Department of ENVIRONMENT, PARKS AND WATER SECURITY

Level 1 Goyder Centre 25 Chung Wah Terrace PALMERSTON NT 0830

PO Box 496 PALMERSTON NT 0831

E DevelopmentAssessment.DEPWS@nt.gov.au T 08 8999 4446

File reference: DP18/0409

The Chairperson
Development Consent Authority
GPO Box 1680
DARWIN NT 0801

Dear Chairperson

Re: Condition Precedent 6 of Development Permit DP18/0409 - Lot 04873 Town of Nightcliff - STAGE 1

Condition Precedent 6 relates to the endorsement of the Erosion and Sediment Control Plan (ESCP).

The Stage 1 Erosion and Sediment Control Plan (ESCP) consisting of the document listed below (and attached) has been assessed as being satisfactory in relation to construction phase erosion and sediment control:

• Erosion and Sediment Control – Approved by Carlo de Byl (CPESC no. 7619) – Drawing Numbers DC1603-2CRU-01-ES01 - DC1603-2CRU-01-ES11

The Department of Environment Parks, and Water Security has assessed the information provided, and consider that Condition Precedent 6 of Development Permit DP18/0409 for Stage 1 has been satisfied.

Please note that officers from this Department may undertake site inspections to ensure these works are implemented and maintained effectively.

Should you have any further queries regarding these comments, please contact the Development Coordination Branch by email <u>DevelopmentAssessment@nt.gov.au</u> or phone (08) 8999 4446.

Yours sincerely

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Lauren Cooper

A/Director Development Coordination, Rangelands

2 June 2022

TO: Cardno, David Bramley (david.breamley@cardno.com.au)

- ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MUST BE IMPLEMENTED AND A REVISED EROSION AND SEDIMENT CONTROL PLAN (ESCP) MUST BE SUBMITTED FOR APPROVAL IN THE EVENT THAT SITE CONDITIONS CHANGE SIGNIFICANTLY FROM THOSE CONSIDERED WITHIN THE ESCP
- 2. WHERE THERE IS A HIGH PROBABILITY THAT SERIOUS OR MATERIAL ENVIRONMENTAL HARM MAY OCCUR AS A RESULT OF SEDIMENT LEAVING THE SITE, APPROPRIATE ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MUST BE IMPLEMENTED SUCH THAT ALL REASONABLE AND PRACTICABLE MEASURES ARE BEING TAKEN TO PREVENT OR MINIMISE SUCH HARM. ONLY THOSE WORKS NECESSARY TO MINIMISE OR PREVENT ENVIRONMENTAL HARM SHALL BE CONDUCTED ON-SITE PRIOR TO APPROVAL OF THE AMENDED EROSION AND SEDIMENT CONTROL PLAN (FSCP).
- IN CIRCUMSTANCES WHERE IT IS CONSIDERED NECESSARY TO PREPARE AN AMENDED EROSION AND SEDIMENT CONTROL PLAN (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 TO BPESC. UPON APPROVAL OF THE AMENDED ESCP, ALL WORKS MUST BE IMPLEMENTED IN ACCORDANCE WITH THE AMENDED PLAN.
- PRE WET SEASON INSPECTION TO BE UNDERTAKEN WITH DEPWS OFFICERS, TO DETERMINE ADEQUATE LEVEL OF EROSION AND SEDIMENT CONTROLS TO BE IMPLEMENTED FOR THE WET SEASON.
- CONTRACTOR TO MAINTAIN SUFFICIENT ESC CONTROL MATERIALS ON SITE SUCH AS SPARE SEDIMENT FENCING AND OTHER MATERIALS FOR SHORT NOTICE REPAIRS
- 6. THE IMPLEMENTATION OF THE ESCP WILL BE REGULARLY MONITORED BY THE SUPERINTENDENT AND DEPWS.
- . THE IMPLEMENTATION OF THE ESCP WILL BE REGULARLY MONITORED BY THE SUPERINTENDENT AND DEPWIN.

 SHOULD IT BE DEEMED NECESSARY FROM MONITORING, THE CONTRACTOR SHALL INSTALL ADDITIONAL MEASURES TO ENSURE THE OBJECTIVES OF THIS ELEMENT ARE MET AND TO MINIMISE THE IMPACT OF CONSTRUCTION ACTIVITIES ON THE SURROUNDING ENVIRONMENT. THE SUPERINTENDENT MAY, AT THEIR DISCRETION, DIRECT THE CONTRACTOR TO CARRY OUT ADDITIONAL CONTROLS, AS AND WHEN REQUIRED. THE CONTRACTOR MAY ALSO AT THEIR DISCRETION OPT TO INCLUDE ADDITIONAL DEVICES AS MAY BE REQUIRED TO ENSURE COMPLIANCE WITH THE APPROVALS AS THEY SEE FIT. IT IS IMPORTANT TO NOTE THAT THE DETAILS CONTAINED HEREIN AND ON THE EROSION AND SEDIMENT CONTROL PLANS ARE NOT NECESSARILY ALL THE MEASURES THAT MAY BE NECESSARY TO FULFIL THE DEVELOPMENT APPROVAL REQUIREMENTS AND ARE TO BE USED AS A GUIDE FOR THE CONSTRUCTION CONTRACTOR.

LAND CLEARING

- LAND CLEARING MUST BE DELAYED AS LONG AS PRACTICABLE AND MUST BE UNDERTAKEN IN CONJUNCTION WITH DEVELOPMENT OF EACH STAGE OF WORKS, UNLESS OTHERWISE APPROVED BY THE SUPERINTENDENT.
- ALL REASONABLE AND PRACTICABLE EFFORTS MUST BE TAKEN TO DELAY THE REMOVAL OF, OR DISTURBANCE TO, EXISTING GROUND COVER (ORGANIC OR INORGANIC) PRIOR TO LAND-DISTURBING ACTIVITIES.
- 10. BULK TREE CLEARING MUST OCCUR IN A MANNER THAT MINIMISES DISTURBANCE TO EXISTING GROUND COVER (ORGANIC OR INORGANIC).
- 11. DISTURBANCE TO NATURAL WATERCOURSES (INCLUDING BED AND BANKS) AND THEIR ASSOCIATED RIPARIAN ZONES MUST BE LIMITED TO
- THE MINIMUM PRACTICABLE.
- 12. NO LAND CLEARING SHALL BE UNDERTAKEN UNLESS PRECEDED BY THE INSTALLATION OF ADEQUATE DRAINAGE AND SEDIMENT CONTROL MEASURES, UNLESS SUCH CLEARING IS REQUIRED FOR THE PURPOSE OF INSTALLING SUCH MEASURES, IN WHICH CASE, ONLY THE MINIMUM CLEARING REQUIRED TO INSTALL SUCH MEASURES SHALL OCCUR.
- 13. LAND CLEARING MUST BE LIMITED TO 5M FROM THE EDGE OF PROPOSED CONSTRUCTED WORKS, 2M OF ESSENTIAL CONSTRUCTION TRAFFIC ROUTES, AND A TOTAL OF 10M WIDTH FOR CONSTRUCTION ACCESS, UNLESS OTHERWISE APPROVED BY THE SUPERINTENDENT.
- 14. PRIOR TO LAND CLEARING, AREAS OF PROTECTED VEGETATION, AND SIGNIFICANT AREAS OF RETAINED VEGETATION MUST BE CLEARLY IDENTIFIED (E.G. WITH HIGH-VISIBILITY TAPE, OR LIGHT FENCING) FOR THE PURPOSES OF MINIMISING THE RISK OF UNNECESSARY LAND CLEARING.
- 15. ALL REASONABLE AND PRACTICABLE MEASURES MUST BE TAKEN TO MINIMISE THE REMOVAL OF, OR DISTURBANCE TO, THOSE TREES, SHRUBS AND GROUND COVERS (ORGANIC OR INORGANIC) THAT ARE INTENDED TO BE RETAINED.
- 16. ALL LAND CLEARING MUST BE IN ACCORDANCE WITH THE FEDERAL, STATE AND LOCAL GOVERNMENT VEGETATION PROTECTION/PRESERVATION REQUIREMENTS AND/OR POLICIES.
- 17. LAND CLEARING IS LIMITED TO THE MINIMUM PRACTICABLE DURING THOSE PERIODS WHEN SOIL EROSION DUE TO WIND, RAIN OR SURFACE
- 18. LAND CLEARING MUST NOT EXTEND BEYOND THAT NECESSARY TO PROVIDE UP TO EIGHT (8) WEEKS OF SITE ACTIVITY DURING THOSE MONTHS WHEN THE EXPECTED RAINFALL EROSIVITY IS LESS THAN 100, SIX (6) IF BETWEEN 100 AND 285, FOUR (4) WEEKS IF BETWEEN 285 AND 1500, AND TWO (2) WEEKS IF GREATER THAN 1500. REFER TABLE BELOW FOR MONTHLY EROSIVITY VALUES AND EROSION RISK RATINGS FOR SITES IN DARWIN.

SITE ACCESS

- 19. PRIOR TO THE COMMENCEMENT OF SITE WORKS, THE LOCATION OF THE SITE ACCESS POINT(S) MUST BE VERIFIED WITH THE SUPERINTENDENT.
- 20. SITE ACCESS MUST BE RESTRICTED TO THE MINIMUM PRACTICAL NUMBER OF LOCATIONS
- 21. SITE EXIT POINTS MUST BE APPROPRIATELY MANAGED TO MINIMISE THE RISK OF SEDIMENT BEING TRACKED ONTO SEALED, PUBLIC
- 22. STORMWATER RUNOFF FROM ACCESS ROADS AND STABILISED ENTRY/EXIT POINTS MUST DRAIN TO AN APPROPRIATE SEDIMENT CONTROL DEVICE.

SOIL AND STOCKPILE MANAGEMENT

- 23. ALL REASONABLE AND PRACTICABLE MEASURES MUST BE TAKEN TO OBTAIN THE MAXIMUM BENEFIT FROM EXISTING TOPSOIL. INCILIDING 3. ALL REASONABLE AND PRACTICABLE MESONES MUST BE TAKEN TO US TAIN THE MAXIMUM BENEFIT PROPOSED AREA OF SOIL DISTURBANCE EXCEEDS 2500M2, AND THE TOPSOIL DOES NOT CONTAIN UNDESIRABLE WEED SEED THE TOP 50MM OF SOIL MUST BE STRIPPED AND STOCKPILED SEPARATELY FROM THE REMAINING TOPSOIL, AND SPREAD AS A FINAL SURFACE SOIL.

 SURFACE SOIL.
- (ii) IN AREAS WHERE THE TOPSOIL CONTAINS UNDESIRABLE WEED SEED, THE AFFECTED SOIL MUST BE SUITABLY BURIED OR REMOVED FROM THE SITE.
- 24. STOCKPILES OF ERODIBLE MATERIAL THAT HAS THE POTENTIAL TO CAUSE ENVIRONMENTAL HARM IF DISPLACED, MUST BE
- (i)APPROPRIATELY PROTECTED FROM WIND, RAIN, CONCENTRATED SURFACE FLOW AND EXCESSIVE UP-SLOPE STORMWATER SURFACE FLOWS.
- (iii) LOCATED AT LEAST 2M FROM ANY HAZARDOUS AREA, RETAINED VEGETATION, OR CONCENTRATED DRAINAGE LINE.
 (iii) LOCATED UP-SLOPE OF AN APPROPRIATE SEDIMENT CONTROL SYSTEM.
- (iii) PROVIDED WITH AN APPROPRIATE PROTECTIVE COVER (SYNTHETIC, MULCH OR VEGETATIVE) IF THE MATERIALS ARE LIKELY TO BE STOCKPILED FOR MORE THAN 28 DAYS.
- (v) PROVIDED WITH AN APPROPRIATE PROTECTIVE COVER (SYNTHETIC, MULCH OR VEGETATIVE) IF THE MATERIALS ARE LIKELY TO BE STOCKPILED FOR MORE THAN 10 DAYS DURING THOSE MONTHS THAT HAVE A HIGH EROSION RISK.
- (vi) PROVIDED WITH AN APPROPRIATE PROTECTIVE COVER (SYNTHETIC, MULCH OR VEGETATIVE) IF THE MATERIALS ARE LIKELY TO BE STOCKPILED FOR MORE THAN 5 DAYS DURING THOSE MONTHS THAT HAVE A EXTREME EROSION RISK.
- 25. A SUITABLE FLOW DIVERSION SYSTEM MUST BE ESTABLISHED IMMEDIATELY UP-SLOPE OF A STOCKPILE OF ERODIBLE MATERIAL THAT HAS THE POTENTIAL TO CAUSE ENVIRONMENTAL HARM IF DISPLACED, IF THE UP-SLOPE CATCHMENT AREA DRAINING TO THE STOCKPILE

- 26. ALL OFFICE FACILITIES AND OPERATIONAL ACTIVITIES MUST BE LOCATED SUCH THAT ANY LIQUID EFFLUENT (E.G. PROCESS WATER, WASH-DOWN WATER, EFFLUENT FROM EQUIPMENT CLEANING, OR PLANT WATERING), CAN BE TOTALLY CONTAINED AND TREATED WITHIN THE SITE.
- 27. THE CONSTRUCTION SCHEDULE MUST AIM TO MINIMISE THE DURATION THAT ANY AND ALL AREAS OF SOIL ARE EXPOSED TO THE EROSIVE EFFECTS OF WIND, RAIN AND SURFACE WATER.
- 28. LAND-DISTURBING ACTIVITIES MUST BE UNDERTAKEN IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN (ESCP) AND ASSOCIATED DEVELOPMENT CONDITIONS 29. LAND-DISTURBING ACTIVITIES MUST BE UNDERTAKEN IN SUCH A MANNER THAT ALLOWS ALL REASONABLE AND PRACTICABLE MEASURES TO
- (i)ALLOW STORMWATER TO PASS THROUGH THE SITE IN A CONTROLLED MANNER AND AT NON-EROSIVE FLOW VELOCITIES UP TO THE
- SPECIFIED DESIGN STORM DISCHARGE; (ii) MINIMISE SOIL EROSION RESULTING FROM RAIN, WATER FLOW AND/OR WIND

- (ii) MINIMISE ADVERSE EFFECTS OF SEDIMENT RUNOFF, INCLUDING SAFETY ISSUES;
 (iv) PREVENT, OR AT LEAST MINIMISE, ENVIRONMENTAL HARM RESULTING FROM WORK-RELATED SOIL EROSION AND SEDIMENT RUNOFF;
 (v) ENSURE THAT THE VALUE AND USE OF LAND/PROPERTIES ADJACENT TO THE DEVELOPMENT (INCLUDING ROADS) ARE NOT DIMINISHED AS A RESULT OF THE ADOPTED ESC MEASURES.
- 30. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST CONFORM TO THE STANDARDS AND SPECIFICATIONS CONTAINED IN:
- (i)THE DEVELOPMENT APPROVAL CONDITION ISSUED BY DEVELOPMENT CONSENT AUTHORITY; AND (ii) THE APPROVED ESCP AND SUPPORTING DOCUMENTATION; OR
- (iii) THE LATEST VERSION OF BPESC IF THE STANDARDS AND SPECIFICATIONS ARE NOT CONTAINED IN THE APPROVED ESCP
- (III) THE ATECT VERSION OF BYESU IF THE STANDARDS AND SPECIFICATIONS ARE NOT CONTAINED IN THE APPROVED ESCP.

 31. ANY WORKS THAT MAY CAUSE SIGNIFICANT SOIL DISTURBANCE AND ARE ANCILLARY TO ANY ACTIVITY FOR WHICH REGULATORY BODY APPROVAL IS REQUIRED, MUST NOT COMMENCE BEFORE THE ISSUE OF THAT APPROVAL.

 32. ADDITIONAL AND/OR ALTERNATIVE ESC MEASURES MUST BE IMPLEMENTED IN THE EVENT THAT SITE INSPECTIONS, THE SITE'S MONITORING AND MAINTENANCE PROGRAM, OR THE REGULATORY AUTHORITY, IDENTIFIES THAT UNACCEPTABLE OFF-SITE SEDIMENTATION IS OCCURRING AS A RESULT OF THE WORK ACTIVITIES.
- 33. LAND-DISTURBING ACTIVITIES MUST NOT CAUSE UNNECESSARY SOIL DISTURBANCE IF AN ALTERNATIVE CONSTRUCTION PROCESS IS AVAILABLE THAT ACHIEVES THE SAME OR EQUIVALENT OUTCOMES AT AN EQUIVALENT COST.

