7 April 2020

2019 Calendar Year Surveillance Review
Tailings Dam 1
Aeris Tritton Mine

Tritton Resources Pty Ltd

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1 INTRODUCTION

This report presents the results and findings of the surveillance review of Tailings Dam 1 undertaken at Aeris's Resources, Tritton Mine located west of Nyngan near Hermidale in NSW. The mine is operated by Tritton Resources Pty Ltd. The surveillance review was undertaken by Ian Grieve on behalf of CMW Geosciences Pty Ltd (CMW) on Friday 7th February 2020 in the company of Jamie Barrow of Aeris Resources Tritton Mine. This is the fifteenth (15th) annual independent review and surveillance report of Tailings Dam 1 (TD1) undertaken by a specialist independent consulting organisation. This review covers activities and information pertaining to the 2019 calendar year. The previous surveillance review was undertaken in February 2019 which covered the 2018 calendar year.

The tailings dam was commissioned in December 2004, the first (1st) review was undertaken in January 2006 and covered the 2005 calendar year, subsequent reviews have been undertaken on an annual basis generally in January or February of each year which satisfies the annual reporting requirements specified by the NSW Dams Safety Committee (NSW DSC).

The surveillance review was commissioned by Jamie Barrow of Aeris Resources Pty Ltd by way of a signed authority and purchase order 4500155399, dated 12 December 2019.

NSW DSC correspondence dated 26 October 2015 ref. TrittTails specified that a Type 3 surveillance report was required. This surveillance assessment has been undertaken using DSC surveillance guidelines, as a general guide for the preparation of this report and continues the annual review and reporting of this tailings dam.

New laws/regulations were introduced by the NSW government in 2019 covering storage dams which includes the Tritton tailings dam. Aeris Resources has commissioned CMW to review current mine operational procedures and documentation. A separate report will be prepared for the mine to address the actual requirements to update their current documentation.

1.1 2019 Surveillance Summary

The findings of this surveillance review are presented in the body of this report. Pertinent information has been summarised as:

- It has been concluded that the tailings dam is being operated and managed to an appropriate standard during the review period, with no reportable safety incidents;
- However based on the fact construction has been halted there is a concern in respect to the spillway having been raised and any significant rainfall may overtop the southern embankment as construction has ceased due to a lack of water; The probability is considered to be rare based on historical records. Based on recent survey information it has been estimated that the available capacity is 1,500,000m^3 to RL267.5m RL (Stage 5) or above the probable maximum precipitation (PMP) event (520 mm of rain).
- No reportable environmental incidents were advised;
- The Stage 6 and 7 design was acknowledged by the NSWDSC in correspondence date 22nd May 2018 – ref INW18/8228;
- Stage 6 construction commenced in October 2018, but was temporarily suspended in November 2019 due to a lack of adequate construction water. The embankment raising was estimated to be to be 70% complete. At the time of this review, February 2020, construction had yet to commence due to ongoing water issues.
- A point to note is the embankment containing the spillway has been raised and that two embankments are yet to be raised and are thus 1.5m below the new raised spillway invert. In the advent of an extreme rainfall event these embankments could be subject to overtopping.

- It is strongly recommended that when Stage 7 works are commenced the embankment with the existing spillway is raised last.
- When works recommence all works shall comply with the construction specification and in particular initial preparation works of gravel removal, scarifying and moisture conditioning needs to be undertaken.
- There were no visible signs of distress (cracking) of the embankments;
- Small piping holes were observed on the intermediate berm of the main embankment, it was assessed that these features currently do not have an adverse effect on the overall integrity of the embankment.
- Water level falls were recorded in the bores associated with TD1. Exceptions were bores PZH017, PZH019, PZH020 and PZH021.

1.2 2018 Surveillance Actions

The 2018 surveillance review outlined recommendations and actions. Pertinent information is summarised from last year review as:

