

APPENDIX E

Erosion and Sediment Control Plan

BEETALOO BASIN EXPLORATION PROJECT

Erosion and Sediment Control Plan

EP 76, EP 98 and EP 117

This document outlines the basic principles for contractors to develop site specific erosion and sediment control plans for Beetaloo Basin Exploration Program.

Revisions

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1	28/06/2019	Revised based on comments received by DEPWS	A.Court/J.Jentz	M.Hanson
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CPESC Review

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1 Introduction

This Erosion and Sediment Control Plan (ESCP) has been developed to ensure best practice erosion and sediment controls are implemented during Tamboran's¹ exploration activities within EP 76, EP 98 and EP 117, to avoid or minimise and control erosion and offsite impacts, such as sedimentation of waterways.

This ESCP has been developed to provide direction for Tamboran and contractors to implement erosion and sediment control (ESC) during construction of the well pads and associated infrastructure, the Sturt Plateau Compression Facility (SPCF), sand wash plant, worker camps and access tracks, seismic lines as well as during ongoing maintenance and monitoring once sites are established. This ESCP has been updated to include proposed Shenandoah South 3D Seismic Program (SS 3D Seismic Program) and Shenandoah South Sand Wash Plant (SWP) which are located in the Shenandoah South E&A area on EP98 and EP117.

The design of the exploration well pads, SWP, SPCF, seismic lines and access tracks comply with Northern Territory (NT) and local government statutory laws and regulations and are to be designed to meet all relevant and applicable codes and standards. This ESCP has been developed in accordance with the following guidelines:

- Code of Practice for Petroleum Activities in the Northern Territory (DEPWS & DITT, 2019)
- Best Practice Erosion and Sediment Control (IECA, 2008)
- Land Clearing Guidelines (DEPWS, 2024)
- Erosion and Sediment Control Guidelines for Rural Development Environment Fact Sheet (DLRM, 2018).

The location of the proposed exploration activities are shown on Figure 1.

Please note the following Northern Territory Government (NTG) Department name changes for the regulation of Onshore Petroleum activities in the NT:

- The Department of Environment, Parks and Water Security (DEPWS) is now referred to as Department of Lands, Planning and Environment (DLPE).
- The Department of Industry, Tourism and Trade (DITT) is now referred to as Department of Mining and Energy (DME).

¹ Including its subsidiaries.

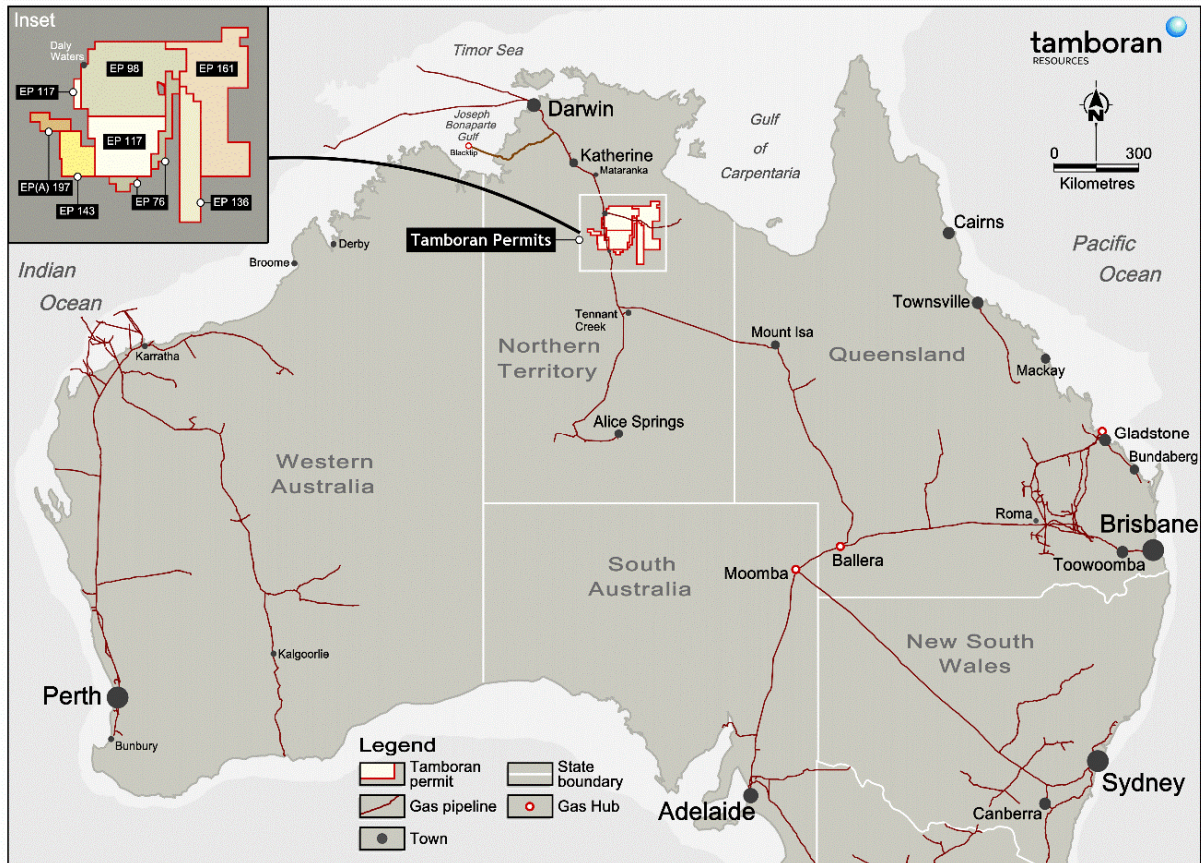


Figure 1: Location of Tamboran exploration permit areas (EPs)

2 Project Context

This plan covers all civil, seismic acquisition, well drilling, stimulating, rehabilitation and routine maintenance/monitoring activities undertaken by Tamboran, its subsidiaries and their contractors within permit EP76, EP98 and EP117 as detailed in Table 1, Table 2 and shown in Figure 2.

Table 1: ESCP infrastructure per Beetaloo Exploration EMP

EMP	EP	Well pad(s)	Camp(s)	Helipad	Seismic line(s)	Access track(s)	Gravel pit(s)	Gathering lines	Other
Beetaloo W-1 EP 117 EMP (ORI8-2) Doc #: NT-2050-15-MP-039	117	X	X	–	–	X	X	–	–
Kalala S1 EMP (ORI9-2) Doc #: NT-2050-MP-040	98	X	X	X	–	X	X	–	–
Beetaloo Sub-basin Multiwell Drilling, Stimulation & Well Testing Program EMP (ORI10-3) Doc #: NT-2050-15-MP-041	76 & 98	X	X	X	–	X	X	–	–
Amungee NW Delineation Program EMP (ORI11-3) Doc #: NT-2050-15-MP-0088	98	X	X	X	X	X	X	–	–
Shenandoah South E&A program EMP (TAM1-3) Doc #: B2-HSE-MP-08	98 & 117	X	X	X	X	X	X	X	–
Sturt Plateau Compression Facility - Appraisal Gas EMP (TAM2-3) Doc #: TB2-HSE-MP-13	98 & 117	–	X	–	–	–	–	X (between SS2 wells and SPCF)	X SPCF pad Fence line
Shenandoah South 3D Seismic EMP (TAM3-2) Doc #: TB2-HSE-MP-14	98 & 117	–	–	–	X	–	–	–	–
Shenandoah South Sand Wash Plant EMP (TAM4-2) Doc #: TB2-HSE-MP-028	117	–	–	–	–	–	–	–	X SWP

Table 2: Coordinates of centroid 2D seismic and exploration well sites

INFRASTRUCTURE	COORDINATES (Zone 53)			
	Start of line		End of line	
	Lat	Long	Lat	Long
Amungee delineation area seismic lines (EP 98) - EMP ORI11-3				
001-SR	-16.32434	133.82875	-16.39386	133.89996
002-SR	-16.32112	133.85894	-16.35325	133.89186
003-SR	-16.34104	133.87802	-16.39438	133.93218
004-SR	-16.36162	133.93763	-16.41430	133.99165
005-SR	-16.34667	133.95114	-16.39806	134.00384
006-SR	-16.37223	133.86042	-16.37795	134.00306
007-SR	-16.34267	133.88364	-16.34584	133.88032
008-SR	-16.34459	133.88562	-16.34777	133.88229
009-SR	-16.34652	133.88759	-16.34970	133.88427
010-SR	-16.34845	133.88957	-16.35163	133.88624
Shenandoah South E&A 2D Seismic Lines (EP 117 and EP 98) – EMP TAM1-3				
Shenandoah South Line A	-16.83863	133.47175	-16.92103	133.55480
Shenandoah South Line B	-16.83284	133.48508	-16.91394	133.56735
Shenandoah South Line C	-16.81729	133.50872	-16.89536	133.58758
Shenandoah South E&A Gathering Lines (EP 117 and EP 98) – EMP TAM1-3				
Shenandoah South B to Shenandoah South C (~4.11 km) – EMP TAM1-3				
Start – Shenandoah South B pad	345035	8135461	–	
Intersection to existing track	345046	8134499		
Intersection to Shenandoah South C	343442	8134573		
End – Shenandoah South C pad	–		343471	8133331

Kyalla 117 N2 to Shenandoah South 2 (~4.5 km) – EMP TAM1-3 and EMP TAM2-3				
Start – Kyalla 117 N2 pad	356274	8137505	–	
Intersection to existing track	356189	8137509		
Intersection to Shenandoah South 2	356205	8140071		
End – Shenandoah South 2 pad	–		355060	8141514
Shenandoah South 3D Seismic Program (EP 98 and EP 117) – EMP TAM3-2				
1	343278	8146979	354493	8153454
2	343528	8146546	354743	8153021
3	343778	8146113	354993	8152588
4	344028	8145680	355243	8152155
5	344278	8145247	355493	8151722
6	344528	8144814	355743	8151289
7	344778	8144381	355993	8150856
8	345028	8143948	356243	8150423
9	345300	8143527	356493	8149990
10	345550	8143094	356743	8149557
11	337573	8137911	356993	8149124
12	337823	8137478	357243	8148691
13	338073	8137045	357493	8148258
14	338323	8136612	357743	8147825
15	338573	8136179	357993	8147392
16	338823	8135746	358243	8146959
17	339073	8135313	358493	8146526
18	339323	8134880	358743	8146093
19	339573	8134447	358993	8145660
20	339823	8134014	359243	8145227
21	340073	8133581	359493	8144794
22	340323	8133148	359743	8144361
23	340594	8132728	359993	8143928
24	340844	8132295	360243	8143495
25	341094	8131862	360493	8143062
26	341344	8131429	360743	8142629
27	341594	8130996	360993	8142196
28	341844	8130563	361243	8141763
29	350408	8134930	361493	8141330

30	351416	8134934	361743	8140897
31	352424	8134938	361993	8140463
32	353431	8134943	362243	8140030
33	354439	8134947	362493	8139597
34	355447	8134952	362743	8139164
35	356455	8134956	362993	8138731
36	357484	8134973	363243	8138298
37	358492	8134978	363493	8137865
38	359500	8134982	363743	8137432
39	360507	8134987	363993	8136999
40	361515	8134991	364243	8136566
41	362523	8134996	364493	8136133
42	363531	8135000	364743	8135700
Well sites, SPCF, access track and gravel pit reference	Coordinates (approximate)			
	Zone	Easting	Northing	
Amungee NW	53	415515	8180683	
Amungee NW-2	53	381039	8192324	
Amungee NW-3	53	375512	8195308	
Amungee NW-4	53	376611	8193100	
Amungee NW-5	53	390313.6	8187337	
Kalala S1	53	351740	8198030	
Velkerri 76 S2	53	435488	8136321	
Kyalla 117 N2	53	356175	8137500	
Beetaloo W (Kyalla 117 W1)	53	368312	8106695	
Shenandoah S2	53	355291	8140676	
Shenandoah S B	53	345035	8135464	
Shenandoah S C	53	343471	8133330	
Shenandoah N A	53	356687	8163762	
Sturt Plateau Compression Facility	53	355195	8141324	
Shenandoah Sand Wash Plant	53	355995	8137514	

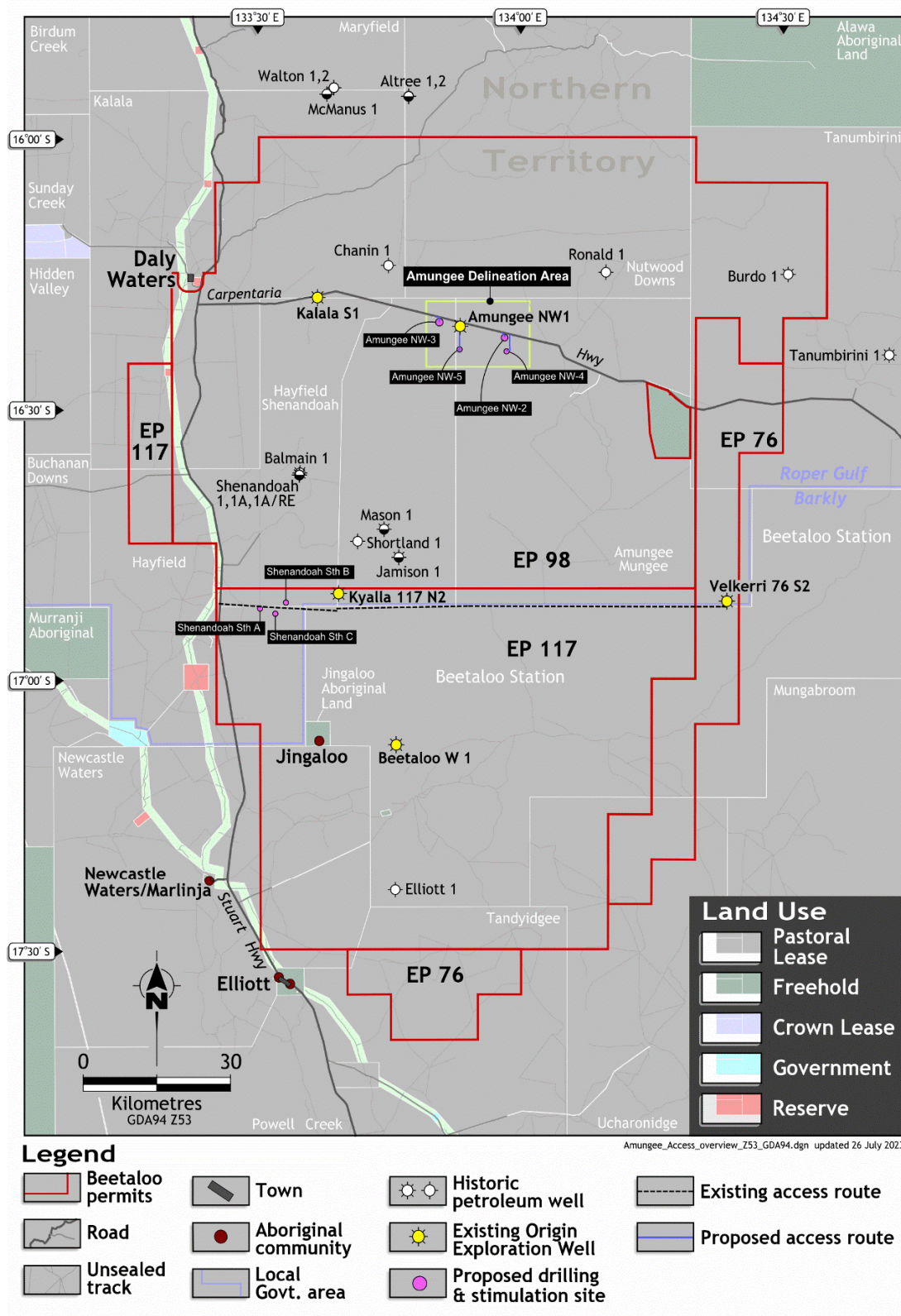


Figure 2: Location of Tamboran's exploration well sites and existing infrastructure

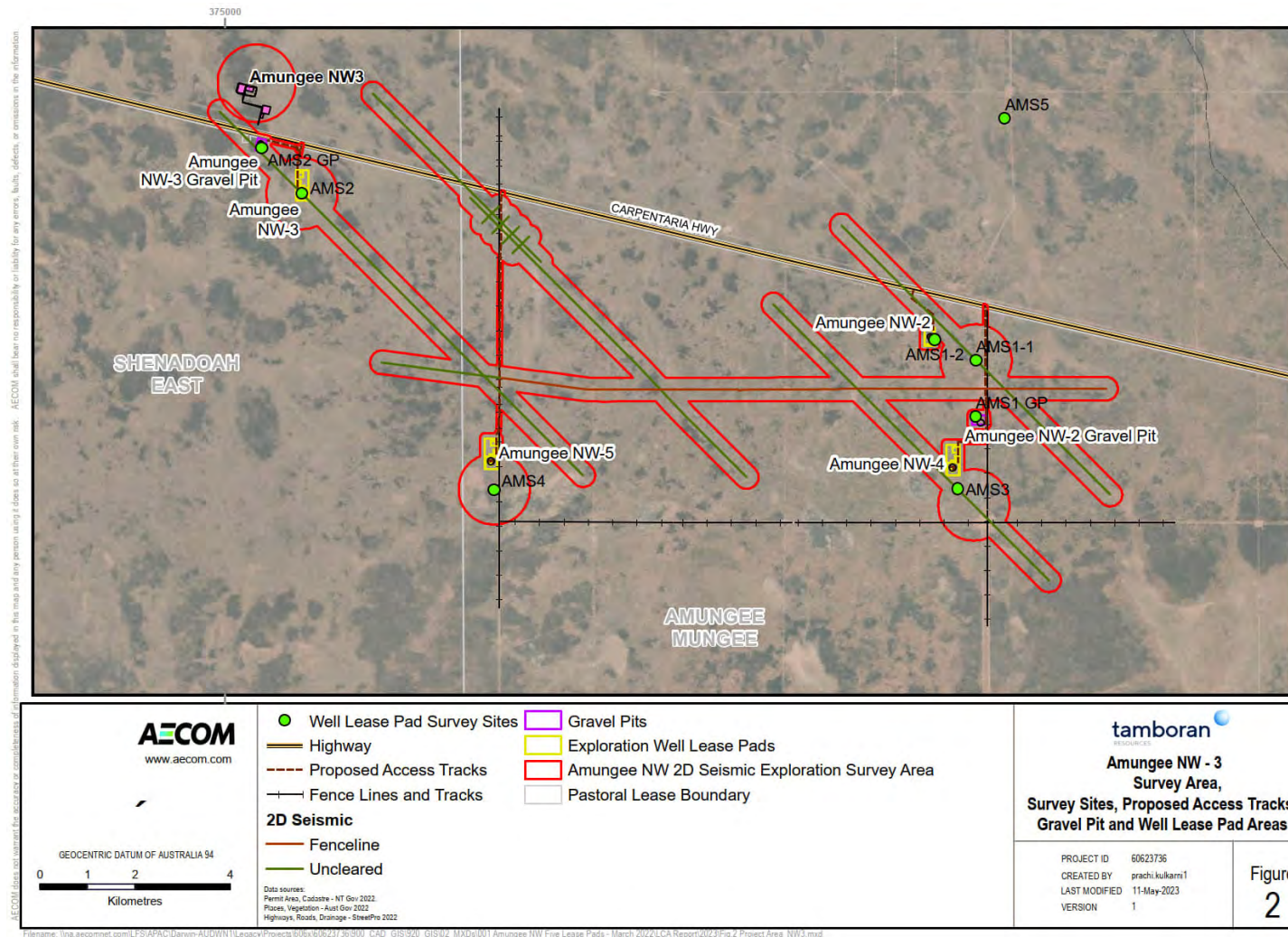


Figure 3: Location of Amungee seismic survey areas

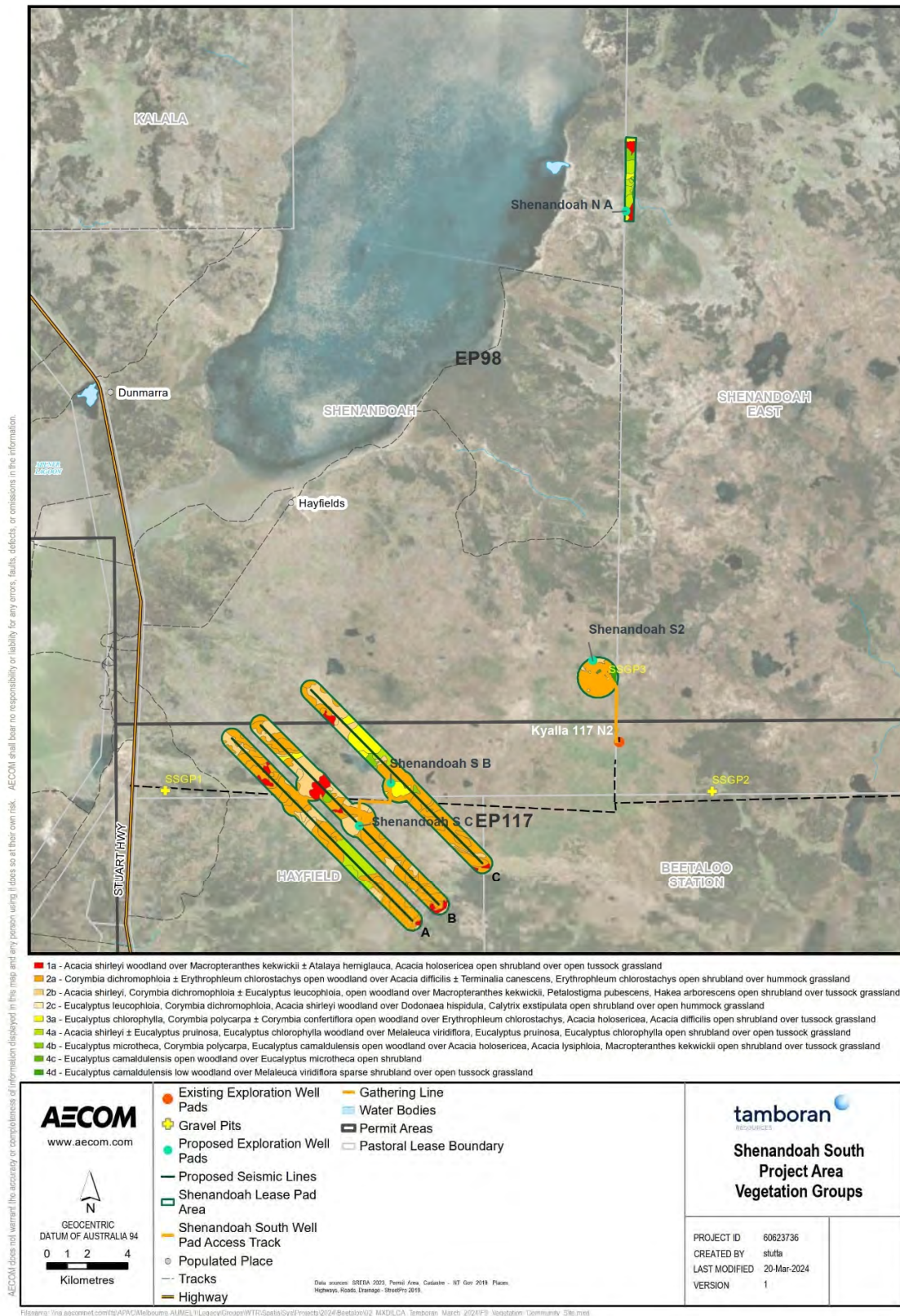


Figure 4: Location of Shenandoah South E&A (includes vegetation communities)

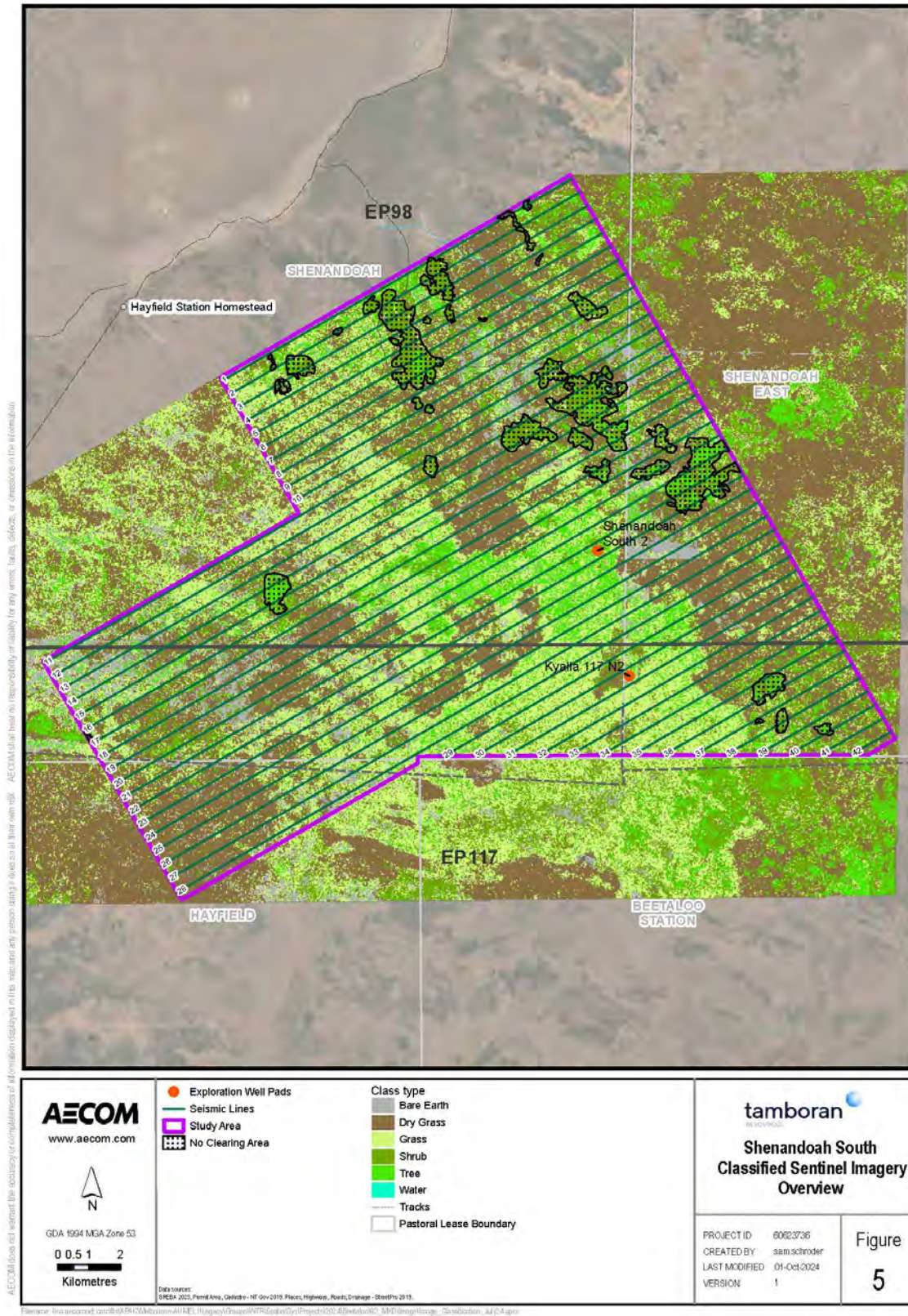


Figure 5: Location of Shenandoah South 3D seismic program

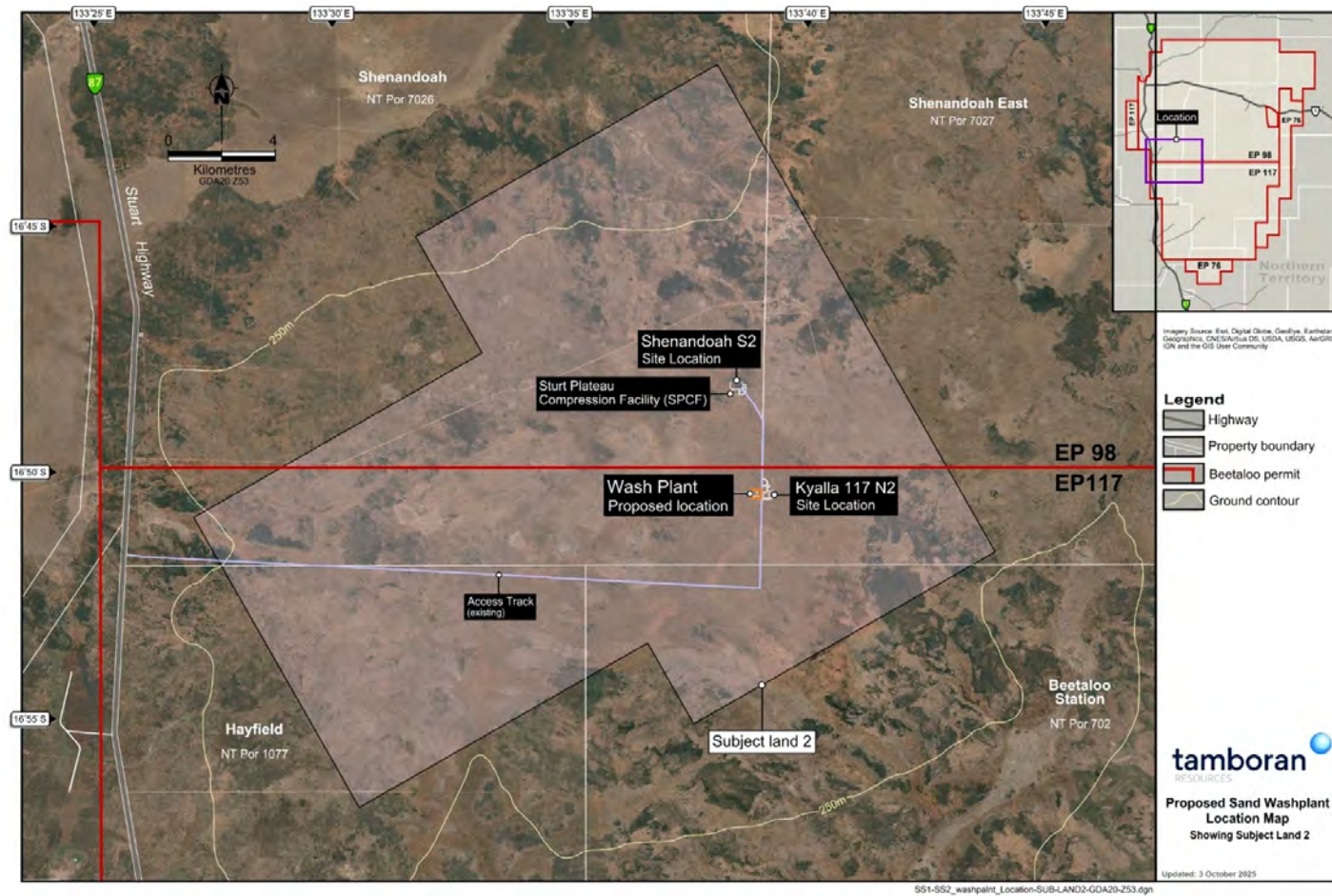


Figure 6: Location of Shenandoah South Sand Wash Plant

The primary activities subject to this ESCP are:

- Construction and or ongoing maintenance of exploration well pads, SPCF pad, SWP pad, camp pads, stockpile areas, helipad and wet weather storage area.
- Minor intersection upgrade works at the intersection with the Stuart Highway and Carpentaria Highway in accordance with Road Agency approval and Permit to Work within NT Government road reserves.
- 2D and 3D seismic line preparation, data collection and rehabilitation.
- Installation of gathering lines between well pads
- Construction and ongoing maintenance of access tracks.
- Gravel extraction, as required, for construction and maintenance of drill pads and sections of the access tracks.
- All other activities ancillary to the seismic survey and drilling, stimulation and well testing of an exploration well.

2.1 Legislation

The activities outlined within the EMP, which this management sub-plan is a component of, aim to comply with relevant guidelines associated with exploration activities, such as International Erosion Control Association (IECA) *Best Practice for Erosion and Sediment Control* (2008), *IECA Appendix P: Land Based Pipeline Construction December 2015* (Addendum to IECA 2008), the *Australian Pipeline Industry Association Code of Environmental Practice for Onshore Pipelines 2017* and the [Code of Practice for Onshore Petroleum Activities in the Northern Territory 2019](#) (the Code).

2.1.1 Code of Practice for Onshore Petroleum Activities in the Northern Territory 2019

The [Code](#) is a mandatory code of practice for the petroleum industry to ensure that petroleum activities in the Northern Territory are managed according to minimum acceptable standards to ensure that risks to the environment can be managed to a level that is as low as reasonably practical (ALARP) and acceptable.

Under these regulations, Tamboran is required to submit an EMP prior to any petroleum exploration or production activity. The EMP for a petroleum activity must include a primary ESCP outlining all activities. This should be developed by a suitably qualified person in accordance with relevant guidelines including specific environmental outcomes and environmental performance standards to be included in the implementation strategy in the EMP. The ESCP must include:

- A risk assessment in relation to the potential impact to the environment from erosion and sedimentation associated with the proposed activities. Including an assessment of site-specific conditions and the nature and timing of works with the NT Land Clearing Guidelines (DEPWS, 2024) website and any amendments.
- Where the Primary ESCP requires it, a further ESCP must be developed by a suitably qualified person in relation to the relevant matters identified in the Primary ESCP and implemented by the interest holder.
- Road and pipeline designs must:
 - minimise erosion of exposed road surfaces and drains
 - ensure that roads and pipeline surface water flow paths minimise erosion of all exposed surfaces and drains

- comply with legislative requirements.
- The requirements of the Land Clearing Guidelines 2024 as published on the DLPE website and amended from time to time must be complied with in relation to protection of natural waterways as a result of land disturbance and ensure the following:
 - appropriate buffers are implemented around natural waterways
 - disturbance in the wet season is minimised
 - the number of crossing points is minimised
 - crossings are established as close as practicable to right angles to the waterway
 - material changes in the shape of the waterway are avoided
 - material changes in the volume, speed or direction of flow or likely flow of water in the waterway are avoided
 - alteration to the stability of the bed or banks of the waterway (including by removal of vegetation) is avoided
 - erosion risk, sedimentation and pollution of waterways is minimised through the appropriate design and implementation of best practice erosion and sediment control measures.

3 Aims and Objectives

The ESCP aims to:

- Address key soil and water management issues, including legislative and client requirements.
- Determine the “Type” of ESC to be implemented during construction, post construction and until exploration activities are completed.
- Where practical identify, eliminate and reduce hazards and associated risks inherent in specific work activities, which if untreated could lead to a diminished product or create the potential for an accident, dangerous occurrence or environmental incident.

The objective of this ESCP is to manage Tamboran’s activities within the EP in a manner that minimises the impacts upon soil, vegetation and surface water which may result from soil disturbance activities including seismic line preparation, land clearing associated with well pad establishment.

This ESCP may be amended as required, in response to the monitoring and maintenance programs described herein to avoid significant and/or sustained deterioration in downstream water quality. Standard drawings are provided as a guide, with the construction supervisor and Tamboran engineers making final determination on site.

Strategies shall be developed, implemented and reviewed on a regular basis, so that risks are identified, measured and recorded throughout the course of the project.

Due to potential chance for activities to lead up to the wet season, wet weather contingencies have been identified in this plan and the overarching EMP (BOM, 2012). It is anticipated that due to the known ground conditions across the region, ground conditions following rainfall events can make access impossible. The primary mitigation will be to monitor weather forecasts daily during the program and where rainfall is likely to result in an event that has potential to limit access, the subcontractor will stabilise the current work areas and go into standby mode until such time can assess the track conditions to recommence activities.

Further strategies will be developed, implemented and reviewed on a regular basis so that risks are identified, measured and recorded throughout the course of exploration activities. Any significant changes to the ESCP will be subject to review and approval by the Department of Lands, Planning and Environment (DLPE) Land Management Team.

3.1 Compliance with IECA Guideline

The ESCP has been prepared by suitably qualified and experienced personnel that understand the intent and minimum standards of IECA. The team that prepared the plan consist of the following:

- Alana Court – BEnvSci, PGDipEnvMgt. Senior Environmental Manager with over 24 years' experience. Alana completed the IECA erosion and sediment control training (2013) and is experienced in providing advice to managing environmental requirements in the Beetaloo Sub-Basin including erosion and sediment control for the past 20 years.
- James Jentz – BEng, RPEQ, CPEng. Civil Engineer with over 30 years' experience in the design and documentation of civil engineering projects. James has signed off all civil drawings under his qualification.

4 Civil Construction Schedule

The exploration schedule for Tamboran's activities will primarily occur from May each year extending into September while rainfall risk rating is considered very low (0 to 30 mm).

Implementation of the ESCP will commence as soon as access is granted and continue throughout the exploration activities until such time that the site is stabilised.

If exploration activities continue through to the wet season, Tamboran will implement the wet weather contingency planning. Planning will occur during August – September and will be implemented between 1 October to 30 April, based on the rainfall erosion risk rating identified in Section 5.1.

Wet weather contingency planning includes the following actions:

- Tamboran to review program schedule to determine what activities will extend into the wet season.
- Undertake inspections of all assets to ensure appropriate ESC in place and are functional before 1 October each year.
- Conduct maintenance on all ESC established onsite before 1 October each year.
- Complete a stocktake on available ESC equipment on site, and where required purchase new equipment before the 1 October each year.

5 Permit Area Erosion Susceptibility

Erosion susceptibility varies throughout the Tamboran permit area, dependent upon the soil types, slope and extent of ground disturbance. Apart from the erosive impact of climatic conditions, soil erosion is influenced mainly by the inherent properties of the soils and the processes which occurred during the formation of the landscapes.

Erosion will occur in the permit area if the land is used beyond its capacity, as is seen if land is overstocked or vehicle movements not controlled, for example. The locations of the exploration well sites for Tamboran have been examined in the field to determine the risk of erosion occurring from exploration activities.

Factors considered include the following:

- Season (R Factor) – the timing of the project works will occur mostly within the dry season of the NT, which has low amounts of rainfall and is considered a low-risk factor. Risk levels of rainfall data of Daly Waters and Newcastle waters can be seen in Table 2 and Table 3 which present the erosion risk rating based on average monthly rainfall using the rating system provided in the IECA (2008) Table 4.4.2 for Daly Waters (northern sites) and Newcastle Waters (southern sites).

Table 3: Erosion risk rating based on average monthly rainfall at Daly Waters (Bureau of Meteorology 2023)

Item	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	165.4	165.4	120.1	23.6	5.0	5.6	1.5	1.7	4.9	22.5	59.4	110
Erosion Risk*	H	H	H	VL	VL	VL	VL	VL	VL	VL	M	H

* ■ = Extreme (>225 mm); ■ = High (100+ to 225 mm); ■ = Moderate (45+ to 100 mm); ■ = Low (30+ to 45 mm); ■ = Very Low (0 to 30 mm)

Table 4: Erosion risk rating based on average monthly rainfall at Newcastle Waters (Bureau of Meteorology 2023)

Item	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	125.5	130.9	93.7	24.6	9.3	5.3	3.4	1.0	5.4	20.9	35.7	77.3
Erosion Risk*	H	H	M	VL	VL	VL	VL	VL	VL	VL	L	M

* ■ = Extreme (>225 mm); ■ = High (100+ to 225 mm); ■ = Moderate (45+ to 100 mm); ■ = Low (30+ to 45 mm); ■ = Very Low (0 to 30 mm)

- Soil type (K Factor) – soils with higher clay content are prone to generation of bulldust and are easily eroded by wind and water. Gravelly soils tend to be more robust to disturbance on the scale expected for Tamboran exploration activities. The primary soil type encountered across the permit can generally be described as silty SAND, SM with some gravel. These soils are considered to have a low to medium erodibility potential when the soils are disturbed.
- Slope length – the slope of the exploration area is one of the characteristics that will help to determine the risk of erosion during rainfall events, with steeply inclined areas a higher risk than small undulations in the landform. The Tamboran exploration areas subject to this ESCP are generally flat with a slope of <1%. There are some slight undulations that occur throughout the area, generally being less than 2% gradient, however some areas are known to be greater 2%. Treatments are defined for sections less than 2% and greater than 2% in this plan. The relevant treatment will be considered on a case-by-case basis.
- Aspect – the position of the seismic lines, access tracks and pads in relation to the direction of the contour should be considered and creation of tracks and the well pads across (as opposed to parallel with) the contour should be avoided.
- Groundcover – clearing will be conducted to construct access tracks, establish gravel pits and earthworks relating to construction of the exploration well pad and associated camps, as well as line preparation for seismic exploration. The method that will be used for seismic line preparation will consist of dozer and grader, ensuring that topsoil and root stock is retained.

The clearing method used for gravel pits and construction of well pads, SPCF pad and camp pads will consist of a dozer to initially clear vegetation and then dozer or grader to strip topsoil, ensuring that rootstock is retained in the stockpiled topsoil. Expected machinery includes grader, 4W loader, tip truck, water truck, water tanks, excavators and compactors.

- Drainage line crossings – potential for minor drainage lines to occur across the exploration area. Generally, these can be trafficable with minimal modification of the creek bed required.

5.1 Erosion Hazard Assessment for EP 76, EP 98 and EP 117

5.1.1 Erosion Hazard Assessment for EP76, EP98 and EP117 – Well Pads, Access Tracks

An Erosion Hazard Assessment for all sites subject to this ESCP has been completed to inform the specific issues and actions that will be required for conducting activities within the permit areas. Table 5 (Amungee, Kalala, Kyalla, Velkerri and Beetaloo) and (Shenandoah South 2, South B, South C and North A) present the results of the assessment for exploration well pads and the SPCF adjacent to the Shenandoah South 2 well pad. The IECA (2008) Explanatory Notes for the assessment are presented Appendix A.

Table 5: Erosion hazard assessment for EP 76, EP 98 and EP 117 – well pads and access tracks

Condition (as described by IECA, 2008)	Points	Erosion Hazard Score					Trigger value
		Amungee Delineation Area*	Kalala S1	Kyalla 117 N2/SWP	Velkerri 76 S2	Beetaloo W	
AVERAGE SLOPE OF DISTURBANCE AREA [1]							
not more than 3% [3% =33H:1V]	0	0	0	0	0	0	4
more than 3% but not more than 5% [5% =20H:1V]	1	Comment - Topographical survey of well sites indicated (low relief) with a slope <3% (refer Appendix B)					
more than 5% but not more than 10% [10% =10H:1V]	2						
more than 10% but not more than 15% [15%= 6.7H:1V]	4						
more than 15%	6						
SOIL CLASSIFICATION GROUP (AS1726) [2]							
GW, GP, GM, GC	0	2	2	2	2	2	-
SW, SP, OL, OH	1	Comment – Geotechnical testing indicated SM - Silty sands, poorly graded sand-silt mixtures (refer Appendix C ²).					
SM, SC, MH, CH	2						
ML, CL, or if imported fill is used, or if soils are untested	3						

² Note, Amungee NW, Beetaloo W and Kalala S well sites were constructed prior to 2018.