- 34. SEDIMENT (INCLUDING CLAY, SILT, SAND, GRAVEL, SOIL, MUD, CEMENT AND CERAMIC WASTE) DEPOSITED OFF THE SITE AS A DIRECT RESULT OF AN ON-SITE ACTIVITY, MUST BE COLLECTED AND THE AREA APPROPRIATELY CLEANED/REHABILITATED AS SOON AS REASONABLE AND PRACTICABLE, AND IN A MANNER THAT GIVES APPROPRIATE CONSIDERATION TO THE SAFETY AND ENVIRONMENTAL RISKS ASSOCIATED WITH THE SEDIMENT DEPOSITION.
- 35. WHEREVER REASONABLE AND PRACTICABLE, BRICK, TILE AND MASONRY CUTTING MUST BE CARRIED OUT ON A PERVIOUS SURFACE, SUCH AS GRASS, OR OPEN SOIL, OR IN SUCH A MANNER THAT ALL SEDIMENT-LADEN RUNOFF IS PREVENTED FROM DISCHARGING INTO A GUTTER, DRAIN, OR WATER BODY.
- 36. ADEQUATE WASTE COLLECTION BINS MUST BE PROVIDED ON-SITE AND MAINTAINED SUCH THAT POTENTIAL AND ACTUAL ENVIRONMENTAL
- 36. ADEQUATE WASTE COLLECTION BIDS MUST BE PROVIDED ON-SITE AND MAINTAINED SUCH THAT POTENTIAL AND ACTUAL ENVIRONMENTAL HARM RESULTING FROM SUCH MATERIAL WASTE IS MINIMISED.

 37. CONCRETE WASTE AND CHEMICAL PRODUCTS, INCLUDING PETROLEUM AND OIL-BASED PRODUCTS, MUST BE PREVENTED FROM ENTERING AN INTERNAL WATER BODY, OR AN EXTERNAL DRAIN, STORMWATER SYSTEM, OR WATER BODY.
- 38. ALL FLAMMABLE AND COMBUSTIBLE LIQUIDS, INCLUDING ALL LIQUID CHEMICALS IF SUCH CHEMICALS COULD POTENTIALLY BE WASHED OR DISCHARGED FROM THE SITE, ARE STORED AND HANDLED ON-SITE IN ACCORDANCE WITH RELEVANT STANDARDS SUCH AS AS1940 *THE* STORAGE AND HANDLING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS.
- TRENCHES NOT LOCATED WITHIN ROADWAYS MUST BE BACKFILLED, CAPPED WITH TOPSOIL, AND COMPACTED TO A LEVEL AT LEAST 75MM ABOVE ADJOINING GROUND LEVEL AND APPROPRIATELY STABILISED.
- 40. ALL STORMWATER. SEWER LINE AND OTHER SERVICE TRENCHES, NOT LOCATED WITHIN ROADWAYS, MUST BE MULCHED AND SEEDED, OR OTHERWISE APPROPRIATELY STABILISED WITHIN 7 DAYS AFTER BACKFILL
- 41. NO MORE THAN 150M OF A STORMWATER, SEWER LINE OR OTHER SERVICE TRENCH MUST TO BE OPEN AT ANY ONE TIME 42. SITE SPOIL MUST BE LAWFULLY DISPOSED OF IN A MANNER THAT DOES NOT RESULT IN ONGOING SOIL EROSION OR ENVIRONMENTAL HARM
- 43. ALL FILL MATERIAL PLACED ON SITE MUST COMPRISE ONLY NATURAL EARTH AND ROCK, AND IS TO BE FREE OF CONTAMINANTS, BE FREE DRAINING, AND BE COMPACTED IN LAYERS NOT EXCEEDING 300MM TO 90% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS1289.

DRAINAGE CONTROL

- 44. ALL DRAINAGE CONTROL MEASURES MUST BE APPLIED AND MAINTAINED IN ACCORDANCE WITH APPROVED ESCP DRAWINGS AND BPESC GUIDELINES.
- 45. WHEREVER REASONABLE AND PRACTICABLE, STORMWATER RUNOFF ENTERING THE SITE FROM EXTERNAL AREAS, AND NON-SEDIMENT LADEN (CLEAN) STORMWATER RUNOFF ENTERING A WORK AREA OR AREA OF SOIL DISTURBANCE, MUST BE DIVERTED AROUND OR THROUGH THAT AREA IN A MANNER THAT MINIMISES SOIL EROSION AND THE CONTAMINATION OF THAT WATER FOR ALL DISCHARGES UP TO THE SPECIFIED DESIGN STORM DISCHARGE.
- 46 DURING THE CONSTRUCTION PERIOD. ALL REASONABLE AND PRACTICABLE MEASURES MUST BE IMPLEMENTED TO CONTROL FLOW VELOCITIES IN SUCH A MANNER THAN PREVENTS SOIL EROSION ALONG DRAINAGE PATHS AND AT THE ENTRANCE AND EXIT OF ALL DRAINS AND DRAINAGE PIPES DURING ALL STORMS UP TO THE RELEVANT DESIGN STORM DISCHARGE.
- TO THE MAXIMUM DEGREE REASONABLE AND PRACTICABLE, ALL WATERS DISCHARGED DURING THE CONSTRUCTION PHASE MUST DISCHARGE ONTO STABLE LAND, IN A NON-EROSIVE MANNER, AND AT A LEGAL POINT OF DISCHARGE.
- 48. WHEREVER REASONABLE AND PRACTICABLE. "CLEAN" SURFACE WATERS MUST BE DIVERTED AWAY FROM SEDIMENT CONTROL DEVICES AND ANY UNTREATED, SEDIMENT-LADEN WATERS.
- 49. DURING THE CONSTRUCTION PERIOD, ROOF WATER MUST BE MANAGED IN A MANNER THAT MINIMISES SOIL EROSION THROUGHOUT THE SITE. AND SITE WETNESS WITHIN ACTIVE WORK AREAS.

EROSION CONTROL

- 50. ALL EROSION CONTROL MEASURES MUST BE APPLIED AND MAINTAINED IN ACCORDANCE WITH APPROVED ESCP DRAWINGS AND BPESC GUIDELINES.
- 51. THE APPLICATION OF LIQUID-BASED DUST SUPPRESSION MEASURES MUST ENSURE THAT SEDIMENT-LADEN RUNOFF RESULTING FROM SUCH MEASURES DOES NOT CREATE A TRAFFIC OR ENVIRONMENTAL HAZARD.
- 52. THE CONSTRUCTION AND STABILISATION OF EARTH BATTERS STEEPER THAN 6:1 (H:V) MUST BE STAGED SUCH THAT NO MORE THAN 3 VERTICAL-METRES OF ANY BATTER IS EXPOSED TO RAINFALL AT ANY INSTANT.
 53. SYNTHETIC REINFORCED EROSION CONTROL MATS AND BLANKETS MUST NOT BE PLACED WITHIN, OR ADJACENT TO, RIPARIAN ZONES AND WATERCOURSES IF SUCH MATERIALS ARE LIKELY TO CAUSE ENVIRONMENTAL HARM TO WILDLIFE OR WILDLIFE HABITATS.
- 54 ALL TEMPORARY FARTH BANKS AND EMBANKMENTS MUST BE MACHINE-COMPACTED. SEEDED AND MULCHED FOR THE PURPOSE OF ESTABLISHING A TEMPORARY VEGETATIVE COVER WITHIN 10 DAYS AFTER GRADING. FLOW DIVERSION SYSTEMS TO BE STABILISED USING CONTROL MEASURES SUITABLE FOR CONCENTRATED FLOW AREAS.
- CONTROL MEASURES SUITABLE FOR CONCENTRALE PICUW AREAS.

 55. A MINIMUM 70% GROUND COVER MUST BE ACHIEVED ON ALL NON-COMPLETED EARTHWORKS EXPOSED TO ACCELERATED SOIL EROSION IF FURTHER CONSTRUCTION ACTIVITIES OR SOIL DISTURBANCES ARE LIKELY TO BE SUSPENDED FOR MORE THAN 30 DAYS DURING THOSE MONTHS WHEN THE EXPECTED RAINFALL EROSIVITY IS LESS THAN 60; MINIMUM 70% COVER WITHIN 30 DAYS IF BETWEEN 60 AND 100; MINIMUM 70% COVER WITHIN 20 DAYS IF BETWEEN 100 AND 285; MINIMUM 75% COVER WITHIN 10 DAYS IF BETWEEN 210 AND 285; MINIMUM 50% COVER WITHIN 15 DAYS IF GREATER THAN 1500. REFER TABLE BELOW FOR MONTHLY RAINFALL EROSIVITY VALUES AND FEONSION REFER STANDARD SEX PATINGS FOR SITES IN DAPWIN.
- ENUSION HISK RATINGS FOR SITES IN DARWIN.

 56. IF IMMINENT HEAVY RAINFALL IS FORCAST PRIOR TO THE STABILISATION OF ANY CHANNEL WORKS AREAS, THEN THE CONTRACTOR SHOULD CONSIDER TEMPORARY STABILISATION OF THE EXPOSED SOIL AREAS WITH A HYDRAULICALLY APPLIED BLANKET SUITABLE FOR USE IN CONCENTRATED FLOW AREAS. FOR HIGH BANK AREAS ABOVE NORMAL STREAM FLOWS TEMPORARY COVERINGS SUCH AS EROSION CONTROL BLANKETS AND MATS (OR APPROVED EQUIVALENT) APPROPRIATELY ANCHORED TO MANUFACTURER'S SPECIFICATION MAY BE UTILISED. FROSION RISK RATINGS FOR SITES IN DARWIN

DUST CONTROL

- ALL DUST CONTROL MEASURES MUST BE APPLIED AND MAINTAINED IN ACCORDANCE WITH APPROVED ESCP DRAWINGS AND CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN.
- 58. WIND EROSION IS NORMALLY CONTROLLED USING ONE OR MORE OF THE FOLLOWING TECHNIQUES:
- (i) REVEGETATION
- (ii) MAINTAINING MOIST SOIL CONDITIONS
- SURFACE ROUGHENING (iv) WIND BREAKS
- (v) HYDRAULICALLY APPLIED SEALANTS/SOIL BINDERS PLACED OVER SOIL SURFACES
- 59. DUST PROBLEMS CAN ALSO BE REDUCED BY THESE ACTIVITIES:

 (i) LIMITING THE AREA OF SOIL DISTURBANCES AT ANY GIVEN TIME
- (ii) PROMPTLY REPLACING TOPSOIL
- (iii) PROGRAMMING WORKS TO MINIMISE THE LIFE OF SOIL STOCKPILES
- (III) PROGRAMMING WORDS INTELLIFE UP SOLLS FLOCATION OF MULCHING) OF LONG TERM STOCKPILES.

 (V) USING A WELL-GRADED GRAVEL-SAND MIXTURE WITH A SMALL QUANTITY OF CLAY AS A WEAR SURFACE ON UNSEALED CONSTRUCTION ROADS.

 (VI) MINIMISING TRAFFIC MOVEMENTS ON EXPOSED SURFACES.
- (vii) LIMITING VEHICULAR TRAFFIC TO 15KPH. (viii) MAINTAINING EXPOSED SOIL SURFACES IN A MOIST CONDITION
- (ix) PROMPTLY REVEGETATION WIND BREAKS.
 (x) PROMPTLY REVEGETATION EXPOSED SOILS

- (xi) INSTALLING WINDBREAKS (60% SHADE CLOTHS, 40% POROUS)

SEDIMENT CONTROL

- 60. ALL SEDIMENT CONTROL MEASURES MUST BE APPLIED AND MAINTAINED IN ACCORDANCE WITH APPROVED ESCP DRAWINGS AND BPESC GUIDELINES. 10. OPTIMUM BENEFIT MUST BE MADE OF EVERY OPPORTUNITY TO TRAP SEDIMENT WITHIN THE WORK SITE, AND AS CLOSE AS PRACTICABLE TO ITS SOURCE.
- 62. SEDIMENT TRAPS MUST BE INSTALLED AND OPERATED TO BOTH COLLECT AND RETAIN SEDIMENT
- 63. THE POTENTIAL SAFETY RISK OF A PROPOSED SEDIMENT TRAP TO SITE WORKERS AND THE PUBLIC MUST BE GIVEN APPROPRIATE CONSIDERATION, ESPECIALLY THOSE DEVICES LOCATED WITHIN PUBLICLY ACCESSIBLE AREAS. 64. ALL REASONABLE AND PRACTICABLE MEASURES MUST BE TAKEN TO PREVENT, OR AT LEAST MINIMISE, THE RELEASE OF SEDIMENT FROM
- 65. SUITABLE ALL-WEATHER MAINTENANCE ACCESS MUST BE PROVIDED TO ALL SEDIMENT CONTROL DEVICES
- 66. SEDIMENT CONTROL DEVICES MUST BE DE-SILTED AND MADE FULLY OPERATIONAL AS SOON AS REASONABLE AND PRACTICABLE AFTER A SEDIMENT-PRODUCING EVENT, WHETHER NATURAL OR ARTIFICIAL, IF THE DEVICE'S SEDIMENT RETENTION CAPACITY FALLS BELOW 75% OF ITS DESIGN RETENTION CAPACITY.
- 67. 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.

 68. CONSTRUCTED SEDIMENT BASINS MUST BE MAINTAINED AND FULLY OPERATIONAL THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL EACH BASIN'S CATCHMENT AREA ACHIEVES 80% GROUND COVER ON ALL SOIL SURFACES.
- EACH BASIN'S CATCHMENT AREA ACHIEVES 80% GROUND COVER ON ALL SOIL SURFACES.

 69. SETTLED SEDIMENT MUST BE REMOVED FROM SEDIMENT BASINS WHEN THE VOLUME OF THE SEDIMENT EXCEEDS THE DESIGNATED SEDIMENT STORAGE CLEVED FOULTH, OR THE DESIGNAM MAXIMUM SEDIMENT STORAGE ELEVEATION.

 70. WHERE APPROPRIATE THE CONTRACTOR MAY CONSIDER PASSIVE APPLICATION TECHNIQUES OF COAGULANTS AND / OR FLOCCULANTS, SUCH AS PLACING FLOC BLOCKS' OR SPREADING LIME OR GYPSUM WITHIN CATCH DRAINS, TO IMPROVE THE EFFICIENCY AND SETTLE OF THE FLOCCULATION PROCESS. SHOULD PASSIVE APPLICATION OF FLOCCULANTS BE PROPOSED, THEN THE DETAILED METHODS AND TYPES OF FLOCCULANTS TO BE USED, INCLUDING THEIR ECOTOXICITY INFORMATION, ARE TO BE CONFIRMED BY THE CONTRACTOR. FOR THE CHARACTERISTICS OF VARIOUS FLOCCULATING AGENTS REFER TO TABLE 1 IN 'CHEMICAL COAGULANTS AND FLOCCULANTS' FACT SHEET BY IECA, OBTAINABLE FROM THE IECA WEBSITE UNDER THE BEST PRACTICE EROSION AND SEDIMENT CONTROL 'APPENDIX'B REVISION JUNE 2018' SECTION. FOR DETAILS ON THE SOIL JAR TESTING PROCEDURE, REFER TO SECTION 5 OF THE FACT SHEET MENTIONED ABOVE

- 71. DEWATERING GOAL IS TO MITIGATE SEDIMENT RELATED ENVIRONMENTAL HARM AND/OR IMPACT TO STORMWATER INFRASTRUCTURE RESULTING FROM DEWATERING ACTIVITIES.
- 72. FLOW DIVERSION BARRIERS, OR OTHER APPROPRIATE SYSTEMS, WILL BE USED TO MINIMISE THE QUANTITY OF WATER ENTERING EXCAVATIONS AND TRENCHES.
- 73. DEWATERING CONTROL MAY INCLUDE GEOFABRIC FILTERS. NON WOVEN FILTER FENCING
- 74. SEDIMENT LADEN WATER WILL NOT BE DISCHARGED TO THE STORMWATER SYSTEM WITHOUT FIRST BEING TREATED SATISFACTORILY.