- **(2018 Comment)** The distribution line across the spillway is again supported on tailings due to current upstream construction activities. It was previously placed on solid supports; **(2019 Action)** *Due to construction activities the pipe has been removed.*
- **(2018 Comment)** At the completion of Stage 6 works in the vicinity of the spillway the pipe should again be elevated above the invert level; **(2019 Action)** *The pipe has been removed.*
- **(2018 Comment)** Several monitoring bores have missing or damaged caps. All bores should be inspected, damaged or missing caps should be replaced; This is the same comment as last year-2017; **(2019 Action)** *Where inspected bores had caps.*
- **(2018 Comment)** It has been assessed that the tailings dam is being operated and managed to an appropriate standard, during the review period, with no reportable safety incidents; **(2019 Action);** *Continues to be well managed.*
- **(2018 Comment)** No reportable environmental incidents were advised; **(2019 Action)** *No actions were required.*
- **(2018 Comment)** The Stage 6 and 7 design was acknowledged by the NSWDSC in correspondence date 22nd May 2018 – ref INW18/8228; **(2019 Action)** *No actions were required.*
- **(2018 Comment)** Stage 6 construction commenced in October 2018; All works shall comply with the construction specification particularly initial preparation works of scarifying and moisture conditioning; **(2019 Action)** *Ongoing until works were suspended due to a shortage of water.*
- **(2018 Comment)** There were no visible signs of distress (cracking) of the embankments; **(2019 Action)**; *No actions were required.*
- **(2018 Comment)** Water level falls were recorded in the bores associated with TD1. An exception was bore PZH008, which is north of the main embankment area; **(2019 Action)** *Bores are measured regularly.*

1.3 Figures and Appendices

Figures 1 to 10 are attached to this document, behind the text. A site location plan is presented as Figure 1. Design details covering Stage 2 are presented as Figures 2 and 3. The location of the monitoring bores is shown on Figure 4. Figure 5 show guidelines for freeboard nomenclature used by the NSW DSC. Survey information previously supplied is presented as Figure 6.

The DSC forms for dams are also included in this report, such as:

- Dam Information Form are attached as Figure 7;
- Declared Dam Owners Address Form as Figures 8, 9 and 10;

Photographs taken during the surveillance review are attached in Appendix A as Figures A1 to A7. Appendix B contains monitoring information including monitoring bore water levels, water quality information and copies of inspection sheets (daily log sheets) which are a requirement of the operations manual.

Appendix C contains stability information prepared for the design of embankment raises for Stages 6 and 7. Liquefaction potential plots of the tailings are also presented in Appendix C, these plots indicate the tailings have a low likelihood of liquefaction based on the seismic intensity assessed.

For completeness purposes, Appendix D contains as constructed details of the Stage 1 starter embankment, Stage 2 survey information, Stage 3 survey information, Stage 4 construction works and Stage 4 surveyed details, the Stage 5 Layout Plan, Stage 5 Sections and Details, and Stage 6 and 7 design details.

2 GENERAL INFORMATION

The tailings dam is used to store milled mine waste (tailings slurry). Tailings slurry is deposited into the dam from a perimeter distribution system that fully encircles the dam. At the time of the February 2020 review tailings slurry deposition was being undertaken in the southern corner of the tailings dam. No construction works associated with Stage 6 were being undertaken. The severe drought has affected the mine, due to a lack of water, suitable for construction activities, these works have been temporarily suspended. The review confirms there is adequate storage capacity to storage slurry production.

However if an extreme rainfall event occurs the southern embankment could be subject to overtopping as the northern embankment containing the spillway has already been raised and has an invert approximately 1.5m higher than the southern embankment. Under normal weather the southern embankment would already have been raised and completed. Based on recent survey information (February 2020) it has been estimated there is sufficient capacity to contain of the PMP event of approximately an 520mm rainfall event. When Stage 7 works are being planned (commenced) careful planning needs to be undertaken to ensure the spillway embankment is raised last so it remains the preferred outflow channel.

The tailings deposition philosophy is based on the fact that when the tailings slurry is discharged there is a rapid decrease in velocity causing the coarser tailings solids fraction to settle out and then consolidate in close proximity to the embankment. Sloped beaches are formed that slope away from the perimeter embankment towards the water recovery pond and pump (refer to the photographs). Water liberated from the deposited slurry water flows down the sloped tailings beach and is concentrated around the recovery pump where it is pumped back to the processing plant.

2.1 General Details

The tailings dam is situated at the Tritton Copper Mine which is located approximately 65km west of Nyngan on the Yarrandale Road, which joins the townships of Hermidale and Girilambone. The approximate centre of the tailings dam is at mine grid 20,200mN and 31,500mE or AMG 6,527,300mN and 474,500mE.

TD1 is a valley type storage facility where the main embankment has dammed a small valley in its upper reaches. Diversion channels and bunds were constructed upstream of the tailings dam as part of Stage 1 works to intercept and divert any runoff around the facility. TD1 is now surrounded by perimeter embankments and the catchment reporting into TD1 is from incident rainfall only.