Condition (as described by IECA, 2008)	Points	Erosion Hazard Score					Trigger value
		Amungee Delineation Area*	Kalala S1	Kyalla 117 N2/SWP	Velkerri 76 S2	Beetaloo W	
EMERSON (DISPERSION) CLASS NUMBER [3]							
• Class 4, 6, 7, or 8	0	4	4	4	4	4	6
• Class 5	2	Comment – Class 3 or default- Amungee Delineation Area Class 3 or default - soils disturbed by cut and fill operations or construction traffic are likely to discolor stormwater (i.e. cause turbid runoff). Controls to reduce turbidity are required.					
• Class 3, (default value if soils are untested)	4						
• Class 1 or 2	6						
DURATION OF SOIL DISTURBANCE [4]							
• not more than 1 month	0	2	2	2	2	2	6
• more than 1 month but not more than 4 months	2	Comment – Clearing and earthworks are expected to be between 1 and 4 months.					
• more than 4 months but not more than 6 months	4						
• more than 6 months	6						
AREA OF DISTURBANCE [5]							
• not more than 1000 m ²	0	6	6	6	6	6	6
• more than 1000 m ² but not more than 5000 m ²	1	Comment – All exploration well sites are greater than 4 ha but less than 12 ha of disturbance.					
• more than 5000 m ² but not more than 1 ha	2						
• more than 1 ha but not more than 4 ha	4						
• more than 4 ha	6						
WATERWAY DISTURBANCE [6]							
• No disturbance to a watercourse, open drain or channel	0	0	0	0	0	0	2
• Involves disturbance to a constructed open drain or channel	1	Comment – Not near natural water courses (refer Appendix D).					
• Involves disturbance to a natural watercourse	2						
REHABILITATION METHOD [7] Percentage of area (relative to total disturbance) revegetated by seeding without light mulching (i.e. worst-case revegetation method).							
• not more than 1%	1	1	1	1	1	1	-
• more than 1% but not	2						

Condition (as described by IECA, 2008)	Points	Erosion Hazard Score					Trigger value
		Amungee Delineation Area*	Kalala S1	Kyalla 117 N2/SWP	Velkerri 76 S2	Beetaloo W	
more than 5%		Comment – topsoil replaced along batters to commence assisted natural regeneration.					
more than 5% but not more than 10%	3						
more than 10%	4						
RECEIVING WATERS [8]							
Saline waters only	0	2	2	2	2	2	-
Freshwater body (e.g. creek or freshwater lake or river)	2	Comment – not located within the major flow pathway (refer to flood assessment in the Amungee Delineation Area Land Condition Assessment).					
SUBSOIL EXPOSURE [9]							
No subsoil exposure except of service trenches	0	0	0	0	0	0	-
Subsoils are likely to be exposed	2						
EXTERNAL CATCHMENTS [10]							
No external catchment	0	1	1	1	1	1	-
External catchment diverted around the soil disturbance	1	Comment – refer to civil design drawings (Appendix E to Appendix M)					
External catchment not diverted around the soil disturbance	2						
ROAD CONSTRUCTION [11]							
No road construction	0	2	2	2	2	2	-
Involves road construction works	2						
pH OF SOILS TO BE REVEGETATED [12]							
more than pH 5.5 but less than pH 8	0	0	0	0	0	0	-
other pH values, or if soils are untested	1	Comment – Soil pH 5.5 to 8.0					
Total Score [13]		20	16	20	20	20	
For guidance purposes only: [13] A primary ESCP must be submitted to the local government for approval during the planning phase for any development that obtains a total point score of 17 or greater or when any trigger value is scored or exceeded							

Table 6: Erosion hazard assessment for EP 76, EP 98 and EP 117 – Shenandoah E&A Program

Condition (as described by IECA, 2008)	Points	Erosion Hazard Score					Trigger value
		Shenandoah South E&A Program					
		South B	South C	South 2 (inclusive of SPCF pad)	North A		
AVERAGE SLOPE OF DISTURBANCE AREA [1]							
• not more than 3% [3% =33H:1V]	0	0	0	0	0		4
• more than 3% but not more than 5% [5% =20H:1V]	1	Comment - Topographical survey of well sites indicated (low relief) with a slope <2% (refer Appendix B)					
• more than 5% but not more than 10% [10% =10H:1V]	2						
• more than 10% but not more than 15% [15%= 6.7H:1V]	4						
• more than 15%	6						
SOIL CLASSIFICATION GROUP (AS1726) [2]							
• GW, GP, GM, GC	0	2	2	2	2		-
• SW, SP, OL, OH	1	Comment – Geotechnical testing indicated SM - Silty sands, poorly graded sand-silt mixtures (refer Appendix C).					
• SM, SC, MH, CH	2						
• ML, CL, or if imported fill is used, or if soils are untested	3						
EMERSON (DISPERSION) CLASS NUMBER [3]							
• Class 4, 6, 7, or 8	0	6	6	4	6		6
• Class 5	2	Comment – Class 3 or default- Class 3 or default - soils disturbed by cut and fill operations or construction traffic are likely to discolour stormwater (i.e. cause turbid runoff). Controls to reduce turbidity are required.					
• Class 3, (default value if soils are untested)	4						
• Class 1 or 2	6						
DURATION OF SOIL DISTURBANCE [4]							
• not more than 1 month	0	2	2	2	2		6
• more than 1 month but not more than 4 months	2	Comment – Clearing and earthworks are expected to be between 1 and 4 months.					
• more than 4 months but not more than 6 months	4						

Condition (as described by IECA, 2008)	Points	Erosion Hazard Score					Trigger value
		Shenandoah South E&A Program					
		South B	South C	South 2 (inclusive of SPCF pad)	North A		
more than 6 months	6						
AREA OF DISTURBANCE [5]							
not more than 1000 m2	0	6	6	6	6		6
more than 1000 m2 but not more than 5000 m2	1	Comment – All exploration well sites are greater than 4 ha but less than 12 ha of disturbance.					
more than 5000 m2 but not more than 1 ha	2						
more than 1 ha but not more than 4 ha	4						
more than 4 ha	6						
WATERWAY DISTURBANCE [6]							
No disturbance to a watercourse, open drain or channel	0	0	0	0	0		2
Involves disturbance to a constructed open drain or channel	1	Comment – Not near natural water courses (refer Appendix D).					
Involves disturbance to a natural watercourse	2						
REHABILITATION METHOD [7] Percentage of area (relative to total disturbance) revegetated by seeding without light mulching (i.e. worst-case revegetation method).							
not more than 1%	1	1	1	1	1		-
more than 1% but not more than 5%	2	Comment – topsoil replaced along batters to commence assisted natural regeneration.					
more than 5% but not more than 10%	3						
more than 10%	4						
RECEIVING WATERS [8]							
Saline waters only	0	2	2	2	2		-
Freshwater body (e.g. creek or freshwater lake or river)	2	Comment – not located within the major flow pathway (refer to flood assessment for each well pad)					

Condition (as described by IECA, 2008)	Points	Erosion Hazard Score					Trigger value	
		Shenandoah South E&A Program						
		South B	South C	South 2 (inclusive of SPCF pad)	North A			
SUBSOIL EXPOSURE [9]								
• No subsoil exposure except of service trenches	0	0	0	0	0		-	
• Subsoils are likely to be exposed	2							
EXTERNAL CATCHMENTS [10]								
• No external catchment	0	1	1	1	1		-	
• External catchment diverted around the soil disturbance	1	Comment – refer to civil design drawings (Appendix E to Appendix M)						
• External catchment not diverted around the soil disturbance	2							
ROAD CONSTRUCTION [11]								
• No road construction	0	2	2	2	2		-	
• Involves road construction works	2							
pH OF SOILS TO BE REVEGETATED [12]								
• more than pH 5.5 but less than pH 8	0	0	0	0	0		-	
• other pH values, or if soils are untested	1							
Total Score [13]		22	22	20	22			
For guidance purposes only: [13] A primary ESCP must be submitted to the local government for approval during the planning phase for any development that obtains a total point score of 17 or greater or when any trigger value is scored or exceeded								

5.1.2 Erosion Hazard Assessment for Seismic Surveys

Table 7 presents the results of the assessment for the seismic programs.

Table 7: Erosion hazard assessment for EP 76, EP 98 and EP 117 –seismic survey areas

Condition (as described by IECA, 2008)	Points	Score	Trigger value
		Seismic Survey Areas	
AVERAGE SLOPE OF DISTURBANCE AREA [1]			
not more than 3% [3% = 33H:1V]	0	1	4
more than 3% but not more than 5% [5% = 20H:1V]	1	Comment - Topographical data of well sites indicated (low relief) with a slope <1-2%. Isolated areas increase to 3% to 5%. Value of 1 adopted as worst case scenario.	
- more than 5% but not more than 10% [10% = 10H:1V]	2		
more than 10% but not more than 15% [15% = 6.7H:1V]	4		
more than 15%	6		
SOIL CLASSIFICATION GROUP (AS1726) [2]			
GW, GP, GM, GC	0	2	-
SW, SP, OL, OH	1	Comment – Initial soil testing during the baseline survey indicated SM - Silty sands, poorly graded sand-silt mixtures (refer EMP).	
SM, SC, MH, CH	2		
ML, CL, or if imported fill is used, or if soils are untested	3		
EMERSON (DISPERSION) CLASS NUMBER [3]			
Class 4, 6, 7, or 8	0	4	6
Class 5	2	Comment – Class 3 – Specific testing for Emerson Class not conducted. Therefore, default value used.	
Class 3, (default value if soils are untested)	4		
Class 1 or 2	6		
DURATION OF SOIL DISTURBANCE [4]			
not more than 1 month	0	2	6
more than 1 month but not more than 4 months	2	Comment – Line preparation to rehabilitation will be less than 1-month duration, however worst-case allowance used.	
more than 4 months but not more than 6 months	4		
more than 6 months	6		
AREA OF DISTURBANCE [5]			
not more than 1000 m²	0	1	6
more than 1,000 m² but not more than 5,000 m²	1	Comment – Due to the tread lightly approach of the line preparation using	

Condition (as described by IECA, 2008)	Points	Score	Trigger value
		Seismic Survey Areas	
more than 5,000 m² but not more than 1 ha	2	existing tracks and minimising tree and shrub clearing and the re-instatement of topsoil and vegetation as soon as possible after acquisition, results in no more than 5,000 m ² assessed at any one time.	
more than 1 ha but not more than 4 ha	4		
more than 4 ha	6		
WATERWAY DISTURBANCE [6]			
No disturbance to a watercourse, open drain or channel	0	2	2
Involves disturbance to a constructed open drain or channel	1	Comment – Activities require crossing of some minor drainage lines (i.e intermittent stream 1 and 2). Not considered to be major works and will be re-instated as completion of acquisition. Also noted that majority of drainage crossings would be avoided for seismic program or would use a tread lightly approach such as on foot resulting in no disturbance.	
Involves disturbance to a natural watercourse	2		
REHABILITATION METHOD [7] Percentage of area (relative to total disturbance) revegetated by seeding without light mulching (i.e. worst-case revegetation method).			
not more than 1%	1	1	-
more than 1% but not more than 5%	2	Comment – Topsoil and vegetated material to be replaced over disturbance within 2 weeks post activity for natural regeneration.	
more than 5% but not more than 10%	3		
more than 10%	4		
RECEIVING WATERS [8]			
Saline waters only	0	N/A	-
Freshwater body (e.g. creek or freshwater lake or river)	2	Comment – not applicable because freshwater bodies are ephemeral drainage lines only, with no flowing water at time of acquisition (dry season acquisition).	
SUBSOIL EXPOSURE [9]			
No subsoil exposure except of service trenches	0	0	-
Subsoils are likely to be exposed	2		
EXTERNAL CATCHMENTS [10]			
No external catchment	0	0	-
External catchment diverted around	1	Comment – Not considered applicable	

Condition (as described by IECA, 2008)	Points	Score	Trigger value
		Seismic Survey Areas	
the soil disturbance		based on the activities being completed are temporary seismic lines.	
External catchment not diverted around the soil disturbance	2		
ROAD CONSTRUCTION [11]			
No road construction	0	0	-
Involves road construction works	2	Comment – only temporary seismic lines required. No construction of new tracks is necessary. Existing pastoral tracks to be treated post activity.	
pH OF SOILS TO BE REVEGETATED [12]			
more than pH 5.5 but less than pH 8	0	0	-
other pH values, or if soils are untested	1	Comment – Majority soils recorded within Soil pH range 5.5-8 across exploration area. Some areas recorded outside range but considered minimal risk to seismic program.	
Total Score [13]		13	
For guidance purposes only: [13] A primary ESCP must be submitted to the local government for approval during the planning phase for any development that obtains a total point score of 17 or greater or when any trigger value is scored or exceeded.			

The erosion hazard assessment for the Tamboran permit areas, all report equal to, or just below the point score of 17. Based on the trigger value being met the ESCP is required for majority of Tamboran's activities.

5.2 Soil Loss Estimate

IECA (2008) soil loss estimation has been used to determine the type of controls the project should adopt to limit soil loss during construction when soils are exposed to rainfall. Long term average soil loss resulting from sheet and rill flow can be predicted using the Revised Universal Soil Loss Equation (RUSLE).

Soil loss calculated using RUSLE for the project area was calculated as follows:

$$A = R K L S C P$$

Where A = annual soil loss due to erosion [tonnes/hectare/year (t/ha/yr)]

R = rainfall erosivity factor based on = 6297)

K = soil erodibility factor of 0.055 for silt loam)

LS = topographic factor derived from slope length and slope gradient (0.24)

C = cover and management factor (1)

P = erosion control practice factor (1.3)

It is noted that the annual R-factor of 6297 for the Katherine region has been adopted as per comment received by DLPE Land Management Team. Since preparation of the initial ESCP, additional geotechnical information has been obtained which provides a larger sample size of the proposed permit areas.

The geotechnical sampling completed on the sites is as provided in Table 8. As such, the K-factor has been determined from Table E4 of the IECA Guidelines.

Revision of the LS-factor on more detailed design drawings shows a total slope length of approx. 200 m at a gradient of 0.00120 m/m (0.12%), indicative of the gradients across both sites. A LS factor of 0.24 was adopted, indicating a 200 m slope at 0.01 m/m (1%) for sites on the Amungee delineation, Kalala, Kyalla, Velkerri and Beetaloo. The slopes based on the contour information at hand for the Shenandoah South 2, South B, South C, North A (and option 2) are provided in Table 8.

Based on the reviewed RUSLE soil loss methodology, the Annual Soil Loss estimate using these values is 33 t/ha/yr – 204 t/ha/yr. A combination of Type 3, Type 2 and Type 1 sediment controls will be required based on the RUSLE equation.

All the proposed activities for the exploration program are planned during the dry season (May to September) when the erosion risk rating for rainfall is very low (refer to Table 2 and Table 3). Where activities occur in the wet season, Tamboran's wet weather contingency plan will be implemented (refer Table 12).

Table 8: RUSLE value and factors

Site	R	K Factor	Slope %	LS	C	P	A (t/ha/yr)
Amungee Delineation	6297	0.055	1	0.24	1	1.3	108
Kalala S	6297	0.055	1	0.24	1	1.3	108
Kyalla 117 N2/SWP	6297	0.055	1	0.24	1	1.3	108
Velkerri 76 S2	6297	0.055	1	0.24	1	1.3	108
Beetaloo W-1	6297	0.055	1	0.24	1	1.3	108
Shenandoah S A	6297	0.043	0.5 - 1.0	0.24	1	1.3	84
Shenandoah S B	6297	0.043	0.3 - 0.5	0.24	1	1.3	84
Shenandoah S C	6297	0.017	0.3 - 0.5	0.24	1	1.3	33
Shenandoah S2	6297	0.055	1	0.24	1	1.3	108
Shenandoah N A	6297	0.025	1.5 - 2.0	0.58	1	1.3	204
Shenandoah N A (option 2)	6297	0.025	1.5 - 2.0	0.58	1	1.3	204

5.3 Erosion Risk and Determination of ESC

Erosion risk ratings for the Project area have been determined based on the average monthly erosivity (R-factor of 6297), average monthly rainfall depth (mm) (refer Table 2 and Table 3 above) and soil loss (estimated at between 108t/ha/yr and 204t/ha/yr). As indicated in Table 9, the Project has an erosion risk rating of "very low" to "low".

Table 9: Erosion risk rating (adapted from IECA, 2008, Tables 4.4.1, 4.4.2 and 4.4.3)

Erosion Risk Rating	Average Monthly Erosivity (R-Factor)	Average Monthly Rainfall Depth (mm)	Soil Loss (t/ha/yr)
Very Low	0 to 60	0 to 30*	0 to 150
Low	60+ to 100	30+ to 45	150+ to 225
Moderate	100+ to 285	45+ to 100	225+ to 500
High	285+ to 1,500	100+ to 225	500+ to 1,500
Extreme	>1,500*	>225	>1,500

* It is noted that the monthly erosivity factor would only be triggered during rainfall events. The construction period is proposed to occur from July to October and based on assessment of the average monthly rainfall for the region (refer Table 2 and Table 3), the erosion risk rating is considered very low (0 to 30 mm during this time). It is anticipated that at completion of construction the site would be stabilised for normal operation.

Table 10 provides an indication of the “Type” of erosion and sediment controls that should be deployed during construction depending on annual soil loss. Based on the proposed construction schedule during the dry season, the project is determined to trigger the use of Type 3, Type 2 and Type 1 erosion and sediment controls, based on the soil loss rate for the site in question. Refer to the results in Table 8 for the soil loss calculations and compare to Table 10, for the type of soil loss controls required.

Table 10: Sediment control standard (adapted from IECA 2008, Table 4.5.1)

Catchment Area (m ²)	Soil Loss Rate Limit (t/ha/yr)		
	Type 1	Type 2	Type 3
250	N/A	N/A	All Cases
1000	N/A	N/A	All Cases
2500	N/A	>75	75
>2500	>150	150	75

Table 11 provides a range of erosion and sediment controls that can be deployed on the project for each ‘Erosion and Sediment Control Type’.

Table 11: Classifications of sediment controls

Type 1	Type 2	Type 3
Sheet flow		
Buffer zone capable of infiltrating 100% of stormwater runoff or processed water Infiltration basin or sand filter bed capable of infiltration of 100% of flow	Buffer zone capable of infiltrating 100% of stormwater runoff Compost / mulch berm	Buffer Zone capable of infiltrating 100% of stormwater runoff Filter fence Modular sediment trap Sediment fence
Concentrated flow		
Sediment basin (sized in accordance with design standard)	Sediment basin (smaller than the design standard) Filter tube dam Rock filter dam Sediment trench	Coarse sediment trap Modular sediment trap U-shaped sediment trap

Type 1	Type 2	Type 3
	Sediment weir	
Dewatering sediment control		
Type F/D Sediment Basin Stilling Pond	Filter bag or filter tube filter pond Filter tube dam Portable sediment tank Settling pond Sump pit	Compost berm Filter fence Grass filter bed Hydro cyclone Portable sediment tank Sediment fence
In-stream sediment control		
Pump sediment laden water to an off-stream type F/D sediment basin or high filtration system	Filter tube barrier Modular sediment barrier Rock filter dam Sediment weir	Modular sediment barrier Sediment filter cage

The site specific ESCP drawings are provided in Appendix E to Appendix M.

Standard drawings that may be applicable for the Project, including controls for access tracks and stream crossings are provided in Appendix N. The final design of the ESC controls will be dependent on decisions made in the field by the Supervising Engineer and site conditions. Any significant changes to those identified in this ESCP will be reported through to DLPE Land Management Team for review and approval. Tamboran and its civil contractors will be responsible for notifying of any changes.

Standard drawings for erosion and sediment controls are available at:
<http://www.austieca.com.au/publications/book-6-standard-drawings>.

5.3.1 Modifying the ESC Measures

It is possible that some ESC measures will require modification as the project is constructed and in response to the performance of ESC measures or changes in project circumstances. The modifications may be considered minor, moderate or significant. Moderate and minor changes will occur, and it is expected that significant modifications will be the exception. If significant erosion events occur, significant changes to the measures used will be required and should be approved by a CPESC or suitably qualified consulting engineer.

To accommodate the range of circumstances likely to occur, a change management decision matrix is presented in Table 12. Where changes are required, these will be risked assessed through a change management process and kept in a change management register.

Table 12: Change management decision matrix

Authority required	Minor	Moderate		Significant
	Maintenance of all measures	Removal or relocation of minor temporary controls	Permanent measure relocation	Permanent measure removal/revisions to ESCP
Tamboran onsite company rep	✓	✗	✗	✗
Site supervisor	-	✓	✗	✗
CPESC	-	-	✓	✓

Authority required	Minor	Moderate		Significant
	Maintenance of all measures	Removal or relocation of minor temporary controls	Permanent measure relocation	Permanent measure removal/revisions to ESCP
Consulting engineer	-	-	✓	✓

- ✓ Authorised to undertake
- ✗ Not authorised to undertake
- Denotes that authority level is not required

Examples of different types of sediment controls can be seen in Table 7. Examples of minor temporary controls would fall under Type 3 sediment controls while Type 2 and Type 1 sediment controls provide examples of permanent measures.

It is noted that minor and permanent are not indications of how long the sediment controls are in place. At completion of the activities, the disturbed areas to be restored and/or rehabilitated to pre-disturbed conditions consistent with the surrounding land use.

If ESC measures are observed to be ineffective (e.g. obvious sediment deposition has occurred, or is occurring in a waterway), the source of the sediment must be identified, and corrective ESC measures implemented.

6 Erosion and Sediment Controls

6.1 Well Exploration Areas

Based on the erosion susceptibility of the exploration area, the ESCP measures to be adopted for the exploration programs are summarised in Table 13. These ESCP measures have been considered during the design of the exploration well pads and associated infrastructures, inclusive of the SWP, SPCF, and will be implemented by the Tamboran contractors during the construction and maintenance activities.

Table 13: Measures to be implemented for erosion and sediment control – well exploration areas

Activity	Management controls
Land clearing	- Undertake selective clearing (only clearing areas that are necessary for construction and ESC activities), using lighter machinery such as graders or smaller bulldozers, taking care not to overwork the site. Overworking the site can lead to the loss of topsoil, compaction, formation of windrows and wheel rutting. - Minimise tree clearing activities only during the dry season (May to September) to allow the ground surface to stabilise before the onset of the wet season (October to April). - Retain vegetation buffers surrounding streams and creeks, as outlined in the <i>NTG Land Clearing Guidelines 2021</i>. - Undertake clearing for each stage in small units over time, keeping the disturbed areas small and time of exposure short, in conjunction with progressive re-vegetation (assisted natural regeneration using available topsoil). - Take all reasonable and practicable measures to minimise the removal of, or disturbance to, trees, shrubs and ground covers (organic or inorganic) that are to be retained. - If bulk tree clearing is required, it must occur in a manner that minimises disturbance to existing ground cover (organic or inorganic). - Bulk tree clearing and grubbing of the site must be immediately followed by specified temporary stabilisation measures (e.g. gravel, soil berm) prior to commencement of each stage of construction works. - Land clearing should not occur unless preceded by the installation of appropriate drainage and sediment control measures. The exception would be any land clearing necessary to allow installation of these control measures. Prior to land clearing, establish tree protection zones around vegetation to be retained e.g. identify with high-visibility tape, or light fencing. - All land clearing must be in accordance with the Federal, Territory and local government vegetation clearing requirements and IECA Table 4.4.7 Best practice land clearing and rehabilitation requirements. - All reasonable and practicable steps to be taken to apply best practice Erosion control measures following earthworks and site stabilised prior to anticipated rainfall. Disturbed areas will be stabilised with a minimum 60% cover within 30 days of completion.

Activity	Management controls
Access tracks	- Where possible, use existing roads and tracks to access the well sites, and where new tracks are required, they should be located along the most direct and practicable route to the well site (noting Velkerri 76 S1 access track has been diverted around the sensitive Bullwaddy/Lancewood vegetation type). - Trucks entering and exiting the site will be constrained in such a manner to prevent dropping or tracking material on the Highway in accordance with the Road Agency Approval (ref 2018-0186-D2). - Monitor Stuart Highway during construction and operation. Where tracked material on the road pavement becomes a potential safety issue, Tamboran and its contractors will sweep and clean material off the road. If Stuart Highway turn-in results in dust, dirt creating hazard to road users, additional ESC will be considered including installation of shaker grid or rock pad. - Minimise track width and surface disturbance (e.g. topsoil, seed and root stock) as far as practicable to allow safe passage of required equipment. - Disturbed areas will be stabilised with a minimum 60% cover 30 days of completion if rainfall possible. - Where gravelling is warranted (Stuart Highway and Carpentaria Turn-in), the formation process can remove undesirable material and/or box the imported material where it is required. Track formation will be required for the following reasons: - Drainage control, especially in areas where erosion or sediment influences are evident, any vegetation, topography, wheel rutting or - compaction is likely to intercept, concentrate and channel water. - Where the topography of the track location or the drainage characteristics of the soil are likely to hinder access for a protracted time period following rain (e.g. 1 to 2 weeks). - Where natural side-slope poses a safety hazard to potential users of the track (e.g. contractors, landowners). - Place scrub and vegetation cleared from the route adjacent to the route where practical to facilitate its return to the disturbed area. Where this occurs, spread the material out rather than form windrows. Allow disturbed areas to be stabilised and natural regeneration of the native grasses to occur. - Construct access tracks with table drains that are free draining. - Avoid road crowning to allow water to naturally cross the road. - Form tracks to allow off-road drainage. Where track intercepts the direction of overland flow and re-directs this flow to a non-natural drainage line, install erosion control works to minimise potential erosion. - The design and position of erosion control measures to be determined in the field by experienced operator and site engineer, based on the site characteristics of the access track location. - Where construction of table drains are deemed necessary, they should have a broad flat base at least 1 m wide and should not be graded to produce a 'V' shape. To minimise erosion, the slope should be no greater than 0.5% on erodible soils or 1% on stable soils.

Activity	Management controls
	- Where encounter dispersive / erosive soils they should be stabilised with gypsum or other stabiliser, as determined by laboratory analysis of soils. - Where cut-out drains are required, they should be spaced based on the slope of the area i.e. 0.5% slope, allow for cut-out draining every 170-180 m or 1 % slope, allow for cut-out drainage every 120-130 m etc. (refer to NT Road Drainage Fact Sheet). It is noted that the recommended distance between turn-out drains is a guide and may not apply to all locations along the access track. - Monitor road conditions to ensure deterioration does not occur. Assist in the maintenance and repair work on roads and tracks used. - Following completion of activities and within 2 years after the surrender of a lease, the land surrounding or affected by the installation of access tracks shall be restored in accordance with the site-specific rehabilitation plan and final determination of asset (i.e. if transferring asset ownership to landholder).
Placement of gathering lines along access tracks	- Placement and installation of gathering lines in accordance with the Upstream Polyethylene Gathering Networks – CSG Industry Code of Practice (Version 5.0 August 2019) and Appendix P - Land-based pipeline construction (IECA, December 2015). - Route selection of gathering lines should consider the location of start and end points, well locations and access requirements, hydraulic requirements based on topography, existing services and infrastructure, and current and future land use. - Gathering line route to be selected such that the pipe can be installed, tested, and operated safely and practically. - Gathering line to be placed above ground within the access track corridor (but not within the trafficable area), minimising the need for additional vegetation clearing where possible. Topsoil to be removed to allow gathering line to be placed directly on the subsoil layer to minimise soil disbursement. - Extra protection of gathering line to be provided where necessary, particularly to prevent damage from conditions such as traffic and cattle movement and at stream and river crossings (where applicable). - Allow for trafficable cross banks where gathering line crosses the access tracks. No other area of the gathering line to be trafficable. - Where gathering line intersects an overland flow path, allow for sheet flow to pass to avoid concentrated flow resulting in scouring. - Install sediment controls such as fibre rolls or mulch berms along line to control velocity and capture minor sediment. - Avoid rocky areas and steep slopes and side slopes if possible. - Align gathering line straight up and down slopes. - Contents of pipes to be clearly labelled based on Table 3.3.1 Colour Specification (i.e. yellow for gas, produced formation water purple, etc.). - Fire protection measures to be employed by reducing fuel loads by up to 5 m either side of the gathering line. - Regularly inspect, monitor and maintain ESC measures.

Activity	Management controls
Pad construction / maintenance	- Pad construction to be in accordance with the typical ESCP (refer Appendix E). The topsoil berm dimension to be in accordance with the IECA Figure 1 Standard Drawing MB-01 presented in Appendix N. - Use topsoil berms to divert upstream runoff from undisturbed areas ('clean' water) around and away from disturbed areas, and back to the environment. - Topsoil bunds are to be formed to the profile provided in the sketch below. Bund height (H) is specified on the drawings. - Where topsoil bunds are to be utilised for wastewater storage spill containment, topsoil bunds are to be formed to the profile provided in the sketch below. Bund height shall consider the well pad slope and volume of wastewater stored onsite. The typical, low point bund height is specified on the drawings, assuming a 0.2% storage area fall. - Topsoil to be compacted to 95% mmdd. - Use topsoil berms to contain / manage runoff from disturbed construction areas ('dirty' water) and prevent release to environment without treatment. - Treat runoff from construction areas through suitable sediment controls (e.g. sediment traps). - Configure berms so that upstream runoff does not mix with construction area runoff prior to treatment of construction area runoff. - Where topsoil stripping is required, the stripping depth would be in accordance with Technical Instruction (NT-2050-15-TI-0001) and amelioration rates agreed with the Construction Supervisor, Tamboran engineers and by a suitably qualified ESC practitioner. It is noted that the expected nominal depth of topsoil across the well pads at locations ranges from <100 mm to 150 mm. Final strip depth will be confirmed in the field. Any changes to the adopted ESCs will be reflected in the ESCP and to satisfaction of DLPE. - Stockpiled felled trees nearby for future use in rehabilitation. - Inspect on a regular basis in accordance with Section 5 Maintenance. - Damage or maintenance is undertaken by an appropriately qualified person i.e. contractor / Tamboran. - Following completion of activities and within 2 years after the surrender of a lease, the land surrounding or affected by the exploration wells

Activity	Management controls
	shall be restored in accordance with the site-specific rehabilitation plan and final determination of asset (i.e. if transferring asset ownership to landholder).
Stream and creek crossings	Where a crossing is required to be upgraded, a bed level crossing as detailed in Appendix L, will be installed in accordance with the following: • Crossings will be aligned perpendicular to the water flow. • Crossing will be constructed from clean rocks (minimal fine material) that are an equivalent or larger size than the natural bed material at the crossing. • The surface is to be left rough and not to be over compacted (e.g. track-rolled finish or rougher). • The lowest point of the bed level crossing will be installed at the level of the lowest point of the natural stream bed (preconstruction), within the footprint of the proposed crossing. • There must be a height difference of at least 100 mm up to ≤ 300 mm from the lowest point of the crossing to the edges of the low flow section of the crossing. Where scour protection is required: • Scour protection must abut the surface edge of the crossing at the same level (this is to ensure that there is no drop in elevation at the join). • If the crossing is set below bed level then the surface of the scour protection must also be below bed level. • The stream bed must abut the scour protection at the same level (this is to ensure that there is no drop in elevation at the join). • The scour protection is installed at a gradient no steeper than 1 in 20 or the natural channel gradient, whichever is steeper. • Scour protection must incorporate a low flow channel. Use clean rocks (minimal fine material), at least 100 mm diameter. • Ensure the rock armouring is not over compacted but left at the same level and uneven (track-rolled finish or rougher). • Use clean rocks (minimal fine material), at least 100 mm diameter. • The retention of vegetation buffers, as outlined in the NTG Land Clearing Guidelines 2019, as they relate to stream order has been considered for the siting of proposed access tracks and pads. • Site specific progressive ECPs should be approved by DLPE prior to any disturbance. • Should activities pushout to the wet season, the DLPE to be reviewed and updated for wet season conditions. The revision to be reviewed and approved by DLPE during September to allow implementation of the plan prior to the onset of the wet season. Wet season ESCP to be implemented between 1 October to 30 April.
Soil and stockpile management	• Stockpile existing topsoil, where available, so that it can be reused on the site for ESC and future rehabilitation at completion of project. • Stockpiles of erodible material that has the potential to cause environmental harm if displaced, must be:

Activity	Management controls
	• Appropriately protected from wind, rain, concentrated surface flow and excessive up-slope stormwater surface flows. • Located at least 2m from any hazardous area or retained vegetation. • Located up-slope of an appropriate sediment control system. • Provided with an appropriate protective cover (synthetic or vegetative) if the materials are likely to be stockpiled for more than 28 days. • Provided with an appropriate protective cover (synthetic or vegetative) if the materials are likely to be stockpiled for more than 10 days during those months that have an erosion risk rating higher than medium. • 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 exceeds 1,500m². • Avoid creating windrows. Do not create windrows across creeks, use rollers when putting in tracks in preference to dozers, or walk the dozer with the blade raised off the ground.
Site management	• All disturbed areas identified as very low, low, medium or high erosion risk must be suitably stabilised prior to anticipated rainfall, from the day that soil disturbances on the area have been finalised- IECA Table 4.4.7. • Tracks to be regularly inspected for early signs of compaction, erosion and soil degradation (generation of bulldust). Ongoing maintenance and repair work should be implemented as required on tracks. • No off-lease or off-road driving. • 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 flow. • Land-disturbing activities must: • allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities. • minimise soil erosion resulting from rain, water flow and/or wind. • minimise adverse effects of sediment runoff, including safety issues. • prevent, or at least minimise, environmental harm resulting from work-related soil erosion and sediment runoff. • ensure that the value and use of land/properties adjacent to the site (including access roads) are not diminished as a result of the adopted ESC measures. • Additional and/or alternative ESC measures must be implemented in the event that unacceptable off-site sedimentation is occurring as a result of the work activities. • Sediment deposited off the site as a direct result of an on-site activity, must be collected and the area appropriately rehabilitated as soon as reasonable and practicable, and in a manner that gives appropriate consideration to the safety and environmental risks associated with the

Activity	Management controls
	sediment deposition.
Drainage control	- Where reasonable and practicable, stormwater runoff entering the site, must be diverted around or through the area in a manner that minimises soil erosion and the contamination of water for all discharges. - All reasonable and practicable measures must be implemented to control flow velocities a manner that prevents soil erosion along drainage paths and at the entrance and exit of all drains and drainage pipes during storms up to the relevant design storm discharge.
Erosion control	- If synthetic reinforced erosion control mats or blankets are required, they must not be placed in, or adjacent to, riparian zones and watercourses if such materials are likely to cause environmental harm to wildlife or wildlife habitats. - A minimum 60% 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 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 80% cover within 10 days if between 285 and 1,500; and - minimum 95% cover within 5 days if greater than 1,500.
Sediment control	- Optimum benefit must be made of every opportunity to trap sediment within the work site, and as close as practicable to its source. - Sediment pond to be installed and operated to both collect and retain sediment (refer to Drawing NT-2050-15-MP-0021 and NT-2050-15-MP-022 in Appendix E). Design details of the sediment pond is provided in NT-2050-20-DD-0030. - All reasonable and practicable measures must be taken to prevent, or at least minimise, the release of sediment from the site (section 7.5). - Sediment control devices must be de-silted and made fully operational as soon as reasonable and practicable after a sediment-producing event if the device's sediment retention capacity falls below 75% of its design retention capacity. - Materials removed from sediment control devices must be disposed of in a manner that does not cause ongoing soil erosion or environmental harm.
Wet weather contingency	7-day forecast from the Bureau of Meteorology (BOM) to be monitored and the civil and water bore construction activities planned around the forecasts. - Where forecasts indicate rainfall is likely to result in an event that has potential to limit access to the work area, the civil and water bore contractor will stabilise the current work areas and go into standby mode until such time they can assess the track condition after an event to recommence activities. - Emergency response – a post-rainfall/flood damage reconnaissance and assessment will be undertaken as soon as the area becomes

Activity	Management controls
	accessible. Any damage observed would be repaired as soon as practicable after the event and ensure the controls and measures are in place prior to the next rainfall event.
Site rehabilitation	• Following completion of works, disturbed areas are to be restored and/or rehabilitated. • Gravel pits to have topsoil returned and re-profiled. • All compacted areas will be ripped and scarified to promote regeneration of vegetation; this may require assistance through spread of native seed stock. • All disturbed areas will be allowed to naturally regenerate or be revegetated on completion of use. • Compacted areas will be contour ripped to 0.5m depth where practicable. • At completion of activities, establish vegetation similar to adjacent vegetation, unless agreement with landowner for alternative use. • Remove and appropriately dispose of all synthetic erosion and sediment control materials. • All disturbed areas identified as very low, low, medium or high erosion risk must be suitably stabilised prior to anticipated rainfall, from the day that soil disturbances on the area have been finalised- IECA Table 4.4.7. • Stabilise disturbed areas quickly to reduce the potential for erosion. Methods of stabilisation will be site specific and based, in part, on laboratory analysis of soils for erosive and dispersive characteristics. • Previously removed vegetation and topsoil will be uniformly re-spread over disturbed area to assist with rehabilitation process through agencies of increased infiltration and return of seed-bearing topsoil. If required, additional native seed mix from the area could be respread to speed up rehabilitation process. • Windrows of debris that cannot be removed should be aligned down the contour or in a manner appropriate to avoid channeling and concentrating runoff. All other windrows are to be removed as soon as practicable. • The type of ground cover applied to completed earthworks is compatible with the anticipated long-term land use, environmental risk, and site rehabilitation measures.

6.2 2D and 3D Seismic Activities

Based on the erosion susceptibility of the exploration areas, the ESCP measures to be adopted for the 2D and 3D seismic exploration programs are summarised in Table 14 below. These ESCP measures have been considered during the design of the seismic program and will be implemented by the Tamboran contractors during the construction and maintenance activities.

Table 14: Measures to be implemented for erosion and sediment control – seismic survey areas

Activity	Management controls
Vegetation clearing	• Undertake selective clearing (only clearing areas that are necessary for surveying lines), using lighter machinery such as graders or smaller bulldozers, taking care not to overwork tracks. Overworking the site can lead to the loss of topsoil, compaction, formation of windrows and wheel rutting. Refer to the first dot point in the seismic line preparation and access track and camp establishment/maintenance section below. • Ground surface to be stabilised before the onset of the wet season (November to March). • Undertake clearing for each stage in small units over time, keeping the disturbed areas small and exposure time short, in conjunction with progressive re-vegetation (assisted natural regeneration using available topsoil and removed vegetation). • Take all reasonable and practicable measures to minimise the removal of, or disturbance to, trees, shrubs and ground covers (organic or inorganic) that are to be retained. • All vegetation clearing must be in accordance with the Federal, Territory and local government vegetation clearing requirements and IECA Table 4.4.7 Best practice land clearing and rehabilitation requirements detailed Appendix O. • Best practice erosion control measures will be implemented in accordance with the ESCP following earthworks and site stabilised prior to anticipated rainfall. • Disturbed areas will be stabilised in accordance with the Rehabilitation Management Plan, as per Section 7.4.

Activity	Management controls			
Creek and Drainage Line Crossings	Minimise disturbance in the buffers in accordance with the stream order of the encountered drainage line in accordance with the buffers provided below:			
	Class	Stream order	Minimum buffer width (m)	Measured from
	Drainage depression	Not applicable	25	The outer edge of the drainage depression, which is the extent of the associated poorly drained soils and associated vegetation.
	Intermittent streams	First	25	The outer edge of the riparian vegetation or levee (whichever is greater). If braided channels are present, the edge of the outer most stream channel
	Intermittent streams	Second	50	As above
	Creeks	Third and fourth	100	As above
	Rivers	Fifth and higher	250	As above
	- No additional material will be used for the seismic acquisition to cross over the creek crossing. Existing crossings will not be altered. - The activities shall be completed in a manner that does not cause a: - material change to the shape of a waterway, - material change to the volume, speed or direction of flow or likely flow of water in or into a waterway, or - alteration to the stability of the bed or banks of a waterway, including by removal of vegetation. - Ongoing monitoring of creek and drainage crossing condition prior to, during and at completion of rehabilitation. - Reinstate the original topography of the creek or drainage bed following seismic acquisition.			
Seismic line preparation	- The method for line preparation described in the EMP is to use existing pastoral station tracks wherever practicable, or minimise the complete removal of the vegetation, with vehicles to traverse over or around the vegetation instead, leaving as much intact as possible. Assessment of the survey area indicates that in the order of 80 to 90% of the undisturbed areas will be traversed as a blade up exercise. - Minimising vegetation and soil disturbance is the default position for the seismic program. Wherever possible vegetation and soil shall not			

Activity	Management controls
	be disturbed when establishing survey lines (i.e. blade up). If disturbance is required, establishment of survey lines which will form a runoff channel is to be avoided. • Seismic vehicles that enter and exit the site will be constrained in such a manner to prevent dropping or tracking material on the Highway in accordance with the Road Agency Approval. • Place scrub and vegetation cleared from the route adjacent to the route where practical to facilitate its return to the disturbed area. Where this occurs, spread the material out rather than form windrows. Allow disturbed areas to be stabilised and natural regeneration of the native grasses to occur.
Site management	• All plant and equipment brought to site is to be certified a “free” of weeds, soil pathogens and pests. • All disturbed areas identified as very low, low, medium or high erosion risk must be suitably stabilised prior to anticipated rainfall, from the day that soil disturbances on the area have been finalised - IECA Table 4.4.7 in Appendix O. • Land-disturbing activities must: • Allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities. Where this cannot be achieved, reference should be made to installing controls as detailed in the following section. • Minimise soil erosion resulting from rain, water flow and/or wind. • Minimise adverse effects of sediment runoff, including safety issues. • Prevent, or at least minimise, environmental harm resulting from work-related soil erosion and sediment runoff. • Ensure that the value and use of land/properties adjacent to the site (including access roads) are not diminished as a result of the adopted ESC measures. • Additional and/or alternative ESC measures must be implemented in the event that unacceptable off-site sedimentation is occurring as a result of the work activities. • Sediment deposited off the site as a direct result of an on-site activity, must be collected and the area appropriately rehabilitated as soon as reasonable and practicable, and in a manner that considers the safety and environmental risks associated with the sediment deposition.
Wet weather contingency	• Wet season contingency planning to be conducted where activities extend into the wet season. • 7-day forecast from the Bureau of Meteorology (BOM) to be monitored and the seismic exploration activities planned around the forecasts. • Where forecasts indicate rainfall is likely to result in an event that has potential to limit access to the work area, the seismic contractor will stabilise the current work areas and go into standby mode until such time they can assess the track condition after an event to recommence activities. • Emergency response - a post-rainfall/flood damage reconnaissance and assessment will be undertaken as soon as area becomes accessible.

Activity	Management controls
	Any damage observed would be repaired as soon as practicable after the event.
Site rehabilitation	- Within 2 weeks of the activities being completed, disturbed areas are to be restored and/or rehabilitated. Reference should be made to Tamboran's Rehabilitation Management Plans. - All compacted areas will be ripped and scarified to promote regeneration of vegetation. - All disturbed areas will be allowed to naturally regenerate or be revegetated on completion of use. - At completion of activities, establish vegetation to the standard of that registered in the pre-assessment, or better. - All disturbed areas identified as very low, low, medium or high erosion risk must be suitably stabilised prior to anticipated rainfall, from the day that soil disturbances on the area have been finalized as per the requirements of IECA Table 4.4.7 (Appendix O). - Stabilise disturbed areas quickly to reduce the potential for erosion. - Previously removed vegetation and topsoil will be uniformly re-spread over disturbed area to assist with rehabilitation process through agencies of increased infiltration and return of seed-bearing topsoil. If required, additional native seed mix from the area could be respread to speed up rehabilitation process. This will be confirmed during rehabilitation monitoring activities. - This will be confirmed during rehabilitation monitoring activities. - Windrows to be removed as soon as practicable. - The type of ground cover applied to completed earthworks is compatible with the anticipated long-term land use, environmental risk, and site rehabilitation measures. - At completion, the disturbed areas are to be restored and/or rehabilitated to original pre-disturbed condition consistent with surrounding land use. - Remove and appropriately dispose of all synthetic erosion and sediment control materials.

6.3 ESC Treatment Options for Specific Situations

Appendix N to Appendix P contain typical erosion and sediment control measures that are to be applied throughout the project when required. Treatments are identified for specific situations and should be applied appropriately. Five different seismic line treatments are identified below.

- Blade up areas where only wheel tracks will develop – no treatments required.
- Surface bladed by grader to smooth out ground surface to allow vehicle movements. No tree removal. Topsoil will be bladed off by grader and windrowed for later respreading at completion of data recording, to preserve the soil structure. Whoa boys or roll over banks to be provided as per details in Appendix P.
 - At the conclusion of activities, or as part of progressive rehabilitation, or the anticipated onset of a significant rainfall event which will require the site to be abandoned, topsoil would be respread and ripped into the soil surface.
 - Works on grade (>2%)– Surface bladed by grader to smooth out ground surface to allow vehicle movements. No tree removal. Topsoil will be bladed off by grader and windrowed for later respreading at completion of data recording, to preserve the soil structure. Whoa boys or roll over banks to be provided as per details in Appendix P.
 - At the conclusion of activities, or as part of progressive rehabilitation, or the anticipated onset of a significant rainfall event which will require the site to be abandoned, topsoil would be respread and ripped into the soil surface.
- Wooded communities e.g. Lancewood/Bullwaddy – For most of the program wherever practical, activities should be planned to avoid impacts to Lancewood and Bullwaddy vegetation communities. Where this is not possible, the vegetation community would require measures as follows:
 - A survey line of 3.5 to 5 m maximum cleared by the dozer avoiding trees where possible, but selective clearing if required. Felled trees to be pushed to the nearby bushland to enable vehicle access through the site, but reinstated post survey.
 - Following clearing the topsoil bladed off by grader and windrowed for later respreading with the vegetated material at completion of data recording.
 - The line preparation will require blading to a sufficient depth, no greater than 150 mm, to enable the safe access of the vehicles where required. The purpose of the blading is to reduce the risk of tyre puncture from the Lancewood which is known to snap off at ground level leaving a spike protruding.
 - Whoa boys or roll over banks to be provided as per detail in Appendix P.
 - At the conclusion of activities, or as part of progressive rehabilitation, or the anticipated onset of a significant rainfall event which will require the site to be abandoned, topsoil would be respread at a thickness of 150 mm and ripped into the soil surface.
 - Felled vegetation will be evenly spread over the top soiled area to provide additional protection against erosion.
- Seasonally inundated areas - Similar to the wooded communities described above, high clay content soils (vertosols) are also found in seasonally inundated areas (i.e. wetlands/floodplains). Unlike the wooded areas these clays continue at depth, making the scraping back of topsoil less effective in keeping bulldust down and preserving soil structure.

