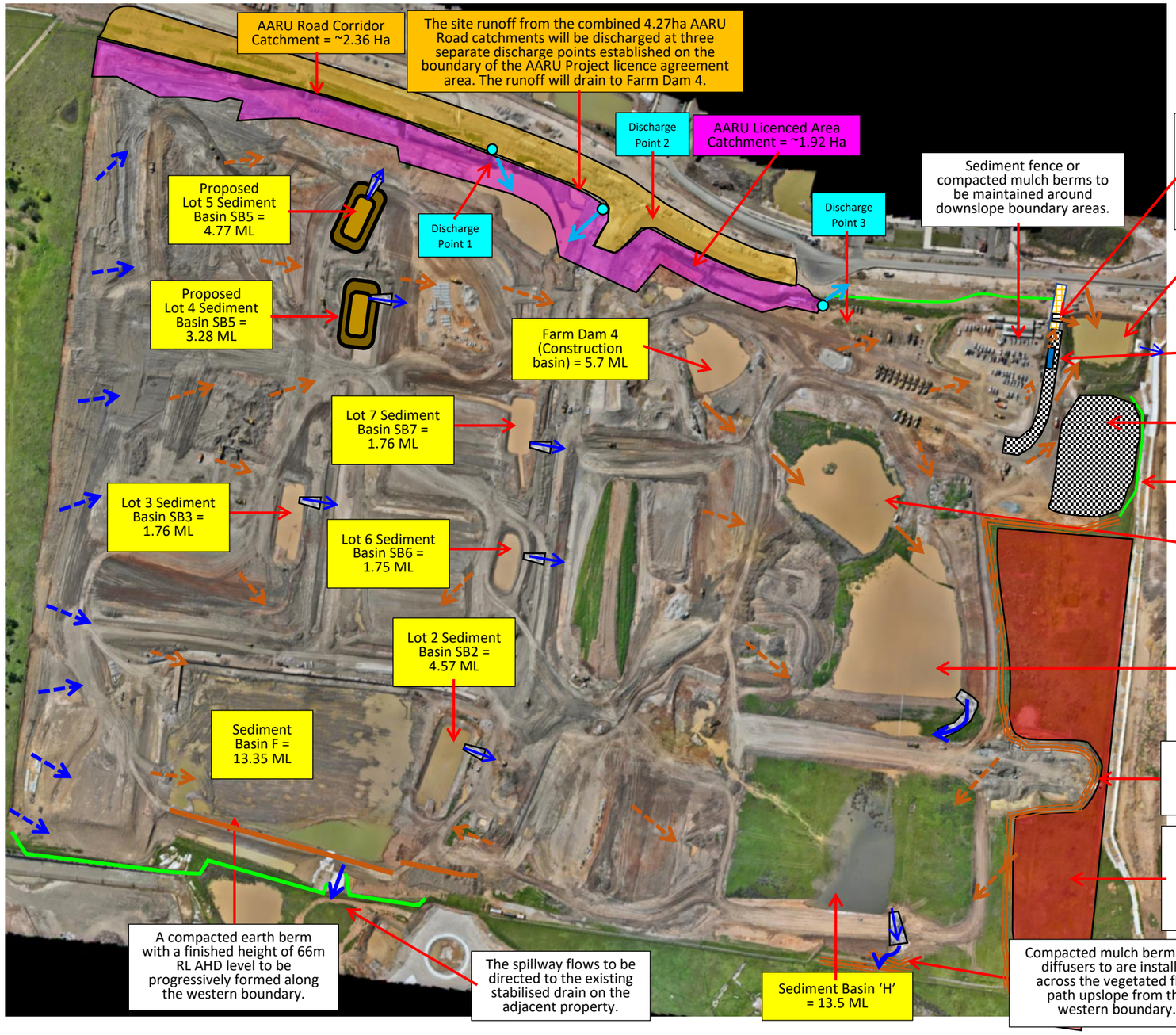
Basin Name/Number	Catchment # combined	Catchment area combined - Ha	Catchment capacity (ML) required combined	Surveyed capacity total (ML)	Under/Over capacity (ML)
Basin A	Catchment 5 (Permanent Basin a & part Lot 13)	1.7	1.52	10.45	8.96

AARU Catchment Drawing - AARU Project Licence Agreement area and AARU Road Corridor – February 2026