SITE REHABILITATION

- TS. ALL DISTURBED AREAS IDENTIFIED AS VERY LOW, LOW, MEDIUM, HIGH, OR EXTREME EROSION RISK MUST BE SUITABLY STABILISED WITHIN 30, 30, 20, 10 OR 5 DAYS RESPECTIVELY. IF SIGNIFICANT RAINFALL IS ANTICIPATED WITHIN THE TIMEFRAMES LISTED ABOVE, THEN CONSIDER TEMPORARY STABILISATION METHODS WHERE PRACTICAL.
- 76. A MINIMUM 60% GROUND COVER MUST BE ACHIEVED ON ALL COMPLETED EARTHWORKS EXPOSED TO ACCELERATED SOIL EROSION WITHIN 30 DAYS DURING THOSE MONTHS WHEN THE EXPECTED RAINFALL DEPTH IS LESS THAN 30mm; MINIMUM 70% COVER WITHIN 30 DAYS IF BETWEEN 30 AND 45mm; MINIMUM 70% COVER WITHIN 20 DAYS IF BETWEEN 15 AND 100mm; MINIMUM 75% COVER WITHIN 10 DAYS IF BETWEEN 100 AND 225mm; AND MINIMUM 80% COVER WITHIN 5 DAYS IF GREATER THAN 225mm.
- 77, NO COMPLETED EARTHWORKS SURFACE MUST REMAIN DENUDED FOR LONGER THAN 30 DAYS
- 73. THE TYPE OF GROUND COVER APPLIED TO COMPLETED EARTHWORKS IS COMPATIBLE WITH THE ANTICIPATED LONG-TERM LAND USE, ENVIRONMENTAL RISK, AND SITE REHABILITATION MEASURES.
- 79 LINESS OTHERWISE DIRECTED BY THE SUPERINTENDENT OR WHERE DIRECTED BY THE APPROVED REVEGETATION PLAN. TOPSOIL MUST BE PLACED AT A MINIMUM DEPTH OF 100mm ON SLOPES 4:1 (H:V) OR FLATTER. AND 150mm ON SLOPES STEEPER THAN 4:1
- 30. THE PH LEVEL (SOIL:WATER 1:5) OF TOPSOIL MUST BE ADEQUATE TO ENABLE ESTABLISHMENT AND GROWTH OF THE SPECIFIED VEGETATION. 81. SOIL AMELIORANTS MUST BE ADDED TO THE SOIL IN ACCORDANCE WITH THE APPROVED LANDSCAPE/REVEGETATION PLANS AND/OR SOIL
- TEMPORARY SITE STABILISATION PROCEDURES MUST COMMENCE AT LEAST 30 DAYS PRIOR TO THE NOMINATED SITE SHUTDOWN DATE. AT LEAST 70% STABLE COVER OF ALL UNSTABLE AND/OR DISTURBED SOIL SURFACES MUST BE ACHIEVED PRIOR TO THE START OF THE SHUTDOWN PERIOD. THE STABILISATION WORKS MUST NOT RELY UPON THE LONGEVITY OF NON-VEGETATED EROSION CONTROL BLANKETS,
- 83. ALL UNSTABLE OR DISTURBED SOIL SURFACES MUST BE ADEQUATELY STABILISED AGAINST EROSION (MINIMUM 80% COVER) PRIOR TO COMMENCEMENT OF USE, OR SURVEY PLAN ENDORSEMENT.

SITE MONITORING

- 84. AT NOMINATED INSTREAM WATER MONITORING SITES, A MINIMUM OF 3 WATER SAMPLES MUST BE TAKEN AND ANALYSED, AND THE AVERAGE RESULT USED TO DETERMINE QUALITY.
- 85. SEDIMENT BASIN WATER QUALITY SAMPLES MUST BE TAKEN AT A DEPTH NO GREATER THAN 200MM ABOVE THE LEVEL OF SETTLED
- 86. ALL ENVIRONMENTALLY RELEVANT INCIDENTS AND REGULAR INSPECTION CHECK SHEETS MUST BE RECORDED IN A FIELD LOG THAT MUST REMAIN ACCESSIBLE TO ALL RELEVANT REGULATORY AUTHORITIES.

87. IT IS RECOMMENDED THAT PHOTOGRAPHS OF THE IMPLEMENTED CONTROL DEVICES BE TAKEN DURING THE REGULAR INSPECTIONS TO ASSIST WITH DEMONSTRATING THE IMPLEMENTATION OF THE EROSION AND SEDIMENT MEASURES ON SITE.

SITE MAINTENANCE

- BB. ALL EROSION AND SEDIMENT CONTROL MEASURES, INCLUDING DRAINAGE CONTROL MEASURES, MUST BE MAINTAINED IN PROPER WORKING ORDER AT ALL TIMES DURING THEIR OPERATIONAL LIVES.
- ORDER AT ALL TIMES DURING THEIR OPERATIONAL LIVES.

 89. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES, INCLUDING DRAINAGE CONTROL MEASURES, MUST BE FULLY OPERATIONAL AND MAINTAINED IN PROPER WORKING ORDER AT ALL TIMES DURING THE MAINTENANCE PERIOD AS SPECIFIED BY DEPWS.

 90. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES, INCLUDING DRAINAGE CONTROL MEASURES, MUST BE REMOVED AFTER ACHIEVING A SATISFACTORY "OF-MAINTENANCE INSPECTION" BY DEPWS, AND ADEQUATE STABILISATION OF THE CONTRIBUTING CATCHMENT HAS BEEN ACHIEVED.
- 91. ALL DRAINAGE FROSION AND SEDIMENT CONTROL MEASURES MUST BE INSPECTED:
- (v) AT LEAST DAILY (WHEN WORK IS OCCURRING ON-SITE);
 (vi) AT LEAST WEEKLY (WHEN WORK IS NOT OCCURRING ON-SITE;
- (vii) WITHIN 24 HOURS OF EXPECTED RAINFALL; AND (viii)WITHIN 18 HOURS OF A RAINFALL EVENT OF SUFFICIENT INTENSITY AND DURATION TO CAUSE RUNOFF ON-SITE.
- (WIII)WITHIN 18 HOURS OF A RAINFALL EVENT OF SUFFICIENT INTENSITY AND DURATION TO CAUSE RUNDER ON-SITE.

 92. WASHING/FLUSHING OF SEALED ROADWAYS MUST ONLY OCCUR WHERE SWEEPING HAS FAILED TO REMOVE SUFFICIENT SEDIMENT AND THERE IS A COMPELLING NEED TO REMOVE THE REMAINING SEDIMENT (E.G. FOR SAFETY REASONS). IN SUCH CIRCUMSTANCES, ALL REASONABLE AND PRACTICABLE SEDIMENT CONTROL MEASURES MUST BE USED TO PREVENT, OR AT LEAST MINIMISE, THE RELEASE OF SEDIMENT INTO RECEIVING WATERS, ONLY THOSE MEASURES THAT WILL NOT CAUSE SAFETY AND PROPERTY FLOODING ISSUES SHALL BE EMPLOYED. SEDIMENT REMOVED FROM ROADWAYS MUST BE DISPOSED OF IN A LAWFUL MANNER THAT DOES NOT CAUSE ONGOING SOIL EPOSION OF ENVIRONMENTAL HAS DESCRIPTED. EROSION OR ENVIRONMENTAL HARM
- 93. 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.
- 94. MAINTENANCE MOWING OF ALL ROAD SHOULDERS, TABLE DRAINS, BATTERS AND OTHER SURFACES LIKELY TO EXPERIENCE ACCELERATED SOIL EROSION MUST AIM TO LEAVE THE GRASS LENGTH NO SHORTER THAN 50MM WHERE REASONABLE AND PRACTICABLE.
- 95. MAINTENANCE MOWING MUST BE DONE IN A MANNER THAT WILL NOT DAMAGE THE PROFILE OF FORMED, SOFT EDGES, SUCH AS THE CREST OF EARTH EMBANKMENTS.

- WET WEATHER PREPAREDNESS
 95. IF IT IS EXPECTED THAT CONSTRUCTION WORKS WILL CONTINUE INTO THE WET SEASON A WET WEATHER ESCP MUST BE SUBMITTED AND APPROVED FOR IMPLEMENTATION PRIOR TO 30 SEPTEMBER.
 96. THE CONTRACTOR SHOULD ALSO CONSIDER ESTABLISHING A WET WEATHER PREPAREDNESS PLAN THAT OUTLINES WHAT EROSION AND SEDIMENT CONTROL MEASURES / ACTIONS SHOULD BE UNDERTAKEN ON SITT IN THE EVENT OF A PREDICTED RAINFALL EVENT. AS A GUIDE THE CONTRACTOR COULD ADOPT THE EXPECTED 24-HOUR RAINFALL RANGES OUTLINED IN TABLE BELOW AS TRIGGERS FOR TAKING ACTION IN REGARDS TO PREPARING THE CONSTRUCTION SITE AND EXPOSED SURFACES FOR THE PREDICTED RAINFALL.

ALTERNATIVE EROSION RISK BASED ON EXPECTED DAILY AND AVERAGE MONTHLY RAINFALL

EROSION RISK RATING	EXPECTED 24-HOUR RAINFALL	AVERAGE MONTHLY RAINFALL
VERY LOW	0 to 2mm	0 to 30mm
LOW	2+ to 10mm	30+ to 45mm
MODERATE	10+ to 25mm	45+ to 100mm
HIGH	25+ to 100mm	100+ to 225mm
EXTREME	> 100mm	> 225mm

- 97. EROSION AND SEDIMENT CONTROL TECHNIQUES AND ACTIONS THAT MAY BE UNDERTAKEN INCLUDE, BUT NOT LIMITED TO, THE FOLLOWING
- MEADURES.

 REVIEW THE CONDITION OF ALL EROSION, DRAINAGE AND SEDIMENT CONTROL DEVICES IMPLEMENTED ON SITE AND ENSURE THAT THESE MEASURES ARE IN AN EFFECTIVE OPERATIONAL CONDITION PRIOR TO THE EVENT. WORN, DAMAGED OR OTHERWISE DEFECTIVE MATERIALS AND COMPONENTS ARE TO BE REPAIRED OR REPLACED.
- SEDIMENT CONTROL DEVICES WITH ACCUMULATED SEDIMENT VOLUMES IN EXCESS OF DESIGN CAPACITY SHOULD BE CLEANED OUT TO REINSTATE THE SETTLING AND STORAGE ZONE VOLUMES. MATERIALS REMOVED MUST BE DISPOSED OF IN A MANNER APPROVED BY THE CONSENT AUTHORITY THAT DOES NOT CAUSE POLLUTION.
- COVERING EXPOSED SOIL SURFACES STILL SUBJECT TO CONSTUCTION WITH TEMPORARY EROSION CONTROL TECHNIQUES SUCH AS TEMPORARY EROSION CONTROL BLANKETS OR MATS, OR HYDRAULICALLY APPLIED BLANKETS. THE CONTRACTOR SHOULD CONSIDER RETAINING A STOCKPILE OF EROSION CONTROL MATERIALS ON SITE TO ENSURE MEASURES ARE READILY AVAILABLE AS NEEDED.

DEVELOPMENT PERMIT: DP19/0050

CONSTRUCTION PERIOD: MAY 2022 - OCTOBER 2022 (TBC) SUPERINTENDENT CONTACT: DAVID BRAMLEY (08 8942 8200) ENGINEERING CONTACT: DAVID BRAMLEY (08 8942 8200)

A 12.04.22 FOR APPROVA Des. Verif. Appd. Development Permit: DP19/0050



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GENERIC INSTALLATION SEQUENCE:

THIS INSTALLATION SEQUENCE ONLY SERVES AS A GENERIC GUIDE FOR THE MINIMUM EROSION AND SEDIMENT CONTROL (ESC) MEASURES FOR EVERY STAGE OF WORK. SITE CONDITIONS SUCH AS DISPERSIVE SOILS MAY WARRANT HIGHER ESC STANDARD (CONTACT SUPERINTENDENT OR THE ENGINEER PRIOR TO WORK).

CODE	ITEM	PLAN	INSTALLED	REMOVED
		NCE. IDENTIFY LOCATION OF D		
	CONTACT THE SUPERIN	TENDENT PRIOR TO COMMENC		SPERSIVE SUIL IS
Entry/Exit	Construction entry/exit – vibration grid	DWG. DC1603-2CRU-01-ES04 & DC1603-2CRU-01-ES10	Day One	When Entry/Exit is no longer required
SF	Sediment Fence with Woven Fabric	DWG. DC1603-2CRU-01-ES04 TO DC1603-2CRU-01-ES08	Prior to clearing of upslope areas	When site office and Stockpiles are removed and when upslope site is suitably stabilised
Site Office	Site Office		Day One	End of Work
Stockpile	Stockpile/Waste/Parts Washdown Area		Day One	End of Work
CD	Parabolic Catch Drain without bank – Type A	DWG. DC1603-2CRU-01-ES04 TO DC1603-2CRU-01-ES08	Day One	After adequate stabilisation of contributing upslope catchment
МВ	Mulch Filter Berms	DWG. DC1603-2CRU-01-ES04 TO DC1603-2CRU-01-ES08	As soon as construction activities allows. Install as required	After site stabilisation or house construction on each individual lot has commenced
OG, SA, FD	On Grade, Sag, and Fabric Drop Inlet Protection	DWG. DC1603-2CRU-01-ES07 & DC1603-2CRU-01-ES08	As soon as inlets and pipes are constructed	After adequate stabilisation of contributing upslope catchment
GFS	1.2m Grass Filter Strip	DWG. DC1603-2CRU-01-ES07 & DC1603-2CRU-01-ES08	As soon as construction activities allows	NA
LS	Level Spreader	DWG. DC1603-2CRU-01-ES04 to DC1603-2CRU-01-ES06	As soon as construction activities allows. Downslope land condition to be determined on site	When next stage begins and LS is no longer required
FR	Fibre Roll	DWG. DC1603-2CRU-01-ES04 TO DC1603-2CRU-01-ES08	As soon as open drains are constructed	After adequate stabilisation of contributing upslope catchment
RCD	Rock Check Dam	DWG. DC1603-2CRU-01-ES04 TO DC1603-2CRU-01-ES08	As soon as construction activities allows. Provide geotextile splash pad and ensure 150mm is provided between centre and outer check dam wing.	After drain stabilisation
RFD	Rock Filter Dam	DWG. DC1603-2CRU-01-ES04 to DC1603-2CRU-01-ES08	Following installation of boundary sediment controls and prior to land clearing	After adequate stabilisation of contributing upslope catchment
Dust	Dust Suppression		At sufficient interval to suppress dust generation	N/A
Revegetation	Revegetation by native species grassing in any disturbed areas		As soon as practicable	N/A



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DEFENCE HOUSING AUSTRALIA					
TOPER MUIRHEAD NORTH DEVELOPMENT LEE POINT ROAD, MUIRHEAD CITY OF DARWIN			PROVAL DNSTRUCTION Scale	N PURPOSE Tsize	
EROSION AND SEDIMENT CONTROL	AHD	July 2021	AS SHOWN	A1	
SEQUENCE TABLE AND R-FACTORS	Drawing Number			Revision	
	DC16	03-2CRU-	·01-ES02	A	

MONTHLY AND ANNUAL RAINFALL EROSIVITY (R-FACTOR) VALUES

DARWIN	12.42S, 130.87E	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
	MEAN	4496	3512	2826	808	160	15	5	47	80	472	948	2355	15724
	% OF ANNUAL	29	22	18	5	1	0	0	0	1	3	6	15	
2 yr ARI	(MEDIAN)	3572	2781	2124	514	0	0	0	0	0	322	906	1775	11994
3 yr ARI	(66.6th PERCENTILE)	5624	3573	2754	978	120	0	0	0	0	466	1207	2542	
4 yr ARI	(75th PERCENTILE)	5961	4538	3720	1182	151	0	0	0	28	753	1325	3318	
5 yr ARI	(80th PERCENTILE)	6242	4735	4440	1553	202	0	0	0	112	933	1488	3667	
10 yr ARI	(90th PERCENTILE)	8517	6370	5988	1728	417	0	0	237	317	1262	1624	4968	

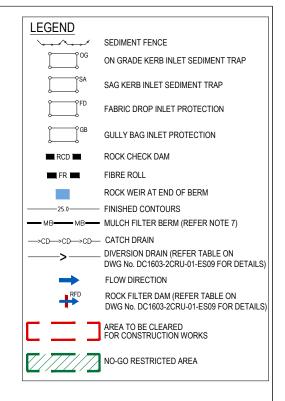
EXTREME HIGH MODERATE LOW VERY LOW

Rev. Date



NOTES

- REFER TO DWG No. DC1603-2CRU-01-ES01 TO ES02 FOR GENERAL NOTES.
- 2. REFER TO DWG No. DC1603-2CRU-01-ES03 FOR EROSION AND SEDIMENT CONTROL KEY PI AN
- REFER TO DWG No. DC1603-2CRU-01-ES04 FOR EROSION AND SEDIMENT CONTROL DETAILS FOR CONSTRUCTION PHASE 1 (APRIL - OCTOBER). REFER TO DWG No. DC1603-2CRU-01-ES05 TO ES06 FOR EROSION AND SEDIMENT CONTROL DETAILS FOR CONSTRUCTION PHASE 2 (APRIL - OCTOBER). REFER TO DWG No. DC1603-2CRU-01-ES07 TO ES08 FOR EROSION AND SEDIMENT CONTROL DETAILS FOR POST CONSTRUCTION PHASE 3.
- 4. REFER TO DWG No. DC1603-2CRU-01-ES12 & ES13 FOR EROSION AND SEDIMENT CONTROL DETAILS NOTES.
- DUST CONTROL FENCE TO BE ERECTED ON SITE WHERE DIRECTED BY THE SUPERINTENDENT AND CITY OF DARWIN TO SUIT PREVAILING WIND CONDITIONS.
- SEDIMENT FENCE TO BE INSTALLED ONLY IF INSUFFICIENT MULCH AVAILABLE ON SITE.