The recommendation in these include:

- line preparation with vehicles traversing directly of the annual grasses, flattening or slashing for data acquisition i.e. blade up (noting bushfire precautions recommended).
- Where soils have been compacted in the seasonally inundated areas, a light ripping to break up the surface is recommended to promote growth of stratum 3 grasses.

7 Monitoring

7.1 Construction

Monitoring for soil erosion and related issues is best undertaken at critical stages, such as:

- At the time of the baseline land condition assessment.
- During siting of access tracks and exploration areas, this is when there is the greatest opportunity to avoid erosion problems.
- After completion of a specific phase of activity, all disturbed areas will be monitored before and after the wet season.
- When accessing the site after the wet season, all disturbed areas should be inspected for signs of erosion. If significant impacts are identified remediation works may need to be conducted prior to continued vehicular access.
- In the unlikely event that water is required to be released from the sediment pond, the stored water will be visually assessed (no sheen, or turbidity) and physical parameters (pH, EC) taken to ensure release water will not impact on any downgradient sensitive receiving environments (refer Section 7.3). It is noted that well sites do not have any sensitive receiving water bodies located in proximity to the sites.

When accessing the site after the wet season, all disturbed areas should be inspected for signs of erosion. If significant impacts are identified remediation works may need to be conducted.

7.2 Operations

Visual inspections will be undertaken throughout operational activities to assess the impact risk level of the regulated activities being undertaken and the likelihood of accelerated erosion occurring. A review of mitigation measures that are implemented throughout the project phase will be conducted regularly to assess the efficacy and that the standard is maintained.

All other areas to be inspected before and after the wet season to identify the occurrence of erosion and sedimentation. Where erosion is observed, maintenance activities shall be undertaken. Ongoing monitoring and maintenance shall occur throughout the life of the infrastructure until the land is handed back.

7.3 ESC Trigger Action Response Plan

The following Trigger Action Response Plan (TARP) is to be implemented during construction:

- Monitoring requirements:
 - 7-day forecast from Bureau of Meteorology (BOM) to be monitored and construction and ground disturbance activities to planned around the forecast.
 - Daily visual inspection of access track, lease pads and campsite conditions for duration of civil construction activities.

- Routine visual inspections of the creek and drainage line access track crossings and the wastewater containment system at the camp weekly or following a rainfall event (i.e. greater than 20 mm in 24 hours).
- Review ESC across the site and where required implement maintenance prior to 1 October each year.
- Action:
 - On establishment of each exploration well pad, undertake jar testing work to determine anticipated settling rate of sediments on site. This will inform flocculent dosing requirements as required.
 - Where monitoring has indicated weather condition have impacted the integrity of the erosion and sediment controls, operators must adopt one of the treatment plans from section 6.0 to mitigate the impacts of rainfall and ensure that the ESC devices are reinstated as soon as physically practicable after the event.
 - Inspection of all ESC devices across the worksite and physical water quality testing (physical parameters only) at the well pad sediment basin should be conducted prior to discharge of water offsite. Water quality discharge indicators include:
 - No visible oil, grease or other hydrocarbons
 - pH: Between 5.2 – 9.0¹
 - EC: 1,300 $\mu\text{S}/\text{cm}^2$

¹ The proposed minimum pH is reflective of observed regional rainfall pH levels, with pH levels of 5.24 observed at Daly Waters on March 20, 2024. Tamboran has observed pH levels on its enclosed tank lids and sediment basins around the pH of 5 level. Given the large volume of rainwater that falls on a site in a very short period, the pH in the sediment basin is anticipated to be low, before increasing as they interact with the receiving soils. This has been observed in sediment basins onsite, with pH increasing from 5.2 to 6.5 over several hours after a rainfall event due to the low buffer capacity of rainwater. Given the existing pH of rainwater is approximately 5.2, we believe this to be an appropriate release limit for stormwater.

² The proposed limit of 1,300 $\mu\text{S}/\text{cm}$ was chosen as it aligns with the EC of the Gum Ridge formation (the main source of water used on proposed sites) and the ANZECC short term irrigation guideline value for moderately sensitive crops (Table 9.2.5 of the ANZEC Guidelines (2000) Volume 3, Chapter 9, Primary industries).

The proposed EC limit is underpinned by modelling designed to assess the changing soil salinities and the potential for impact on the receiving vegetation types, including Eucalyptus, Acacia, Melaleuca species and native grasses which are common to the area. Many of these species have been shown to have a moderate to high tolerance to salinity.

The results of the modelling indicate the maximum root zone salinity will be in the order of 1.6 dS/m (for a sandy loam) to 1.7 dS/m (for a clay). This is below the likely vegetation root zone salinity of the vegetation types in the area. Also, the sodium adsorption ratio (SAR) for the Gum Ridge Formation was calculated at 2, which when combined with the EC values, indicates that the release of stormwater based on the revised release criteria is unlikely to cause soil structural issues.

The adopted discharge criteria are widely used by Tamboran at its other operational sites on EP 117, EP 98 and EP 76, with no negative effects on soil properties or native vegetation.

Response:

- Post-rainfall/flood damage reconnaissance and assessment to be undertaken as soon as the area becomes accessible. Any damage observed would be repaired as soon as practicable after the event and ensure the controls and measures are in place prior to the next rainfall event.
- If water quality conditions meet discharge indicators, beneficial reuse of water may be considered for construction activities.
- Maintain dewatering records for any sediment basins including pH, EC, visual description and volume of water dewatered.
- External NATA accredited laboratory testing of soil/sediment or surface water would only be required for the following triggers:
 - Work area has a known existing contaminating event in the preceding 3 months that could influence stormwater discharge quality (refer to Tamboran's Spill Management Plan appended to the EMP).
 - The visual inspection and physical water quality testing indicated potential contamination.
 - Where there is a sensitive receiving water body within 200 m of the discharge point.

7.4 Rehabilitation

7.4.1 Well Sites, SPCF, SWP, Access Tracks, Gathering Lines, Gravel Pits and Camps

Where rehabilitation of a site is required, rehabilitation monitoring will be undertaken annually to assess the rehabilitation success and determine whether additional remedial works are required. Success criteria are defined in the relevant EMP and include:

- Safe for humans and wildlife
- Non-polluting
- Stable, with appropriate vegetation cover
- Land condition suitable for existing pastoral land use.

7.4.2 Seismic Line Acquisition

Rehabilitation will be undertaken along all newly cleared survey lines concurrently with the completion of the survey process. Reference should be made to the relevant Rehabilitation Management Plan prepared in support of each EMP. Rehabilitation of all areas must be undertaken in accordance with the methodologies described in the Rehabilitation Management Plan and treatments in Appendix P of this document.

Rehabilitation monitoring will be undertaken before and after the initial wet season and then annually for 5 years to assess the rehabilitation success and determine whether additional remedial works are required. Success criteria are defined in the relevant EMP and include:

- safe for humans and wildlife
- non-polluting
- stable, with appropriate vegetation cover
- waterways are not materially changed.
- land condition suitable for existing pastoral land use.

7.5 Incident Reporting

The constructor must follow incident reporting requirements covered in the Tamboran incident management directive.

Sediment release and turbidity increase incidents can require some assessment to determine if they are reportable, as controls are only designed to cope with certain rain events (refer to IECA, 2008).

The constructor must:

- Report sediment release and turbidity increase incidents.
- Include justification in each case of why the incident is, or is not, reportable to the regulator based on:
 - The state of the controls prior to the rainfall
 - The design standard applied (IECA, 2008)
 - The actual rainfall received, based on the nearest data source available
 - Whether the design storm event was exceeded or not; and
 - Whether environmental harm was caused or not.

7.6 Records

Records shall be retained demonstrating areas have been inspected. Photographic records will be maintained over the duration of the activities for documenting soil disturbance.

All environmentally relevant incidents are to be recorded in a field log that must remain accessible to all relevant regulatory authorities.

Minimum records to be retained for each site include:

Location of disturbance	Area of disturbance	Date	Close out
-------------------------	---------------------	------	-----------

7.7 ESCP Revisions

Where major changes are required to the proposed ESC controls available to be deployed and/or the ESC philosophy in the ESCP through Tamboran's change management processes, the changes would be reviewed by a suitably qualified person (CPESC). Should any civil works be required during the wet season, the wet weather contingency plan outlined in Table 13 will be implemented.

Where new sites are added to this ESCP without any alteration to the controls or ESC philosophy outlined under the ESCP and where the erosion hazard does not change, this is considered to be a minor amendment to the ESCP and will not require CPESC review.

7.8 Maintenance

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 project.

When undertaking construction work, erosion and sediment control measures must be inspected:

- at least daily (when work is occurring on-site during the wet season)
- within 24 hours of expected rainfall
- within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff on-site or greater than 20 mm in 24 hours.

Once operational, inspections of the site will continue daily while onsite, and before and after the wet season. Where erosion is observed, maintenance activities shall be undertaken.

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. Laboratory testing will be required to determine contamination status, however if consistent with surrounding natural environment and can be returned to site.

Prior to the completion of activities on the ground, the construction areas will be stabilised to the satisfaction of the construction supervisor.

8 References

- APGA. 2019. *Upstream Polyethylene Gathering Networks – CSG Industry Code of Practice* (Version 5.0 August 2019). Australian Pipelines and Gas Association, QLD.
- Catchment and Creeks Pty Ltd. 2012. *Erosion & Sediment Control – A Field Guide for Construction Site Managers V5*. Catchment and Creeks. Brisbane. QLD.
- Department of Agriculture, Fisheries and Forestry. 2013. *Code for Self-Assessable Development Minor Waterway Barrier Works Part 4: Bed Level Crossings Code Number WWBW01 April 2013*. State of Queensland, Qld.
- Department of Environment, Parks and Water Security (DEPWS) 2024. *Land Clearing Guidelines*. Version 2. Northern Territory Government.
- IECA. 2008. *Best Practice Erosion and Sediment Control – for building and construction sites*. Picton, NSW: International Erosion Control Association (Australasia).
- IECA & Australian Pipelines and Gas Association Ltd (APGA). 2015. *Appendix P: Land-Based Pipeline Construction* (addendum to IECA 2008). Picton, NSW: International Erosion Control Association (Australasia).
- Scientific Inquiry into Hydraulic Fracturing in the Northern Territory. 2018. *Scientific Inquiry into Hydraulic Fracturing in the Northern Territory – Final Report*.

APPENDIX A Erosion hazard assessment explanatory notes

reference: IECA, 2008, *Best Practice Erosion and Sediment Control Hazard Assessment Form*)

Requirements: Specific issues or actions required by the proponent.

Warnings: Issues that should be considered by the proponent.

Comments: General information relating to the topic.

[1] REQUIREMENTS:

For sites with an average slope of proposed land disturbance greater than 10%, a preliminary ESCP must be submitted to the regulatory authority for approval during planning negotiations.

Proponents must demonstrate that adequate erosion and sediment control measures can be implemented on-site to effectively protect downstream environmental values.

If site or financial constraints suggest that it is not reasonable or practicable for the prescribed water quality objectives to be achieved for the proposal, then the proponent must demonstrate that alternative designs or construction techniques (e.g. pole homes, suspended slab) cannot reasonably be implemented on the site.

WARNINGS:

Steep sites usually require more stringent drainage and erosion controls than flatter grade sites.

COMMENTS:

The steeper the land, the greater the need for adequate drainage controls to prevent soil and mulch from being washed from the site.

[2] REQUIREMENTS:

If the actual soil K-factor is known from soil testing, then the Score shall be determined from Table 1.

If a preliminary ESCP is required during planning negotiations, then it must be demonstrated that adequate space is available for the construction and operation of any major sediment traps, including the provision for any sediment basins and their associated embankments and spillways. It must also be demonstrated that all reasonable and practicable measures can be taken to divert the maximum quantity of sediment-laden runoff (up to the specified design storm) to these sediment traps throughout the construction phase and until the contributing catchment is adequately stabilised against erosion.

WARNINGS: -

The higher the point score, the greater the need to protect the soil from raindrop impact and thus the greater the need for effective erosion control measures. A point score of 2 or greater will require a greater emphasis to be placed on revegetation techniques that do not expose the soil to direct rainfall contact during vegetation establishment, e.g. turfing and *Hydro mulching*.

COMMENTS:

Table 2 provides an *indication* of soil conditions likely to be associated with a particular Soil group based on a statistical analysis of soil testing across NSW. This table provides only an initial estimate of the likely soil conditions.

The left-hand-side of the table provides an indication of the type of sediment basin that will be required (Type C, F or D). The right-hand-side of the table provides an indication of the likely erodibility of the soil based on the Revised Universal Soil Loss Equation (RUSLE) K-factor.

Table 3 provides some general comments on the erosion potential of the various soil groups.

Table 1 – Score if soil K-factor is known

	RUSLE soil erodibility K-factor			
	K < 0.02	0.02<K<0.04	0.04<K<0.06	K > 0.06
Score	0	1	2	3

Table 2 – Statistical analysis of NSW soil data ^[1]

Unified Soil Class System	Likely sediment basin classification (%)			Probable soil erodibility K-factor (%) ^[2]			
	Dry	Wet		Low	Moderate	High	Very High
	Type C	Type F	Type D	K < 0.02	0.02<K<0.04	0.04<K<0.06	K > 0.06
GM	30	58	12	12	51	26	12
GC	42	33	25	13	71	17	0
SW	40	48	12	49	39	12	0
SP	53	32	15	76	18	5	1
SM	21	67	12	26	48	25	1
SC	26	50	24	16	64	18	2
ML	5	63	32	4	35	45	16
CL	9	51	39	12	56	19	13
OL	2	80	18	34	61	5	1
MH	12	41	48	15	19	41	25
CH	5	44	51	39	43	11	7

Notes: [1] Analysis of soil data presented in Landcom (2004).

[2] Soil erodibility based on Revised Universal Soil Loss Equation (RUSLE) K-factor.

Unified Soil Classification System (USCS)

- GW Well graded gravels, gravel-sand mixtures, little or no fines
- GP Poorly graded gravels, gravel-sand mixture, little or no fines
- GM Silty gravels, poorly graded gravel-sand-silt mixtures
- GC Clayey gravels, poorly graded gravel-sand-clay mixtures
- SW Well graded sands, gravelly sands, little or no fines
- SP Poorly graded sands, gravelly sands, little or no fines
- SM Silty sands, poorly graded sand-silt mixtures
- SC Clayey sands, poorly graded sand-clay mixtures
- ML Inorganic silts & very fine sands, rock flour, silty or clayey fine sands with slight plasticity
- CL Inorganic clays, low-medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
- OL Organic silts and organic silt-clays of low plasticity
- MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
- CH Inorganic clays of high plasticity, fat clays
- OH Organic clays of medium to high plasticity

Table 3 – Typical properties of various soil groups ^[1]

Soil Groups	Typical properties ^[2]
GW, GP	Low erodibility potential.
GM, GC	Low to medium erodibility potential. May create turbid runoff if disturbed as a result of the release of silt and clay particles.
SW, SP	Low to medium erodibility potential.
SM, SC	Medium erodibility potential. May create turbid runoff if disturbed as a result of the release of silt and clay particles.
MH, CH	Highly variable (low to high) erodibility potential. Will generally create turbid runoff if disturbed.
ML, CL	High erodibility potential. Tendency to be dispersive. May create some turbidity in runoff if disturbed.

Note: [1] After Soil Services & NSW DLWC (1998).

[2] Any soil can represent a high erosion risk if the binding clays or silts are unstable.

Table 4 provides **general** guidelines on the suitability of various soil groups to various engineering applications.

Table 4 – Engineering suitability based on Unified Soil Classification ^[1]

Unified Soil Class	USC Group	Embankments		Fill	Slope stability	Untreated roads
		Water retaining	Non- water retaining			
Well graded gravels	GW	Unsuitable	Excellent	Excellent	Excellent	Average
Poorly graded gravel	GP	Unsuitable	Average	Excellent	Average	Unsuitable
Silty gravels	GM	Unsuitable	Average	Good	Average	Average
Clayey gravels	GC	Suitable	Average	Good	Average	Excellent
Well graded sands	SW	Unsuitable	Excellent	Excellent	Excellent	Average
Poorly graded sands	SP	Unsuitable	Average	Good	Average	Unsuitable
Silty sands	SM	Suitable [2]	Average	Average	Average	Poor
Clayey sands	SC	Suitable	Average	Average	Average	Good
Inorganic silts	ML	Unsuitable	Poor	Average	Poor	Unsuitable
Inorganic clays	CL	Suitable [2]	Good	Average	Good	Poor
Organic silts	OL	Unsuitable	Unsuitable	Poor	Unsuitable	Unsuitable
Inorganic silts	MH	Unsuitable	Poor	Poor	Poor	Unsuitable
Inorganic clays	CH	Suitable [2]	Average	Unsuitable	Average	Unsuitable
Organic clays	OH	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Unsuitable
Highly organic soils	Pt	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Unsuitable

Unified Soil Class	USC Group	Embankments		Fill	Slope stability	Untreated roads
		Water retaining	Non- water retaining			
Notes: [1] Modified from Hazelton & Murphy (1992)						
[2] Suitable only after modifications to soil such as compaction and/or erosion protection						

- [3] If the soils have not been tested for Emerson Class, then adopt a score of 4.

REQUIREMENTS:

Works proposed on sites containing Emerson Class 1 or 2 soils have a very high pollution potential and must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the authority) during planning negotiations.

WARNINGS:

Class 3 and 5 soils disturbed by cut and fill operations or construction traffic are highly likely to discolour stormwater (i.e. cause turbid runoff). Chemical stabilisation will likely be required if these soils are placed immediately adjacent to a retaining wall. Any disturbed Class 1, 2, 3 and 5 soils that are to be revegetated must be covered with a non-dispersive topsoil as soon as possible (unless otherwise agreed by the regulatory authority).

Class 1 and 2 soils are highly likely to discolour (pollute) stormwater if exposed to rainfall or flowing water. Treatment of these soils with gypsum (or other suitable substance) will most likely be required. These soils should not be placed directly behind a retaining wall unless it has been adequately treated (stabilised) or covered with a non-dispersible soil.

- [4] The duration of disturbance refers to the total duration of soil exposure to rainfall up until a time when there is at least 70% coverage of all areas of soil.

REQUIREMENTS:

All land developments with an expected soil disturbance period greater than 6 months must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the authority) during planning negotiations.

COMMENTS:

Construction periods greater than 3 months will generally experience at least some significant storm events, independent of the time of year that the construction (soil disturbance) occurs.

- [5] **REQUIREMENTS:**

Development proposals with an expected soil disturbance in excess of 1ha must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the regulatory authority) during planning negotiations.

The area of disturbance refers to the total area of soil exposed to rainfall or dust-producing winds either as a result of:

- (a) the removal of ground cover vegetation, mulch or sealed surfaces;
- (b) past land management practices;
- (c) natural conditions.

WARNINGS:

A *Sediment Basin* will usually be required if the disturbed area exceeds 0.25ha (2500m²) within any sub-catchment (i.e. land flowing to one outlet point).

COMMENTS:

For soil disturbances greater than 0.25ha, the revegetation phase should be staged to minimise the duration for which soils are exposed to wind, rain and concentrated runoff.

- [6] **REQUIREMENTS:**

All developments that involve earthworks or construction within a natural watercourse (whether that

watercourse is in a natural or modified condition) must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the regulatory authority) during planning negotiations.

Permits and/or licences may be required from the State Government, including possible submission of the ESCP to the relevant Government department.

[7] **REQUIREMENTS:**

No areas of soil disturbance shall be left exposed to rainfall or dust-producing winds at the end of a development without an adequate degree of protection and/or an appropriate action plan for the establishment of at least 70% cover.

COMMENTS:

Grass seeding without the application of a light mulch cover is considered the least favourable revegetation technique. A light mulch cover is required to protect the soil from raindrop impact, excessive temperature fluctuations, and the loss of essential soil moisture.

[8] **COMMENTS:**

All receiving waters can be adversely affected by unnatural quantities of sediment-laden runoff. Freshwater ecosystems are generally more susceptible to ecological harm resulting from the inflow of fine or dispersible clays than saline water bodies. The further inland a land disturbance is, the greater the potential for the released sediment to cause environmental harm as this sediment travels towards the coast.

For the purpose of this clause it is assumed that all sediment-laden runoff will eventually flow into saline waters. Thus, sediment-laden discharges that flow first into freshwater are likely to adversely affect both fresh and saline water bodies and are therefore considered potentially more damaging to the environment.

This clause does **not** imply that sediment-laden runoff will not cause harm to saline waters.

[9] **COMMENTS:**

This clause refers to subsoils exposed during the construction phase either as a result of past land practices or proposed construction activities. The exposure of subsoils resulting from the excavation of minor service trenches should not be considered.

[10] **WARNINGS:**

The greater the extent of external catchment, the greater the need to divert up-slope stormwater runoff around any soil disturbance.

COMMENTS:

The ability to separate "clean" (i.e. external catchment) stormwater runoff from "dirty" site runoff can have a significant effect on the size, efficiency and cost of the temporary drainage, erosion, and sediment control measures.

[11] **REQUIREMENTS:**

Permission must be obtained from the owner of a road reserve before placing any erosion and sediment control measures within the road reserve.

WARNINGS:

Few sediment control techniques work efficiently when placed on a road and/or around roadside stormwater inlets. Great care must be taken if sediment control measures are located on a public roadway, specifically:

- safety issues relating to road users;
- the risk of causing flooding on the road or within private property.

The construction of roads (whether temporary or permanent) will usually modify the flow path of stormwater runoff. This can affect how "dirty" site runoff is directed to the sediment control measures.

COMMENTS:

"On-road" sediment control devices are at best viewed as secondary or supplementary sediment control measures. Only in special cases and/or on very small projects (e.g. kerb and channel replacement) might these controls be considered as the "primary" sediment control measure.

[12] **WARNINGS:**

Soils with a pH less than 5.5 or greater than 8 will usually require treatment in order to achieve satisfactory revegetation. Soils with a pH of less than 5 (whether naturally acidic or in acid sulfate soil areas) may also

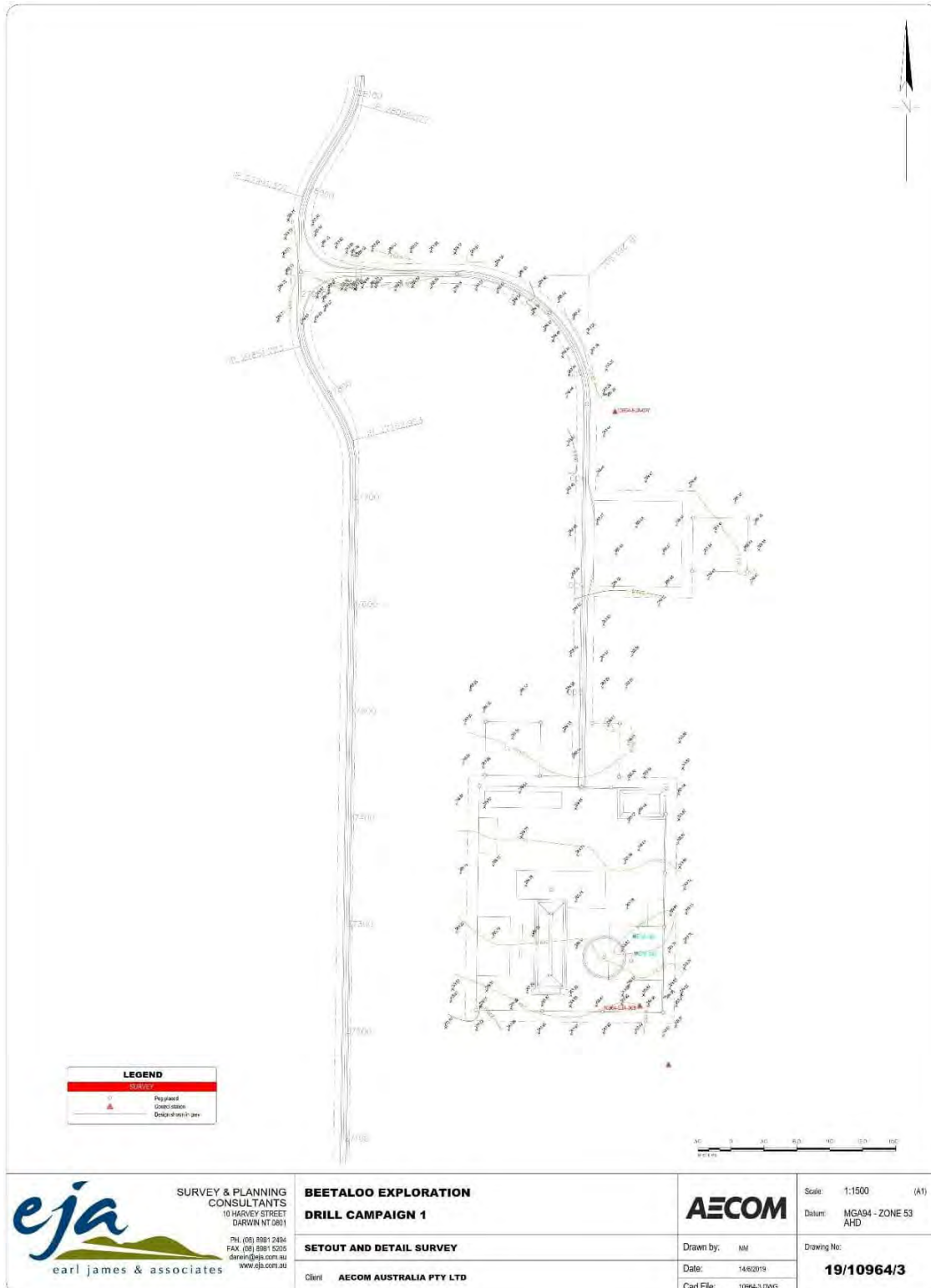
limit the choice of chemical flocculants (e.g. Alum) for use in the flocculation of *Sediment Basins*.

[13] **REQUIREMENTS:**

A preliminary ESCP must be submitted to the local government for approval during the planning phase for any development that obtains a total point score of 17 or greater or when any trigger value is scored or exceeded.

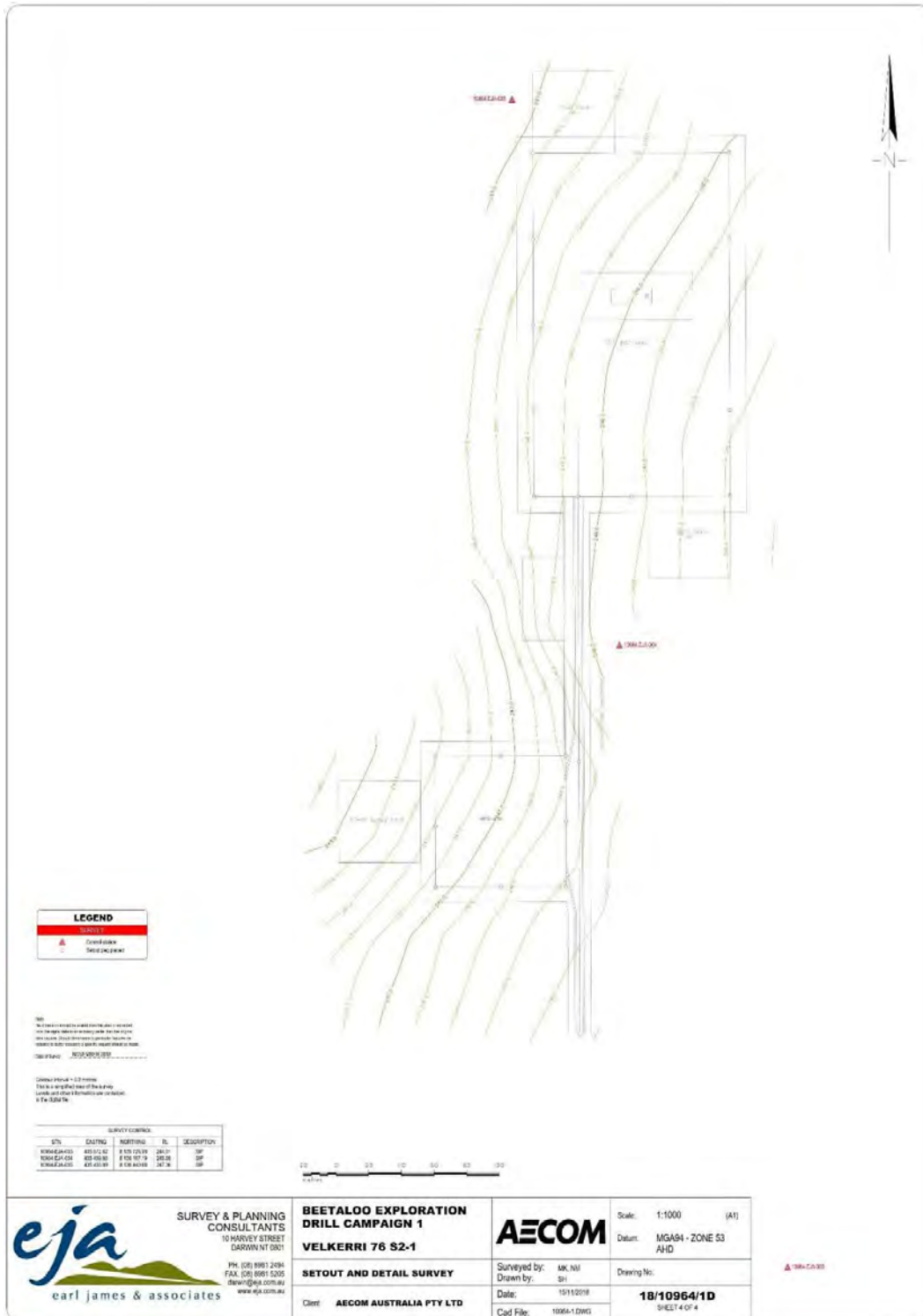
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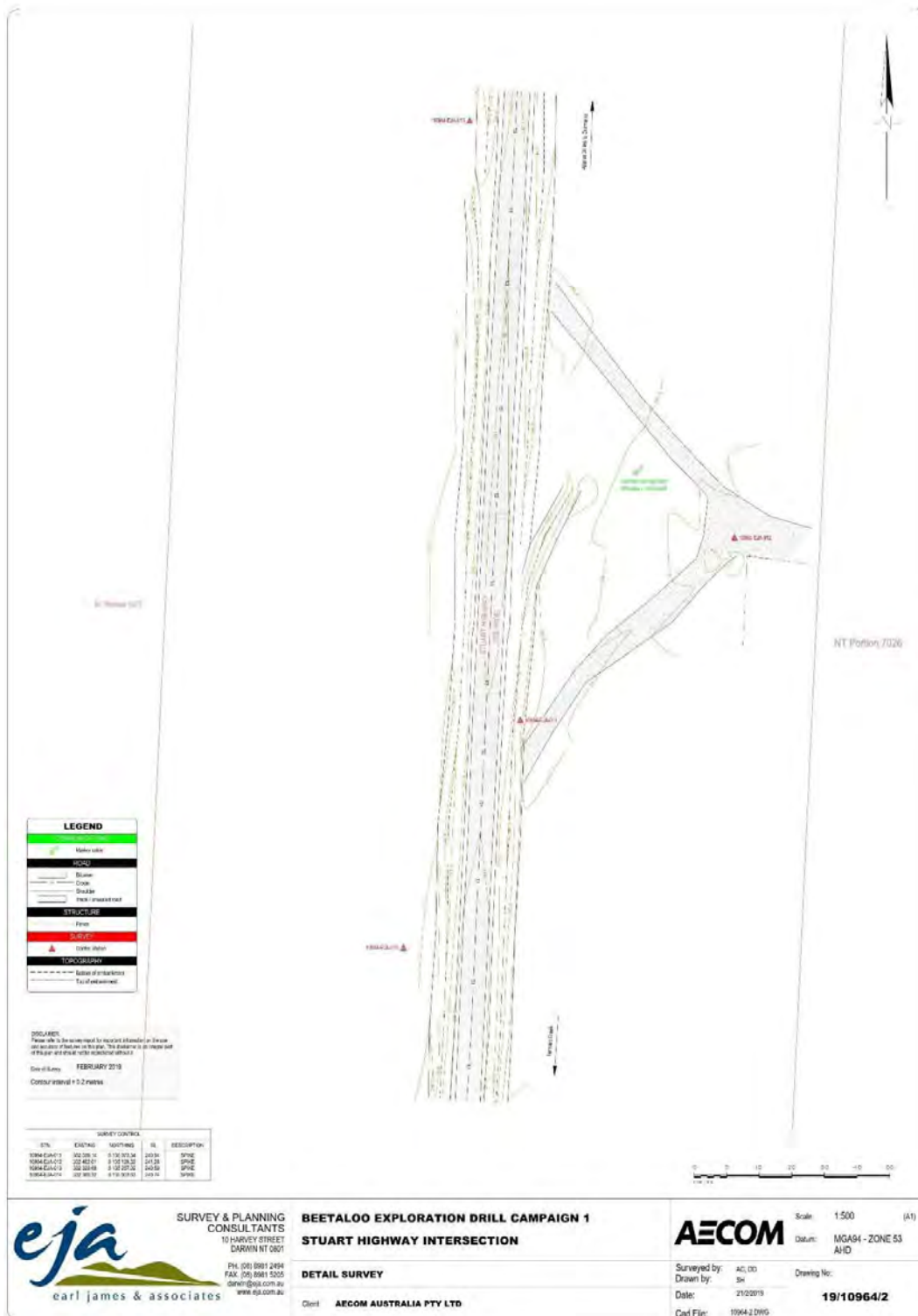
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Review due: 01/10/25

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APPENDIX C Geotechnical laboratory results

Material Test Report

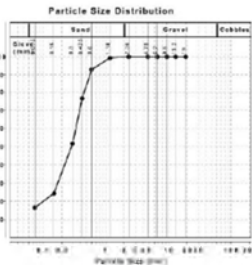
Report Number: 877612-80-1
Issue Number: 2 - This version supersedes all previous issues
Date Issued: 29/01/2019
Client: ALCOA Australia Pty Ltd
PO Box 73, Hunter Region NSW 2310
Contact: Jane Emsberg
Project Number: 877612-00
Project Name: 6040248 - Borehole soil samples
Project Location: 6040248, NT
Work Request: 1486
Sample Number: 19-1486G
Date Sampled: 13/12/2018
Sampling Method: AS1289 1.2.1.6.4 - Sampling from layers in earthworks or pavement - undisturbed (compacted)
Sample Location: KYALLA2 (8.8 - 8.4m)
Material: SAND, with silt

Sieve	Percent %	Passing Limits
19 mm	100	
15.2 mm	100	
9.5 mm	100	
6.7 mm	100	
4.75 mm	100	
2.36 mm	100	
1.18 mm	99	
0.6 mm	92	
0.425 mm	78	
0.3 mm	52	
0.15 mm	24	
0.075 mm	16	

Atterberg Limit (AS1289 3.1.2 & 3.1.6, 3.3.1)	Min	Max
Sample History	Air Dried	
Preparation Method	Dry Sieve	
Liquid Limit (%)	Not Determined	
Plastic Limit (%)	Not Determined	
Plasticity Index (%)	Non Plastic	

Linear Shrinkage (AS1289 3.6.1)	Min	Max
Linear Shrinkage (%)	0.0	
Cracking / Crumpling / Curling	None	

Mixture Content (AS 1289 2.1.1)	Min	Max
Mixture Content (%)	3.9	



Material Test Report

Douglas Partners
Borehole - Borehole
Douglas Partners Pty Ltd
Borehole Laboratory
Unit 214 Cayula Dr COOCHUPAT GROVE NT 1611
Phone: (08) 894 6300
Fax: (08) 894 6300
Email: sales@dpresources.com.au
Accredited to compliance with ISO/IEC 17025 - Testing
Approved Signatory: Gail Wilson
Engineering Director
NATA Accredited Laboratory Number: 308



Material Test Report

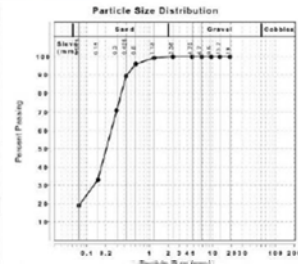
Report Number: 877612-80-1
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Date Issued: 29/01/2019
Client: ALCOA Australia Pty Ltd
PO Box 73, Hunter Region NSW 2310
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Project Number: 877612-00
Project Name: 6040248 - Borehole soil samples
Project Location: 6040248, NT
Work Request: 1486
Sample Number: 19-1486G
Date Sampled: 13/12/2018
Sampling Method: AS1289 1.2.1.6.4 - Sampling from layers in earthworks or pavement - undisturbed (compacted)
Sample Location: KYALLA2 (8.8 - 8.4m)
Material: Silty SAND

Sieve	Percent %	Passing Limits
19 mm	100	
15.2 mm	100	
9.5 mm	100	
6.7 mm	100	
4.75 mm	100	
2.36 mm	100	
1.18 mm	99	
0.6 mm	96	
0.425 mm	77	
0.3 mm	71	
0.15 mm	33	
0.075 mm	19	

Atterberg Limit (AS1289 3.1.2 & 3.1.6, 3.3.1)	Min	Max
Sample History	Air Dried	
Preparation Method	Dry Sieve	
Liquid Limit (%)	14	
Plastic Limit (%)	13	
Plasticity Index (%)	1	

Linear Shrinkage (AS1289 3.6.1)	Min	Max
Linear Shrinkage (%)	0.0	
Cracking / Crumpling / Curling	Cracking	

Mixture Content (AS 1289 2.1.1)	Min	Max
Mixture Content (%)	3.7	



Material Test Report

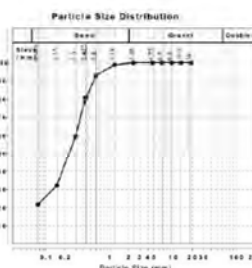
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Issue Number: 2 - This version supersedes all previous issues
Date Issued: 29/01/2019
Client: ALCOA Australia Pty Ltd
PO Box 73, Hunter Region NSW 2310
Contact: Jane Emsberg
Project Number: 877612-00
Project Name: 6040248 - Borehole soil samples
Project Location: 6040248, NT
Work Request: 1486
Sample Number: 19-1486H
Date Sampled: 13/12/2018
Sampling Method: AS1289 1.2.1.6.4 - Sampling from layers in earthworks or pavement - undisturbed (compacted)
Sample Location: KYALLA3 (8.8 - 8.4m)
Material: Silty SAND

Sieve	Percent %	Passing Limits
19 mm	100	
15.2 mm	100	
9.5 mm	100	
6.7 mm	100	
4.75 mm	100	
2.36 mm	100	
1.18 mm	99	
0.6 mm	94	
0.425 mm	81	
0.3 mm	69	
0.15 mm	32	
0.075 mm	22	

Atterberg Limit (AS1289 3.1.2 & 3.1.6, 3.3.1)	Min	Max
Sample History	Air Dried	
Preparation Method	Dry Sieve	
Liquid Limit (%)	15	
Plastic Limit (%)	13	
Plasticity Index (%)	2	

Linear Shrinkage (AS1289 3.6.1)	Min	Max
Linear Shrinkage (%)	0.5	
Cracking / Crumpling / Curling	Cracking	

Mixture Content (AS 1289 2.1.1)	Min	Max
Mixture Content (%)	3.1	



Material Test Report

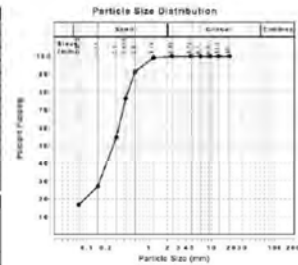
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Issue Number: 2 - This version supersedes all previous issues
Date Issued: 29/01/2019
Client: ALCOA Australia Pty Ltd
PO Box 73, Hunter Region NSW 2310
Contact: Jane Emsberg
Project Number: 877612-00
Project Name: 6040248 - Borehole soil samples
Project Location: 6040248, NT
Work Request: 1486
Sample Number: 19-1486H
Date Sampled: 13/12/2018
Sampling Method: AS1289 1.2.1.6.4 - Sampling from layers in earthworks or pavement - undisturbed (compacted)
Sample Location: KYALLA4 (8.8 - 8.4m)
Material: Silty SAND

Sieve	Percent %	Passing Limits
19 mm	100	
15.2 mm	100	
9.5 mm	100	
6.7 mm	100	
4.75 mm	100	
2.36 mm	100	
1.18 mm	99	
0.6 mm	91	
0.425 mm	77	
0.3 mm	69	
0.15 mm	27	
0.075 mm	17	

Atterberg Limit (AS1289 3.1.2 & 3.1.6, 3.3.1)	Min	Max
Sample History	Air Dried / Air Dried / Natural	
Preparation Method	Wet Sieve / Dry Sieve / Both Sieves	
Liquid Limit (%)	15	
Plastic Limit (%)	13	
Plasticity Index (%)	2	

Linear Shrinkage (AS1289 3.6.1)	Min	Max
Linear Shrinkage (%)	0.5	
Cracking / Crumpling / Curling	Cracking	

Mixture Content (AS 1289 2.1.1)	Min	Max
Mixture Content (%)	2.0	



Review due: 01/10/25

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Erosion and Sediment Control Plan

Doc #: TB2-HSE-MP-12

Material Test Report

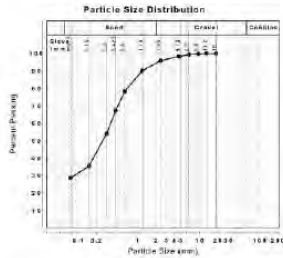
Report Number: 677612-00-1
Issue Number: 2 - This version supersedes all previous issues
Date Issued: 20/01/2019
Client: AECOM Australia Pty Ltd
 PO Box 73, Hunter Region NSW 2310
Contact: Jaco Emborg
Project Number: 677612-00
Project Name: 60480548 - Beetaloo soil samples
Project Location: Beetaloo, NT
Work Request: 1496
Sample Number: 19-1496A
Date Sampled: 13/12/2018
Sampling Method: AS1289 1.2.1 6.4 - Sampling from layers in earthworks or pavement - uncompacted/compacted
Sample Location: VELKERRIE (0.0 - 0.4m)
Material: Silty SAND, trace gravel

Douglas Partners

Accredited for compliance with ISO/IEC 17025 - Testing
 Unit 214 Cayula Ct COCONUT GROVE NT 0810
 Phone: (08) 8448 6800
 Fax: (08) 8448 6809
 Email: douglaspartners@douglaspartners.com.au



Approved Signatory: Dave Milner
 Engineering Geologist
 NATA Accredited Laboratory Number: 607



Material Test Report

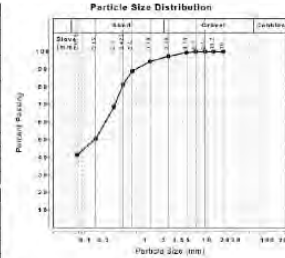
Report Number: 677612-00-1
Issue Number: 2 - This version supersedes all previous issues
Date Issued: 20/01/2019
Client: AECOM Australia Pty Ltd
 PO Box 73, Hunter Region NSW 2310
Contact: Jaco Emborg
Project Number: 677612-00
Project Name: 60480548 - Beetaloo soil samples
Project Location: Beetaloo, NT
Work Request: 1496
Sample Number: 19-1496B
Date Sampled: 13/12/2018
Sampling Method: AS1289 1.2.1 6.4 - Sampling from layers in earthworks or pavement - uncompacted/compacted
Sample Location: VELKERRIE (0.0 - 0.4m)
Material: Silty SAND

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 Email: douglaspartners@douglaspartners.com.au



Approved Signatory: Dave Milner
 Engineering Geologist
 NATA Accredited Laboratory Number: 607



Material Test Report

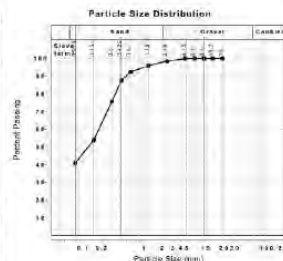
Report Number: 677612-00-1
Issue Number: 2 - This version supersedes all previous issues
Date Issued: 20/01/2019
Client: AECOM Australia Pty Ltd
 PO Box 73, Hunter Region NSW 2310
Contact: Jaco Emborg
Project Number: 677612-00
Project Name: 60480548 - Beetaloo soil samples
Project Location: Beetaloo, NT
Work Request: 1496
Sample Number: 19-1496C
Date Sampled: 13/12/2018
Sampling Method: AS1289 1.2.1 6.4 - Sampling from layers in earthworks or pavement - uncompacted/compacted
Sample Location: VELKERRIE (0.0 - 0.4m)
Material: Silty SAND