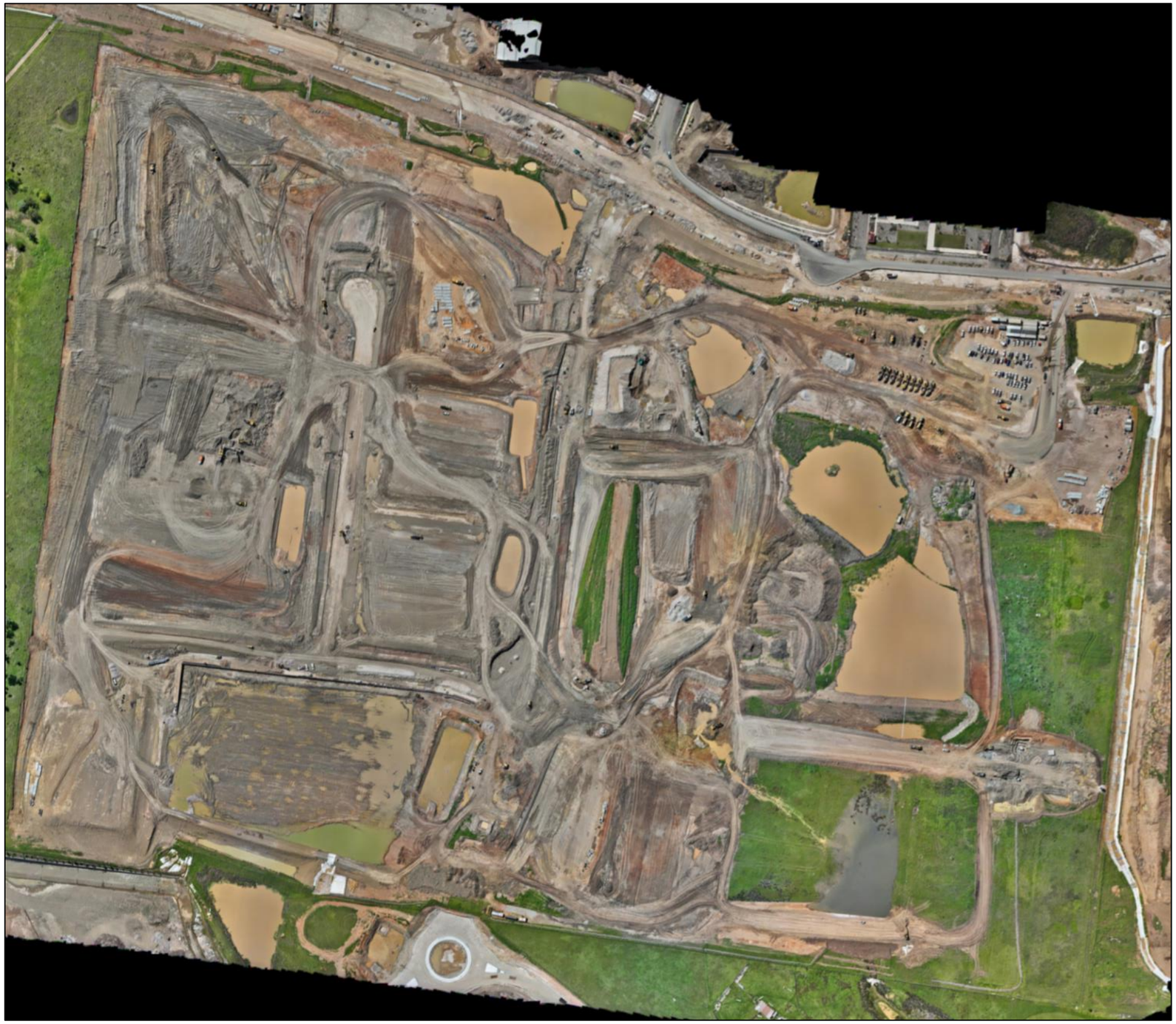
Edge Estate - Warehouse & Distribution Centre, 155-251 Aldington Road, Kemps Creek NSW 2178 - Progressive Erosion & Sediment Control Plans

Drainage Plans – Stage 1 & Stage 2 – Topsoil stripping, earthworks and roads.

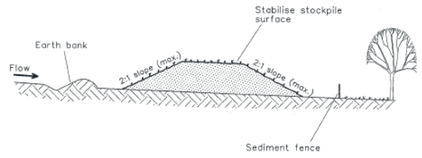


Legend													
Clean Water – Sheet Flows		Piped Drainage		Coarse rock / sandbag check dam		Compacted mulch bund		Sediment Fence		Filter bag / rock & shade cloth sediment filter		Controlled site access	
Clean Water – Concentrated Flow/Drain		Geotextile lined drain/ spillway		Coffer Dam / Separation bund		Topsoil berm - sump & filter outlet		Geotextile Apron		Drop inlet filter (Filter bags, coir logs, sed fence, etc)		Unstabilised access track	
Dirty Water - Concentrated Flow/Drain		Vegetated drain Rock lined drain		Drainage Line / Waterway Crossing		Geotextile covered rock or compacted topsoil sediment trap		Sediment basin / large sump		Coir Log/s Straw bale or coir log filter		Catchment Boundary	
Dirty Water – Sheet Flows		Level Spreader / Diffuser		Stabilised Topsoil Berm (geotextile/jute/seed)		Vegetated Filter		Excavated sediment trap		Stabilised Haul Road/Compound/Access Track		Site Boundary	

Aerial view of the works for Stage 1 & Stage 2 – Topsoil stripping, earthworks and roads – Imagery from March 2026



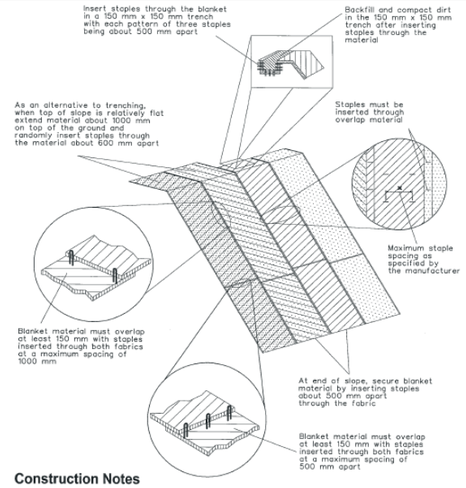
Standard Drawings



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.

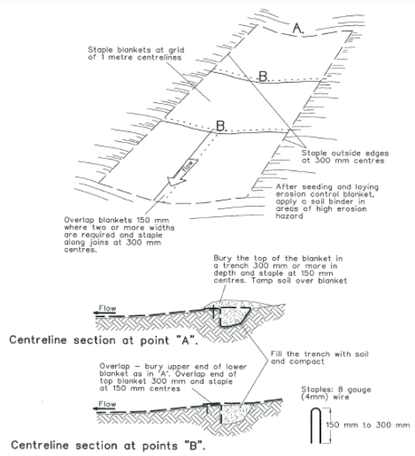
STOCKPILES **SD 4-1**



Construction Notes

1. Remove any rocks, clods, sticks or grass from the ground surface before laying the matting.
2. Spread topsoil to at least 75 mm depth.
3. Where appropriate, complete fertilising and seeding on a properly prepared seedbed (Standard Drawing 7-1) before laying the matting.
4. Ensure the fabric can be continuously in contact with the soil by grading the surface carefully first.
5. Lay the matting in "shingle-fashion" with the ends of each upstream roll overlapping the next roll downslope.
6. Ensure sufficient staples are used to maintain a good contact between the soil and the matting.