CdB DMB Des. Verif. Appd. Development Permit: DP19/0050

A 12.04.22 FOR REVIEW

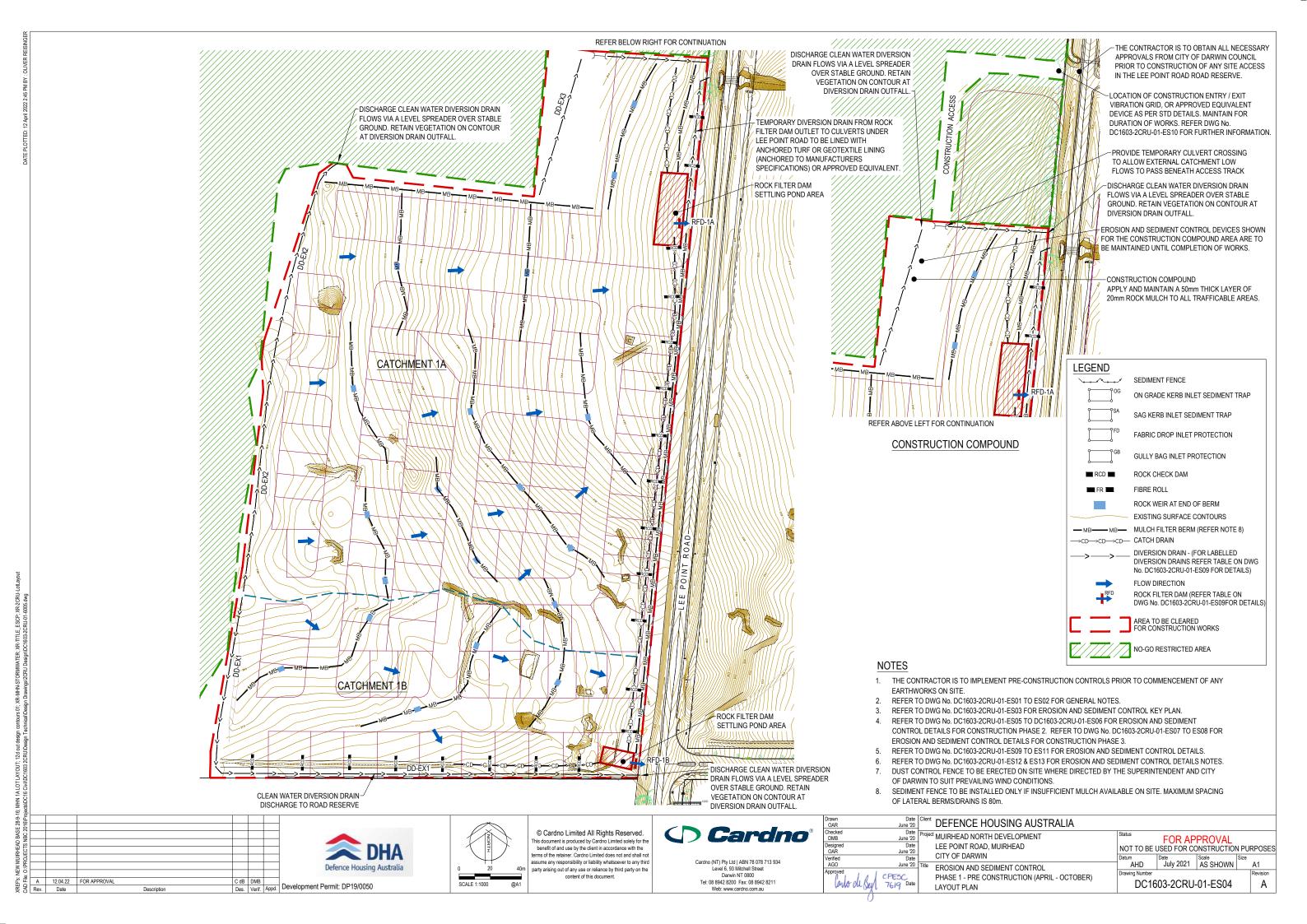
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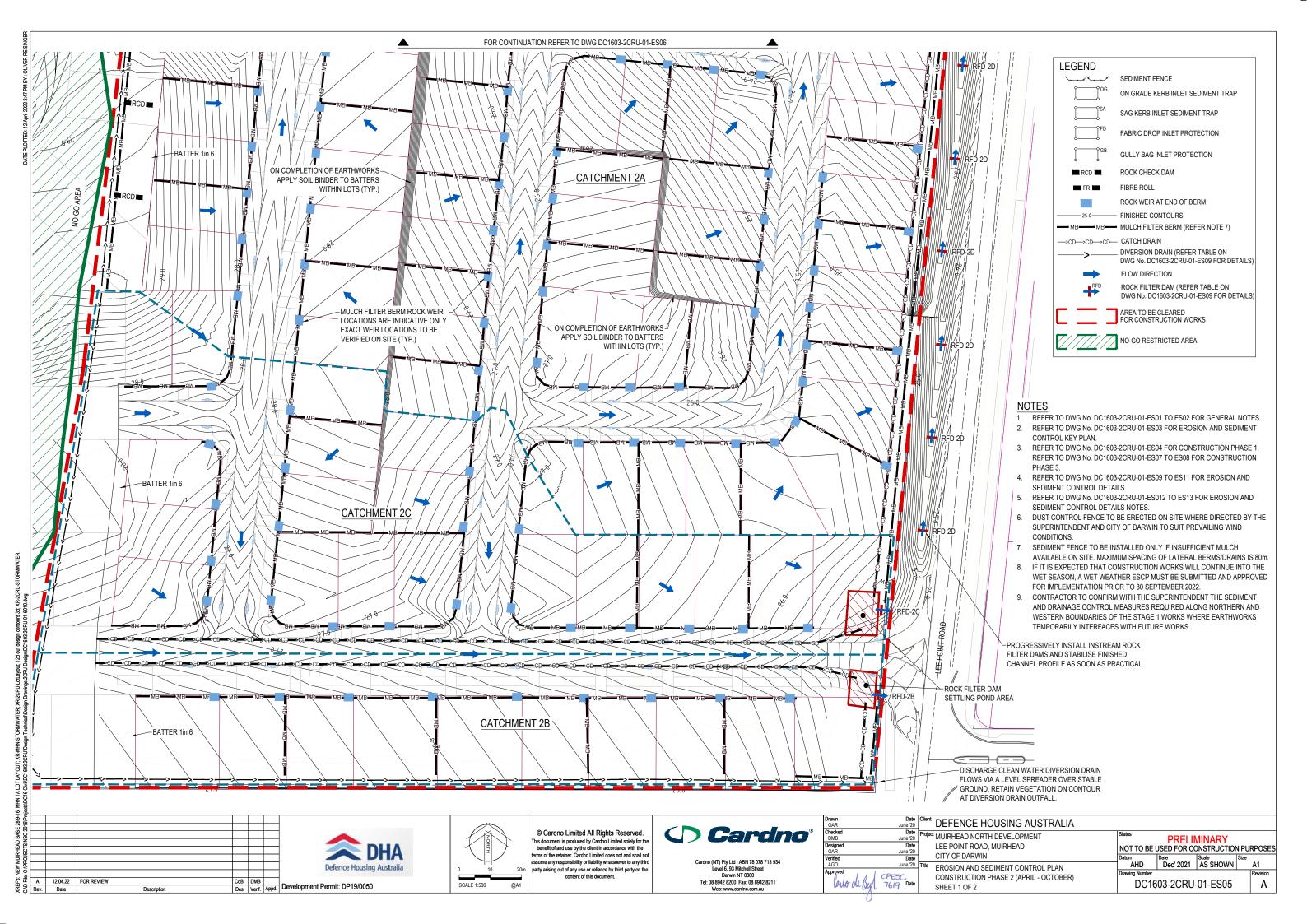


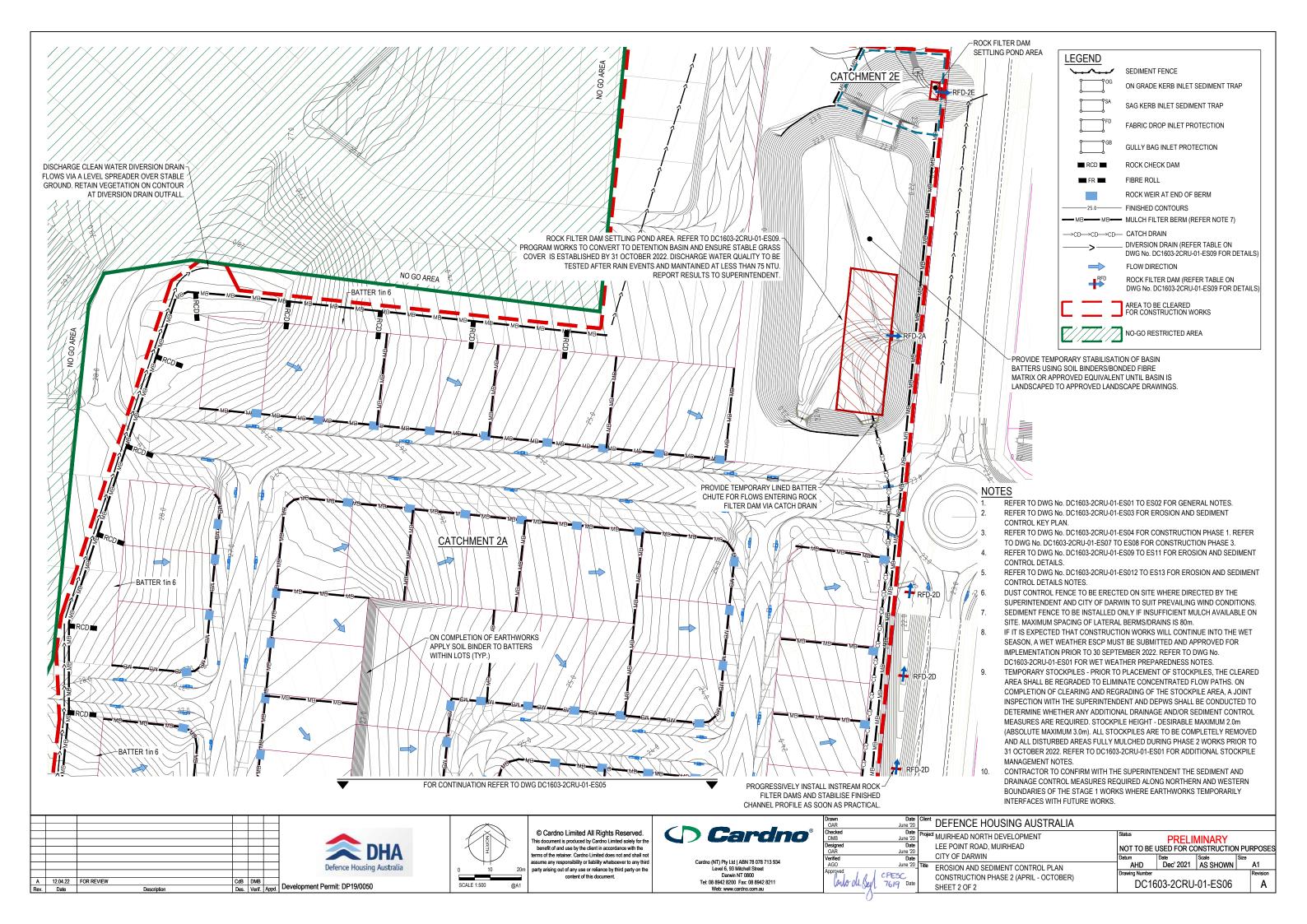
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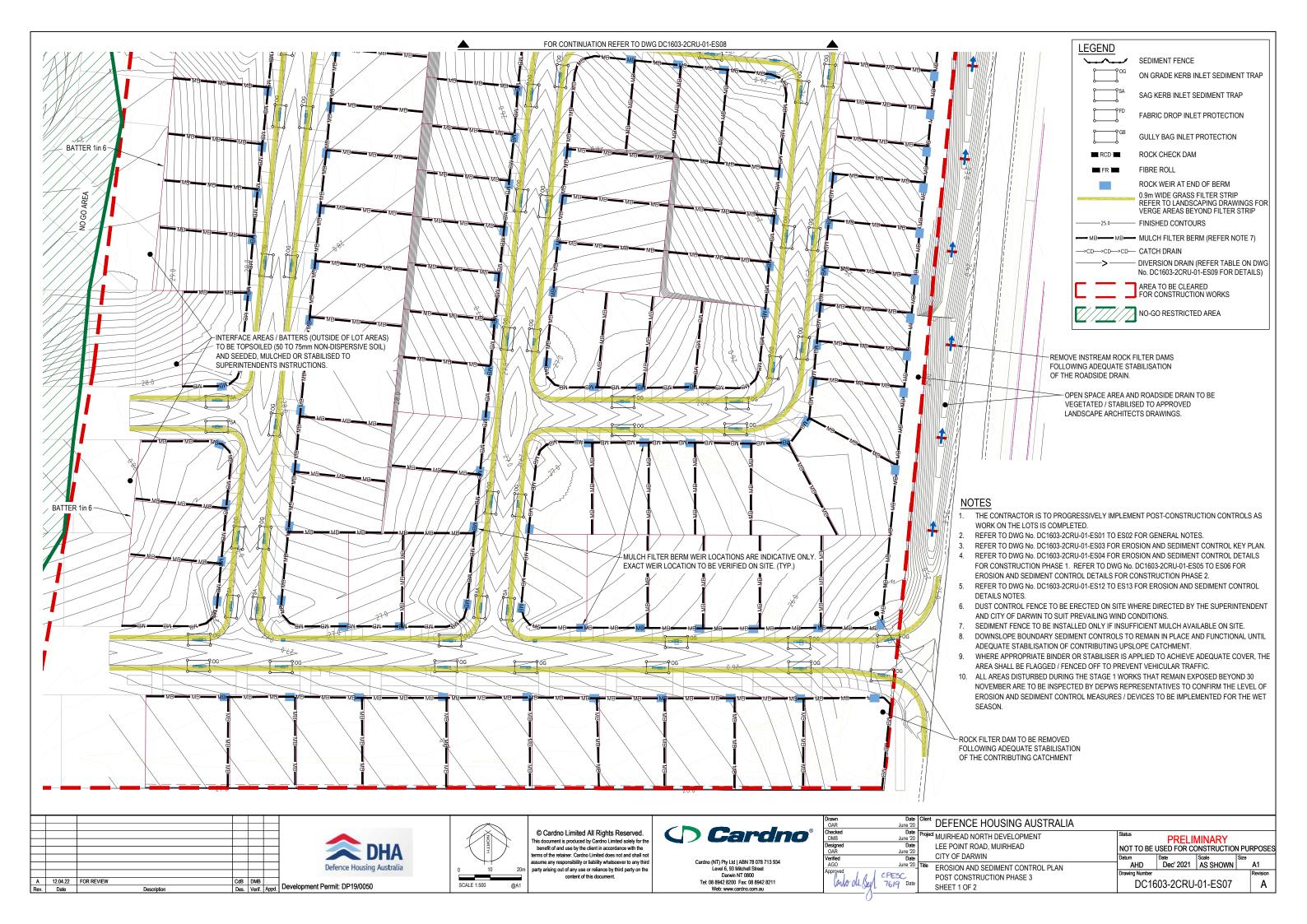
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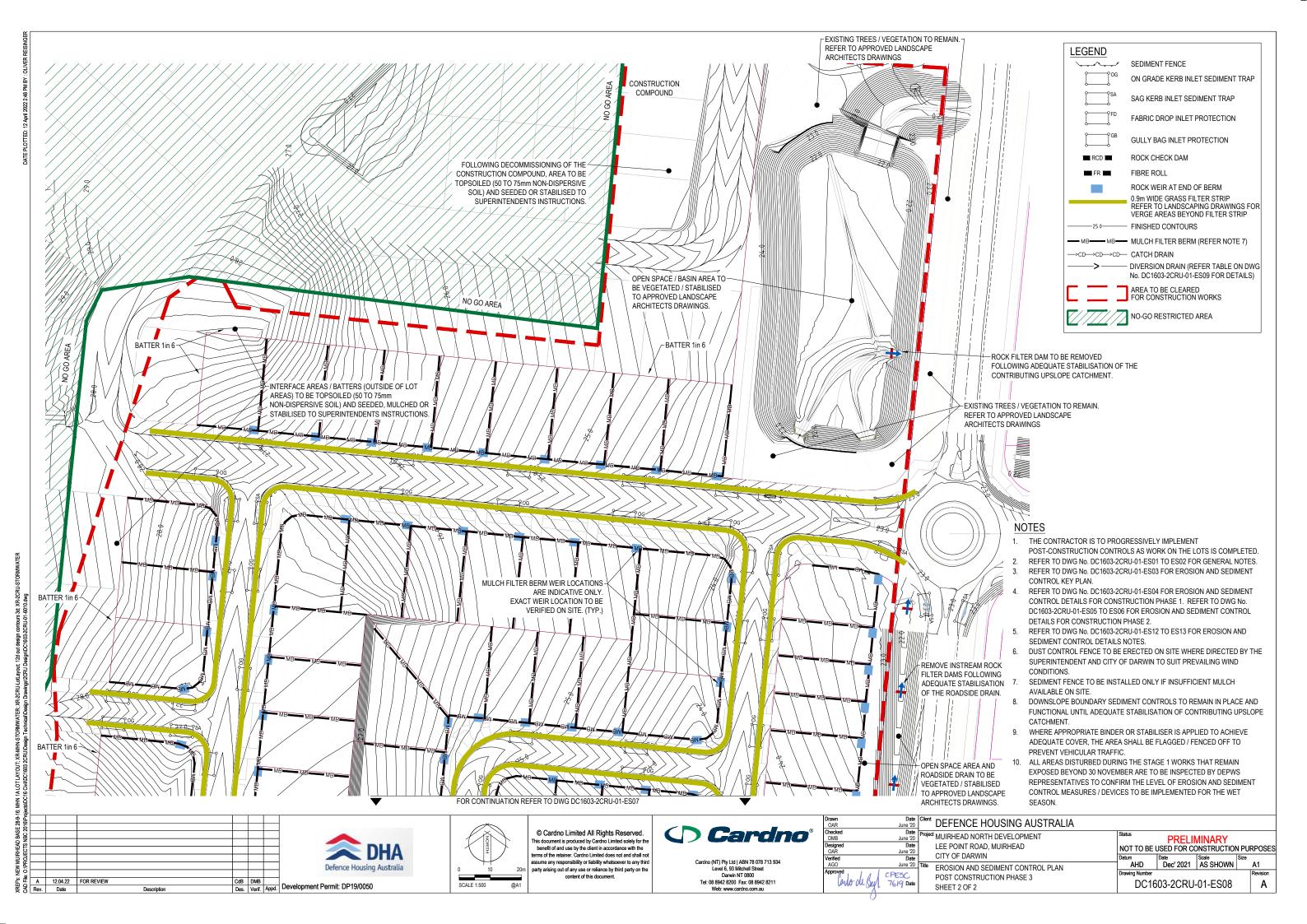
nt DEFENCE HOUSING AUSTRALIA ject MUIRHEAD NORTH DEVELOPMENT Status
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES LEE POINT ROAD, MUIRHEAD CITY OF DARWIN Date Scale Size AS SHOWN A1 um AHD EROSION AND SEDIMENT CONTROL KEY PLAN DC1603-2CRU-01-ES03