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Material Test Report

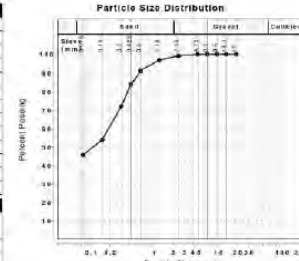
Report Number: 677612-00-1
Issue Number: 2 - This version supersedes all previous issues
Date Issued: 20/01/2019
Client: AECOM Australia Pty Ltd
 PO Box 73, Hunter Region NSW 2310
Contact: Jaco Emborg
Project Number: 677612-00
Project Name: 60480548 - Beetaloo soil samples
Project Location: Beetaloo, NT
Work Request: 1496
Sample Number: 19-1496D
Date Sampled: 13/12/2018
Sampling Method: AS1289 1.2.1 6.4 - Sampling from layers in earthworks or pavement - uncompacted/compacted
Sample Location: VELKERRIE (0.0 - 0.4m)
Material: Silty SAND

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 NATA Accredited Laboratory Number: 607



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Erosion and Sediment Control Plan
Doc #: TB2-HSE-MP-12

Material Test Report

Report Number: 215285.00-1
Issue Number: 1
Date Issued: 13/05/2022
Client: AECOM Australia Pty Ltd
PO Box 3175, Darwin NT 0801
Contact: David van de Hoek
Project Number: 215285.00
Project Name: Project 60623736 - February
Project Location: Not Supplied, - NT
Client Reference: Project 60623736
Work Request: 4176
Sample Number: DW-4176B
Date Sampled: 05/05/2022
Dates Tested: 10/05/2022 - 12/05/2022
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: AMS2 - Gravel Pit, Amungee NW3
Material: Silty Sandy Gravel

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
19 mm	100	
13.2 mm	95	
9.5 mm	88	
6.7 mm	83	
4.75 mm	75	
2.36 mm	54	
1.18 mm	48	
0.6 mm	46	
0.425 mm	46	
0.3 mm	43	
0.15 mm	29	
0.075 mm	19	

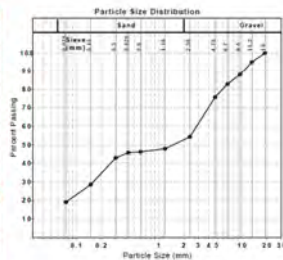
Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		
Sample History	Air Dried	
Preparation Method	Wet Sieve	
Liquid Limit (%)	Not Obtainable	
Plastic Limit (%)	Not Obtainable	
Plasticity Index (%)	Non Plastic	

Linear Shrinkage (AS1289 3.4.1)		
Moisture Condition Determined By	AS 1289 3.1.2	
Linear Shrinkage (%)	0.0	
Cracking Crumpling Curling	Cracking	

Emerson Class Number of a Soil (AS 1289 3.8.1)		
Emerson Class	5	
Soil Description	Natural Soil	
Nature of Water	Demineralised Water	
Temperature of Water (°C)	26.5	

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Laboratory Manager
Laboratory Accreditation Number: 828



Material Test Report

Report Number: 215285.00-1
Issue Number: 1
Date Issued: 13/05/2022
Client: AECOM Australia Pty Ltd
PO Box 3175, Darwin NT 0801
Contact: David van de Hoek
Project Number: 215285.00
Project Name: Project 60623736 - February
Project Location: Not Supplied, - NT
Client Reference: Project 60623736
Work Request: 4176
Sample Number: DW-4176C
Date Sampled: 05/05/2022
Dates Tested: 10/05/2022 - 12/05/2022
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: AMS2 Amungee NW3
Material: Silty Gravel

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
19 mm	100	
13.2 mm	99	
9.5 mm	97	
6.7 mm	92	
4.75 mm	83	
2.36 mm	59	
1.18 mm	52	
0.6 mm	52	
0.425 mm	51	
0.3 mm	50	
0.15 mm	41	
0.075 mm	32	

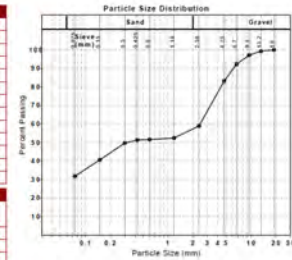
Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		
Sample History	Air Dried	
Preparation Method	Wet Sieve	
Liquid Limit (%)	16	
Plastic Limit (%)	10	
Plasticity Index (%)	6	

Linear Shrinkage (AS1289 3.4.1)		
Moisture Condition Determined By	AS 1289 3.1.2	
Linear Shrinkage (%)	2.5	
Cracking Crumpling Curling	Cracking	

Emerson Class Number of a Soil (AS 1289 3.8.1)		
Emerson Class	2	
Soil Description	Natural Soil	
Nature of Water	Demineralised Water	
Temperature of Water (°C)	25.6	

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Material Test Report

Report Number: 215285.00-1
Issue Number: 1
Date Issued: 13/05/2022
Client: AECOM Australia Pty Ltd
PO Box 3175, Darwin NT 0801
Contact: David van de Hoek
Project Number: 215285.00
Project Name: Project 60623736 - February
Project Location: Not Supplied, - NT
Client Reference: Project 60623736
Work Request: 4176
Sample Number: DW-4176D
Date Sampled: 05/05/2022
Dates Tested: 10/05/2022 - 12/05/2022
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: AMS3, Amungee NW4
Material: Silty Sandy Gravel

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
19 mm	100	
13.2 mm	99	
9.5 mm	97	
6.7 mm	86	
4.75 mm	76	
2.36 mm	59	
1.18 mm	51	
0.6 mm	50	
0.425 mm	49	
0.3 mm	47	
0.15 mm	36	
0.075 mm	27	

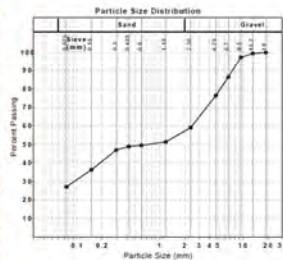
Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		
Sample History	Air Dried	
Preparation Method	Wet Sieve	
Liquid Limit (%)	14	
Plastic Limit (%)	12	
Plasticity Index (%)	2	

Linear Shrinkage (AS1289 3.4.1)		
Moisture Condition Determined By	AS 1289 3.1.2	
Linear Shrinkage (%)	1.0	
Cracking Crumpling Curling	Cracking	

Emerson Class Number of a Soil (AS 1289 3.8.1)		
Emerson Class	8	
Soil Description	Natural soil	
Nature of Water	Demineralised Water	
Temperature of Water (°C)	26.6	

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Material Test Report

Report Number: 215285.00-1
Issue Number: 1
Date Issued: 13/05/2022
Client: AECOM Australia Pty Ltd
PO Box 3175, Darwin NT 0801
Contact: David van de Hoek
Project Number: 215285.00
Project Name: Project 60623736 - February
Project Location: Not Supplied, - NT
Client Reference: Project 60623736
Work Request: 4176
Sample Number: DW-4176E
Date Sampled: 05/05/2022
Dates Tested: 10/05/2022 - 12/05/2022
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: AMS4 Amungee NWS
Material: Clayey Sandy Gravel

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
19 mm	100	
13.2 mm	97	
9.5 mm	94	
6.7 mm	90	
4.75 mm	83	
2.36 mm	64	
1.18 mm	54	
0.6 mm	52	
0.425 mm	51	
0.3 mm	49	
0.15 mm	38	
0.075 mm	28	

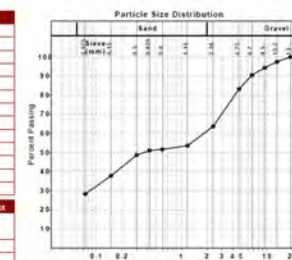
Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		
Sample History	Air Dried	
Preparation Method	Wet Sieve	
Liquid Limit (%)	21	
Plastic Limit (%)	11	
Plasticity Index (%)	10	

Linear Shrinkage (AS1289 3.4.1)		
Moisture Condition Determined By	AS 1289 3.1.2	
Linear Shrinkage (%)	4.0	
Cracking Crumpling Curling	Cracking	

Emerson Class Number of a Soil (AS 1289 3.8.1)		
Emerson Class	2	
Soil Description	Natural Soil	
Nature of Water	Demineralised Water	
Temperature of Water (°C)	25.6	

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Erosion and Sediment Control Plan

Doc #: TB2-HSE-MP-12

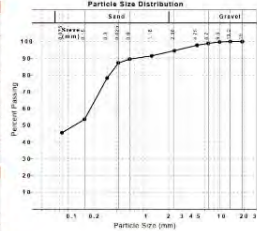
Material Test Report

Report Number: 220270.00-2
Issue Number: 1
Date Issued: 21/04/2023
Client: AECOM Australia Pty Ltd
 PO Box 3175, Darwin NT 0801
Contact: William Iddell
Project Number: 220270.00
Project Name: Material Testing
Project Location: Beetaloo basin, Beetaloo H1
Work Request: 4919
Sample Number: DW 4919A
Date Sampled: 01/04/2023
Dates Tested: 13/04/2023 - 20/04/2023
Sampling Method: Sampled by Client
 (the results apply to the sample as received)
Sample Location: Shenandoah NA (Option 1)
Material: Cheery Sand

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
19 mm	100	
13.2 mm	100	
9.5 mm	100	
6.7 mm	99	
4.75 mm	95	
2.36 mm	95	
1.18 mm	90	
0.6 mm	90	
0.425 mm	87	
0.3 mm	78	
0.15 mm	54	
0.075 mm	46	
Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		
Sample History	Air Dried	
Preparation Method	Wet Sieve	
Liquid Limit (%)	10	
Plastic Limit (%)	11	
Plasticity Index (%)	1	
Emerson Class (AS1289 3.4.1)		
Moisture Condition Determined by	AS 1289 3.1.2	
Linear Shrinkage (%)	4.0	
Cracking Crumbling Curling	None	
Emerson Class Number of a Soil (AS 1289 3.6.1)		
Emerson Class		
Soil Description	Natural Soil	
Nature of Water	Distilled Water	
Temperature of Water (°C)	25.5	

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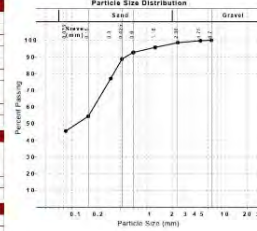
Material Test Report

Report Number: 220270.00-2
Issue Number: 1
Date Issued: 21/04/2023
Client: AECOM Australia Pty Ltd
 PO Box 3175, Darwin NT 0801
Contact: William Iddell
Project Number: 220270.00
Project Name: Material Testing
Project Location: Beetaloo basin, Beetaloo H1
Work Request: 4919
Sample Number: DW 4919A
Date Sampled: 02/04/2023
Dates Tested: 13/04/2023 - 20/04/2023
Sampling Method: Sampled by Client
 (the results apply to the sample as received)
Sample Location: Shenandoah NA (Option 2)
Material: Sandy Clay

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
19 mm	100	
13.2 mm	100	
9.5 mm	99	
6.7 mm	96	
4.75 mm	93	
2.36 mm	89	
1.18 mm	77	
0.6 mm	64	
0.425 mm	54	
0.3 mm	46	
0.15 mm	46	
0.075 mm	46	
Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		
Sample History	Air Dried	
Preparation Method	Wet Sieve	
Liquid Limit (%)	25	
Plastic Limit (%)	12	
Plasticity Index (%)	13	
Emerson Class (AS1289 3.4.1)		
Moisture Condition Determined by	AS 1289 3.1.2	
Linear Shrinkage (%)	6.5	
Cracking Crumbling Curling	Cracking	
Emerson Class Number of a Soil (AS 1289 3.6.1)		
Emerson Class	6	
Soil Description	Natural Soil	
Nature of Water	Distilled Water	
Temperature of Water (°C)	25.5	

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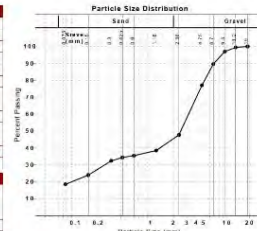
Material Test Report

Report Number: 220270.00-2
Issue Number: 1
Date Issued: 21/04/2023
Client: AECOM Australia Pty Ltd
 PO Box 3175, Darwin NT 0801
Contact: William Iddell
Project Number: 220270.00
Project Name: Material Testing
Project Location: Beetaloo basin, Beetaloo H1
Work Request: 4919
Sample Number: DW 4919A
Date Sampled: 03/04/2023
Dates Tested: 13/04/2023 - 20/04/2023
Sampling Method: Sampled by Client
 (the results apply to the sample as received)
Sample Location: Shenandoah NB
Material: Silty Sandy Gravel

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
19 mm	100	
13.2 mm	99	
9.5 mm	97	
6.7 mm	90	
4.75 mm	77	
2.36 mm	40	
1.18 mm	38	
0.6 mm	36	
0.425 mm	34	
0.3 mm	32	
0.15 mm	24	
0.075 mm	18	
Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		
Sample History	Air Dried	
Preparation Method	Wet Sieve	
Liquid Limit (%)	15	
Plastic Limit (%)	11	
Plasticity Index (%)	4	
Linear Shrinkage (AS1289 3.4.1)		
Moisture Condition Determined by	AS 1289 3.1.2	
Linear Shrinkage (%)	3.0	
Cracking Crumbling Curling	Cracking	
Emerson Class Number of a Soil (AS 1289 3.6.1)		
Emerson Class	3	
Soil Description	Natural Soil	
Nature of Water	Distilled Water	
Temperature of Water (°C)	25.5	

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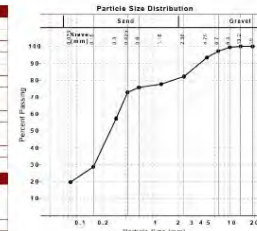
Material Test Report

Report Number: 220270.00-2
Issue Number: 1
Date Issued: 21/04/2023
Client: AECOM Australia Pty Ltd
 PO Box 3175, Darwin NT 0801
Contact: William Iddell
Project Number: 220270.00
Project Name: Material Testing
Project Location: Beetaloo basin, Beetaloo H1
Work Request: 4919
Sample Number: DW 4919A
Date Sampled: 21/04/2023
Dates Tested: 13/04/2023 - 19/04/2023
Sampling Method: Sampled by Client
 (the results apply to the sample as received)
Sample Location: Shenandoah SA
Material: Silty Sand with Gravel

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
19 mm	100	
13.2 mm	100	
9.5 mm	99	
6.7 mm	97	
4.75 mm	93	
2.36 mm	82	
1.18 mm	78	
0.6 mm	76	
0.425 mm	73	
0.3 mm	67	
0.15 mm	29	
0.075 mm	20	
Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		
Sample History	Air Dried	
Preparation Method	Wet Sieve	
Liquid Limit (%)	13	
Plastic Limit (%)	11	
Plasticity Index (%)	2	
Linear Shrinkage (AS1289 3.4.1)		
Moisture Condition Determined by	AS 1289 3.1.2	
Linear Shrinkage (%)	5.0	
Cracking Crumbling Curling	Cracking	
Emerson Class Number of a Soil (AS 1289 3.6.1)		
Emerson Class	3	
Soil Description	Natural Soil	
Nature of Water	Distilled Water	
Temperature of Water (°C)	25.5	

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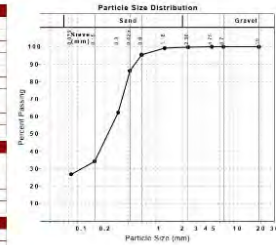
Material Test Report

Report Number: 220270.00-2
Issue Number: 1
Date Issued: 21/04/2023
Client: AECOM Australia Pty Ltd
PO Box 3175, Darwin NT 0801
Contact: William Riddell
Project Name: Material Testing
Project Location: Beetaloo Basin, Beetaloo N1
Work Request: 4919
Sample Number: DW 4919C
Date Sampled: 01/04/2023
Dates Tested: 13/04/2023 - 19/04/2023
Sampling Method: Sampled by Client
Sample Location: Shenandoah SB
Material: Silty Sand

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
8.75 mm	100	
4.75 mm	100	
2.36 mm	100	
1.18 mm	99	
0.6 mm	95	
0.425 mm	86	
0.3 mm	62	
0.15 mm	34	
0.075 mm	27	
Atterberg Limit (AS1289 3.1.2 & 3.1.3)		
Sample History	Air Dried	Min Max
Preparation Method	Wet Sieve	
Liquid Limit (%)	14	
Plastic Limit (%)	10	
Plasticity Index (%)	4	
Linear Shrinkage (AS1289 3.4.1)		
Sample History	Air Dried	Min Max
Preparation Method	Wet Sieve	
Liquid Limit (%)	14	
Plastic Limit (%)	10	
Plasticity Index (%)	4	
Emerson Class Number of a Soil (AS 1289 3.6.1)		
Emerson Class	3	Min Max
Soil Description	Material Soil	
Nature of Water	Distilled Water	
Temperature of Water (°C)	25.5	

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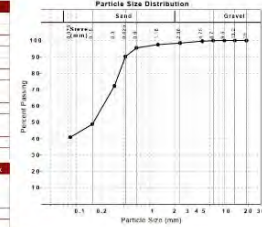
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Material Test Report

Report Number: 220270.00-2
Issue Number: 1
Date Issued: 21/04/2023
Client: AECOM Australia Pty Ltd
PO Box 3175, Darwin NT 0801
Contact: William Riddell
Project Name: Material Testing
Project Location: Beetaloo Basin, Beetaloo N1
Work Request: 4919
Sample Number: DW 4919C
Date Sampled: 01/04/2023
Dates Tested: 13/04/2023 - 19/04/2023
Sampling Method: Sampled by Client
Sample Location: Shenandoah SC
Material: Sandy Clay With Gravel

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
19 mm	100	
15.2 mm	100	
9.5 mm	100	
8.75 mm	100	
4.75 mm	100	
2.36 mm	98	
1.18 mm	95	
0.6 mm	85	
0.425 mm	80	
0.3 mm	72	
0.15 mm	49	
0.075 mm	41	
Atterberg Limit (AS1289 3.1.2 & 3.1.3)		
Sample History	Air Dried	Min Max
Preparation Method	Wet Sieve	
Liquid Limit (%)	22	
Plastic Limit (%)	12	
Plasticity Index (%)	10	
Linear Shrinkage (AS1289 3.4.1)		
Sample History	Air Dried	Min Max
Preparation Method	Wet Sieve	
Liquid Limit (%)	22	
Plastic Limit (%)	12	
Plasticity Index (%)	10	
Emerson Class Number of a Soil (AS 1289 3.6.1)		
Emerson Class	3	Min Max
Soil Description	Material Soil	
Nature of Water	Distilled Water	
Temperature of Water (°C)	25.5	



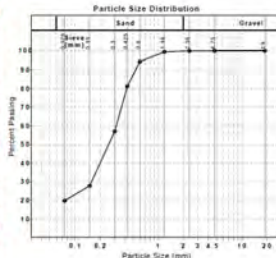
Material Test Report

Report Number: 220270.00-1
Issue Number: 1
Date Issued: 20/01/2023
Client: AECOM Australia Pty Ltd
PO Box 3175, Darwin NT 0801
Contact: William Riddell
Project Name: Material Testing
Project Location: Beetaloo Basin, Beetaloo NT
Work Request: 4776
Sample Number: DW-4776F
Date Sampled: 14/12/2022
Dates Tested: 13/01/2023 - 18/01/2023
Sampling Method: Sampled by Client
Sample Location: Shen South 2
Material: Silty SAND

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
4.75 mm	100		
2.36 mm	100		
1.18 mm	99		
0.6 mm	94		
0.425 mm	81		
0.3 mm	57		
0.15 mm	28		
0.075 mm	20		
Atterberg Limit (AS1289 3.1.2 & 3.1.3 & 3.1.5.1)			
Sample History	Air Dried	Min	Max
Preparation Method	Wet Sieve		
Liquid Limit (%)	13		
Plastic Limit (%)	11		
Plasticity Index (%)	2		
Linear Shrinkage (AS1289 3.4.1)			
Sample History	Air Dried	Min	Max
Preparation Method	Wet Sieve		
Liquid Limit (%)	13		
Plastic Limit (%)	11		
Plasticity Index (%)	2		
Moisture Condition Determined By AS 1289 1.1.2			
Linear Shrinkage (%)	0.5		
Cracking Crumpling Curling	Cracking		
Emerson Class Number of a Soil (AS 1289 3.6.1)			
Emerson Class	5	Min	Max
Soil Description	Natural		
Nature of Water	Demineralised Water		
Temperature of Water (°C)	25		

Douglas Partners

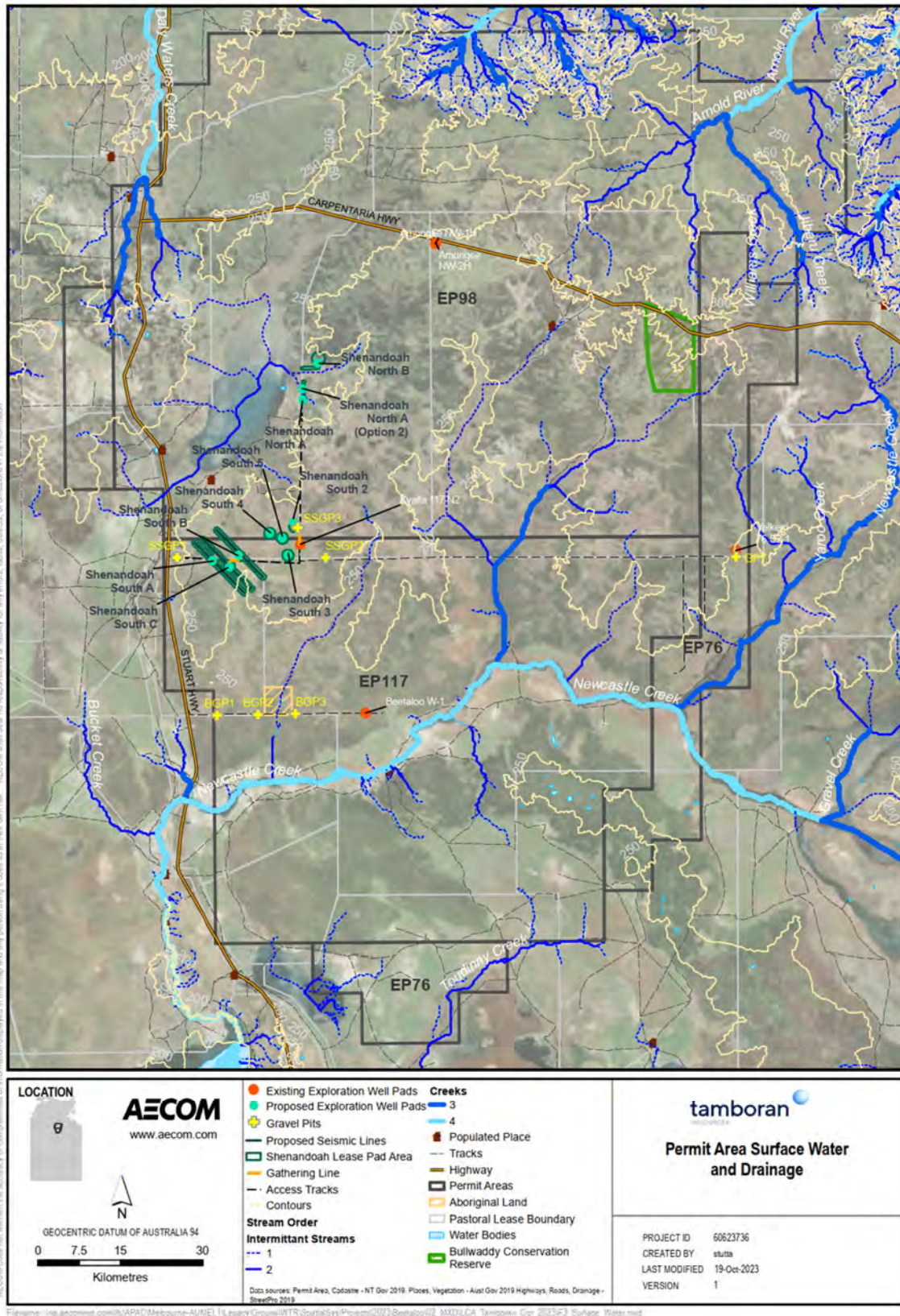
Geotechnics | Environment | Groundwater
Unit 214 Cayula Circuit Coonal Weir NT 0810
Phone: (08) 8948 6800
Email: Sunil.Sukhdeo@douglaspartners.com.au
Accredited for compliance with ISO/IEC 17025 - Testing
Approved Signatory: Sunil Sukhdeo
Laboratory Manager
Laboratory Accreditation Number: 828



Review due: 01/10/25

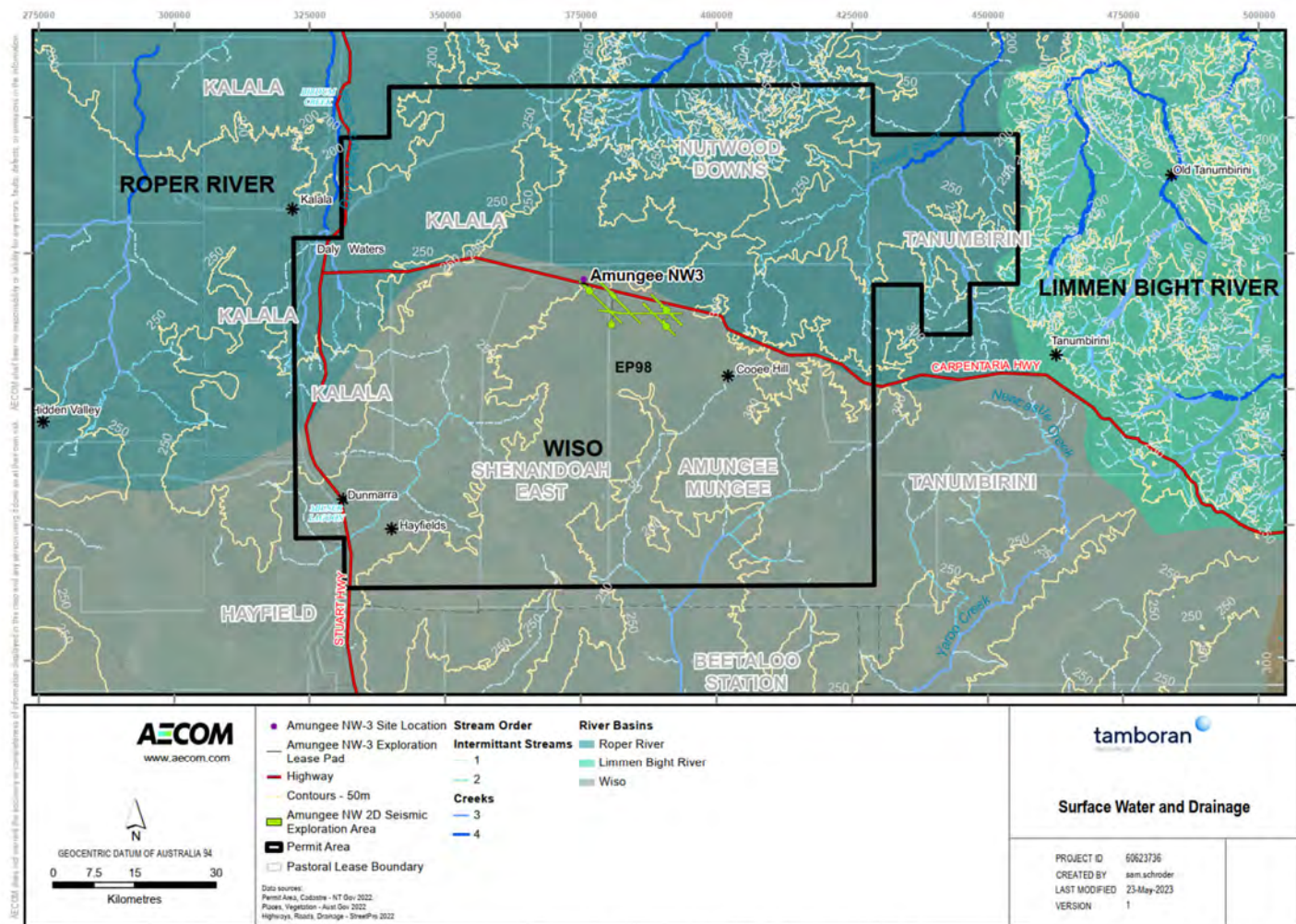
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APPENDIX D Permit area surface water



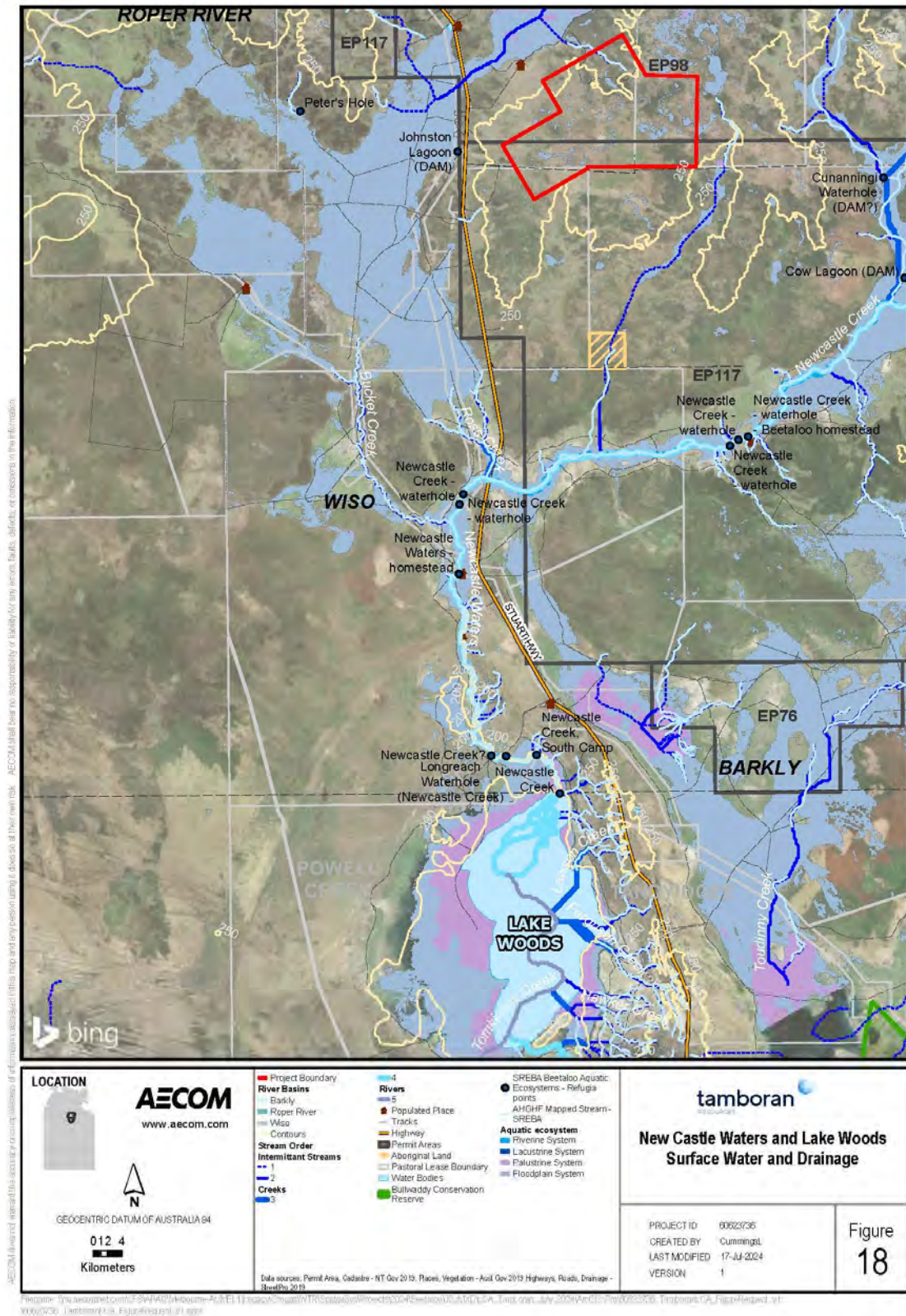
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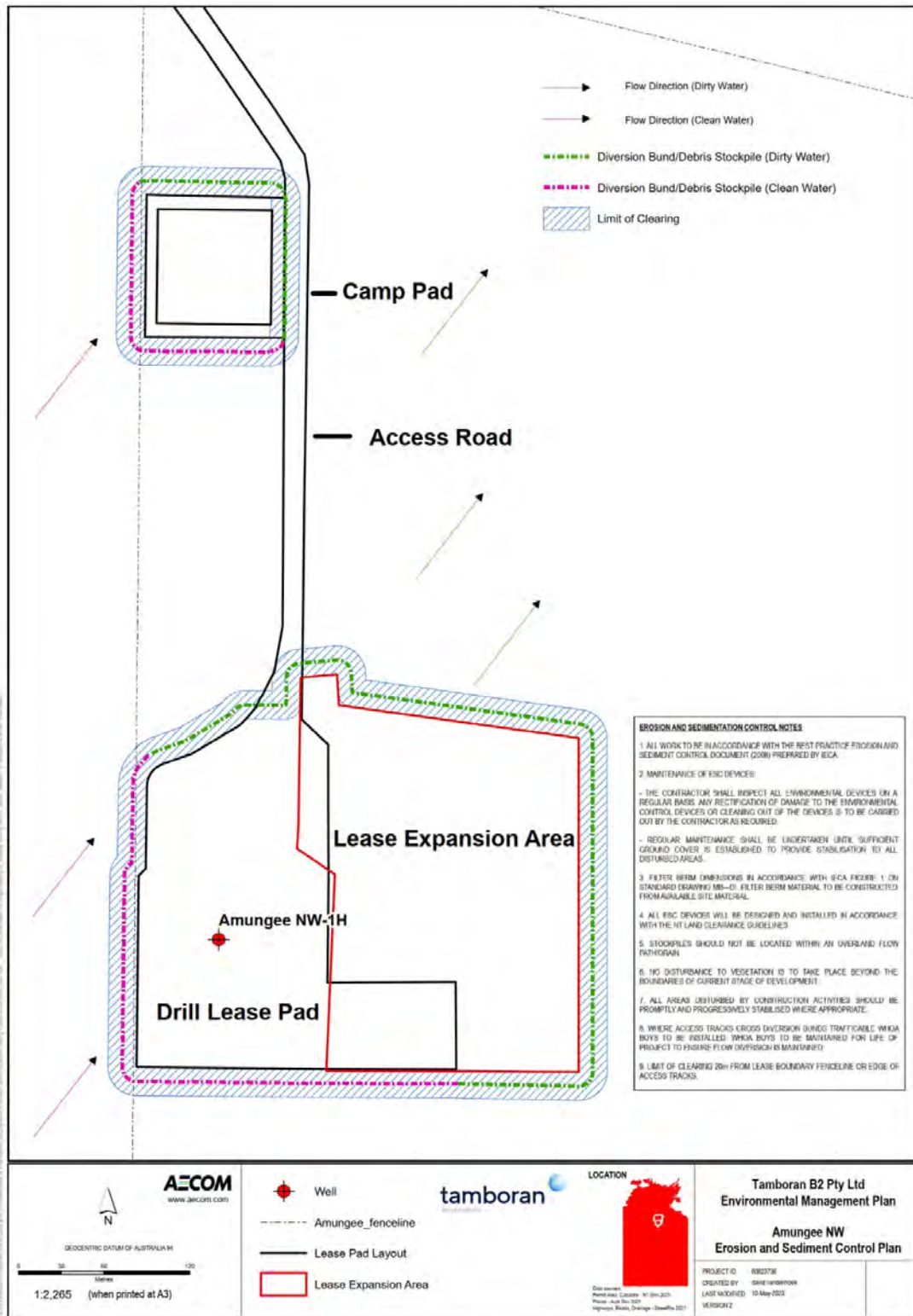


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APPENDIX E Erosion and sediment control plans:

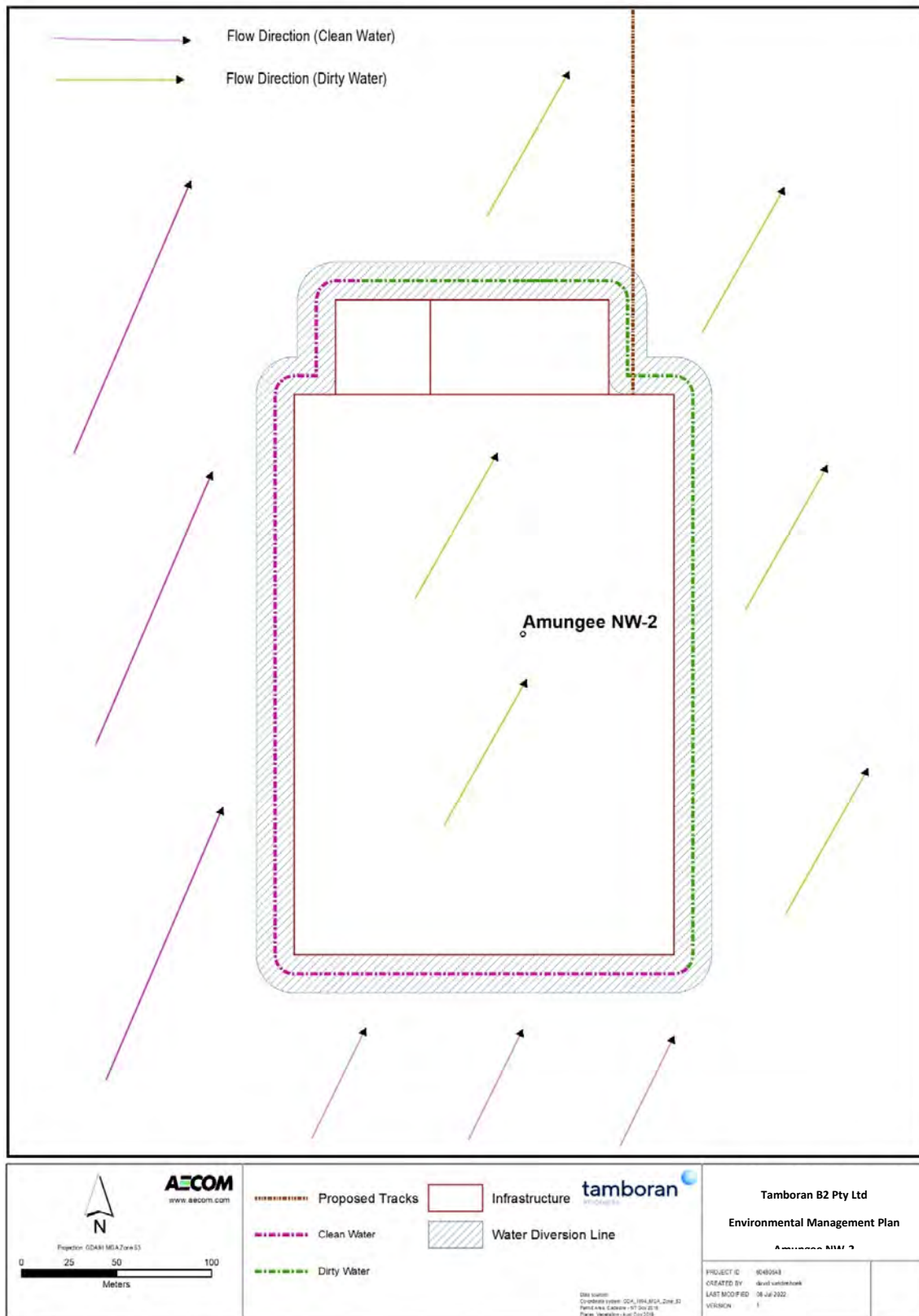
- Amungee NW
- Amungee NW-2
- Amungee NW-3
- Amungee NW-4
- Amungee NW-5
- Shenandoah South A
- Shenandoah South B
- Shenandoah South C
- Shenandoah South 2, including SPCF
- Shenandoah North A
- Shenandoah North A (option 2)
- Shenandoah South Sand Wash Plant