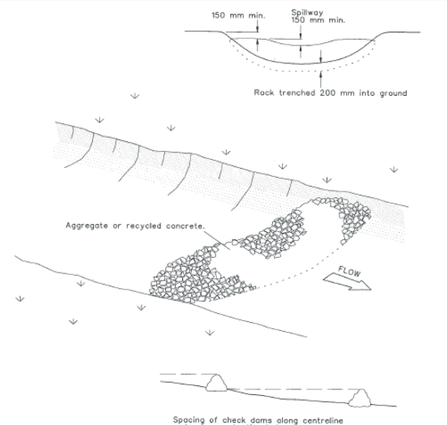
RECP : SHEET FLOW **SD 5-2**



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.

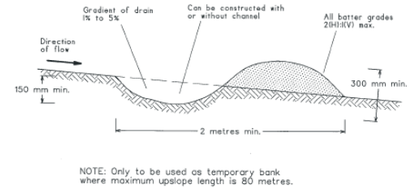
RECP : CONCENTRATED FLOW **SD 5-7**



Construction Notes

1. Check dams can be built with various materials, including rocks, logs, sandbags and straw bales. The maintenance program should ensure their integrity is retained, especially where constructed with straw bales. In the case of bales, this might require their replacement each two to four months.
2. Trench the check dam 200 mm into the ground across its whole width. Where rock is used, fill the trenches to at least 100 mm above the ground surface to reduce the risk of undercutting.
3. Normally, their maximum height should not exceed 600 mm above the gully floor. The centre should act as a spillway, being at least 150 mm lower than the outer edges.
4. Space the dams so the toe of the upstream dam is level with the spillway of the next downstream dam.

ROCK CHECK DAM **SD 5-4**

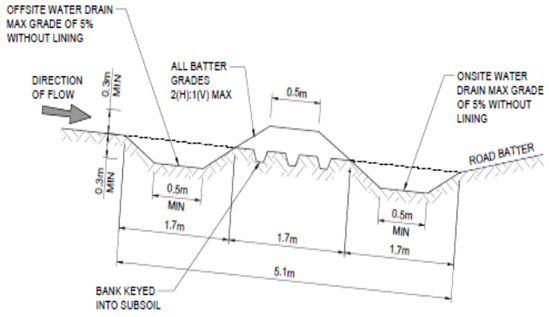


NOTE: Only to be used as temporary bank where maximum upslope length is 80 metres.

Construction Notes

1. Build with gradients between 1 percent and 5 percent.
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction.

EARTH BANK (LOW FLOW) **SD 5-5**

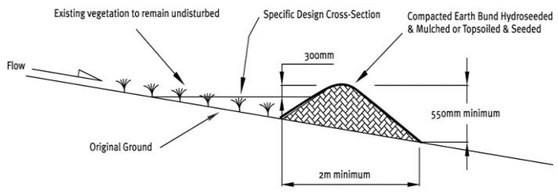


EARTH BANK (ONSITE & OFFSITE COMBINED)
N.T.S.

GENERAL CONSTRUCTION NOTES

1. CONSTRUCT WITH GRADIENT OF 1% TO 5%.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM
3. DRAINS TO BE CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTION NOT V-SHAPED.
4. EARTH BANK TO BE ADEQUATELY COMPACTED IN ORDER TO PREVENT FAILURE.
5. PERMANENT OR TEMPORARY STABILISATION OF THE EARTH BANK TO BE COMPLETED WITHIN 10 DAYS OF CONSTRUCTION.
6. ALL OUTLETS FROM DISTURBED LANDS ARE TO BE FED INTO A SEDIMENT BASIN OR SIMILAR.
7. DISCHARGE RUNOFF COLLECTION FROM UNDISTURBED LANDS ONTO EITHER A STABILISED OR AN UNDISTURBED DISPOSAL SITE WITHIN THE SAME SUBCATCHMENT AREA FROM WHICH THE WATER ORIGINATED.
8. COMPACT BANK WITH A SUITABLE IMPLEMENT IN SITUATIONS WHERE THEY ARE REQUIRED TO FUNCTION FOR MORE THAN FIVE DAYS,
9. EARTH BANK TO BE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT WILL IMPEDE NORMAL FLOW.

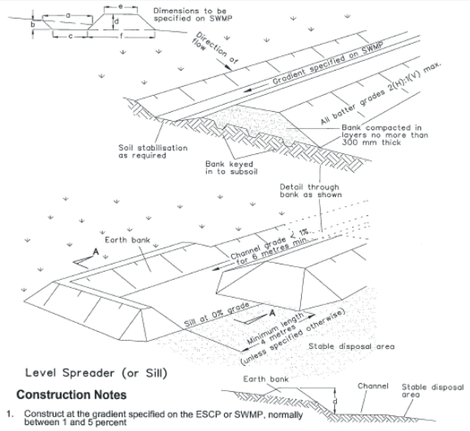
Stabilised topsoil diversion bank



Cross Section

Example photo of a stabilised topsoil berm on low grades.

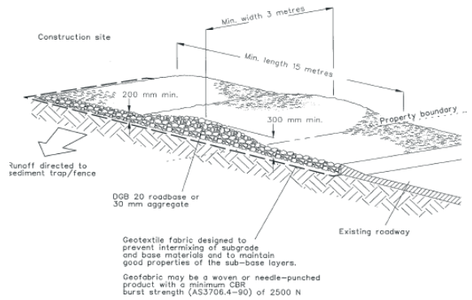
Edge Estate - Warehouse & Distribution Centre, 155-251 Aldington Road, Kemps Creek NSW 2178
Standard Drawings



Construction Notes

1. Construct at the gradient specified on the ESCP or SWMP, normally between 1 and 5 percent
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V-shaped, at the dimensions shown on the SWMP.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction following Table 5.2 in Landcom (2004).
7. Where discharging to erodible lands, ensure they outlet through a properly constructed level spreader.
8. Construct the level spreader at the gradient specified on the ESCP or SWMP, normally less than 1 percent or level.
9. Where possible, ensure they discharge waters onto either stabilised or undisturbed disposal sites within the same subcatchment area from which the water originated. Approval might be required to discharge into other subcatchments.