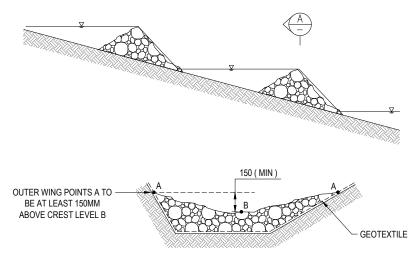






REFER DWG. NO. DC1603-2CRU-01-ES13 AND IECA BPESC STD. DWG. SD-SA-01 FOR FURTHER INFORMATION.

SAG KERB INLET SEDIMENT TRAP N.T.S.



SECTION

REFER DWG. NO. DC1603-2CRU-01-ES13 AND IECA BPESC STD. DWG. SD-RCD-01 FOR FURTHER INFORMATION.

ROCK CHECK DAM

REFER NOTE 1

N.T.S.

ROCK FILTER DAM DETAILS TABLE

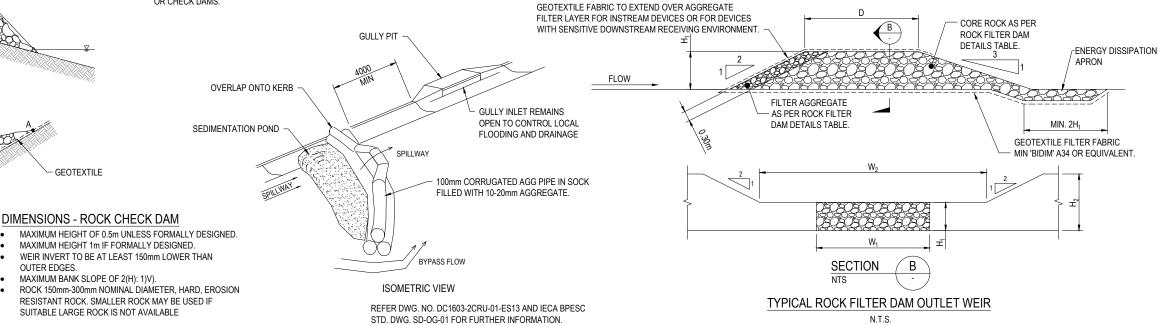
DEVICE ID	CATCHMENT ID	MIN. SETTLING POND SURFACE AREA	SUGGESTED SETTLING POND LENGTH	SUGGESTED SETTLING POND WIDTH	DEVICE THICKNESS (IN DIRECTION OF FLOW) (D)	HEIGHT OF ROCK FILTER (WEIR) (H ₁)	FILTER AGGREGATE SIZE	MIN. THICKNESS OF FILTER AGGREGATE	MIN. CORE ROCK SIZE	WIDTH OF FILTER DAM (W ₁)	SPILLWAY LENGTH (W ₂)	SPILLWAY DEPTH	EMBANKMENT HEIGHT (H ₂)
RFD-1A	1A	604m²	45.0m	14.0m	MIN. 1.50m	0.50m	25mm	0.30m	250mm	35.0m	35.0m	0.45m	0.95m
RFD-1B	1B	180m²	10.0m	18.0m	MIN. 1.50m	0.50m	25mm	0.30m	250mm	10.0m	10.0m	0.45m	0.95m
RFD-2A	2A	610m²	45.0m	14.0m	MIN. 1.50m	0.50m	25mm	0.30m	250mm	35.0m	35.0m	0.45m	0.95m
RFD-2B	2B	84m²	10.0m	9.0m	MIN. 1.50m	0.30m	25mm	0.30m	250mm	10.0m	10.0m	0.40m	0.70m
RFD-2C	2C	134m²	10.0m	14.0m	MIN. 1.50m	0.50m	25mm	0.30m	250mm	10.0m	10.0m	0.40m	0.90m
RFD-2D	ROADSIDE DRAIN	VARIES	VARIES	VARIES	MIN. 1.50m	0.30m	25mm	0.30m	250mm	1.5m	5.0m	VARIES	0.70m
RFD-2E	2E	7m²	5.0m	2.0m	MIN. 1.50m	0.30m	25mm	0.30m	250mm	2.0m	9.0m	0.40m	0.70m

- REFER TYPICAL ROCK FILTER DAM OUTLET WEIR DETAILS FOR LOCATION OF VARIABLES 'D' 'H1' 'H2' 'W1' AND 'W2' FROM THE ABOVE TABLE.
- OFF-LINE ROCK FILTER DAM DETAILS BASED ON 3 MONTH ARI PEAK FLOWS FILTERING THROUGH FILTER AGGREGATE, WITH SPILLWAY SIZED FOR 2 YEAR ARI PEAK FLOWS.
- SUITABILITY OF DEVICE AND DEVICE DETAILS TO BE CONFIRMED ON SITE.
- REFER IECA STD DWG SD-RFD-01 AND SD-RFD-02 FOR TYPICAL ROCK FILTER DAM DETAILS
- REFER IECA STD DWG SD-RFD-03 AND SD-RFD-04 FOR TYPICAL INSTREAM ROCK FILTER DAM DETAILS (RFD-2D ONLY)

CLEAN WATER DIVERSION DRAINS DETAILS TABLE

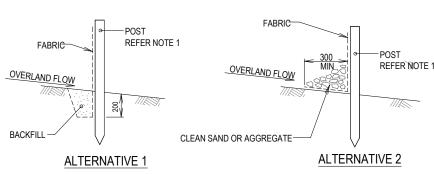
DEVICE ID	CATCHMENT ID	LINING MATERIAL	MINIMUM LONGITUDINAL GRADE	LEFT HAND BATTER SLOPE	CHANNEL BASE WIDTH	RIGHT HAND BATTER SLOPE	DEPTH OF FLOW	MINIMUM FREEBOARD	ADOPTED DEPTH
DD-EX1	EX1	GEOTEXTILE LINING	1.0%	1 IN 2	0.0m	1 IN 2	0.25m	0.15m	0.4m
DD-EX2	EX2	GEOTEXTILE LINING	1.0%	1 IN 2	0.2m	1 IN 2	0.35m	0.15m	0.5m
DD-EX3	EX2 + EX3	GEOTEXTILE LINING	1.0%	1 IN 2	0.9m	1 IN 2	0.35m	0.15m	0.5m

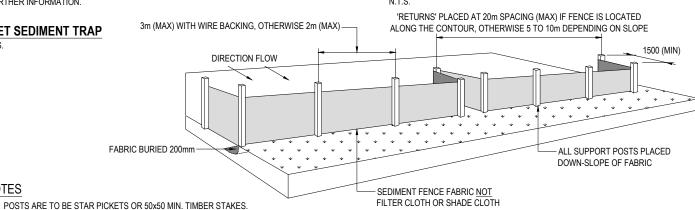
- LEFT AND RIGHT HAND SIDE ARE BASED ON THE ASSUMPTION OF FACING DOWNSTREAM
- REFER TO IECA STD DWG SD-DC-01, SD-CD-01, SD-CD-02, SD-CD-03, SD-CD-04 AND SD-CD-05 FOR TYPICAL CLEAN WATER DIVERSION DRAIN DETAILS.
- d50 ROCK SIZE DENOTES THE DIAMETER OF WHICH 50% OF THE ROCKS ARE SMALLER, d90 OF WHICH 90% OF THE ROCKS ARE SMALLER.
- ROCK SIZE DISTRIBUTION (d50/d90) ASSUMED TO BE 0.67
- FOR IDENTIFIED DISPERSIVE SOILS AREAS, FLOW DIVERSION BUNDS/BANKS SHOULD BE ADOPTED OVER CUT IN CATCH DRAINS. WHERE CUT IN DRAINS ARE NECESSARY WITHIN DISPERSIVE SOIL AREAS, THESE CATCH DRAINS SHOULD BE ADEQUATELY LINED WITH A MINIMUM OF 150mm OF NON-DISPERSIVE MATERIAL PRIOR TO THE INSTALLATION OF OTHER TEMPORARY CHANNEL LININGS OR CHECK DAMS.



ON-GRADE KERB INLET SEDIMENT TRAP N.T.S.

NOTES





ANCHORING BASE OF FABRIC

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STEEL DROPPERS ARE NOT TO BE USED.

REFER DWG. NO. DC1603-2CRU-01-ES12 AND IECA BPESC STD.

DWG. SD-SF-01 AND SD-SF-02 FOR FURTHER INFORMATION. Date Client DEFENCE HOUSING AUSTRALIA

Date Project MI JIRHEAD NORTH DEVELOPMENT MUIRHEAD NORTH DEVELOPMENT FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION PURPOSES LEE POINT ROAD, MUIRHEAD CITY OF DARWIN ΔHD July 2021 AS SHOWN EROSION AND SEDIMENT CONTROL CPESC. **DETAILS** DC1603-2CRU-01-ES09 SHEET 1 OF 3

INSTALLATION OF SEDIMENT FENCE

Α	12.04.22	FOR APPROVAL		C dB	DMB	

LOCATION OF FENCE RELATIVE

TO BASE OF SLOPE

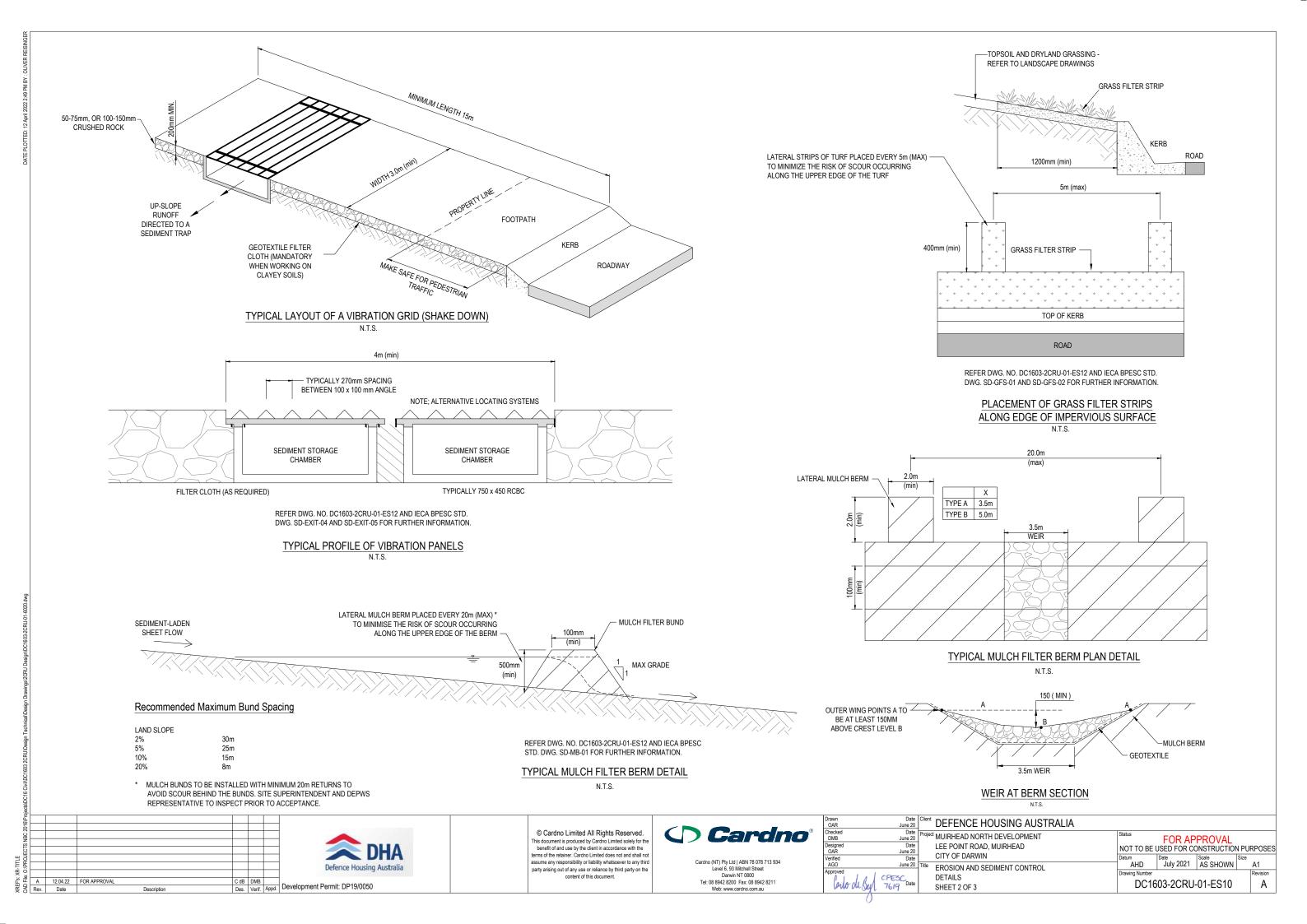
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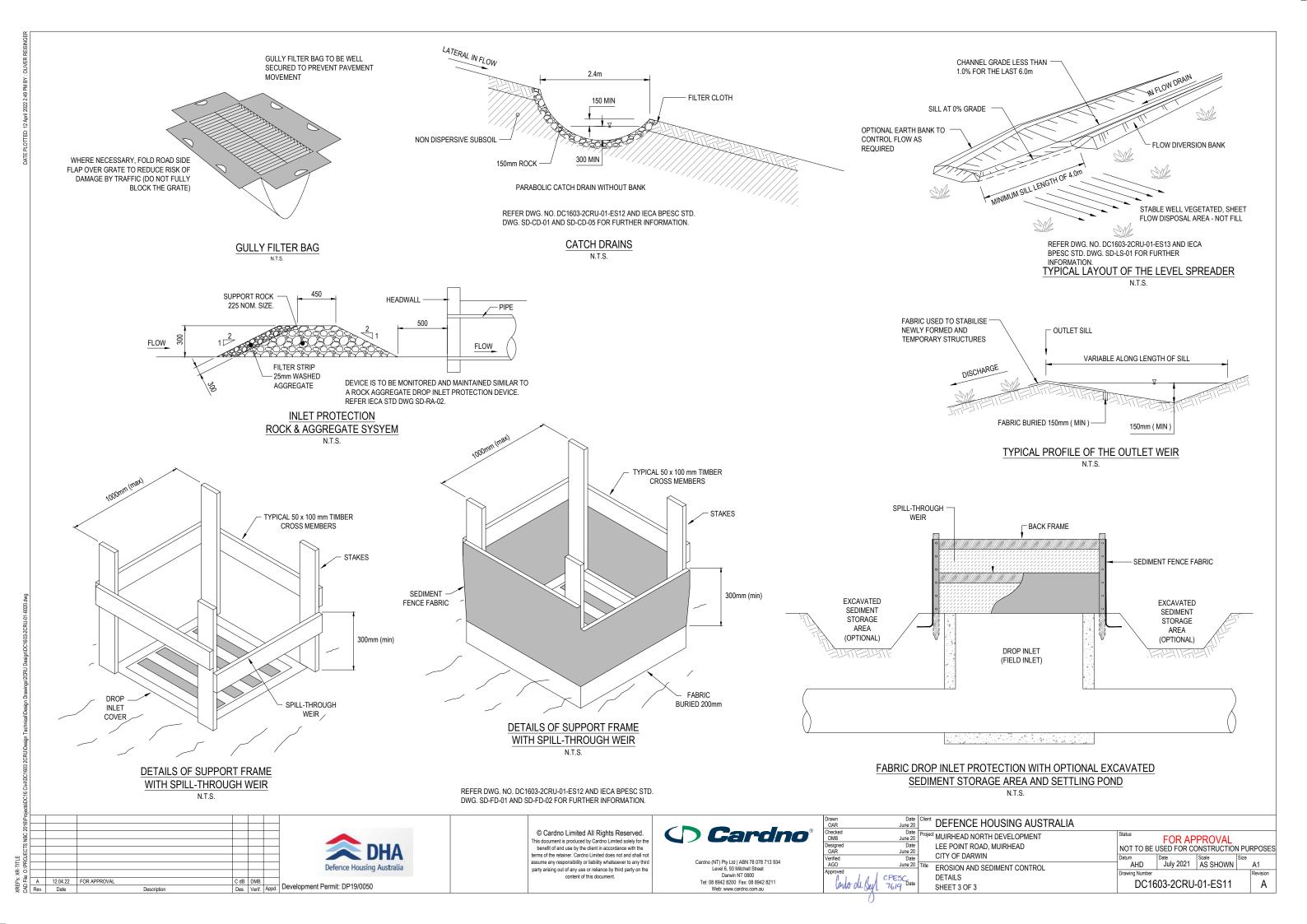
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MAXIMUM BANK SLOPE OF 2(H): 1)V).