A3 size

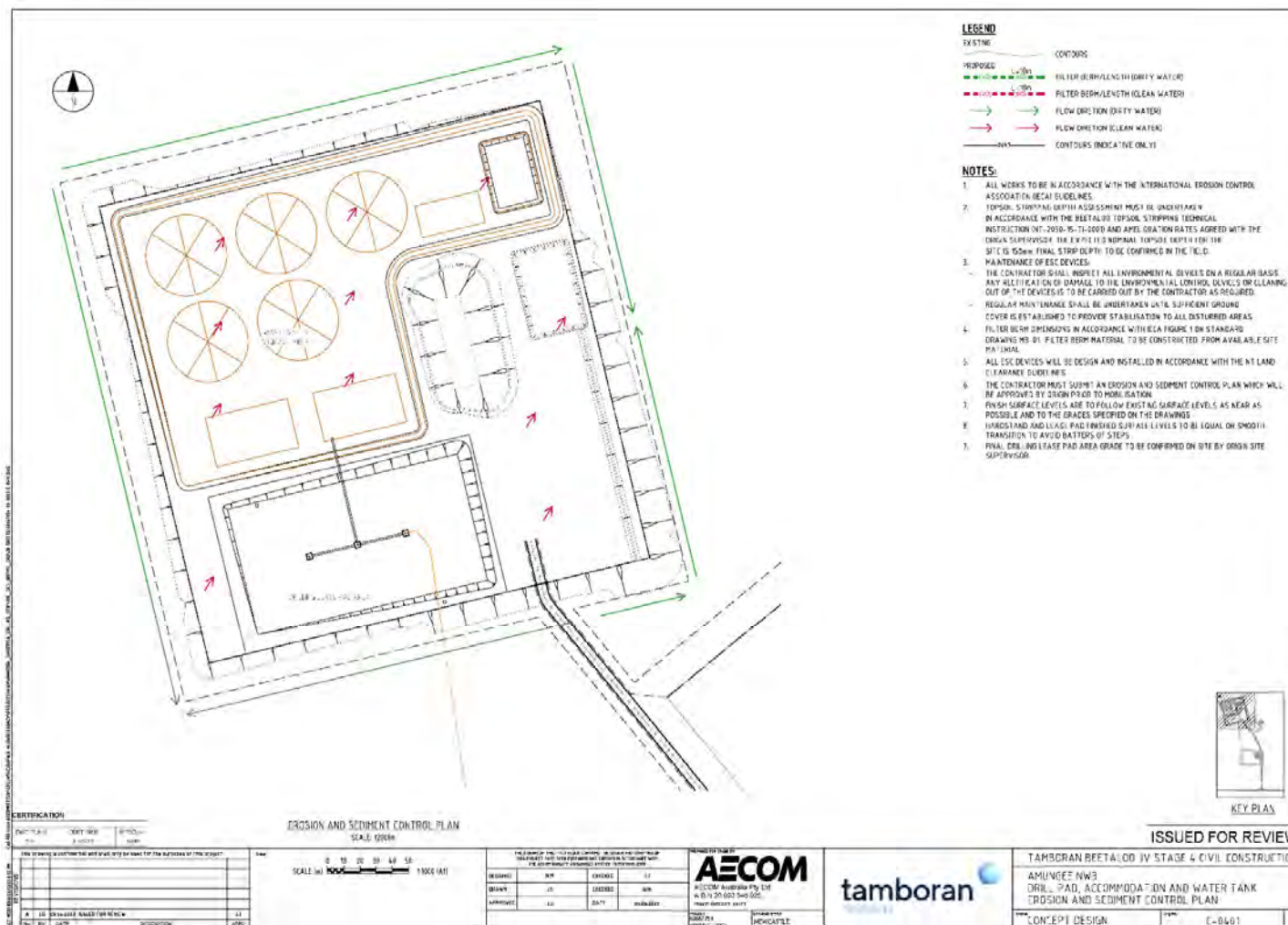
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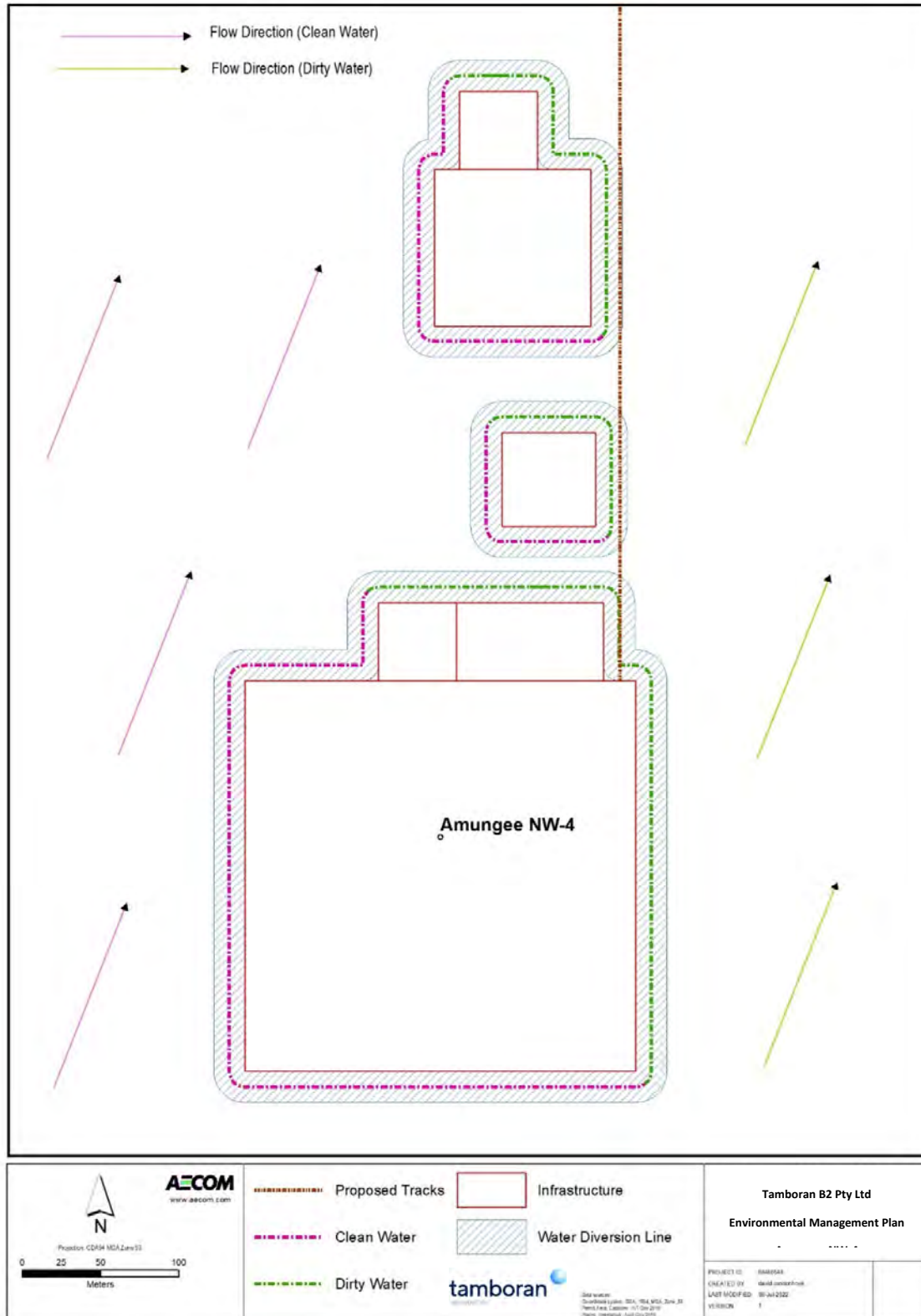
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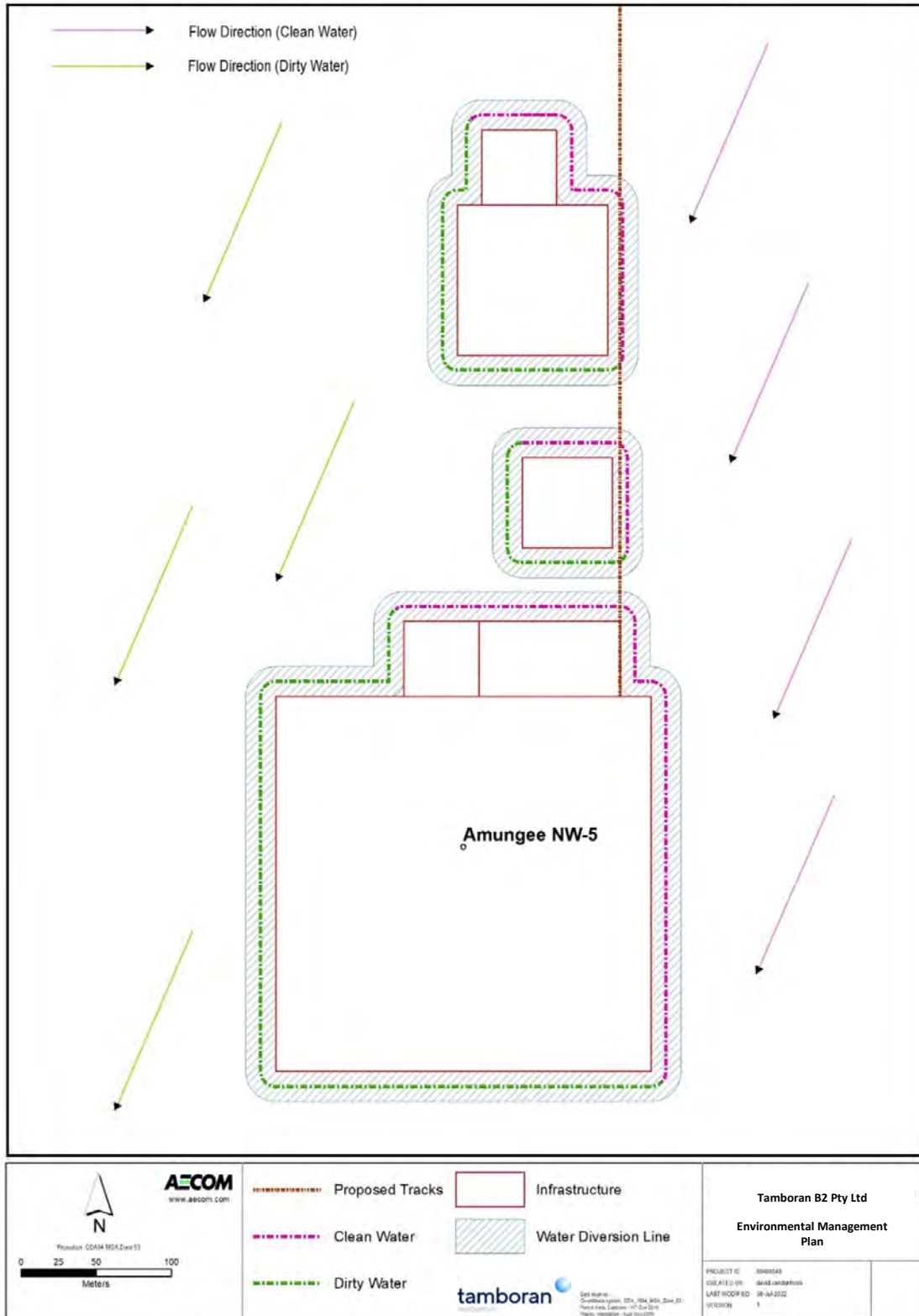
Review due: 01/10/25

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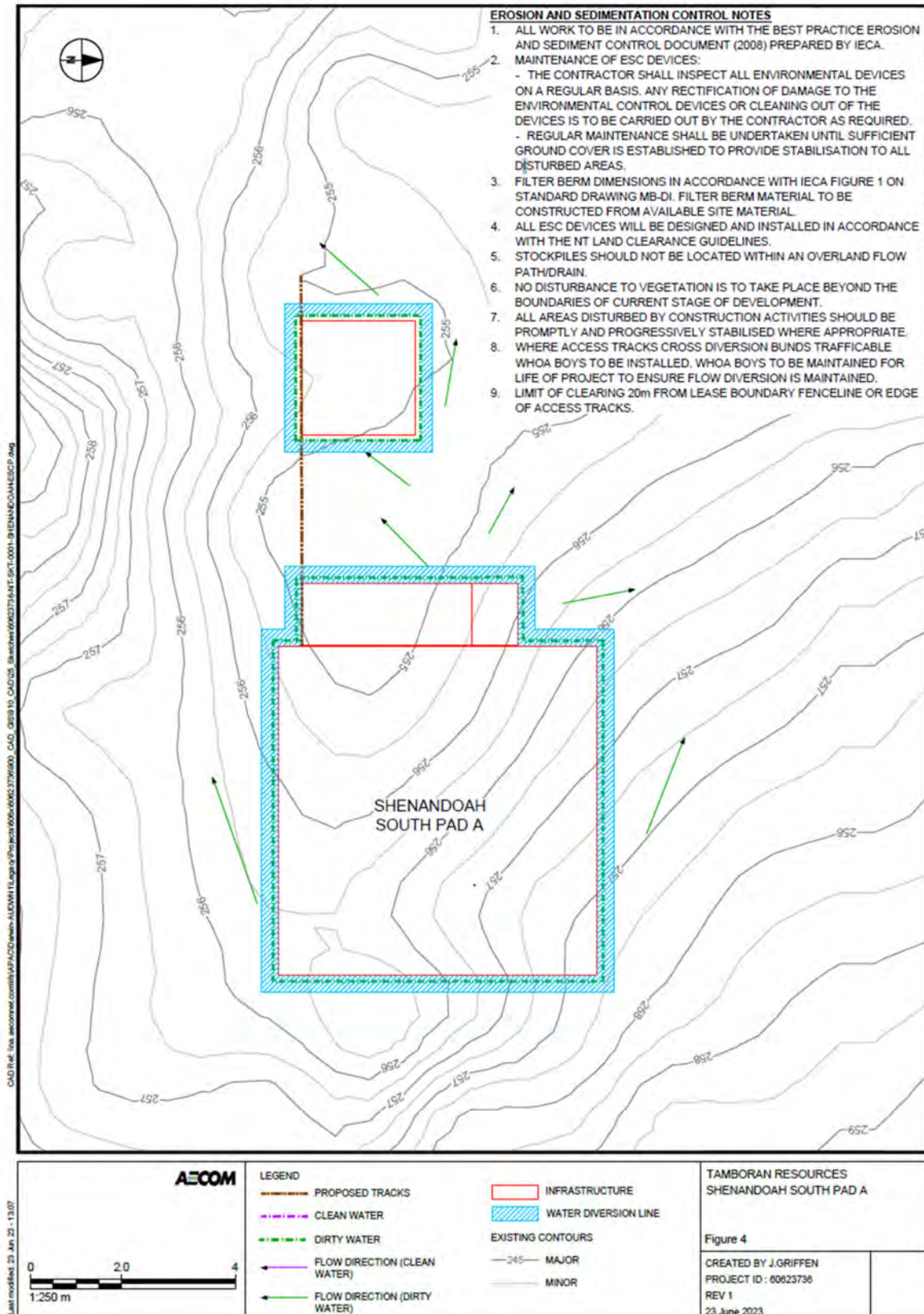
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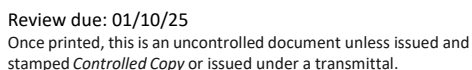
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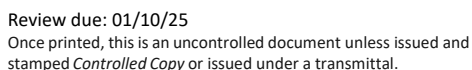
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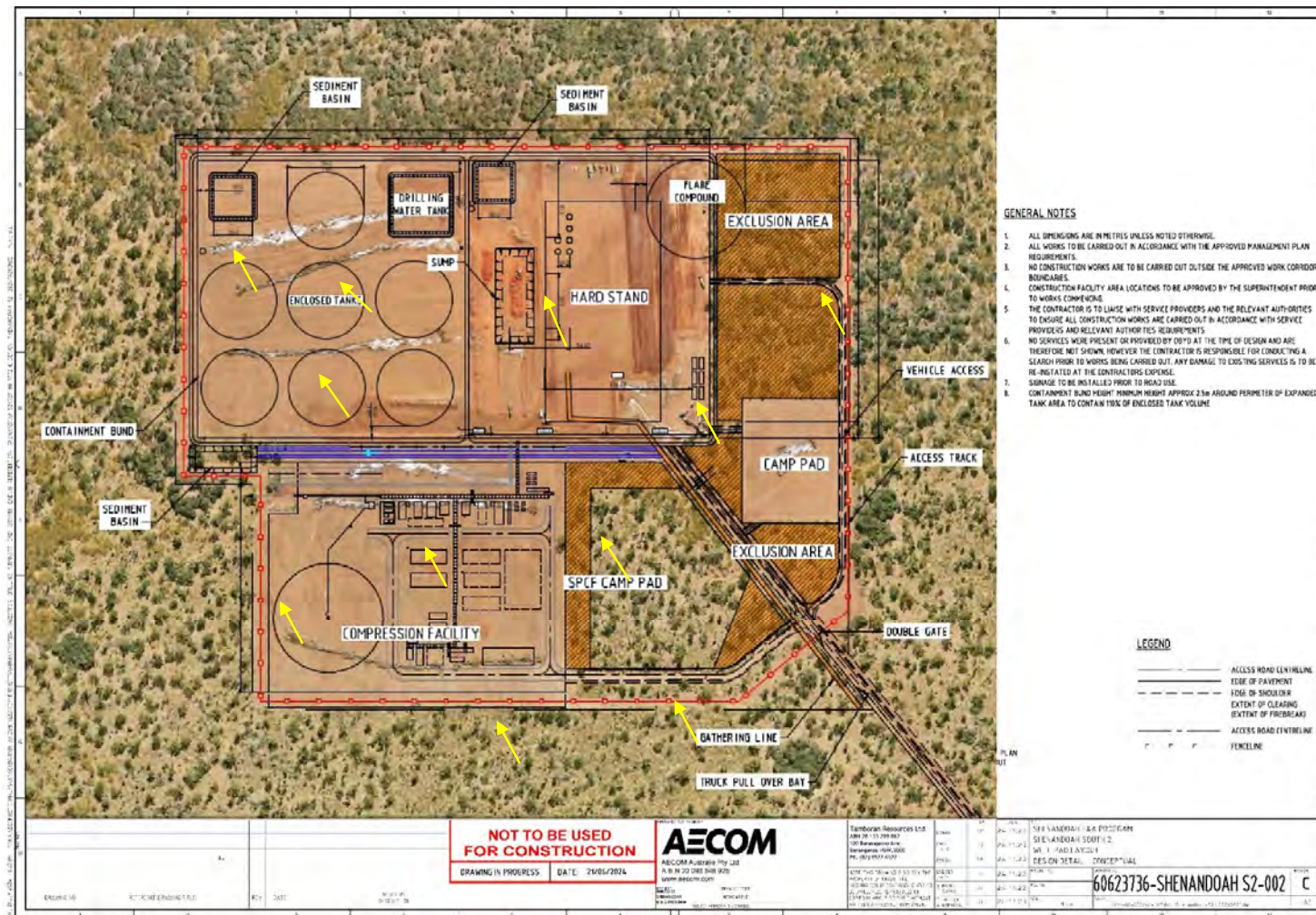
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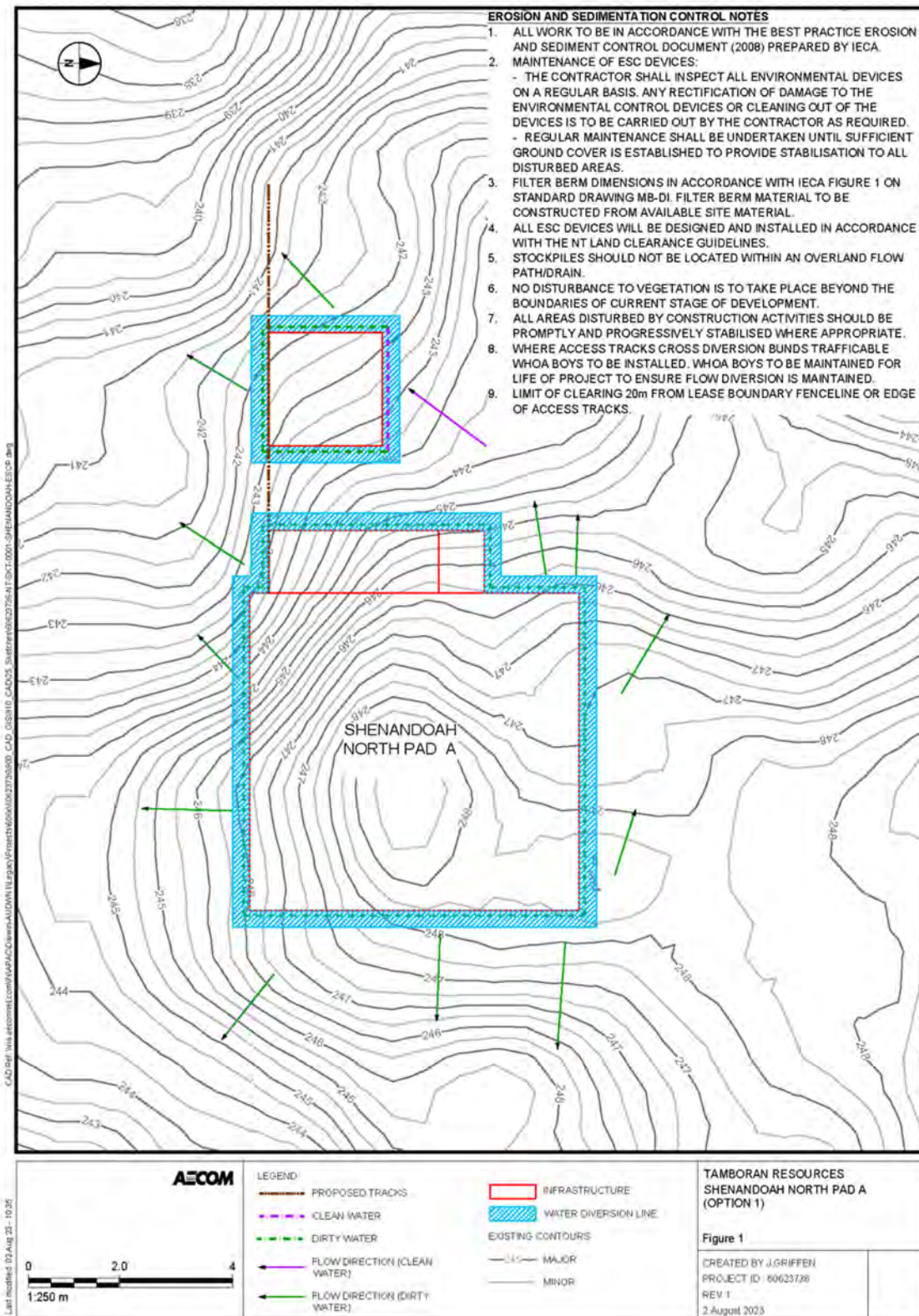


NB: This ESCP shows the directional flow for the Shenandoah S2 site, including the proposed integration between the well site and the SPCF.



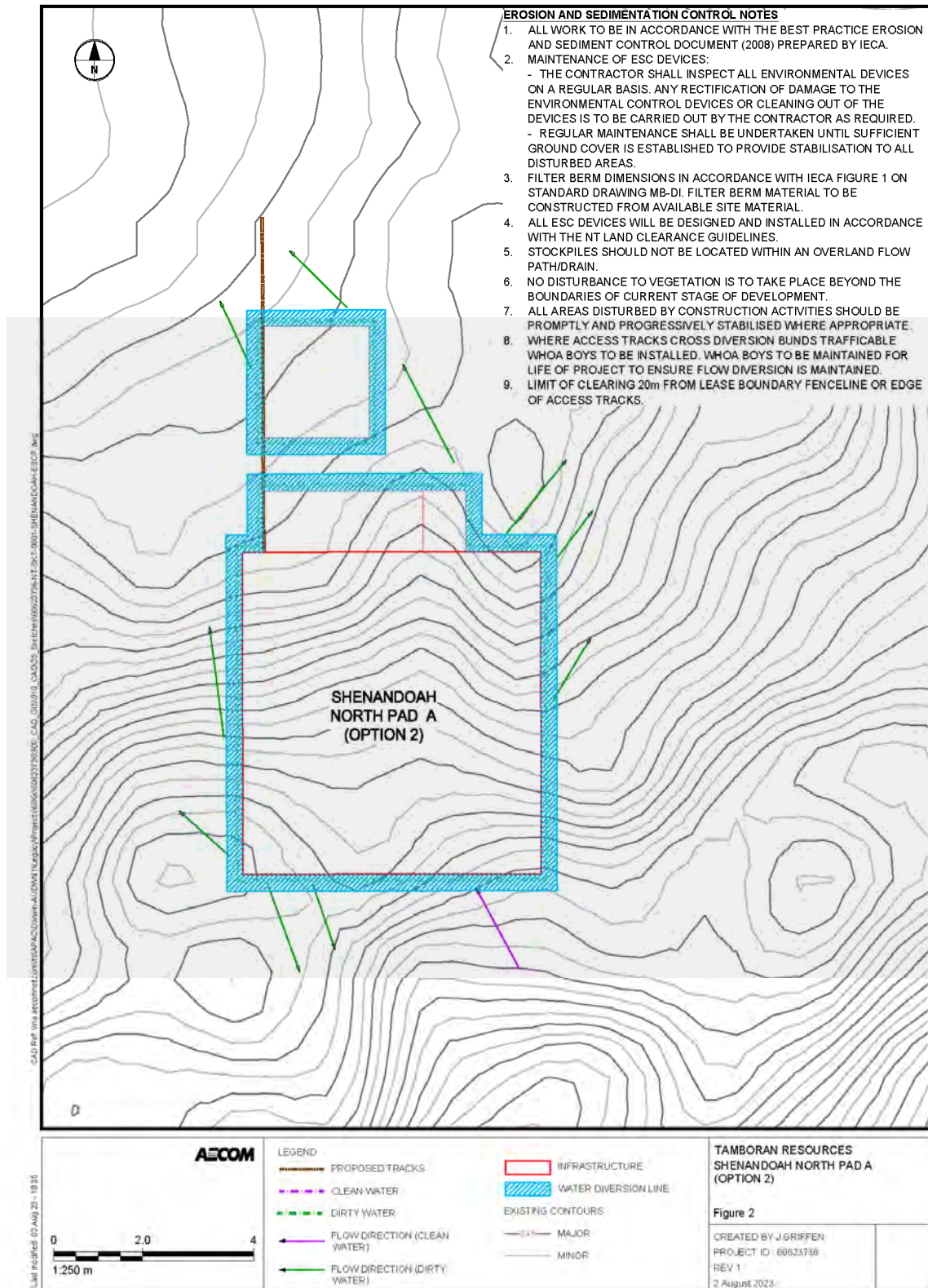
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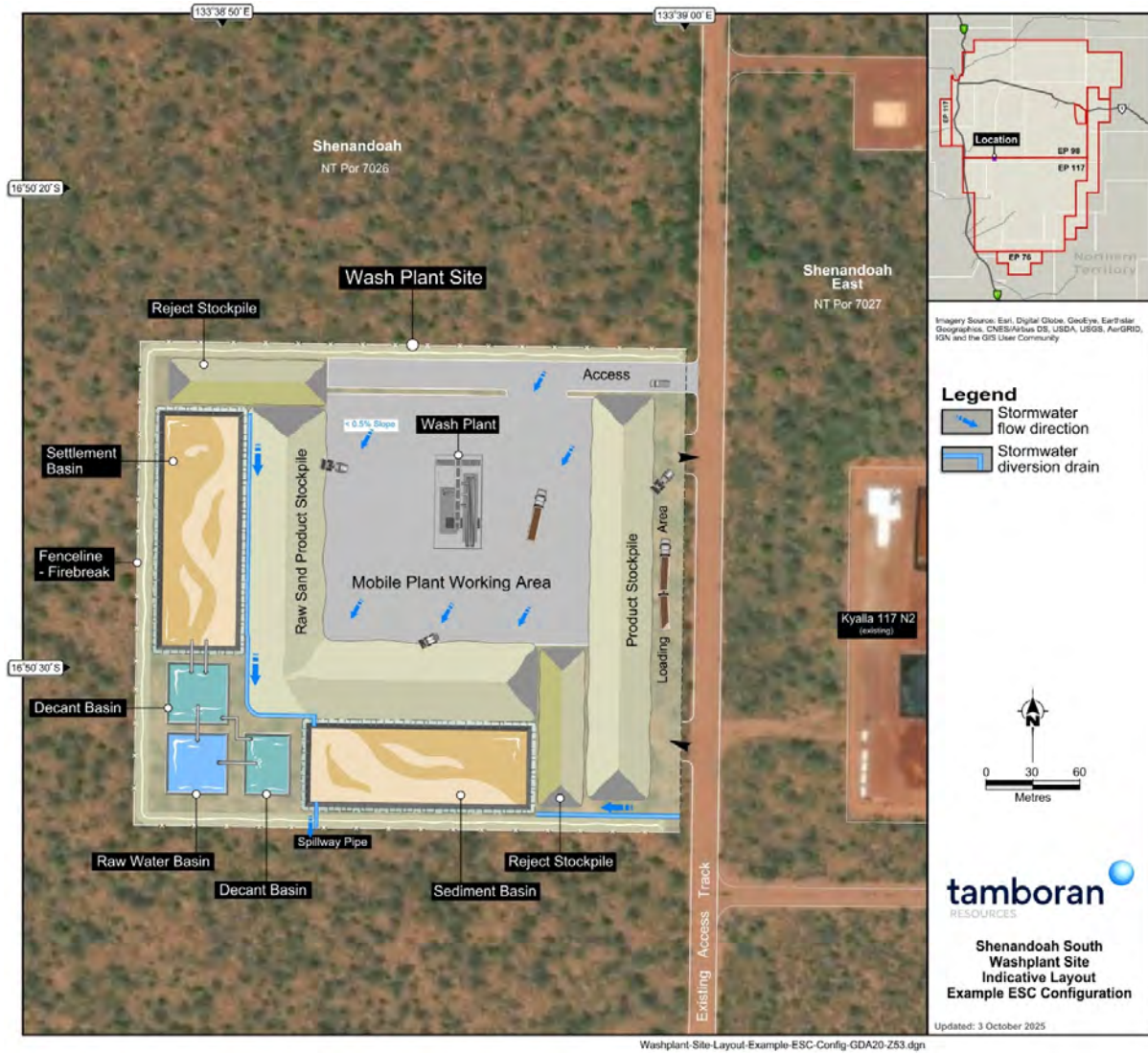
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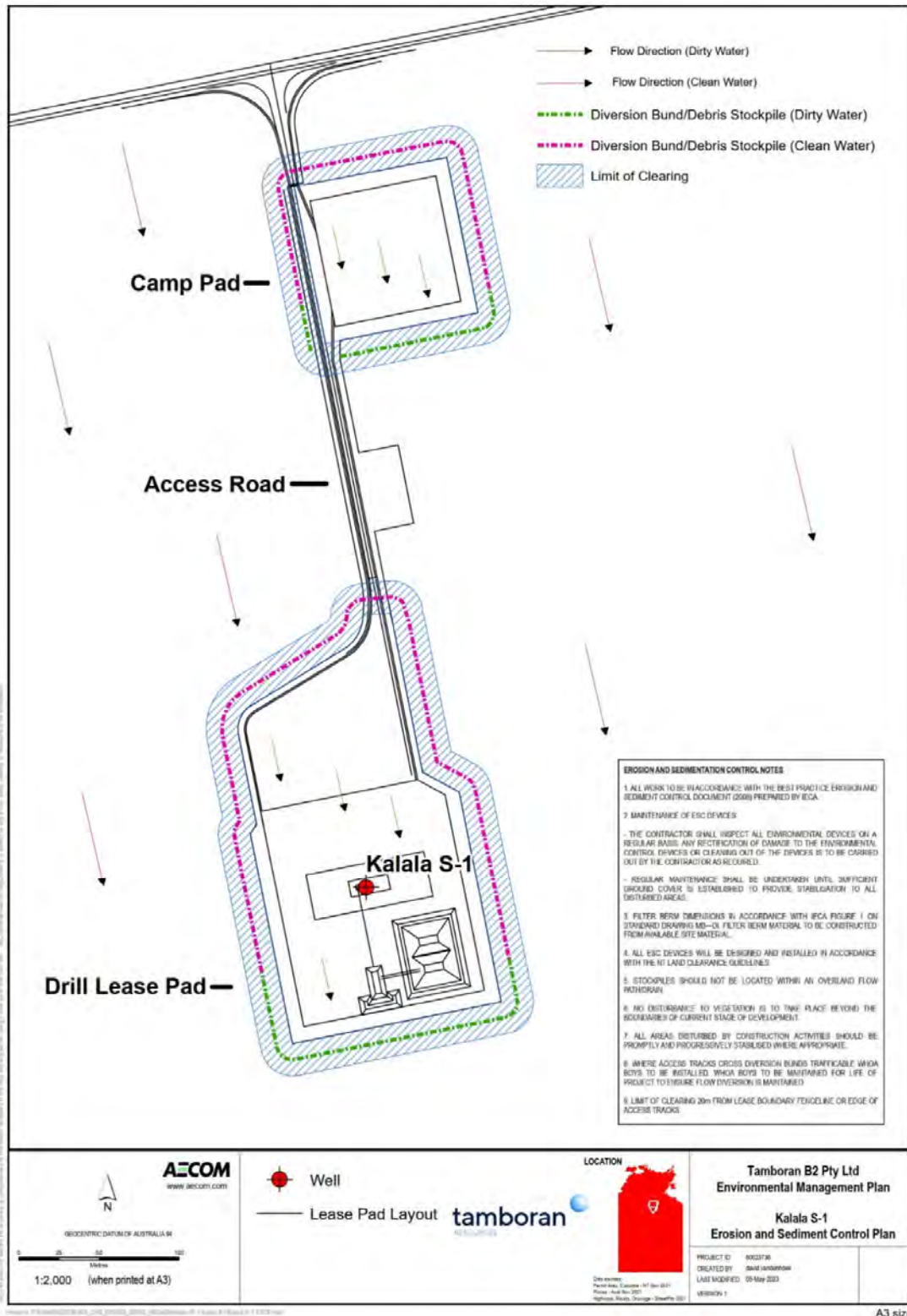
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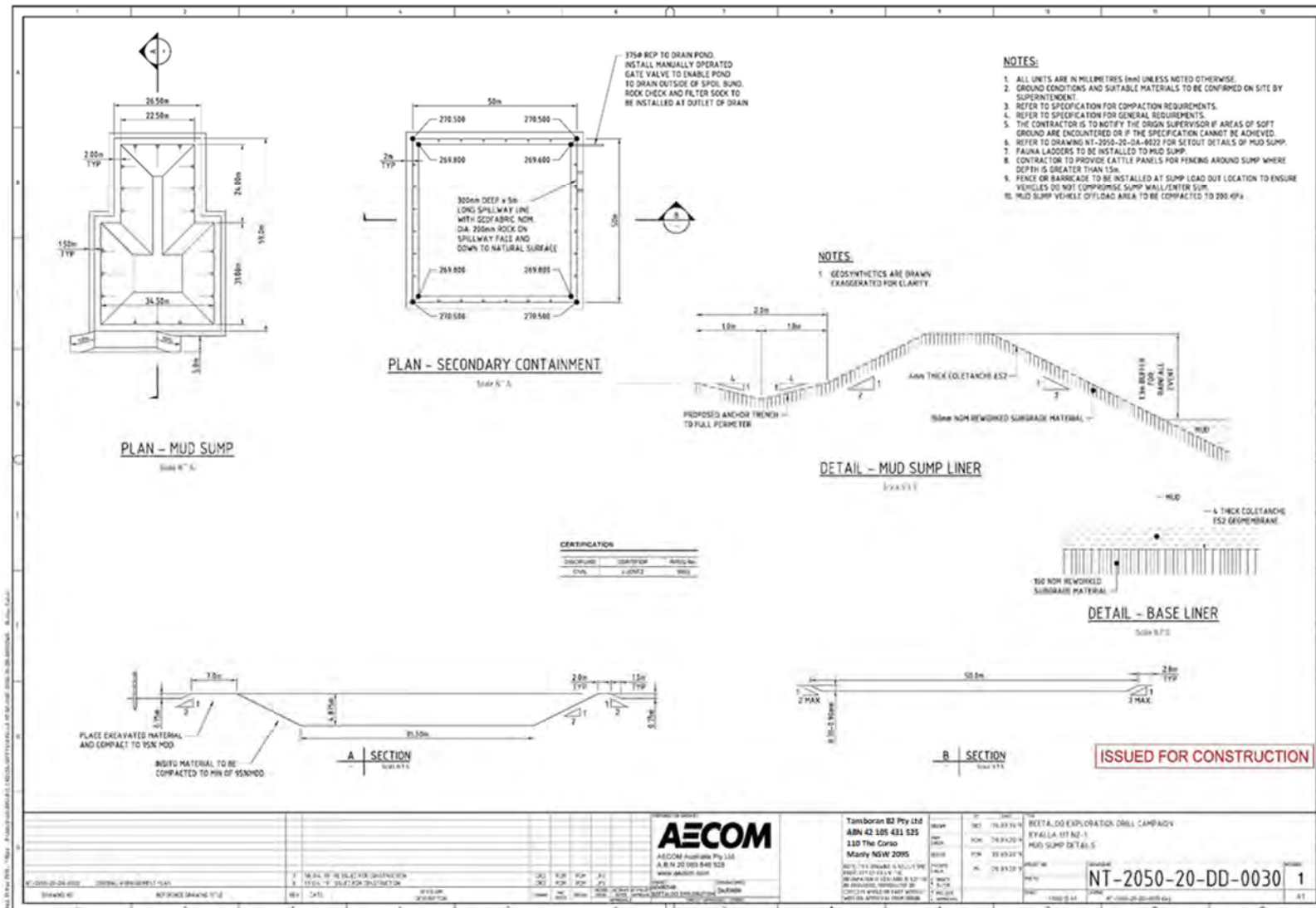
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Appendix F Erosion and sediment control plan for Kalala S1



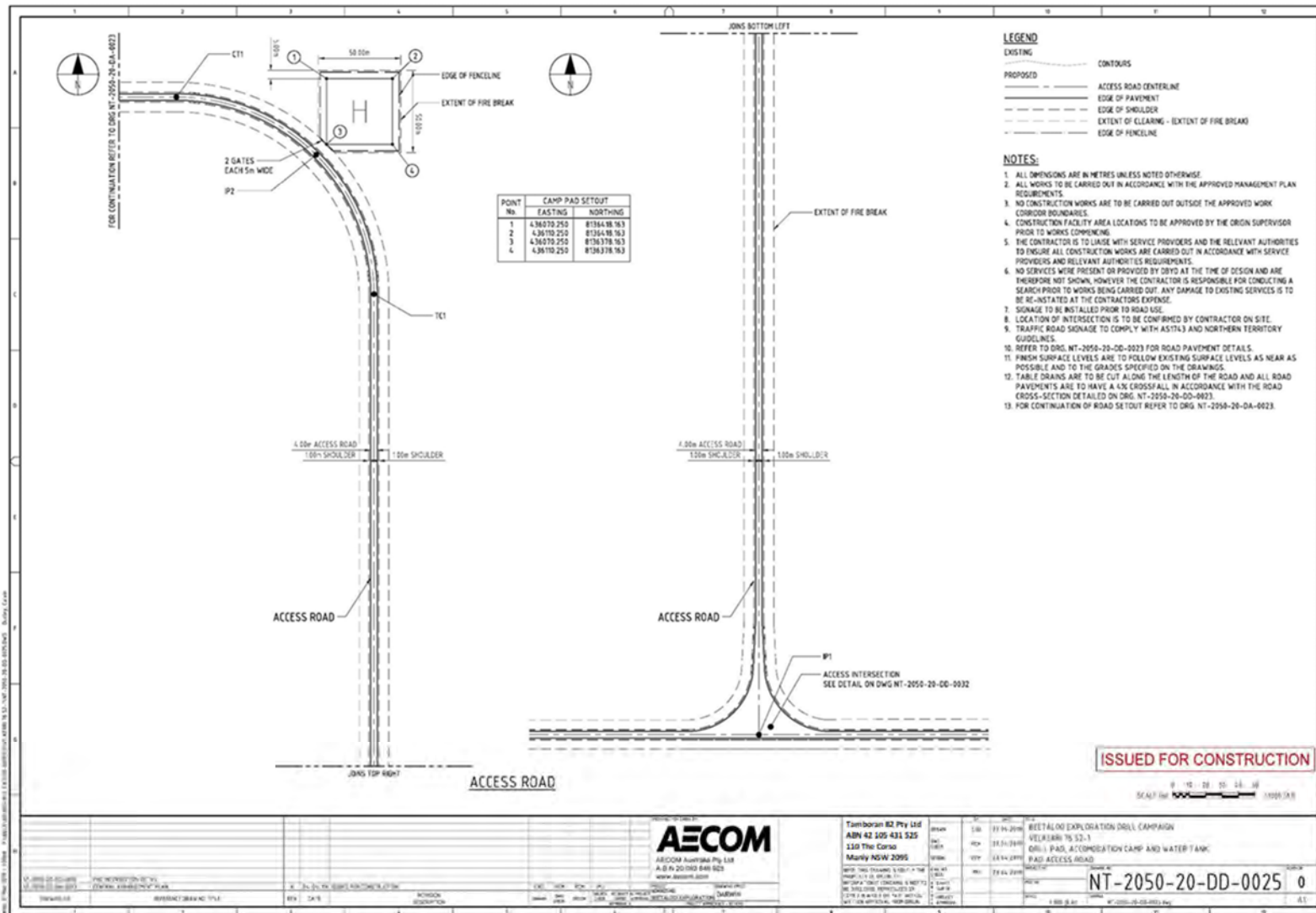
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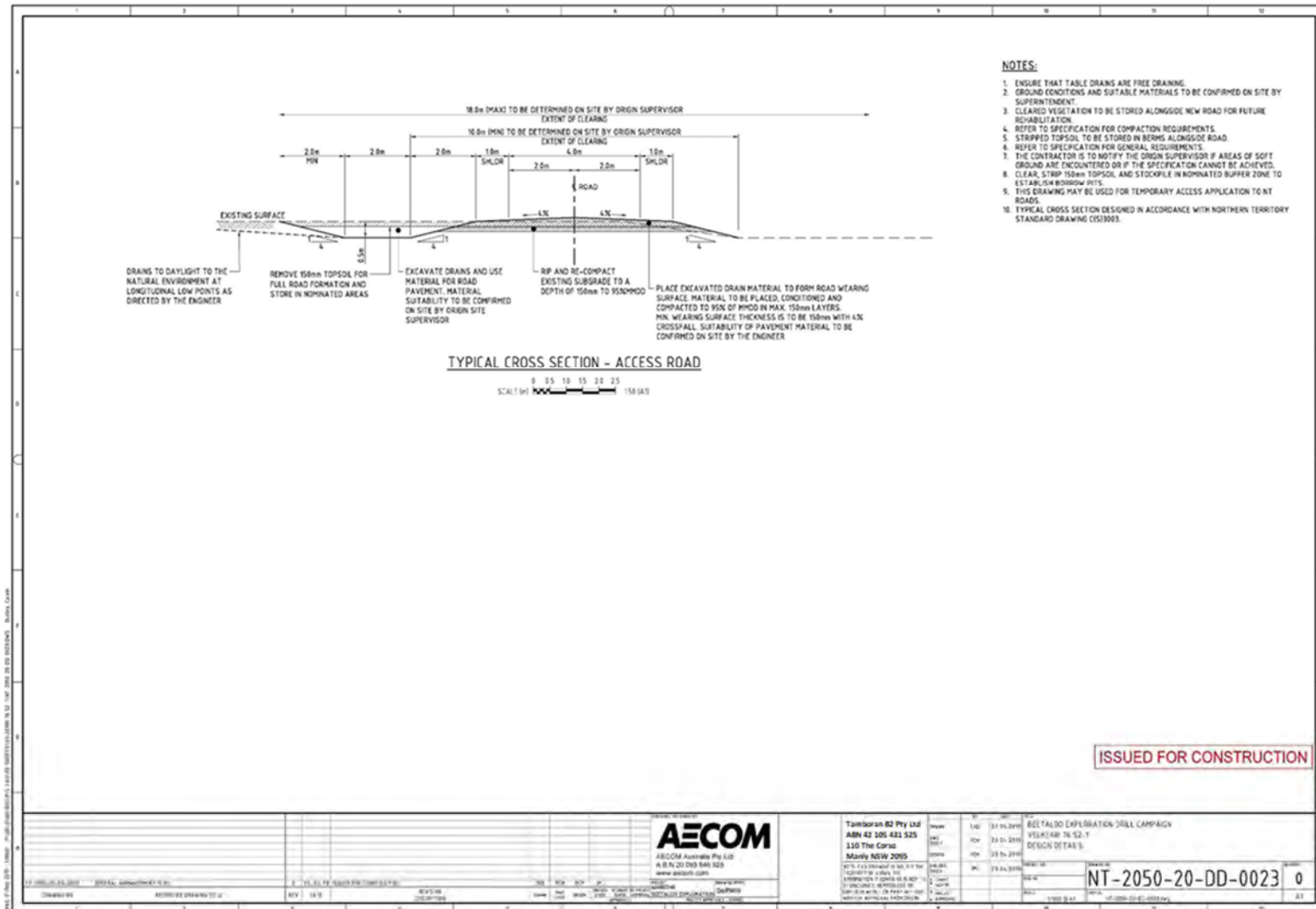
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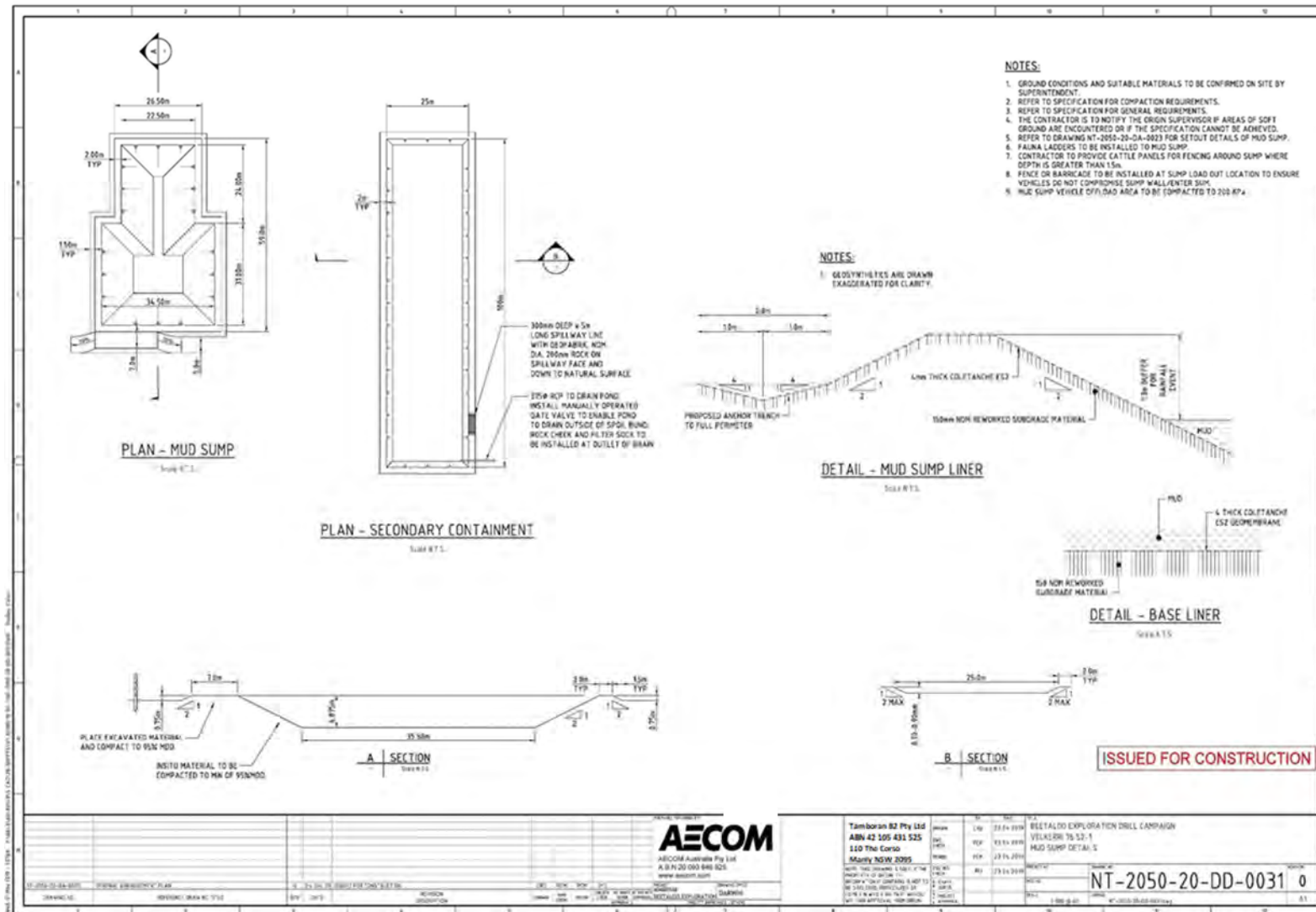
Review due: 01/10/25