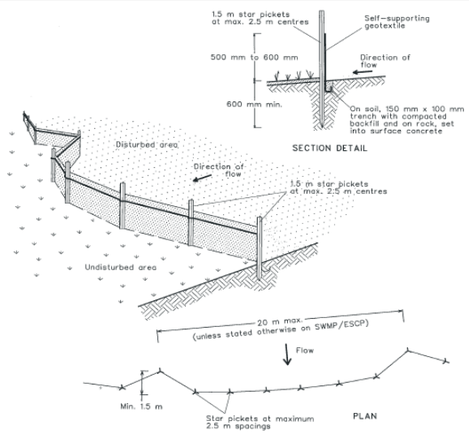
EARTH BANK (HIGH FLOWS) **SD 5-6**



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

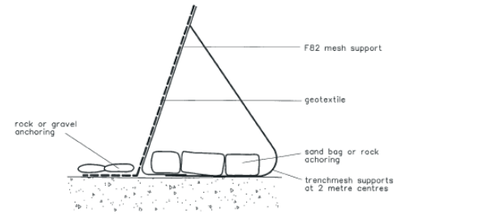
STABILISED SITE ACCESS **SD 6-14**



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.

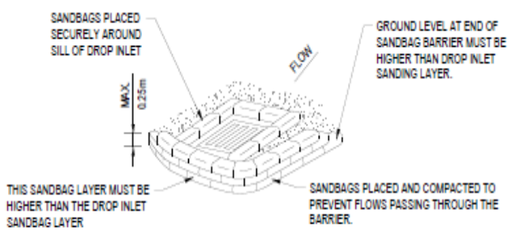
SEDIMENT FENCE **SD 6-8**



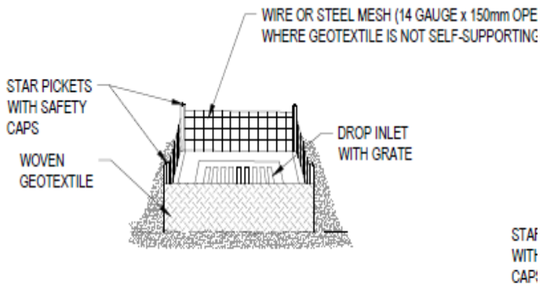
Construction Notes

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.

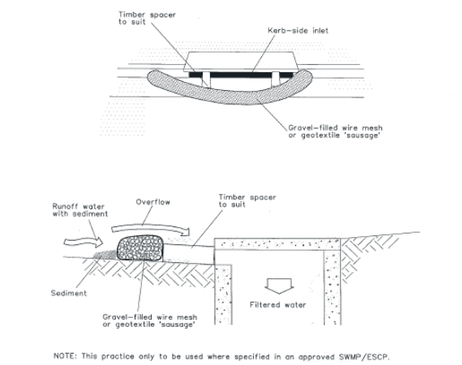
ALTERNATIVE SEDIMENT FENCE **SD 6-9**



SEDIMENT BARRIER (SD 5-4) DETAIL



GEOTEXTILE INLET FILTER (SD 6-12) - PERSPECTIVE
NTS

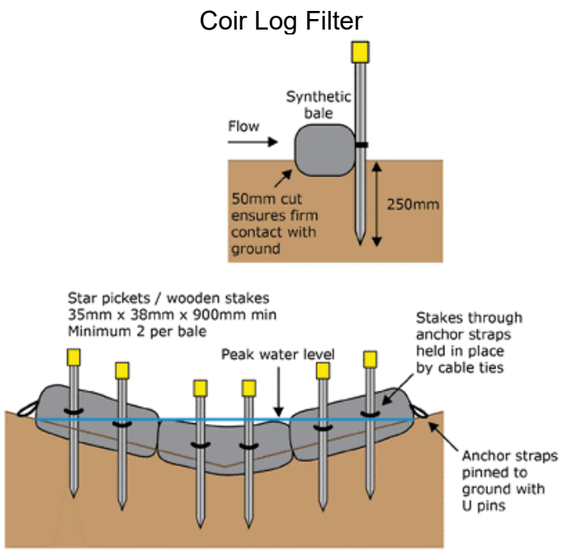


NOTE: This practice only to be used where specified in an approved SWMP/ESCP.

Construction Notes

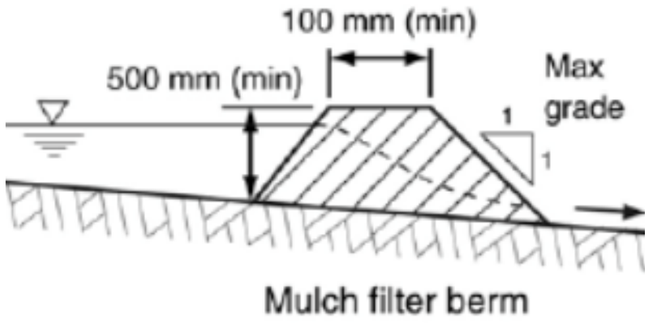
1. Install filters to kerb inlets only at sag points.
2. Fabricate a sleeve made from geotextile or wire mesh longer than the length of the inlet pit and fill it with 25 mm to 50 mm gravel.
3. Form an elliptical cross-section about 150 mm high x 400 mm wide.
4. Place the filter at the opening leaving at least a 100-mm space between it and the kerb inlet. Maintain the opening with spacer blocks.
5. Form a seal with the kerb to prevent sediment bypassing the filter.
6. Sandbags filled with gravel can substitute for the mesh or geotextile providing they are placed so that they firmly abut each other and sediment-laden waters cannot pass between.

MESH AND GRAVEL INLET FILTER **SD 6-11**



Standard Drawings

Mulch filter berm

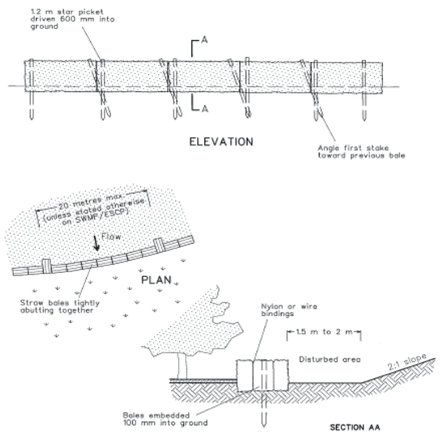


Example photo of a compacted mulch berm on low grades.