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MATERIALS

**ROCK: WELL GRADED, HARD, ANGULAR, EROSION RESISTANT ROCK, NOMINAL DIAMETER OF 50MM TO 75MM (SMALL DISTURBANCES) OR 100 TO 150MM (LARGE DISTURBANCES). ALL REASONABLE MEASURES MUST BE TAKEN TO OBTAIN ROCK OF NEAR UNIFORM SIZE.

FOOTPATH STABILISING AGGREGATE: 25 TO 50MM GRAVEL OR AGGREGATE.

GEOTEXTILE FABRIC: HEAVY-DUTY, NEEDLE-PUNCHED, NON-WOVEN FILTER CLOTH ('BIDIM' A24 OR EQUIVALENT).

CONSTRUCTION EXIT - VIBRATION GRID

1. REFER TO APPROVED PLANS FOR LOCATION AND DIMENSIONAL 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. CLEAR THE LOCATION OF THE VIBRATION GRID, REMOVING STUMPS, ROOTS AND OTHER VEGETATION TO PROVIDE A FIRM FOUNDATION SO THAT THE ROCK IS 2. CLEAR THE LOCATION OF THE VIBRATION GRID, REMOVING STUMPS, ROOTS AND OTHER VEGETATION TO PROVIDE A FIRM FOUNDATION SO THAT THE ROCK IS NOT PRESSED INTO SOFT GROUND. CLEAR SUFFICIENT WIDTH TO ALLOW PASSAGE OF LARGE VEHICLES, BUT CLEAR ONLY THAT NECESSARY FOR THE EXIT. DO NOT CLEAR ADJACENT AREAS UNTIL THE REQUIRED EROSION AND SEDIMENT CONTROL DEVICES ARE IN PLACE.

3. GRADE THE LOCATION OF THE VIBRATION GRID SO THAT RUNOFF FROM THE UNIT WILL NOT FLOW INTO THE STREET, BUT WILL FLOW TOWARDS AN APPROPRIATE SEDIMENT-TRAPPING DEVICE.

4. ENSURE THAT THE INSTALLATION OF THE VIBRATION GRID INCLUDES ADEQUATE SEDIMENT STORAGE VOLUME UNDER THE GRID. WHERE NECESSARY,

INSTALL SUITABLE PRECAST SEDIMENT COLLECTION CHAMBERS.
5. PLACE A ROCK PAD/RAMP FORMING A MINIMUM 200MM THICK LAYER OF CLEAN, OPEN-VOID ROCK OVER THE ROADWAY BETWEEN THE VIBRATION GRID AND

THE SEALED STREET TO PREVENT TYRES FROM PICKING UP MORE SOIL AFTER THEY HAVE BEEN CLEANED.

6. THE TOTAL LENGTH OF THE VIBRATION GRIP AND ROCK RAMPS SHOULD BE AT LEAST 15M WHERE PRACTICABLE, AND AS WIDE AS THE FULL WIDTH OF THE ENTRY OR EXIT AND AT LEAST 3M. THE ROCK RAMP SHOULD COMMENCE AT THE EDGE OF THE SEALED ROAD OR PAVEMENT.

7. FLARE THE END OF THE ROCK PAD WHERE IT MEETS THE PAVEMENT SO THAT THE WHEELS OF TURNING VEHICLES DO NOT TRAVEL OVER UNPROTECTED.

SOIL
8. IF THE FOOTPATH IS OPEN TO PEDESTRIAN MOVEMENT, THEN COVER THE COARSE ROCK WITH FINE AGGREGATE OR GRAVEL, OR OTHERWISE TAKE WHATEVER MEASURES ARE NEEDED TO MAKE THE AREA SAFE

MAINTENANCE

1. INSPECT VIBRATION GRID PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF-PRODUCING RAINFALL. OR OTHERWISE AT FORTNIGHTLY INTERVALS.

2 IE SAND SOIL SEDIMENT OR MID IS TRACKED OR WASHED ONTO THE ADJACENT SEALED ROADWAY THEN SLICH MATERIAL MUST BE PHYSICALLY REMOVED.

2. IF SAIND, SOLD, SEDIMENT OR MUD IS TRACLED UN WASHED ONLY THE AUGUSCHY SEALED ROADWAY, THEN SOON MAN BETWEEN DIS PETISICALLY REMOVED, FIRST USING A SOUARE-EDGED SHOVEL, AND THEN A STIFF-BRISTLED BROOM, AND THEN BY A MECHANICAL VACUUM UNIT, IF AVAILABLE.

3. IF NECESSARY FOR SAFETY REASONS, THE ROADWAY SHALL ONLY BE WASHED CLEAN AFTER ALL REASONABLE EFFORTS HAVE BEEN TAKEN TO SHOVEL AND SWEEP THE MATERIAL FROM THE ROADWAY.

4. WHEN THE VOIDS BETWEEN THE ROCK BECOMES FILLED WITH MATERIAL AND THE EFFECTIVENESS OF THE ROCK RAMPS ARE REDUCED TO A POINT WHERE

SEDIMENT IS BEING TRACKED OFF THE SITE, A NEW 100MM LAYER OF ROCK MUST BE ADDED AND/OR THE ROCK PAD MUST BE EXTENDED.

5. ENSURE ANY ASSOCIATED DRAINAGE CONTROL MEASURES ARE MAINTAINED IN ACCORDANCE WITH THEIR DESIRED OPERATIONAL CONDITION.

6. DISPOSE OF SEDIMENT AND DEBRIS IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

1. THE VIBRATION GRID SHOULD BE REMOVED ONLY AFTER IT IS NO LONGER NEEDED AS A SEDIMENT CONTROL DEVICE.

2 REMOVE MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.
3. RE-GRADE AND STABILISE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

SEDIMENT FENCE

MATERIALS

MIATERIALS

*FABRIC: POLYPROPYLENE, POLYAMIDE, NYLON, POLYESTER, OR POLYETHYLENE WOVEN OR NON-WOVEN FABRIC, AT LEAST 700MM IN WIDTH AND A MINIMUM UNIT WEIGHT OF 140GSM. ALL FABRICS TO CONTAIN ULTRAVIOLET INHIBITORS AND STABILISERS TO PROVIDE A MINIMUM OF 6 MONTHS OF USEABLE CONSTRUCTION LIFE (ULTRAVIOLET STABILITY EXCEEDING 70%).

*FABRIC REINFORCEMENT: WIRE OR STEEL MESH MINIMUM 14-GAUGE WITH A MAXIMUM MESH SPACING OF 200MM.

*SUPPORT POSTS/STAKES: 1500MM2 (MIN) HARDWOOD, 2500MM2 (MIN) SOFTWOOD, OR 1.5KG/M (MIN) STEEL STAR PICKETS SUITABLE FOR ATTACHING FABRIC.

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND REQUIRED TYPE OF FABRIC (IF SPECIFIED). IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, FABRIC TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. TO THE MAXIMUM DEGREE PRACTICAL, AND WHERE THE PLANS ALLOW, ENSURE THE FENCE IS LOCATED:

2. TO THE MAXIMUM DEGREE PRACTICAL, AND WHERE THE PLANS ALLOW, ENSURE THE FENCE IS LOCATED:
(1) TOTALLY WITHIN THE PROPERTY BOUNDARIES;
(1) ALONG A LINE OF CONSTANT ELEVATION WHEREVER PRACTICAL;
(11) AT LEAST 2M FROM THE TOE OF ANY FILLING OPERATIONS THAT MAY RESULT IN SHIFTING SOIL/FILL DAMAGING THE FENCE.
3. INSTALL RETURNS WITHIN THE FENCE AT MAXIMUM 20M INTERVALS IF THE FENCE IS INSTALLED ALONG THE CONTOUR, OR 5 TO 10M MAXIMUM SPACING (DEPENDING ON SLOPE) IF THE FENCE IS INSTALLED ALONG THE CONTOUR, THE "RETURNS" SHALL CONSIST OF EITHER:
(1) V. SHAPED SECTION EXTENDING AT LEAST 1.5M UP THE SLOPE; OR
(1) SANDBAG OR ROCK/AGGREGATE CHECK DAM A MINIMUM 1/3 AND MAXIMUM 1/2 FENCE HEIGHT, AND EXTENDING AT LEAST 1.5M UP THE SLOPE.

4 ENSURE THE EXTREME ENDS OF THE FENCE ARE TURNED UP THE SLOPE AT LEAST 1.5M, OR AS NECESSARY, TO MINIMISE WATER BYPASSING AROUND THE

ENSURE THE SEDIMENT FENCE IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE FENCE, AND THE UNDESIRABLE

5. ENDIRE THE SEDIMENT FERCE IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE FERCE, AND THE UNDESIRABLE DISCHARGE OF WATER AROUND THE ENDS OF THE FERCE.

6. IF THE SEDIMENT FENCE IS TO BE INSTALLED ALONG THE EDGE OF EXISTING TREES, ENSURE CARE IS TAKEN TO PROTECT THE TREES AND THEIR ROOT SYSTEMS DURING INSTALLATION OF THE FENCE OD NOT ATTACH THE FABRIC TO THE TREES.

7. UNLESS DIRECTED BY THE SITE SUPERVISOR OR THE APPROVED PLANS, EXCAVATE A 200MM WIDE BY 200MM DEEP TRENCH ALONG THE PROPOSED FENCE.

LINE, PLACING THE EXCAVATED MATERIAL ON THE UP-SLOPE SIDE OF THE TRENCH.

LINE, PLACING THE EXCAVATED MATERIAL ON THE UP-SLOPE SIDE OF THE TRENCH.

8. ALONG THE LOWER SIDE OF THE TRENCH, APPROPRIATELY SECURE THE STAKES INTO THE GROUND SPACED NO GREATER THAN 3M IF SUPPORTED BY A TOP SUPPORT WIRE OR WEIR MESH BACKING, OTHERWISE NO GREATER THAN 2M.

9. IF SPECIFIED, SECURELY ATTACH THE SUPPORT WIRE OR MESH TO THE UP-SLOPE SIDE OF THE STAKES WITH THE MESH EXTENDING AT LEAST 200MM INTO THE EXCAVATED TRENCH. ENSURE THE MESH AND FABRIC IS ATTACHED TO THE UP-SLOPE SIDE OF THE STAKES EVEN WHEN DIRECTING A FENCE AROUND A CORNER OR SHARP CHANGE-OF-DIRECTION.

10. WHEREVER POSSIBLE, CONSTRUCT THE SEDIMENT FENCE FROM A CONTINUOUS ROLL OF FABRIC. TO JOIN FABRIC CITHER:

10. ATTACH EACH SID TO TAME ONCE JUDIO STAYES WITH THE GRAPIC SOLD BUGS ADOLLING THE SECONATE OF TAME ONE TIME THAN AND WITH THE TWO STAKES TIED.

(I) ATTACH EACH END TO TWO OVERLAPPING STAKES WITH THE FABRIC FOLDING AROUND THE ASSOCIATED STAKE ONE TURN, AND WITH THE TWO STAKES TIED

TOGETHER WITH WIRE (METHOD 1): OR (II) OVERLAP THE FARRIC TO THE NEXT ADJACENT SUPPORT POST (METHOD 2).

(II) OVERLAP THE FABRIC TO THE NEXT ADJACENT SUPPORT POST (METHOD 2).

11. SECURELY ATTACH THE FABRIC TO THE SUPPORT POSTS USING 25 X 12 SEM STAPLES, OR TIE WIRE AT MAXIMUM 150MM SPACING.

12. SECURELY ATTACH THE FABRIC TO THE SUPPORT WIRE/MESH (IF ANY) AT A MAXIMUM SPACING OF 1M.

13. ENSURE THE COMPLETED SEDIMENT FENCE IS AT LEAST 450MM, BUT NOT MORE THAN 700MM HIGH. IF A SPILL-THOUGH WEIR IS INSTALLED, ENSURE THE CREST OF THE WEIR IS AT LEAST 300MM ABOVE GROUND LEVEL.

14. BACKFILL THE TRENCH AND TAMP THE FILL TO FIRMLY ANCHOR THE BOTTOM OF THE FABRIC AND MESH TO PREVENT WATER FROM FLOWING UNDER THE

FERVEL: IS NOT POSSIBLE TO ANCHOR THE FABRIC IN AN EXCAVATED TRENCH, THEN USE A CONTINUOUS LAYER OF SAND OR AGGREGATE TO HOLD THE FABRIC

1. DURING THE MAINTENANCE PERIOD, INSPECT THE SEDIMENT FENCE AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY

2. REPAIR ANY TORN SECTIONS WITH A CONTINUOUS PIECE OF EARRIC FROM POST TO POST.

2. REPAIR ANT TORN SECTIONS WITH A CONTINUOUS PIECE OF PARIC FROM POST TO POST.

3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED.

4. IF THE FENCE IS SAGGING BETWEEN STAKES, INSTALL ADDITIONAL SUPPORT POSTS.

5. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 1/3 THE HEIGHT OF THE FENCE.

6. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

7. REPLACE THE FABRIC IF THE SERVICE LIFE OF THE EXISTING FABRIC EXCEEDS 6-MONTHS.

MAINTENANCE

1. WHEN DISTURBED AREAS UP-SLOPE OF THE SEDIMENT FENCE ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE FENCE MUST BE REMOVED.

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

3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

CATCH DRAINS - ROCK LINED

MATERIALS.

ROCK:
* ALL ROCK MUST BE HARD, WEATHER RESISTANT, AND DURABLE AGAINST DISINTEGRATION UNDER CONDITIONS TO BE MET IN HANDLING, PLACEMENT AND

OF ENATION.

* ALL ROCK MUST HAVE ITS GREATEST DIMENSION NOT GREATER THAN 3 TIMES ITS LEAST DIMENSIONS.

THE ROCK USED IN FORMATION OF THE DRAIM MUST BE EVENLY GRADED WITH 50% BY VHIGHT LARGER THAN THE SPECIFIED NOMINAL ROCK SIZE AND HAVE SUFFICIENT SMALL ROCK TO FILL THE VOIDS BETWEEN THE LARGER ROCK. DIRT, FINES, AND SMALLER ROCK MUST NOT EXCEED 5% BY WEIGHT. THE DIAMETER OF THE LARGES FROCK DIST, FINES, AND SMALLER ROCK MUST NOT EXCEED 5% BY WEIGHT. THE DIAMETER OF THE LARGES FROCK SIZE SHOULD BE NO LARGER THAN 1.5 TIMES THE ROMINAL ROCK SPECIFIC FRANTYT TO BE AT LEAST 2.5.