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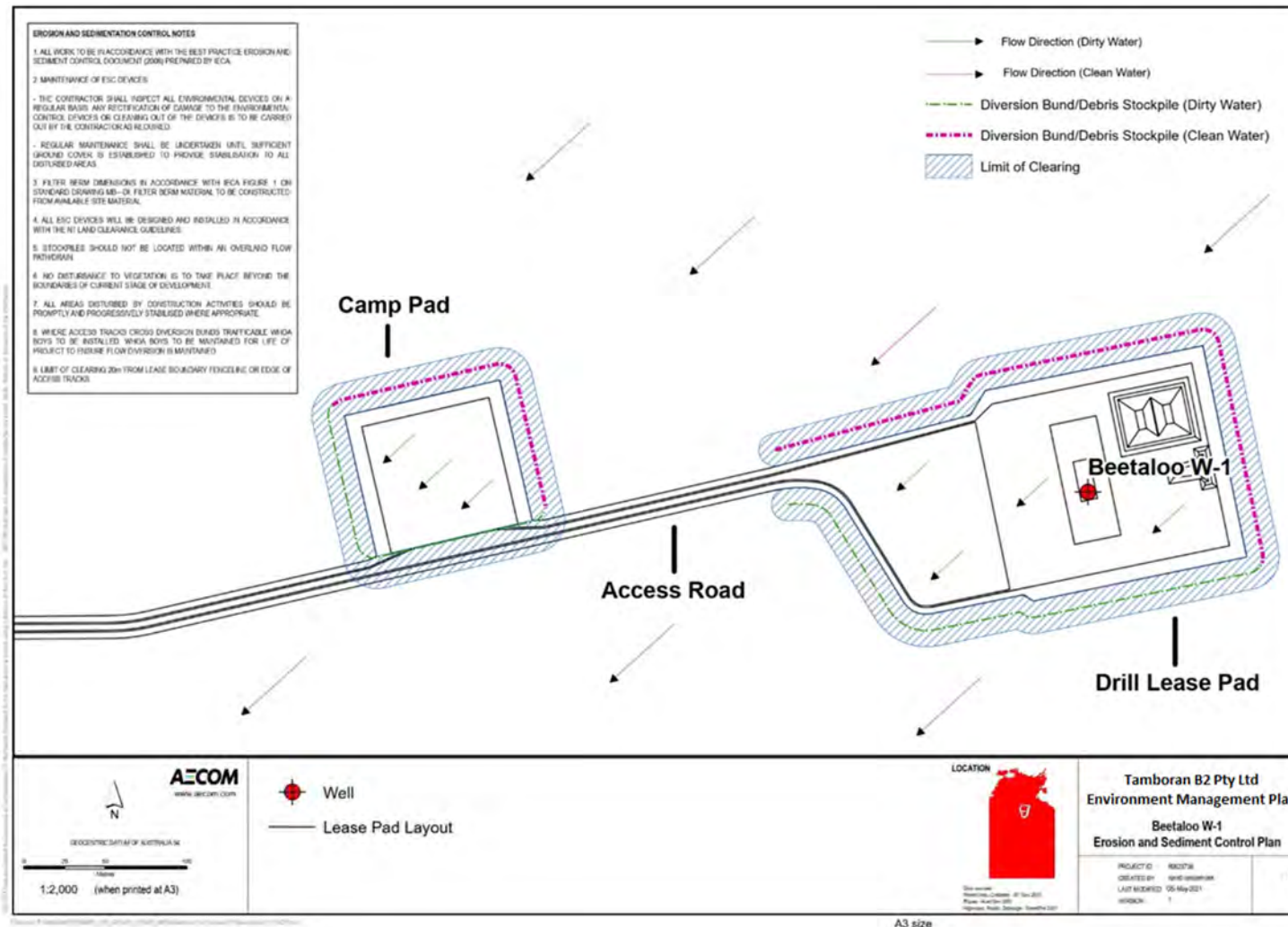


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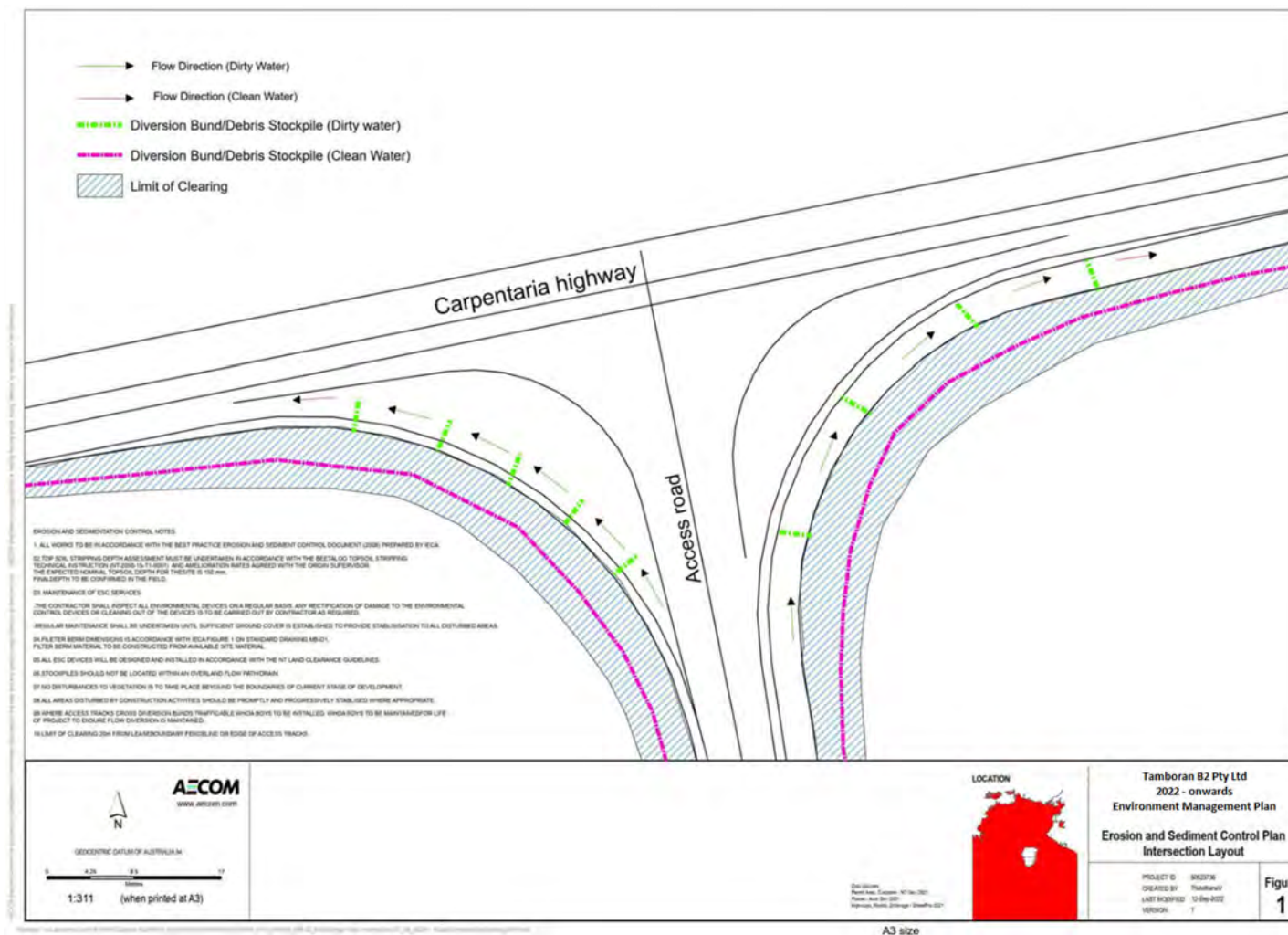
Appendix I Erosion and sediment control plan for Beetaloo W



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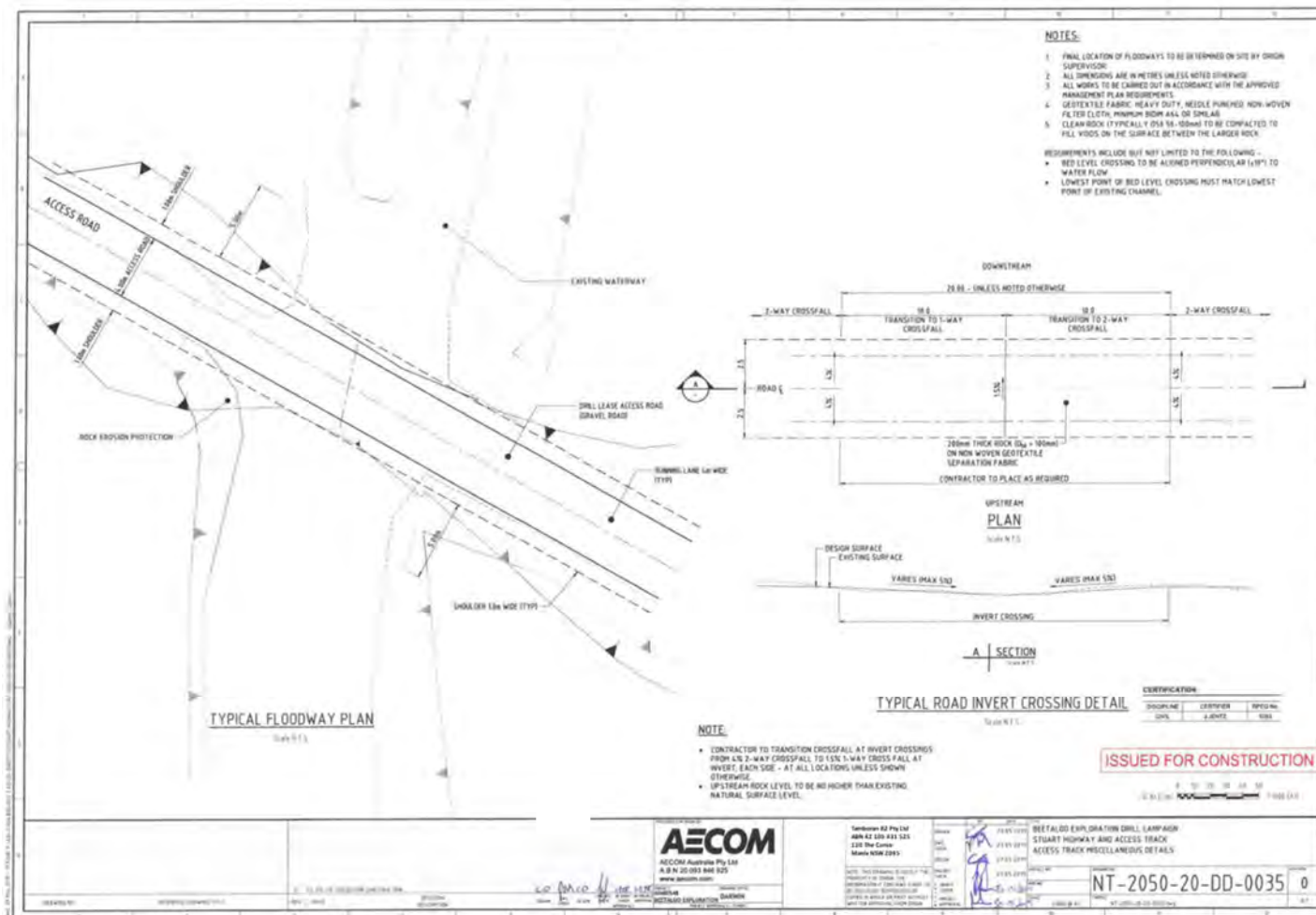
Appendix K Erosion and sediment control plan for typical Carpentaria Highway intersection



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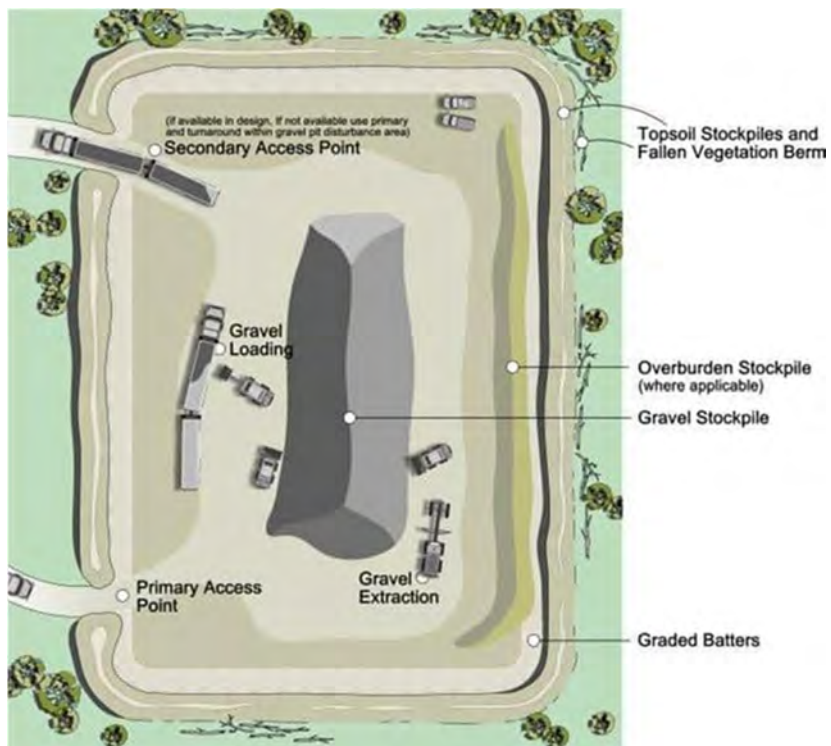
Appendix L Erosion and sediment control plan for typical road invert crossing



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Appendix M Erosion and sediment control schematic for typical gravel pit



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Appendix N Other IECA standard specifications (as required)

MATERIALS (i) MULCH MUST COMPLY WITH THE REQUIREMENTS OF AS4454. (ii) MAXIMUM SOLUBLE SALT CONCENTRATION OF 5dS/m. (iii) MOISTURE CONTENT OF 30 TO 50% PRIOR TO APPLICATION. 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: (i) TOTALLY WITHIN THE PROPERTY BOUNDARIES; (ii) ALONG A LINE OF CONSTANT ELEVATION (PREFERRED, BUT NOT ALWAYS PRACTICAL); (iii) AT LEAST 1m, IDEALLY 3m, FROM THE TOE OF A FILL EMBANKMENT; (iv) 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 AROUND THE END OF THE BERM. 4. ENSURE 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% CONTACT WITH THE SOIL SURFACE. 7. WHERE SPECIFIED, TAKE APPROPRIATE STEPS TO VEGETATE THE BERM. MAINTENANCE 1. DURING THE CONSTRUCTION PERIOD, INSPECT ALL BERMS AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY. 2. REPAIR OR REPLACE ANY DAMAGED SECTIONS. 3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED. 4. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 100mm OR 1/3 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 MAYBE 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.	<table border="1"> <thead> <tr> <th colspan="2">Recommended maximum berm spacing</th> </tr> <tr> <th>Land slope</th> <th>Max spacing</th> </tr> </thead> <tbody> <tr> <td>< 2%</td> <td>30 m</td> </tr> <tr> <td>5%</td> <td>25 m</td> </tr> <tr> <td>10%</td> <td>15 m</td> </tr> <tr> <td>20%</td> <td>8 m</td> </tr> </tbody> </table>	Recommended maximum berm spacing		Land slope	Max spacing	< 2%	30 m	5%	25 m	10%	15 m	20%	8 m
Recommended maximum berm spacing															
Land slope	Max spacing														
< 2%	30 m														
5%	25 m														
10%	15 m														
20%	8 m														

Figure 1 - Typical placement of mulch filter berm

Drawn:	Date:		
GMW	Apr-10	Mulch Filter Berms	MB-01

Review due: 01/10/25

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MATERIAL

ROCK MULCH: 25–75mm DURABLE, WEATHER RESISTANT AND EVENLY GRADED WITH 50% BY WEIGHT LARGER THAN THE SPECIFIED NOMINAL ROCK SIZE (IF SPECIFIED).

INSTALLATION

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

2. SPREAD ENOUGH ROCK TO COMPLETELY COVER THE SURFACE OF THE SOIL AT THE DENSITY OR THICKNESS SPECIFIED IN THE APPROVED PLANS. IF THE APPLICATION DENSITY IS NOT SUPPLIED, THEN APPLY AT A THICKNESS OF AT LEAST 50mm OR TWICE THE NOMINAL ROCK SIZE (WHICHEVER IS GREATER).

3. IF THE EXPOSED SOILS ARE DISPERSIVE, THEN ENSURE THESE SOILS ARE COVERED WITH A LAYER OF NON-DISPERSIVE SOIL (MINIMUM 200mm) BEFORE PLACEMENT OF ROCK.

4. MAKE ALL NECESSARY ADJUSTMENTS TO ENSURE ANY SURFACE FLOW IS ALLOWED TO PASS FREELY ACROSS THE TREATED AREA FOLLOWING ITS NATURAL DRAINAGE PATH.

MAINTENANCE

1. INSPECT ALL TREATED SURFACES FORTNIGHTLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. CHECK FOR RILL EROSION, OR DISLODGMET OF THE ROCKS.

3. REPLACE ANY DISPLACED ROCKS TO MAINTAIN THE REQUIRED COVERAGE.

4. IF WASH-OUTS OCCUR, REPAIR THE SLOPE AND REINSTALL ROCK COVER.

5. IF THE ROCK MULCHING IS NOT EFFECTIVE IN CONTAINING THE SOIL EROSION IT SHOULD BE REPLACED, OR AN ALTERNATIVE EROSION CONTROL PROCEDURE ADOPTED.

Drawn:

GMW

Date:

Dec-09

Rock Mulching

MR-01

Review due: 01/10/25

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PREPARATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND DIMENSIONAL DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, OR EXTENT, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
2. TAKE ALL NECESSARY STEPS TO ENSURE DISTURBANCE TO THE BUFFER ZONE IS MINIMISED THROUGHOUT THE TIME IT IS USED AS A SEDIMENT TRAP.
3. TO THE MAXIMUM DEGREE PRACTICABLE, ENSURE FLOW PASSING THROUGH THE BUFFER ZONE IS NOT ALLOWED TO CONCENTRATE WITHIN DRAINAGE DEPRESSIONS, SWALES, RILLS OR WHEEL TRACKS.
4. WHERE NECESSARY, INSTALL APPROPRIATE DRAINAGE CONTROLS UP-SLOPE OF THE BUFFER ZONE TO DISTRIBUTE THE INFLOW ALONG THE FULLY LENGTH OF THE BUFFER ZONE AS 'SHEET FLOW'.
5. WHERE NECESSARY, INSTALL A COARSE SEDIMENT TRAP, SUCH AS A SEDIMENT FENCE, UP-SLOPE OF THE BUFFER ZONE TO REDUCE THE QUANTITY OF SEDIMENT PASSING ONTO THE GRASS. GENERALLY THIS IS REQUIRED IF LARGE QUANTITIES OF COARSE SEDIMENT ARE EXPECTED.

6. IF REQUIRED, INSTALL A LIGHT BARRIER FENCE TO CLEARLY IDENTIFY THE BUFFER ZONE AND HELP EXCLUDE CONSTRUCTION TRAFFIC.

MAINTENANCE

1. INSPECT THE BUFFER ZONE ON A REGULAR BASIS AND AFTER RUNOFF-PRODUCING RAINFALL.
2. ENSURE THAT THERE IS NO SOIL EROSION AND THAT SEDIMENT DEPOSITION IS NOT CAUSING THE CONCENTRATION OF FLOW THROUGH THE BUFFER ZONE, OR FLOW BYPASSING.
3. IF THE BUFFER ZONE HAS BEEN DISTURBED, TAKE NECESSARY STEPS TO RE-ESTABLISH SUITABLE SHEET FLOW CONDITIONS.
4. REMOVE EXCESSIVE ACCUMULATIONS OF SEDIMENT THAT MAY CAUSE THE CONCENTRATION OF FLOW. EXCESSIVE SEDIMENT SHOULD BE REMOVED AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT, OR WHERE APPROPRIATE, EVENLY RAKED INTO THE SOIL. SEDIMENT SHOULD BE REMOVED IN A MANNER THAT AVOIDS DAMAGE TO THE BUFFER ZONE OR THE CREATION OF WHEEL TRACKS DOWN THE SLOPE.

5. EXCESSIVE SEDIMENT MAY BE DEFINED AS:

- (i) ANY SEDIMENT THAT COVERS A PORTION OF THE GRASSED SURFACE; OR
- (ii) SEDIMENT DEPOSITION SUCH THAT THE GRASS STRAND HEIGHT ABOVE THE SEDIMENT IS LESS THAN 50mm; OR
- (iii) A DEPOSITION OF SEDIMENT IN EXCESS OF 750g/m² (APPROXIMATELY THE EQUIVALENT OF THREE 70mm DIAMETER BALLS OF DRY SOIL).

6. THE SOURCE OF ANY EXCESSIVE SEDIMENT SHOULD BE INVESTIGATED AND CONTROLLED WHERE PRACTICAL.

7. TAKE APPROPRIATE STEPS TO MAINTAIN AT LEAST 75% GRASS COVER OVER THE BUFFER ZONE.
8. WHERE PRACTICAL, MAINTAIN ANY GROUND COVER VEGETATION AT A HEIGHT GREATER THAN THE EXPECTED DEPTH OF WATER FLOW AND AT LEAST 50mm.

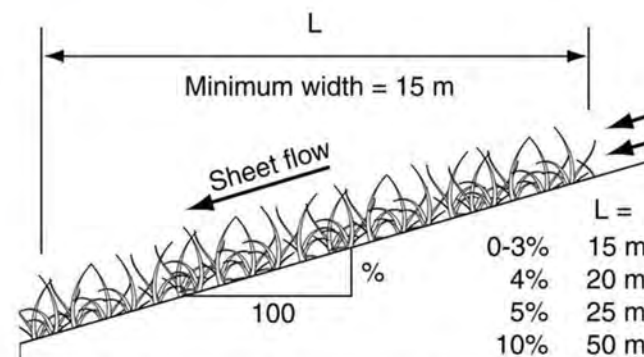
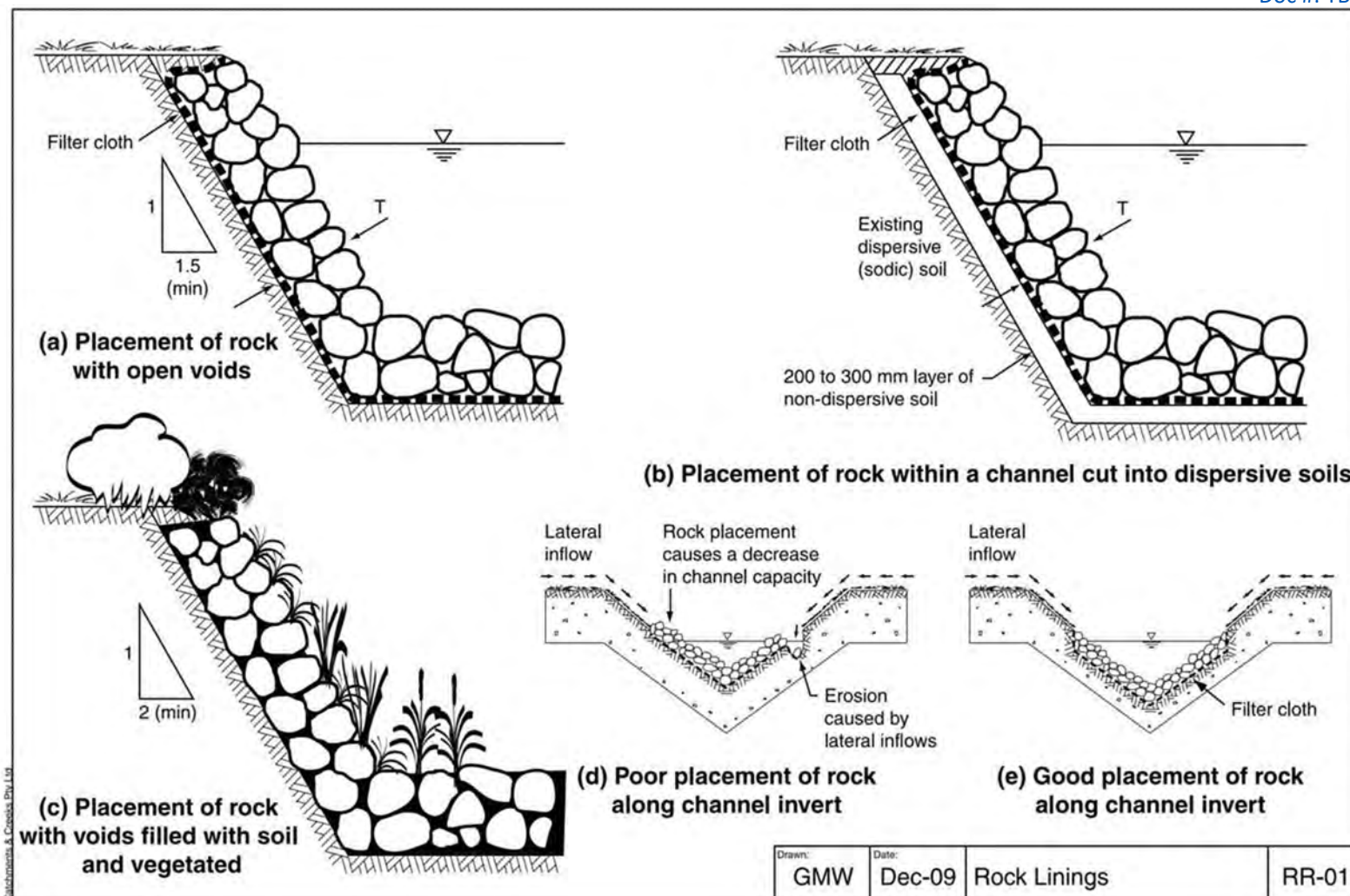


Figure 1 - Minimum dimensional requirements of a grassed buffer zone

Drawn:	Date:		
GMW	Apr-10	Buffer Zones (grassed)	BZ-01



Review due: 01/10/25

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MATERIALS

ROCK: HARD, ANGULAR, DURABLE, WEATHER RESISTANT AND EVENLY GRADED WITH 50% BY WEIGHT LARGER THAN THE SPECIFIED NOMINAL ROCK SIZE AND SUFFICIENT SMALL ROCK TO FILL THE VOIDS BETWEEN THE LARGER ROCK. THE DIAMETER OF THE LARGEST ROCK SIZE SHOULD BE NO LARGER THAN 1.5 TIMES THE NOMINAL ROCK SIZE. SPECIFIC GRAVITY TO BE AT LEAST 2.5.

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

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT AND INSTALLATION 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. CLEAR THE PROPOSED CHANNEL AREA OF TREES, STUMPS, ROOTS, LOOSE ROCK, AND OTHER OBJECTIONABLE MATERIALS.

3. EXCAVATE THE CHANNEL TO THE LINES AND GRADES AS SHOWN ON THE PLANS. OVER-CUT THE CHANNEL TO A DEPTH EQUAL TO THE SPECIFIED DEPTH OF ROCK PLACEMENT SUCH THAT THE FINISHED ROCK SURFACE WILL BE AT THE ELEVATION OF THE SURROUNDING LAND.

4. ROCK MUST BE PLACED WITHIN THE CHANNEL AS SPECIFIED WITHIN THE APPROVED PLANS, INCLUDING THE PLACEMENT OF ANY SPECIFIED FILTER LAYER.

5. IF DETAILS ARE NOT PROVIDED ON THE ROCK PLACEMENT, THEN THE PRIMARY ARMOUR ROCK MUST BE EITHER PLACED ON:

- (i) A FILTER BED FORMED FROM A LAYER OF SPECIFIED SMALLER ROCK (ROCK FILTER LAYER);
- (ii) AN EARTH BED LINED WITH FILTER CLOTH;
- (iii) AN EARTH BED NOT LINED IN FILTER CLOTH, BUT ONLY IF ALL VOIDS BETWEEN THE ARMOUR ROCK ARE TO BE FILLED WITH SOIL AND POCKET PLANTED IMMEDIATELY AFTER PLACEMENT OF THE ROCK.

6. IF A ROCK/AGGREGATE FILTER LAYER IS SPECIFIED, THEN PLACE THE FILTER LAYER IMMEDIATELY AFTER THE FOUNDATIONS ARE PREPARED. SPREAD THE FILTER ROCK IN A UNIFORM LAYER TO THE SPECIFIED DEPTH BUT A MINIMUM OF 150mm. WHERE MORE THAN ONE LAYER OF FILTER MATERIAL HAS BEEN SPECIFIED, SPREAD EACH LAYER SUCH THAT MINIMAL MIXING OCCURS BETWEEN EACH LAYER OF ROCK.

7. IF A GEOTEXTILE (FILTER CLOTH) UNDERLAY IS SPECIFIED, PLACE THE FABRIC DIRECTLY ON THE PREPARED FOUNDATION. IF MORE THAN ONE SHEET OF FABRIC IS REQUIRED TO COVER THE AREA, OVERLAP THE EDGE OF EACH SHEET AT LEAST 300mm AND PLACE ANCHOR PINS AT MINIMUM 1m SPACING ALONG THE OVERLAP.

8. ENSURE THE GEOTEXTILE FABRIC 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.

9. WHERE NECESSARY, A MINIMUM 100mm LAYER OF FINE GRAVEL, AGGREGATE OR SAND SHOULD BE PLACED OVER THE FABRIC TO PROTECT IT FROM DAMAGE.

10. 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.

11. PLACE ROCK TO ITS FULL THICKNESS IN ONE OPERATION. DO NOT PLACE ROCK BY DUMPING THROUGH CHUTES OR OTHER METHODS THAT CAUSE SEGREGATION OF ROCK SIZES.

12. THE FINISHED SURFACE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS. HAND PLACING MAY BE NECESSARY TO ACHIEVE THE PROPER DISTRIBUTION OF ROCK SIZES TO PRODUCE A RELATIVELY SMOOTH, UNIFORM SURFACE. THE FINISHED GRADE OF THE ROCK SHOULD BLEND WITH THE SURROUNDING AREA. NO OVERFALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.

13. IMMEDIATELY UPON COMPLETION OF THE CHANNEL, VEGETATE ALL DISTURBED AREAS OR OTHERWISE PROTECT THEM AGAINST SOIL EROSION.

14. WHERE SPECIFIED, FILL ALL VOIDS WITH SOIL AND VEGETATE THE ROCK SURFACE IN ACCORDANCE WITH THE APPROVED PLAN.

MAINTENANCE

1. ROCK-LINED CHANNELS SHOULD BE INSPECTED PERIODICALLY AND AFTER SIGNIFICANT STORM EVENTS. CHECK FOR SCOUR OR DISLODGED ROCK. REPAIR DAMAGED AREAS IMMEDIATELY.

2. CLOSELY INSPECT THE OUTER EDGES OF THE ROCK PROTECTION. ENSURE WATER ENTRY INTO THE CHANNEL OR CHUTE IS NOT CAUSING EROSION ALONG THE EDGE OF THE ROCK PROTECTION.

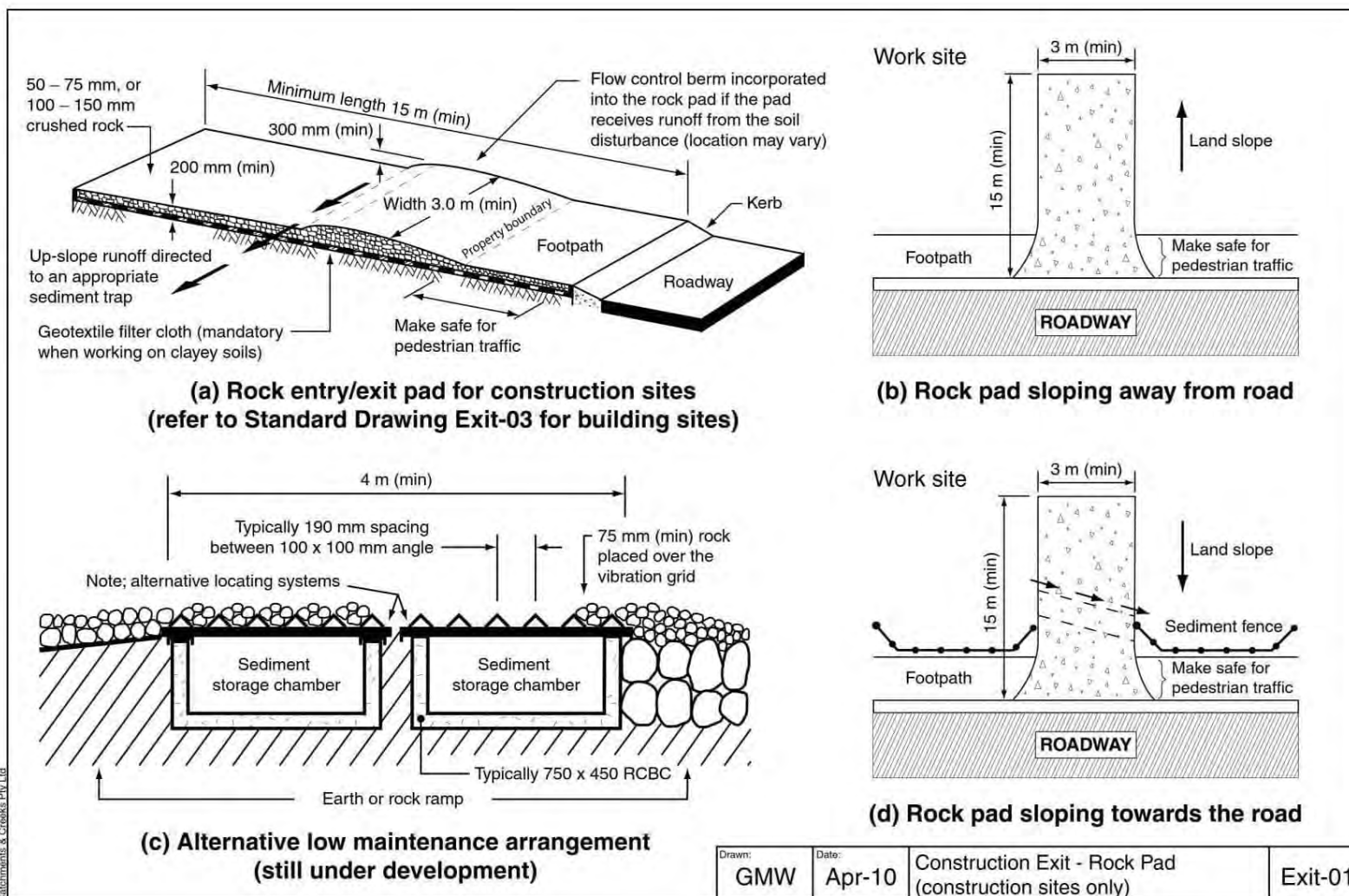
3. CAREFULLY CHECK THE STABILITY OF THE ROCK LOOKING FOR INDICATIONS OF PIPING, SCOUR HOLES, OR BANK FAILURES.

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

Drawn:	Date:		
GMW	May-10	Rock Linings	RR-02

Review due: 01/10/25

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Review due: 01/10/25

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MATERIALS ROCK: WELL GRADED, HARD, ANGULAR, EROSION RESISTANT ROCK, NOMINAL DIAMETER OF 50 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). INSTALLATION 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 ROCK PAD, 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. IF THE EXPOSED SOIL IS SOFT, PLASTIC OR CLAYEY, PLACE A SUB-BASE OF CRUSHED ROCK OR A LAYER OF HEAVY-DUTY FILTER CLOTH TO PROVIDE A FIRM FOUNDATION.	4. PLACE THE ROCK PAD FORMING A MINIMUM 200mm THICK LAYER OF CLEAN, OPEN-VOID ROCK. 5. IF THE ASSOCIATED CONSTRUCTION SITE IS UP-SLOPE OF THE ROCK PAD, THUS CAUSING STORMWATER RUNOFF TO FLOW TOWARDS THE ROCK PAD, THEN FORM A MINIMUM 300mm HIGH FLOW CONTROL BERM ACROSS THE ROCK PAD TO DIVERT SUCH RUNOFF TO A SUITABLE SEDIMENT TRAP. 6. THE LENGTH OF THE ROCK PAD 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 PAD SHOULD COMMENCE AT THE EDGE OF THE OFF-SITE 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 ALL SITE ENTRY AND EXIT POINTS PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER RUNOFF-PRODUCING RAINFALL, OR OTHERWISE AT FORTNIGHTLY INTERVALS. 2. IF SAND, SOIL, SEDIMENT OR MUD IS TRACKED OR WASHED ONTO THE ADJACENT SEALED ROADWAY, THEN SUCH MATERIAL MUST BE PHYSICALLY REMOVED, FIRST USING A SQUARE-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 PAD IS 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 (e.g. FLOW CONTROL BERM) ARE MAINTAINED IN ACCORDANCE WITH THEIR DESIRED OPERATIONAL CONDITIONS.	6. DISPOSE OF SEDIMENT AND DEBRIS IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD. REMOVAL 1. THE ROCK PAD SHOULD BE REMOVED ONLY AFTER IT IS NO LONGER NEEDED AS A SEDIMENT TRAP. 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.
Parameters & Controls Pty Ltd			
Drawn: GMW	Date: Apr-10	Construction Exit - Rock Pad (construction sites only)	Exit-02

APPLICATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND APPLICATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF APPLICATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
2. FILL OR SUITABLY CONTOUR ANY EXISTING RUTTING, RILLING OR GULLIES.
3. SUITABLY DIVERT UP-SLOPE STORMWATER RUNOFF AROUND TREATED AREA AS DIRECTED WITHIN THE APPROVED PLANS, OR OTHERWISE AS DIRECTED BY THE SITE ENGINEER.
4. APPLY TREATMENT TO THE AREA TO THE DEPTH AND FREQUENCY (SPACING) SPECIFIED ON THE APPROVED PLANS, OR OTHERWISE AS DIRECTED BY THE SITE ENGINEER.
5. IMMEDIATELY SEED AND MULCH ROUGHENED AREAS TO OPTIMISE SEED GERMINATION AND GROWING CONDITIONS.

MAINTENANCE

1. DURING THE CONSTRUCTION PERIOD, INSPECT THE TREATED AREA PRIOR TO FORECAST RAINFALL, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING RAINFALL, OR OTHERWISE ON A WEEKLY BASIS.
2. FILL EROSION RILLS SLIGHTLY ABOVE THE ORIGINAL GRADE, OR REGRADE THE SLOPE AS DIRECTED TO REMOVE THE RILLS.

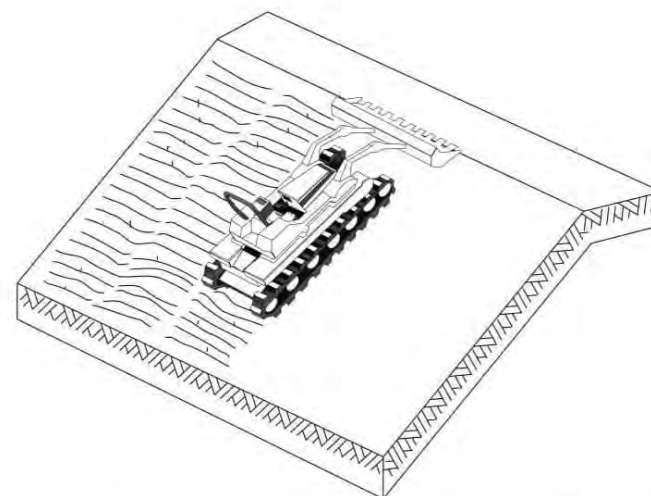


Figure 1 - Application of surface roughening on slope

Drawn:	Date:		
GMW	Dec-09	Surface Roughening	SR-01

Appendix O Table 4.4.7 IECA best practice land clearing and rehabilitation requirements

Risk ¹	Best practice requirements
All cases	• All reasonable and practicable steps taken to apply best practice erosion control measures to completed earth works, or otherwise stabilise such works, prior to anticipated rainfall – including existing unstable, undisturbed, soil surfaces under the management or control of the building/construction works.
Very low	• Land clearing limited to 8 weeks of work if rainfall is reasonably possible. • Disturbed soil surfaces stabilised with minimum 60% cover^[2] within 30 days of completion of works if rainfall is reasonably possible. • Unfinished earthworks are suitably stabilised if rainfall is reasonably possible, and disturbance is expected to be suspended for a period exceeding 30 days.
Low	• Land clearing limited to maximum 8 weeks of work. • Disturbed soil surfaces stabilised with minimum 70% cover^[2] within 30 days of completion of works within any area of a work site. • Unfinished earthworks are suitably stabilised if rainfall is reasonably possible and disturbance is expected to be suspended for a period exceeding 30 days. • Appropriate protection of all planned garden beds is strongly recommended.
Moderate	• Land clearing limited to a maximum 6 weeks of work. • Disturbed soil surfaces stabilised with minimum 70% cover^[2] within 20 days of completion of work within any area of a work site. • All planned garden beds protected with a minimum 75mm layer of organic <i>Mulching</i>, heavy <i>Erosion Control Blanket</i>, <i>Rock Mulching</i>, or the equivalent. • Staged construction and stabilisation of earth batters (steeper than 6H:1V) in maximum 3m vertical increments wherever reasonable and practicable. • The use of turf to form grassed surfaces given appropriate consideration. • Soil stockpiles and unfinished earthworks are suitably stabilised if disturbance is expected to be suspended for a period exceeding 10 days.

Review due: 01/10/25

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Risk ¹	Best practice requirements
High	• Land clearing limited to a maximum 4 weeks of work. • Disturbed soil surface stabilised with minimum 75% cover^[2] within 10 days of completion of works within any area of a work site. • All planned garden beds protected with a minimum 75mm layer of organic <i>Mulching</i>, heavy <i>Erosion Control Blanket</i>, <i>Rock Mulching</i>, or the equivalent. • Staged construction and stabilisation of earth batters (steeper than 6H:1V) in maximum 3m vertical increments wherever reasonable and practicable. • The use of turf to form grassed surfaces given appropriate consideration. • Soil stockpiles and unfinished earthworks are suitably stabilised if disturbance is expected to be suspended for a period exceeding 10 days.
Extreme	• Land clearing limited to maximum 2 weeks of work. • Disturbed soil surfaces stabilised with minimum 80% cover^[2] within 5 days of completion of works within any area of a work site. • All planned garden beds protected with a minimum 75mm layer of organic <i>Mulching</i>, heavy <i>Erosion Control Blanket</i>, <i>Rock Mulching</i>, or the equivalent. • Staged construction and stabilisation of earth batters (steeper than 6H:1V) in maximum 2m vertical increments wherever reasonable and practicable. • High priority given to the use of turf to form grassed surfaces. • Soil stockpiles and unfinished earthworks are suitably stabilised if disturbance is expected to be suspended for a period exceeding 5 days.

1. Erosion risk based on monthly erosivity (Table 4.4.1), average monthly rainfall depth (Table 4.4.2), or soil loss rate (Table 4.4.3) as directed by the regulatory authority.
2. Minimum cover requirements may be redirected if the natural cover of the immediate land is less than the nominated value, for example in arid and semi-arid areas or on coastal sand dunes.

Review due: 01/10/25

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Appendix P Erosion and sediment control treatment – seismic lines

Blade up erosion controls

Figure 1 shows the condition of land following blade up traverse of survey area. No treatment required.



Figure 1 Typical condition 'blade up' treatment

Surface bladed by grader (including woodland areas)

Erosion control treatments as follows:

- A diversion bank shall be installed along sections of the survey lines where material has been stripped from the surface (refer Table 12).
- The bank shall be constructed as a cut and push operation. Lines shall be ripped across the area at a grade of 0.3%. A shallow channel should be cut along this line (approximately 0.6 metres deep). Excavated material is dumped on the down slope side of the channel then compacted and smoothed out to form a bank with even batters and a level top (refer Figure 2).
- To aid trafficability, an approach and departure ramp shall be shaped during construction of the bank.
- The bank should direct runoff into undisturbed vegetation or into an existing drain (care needs to be taken to ensure that erosion does not occur where the water runs down into the drain).
- Ensure the diversion bank is not eroded by traffic.
- Undertake maintenance as necessary.