The perimeter containment embankments vary between the Stage 5 level of RL267.5.0m (southern and SE embankments) and the Stage 6 level of RL270.0m (eastern, northern and parts of the western embankments).

There is one spillway associated with this tailings dam. The spillway has been designed to pass the 1:100 year average exceedance probability (AEP) rainfall event with an average flow depth of less than 0.5m and the PMP event at less than 1m depth. The spillway is located through the northern abutment and has an invert level at RL269.0m or 1m below the Stage 6 embankment crest, the invert is raised as part of each staged construction lift. A view of the spillway is shown on Figure A3.

The hazard rating for the dam was originally assessed based on the criteria outlined in DSC 13 "Hazard Ratings of Dams" dated October 1992. The primary assessment of either Sunny Day Hazard Rating or Incremental Flood Hazard Category has been assessed as Low. TD1 was re-assessed as part of the Stage 6 and 7 design in 2018.

The 2018 design document for Stages 6 and 7 re-examined the consequence category (hazard rating). Based on the DSC3A and DSC3F Guidelines, the consequence category for TD1 has been re-assessed as 'Significant', based on Table 2 in the guide, with the following considerations:

- Population at risk (PAR): <1. Note if the PAR was >1 to 10, the consequence category would be the same.
- Receiving Environment: Rural / Productive.
- Severity of Damage or Loss: Medium – saline liquid and possible solids.

3 DESIGN AND CONSTRUCTION ACTIVITIES AND REPORTS

The following section provides a chronological summary of the history of the tailings dam, the information is included in each annual surveillance report for completeness and continuity purposes and remains unchanged except for the current years activities.

3.1 Design History and Reports

The tailings dam was located and partially designed by Knight Piesold (KP) prior to Tritton Resources becoming the owners of the project. A geotechnical investigation was undertaken by SRE in November 2003, the associated geotechnical report was dated January 2004.

The original design by KP was reviewed and reassessed by SRE, based on changed production rates and life of mine projections, design information and assumptions are outlined in SRE's design report titled "*Design Report, Tailings Storage Facility 1, Tritton Copper Project*", Revision 1, dated 2 March 2004. The report required minor amendments following a review by the NSW DSC.

An Operations Manual co-authored by Coffey and Tritton Resources was submitted to the NSW DSC in July 2005. The operations manual was reviewed and revised by Tritton in conjunction with Coffey in 2011 and 2016 and by CMW Geosciences in 2018.

3.2 Stages 1 to 7 Design Reports

Table 1 summarises staged construction information. Stage 1 - SRE (2004) prepared and submitted design documentation covering the starter embankment (Stage 1) and staged upstream construction of the embankments, (Stages 2 to 5). The design was based on investigation and design information provided by others. SRE became part of Coffey in October 2003.

Stage 2 - Coffey (2006) prepared the Stage 2 embankment design and earthworks scope of works reports during 2006 titled "*Stage 2 Design Report, Tailings Storage Facility 1 Tritton Resources Limited"* - reference P6926.03-BB-stage 2 design report, dated 19 July 2006. Stage 2 earthworks were completed during 2007.

Stage 3 Coffey (2007) prepared embankment design and earthworks scope of works documentation during 2007, titled "*Stage 3 Design Report, Tailings Storage Facility 1 Tritton Resources Limited*", reference MH00100AD-Stage 3 design report Rev 1, dated March 2007. The Stage 3 earthworks specification document is titled "*Scope of Works - Stage 3, Embankment Raising by 2m to RL264.0m, Tailings Storage Facility 1 Tritton Copper Mine, Hermidale*" reference MH00100AD-AC-sowrep-Rev A, dated 20 June 2007. The Stage 3 earthworks commenced in December 2007 and were completed in 2011. A construction report covering Stage 3 activities was prepared by Barnson (engineering organisation) titled '*Construction Report Tritton Copper Mine, Stage 3 Tailings Storage Facility Works'*, dated October 2011. Stage 3 as constructed details are presented in Appendix D.

Stage 4 (Coffey 2010) embankment design documentation and earthworks scope of works was prepared by Coffey during 2010 and is titled '*Stage 4 Design Report, Tailings Storage Facility 1 Tritton Copper Project'*, reference MINEWPER00100AN-Stage 4 design report Rev 0, dated August 2010. The Stage 4 design provides for embankment raising by 2m to RL266.0m. Stage 4 construction details are shown in Appendix D. The scope of works is titled '*Scope of Works - Stage 4, Embankment Raising by 2m to RL266.0m, Tailings Storage Facility 1 Tritton Copper Mine, Hermidale'*, reference MWP00100AN-AC-sowrep-Rev 0, dated 20 June 2010. A construction report covering Stage 4 activities was prepared by Barnson's titled '*Earthworks Quality Control Construction Report, Tritton Copper Mine, Stage 4 Tailings Storage Dam Facility Works'*, dated April 2015. The Stage 4 as constructed survey plan is presented in Appendix D.