Example photo of a compacted mulch berm on steeper grade with an upslope facing groyne

Example photo of an excavated sediment trap with mulch filter berm.

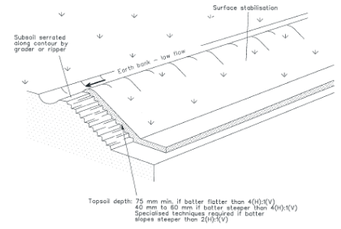
Example photo of a shade cloth and rock sediment filter.



Construction Notes

1. Construct the straw bale filter as close as possible to being parallel to the contours of the site.
2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws are to be placed parallel to ground.
3. Ensure that the maximum height of the filter is one bale.
4. Embed each bale in the ground 75 mm to 100 mm and anchor with two 1.2 metre star pickets or stakes. Angle the first star picket or stake in each bale towards the previously laid bale. Drive them 600 mm into the ground and, if possible, flush with the top of the bales. Where star pickets are used and they protrude above the bales, ensure they are fitted with safety caps.
5. Where a straw bale filter is constructed downslope from a disturbed batter, ensure the bales are placed 1 to 2 metres downslope from the toe.
6. Establish a maintenance program that ensures the integrity of the bales is retained - they could require replacement each two to four months.

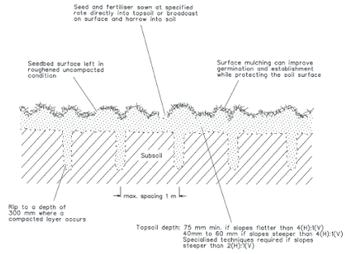
STRAW BALE FILTER **SD 6-7**



Construction Notes

1. Scarify the ground surface along the line of the contour to a depth of 50 mm to 100 mm to break up any hardsetting surfaces and to provide a good bond between the respread material and subsoil.
2. Add soil ameliorants as required by the ESCP or SWMP.
3. Rip to a depth of 300 mm if compacted layers occur.
4. Where possible, replace topsoil to a depth of 40 to 60 mm on lands where the slope exceeds 4(H):1(V) and to at least 75 mm on lower gradients.

REPLACING TOPSOIL **SD 4-2**



Construction Notes

1. Loosen compacted soil before sowing any seed. If necessary, rip the soil to a depth of 300 mm. Avoid rotary hoe cultivation.
2. Work the ground only as much as necessary to achieve the desired tilth and prepare a good seedbed.
3. Avoid cultivation in very wet or very dry conditions.
4. Cultivate on or close to the contour where possible, not up and down the slope.

SEEDBED PREPARATION **SD 7-1**

Appendix A

Sediment Basin Management & Dewatering Procedure

1.1 Purpose

The purpose of the Sediment Basin Management & Dewatering Procedure (the Procedure) is to detail the actions to be taken in regard to site dewatering in general and specific measures for the construction and maintenance of sediment basins, including steps to be taken prior to any discharge.

Adherence to the methodology outlined in procedure will ensure that works are carried out in accordance with industry standard and environmental conditions.

1.2. Scope

The Procedure applies to the following works:

- Sediment basin management and maintenance; and
- Dewatering of excavations and construction water generally, and
- Acid sulfate leachate ponds in the event that acid sulfate soils or rock is encountered.

1.3. Objectives

The objectives of this Procedure are to:

- Ensure all Project personnel are aware of the requirements of this procedure
- Detail personnel responsible for undertaking actions relating to sediment basin, construction dewatering and acid sulfate leachate management on the site;
- Providing a uniform, controlled methodology and clear criteria for water releases from the site;
- Implement industry standard methods for managing sediment basins and dewatering in accordance with best practice guidelines such as Managing Urban Stormwater Soils and Construction (Landcom 2004) and Acid Sulfate Soil Manual (ASSMAC 1998);
- Ensure water discharges from site are compliant with:
    - the NSW EPA Water Quality Criteria;
    - Managing Urban Stormwater Soils and Construction (Landcom 2004)
    - Approved Erosion and Control Plan; and
- Comply with environmental requirements of the Project, including all legal requirements and contractual obligations.

The procedure shall ensure appropriate environmental protection measures are in place relating to sediment basins, construction water management (dewatering of excavations, culverts, etc) and management of leachate collected in ponds from acid sulfate material stockpiles.

2. Sediment Basin Management & Dewatering Procedure

Environmental Management Controls	Person Responsible	Timing / Frequency
Planning		
A copy of this Sediment Basin Management and Discharge Procedure will be kept on site and be made available to all relevant project personnel	Supervisor / Environmental Site Representative	Site Establishment / Duration
All relevant project personnel will be made aware of this document during the site induction and again in Toolbox Talks and targeted training sessions.	Supervisor / Environmental Site Representative	Site Establishment / Duration
Training and Awareness		
Training, instruction and equipment familiarisation for environmental personnel undertaking water quality monitoring, equipment calibration and maintenance will be the responsibility of the Environmental Site Representative. This will be completed prior to the initial use of equipment or as new equipment arrives on site.	Environmental Site Representative	Site Establishment / Duration
Training sessions will be conducted with Supervisors, Foreman, and Environmental Work Crew and relevant personnel. The training will address • Construction of Sediment Basins • Preliminary post-rainfall inspections • Testing and recording • Treatment methods and recording • Details of the Water Discharge Permit • Dewatering requirements, methods and recording • Maintenance requirements, methods and recording • Storage, Handling and Application of Flocculants	Supervisor / Environmental Site Representative	Site Establishment / Duration
Any personnel that are responsible for monitoring pumps during dewatering activities, and that have not undertaken training described above, will undertake a specific toolbox talk to ensure awareness of requirements.	Supervisor / Environmental Site Representative	Site Establishment / Duration
Construction of Sediment Basins		
Refer to the relevant PESCPs for the location of the sediment basin/s.	Supervisor / Environmental Site Representative	Site Establishment / Duration
The location and design criteria (volume – length, width & depth) for the sediment basin/s will be outlined in the relevant PESCP. The following criteria will be observed: • All requirements of Landcom's - Managing Urban Stormwater: Soils and Construction Volume 1 (the Blue Book). Refer to Section 6.3.3 volume 1 of the Blue Book for detailed design of the sediment basin. • Impervious clay to be used where required in construction of the internal basin invert and embankments. • Inlet and outlet structures will be appropriately constructed to cater for the nominated rainfall event. • Markers will be present to indicate sediment storage volume and to ensure adequate capacity levels are available.	Supervisor / Environmental Site Representative	Site Establishment / Duration
Sediment basins will be constructed in a way that predominantly only site run-off is collected, and clean water is diverted around them. Earthworks will be conducted in a way so as to avoid ponding of water.	Supervisor / Environmental Site Representative	Site Establishment / Duration