Table 12: Bank spacing requirements (m)

Slope		Diversion bank spacing (m)
%	Gradient	
0.5	1:200	170-180
1	1:100	120-130
2	1:50	90-100
3	1:33	70-80
4	1:25	60-70
5	1:20	55-60
6	1:17	40-45

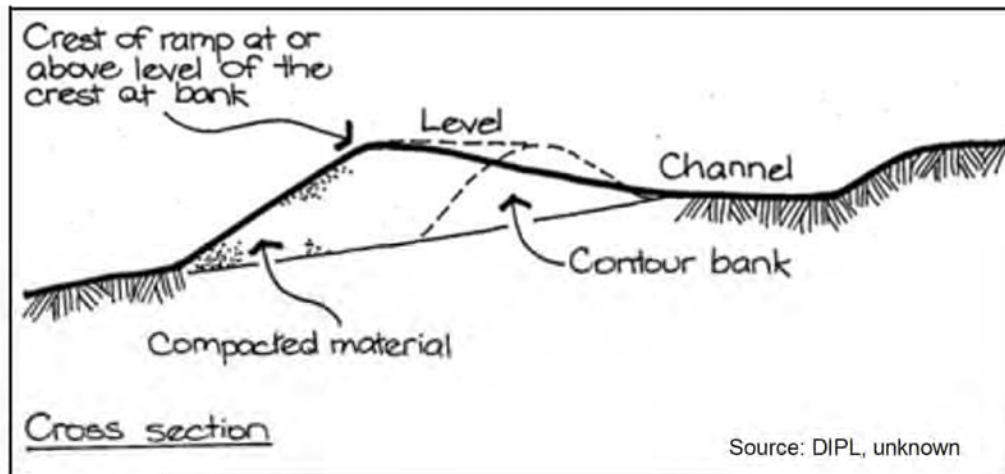


Figure 2 Whoa boys or roll over banks drawing

Woodland area erosion controls

Figure 3 shows the expected final rehabilitation treatment for woodland areas disturbed by the seismic survey activities. In the event of an expected significant rainfall event which will require the site to be abandoned, a similar treatment is to be adopted.

- Step 1. Respread windrowed topsoil of disturbed area and ripped into the soil surface.
- Step 2. Spread vegetation over top soiled area in an even layer.

Felled vegetation will be evenly spread over the top soiled area to provide additional protection against erosion.



Figure 3 Treatment for woodland areas

Typical offlet drain detail of access tracks

Figure 4 shows the typical offlet drain and table drain block detail, which consists of the following actions:

- Construct access tracks with table drains that are free draining.
- Avoid road crowning to allow water to naturally cross the road.
- Form tracks to allow off-road drainage. Where track intercepts the direction of overland flow and re-directs this flow to a non-natural drainage line, install erosion control works to minimise potential erosion.
- The design and position of erosion control measures to be determined by experienced operator and site engineer, based on the site characteristics of the access track location.
- Where construction of table drains are deemed necessary, they should have a broad flat base at least 1 m wide and should not be graded to produce a 'V' shape. To minimise erosion,
- the slope should be no greater than 0.5% on erodible soils or 1% on stable soils.
- Where encounter dispersive / erosive soils they should be stabilised with gypsum or other stabiliser, as determined by laboratory analysis of soils.
- Where cut-out drains are required, they should be spaced based on the slope of the area i.e. 0.5% slope, allow for cut-out draining every 170-180 m or 1 % slope, allow for cut-out drainage every 120-130 m etc. (refer to NT Road Drainage Fact Sheet). It is noted that the recommended distance between turn-out drains is a guide and may not apply to all locations along the access track.

- Monitor road conditions to ensure deterioration does not occur. Assist in the maintenance and repair work on roads and tracks used.

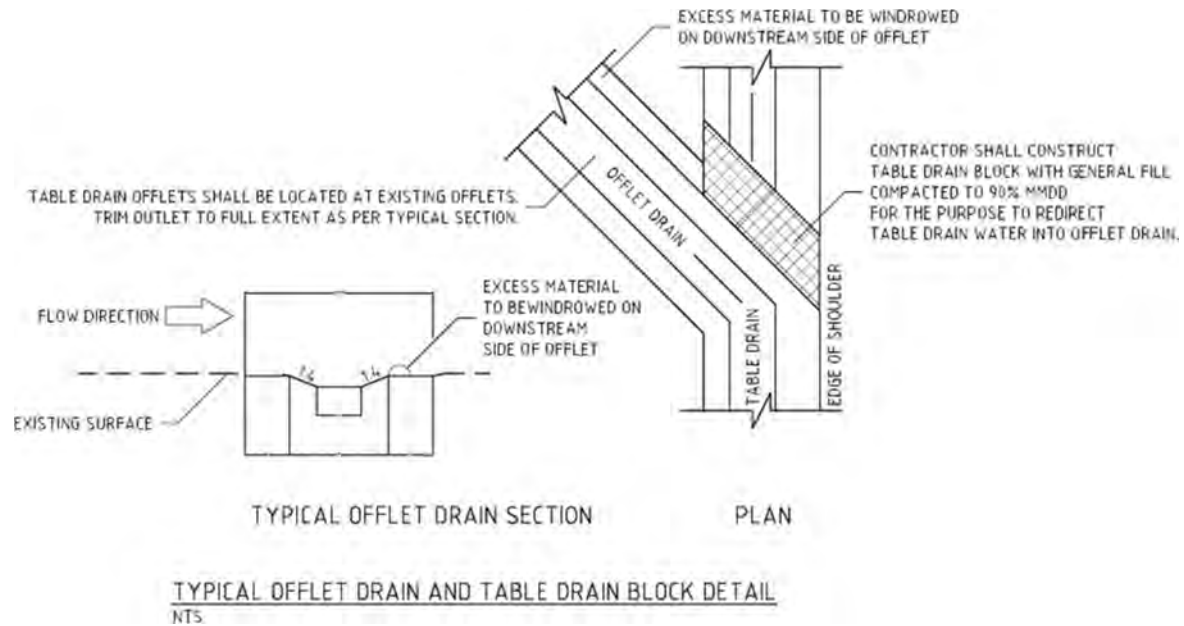


Figure 4 Typical offlet drain and table drain block diagram

APPENDIX F

Spill Management Plan

BEETALOO EXPLORATION PROJECT SPILL MANAGEMENT PLAN

Review record

Rev	Date	Reason for issue	Consolidator	Approver
2.2	21/09/2023	Edits to Appendix A and DEPWS contacts	LP	MK
2.3	25/03/2024	Addresses regulation 10 and regulation 11 feedback from DEPWS, 29-Feb-2024	LP	MK
2.4	09/05/2024	Baker Hughes chemicals added to Appendix A	LP	MK
3.0	08/07/2024	Inclusion of SPCF	LP	MK
4.0	27/09/2024	Addresses regulation 10 feedback from DEPWS, 26-Sept-2024. Includes additional chemicals assessed under regulation 22 modifications.	LP	MK
5.0	14/10/2024	Update for inclusion of 3D seismic EMP	AC	MK
5.1	06/03/2025	Minor update for 3D seismic EMP	AC	MK
6.0	30/04/2025	Inclusion of the SWP EMP	AC	BO
6.1	3/10/2025	Minor update for SWP EMP	BOR	MK

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Appendices

Appendix A: Chemical volumes per well and storage areas (based on maximum 3 wells per pad)

1. Purpose

This Spill Management Plan (SMP) has been prepared to support Tamboran's Beetaloo exploration program. The SMP is a mandatory requirement prepared in accordance with the [Code of Practice for Petroleum Activities in the Northern Territory](#) (the Code). This SMP is designed to provide the strategy for the management of spills across Tamboran's Beetaloo exploration activities.

The SMP covers all regulated activities described in the Environment Management Plans (EMPs), currently in force under the Petroleum (Environment) Regulations 2016 (the Regulations). EMPs that are currently in force under the Regulations are available at: [Environment management plan decisions | Department of Lands, Planning and Environment](#).

Activities undertaken by Tamboran and its subsidiaries in the Northern Territory (NT), within its exploration permit (EP) areas (EP 76, EP 98, EP 117, EP 136, EP 143, EP 161 and EP(A) 197 (Figure 1)) include:

- civil works
- drilling and stimulating gas wells for exploration and appraisal purposes
- 2D and 3D seismic programs
- construction and operation of the temporary Sturt Plateau Compression Facility (SPCF)
- construction and operation of the Shenandoah South Sand Wash Plant
- rehabilitation and routine maintenance/monitoring activities.

The SMP will reference the relevant sections within each EMP to avoid duplication. The SMP should be read in conjunction with the chemical risk assessment and operation risk assessment appended to each EMP, in accordance with section 3.4 of the Code. The chemical risk assessment is not applicable for seismic surveys.

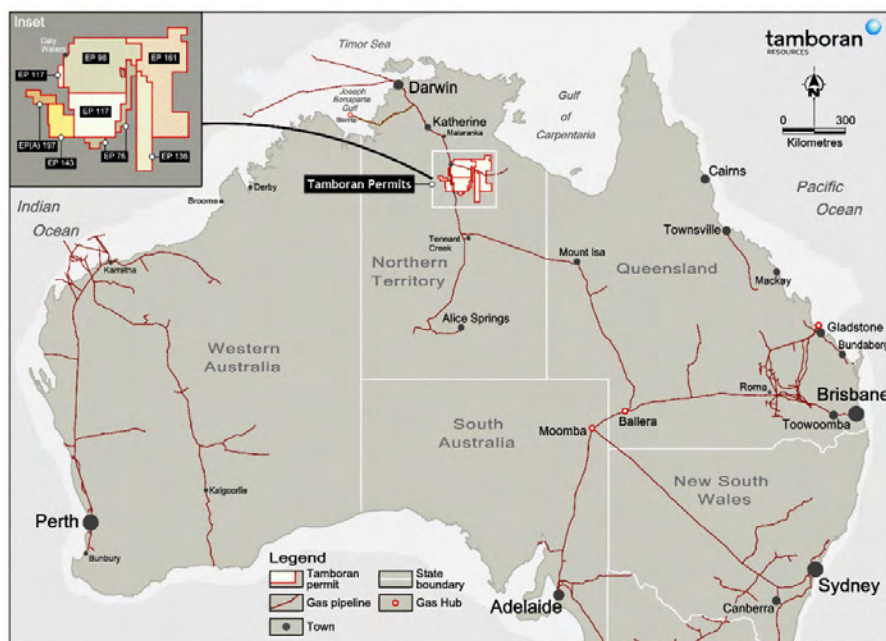


Figure 1: Location of Tamboran exploration permit areas (EPs)

2. Key legislation

Key legislation and documents consulted in the development of this plan are provided below (a full list of applicable legislation is provided in the corresponding management plans):

- **Code of Practice: Onshore Petroleum Activities in the Northern Territory (NT):** Mandatory code of practice legislating the management of chemicals and wastewater onsite, including the use of secondary containment, lined tanks and spill management plan.
- **Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act 2010:** Covers the transportation of goods by road in the NT. This also covers licences for vehicles and drivers carrying dangerous goods.
- **Workplace Health and Safety (National Uniform Legislation) Act 2011:** Covers the storage and handling of chemicals on site.
- **Waste Management and Pollution Control Act 1998:** Covers the requirements for the transportation and disposal of waste within the NT. This includes the requirements for contractors, vehicles and facilities managing listed wastes to be licenced.

3. Chemicals and wastewater description

The chemicals and wastewater typically stored within Tamboran's exploration areas include:

- Chemicals used for drilling
- Waste drilling fluids, cuttings and muds
- Chemicals used for stimulation
- Flowback wastewater
- Completions and well suspension fluids
- Waste and wastewater streams from the SPCF
- General use chemicals such as incidental condensate and oil, diesel and fuels, general equipment maintenance chemicals (hydraulic oils, degreasers etc.)

The full list of chemicals and wastewater stored onsite, including their volume, location and hazardous status is provided in Appendix A for current EMPs. The types of chemicals used under drilling and hydraulic fracture stimulation EMPs covered by this SMP is provided in Table 1, which also identifies the relevant sections and appendices per EMP. A copy of these EMPs and appendices can be found on the Department of Land, Planning and Environment (DLPE) website¹ at: <https://environment.nt.gov.au/onshore-gas/environment-management-plan/approved-emps>.

The assessment of chemicals, including evaluation of the environmental hazard of the chemical additives in the hydraulic fracturing fluid systems, based on their environmental persistence, bioaccumulation and aquatic toxicity properties; evaluation of human health effects; and exposure assessment can be reviewed by accessing in the relevant hydraulic fracturing chemical risk assessment appended to each approved EMP. All chemicals and wastewater stored on site will be in accordance with cl A.8.3 of the Code.

¹ Please note recent changes in the Northern Territory Government includes the update of Department names as follows: Department of Environment, Parks and Water Security (DEPWS) is now referred to as Department of Lands, Planning and Environment (DLPE)

Table 1: Types of chemicals and wastewater relevant to each drilling and HFS EMP

EMP	Drilling chemicals and waste fluids	Stimulation chemicals	Flowback wastewater	Completion and well suspension fluids	SPCF process wastewater- drip trays and bunds	General use	SWP Process Water
NT-2050-15-MP-032 Velkerri 76 S2 EMP: • Chemical RA Appendix C • Risk assessment Appendix N	x	x	x	x	N/A	x	N/A
CDN/ID NT-2050-35-PH-0018 Amungee NW-1H (ORI7): • Section 2.1.1, Table 2, Table 3.	N/A	N/A	x	x	N/A	x	N/A
NT-2050-15-MP-039 Beetaloo W-1 EMP (ORI8): Section 3.9, Table 8.	N/A	N/A	N/A	Incidental volumes may be generated	N/A	x	N/A
NT-2050-MP-040 Kalala S1 EMP (ORI9): Section 3.8, Table 8.	N/A	N/A	N/A	Incidental volumes may be generated	N/A	x	N/A
NT-2050-15-MP-041 Beetaloo Sub-basin Multi-well EMP (ORI10): • Chemical RA Appendix E • Risk assessment Appendix M	x	x	x	x	N/A	x	N/A
NT-2050-15-MP-0088 Amungee NW Delineation Program EMP (ORI11): • Section 4.13 and Section 3.15	x	x	x	x	N/A	x	N/A

EMP	Drilling chemicals and waste fluids	Stimulation chemicals	Flowback wastewater	Completion and well suspension fluids	SPCF process wastewater- drip trays and bunds	General use	SWP Process Water
- Chemical RA Appendix D - Risk assessment Appendix L							
TB2-HSE-MP-08 Shenandoah South E&A Program EMP (TAM1-3) - Section 3.10 and Section 3.12 - Chemical RA Appendix E and Appendix E.1 - Risk assessment Appendix M	x	x	x	x	N/A	x	N/A
TB2-HSE-MP-13 Sturt Plateau Compression Facility – Appraisal gas (TAM2-2) - Section 3.17.18 and Section 3.8 - Risk assessment Appendix K	N/A	N/A	N/A generated and managed under TAM1-3	N/A generated and managed under TAM1-3	x	x	N/A
TB2-HSE-MP-14 Shenandoah South 3D Seismic Program EMP (TAM3-2) - Section 3.8.3 - Risk assessment Appendix I	N/A	N/A	N/A	N/A	N/A	x	N/A
TB2-HSE-MP-28 Shenandoah South Sand Wash Plant EMP (TAM4) Section 3.7.3 Risk assessment Appendix I	N/A	N/A	N/A	N/A	N/A	x	x

4. Spill failure scenarios

Potential spill scenarios associated with appraisal activities are summarised in Table 2. These scenarios include:

- spills from chemical, waste and wastewater handling, transfer and storage activities onsite
- spills from chemical, waste and wastewater during transportation - trucking and gathering
- tank, drilling sump and containment vessel overflows and structural failures
- overflows from operational settlement basins at the SWP

The loss of containment due to the failure of well barriers is covered under the Well Operations Management Plan (WOMP).

Table 2: Spill scenario summary table

Spill scenario	Activity duration	Mechanisms	Location	Quality ¹	Quantity	Key management controls	Monitoring	Receptors	Effectiveness of controls
Spills from chemical and waste / wastewater handling and storage activities onsite.	- Drilling – 45 days - Stimulation – 15-30 days. - Well testing – 30– 180 days. - SPCF construction and commissioning – 18 months. - SPCF operation for extended appraisal – 36 months. - Duration of seismic – 3-4 months - Sand Wash Plant construction and commissioning – 1 month - Initial sand washing trial – 10 weeks - Ongoing sand washing – TBA.	- Container rupture - Spill during chemical storage, handling and mixing - Runoff from drilling waste management and composting. - Contaminants in water and soil pass through the food chain and bioaccumulate.	- Chemical storage area. - Chemical, oils and waste oil storage area on the SPCF and SWP. - Drilling rig. - Stimulation spread. - Drilling sumps. - Flowback storage tanks. - Well testing equipment. - Seismic lines and storage areas.	Potentially hazardous fluids such as: - Saline and drilling fluids. - Saline flowback. - Chemicals listed in EMP. - SPCF oils, coolants, antiscalants and other chemicals. NB: All added drilling and hydraulic fracturing chemicals have been assessed and verified to not be toxic and persistent and bio-accumulative (see EMP chemical risk assessment).	<10,000 L	- Designated storage areas with appropriate segregation of incompatible chemicals. - Secondary containment to be deployed under high-risk spill/leak storage and handling areas. - Spill kits available. - Routine inspection of chemical stores. - Sites are manned during operations, with continuous leak detection and level monitoring at all other times. - Wastewater management plan.	- Routine inspection of chemical stores, sumps and tanks during operations. - Tank leak detection.	Retained on-site	High – use of secondary containment reduces the probability of a spill. High – controls managing the storage of chemicals and wastes are mature with secondary containment measures limiting potential receptor impacts. The scientific certainty around the effectiveness of secondary containment in preventing groundwater contamination is high and mature.
Loss of containment during transfer onsite (e.g. leakage from the SPCF, gathering lines, pipes, hoses, fittings, refuelling/maintenance of SWP equipment and seismic equipment etc).	- Drilling – 45 days - Stimulation – 15-30 days. - Well testing – 30– 180 days. - SPCF construction and commissioning – 18 months. - SPCF operation for extended appraisal – 36 months. - Duration of wastewater transfer – 30 – 45 days. - Duration of seismic – 3-4 months - Sand Wash Plant construction and commissioning – 1 month	- Coupling, valve, hosing and equipment failure. - Failure of buried / aboveground gathering lines. - During the seismic survey, leaks and spills would most likely result from: - loss of containment of fuels from storage area - spill during refuelling or fuel transfer - hydraulic oil leaks from seismic survey vehicles. - Contaminants in water and soil pass through	- Chemical mixing and transfer areas on the drill rig, mixing hoppers and wastewater storages. - SPCF and SWP chemical and oil storage and transfer areas. - Gathering/wastewater lines between well pads and SPCF and wastewater tanks. - Seismic lines and storage areas.	Potentially hazardous fluids such as: - Saline and drilling fluids and flowback wastewater. - Chemicals listed in EMP chemical risk assessment. - SPCF chemicals listed in EMP and managed in accordance with safety data sheets. NB: All added drilling and hydraulic	<1,000 L	- Secondary containment to be deployed under high-risk spill/leak storage and handling areas - Spill kits available - Routine inspection of chemical stores - Sites are manned during operations, with continuous leak detection and level monitoring at all other times - Wastewater management plan - Hydrostatic testing of gathering lines prior to operation - Seismic survey maintenance truck fitted with spill prevention equipment.	- Routine inspection of all chemical handling areas, including wastewater transfer points and chemical mixing areas, seismic survey area. - Monthly inspection of buried gathering lines and weekly inspection of surface gathering lines when in operation.	Retained on-site	High – use of secondary containment reduces the probability of a spill High – use and continuous monitoring of flow and pressure meters during operations reduces the probability of a spill High – controls managing the storage of various fluids are in accordance with the requirements of the Code, which limit potential receptor impacts. The scientific certainty around the effectiveness of secondary containment and transfer in preventing

Spill scenario	Activity duration	Mechanisms	Location	Quality ¹	Quantity	Key management controls	Monitoring	Receptors	Effectiveness of controls
	- Initial sand washing trial – 10 weeks - Ongoing sand washing – TBA.	the food chain and bioaccumulate.		fracturing chemicals have been assessed and verified to not be toxic and persistent and bio-accumulative (see EMP chemical risk assessment).		- Hydraulic fluid and fuel drums stored within portable bunding and bulk fuel stored within tankers equipped with safety features such as double skins (or temporary bunding), safety cut-off valves, top accessing etc. - Spill leak and drip trays used to address the risk of minor drips and spills associated with re-fuelling operations. - In/out volume discrepancy and pressure monitoring during transfer operations - Valve pits installed at approximately 1 km intervals so if a leak is detected, flow can be shut off and the line repaired - Gathering lines will be purged of wastewater and valves will be shut-in when not in operation			groundwater contamination is high and mature.
Spills from chemical and wastewater during transportation (off-site- including transport on unsealed roads during the wet season)	- Drilling chemical transfer—1–5 days of bulk chemical transfer generally pre-drilling - Stimulation chemical transfer 2–3 truckloads of chemicals per week for approximately 6 weeks - Wastewater disposal over 3 weeks—up to approximately 22 truck movements total over the duration - Duration of seismic – 3-4 months - Sand Wash Plant construction and commissioning – 1 month - Initial sand washing trial – 10 weeks	- Transport spill due to road condition, flooding or another event. - Traffic accident (total or partial release). - Contaminants in water and soil pass through the food chain and bioaccumulate.	Off-site along highway or access tracks	Potentially hazardous fluids such as: - Combustible fluids (e.g. diesel). - Various chemicals as listed in EMP chemical risk assessment. - SPCF chemicals listed in EMP and managed in accordance with safety data sheets for the SPCF. - Saline wastewater. NB: All added drilling and hydraulic fracturing	<1,000 L for transport spill <50,000 L for total loss of B- triple carrying flowback	- All transport companies to be appropriately licenced to transport chemicals and waste (<i>Dangerous Goods Act</i> and <i>Waste Management and Pollution Control Act</i>) including the requirement to detect and respond to spills - No chemical or wastewater transportation during wet season, unless a risk assessment determined the activity is safe and low risk - Transportation will not occur on tracks where the surface is not safe to allow transportation - Wastewater and chemical transportation will not be undertaken through flooded waterways	Performance of contractors to be monitored as a part of transportation contractors	- Chemical transport between Darwin/South Australia and Queensland/ and Daly Waters - Wastewater transportation between Daly Waters and Queensland via Tennant Creek	High – The transportation of wastes and chemicals is a tightly controlled industry with mature practices designed to prevent, detect and respond to transportation spills. Transport will only be undertaken in the wet season as per the specified controls to ensure the risks are ALARP. High - Any accident is likely to be restricted to road corridors and result in "serious", short term (days-weeks) reversible impacts. The scientific certainty around the transportation of chemicals and wastes is high and mature, and well understood across Australia, limiting exposure to

Spill scenario	Activity duration	Mechanisms	Location	Quality ¹	Quantity	Key management controls	Monitoring	Receptors	Effectiveness of controls
	Ongoing sand washing – TBA.			chemicals have been assessed and verified to not be toxic and persistent and bio-accumulative (see EMP chemical risk assessment).		- Driving on unsealed roads and access tracks will be avoided 24 hours following a >20 mm rainfall event - Area is remote with major urban centres to be avoided. - Wastewater management plan			personnel, the public and surrounding receptors.
Tank, drilling sump and containment vessel overflows and structural failures	Duration of all activities plus ongoing wastewater storage which may be extended beyond 12-months to allow for ongoing evaporation of fluids	- Overfilling of a sump and flowback tank - Structural failure of embankment or tank wall - Contaminants in water and soil pass through the food chain and bioaccumulate	Sumps and tanks on well pad	Potentially hazardous fluids such as: Saline wastewater with total dissolved solids >50,000 mg/L NB: All added drilling and hydraulic fracturing chemicals have been assessed and verified to not be toxic and persistent and bio-accumulative (see EMP chemical risk assessment).	1L to >10,000 L	- Lease pads bunded during the storage of flowback - Enclosed tanks used during wet seasons operations - Open tanks with 1:1000 ARI freeboard - Tanks constructed to Australian Standards - Routine tank and sump inspections - Drilling sump to be designed and operated to handle the drilling of multiple wells - Sump solid levels to be periodically removed from the sump between wells to maintain sump capacity - Any removed drilling muds and cuttings from the sump will be stored on an impermeable liner with a permeability of less than 6×10^{-14} m/s- and fluid captured in the sump directed to the wastewater tank	Routine tank and sump level and structural integrity (visual) inspections	Retained on lease pad within bund	High – controls managing the storage of various fluids are in accordance with the requirements of the Code, which limit potential receptor impacts. The scientific certainty around the effectiveness of conservative freeboard as a mitigation is high and mature.
SWP Settlement/decant basin process water overflow	- Site to be operational 12+ weeks/year, (dependant on proppant volumes required). - While not operational, site will be placed on care and maintenance.	Overflow of settlement/decant basin due to direct rainfall or stormwater run-off entering basins	Settlement/decant basins	Non-hazardous (raw water with entrained sediment (primarily inert silica dioxide with no identified contaminants present))	>10,000L	- Clean water diversion bunds/drains - ESCP to divert stormwater run-off from entering process water storages - Significant excess capacity to be maintained in settlement basins (at least 300mm dry season freeboard (1:1000 ARI dry season rainfall) and a 580mm Wet season	Weekly site inspections (daily wet season inspections during rainfall events) to check freeboard/levels.	Any releases will be to grade adjacent to the SWP site. No waterways/drainage features are present in the surrounding landscape – i.e. there are no surface water receptors. The sandy soils present are	High– controls managing the storage of process water are in accordance with the requirements of the Code, which limit potential receptor impacts. The scientific certainty around the effectiveness of conservative freeboard as a mitigation is high and mature.

Spill scenario	Activity duration	Mechanisms	Location	Quality ¹	Quantity	Key management controls	Monitoring	Receptors	Effectiveness of controls
						freeboard (1:100 7-day rainfall event) with additional volumetric capacity to be available.		inherently highly permeable. As such any process water releases from the site would be expected to infiltrate into the soil within a relatively short distance of the release point;	
¹ Refer Table 1 for a summary of the types of chemicals used under drilling and hydraulic fracture stimulation EMPs covered by this SMP.									

5. Potential receptors

The location of Tamboran's Beetaloo exploration activities is remote. A description of the environment, including environmental and cultural sensitivities, with the potential to be impacted by a spill is provided in each of the EMPs. Figure 2 illustrates the separation distance from sensitive receptors such as:

- Watercourses and drainage features/ depressions
- Communities
- Homesteads
- Heritage places
- Vegetation communities
- Protected areas
- Water bores

Maps regarding sacred sites and restricted work areas are also applicable and will be provided to work crews to ensure awareness of these features.

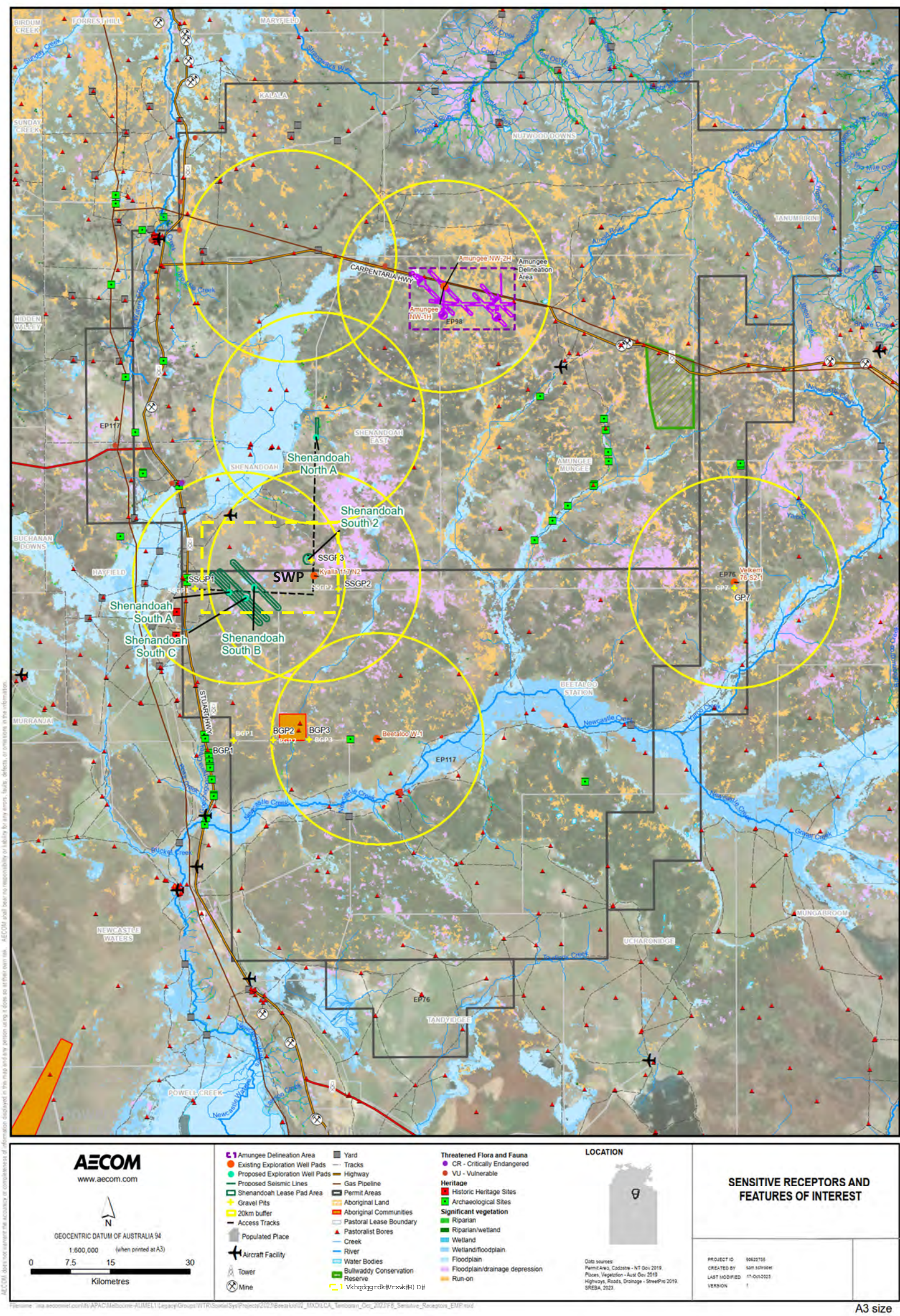


Figure 2: Location of activities and potential receptors and features of interest²

² Strategic Regional Environmental and Baseline Assessment (SREBA) 2022 mapping data has been used to draft this figure: Department of Environment, Parks and Water Security 2022. *Strategic Regional Environmental and Baseline Assessment for the Beetaloo Sub-basin*. [SREBA Data Catalogue](#), viewed May 2023.

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6. Risk assessment

The risk of spills associated with all Tamboran activities is covered under the respective EMP for each activity.

7. Control measures

Control measures to manage spills associated with Tamboran activities are provided in the EMPs and summarised in Table 2. The key management controls include:

- Contractors are required to develop spill management procedures to comply with the requirements of this SMP.
- All chemicals, oils and waste oils to be stored within secondary containment.
- All flowback, completion fluids, chemicals, oil and fuel storage will be equipped with secondary containment (or dual liners), as per the Code.
- Drilling sumps will be lined, with enough freeboard to manage a 1:1000 Average Recurrence Interval (ARI) wet season (~1300 mm).
- Flare pits will be designed to manage a 1:1000 ARI 24-hour storm event (377 mm).
- Tanks will be designed, installed and operated as per the manufacturer's specifications and Code.
- Where flowback is being stored, the wastewater tanks shall be earthen bunded to prevent release to surrounding areas in the case of a catastrophic failure.
- The earthen bund shall be designed to hold 110% of the volume of the largest wastewater tank onsite.
- The earthen bund shall be constructed to withstand a failure event, with the bund appropriately compacted and stabilised.
- Well sites are designed and constructed to prevent spills of hazardous chemicals; this includes:
 - compacting the lease pad surface to 100 kPa to prevent infiltration.
 - provision of bunded (lined) chemical segregation areas.
- Gathering/wastewater transfer lines to have leak detection
- Monitoring to detect spills will be undertaken in accordance with Section 9.
- Procedures will be developed by contractors designed to detect, remediate and report any spills. This includes:
 - Chemical handling procedures
 - Chemical storage and handling inspection procedures
 - Spill prevention, detection and response procedures
- The transport of hydraulic fracturing chemicals and wastewater during the wet season (October to April inclusive) will be avoided, unless a risk assessment determined the activity is safe and low risk. Any necessary transportation will be undertaken in accordance with the following:
 - Transportation will not occur on tracks where the surface is not safe to allow transportation vehicles to drive upon.

- Wastewater and chemical transportation will not be undertaken through flooded waterways.
- The transportation of wastewater/ chemicals during rainfall events will be avoided.
- Driving on unsealed roads and access tracks will be avoided 24 hours following a >20 mm rainfall event.
- After a rainfall event >20 mm, or when the integrity of any unsealed road may be compromised due to prolonged rainfall, each unsealed access track proposed to be used for wastewater/ chemical transportation will be inspected to ensure the integrity of the road is sufficient to allow safe passage of the proposed transport vehicle.
- Chemicals will not be unloaded during rainfall events.
- Effective spill clean-up material readily available at each work site and on all mobile service trucks or vehicles, where hydrocarbons and chemicals are stored and/or used.
- Inspection reports and maintenance records of secondary containment shall be kept and available for review upon request.
- Spill response mock-up drills to be completed as a part of routine emergency response training.

8. Spill response and management

The following section provides an overview of the response to spills during drilling, stimulation and well testing activities, as well as seismic program activities. Where the spill is the result of an emergency that is still active, the Beetaloo Exploration Emergency Response Plan (TBN-HSE-MP-05) will take precedence over this plan.

8.1 Rapid spill assessment

When a spill occurs, the on-site Supervisor will carry out a rapid assessment to determine the potential hazards and the type and location of emergency assistance required. This assessment shall include the following:

- Determine the physical (volume and state) and location of the spill
- Determine the appropriate spill category and type of response as per section 12.1.
- Assess the hazard of the material spilled, including any potential hazards associated with chemical mixing (such as oxidising and reducing agents)
- Determine the safety hazard to immediate response personnel and whether additional resources (such as emergency services or specialised equipment or advice) are required to manage the spill safely
- Determine spill movement, factors affecting the movement (i.e. impending weather, topography, drainage lines, seasonality etc) and spill response priorities, as per Table 3.

Table 3: Spill response priorities

Spill priority	Response considerations
People and communities	• Evacuate and muster (if deemed necessary) • Account for all people and determine missing persons • Stop unauthorised access • Provide a technical resource to the Emergency Services (if required) • Protect community (including indigenous community members) and pastoralists
Environment and sacred sites	• For emergencies that are safe to manage, onsite personnel will respond with available resources to limit the extent of the impact to the environment or a protected site • For larger incidents, or where it is unsafe for onsite personnel to respond, trained people will be mobilised to control and contain the emergency to minimise the impact to the environment or protected site
Regulators	• Notify Regulators as per incident reporting requirements
Assets	• Monitor automatic shutdown of the equipment or part thereof, or initiate manual shutdowns where it is safe to do so • Mobilise emergency services to intervene
Landholders/ leaseholders/ Native Title holders	• Notify neighbours • Notify NLC

8.2 Spill containment and clean up procedures

Generic spill containment clean-up procedures must be developed and implemented by each contractor engaged by Tamboran for significant onsite activities, aligning with the requirements of this plan. These procedures shall be adapted (where appropriate) to consider the site and chemical specific hazards associated with each spill event.

The procedures shall consider the following generic spill containment and response procedure:

- Move all people out of harm's way.
- Alert others nearby.
- Assess the situation—determine what substances are involved, the volumes, the potential receptors (people and the environment) and if additional support is required. The substance must be known prior to taking any action (refer to the safety data sheet).
- If applicable; remove any possible risk escalating factors (e.g. ignition hazards in case of flammable/combustible spills); approach from up-wind to reduce fume risks, isolate the spill source (close containment valve, similar). Ensure appropriate controls requirements are met, e.g. personal protection equipment, first aid support, etc., prior to conducting spill clean-up.
- If it is safe to do so; stop the source of the leak (if possible) and contain the spill using onsite equipment to:
 - Prevent from leaving site or entering a waterway or sensitive feature (including flood water).
 - Recover free liquid and contaminated material as soon as possible to mitigate infiltration. Material recovery should consider the benefit of recovery versus the additional impact recovery of all contaminated material could cause, as per the National Environment Protection (Assessment of Site Contamination) Measure.
- Prevent people, livestock and wildlife access to hazardous material through fencing or other barriers.
- Store contaminated material in a manner to minimise the risk of additional contamination
- Collect and retain information on the volume of extent of the spill, including photographs.
- For Level 2 spills and higher, the Project Manager shall be notified as soon as it is safe to do so, but within 2-hours.
- Project Manager to ensure appropriate external incident reporting requirements are actioned in accordance with the impact of the spill.
- For Level 2 spills and higher, Tamboran Project Manager to seek expertise as to whether additional testing and remediation is required upon completion of the initial containment and clean up. This consideration will be undertaken in accordance with the National Environment Protection (Assessment of Site Contamination) Measure.
- Upon rectification of a reportable spill, an incident investigation shall be completed as per the Regulations. This shall include the root cause of the incident, actions taken to mitigate the impact and ongoing monitoring, and maintenance required to ensure the site is stable and non-polluting.
- Where spills have occurred in proximity to a surface water feature (such as a water course or drainage depression) ongoing monitoring of that feature may be required if impacts are reasonably expected. This includes leaks from gathering lines and transport accident. This shall be considered on a case-by-case basis and included in the incident response to DLPE Petroleum Regulation Branch.

8.3 Contaminated material disposal

Contaminated material disposal will be undertaken in consideration of the following:

- Depending on the nature of the spill (i.e. size, duration and chemical involved), contaminated material may be identified visibly during clean up (i.e. identify the extent of the wetting front) or may require in situ analysis (such as soil EC/pH testing). Where it is difficult to ascertain whether all contaminated material has been removed, additional lab analysis verification may be required (i.e. for extensive spills typically a category 3 and beyond).
- During a spill clean-up, the storage of contaminated material must be undertaken in a manner that minimises additional contamination.
- Offsite disposal must be undertaken in accordance with the *Waste Management and Pollution Control Act 1998*.
- All listed waste transportation shall be undertaken by licenced contractors, be tracked and disposed of at licenced waste management facilities.

9. Monitoring and inspections

The monitoring and inspection programs to identify spills is summarised in Table 4.

Table 4: Spill monitoring and inspections

Monitoring program	Frequency	Methodology	Purpose	Minimum volume of leak
Flowback wastewater tank and sump level monitoring (when wastewater is stored on-site)	During operations: - Daily - All other times: Weekly during the dry season (May to September) - Daily during the wet season (October to April)	- Instrument or - Level dip/ visual assessment	Prevent the overtopping of tanks	<10 L
Tank leak detection (when flowback wastewater is stored on-site)	Continuous	Instrument	Detect the migration of fluid through primary containment into the interstitial space	<50 L
Chemical and oil storage areas (when chemical stored on-site)	During operations: Daily All other times: Weekly	Visual (a camera may be used where sites are unmanned)	Detection of leaks	<5 L
Wastewater tank structural integrity (when wastewater is stored onsite)	Weekly	Visual inspection	Detect potential structural weakness	N/A

Monitoring program	Frequency	Methodology	Purpose	Minimum volume of leak
Gathering/wastewater lines	Continuous flow and pressure monitoring during wastewater transfers of gathering lines	Instrument and visual inspection	Detection of leaks	<110 L gathering line
	Surface pipework and infrastructure: weekly during operations			<10 L surface pipework
	Buried pipework: monthly during operations			<50 L for a buried pipeline
SPCF liquid waste handling system	Monthly during operations	Instrument and visual inspection	Detection of leaks	<1 L
Field service truck and refuelling trucks	Daily during operations	Visual inspections	Detection of leaks	1-200 L
	Continuous during refuelling operations			
SWP Settlement and decant basins	Daily during operations Weekly during non-operational period Pre-wet season site assessment Daily wet season inspections during rainfall events	Visual inspection	Observation of storage level / freeboard Identification of maintenance requirements	<1000L

10. Roles and responsibilities

The critical roles and responsibilities set out in Table 5 are for the main members of the spill response group. This team represents the core group of resources that will lead a spill response with the support of the broader Tamboran team.

Table 5: Roles and responsibilities

Position	Role and responsibility
Project Manager/ Drilling and completions VP/ Seismic VP	Ultimately accountable for the implementation of the spill management plan (SMP). Role, or delegate, will liaise with Tamboran environment specialists to determine remediation requirements and external reporting obligations.

On-site Supervisor/ Onsite Company representative	Responsible for the initial response to a spill. This role will be delegated to the well site representative or nominated contractor in charge of a work program. Role will undertake the initial spill assessment, engage emergency services (if required) and co-ordinate immediate spill clean-up operations associations to minimise the potential impacts to people, places and the environment.
VP Environment and Permit Approvals	Report spill to regulatory authorities. Provide expertise on clean up requirements and ongoing monitoring and management requirements. Interface with government and regulatory bodies for communication and consents.
HSE Manager	Provide specialist technical advice (emergency response) to support spill management activities.

11. Waste transportation and disposal

All contractors engaged to undertake waste transportation and disposal will be required to comply with this plan. A bridging SPMP will be developed by each contractor summarising the activities to be undertaken to comply with this plan and the Code.

12. Spill reporting

12.1 Spill rating

All spills shall be reported, with volumes of spilled material/ substances recorded.

Table 6 provides a summary of the spill classification based upon the volume and location of spill. The hazards of the potential spill to people and the environment should be assessed independently, to ensure incident specific hazards are considered in the spill response. This table provides guidance as to the likely spill scenarios that may trigger the different incident reporting requirements.

When classifying spills and determining the reporting requirements, Ministerial conditions and environmental performance objectives and criteria should also be considered when determining whether the event is a recordable or reportable event.

The spill tiers include:

- **Internal Record:** Minor routine spills readily dealt with during normal operations (i.e. minor diesel spills during refuelling, hydraulic oil hose leaks etc.). Spills below 200 L and restricted to the facility or activity area. Spills contained within existing bunds below 2,500 L and low hazardous materials (i.e. sediment, grey water, and low toxicity substances) fall within this category. Clean up time is generally hours, with no residual contamination.
- **Level 1:** Spills contained within the facility or activity area and can be cleaned up without involvement of external organisations. Tier 1 spills include spills with clean up time greater than 3 hours but less than 1-day and leave no residual contamination. These spills are not trivial or routine and are therefore classified as recordable incidents as per section 12.2.
- **Level 2:** Spills that have not been completely contained within the site boundary and/or may require additional resources to clean up. These include larger spills with cleanup time greater than 1 day but less than 7 days. Level 2 spills are recordable and may be reportable depending on the actual or potential for downstream environmental impact, as defined in section 12.2. These spills may require notification under the *Waste Management and Pollution Control Act 1998*.

- **Level 3:** Severe spills that cannot be contained by the operator and requires substantial additional resources to manage the spill. Clean up time is generally greater than a week. Level 3 spills are reportable incidents.

Table 6: Spill tier levels

		Spill (L)		
		20-200 L	200-2,500 L	>2,500 L
Receiving environment	Spills contained in bunds	Internal record*		Level 1
	Onsite (<i>well pad, camp pad, hardstand, road, or work area</i>) compacted or sealed surface**	Internal record*	Level 1	Level 2
	Offsite - areas adjacent to well pads, camp pads, roads, seismic lines where spills have moved beyond the approved activity area**	Level 1	Level 2	Level 3
	Sensitive environmental or cultural feature (such as a waterway, drainage lines, wetland, high valued habitat and sacred site) or where the spill has, or has the potential to, cause material or serious environmental harm **	Level 2	Level 3	Level 3

Notes:

* Internal records in Tamboran's incident management system, with monthly reviews. For certain substances, such as flowback, there may be site specific requirements outlined in the EMP approval notice. The approvals notice should be reviewed.

** Spills of dangerous goods or wastes offsite may need to be reported under NT *Dangerous Goods Act 1998* or *Waste Management and Pollution Control Act 1998*.

12.2 Incident reporting

Incidents may require reporting under the Petroleum (Environment) Regulations and Waste Management Pollution Control Act.

12.2.1 Petroleum (Environment) Regulations incident reporting

12.2.1.1 Reportable environmental incident reporting

The Regulations define a reportable incident as an incident arising from a regulated activity that has caused, or has the potential to cause, material environmental harm or serious environmental harm as defined under the Petroleum Act.

An interest holder must notify DLPE Petroleum Regulation Branch of a reportable incident as soon as practicable but no later than two-hours after the first occurrence of the incident or after the time the interest holder becomes aware of the incident. The preferred method of notifying DLPE Petroleum Regulation Branch is email:

1. Email: Onshoregas.dlpe@nt.gov.au³
2. Phone: 1800 064 567 NT Environment Protection Authority (NT EPA) Pollution Hotline (caller to state it is a petroleum matter)

Any verbal report to DLPE Petroleum Regulation Branch must be followed up by a written report from the Project Manager within three days in accordance with the Regulations.

³ Effective 20 September 2023, the preferred method of DPLE notification is email.