**THE COLOUR OF THE RIPRAP SHALL BE [INSERT] AND MUST BE APPROVED BY THE ENGINEER. ONCE APPROVED, THE COLOUR SHALL BE KEPT CONSISTENT TIPLOURISTIC FROM THE RIPRAP SHALL BE [INSERT] AND MUST BE APPROVED BY THE ENGINEER. ONCE APPROVED, THE COLOUR SHALL BE KEPT CONSISTENT TIPLOURISTIC FROM THE SHALL BE THE

* GEOTEXTILE FABRIC: HEAVY-DUTY, NEEDLE-PUNCHED, NON-WOVEN FILTER CLOTH, MINIMUM 'BIDIM' A24 OR EQUIVALENT.

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS, IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT,

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

2. PRIOR TO PLACEMENT, ALL ROCKS MUST BE VISUALLY CHECKED FOR SIZE, ELONGATION, CRACKS, DETERIORATION AND OTHER VISIBLE. THE DEGREE AND THOROUGHNESS OF SUCH CHECKING MUST BE APPROPRIATE FOR THE POTENTIAL CONSEQUENCES ASSOCIATED WITH FAILURE OF THE STRUCTURE OR PURPOSE FOR WHICH THE MATERIAL WILL BE USED.

3. CLEAR THE LOCATION FOR THE CATCH DRAIN, CLEARING ONLY WHAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND EQUIPMENT FOR INSTALLATION.

4. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD THE BANK.

5. REMOVE ALL SOFT, YIELDING MATERIAL, REPLACE WITH SUITABLE ON-SITE MATERIAL, COMPACT TO SMOOTH FIRM SURFACE.

6. EXCAVATE THE DRAIN TO THE LINES AND GRADES SHOWN ON THE APPROVED PLANS, OVER-CUT THE DRAIN TO A DEPTH EQUAL TO THE SPECIFIED DEPTH OF DEVICE AND THE PROVENTION OF THE ENERGY OF THE PROVENTION.

ROCK PLACEMENT SUCH THAT THE FINISHED TOP SURFACE WILL BE AT THE ELEVATION OF THE SURROUNDING LAND. PLACEMENT OF THE ROCK LINING MUST

ROCK PLACEMENT SUCH THAT THE FINISHED TOP SUFFACE WILL BE AT THE ELEVATION OF THE SURROUNDING LAND, PLACEMENT OF THE ROCK LINING MUST NOT REDUCE THE DRAINS TOP WIDTH AND DEPTH AS SPECIFIED WITHIN THE APPROVED PLANS.

7. GRADE THE DRAIN TO THE SPECIFIED SLOPE AND FORM THE ASSOCIATED EMBANKMENT WITH COMPACTED FILL. NOTE THAT THE DRAIN INVERT MUST FALL 10CM EVERY 10M FOR EACH 1% OF CHANNEL GRADIENT.

8. ENSURE THE SIDES OF THE CUT DRAIN ARE NO STEEPER THAN A 1.5:1 (H:V) SLOPE AND THE EMBANKMENT FILL SLOPES NO STEEPER THAN 2:1.

9. IF THE DRAIN IS CUT INTO A DISPERSIVE (SODIC) SOIL, THEN PRIOR TO PLACEMENT OF FILTER CLOTH, THE EXPOSED DISPERSIVE SOIL MUST BE COVERED WITH A MINIMUM 200MM THICK LAYER OF NON-DISPERSIVE SOIL PRIOR TO PLACEMENT OF FILTER CLOTH OR ROCKS.

TO JE A BILTER CLOTH UNDERLAY IS SPECIFIED. PLACE THE FILTER FARRIC DIRECTLY ON THE PREPARED FOUNDATION. JE MORE THAN ONE SHEET OF FILTER CLOTH IS REQUIRED TO OVER THE AREA, OVERLAP THE EDGE OF EACH SHEET AT LEAST 300MM, AND SECURE ANCHOR PINS AT MINIMUM 1M SPACING ALONG

IL ENSIRE THE FILTER OF OTH IS PROTECTED FROM PUNCHING OR TEARING DURING INSTALLATION OF THE FABRIC AND THE ROCK, REPAIR ANY DAMAGE BY REMOVING THE ROCK AND PLACING WITH ANOTHER PIECE OF FILTER CLOTH OVER THE DAMAGED AREA OVERLAPPING THE EXISTING FABRIC A MINIMUM OF

300MM. 12. PLACEMENT OF ROCK SHOULD FOLLOW IMMEDIATELY AFTER PLACEMENT OF THE FILTER LAYER. PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED

MASS OF ROCK WITH A MINIMUM OF VOIDS.

13. PLACE ROCK LINING TO THE EXTENT AND DEPTH INDICATED WITHIN THE APPROVED PLANS.

14. ENSURE THE ROCK IS PLACED IN AN APPROPRIATE MANNER TO AVOID DISPLACING UNDERLYING MATERIALS OR PLACING UNDUE IMPACT FORCE ON THE

BEDDING MATERIALS.

15. ENSURE THE ROCK IS PLACED WITH A MINIMUM THICKNESS OF 1.5 TIMES THE NOMINAL ROCK SIZE (D50).

16. ENSURE MATERIALS THAT ARE D50 AND LARGER ARE POSITIONED FLUSH WITH THE TOP SURFACE WITH FACES AND SHAPES MATCHED TO MINIMISE VOIDS.

17. ENSURE PROJECTIONS ABOVE OR DEPRESSIONS UNDER THE SPECIFIED TOP SURFACE ARE LESS THAN 20% OF THE ROCK LAYER THICKNESS. THE AVERAGE SURFACE PLANE OF THE FINISHED ROCK IS DEFINED AS THE PLANE WHERE 50% OF THE TOPS OF ROCKS WILD CONTACT.

18. ENSURE THE COMPLETED DRAIN HAS SUFFICIENT DEEP (AS SPECIFIED FOR THE TYPE OF DRAIN) MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN) MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MEASURED FROM THE DRAIN INVERT (AVERAGE SURFACE LAND MATERIAL PROMISED FOR THE TYPE OF DRAIN MATERIAL PROMISED FOR THE TYPE OF DRAIN MATERIAL PROMISED FOR THE T

PLANE ALONG CHANNEL INVERT) TO THE TOP OF THE EMBANKMENT. THE AVERAGE SURFACE PLANE OF THE FINISHED ROCK IS DEFINED AS THE PLANE WHERE 50% OF THE TOPS OF ROCKS WOULD CONTACT.

39/3 OF THE 10FS OF NOORS WOULD UDNIAGL.

19. TO THE MAXIMUM DEGREE PRACTICABLE. THE MATERIAL BETWEEN LARGER ROCK MUST NOT BE LOOSE OR EASILY DISPLACED BY THE EXPECTED FLOW.

20. AFTER PLACEMENT OF THE ROCK LINING, ENSURE THE DRAIN HAS A CONSTANT FALL IN THE DESIRED DIRECTION FREE OF DESTRUCTIONS.

21. ENSURE THE DRAIN DISCHARGES TO A STABLE OUTLET SUCH THAT SOIL EROSION WILL BE PREVENTED FROM OCCURRING. ENSURE THE DRAIN DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

MAINTENANCE

1. INSPECT ALL CATCH DRAINS AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING STORM EVENTS AND REPAIR ANY SLUMPS, BANK DAMAGE, OR LOSS OF

TREEDWARD.
2. CLOSELY INSPECT THE OUTER EDGES OF THE ROCK PROTECTION. ENSURE WATER ENTRY INTO THE ROCK-LINED AREA IS NOT CAUSING EROSION ALONG THE EDGE OF THE ROCK PROTECTION. EDGE OF THE ROCK PROTECTION. 3. CAREFULLY CHECK THE STABILITY OF THE ROCK LOOKING FOR INDICATIONS OF PIPING, SCOUR HOLES, OR BANK FAILURES.

REPLACE OR REPOSITION THE SURFACE ROCK SUCH THAT THE DRAIN FUNCTIONS AS REQUIRED AND THE DRAIN'S REQUIRED HYDRAULIC CAPACITY IS NOT

REDUCED.

5. REPLACE ANY DISPLACED ROCK WITH ROCK OF A SIGNIFICANTLY (MINIMUM 110%) LARGER SIZE THAN THE DISPLACED ROCK.

6. ENSURE SEDIMENT IS NOT PARTIALLY BLOCKING THE DRAIN. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

7. DISPOSE OF ANY SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

1. WHEN THE SOIL DISTURBANCE ABOVE THE CATCH DRAIN IS FINISHED AND THE AREA IS STABILISED, THE DRAIN AND ANY ASSOCIATED BANKS SHOULD BE

REMOVED, UNLESS IT IS TO REMAIN AS A PERMANENT DRAINAGE FEATURE.

2. DISPOSE OF ANY SEDIMENT OR EARTH IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

3. GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION 4. STABILISE THE AREA BY GRASSING OR AS SPECIFIED WITHIN THE APPROVED PLAN

MULCH FILTER BERMS

* MULCH MUST COMPLY WITH THE REQUIREMENTS OF AS4454

MAXIMUM SOLUBLE SALT CONCENTRATION OF 5DS/M.
MOISTURE CONTENT OF 30 TO 50% PRIOR TO APPLICATION.

INSTALLATION

INSTALLATION

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

2. WHEN SELECTING THE LOCATION OF A MULCH FILTER BERM, TO THE MAXIMUM DEGREE PRACTICAL, ENSURE THE BERM IS LOCATED:

TOTALLY WITHIN THE PROPERTY BOUNDARIES;

* ALONG A LINE OF CONSTANT ELEVATION (PREFERRED, BUT NOT ALWAYS PRACTICAL):

* AT LEAST 1M, IDEALLY 3M, FROM THE TOE OF A FILL EMBANKMENT

*AWAY FROM AREAS OF CONCENTRATED FLOW.

3. ENSURE THE BERM IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE BERM, OR THE UNDESIRABLE DISCHARGE OF WATER. 3. ENSURE THE BERM IS INSTALLED IN A MANIVER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE BERM, OR THE UNDESIRABLE DISCHARGE OF WA AROUND THE BERM HAS BEEN PLACED SUCH THAT PONDING UP-SLOPE OF THE BERM IS MAXIMISED.

5. ENSURE BOTH ENDS OF THE BERM ARE ADEQUATELY TURNED UP THE SLOPE TO PREVENT FLOW BYPASSING PRIOR TO WATER PASSING OVER THE BERM.

6. ENSURE 100 PER CENT CONTACT WITH THE SOIL SURFACE.

7. WHERE SPECIFIED. TAKE APPROPRIATE STEPS TO VEGETATE THE BERM.

MAINTENANCE

1 DURING THE MAINTENANCE PERIOD, INSPECT ALL BERMS AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN, MAKE NECESSARY REPAIRS IMMEDIATELY

1. DOWNING THE WANTE PROVINCE PROBLEM FOR THE BERNING AT LEAST WEEKLET AND AT THE NATH SIGNIFFICANT PARTIES. MINIBEDIATE 2.

2. REPAIR OR REPLACE ANY DAMAGED SECTIONS.

3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AREA REQUIRED OR SPECIFIED.

4. REMOYE ACCUMULATED SECIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF TOMM OR ONE-THIRD THE HEIGHT OF THE BERM.

5. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL (IF REQUIRED)

1. WHEN DISTURBED AREAS UP-SLOPE OF THE BERM ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE BERM MAY BE REMOVED.

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

3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

FABRIC DROP INLET PROTECTION

MATERIALS

INFA I EXPLAND.

FABRIC: POLYPROPYLENE, POLYAMIDE, NYLON, POLYESTER, OR POLYETHYLENE WOVEN OR NON-WOVEN REINFORCED FABRIC. THE FABRIC WIDTH SHOULD BE AT LEAST 700MM, WITH A MINIMUM UNIT WEIGHT OF 140GSM. FABRICS SHOULD CONTAIN ULTRAVIOLET INHIBITORS AND STABILISERS TO PROVIDE A MINIMUM OF 6 MONTHS OF USEABLE CONSTRUCTION LIFE (ULTRAVIOLET STABILITY EXCEEDING 70%).

FOR MIGHTIS OF GSEABLE CONSTRUCTION EITE (GETICATIOLET STABLETT EXCELSING 1879).
FABRIC REINFORCEMENT: WIRE OR STEEL MESH MINIMUM 14-GAUGE WITH A MAXIMUM MESH SPACING OF 200MM.

* STAKES: MINIMUM 1500MM2 (MIN) HARDWOOD, 2500MM2 (MIN) SOFTWOOD, OR 1 5KG/M (MIN) STEEL STAR PICKETS TIMBER CROSS MEMBERS: 50 X 100MM TIMBER OR EQUIVALENT

* AGGREGATE: 15 TO 25MM CRUSHED ROCK

1 REFER TO APPROVED PLANS FOR LOCATION AND DIMENSIONAL DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION DIMENSIONS OR 1. REFER TO APPROVED PLANS FOR LOCATION AND DIMENSIONAL 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. WHERE POSSIBLE, EXCAVATE A 200X200MM TRENCH AROUND THE INLET STRUCTURE.

4. SPACE STAKES EVENLY AROUND THE PERIMETER OF THE STORMWATER INLET AT A MAXIMUM 1M SPACING, AND SECURELY DRIVE THEM INTO THE GROUND.

5. WHERE NECESSARY, INSTALL A HORIZONTAL SPILL-THROUGH WEIR TO LIMIT THE MAXIMUM HEIGHT WATER PONDING AROUND THE STRUCTURE.

6. ENSURE THE MAXIMUM POND HEIGHT WILL NOT CAUSE A SAFETY HAZARD, INCLUDING UNDESIRABLE FLOODING OF AN ADJACENT PROPERTY OR ROADWAY.

MARGINEER PORTOR COLUMN LEVEL SERVILL TUROLOGUE MEER DAY OF AN ADJACENT PROPERTY OR ROADWAY.

WHEREVER PRACTICAL, THE SPILL-THROUGH WEIR SHOULD BE AT LEAST 300MM ABOVE GROUND LEVEL

7. IF A SPILL-THROUGH WEIR IS NOT INSTALLED, THEN FRAME THE TOP OF THE STAKES WITH HORIZONTAL CROSS MEMBERS

7. IF A SPILL-THROUGH WEIR IS NOT INSTALLED, THEN FRAME THE TOP OF THE STAKES WITH HORIZONTAL CROSS MEMBERS.
8. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS.
9. PLACE THE BOTTOM 300MM OF FABRIC IN THE EXCAVATED TRENCH.
10. SECURELY FASTEN THE FABRIC TO THE STAKES AND CROSS MEMBERS. AT THE FABRIC JOINT, OVERLAP THE FABRIC TO THE NEXT STAKE.
11. BACKFILL THE TRENCH WITH AT LEAST 200MM OF AGGREGATE OR COMPACTED SOIL. IF A TRENCH CANNOT BE EXCAVATED, LAY THE BOTTOM 300MM OF FABRIC EVENLY ON THE GROUND SURFACE AND COVER WITH A 300MM LAYER OF AGGREGATE, NOT EARTH OR SOIL.
12. WHERE REQUIRED, INSTALL A FLOW CONTROL BUND TO MAINTAIN THE SPECIFIED POOL DEPTH AND CONTROL THE MOVEMENT OF WATER.
13. TAKE ALL NECESSARY MEASURE TO MINIMISE THE SAFETY RISK CAUSED BY THE STRUCTURE AND TO PREVENT UNSAFE ENTRY INTO THE STORMWATER INSET.

1. INSPECT THE SEDIMENT TRAP AFTER EACH RUNGEE-PRODUCING RAINFALL EVENT AND MAKE REPAIRS AS NEEDED TO THE SEDIMENT TRAP AND ASSOCIATED

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

3. SEDIMENT DEPOSITS SHOULD BE REMOVED IMMEDIATELY IF THEY REPRESENT A SAFETY RIS

11. 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.

2. BRING THE DISTURBED AREA TO A PROPER GRADE, THEN SMOOTH, COMPACT AND STABILISE AND/OR REVEGETATE AS REQUIED.

GRASS FILTER STRIPS

INSTALLATION

INSTALLATION

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

2. ENSURE ALL NECESSARY SOIL TESTING (E.G. SOIL PH, NUTRIENT LEVELS) HAS BEEN COMPLETED, AND REQUIRED SOIL ADJUSTMENTS PERFORMED, PRIOR TO PLANTING.