Environmental Management Controls	Person Responsible	Timing / Frequency
The sediment basin/s to be constructed prior to any earthworks or topsoil stripping in the catchment being undertaken. Necessary clearing to access the basin location and associated earthworks will occur with appropriate erosion and sediment controls installed.	Supervisor / Environmental Site Representative	Site Establishment / Duration
Where applicable, the formation of operational sediment basins will be partially or fully constructed in early stages of works and managed as a temporary sediment basin to capture construction runoff.	Supervisor / Environmental Site Representative	Site Establishment / Duration
Effective diversions such as drains and berms will be implemented to ensure that the diversion of site runoff is maximised to basins during all stages of construction.	Supervisor / Environmental Site Representative	Site Establishment / Duration
Water Quality Testing, Treatment & Criteria for Discharge		
Captured water to be discharged from sediment basins must meet the following criteria: • pH between 6.5 – 8.5 • TSS < 50mg/L and • Oil and grease - no visible trace.	Supervisor / Environmental Site Representative	Duration
<u>Correlation between TSS and Turbidity</u> A correlation between TSS and turbidity may be developed for the basin/s to allow discharge based on turbidity levels. This correlation will be submitted to the relevant Approval Authority for approval prior to implementation. If approved, a TSS sample will be taken from every tenth discharge and tested to confirm compliance with required criteria. These results will be used to check and revise the correlation. If these tests indicate an exceedance of TSS criteria, discharges on the basis of turbidity measurements will be suspended until the correlation can be re-established and approved.	Environmental Manager/ Environmental Site Representative	Duration
Potential contamination of any basin or ponded waters will be considered prior to discharge. Where the main source is from storm water, TSS and oil and grease are considered to be the likely pollutants. Where groundwater is a significant contributing source, influence from ASS/PASS, or other contaminants will be considered as potential pollutants and additional testing in the form of pH and metals may be undertaken.	Supervisor / Environmental Site Representative	Duration
Water Treatment		
The drain inverts upslope from sediment basin inlets will be pre-dosed with suitable flocculants/coagulants (Gypsum or Calcium Chloride broadcast in the drain invert and/or Anionic Polyacrylamide gel blocks suspended in cages in locations of turbulent water flow.) to pre-treat run-off before it enters the basin during rainfall	Supervisor / Environmental Site Representative	Duration
The implementation of rain-activated, passive dosing units will deploy suitable liquid flocculants/coagulants during prolonged rainfall events to promote rapid coagulation/flocculation of sediment laden water in the treatment forebay of sediment basins.	Supervisor / Environmental Site Representative	Duration
Onsite reuse of ponded stormwater or infiltrated groundwater should always be the first dewatering option considered. Onsite reuse may include application for dust suppression, earthworks compaction and vegetation establishment.	Supervisor / Environmental Site Representative	Duration
If water is to be used for construction purposes (e.g. compaction, dust control) no treatment is required. However, the water should be removed to re-secure design capacity of sediment basins within 5 days.	Supervisor / Environmental Site Representative	Duration

Environmental Management Controls	Person Responsible	Timing / Frequency
All sediment basins to be inspected for capacity and water quality daily on work days and within 24 hours (out of site hours) following cessation of a rain period.	Supervisor / Environmental Site Representative	Duration
Before any de-watering of site areas, excavations, etc, the parameters of pH, T.S.S. and oil and grease are to be tested and meet the following criteria: • pH between 6.5 – 8.5 • TSS < 50mg/L ; and • Oil and grease < 10mg/L (and no visible trace). Treatment should commence as soon as practical following cessation of a rain to allow enough time for settlement of suspended solids.	Supervisor / Environmental Site Representative	Duration
Records of water quality management must be maintained and the required records include: • The date(s) on which the sample was taken; • The time(s) at which the sample was collected; • The name of the person who collected the sample.	Supervisor / Environmental Site Representative	Duration
pH Treatment should be undertaken as follows: • Test basin water with a suitable pH meter. No action is required if the pH reading is between 6.5 and 8.5 • Lime to be added if pH below 6.5 or Hydrochloric Acid (32% Muriatic) or Sulfuric Acid to be added if pH above 8.5 • Determine volume of water to be treated in the sediment basin. • Determine the percentage of lime or acid required by taking a 10-litre sample of basin water and adding a known amount of lime or acid (initially 0.004%). If the pH is still not acceptable, vary the amount of lime or acid until within the limits. • Once the required percentage has been determined, calculate the actual amount of lime or acid to be added by multiplying the volume of water in the basin by the determined percentage. • Add the required amount of lime or acid to the basin and mix the water in the sediment basin well • Treat for pH prior to T.S.S.	Supervisor / Environmental Site Representative	Duration
Total Suspended Solids • Test the sediment basin water initially for NTU using a turbidity tube, nephelometer (Turbidity tester) or by comparing with water samples contained in jars with representative readings up to 100mg/l. • When the comparative NTU readings indicate T.S.S. levels are <50mg/l obtain a grab sample in accordance with approved sampling methods. The water sample to be promptly analysed by a laboratory that is NATA certified in T.S.S. testing. • No further treatment action is required if T.S.S. results are <50mg/l.	Supervisor / Environmental Site Representative	Duration