12.2.1.2 Recordable incidents

The Regulations define a recordable incident as an incident arising from a regulated activity that:

- I. Has resulted in an environmental impact or environmental risk not specified in the current plan for the activity; or
- II. Has resulted in a contravention of an environmental performance standard specified in the current plan for the activity; or
- III. Is inconsistent with an environmental outcome specified in the current plan for the activity; and
- IV. Is not a reportable incident.

These types of spills are typically a Level 1 type spill as defined in Table 6.

An interest holder must notify DLPE Petroleum Regulation Branch of a recordable incident as soon as practicable but no later than 15-days after the reporting period (agreed period or each 90-day period after the day on which the EMP is approved). The preferred method of notifying DLPE Petroleum Regulation Branch is email: Onshoregas.dlpe@nt.gov.au.

12.2.2 Waste Management and Pollution Control Act incident reporting

In accordance with the *Waste Management and Pollution Control Act*, where contaminants or waste is not confined within the land on which the petroleum activities are undertaken (i.e. the approved disturbance areas where the petroleum activity is occurring), Tamboran will notify the NT EPA of any incident causing or threatening to cause pollution as soon as practicable, but no less than 24 hours after becoming aware of the incident.

A notifiable incident is defined as an incident that causes, or is threatening or may threaten to cause, pollution resulting in material environmental harm or serious environmental harm.

A notification must include:

- a) the incident causing or threatening to cause pollution;
- b) the place where the incident occurred;
- c) the date and time of the incident;
- d) how the pollution has occurred, is occurring or may occur;
- e) the attempts made to prevent, reduce, control, rectify or clean up the pollution or resultant environmental harm caused or threatening to be caused by the incident; and
- f) the identity of the person notifying.

The notification shall be made to the NT EPA Pollution Hotline 1800 064 567 (caller to state it is a petroleum matter) and the DLPE Petroleum Regulation Branch email: Onshoregas.dlpe@nt.gov.au.

13. Acronyms and Abbreviations

Acronym / abbreviation	Meaning
km	Kilometre
kPa	kilopascal
mm	Millimetre
m/s	Metres per second
L	Litre
ARI	Average Recurrence Interval
DEPWS	Department of Environment, Parks and Water Security (previous Department name)
DLPE	Department of Lands, Planning and Environment (new Department name)
EMP(s)	Environment management plan(s)
EP	Exploration Permit
NT	Northern Territory
NT EPA	Northern Territory Environment Protection Authority
SPCF	Sturt Plateau compression facility
SMP	Spill Management Plan
SREBA	Strategic Regional Environmental and Baseline Assessment
WOMP	Well Operations Management Plan

Appendix A Chemical volumes per well and storage areas (based on maximum 3 wells per pad)

NOTE: In accordance with the Code, a chemical risk assessment has been completed on all listed chemicals, which have been verified to not be toxic and persistent and bioaccumulative.

Material name	Typical volume	Maximum volume	Unit	Storage area	Hazardous (Y/N)
Acetic acid – 60%	3,000	9,000	L	Stimulation chemical storage area	No
BE-9 Biocide	17,000	51,000	L	Stimulation chemical storage area	Yes
Caustic Soda Liquid	15,000	45,000	L	Stimulation chemical storage area	No
DCA-11001 Breaker activator	5,000	15,000	L	Stimulation chemical storage area	Yes
DCA-13002 Breaker	300	900	kg	Stimulation chemical storage area	Yes
DCA-13003 Breaker	10,000	30,000	L	Stimulation chemical storage area	Yes
DCA-16001 Clay Stabiliser	42,000	126,000	L	Stimulation chemical storage area	No
DCA-17001 Corrosion inhibitor	1,000	3,000	L	Stimulation chemical storage area	Yes
DCA-19001 Crosslinker	600	1,800	kg	Stimulation chemical storage area	Yes
DCA-19002 Crosslinker	10,000	30,000	L	Stimulation chemical storage area	Yes
DCA-23001 Friction reducer	5,000	15,000	kg	Stimulation chemical storage area	No
DCA-23003 Friction reducer	18,000	54,000	L	Stimulation chemical storage area	No
DCA-25005 Gelling agent	35,000	105,000	kg	Stimulation chemical storage area	No
DCA-30001 Scale inhibitor	15,000	45,000	L	Stimulation chemical storage area	No
DCA-32002 Surfactant	15,000	45,000	L	Stimulation chemical storage area	Yes
DCA-32014 Surfactant	200	600	L	Stimulation chemical storage area	Yes
FE-2 Buffer	200	600	kg	Stimulation chemical storage area	No
Hydrochloric acid – 32%	50,000	150,000	L	Stimulation chemical storage area	Yes
Alcohols, C11-14-iso-, C13-rich, ethoxylated- Surfactant	5,285	15,855	L	Stimulation chemical storage area	Yes

Material name	Typical volume	Maximum volume	Unit	Storage area	Hazardous (Y/N)
Sodium (C14-16) olefin sulfonate - Surfactant	4,658	13,974	L	Stimulation chemical storage area	Yes
Diisobutyl glutarate - plasticiser	627	1,881	L	Stimulation chemical storage area	No
Diisobutyl succinate - plasticiser	209	627	L	Stimulation chemical storage area	No
Diisobutyl adipate- plasticiser	179	537	L	Stimulation chemical storage area	No
Sodium thiosulphate- stabilising agent	4,763	14,289	L	Stimulation chemical storage area	No
Sodium sulphate stabilising agent	913	2,739	L	Stimulation chemical storage area	No
Sodium sulphite stabilising agent	794	2,382	L	Stimulation chemical storage area	No
Ethylene glycol- crosslinker	5,112	15,336	L	Stimulation chemical storage area	Yes
Choline Chloride- Clay stabiliser	10,301	30,903	L	Stimulation chemical storage area	No
Glutaraldehyde- biocide	14,930	44,790	L	Stimulation chemical storage area	Yes
Ammonium sulphate- breaker	4,479	13,491	L	Stimulation chemical storage area	Yes
Polyacrylamide- friction reducer	4,479	13,491	L	Stimulation chemical storage area	No
Sodium polyacrylate- gelling agent	746	2,238	L	Stimulation chemical storage area	No
Sodium bisulfite- stabiliser	149	447	L	Stimulation chemical storage area	No
Alkyl alcohol- surfactant	149	447	L	Stimulation chemical storage area	Yes
2-Propenoic acid, homopolymer, ammonium salt- biocide	149	447	L	Stimulation chemical storage area	Yes
Potassium persulfate-breaker	149	447	L	Stimulation chemical storage area	Yes
2-Ethoxy-naphthalene-surfactant	149	447	L	Stimulation chemical storage area	Yes
Sodium gluconate- stabiliser	8,576	25,728	L	Stimulation chemical storage area	No
Boric -crosslinker	4,288	12,864	L	Stimulation chemical storage area	Yes
Potassium hydroxide- pH control	10,745	32,235	L	Stimulation chemical storage area	Yes

Material name	Typical volume	Maximum volume	Unit	Storage area	Hazardous (Y/N)
Mannanase- crosslinker	2	6	L	Stimulation chemical storage area	Yes
Ammonium persulphate- breaker	7,451	22,353	L	Stimulation chemical storage area	Yes
Talc- buffer	384	1,152	L	Stimulation chemical storage area	No
Sodium bromate- breaker	50,441	151,323	L	Stimulation chemical storage area	Yes
Hepta sodium phosphonate- emulsifier	3,176	9,528	L	Stimulation chemical storage area	No
Distillates, hydrotreated light-friction reducer	54,231	162,693	L	Stimulation chemical storage area	No
Guar gum- viscosity regulator	15,141	45,423	L	Stimulation chemical storage area	No
Poly-oxyethylene nonylphenol ether- surfactant	4,466	13,398	L	Stimulation chemical storage area	Yes
Quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, salts with bentonite- biocide	4,466	13,398	L	Stimulation chemical storage area	Yes
1,6-Hexanediol- cross linker	447	1,341	L	Stimulation chemical storage area	Yes
Hydrochloric acid- pH control	44,715	134,145	L	Stimulation chemical storage area	Yes
N-benzyl-alkyl pyridinium chloride- pH control	28	84	L	Stimulation chemical storage area	Yes
Formic acid- corrosion inhibitor	38	114	L	Stimulation chemical storage area	Yes
Sodium erythorbate- scaler prohibitor	334	1,002	L	Stimulation chemical storage area	No
Citric acid- pH control	15,878	47,634	L	Stimulation chemical storage area	No
Acetic acid- pH control	15,878	47,634	L	Stimulation chemical storage area	No
Isopropanol- clay management	83	249	L	Stimulation chemical storage area	Yes
Ethoxylated C12-C16 alcohol - surfactant	57	171	L	Stimulation chemical storage area	Yes
Ethoxylated decanol - surfactant	19	57	L	Stimulation chemical storage area	Yes
Cinnamaldehyde- biocide	57	171	L	Stimulation chemical storage area	Yes

Material name	Typical volume	Maximum volume	Unit	Storage area	Hazardous (Y/N)
Ethoxylated tallow alkyl amine - surfactant	9	27	L	Stimulation chemical storage area	Yes
Methanol- corrosion inhibitor	2	6	L	Stimulation chemical storage area	Yes
Polyacrylamide - friction reducer	49,093	147,279	L	Stimulation chemical storage area	No
Polyethylene glycol trimethylnonyl ether - clay manager	87	261	L	Stimulation chemical storage area	Yes
Water in additive- stabiliser	66,804	200,412	L	Stimulation chemical storage area	No
Potassium sorbate food grade- corrosion inhibitor	14	42	L	Stimulation chemical storage area	No
Mannanase (Mannan endo-1,4-beta-mannosidase)- cross linker	2	6	L	Stimulation chemical storage area	Yes
Nonoxynol-9- surfactant	9	27	L	Stimulation chemical storage area	Yes
2-Ethylhexanol PO/EO polymer- stabiliser	9	27	L	Stimulation chemical storage area	No
Corn oil- friction reducer	662	1,986	L	Stimulation chemical storage area	No
Sodium chloride	15,000	45,000	kg	Completion chemical storage area	No
ALDACIDE G	500	1,500	L	Completion chemical storage area	Yes
OXYGON	100	300	kg	Completion chemical storage area	No
BARACOR 100	2,000	6,000	L	Completion chemical storage area	Yes
Sodium Hypochlorite 10–30%	10,000	30,000	L	Completion chemical storage area	Yes
CON-DET	50	150	kg	Drilling chemical storage area	No
SAPP	50	150	kg	Drilling chemical storage area	No
Bentonite	3,000	9,000	kg	Drilling chemical storage area	No
Caustic soda	1,400	4,200	kg	Drilling chemical storage area	No
EZ MUD DP or EZ MUD Liquid	2,000	6,000	kg	Drilling chemical storage area	No
ALDACIDE G	336	1008	kg	Drilling chemical storage area	Yes
STOPPIT	1,000	3,000	kg	Drilling chemical storage area	No
Soda ash	350	1050	kg	Drilling chemical storage area	Yes
BARACOR 100	250	750	kg	Drilling chemical storage area	Yes
Sodium chloride (flossy salt)	96,000	288,000	kg	Drilling chemical storage area	No

Material name	Typical volume	Maximum volume	Unit	Storage area	Hazardous (Y/N)
Barite	500	1,500	kg	Drilling chemical storage area	No
BARACARB	500	1,500	kg	Drilling chemical storage area	Yes
Citric acid	500	1,500	kg	Drilling chemical storage area	Yes
BARADEFOAM HP	500	1,500	kg	Drilling chemical storage area	No
Sodium Bicarbonate	500	1,500	kg	Drilling chemical storage area	No
PERFORMATROL	500	1,500	kg	Drilling chemical storage area	Yes
SOURSCAV	500	1,500	kg	Drilling chemical storage area	No
DRIL-N-SLIDE	500	1,500	kg	Drilling chemical storage area	No
STEELSEAL	500	1,500	kg	Drilling chemical storage area	Yes
BARAZAN D or BARAZAN D Plus	4,150	12,450	kg	Drilling chemical storage area	No
PAC L	2,300	6,900	kg	Drilling chemical storage area	Yes
Potassium chloride	22,500	67,500	kg	Drilling chemical storage area	No
QUIK-FREE	500	1,500	kg	Drilling chemical storage area	No
BAROFIBRE, BAROFIBRE Superfine and BAROFIBRE COARSE	500	1,500	kg	Drilling chemical storage area	No
BaraBlend-657	500	1,500	kg	Drilling chemical storage area	Yes
N-DRIL HT Plus	500	1,500	kg	Drilling chemical storage area	Yes
DEXTRID LTE	4,600	13,800	kg	Drilling chemical storage area	No
BARABUF	500	1,500	kg	Drilling chemical storage area	No
BDF 933 or BaraLube W-933	864	2,592	kg	Drilling chemical storage area	Yes
BAROLIFT	500	1,500	kg	Drilling chemical storage area	No
OXYGON	500	1,500	kg	Drilling chemical storage area	No
ENVIRO-THIN	500	1,500	kg	Drilling chemical storage area	No
Lime	500	1,500	kg	Drilling chemical storage area	Yes
Calcium chloride	37,000	111,000	kg	Drilling chemical storage area	Yes
Sodium bromide	8,610	24,480	kg	Drilling chemical storage area	Yes
Evolube TR	14,500	43,500	L	Drilling chemical storage area	Yes
Radiagreen EME	4,800	14,400	L	Drilling chemical storage area	Yes
Radiagreen EBL	4,800	14,400	L	Drilling chemical storage area	Yes
Polydrill	7,500	22,500	kg	Drilling chemical storage area	Yes
Alpine spotting beads	1,000	3,000	kg	Drilling chemical storage area	Yes
Barite- weighting agent	354,000	1,062,000	kg	Drilling chemical storage area	No
Bio-Paq HT filtration control	1,134	3,402	kg	Drilling chemical storage area	Yes
Brine-Pac XTS corrosion inhibitor	3,400	10,200	L	Drilling chemical storage area	Yes
Calcium chloride -salinity	180,000	540,000	kg	Drilling chemical storage area	Yes
CF Desco deflocculant	2,270	6,810	kg	Drilling chemical storage area	Yes

Material name	Typical volume	Maximum volume	Unit	Storage area	Hazardous (Y/N)
Chek-Loss fibrous LCM	1,360	4,080	kg	Drilling chemical storage area	No
Citric acid pH control	1,360	4,080	kg	Drilling chemical storage area	No
Ecco-Temp HT extender	8,000	24,000	L	Drilling chemical storage area	Yes
Flowzan viscosifier	5,000	15,000	kg	Drilling chemical storage area	No
Mil-Lime (calcium hydroxide alkalinity)	1,361	4,080	L	Drilling chemical storage area	No
Magnesium oxide pH buffer	7,500	22,500	kg	Drilling chemical storage area	No
Mil-bio SEA 98 biocide	1,800	5,400	L	Drilling chemical storage area	Yes
Mil-carb LCM / bridging	5,000	15,000	kg	Drilling chemical storage area	No
Milstarch filtration control	5,000	15,000	kg	Drilling chemical storage area	No
Navi-Lube lubricant	16,650	49,950	L	Drilling chemical storage area	Yes
New-Drill Plus shale stabiliser	1,000	3,000	kg	Drilling chemical storage area	No
Noxygen XT oxygen scavenger	884	2,652	kg	Drilling chemical storage area	No
Ova Col 110 HC cloud point glycol	13,000	39,000	kg	Drilling chemical storage area	Yes
Potassium chloride salt / shale stabiliser	41,000	123,000	kg	Drilling chemical storage area	Yes
Potassium hydroxide pH source	1,250	3,750	kg	Drilling chemical storage area	Yes
Pyro-Trol II HT filtration control	25	75	kg	Drilling chemical storage area	No
Pyro-Vis II HT viscosifier	1,400	4,200	kg	Drilling chemical storage area	Yes
Soda ash pH and hardness control	1,000	3,000	kg	Drilling chemical storage area	Yes
Sodium bicarbonate pH and hardness control	1,000	3,000	kg	Drilling chemical storage area	No
Sodium chloride salt	54,400	163,200	kg	Drilling chemical storage area	No
TEQ-Lube II	28,800	86,400	kg	Drilling chemical storage area	Yes
New-Thin – polymeric thinner	4,680	14,040	kg	Drilling chemical storage area	Yes
LC-Lube – lubricant (graphite)	9,090	27,270	Kg	Drilling chemical storage area	No
W.O. defoam defoamer	600	1,800	L	Drilling chemical storage area	Yes
Xan-Plex D viscosifier	3,000	9,000	kg	Drilling chemical storage area	No
TEQ-LUBE II - lubricant (25322-6-3)	14,400	43,200	kg	Drilling chemical storage area	Yes
TEQ-LUBE II - lubricant (39464-69-2)	14,400	43,200	kg	Drilling chemical storage area	Yes
NEW-THIN - Polymeric thinner	4,680	14,040	kg	Drilling chemical storage area	No
LC-LUBE - lubricant (graphite)	9,090	27,270	kg	Drilling chemical storage area	No
MAX-GUARD EA	26,000	78,000	L	Drilling chemical storage area	Yes
MAX-GUARD PLUS	26,000	78,000	L	Drilling chemical storage area	Yes
MAX-GUARD PLUS A	26,000	78,000	L	Drilling chemical storage area	Yes

Material name	Typical volume	Maximum volume	Unit	Storage area	Hazardous (Y/N)
SARALINE 185V	18,603	55,809	kg	Drilling chemical storage area	Yes
General operation chemicals					
Diesel	250	750	KL	Diesel storage tanks	Yes
Hydraulic oil	1,000	3,000	L	Workshop	Yes
Engine oil	1,000	3,000	L	Workshop	Yes
Degreasers	100	300	L	Workshop	Yes
Waste drilling fluids	2,500	7,500	m ³	Drilling mud sump	Yes
Completion fluids	1.4	4.2	ML	Drilling mud sump	No
Condensate	10	10	KL	Drilling chemical storage area	Yes
Flowback	~10.8 ML per well		ML	Flowback tanks	Yes
Lubricants	-	6,600	L/pa	SPCF chemical storage	Yes
Triethylene glycol	-	150,000	L/pa	SPCF chemical storage	Yes
Methanol	-	36,000	L/pa	SPCF chemical storage	Yes
Corrosion inhibitor	-	9,000	L/pa	SPCF chemical storage	Yes
H ₂ S scavenger	-	160,000	L/pa	SPCF chemical storage	Yes
Biocide	-	2,000	L/pa	SPCF chemical storage	Yes
Bulk diesel	-	50,000	L/pa	SPCF chemical storage	Yes
Engine coolants	-	25,000	L/pa	SPCF chemical storage	Yes
Hydraulic oil	-	25,000	L/pa	SPCF chemical storage	Yes
Engine oil	-	10,000	L/pa	SPCF chemical storage	Yes
Greases, solvent, paints, solvents	-	100	L/pa	SPCF chemical storage	Yes
Chemical inhibitors	-	5,000	L/pa	SPCF chemical storage	Yes
Condensate (trace levels)	-	<160	L/pa	SPCF chemical storage	Yes
Proppants*					
100 mesh sand	91,000	273,000	kg	Stimulation chemical storage area	No
Quartz or organophilic phyllosilicate- proppant	1,084	3,252	L	Stimulation chemical storage area	No
40/70 sand	1,650,000	4,950,000	kg	Stimulation chemical storage area	No
30/50 sand	610,000	1,830,000	kg	Stimulation chemical storage area	No
Silicon dioxide (quartz/sand) 100% Sand	4,757,614	14,272,842	kg	Stimulation chemical storage area	No
Silicon dioxide (quartz/sand) 40/70	5,435,287	16,305,860	kg	Stimulation chemical storage area	No

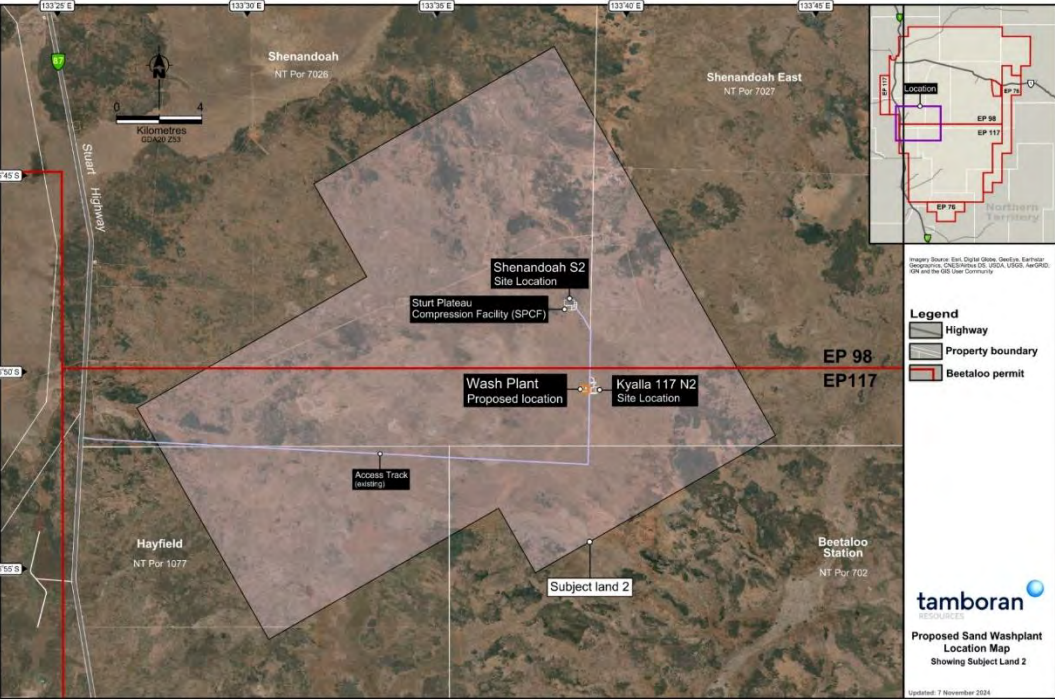
Material name	Typical volume	Maximum volume	Unit	Storage area	Hazardous (Y/N)
* Proppants are sand which is inert. They do not require special chemical bunding but are co-located in the stimulation chemical storage area, within the well pad bund. Residual proppant from a stimulation campaign is often used to assist with chemical spills on the well pad, where contaminated spill material is removed.					
Cleaning chemicals and spill response					
Soda ash – sodium carbonate	3,750	11,250	kg	Stimulation chemical storage area - spill response for acid spills	Yes
Flush fluid - distillates (petroleum), hydrotreated	1,500	4,500	L	Stimulation chemical storage area - Equipment cleaning	Yes

APPENDIX G

Rehabilitation Management Plan

Location of Sand Wash Plant

Property and land uses	Gas exploration, cattle grazing, and native title rights and interests recognised by the native title determinations over the land and waters.
Climate	The permit area is described as arid to semi-arid. Climate is influenced by the monsoon and there is a distinct wet and dry season. Most rainfall (90%) occurs during the summer months, between October and March. Annual rainfall varies across the permit area is around 680 mm, with rainfall totals show moderate variability and drought conditions are known to occur every 10 years.
Pre-disturbance land condition summary	Shenandoah South SWP location (GDA94, zone 53, 355995m E, 8137514m N) is on EP 117. The natural vegetation community that exists at SWP is of Eucalyptus low woodland which is broadly dominated by <i>Corymbia dichromophloia</i> and ground cover of <i>Triodia bitextura</i>. The landform at SWP is characterised by plains and rises associated with deeply weathered lateritic profiles, including sand sheets. Soils at this site are sandy at the surface, with a loamy sand to sandy loam A horizon. The site is in good ecological condition. The site contained moderate to high habitat values for wildlife, with coverage of leaf litter, grass cover and woody debris. Seemingly good continuous cover exists adjoining adjacent woodland habitat. Minor disturbance was evident from recent grazing and burning impacts. There is no evidence of weeds or feral animals.



Rehabilitation aims and objectives

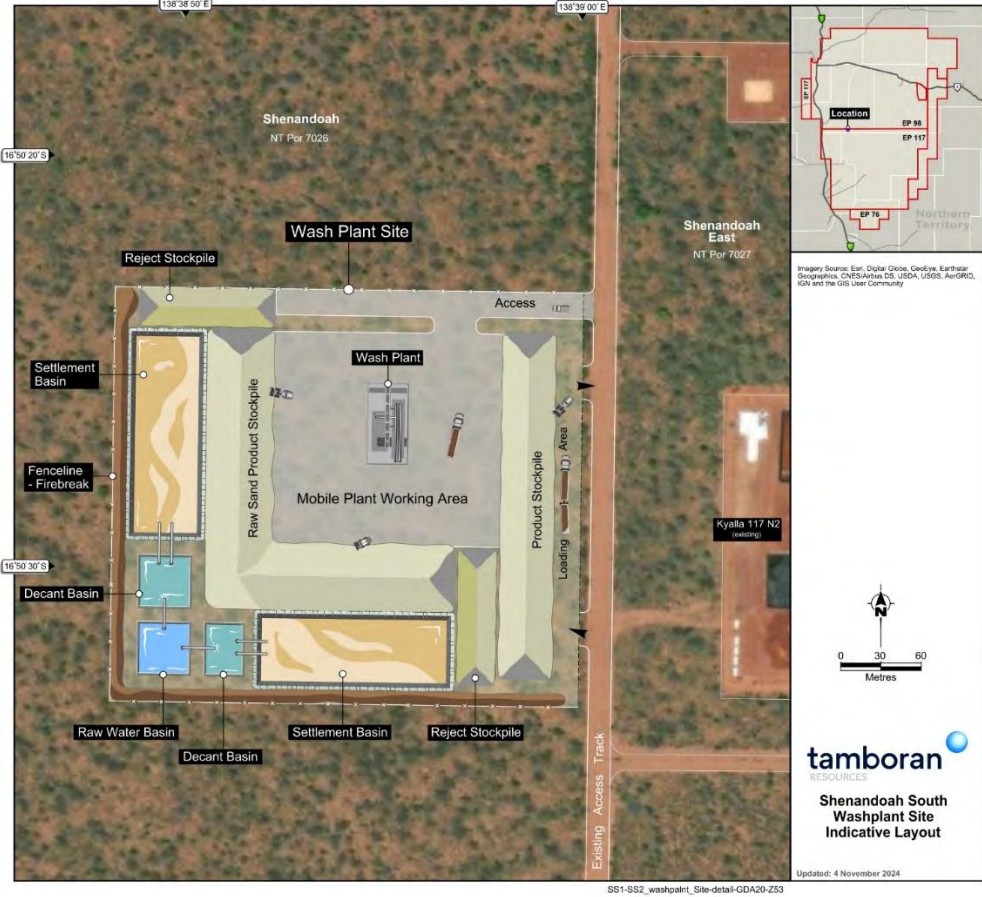
Site management aim	The aim is to rehabilitate any part of the land affected by the regulated activity to a safe condition consistent with industry standards, the Code and in consultation with the landholder.
Rehabilitation objectives	The rehabilitation objective is to provide a stable landform, which supports a) the rights and interests of the Native Title Holders in the land and water, and b) a resilient self-sustaining vegetation community that can withstand impacts including fire and cattle grazing and is safe to humans and wildlife.

Soil and general environmental condition (Sep 2018)



Name	Contact details
Beetaloo Field Manager	Mobile: [REDACTED] Satellite Phone: [REDACTED] Email: [REDACTED]

Rehabilitation zones			
Infrastructure	Size (ha)	Soil type / slope	Vegetation community / dominant species
Sand Wash Plant	11.2	Lateritic plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products, sandy and earth soils. <1% slope.	Comm 2a-Corymbia dichromophloia ± <i>Erythrophleum chlorostachys</i> open woodland, over <i>Acacia difficilis</i> ± <i>Terminalia canescens</i> , <i>Erythrophleum chlorostachys</i> open shrubland, over hummock grassland.
Disturbance	11.2		



Rehabilitation risk

Key Risks	Controls
Drought - impacting the establishment of rehabilitated vegetation	- Time rehabilitation actions to coincide with the beginning of the wet season, to ensure access to the site and maximise the establishment period of vegetation over the wet season. - Re-spread topsoil across the site to utilise the local seed bank. - Ongoing monitoring to identify if further seed inputs are required. - Collection of seed from the local area to ensure seed stock is suited to the climatic conditions of the site.
Fire - impacting revegetation	- Establish a mix of perennial and annual grass species. - Establish a mix of resprouting (e.g., <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp.) and reseeded species (e.g., <i>Acacia</i> spp.). - Ongoing monitoring to determine fire impacts on revegetation. - Ongoing monitoring to determine if further seed inputs are required.
Grazing - impacting revegetation	- Establish a mix of perennial and annual grass species. - Re-spread timber with topsoil. - Ongoing monitoring to determine grazing impacts on revegetation. - Ongoing monitoring to determine if further seed inputs are required. - Ongoing monitoring to determine if fencing is required.
Exposed ground - leading to an increase in weed establishment and/or erosion	- Remove windrows and topsoils. - Respread of topsoil and vegetated matter across the site. - Annual weed surveys of rehabilitated area once rehabilitation is established. - Control of any weed incursions.

Pre-disturbance photos of vegetation community



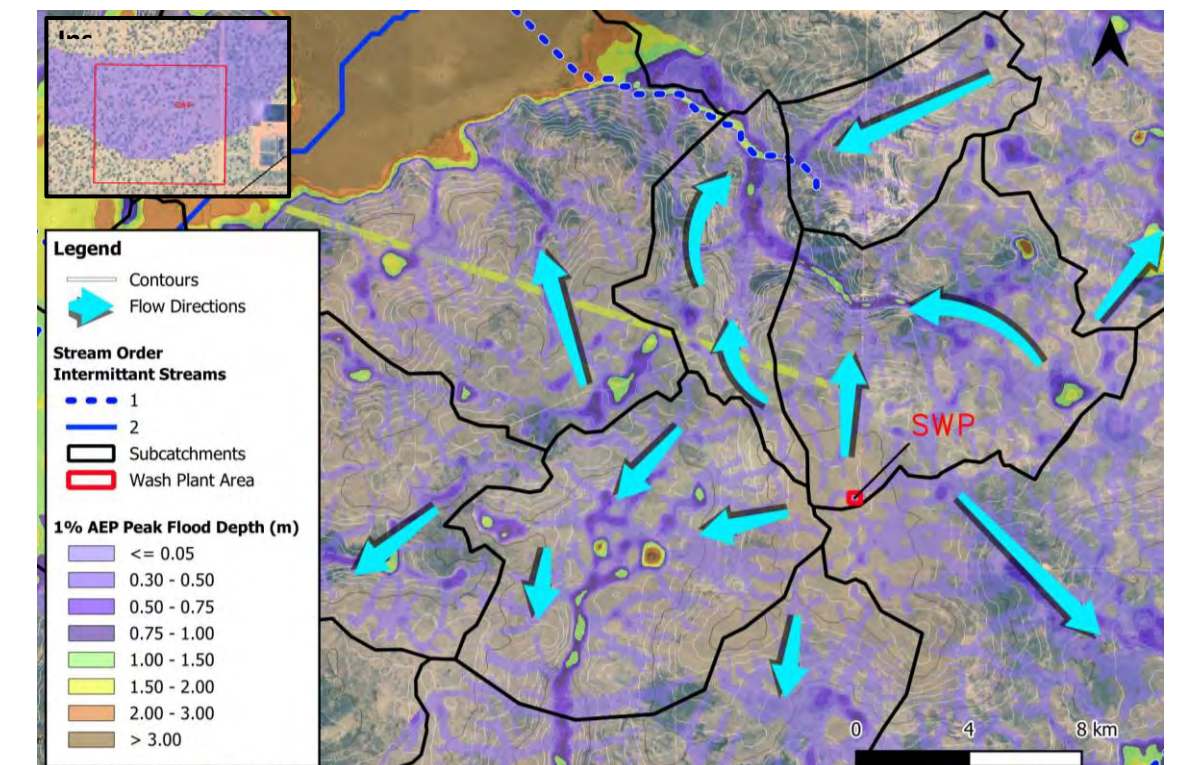
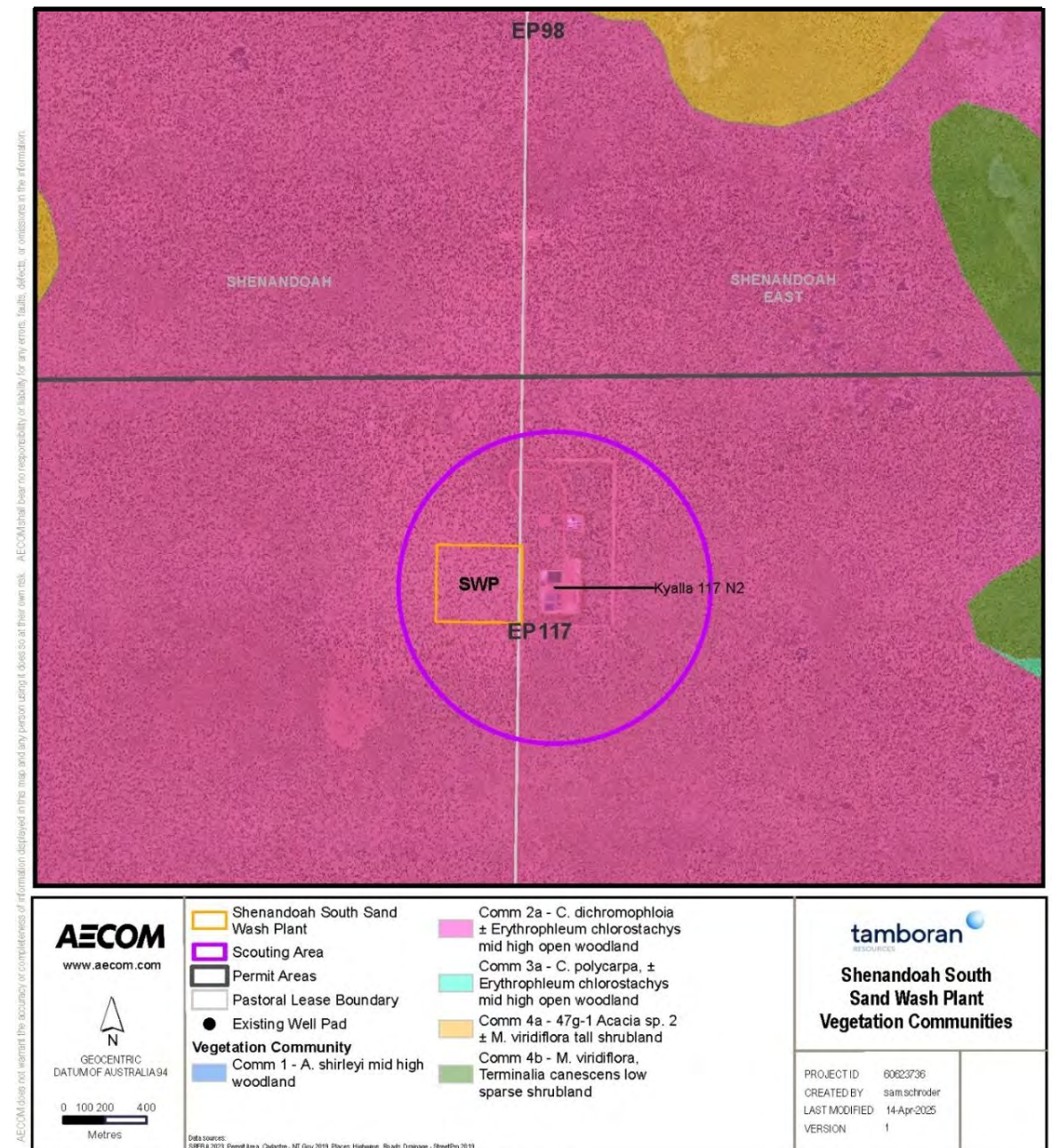
Rehabilitation strategy

Parameter	Methods	Objective
Vegetation	- Rehabilitation will be implemented for disturbance areas following completion of the individual activity within 12 months. - Disturbed areas to be allowed to naturally regenerate or revegetate on completion of the regulated activity. - All compacted areas to be ripped and scarified to promote regeneration of vegetation, this may require assistance through spread of native seed stock. Where possible, native seed stock would be supplied by local indigenous suppliers.	- Establish vegetation trending toward the target vegetation community for the area disturbed (i.e. species richness, %cover and structure) and in accordance with the Code (Clause A.3.9(d)). - Reinstate disturbance area to its pre-disturbed condition.
Ground cover	- Previously removed vegetation and topsoil will be uniformly respread over disturbed area. This will assist with the rehabilitation process by increasing infiltration and returning seed-bearing topsoil, as well as reducing erosion. - After first 12 months, additional input of native seed mix may be required from the area to assist rehabilitation process.	The type of ground cover applied to completed earthworks is to be compatible with the anticipated long-term land use, environmental risk, and site rehabilitation measures.
Landform stability	All windrows are to be removed post construction and at completion of the activities.	

Final success criteria

Area to be rehabilitated	- Total area of approved surface disturbance is 11.20 ha. - Total area required for rehabilitation 11.20 ha.
Vegetation composition returned to an agreed and as close to pre-disturbance level that requires little or no ongoing management	- Vegetation composition (i.e. type, density) equivalent to 60% of the analogue site, showing a trajectory to becoming ecologically integrated into the surrounding area and self-sustaining. - Perennial species cover, including woody species such as trees and shrubs (i.e. Acacia, Eucalypt and Bullwaddy) and perennial grass/forb species equivalent to 60% of the analogue site. - Ground foliage cover equivalent to 60% of the target vegetation community. - The dominant flora species in the mid and ground strata equivalent to 80% of the analogue site. - Organic litter and coarse woody debris equivalent to 50% of the analogue site. - Evidence of native fauna using habitat (i.e. tracks, scats, burrows).
Watercourse crossings	- All stream crossings, where intersected, to be reinstated to the original topography. - No evidence of erosion as result of activity present within water course by end of first 12 months.
Erosion	Less than 5 % erosion evident after the first 12 months and no rill/sheet/gully erosion evident by year 5.
Weeds	No weed infestations in rehabilitated area that are declared under the NT <i>Weeds Management Act</i>.
Hazardous materials and waste	All hazardous material and waste removed from site upon completion of works to licensed landfill facilities or recycling facilities.
Safety for humans and wildlife	- Rehabilitation of disturbance areas should be similar in landform to the surrounding area. No steep slopes or barriers to remain on site that endanger wildlife, livestock or humans. - No windrows remaining as result of exploration activity. 100% of all surface facilities removed including fencing (star pickets / fencing wire).

Monitoring program and schedule				
Stage	Timing	Method	Measurable attributes (Record of data/description, GPS and photographic evidence)	Corrective Actions
Planning and Design	Prior to commencement of clearing and grubbing	- Ground truth/pre-disturbance survey to obtain geospatial data prior to disturbance including planned access routes, buffers and identify hazards and obstacles including existing erosion areas or weeds. - Identify proposed analogue sites.	- Weed species/patch. - Erosion areas. - Waterlogged areas.	- Weed management. - Establish buffers as per EMP requirements.
Progressive rehabilitation	Within 6-12 weeks of completion of activities	- Ripping of compacted areas. - Topsoil, windrows and cleared vegetation stockpiled are to be respread across the disturbed area. - Refer to detail in Tamboran's Erosion and Sediment Control Plan	All disturbed areas must be considered suitably stabilised as per IECA Table in the Tamboran's Erosion and Sediment Control Plan (Appendix E).	N/A
Preliminary assessment	Post rehabilitation, end of wet season survey (ideally between February to July) within 12 months of rehabilitation completion.	- Analogue sites will be established for the one vegetation community identified in the baseline Land Condition Assessment (AECOM 2025) at adjacent undisturbed sites. - Permanent 100 m x 4 m transects (one or more per vegetation community based on the level of disturbance of the type of community), will be established at disturbed and analogue sites including photo monitoring point(s). - Collect 1 x 1 m ground cover quadrats every 10 m along each 100 m transect. - Transects to be positioned <20 m from pastoral and gas infrastructure assets (i.e. access tracks, fence lines, well pads, water troughs) to reduce edge effects.	- Weed presence/absence (species and density). - Disturbance (fire frequency and intensity, evidence of feral animal/cattle). - Evidence of erosion (type of erosion, approximate area of erosion). - Vegetation condition (comparison to analogue sites): - Seedling/sapling density of dominant species respective to each vegetation community. % ground cover. % annual cover vs % perennial cover. - number of species at canopy, mid and ground strata.	Corrective action as required based on third-party report and/landholder feedback: - Erosion remediated - Weed management - Additional seeding - Soil amelioration
Early rehabilitation	Years 1, 2 and 3 post rehabilitation, end of wet season survey (February to July).	- Monitoring to be undertaken using permanent transects at analogue and disturbed sites. - Collect data as per preliminary methods. - Compare results from monitoring sites with analogue sites and previous year's assessment to determine if require additional management inputs (i.e. seeding, stabilisation). - Annually review success criteria.	- Early assessment of rehabilitation will determine attributes of woody plants in each 100 m x 4 m transect. - Assessment of species richness, DBH (>1.5 cm) and height (>2 m), in addition to measurable attributes described within the preliminary assessment.	
Long-term rehabilitation	Annually until final success criteria has been met, end of wet season survey (February to July).		Long-term assessment to determine establishment, recruitment, and growth rate attributes of plant species, in addition to parameters described during preliminary and early rehabilitation stage.	
Completion of rehabilitation	5 years post rehabilitation or when achieve final success criteria.	- Final inspection and report prepared by a suitably qualified person as per rehabilitation monitoring program. - Signoff by landowner and regulator	As per final success criteria.	N/A



APPENDIX H

EMP Commitment Register

Appendix H Shenandoah South Sand Wash Plant Environmental Commitment Register

Obligation details	Accountability	When
The layout of the site and exact placement of SWP will be informed by the environmental sensitivities and mitigation measures identified in this EMP. This includes additional scouting as required, where infrastructure placement need to be moved or areas to avoid to accommodate pastoral or new / additional cultural heritage considerations.	Project Manager, Beetaloo Field Manager	Site establishment
Land clearance will not be undertaken as a part of this activity, unless authorised to do so.	Beetaloo Field Manager	Continuous
The monitoring and maintenance under the erosion and sediment control plan shall be implemented.	Beetaloo Field Manager	Pre and post wet season
The spill management plan will be implemented including spill prevention, detection, response and reporting measures.	Beetaloo Field Manager	Throughout the activity
The bushfire management plan will be implemented to reduce the risk of bushfires.	Beetaloo Field Manager	Throughout the activity
Secondary containment will be implemented for all chemical storage and handling areas.	Beetaloo Field Manager	Throughout the activity
Tamboran and its subcontractors will prioritise the use of local labour where such skill sets are available.	Project Manager Contracts Administrator	Activity planning
The weed management plan shall be implemented, including assuring all equipment and vehicles on-site have a valid weed hygiene certificate and routine monitoring is completed. All identified weeds associated with Tamboran's activities to be treated and managed in consultation with the DLPE Onshore Petroleum Weed Management Officer.	Beetaloo Field Manager	Throughout the activity and post rehabilitation
Records of weed distribution will be maintained within Tamboran's GIS and if required provided to the DLPE Onshore Petroleum Weed Management Officer.	Environment and Approvals Manager	Throughout the activity
The site will be fenced to prevent fauna and livestock access to site and sediment basins.	Beetaloo Field Manager	Throughout the activity
All groundwater will be extracted, monitored and recorded in accordance with the water extraction licence.	Environment and Approvals Manager	Throughout the activity
All wastes will be transported and disposed of at licensed facilities in accordance with the <i>NT Waste Management and Pollution Control Act 1998</i> .	Beetaloo Field Manager	Throughout the activity
Stormwater flooding across the cleared site will be managed to minimise impacts from erosion and sedimentation.	Project Manager	Throughout the activity
Tamboran have committed to comply with conditions as prescribed by AAPA for the duration of the program.	Project Manager	Throughout the activity
Tamboran has committed resources and time to allow competent and experienced personnel to participate in educational and community information sessions from Darwin in the north, to Alice Springs in the south and across to Borroloola in the east.	Project Manager	Planning and implementation of activities
Appropriate housekeeping standards will be maintained, and the site will be maintained free of rubbish.	Beetaloo Field Manager or Operating Company Representative (OCR)	Throughout the activity
Camps will be used to mitigate the impact on available accommodation and townships.	Project Manager	Throughout the activity
Monitor public road and access track conditions to ensure deterioration with possible increase in dust creation, does not occur and undertake road rehabilitation as required.	Beetaloo Field Manager or Operating Company	Daily during the activity

Obligation details	Accountability	When
	Representative (OCR)	
Tamboran will progressively implement a rehabilitation plan to rehabilitate all disturbed areas.	Health Safety and Environment Representative	With 12 months of determining an asset is no longer required
Work instructions summarising the requirements of this EMP shall be prepared and submitted to contractors performing work under this EMP.	HSE Representative	Prior to commencement of an activity.