3 REMOVE ALL OBJECTIONABLE MATERIAL FROM THE AREA TO BE TUREED. 4. ALL TURE SHOULD BE USED WITHIN 12-HOURS OF DELIVERY, OTHERWISE ENSURE THE TURE IS STORED IN CONDITIONS APPROPRIATE FOR THE WEATHER

CONDITIONS.
5. MOISTENING THE TURF AFTER IT IS UNROLLED WILL HELP MAINTAIN ITS VIABILITY.
6. TURF SHOULD BE LAID ON A MINIMUM 75MM BED OF ADEQUATELY FERTILISED TOPSOIL. RAKE THE SOIL SURFACE TO BREAK THE CRUST JUST BEFORE LAYING.

7. ENSURE THE TURF IS NOT LAID ON GRAVEL, HEAVILY COMPACTED SOILS, OR SOILS THAT HAVE BEEN RECENTLY TREATED WITH HERBICIDES 8. ENSURE THAT INTIMATE CONTACT IS ACHIEVED AND MAINTAINED BETWEEN THE TURF AND THE SOIL SUCH THAT SEEPAGE FLOW BENEATH THE TURF IS

9. IF THE FILTER STRIPS ARE REQUIRED TO BE PLACED ALONG THE CONTOUR, THEN ENSURE EACH ROW OF TURF IS PLACED ALONG A LINE OF CONSTANT LAND 19. IF THE LECTION OF A LEGISLATION OF THE LAND SLOPE (I.E. SUCH THAT UP-SLOPE RUNOFF WILL BE DEFLECTED ALONG THE UPPER EDGE OF THE FILTER STRIPS ARE PLACED AT AN ANGLE TO THE LAND SLOPE (I.E. SUCH THAT UP-SLOPE RUNOFF WILL BE DEFLECTED ALONG THE UPPER EDGE OF THE FILTER STRIP. THE TURP, THE LATERAL STRIPS OF TURF MUST BE PLACED AT MAXIMUM 5M INTERVALS AND EXTENDING AT LEAST 400MM UP-SLOPE OF THE FILTER STRIP. 11. WATER UNTIL THE SOIL IS WET 100MM BELOW THE TURF. THEREAFTER, WATERING SHOULD BE SUFFICIENT TO MAINTAIN AND PROMOTE HEALTHY GROWTH.

MAINTENANCE 1. INSPECT THE GRASS FILTER STRIPS AFTER EACH RUNOFF EVENT. CHECK FOR EVIDENCE OF CONCENTRATED RILL-FORMING FLOW ALONG THE UPPER EDGE

OF THE TOWN.

2. IF EXCESSIVE EXCISION IS OCCURRENTIAL CLIPIED OF STORE EDGE OF THE UNIT, THEN FLICE ADDITIONAL DIRECTION OF THIRS. ILLEWIND INTERNAL CLIPIED OF THE UNIT, THE UNIT OF THIRD OF THE UNIT OF THIRD OF THE UNIT OF THIRD OF

FIBRE ROLLS

MATERIALS

FIBRE ROLLS: TYPICALLY 200 TO 250MM JUTE, COIR OR STRAW ROLL TIED WITH SYNTHETIC OR BIODEGRADABLE MESH.
*STAKES: MINIMUM 20 BY 20MM TIMBER STAKES.

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. WHEN PLACED ACROSS NON-VEGETATED OR NEWLY SEEDED SLOPES, THE ROLLS MUST BE PLACED ALONG THE CONTOUR.
3. IF PLACED ON OPEN OR LOOSE SOIL, ENSURE THE FIBER ROLLS ARE TRENCHED 75 TO 125MM IN SANDY SOILS AND 50 TO 75MM IN CLAYEY SOILS.

4. ENSURE THE OUTER MOST ENDS OF THE FIBRE ROLL ARE TURNED UP THE SLOPE TO ALLOW WATER TO ADEQUATELY POND UP-SLOPE OF THE ROLL, AND TO

MINIMISE ELOW RYPASSING

3. THE BIODEGRADABLE CONTENT OF THE STRAW ROLLS MAY NOT NECESSARILY NEED TO BE REMOVED FROM THE SITE

MINIMISE FLOW BYPASSING.
5. WHEN PLACED ACROSS THE INVERT OF MINOR DRAINS, ENSURE THE SOCKS ARE PLACED SUCH THAT:
(1) THE CREST OF THE DOWNSTREAM ROLL IS LEVEL WITH THE CHANNEL INVERT AT THE IMMEDIATE UPSTREAM SOCK (IF ANY);
(II) EACH ROLL EXTENDS UP THE CHANNEL BANKS SUCH THAT THE CREST OF THE FIBRE ROLL AT ITS LOWEST POINT IS LOWER THAN THE GROUND LEVEL AT

EITHER END OF THE ROLL.
6. ENSURE THE ANCHORING STAKES ARE DRIVEN INTO THE END OF EACH ROLL AND ALONG THE LENGTH OF EACH ROLL AT A SPACING NOT EXCEEDING 1.2M OR SIX TIMES THE ROLL DIAMETER, WHICHEVER IS THE LESSER, A MAXIMUM STAKE SPACING OF 0.3M APPLIES WHEN USED TO FORM CHECK DAMS

7. ADJOINING ROLL MUST BE OVERLAP AT LEAST 450MM, NOT ABUTTED.

MAINTENANCE I. INSPECT ALL FIBRE ROLLS PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING STORMS OR OTHERWISE AT WEEKLY INTERVALS.

2. REPAIR OR REPLACE DAMAGED FIBRE ROLLS.

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

1. ALL EXCESSIVE SEDIMENT TRAPPED BY THE ROLLS MUST BE REMOVED FROM THE DRAIN OR SLOPE IF SUCH SEDIMENT IS LIKELY TO BE WASHED AWAY BY EXPECTED FLOWS.

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

INFORMATION ON DEVICES SHOWN ON THIS DRAWING SOURCED

4. ALL SYNTHETIC (PLASTIC) MESH OR OTHER NON READILY BIODEGRADABLE MATERIAL MUST BE REMOVED FROM THE SITE ONCE THE SLOPE OR DRAIN IS STABILISED, OR THE ROLLS HAVE DETERIORATED TO A POINT WHERE THEY ARE NO LONGER PROVIDING THEIR INTENDED DRAINAGE OR SEDIMENT CONTROL

A 12.04.22 FOR APPROVAL Des. Verif. Appd. Development Permit: DP19/0050

Defence Housing Australia

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Cardno (NT) Ptv Ltd | ABN 78 078 713 934 Level 6, 93 Mitchell Street Darwin NT 0800 Tel: 08 8942 8200 Fax: 08 8942 8211

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FROM IECA(2008) BOOK 6 - STANDARD DRAWINGS.

CHECK DAM SEDIMENT TRAP

MATERIALS

* ROCK: 150 TO 300MM EQUIVALENT DIAMETER, HARD, EROSION RESISTANT ROCK.

* SANDBAGS: GEOTEXTILE BAGS (WOVEN SYNTHETIC, OR NON-WOVEN BIODEGRADABLE) FILLED WITH CLEAN COARSE SAND, CLEAN AGGREGATE, OR COMPOST

INSTALLATION (ROCK CHECK DAM)

INSTALLATION (NOOR GITLOR DAW)

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

2. PRIOR TO PLACEMENT OF THE SEDIMENT TRAP, ENSURE THE DRAINAGE CHANNEL IS DEEP ENOUGH TO PREVENT WATER BEING UNSAFELY DIVERTED OUT OF THE DRAIN ONCE THE CHECK DAMS ARE INSTALLED.

3. LOCATE EACH CHECK DAM SEDIMENT TRAP AS DIRECTED WITHIN THE APPROVED PLANS, OR OTHERWISE AT SUCH A SPACING TO ACHIEVE THE REQUIRED

3. LOCATE EACH CHECK DAM SEDIMENT TRAP AS DIRECTED WITHIN THE APPROVED PLANS, OR OTHERWISE AT SUCH A SPACING TO ACHIEVE THE REQUIRED SEDIMENT TRAPPING OUTCOMES.

4. IF THE CHECK DAMS ARE ALSO BEING USED TO CONTROL EROSION WITHIN THE DRAINAGE CHANNEL, THEN LOCATE EACH SUCCESSIVE CHECK DAM SUCH THAT THE CREST OF THE IMMEDIATE DOWNSTREAM DAM IS LEVEL WITH THE CHANNEL INVERT AT THE IMMEDIATE UPSTREAM CHECK DAM.

5. CONSTRUCT EACH CHECK DAM TO THE DIMENSIONS AND PROFILE SHOWN WITHIN THE APPROVED PLAN.

6. WHERE SPECIFIED, THE CHECK DAMS MUST BE CONSTRUCTED ON A SHEET OF GEOTEXTILE FABRIC USED AS A DOWNSTREAM SPLASH PAD.

7. EACH CHECK DAM MUST BE EXTENDED UP THE CHANNEL BANK (WHERE PRACTICABLE) TO AN ELEVATION AT LEAST 150MM ABOVE THE CREST LEVEL OF THE

1. INSPECT EACH CHECK DAM AND THE DRAINAGE CHANNEL AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL

1. INSPECT EACH CHECK DAM AND THE DRAINAGE CHANNEL AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.
2. CORRECT ALL DAMAGE IMMEDIATELY. IF GIGNIFICANT EROSION OCCURS BETWEEN ANY OF THE CHECK DAMS, THEN CHECK THE SPACING OF THE DAMS AND WHERE NECESSARY INSTALL INTERMEDIATE CHECK DAMS OR A SUITABLE CHANNEL LINER.
3. CHECK FOR DISPLACEMENT OF THE CHECK DAMS.
4. CHECK FOR SOIL SCOUR AROUND THE ENDS OF EACH CHECK DAM. IF SUCH EROSION IS OCCURRING, CONSIDER EXTENDING THE WIDTH OF THE CHECK DAM TO AVOID SUCH PROBLEMS.
5. IF SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.
5. PE SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.
5. PE SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.
5. PE SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.
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5. PE SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.
5. PE SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.
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5. PE SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.
5. PE SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.
5. PE SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SECRE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SECRE SOIL EROSION OCCURS EITHER UNDER OR AROUND

DE-SILT SEDIMENT TRAP IF THE SEDIMENT LEVEL EXCEEDS 1/3 THE CREST HEIGHT.
 DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

1. WHEN CONSTRUCTION WORK WITHIN THE DRAINAGE AREA ABOVE THE CHECK DAMS HAS BEEN COMPLETED AND DISTURBED AREAS SUFFICIENTLY

1. WHICH CONSTRUCTION WORK WITHIN THE OFFICIANCE MEAR ADVECTIFE OFFICE DURING THE COMPITALE COMPITALE AND DISTORED AREA STABILISED TO RESTRAIN EROSION, THE DAMS MUST BE REMOVED, UNLESS THE SEDIMENT TRAPS ARE TO REMAIN AS A PERMANENT FEATURE.

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

3. REMOVE AND APPROPRIATELY DISPOSE OF ALL MATERIALS INCLUDING ANY GEOTEXTILE FABRIC.

4. STABILISE THE DISTURBED CHANNEL WITH A LINING OF FABRIC AND ROCK, OR ESTABLISH VEGETATION AS APPROPRIATE.

KERB INLET TRAP - SAG INLETS

INSTALLATION

IND I ALLA I IUN

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.

LINEESS 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

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

MAINTENANCE

- INATIVE TEMPORE

 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.

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.

KERB INLET TRAP - ON-GRADE

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

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 UNDESINABLE 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 SUPPERVISOR.

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

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

- 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.

ROCK FILTER DAM

FOR INSTALLATION, MAINTENANCE AND REMOVAL NOTES REFER TO STANDARD DRAWING SD-RED-02

LEVEL SPREADERS

INSTALLATION

- IND TALLATION

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

 2. WHEREVER PRACTICAL LOCATE THE LEVEL SPREADER ON UNDISTURBED, STABLE SOIL.

 3. ENSURE FLOW DISCHARGING FROM THE LEVEL SPREADER WILL DISPERSE ACROSS A PROPERLY STABILISED SLOPE NOT EXCEEDING 10:1 (H-V) AND SUFFICIENTLY EVEN IN GRADE ACROSS THE SLOPE TO AVOID CONCENTRATING THE OUTFLOW.

 4. THE OUTLET SILL OF THE SPREADER SHOULD BE PROTECTED WITH EROSION CONTROL MATTING TO PREVENT EROSION DURING THE ESTABLISHMENT OF

- 4. THE OUTLET SILL OF THE SPREADER SHOULD BE A MINIMUM OF IZONOM WITH EXCISION CONTROL MAY INIGIT TO PREVENT BEROSION DURING THE ESTABLISHMENT OF VEGETATION. THE MATTING SHOULD BE A MINIMUM OF IZONOM WIDE EXTENDING AT LEAST 300MM UPSTREAM OF THE EDGE OF THE OUTLET CREST AND BURIED AT LEAST 150MM IN A VERTICAL TRENCH. THE DOWNSTREAM EDGE SHOULD BE SECURELY HELD IN PLACE WITH CLOSELY SPACED HEAVY-DUTY WIRE STAPLES AT LEAST 150MM LONG.

 5. ENSURE THAT THE OUTLET SILL (CREST) IS LEVEL FOR THE SPECIFIED LENGTH.

 6. IMMEDIATELY AFTER CONSTRUCTION, TURF, OR SEED AND MULCH WHERE APPROPRIATE, THE LEVEL SPREADER.

1. INSPECT THE LEVEL SPREADER AFTER EVERY RAINFALL EVENT UNTIL VEGETATION IS ESTABLISHED.

2. AFTER ESTABLISHMENT OF VEGETATION OVER THE LEVEL SPREADER, INSPECTIONS SHOULD BE MADE ON A REGULAR BASIS AND AFTER RUNOFF-PRODUCING RAINFALL.

3. ENSURE THAT THERE IS NO SOIL EROSION AND THAT SEDIMENT DEPOSITION IS NOT CAUSING THE CONCENTRATION OF FLOW.

4. ENSURE THAT THERE IS NO SOIL EROSION OR CHANNEL DAMAGE UPSTREAM OF THE LEVEL SPREADER, OR SOIL EROSION OR VEGETATION DAMAGE DOWNSTREAM OF THE LEVEL SPREADER.

5. INVESTIGATE THE SOURCE OF ANY EXCESSIVE SEDIMENTATION.

6. MAINTAIN GRASS IN A HEALTH CONDITION WITH NO LESS THAN 90% COVER UNLESS CURRENT WEATHER CONDITIONS REQUIRE OTHERWISE.

7. GRASS HEIGHT SHOULD BE MAINTAINED AT A MINIMUM 50MM BLADE LENGTH WITHIN THE LEVEL SPREADER AND DOWNSTREAM DISCHARGE AREA, AND A MAXIMUM BLADE LENGTH NO GREATER THAN ADJACENT GRASSES.

1. TEMPORARY LEVEL SPREADERS SHOULD BE DECOMMISSIONED ONLY AFTER AN ALTERNATIVE STABLE OUTLET IS OPERATIONAL, OR WHEN THE INFLOW

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

2. REMOVE OULECTIED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THA 3. REMOVE AND APPROPRIATELY DISPOSE OF ANY EXPOSED GEOTEXTILE. 4. GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION. 5. STABILISE THE AREA AS SPECIFIED ON THE APPROVED PLAN.

WIND BUFFER CLEARING

METHODOLOGY

ME I HODOLOGY

1. REFER TO APPROVED PLANS FOR EXTENT OF CLEARING.
2. ALL SMALL TREES, SHRUBS AND LONG GRASS TO BE REMOVED.
3. TALL TREES ARE TO BE REMOVED, WITH THE EXCEPTION OF UP TO 10% TREE COVERAGE AS SHOWN IN NOMINAL LOCATIONS ON DWG No.

DC1603-2CRU-01-ES06 & ES08 OR AS DIRECTED BY SUPERINTENDENT AFTER CONSULTATION WITH DEPWS.

4. EXISTING GROUND TO BE GRADED TO AVOID PONDING OF STORMWATER AND TOP SOILED WITH NATURAL MATERIAL CONTAINING NATURAL GRASSES.

5. UNDISTURBED GRASSED AREAS ARE TO BE SLASHED.

MAINTENANCE

IN INSPECT AND REPLENISH MULCH POST WET SEASON UNTIL AREA IS DEVELOPED OR NATURAL GRASSIGROUNDCOVER IS ESTABLISHED.
2. NATURAL GRASS AND GROUNDCOVER RE-GROWTH IS ENCOURAGED TO AID IN EROSION CONTROL. SLASH / MAINTAIN TO LOW HEIGHT.

WIND BUFFER AREA WILL BE REPLACED WITH RURAL RESIDENTIAL LOTS AND A STABILISED DETENTION BASIN DURING FUTURE STAGE WORKS.

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INFORMATION ON DEVICES SHOWN ON THIS DRAWING SOURCED

FROM IECA(2008) BOOK 6 - STANDARD DRAWINGS.

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