Environmental Management Controls	Person Responsible	Timing / Frequency
Total Suspended Solids • Test the sediment basin water initially for NTU using a turbidity tube, nephelometer (Turbidity tester) or by comparing with water samples contained in jars with representative readings up to 100mg/l. • When the comparative NTU readings indicate T.S.S. levels are <50mg/l obtain a grab sample in accordance with approved sampling methods. The water sample to be promptly analysed by a laboratory that is NATA certified in T.S.S. testing. • No further treatment action is required if T.S.S. results are <50mg/l. • If basins require flocculation (e.g. T.S.S. >50mg/l), a flocculant/coagulant is to be utilised at the determined dosage initially, then treated with incremental doses should more flocculant be required. • Basins should be monitored daily after flocculation until desired TSS is achieved and to assist in determination of optimal dosage levels. Methods of application to include: • broadcast by shovels on small sumps and excavations is acceptable. This method requires spreading powdered coagulants (i.e. gypsum, calcium chloride, etc) evenly and thinly (i.e. “dusting”) over as much of the water surface as possible. • For sediment basins or areas with a large water surface area. The powdered or flake style coagulants should be pre-mixed thoroughly in a drum with clean water and sprayed over the maximum surface area of water as possible. • When spraying coagulant mixtures, the mixture should hit the water at between 10 to 20 degrees to increase surface areas exposure to the water column. • Alternative water treatment utilising liquid flocculants/coagulants will require the assessed dosage to be pre-mixed and discharged into the basin. Following dosing, the basin water is to be gently re-circulated for a suitable period (2-4 hours) to allow chemical reaction time, and to keep precipitated flocculant/coagulant in suspension a sufficient time to collect the maximum quantity of fine suspended particles into floc clusters. • The process outlined may need to be repeated if acceptable water quality is not achieved initially. **Oil and Grease** • Examine surface of water for evidence (e.g. sheen, discoloration). • No action if no visual contamination. • Oil absorbent material to be spread if there is contamination (e.g. cell-u-sorb). Leave basins to compensate for 24 to 48 hours.	Supervisor / Environmental Site Representative	Duration

Environmental Management Controls	Person Responsible	Timing / Frequency
After retesting, and once the above field tests indicate, the water quality is acceptable, pumping or siphoning can commence with the water extraction inlet protected to prevent extraction of sediment.	Supervisor / Environmental Site Representative	Duration
Discharging Water		
Where possible ponded water and sediment basin water will be reused on site for compaction, dust suppression, and irrigation.	Supervisor / Environmental Site Representative	Duration
The whole process of water quality management in sediment basins will be completed within 5 days of cessation of a rain period.	Supervisor / Environmental Site Representative	Duration
Water may be discharged from site where the tested water quality meets NSW EPA criteria and the Site Representative gives approval. The discharge outlet will be constructed to prevent erosion and scour.	Supervisor / Environmental Site Representative	Duration
The Supervisor is to ensure that treated water has been re-tested for pH and turbidity (NTU) in-situ immediately prior to discharge.	Supervisor / Environmental Site Representative	Duration
The preferred method for dewatering a sediment basin is by the use of a static siphon system with sufficient flow capacity to discharge the volume of supernatant water within a reasonable timeframe (i.e. 12 to 24 hours). The siphon inlet is to be positioned so that settled sediments are not extracted during dewatering. The siphon system is to be installed above the sediment basin embankment and not within the basin spillway.	Supervisor / Environmental Site Representative	Duration
Where sediment basins are to be dewatered by pump, suitable inlet protection devices (i.e. float & housing or extraction tube) will be provided to prevent the extraction of settled sediments within the basin. The flows from the pump outlet and basin are to be constantly monitored during discharge.	Supervisor / Environmental Site Representative	Duration
Only personnel who have undertaken the relevant training and been approved by the Supervisor may operate pumps and discharge sediment basins. During dewatering pumps must be monitored at all times to ensure that settled sediment is not disturbed or extracted, and that water is discharged in a diffused manner to prevent erosion.	Supervisor / Environmental Site Representative	Duration
A Sediment Basin Management Register will be maintained for each basin that details discharge volumes, dates, water treatment. The Sediment Basin Management Register will be updated when treated water is discharged from the basin.	Supervisor / Environmental Site Representative	Duration
Maintenance		
Maintenance of the sediment basins will be ongoing for the duration of the Project and will comprise the following: • The sediment storage capacity limit will be defined through the installation of a marker inside the basin. Sediment will be removed from the basin in accordance with the maintenance schedule, or when the accumulated sediment exceeds 60% of the sediment storage zone. • Sediment removed from basins may be reused on site by incorporating into spoil. • All sediment that will not be reused on site will be disposed of in locations that it will not be conveyed back into the construction areas or watercourses. • Maintenance inspections will be undertaken and the results incorporated into the Weekly Environmental Inspection Checklist.	Supervisor / Environmental Site Representative	Duration

Environmental Management Controls	Person Responsible	Timing / Frequency
The stormwater capacity of sediment basins will be reinstated within 5 days of the cessation of a rainfall event that causes runoff to occur	Supervisor / Environmental Site Representative	Duration
Assessment and use of Coagulants & Flocculants		
Coagulation is the neutralisation and/or destabilisation of electrical charge on suspended soil colloids, whereas flocculation utilises bridging type interactions involving polyelectrolyte chains adsorbing to multiple colloid particles and aggregates through electrostatic charge interactions. The following procedure will be implemented to determine the suitability and effectiveness of the various water treatment products. • The product will be sourced from a reputable and traceable supplier together with MSDS and any other supporting documentation. • Controlled 'jar testing' will be undertaken using site sourced water from the sediment basin. The jar testing will establish the site-specific dosing rates for any given products. • Initial dosing will be undertaken incrementally up to the site specific/determined dosing rate in the event that the basin water responds to a lower dose in the 'real world' application. • Settling rates in the basin will be assessed to determine the efficiency of each product. • On site water sampling and testing will progressively assess the water's pH and turbidity in NTU's prior to lab testing. • NATA certified lab testing for TSS, NTU & pH will be completed prior to any dry weather/controlled discharge to downstream waterways.	Supervisor / Environmental Site Representative	Duration
The range and type of suitable flocculants/coagulants (including typical dosing rates described as product required to water volume)) that may be utilised include; • Calcium Sulphate (Gypsum - powder) – 300ppm (30kg/100m3) • Anionic Polyacrylamide (gel blocks) – 200ppm (20kg/100m3) • Calcium Chloride (solid - flakes), – 200ppm (20kg/100m3) • Aluminium Chlorohydrate (liquid) – 40ppm (4L/100m3) • PAC23 (poly aluminium chloride 23% - solution) - 50ppm (12.5L/100m3) • Aluminium Sulphate (crystals) – 200ppm (20kg/100m3)	Supervisor / Environmental Site Representative	Duration
Storage and Handling of Flocculants		
Gypsum and agricultural lime will be stored on site as either bagged or bulk product. Storage of bulk gypsum and agricultural lime will be covered, within erosion and sediment controls in a position where run on water will not erode the stockpiles.	Supervisor / Environmental Site Representative	Duration
All treatment chemicals particularly acids and basics will be stored in appropriately bunded and covered locations that are locked to prevent unauthorised access.	Supervisor / Environmental Site Representative	Duration
All chemicals on site will be stored with MSDSs for ease of reference in the event of a spill or irritation/injury to handlers.	Supervisor / Environmental Site Representative	Duration
Requirements of the Material Safety Data Sheets (MSDSs) will be met to ensure compatible storage with other chemicals to ensure safety.	Supervisor / Environmental Site Representative	Duration

Monitoring and Record Keeping		
Environmental Management Controls	**Person Responsible**	**Timing / Frequency**
All sediment basins will be inspected on a weekly basis as a minimum, with any defects or maintenance requirements reported immediately. Sediment basins will be inspected immediately after rainfall events to assess: • Water Storage capacity and water quality treatment requirements prior to discharge • Following treatment and discharge from the sediment basin the sediment storage capacity and requirement for clean out will be assessed.	Supervisor / Environmental Site Representative	Duration
Records to be kept of the rainfall events, inspections undertaken, field tests undertaken, dosage rates and when basin water is released etc.	Supervisor / Environmental Site Representative	Duration
The results of all inspections, including inspection reports will be retained in the site environmental inspection register	Supervisor / Environmental Site Representative	Duration
All discharges will be recorded on a discharge permit which will include: • Volume to be discharged • Treatment details (e.g. Coagulant/ flocculant used, dosage, duration and treatment date) • Water quality monitoring results (including date and time of testing) • Discharge water quality results • Date and time of discharge	Supervisor / Environmental Site Representative	Duration
Pumped discharge of any water off site will be monitored regularly to ensure that tested water quality meets all applicable criteria.	Supervisor / Environmental Site Representative	Duration
Decommissioning Construction Sediment Basins		
Construction sediment basins will remain in place until all upstream areas have been stabilised to achieve a 'C' Factor of 0.05 which equates to 70% groundcover as per Blue Book 7.1	Supervisor / Environmental Site Representative	Duration
All operational sediment basins will be desilted and reformed as per design requirements prior to completion of major works within the catchment.	Supervisor / Environmental Site Representative	Duration
Construction Sediment basins will be removed by restoring the ground disturbed by the construction of the basin similar to pre-existing conditions. This will be achieved by: • Removing all redundant basin equipment such as basin markers, siphons, spillway linings, etc. • Spreading and compacting the embankment material in the basin area • Disturbed ground will be compacted to at least the relative density of the material in the ground adjacent to it.	Supervisor / Environmental Site Representative	Duration

3. Procedure Review

The procedure will be regularly reviewed as part of the CEMP audit requirements. This document will be updated when needed in response to audit findings or changes to site conditions. The Environmental Site Representative will modify the procedure where improvements are identified.

RUBICON ENVIRO PTY LTD
ABN: 75 616 518 211

Sediment Basin Management and Discharge Record

Date Inspected		Basin/discharge point ID:	
Date of last rainfall event:		Amount of rainfall received:	
Estimated basin level in %?		Approximate volume of water in basin prior to treatment:	
Initial turbidity reading of the basin in NTU's		Initial pH of the basin? (range of 6.5 -8.5 required)	
The initial amount of acid/lime used if pH correction is required.		Date & time of acid/lime dosing	/ / am/pm
Subsequent amount of acid/lime used if pH correction is required.		Date & time of acid/lime dosing	/ / am/pm

Type of flocculant or coagulant product used (and typical dosing volume)	Yes	No	Flocculant or coagulant product used	Date & time of flocculant or coagulant dosing
Calcium Sulphate (Gypsum - powder) 300ppm (30kg/100m3)				/ / am/pm
Anionic Polyacrylamide (gel blocks) 200ppm (20kg/100m3)				/ / am/pm
Calcium Chloride (solid - flakes) 200ppm (20kg/100m3)				/ / am/pm
Aluminium Chlorohydrate (liquid) 40ppm (4L/100m3)				/ / am/pm
PAC23 (poly aluminium chloride 23% - solution) 50ppm (12.5L/100m3)				/ / am/pm
Aluminium Sulphate (crystals) 200ppm (20kg/100m3)				/ / am/pm

Turbidity reading of the basin in NTU's		Laboratory TSS Result: (if applicable)	
Time and Date of dewatering (i.e. siphon valve opened for discharge or commencement of pump operation)			/ / am/pm
Supervisor responsible for discharge:	Name:		
Date:	Signed:		
Comments? (E.g. next rainfall predicted – slight, moderate, severe?) Was rainfall received during treatment period affecting basin (start a new sheet)			