Stage 5 (Coffey 2015) embankment design documentation and earthworks scope of works was prepared by Coffey during 2015 and is titled '*Stage 5 Design Report, Tailings Storage Dam 1 Straits Tritton Copper Mine'*, reference MWP00100AW-Stage 5 design report Rev 0, dated August 2015. The Stage 5 design provides for embankment raising by 1.5m to RL267.5m. Stage 5 construction details are shown in Appendix D. The scope of works outlining construction details is titled '*Scope of Works - Stage 5, Embankment Raising by 1.5m to RL267.5m, Tailings Storage Facility 1 Tritton Copper Mine, Hermidale'*, reference MINEWPER00100AW Rev 0, dated 10 August 2015.

The Stage 5 design (dated August 2015) was acknowledged by the NSW Dams Safety Committee in correspondence dated 26 October 2015 which also confirmed that a Type 3 surveillance review is required on an annual basis. A construction report covering Stage 5 activities was prepared by Barnson's titled '*Earthworks Quality Control Construction Report, Tritton Copper Mine, Stage 5 Tailings Storage Dam Facility Works'*, dated 2017. The Stage 5 as constructed survey plan is presented in Appendix D.

Stages 6 and 7 (CMW Geosciences 2018) embankment design documentation and earthworks scope of works was prepared by new consultants namely CMW Geosciences. The design report is titled '*Stages 6 and 7 Design Report, Tailings Dam 1, Tritton Mine'*, reference PER2017-0066AB Design Report Rev0, dated March 2018. The design provides for embankment raising in two stages by 4.5m from RL267.5m to RL272.0m. The design report includes electric friction probe results, laboratory test results and design information including stability and seepage analyses and liquefaction assessments. Stage 6 and 7 construction details presented in Appendix D. The Stage 6 and 7 design report was acknowledged by the NSWDSC in correspondence dated 21st March 2018.

Table 1 - Staged Construction Information					
Stage	RL	Design report date	Start date of construction	End date of construction	Construction report
1	260.0m	2004	2004	2004	2004
2	262.0m	2006	2006	2007	2007
3	264.0m	2007	2007	2011	2011
4	266.0m	2010	2013	Early 2015	April 2015
5	267.5m	August 2015	Mid-2016	Late 2017	Late 2017
6	270.0m	March 2018	December 2018	ongoing	n.a.
7	272.0m	March 2018	Pending	n.a.	n.a.

3.3 2004 Activities – Stage 1 Starter Embankment

Stage 1 construction (starter embankment) was completed to RL260.0m in September 2004, with a spillway invert at RL259.0m. Initial construction also comprised an underdrainage water interception system located immediately upstream of the main embankment, a downstream toe drain, collection sump and recovery pump. The catchment area was 330,000 m^2. Four monitoring bores were installed prior to commissioning in November 2004.

Coffey prepared a construction report[4] titled "*Stage 1 to RL260.0m Tailings Storage Facility 1 Construction Report, Tritton Copper Project*", dated 17 November 2004. The works were supervised on a full time basis with associated soil testing. Stage 1 as constructed details are presented in Appendix D.

3.4 2005 Activities

Activities included, installing additional spigot off-takes and valves to the tailings distribution line, the decant water recovery trench was increased in length with the recovery pump relocated further up the valley. These additional works were completed in September 2005.

3.5 2006 Activities – Stage 2

Stage 2 construction works commenced in October 2006 and were completed in early 2007 and entailed raising the embankments by 2m to RL262.0m and extending both abutments. A new saddle embankment was constructed along the northern abutment, the spillway invert was raised by 2m to RL261.1m. A low permeability clay layer was placed over the base of the Stage 2 area. Embankments and the clay blanket were constructed using compacted clayey borrow materials sourced from within the impoundment area.

3.6 2007 Activities – Stages 2 and 3

The Stage 2 works were completed in early 2007. A construction report was prepared by Barnson's, who provided testing and supervision services, titled "Construction Report Stage 2 Tailings Dam, Tritton Copper Mine, Straits Tritton Resources Limited" ref 10265, dated December 2007. As constructed details are presented in Appendix D.

Stage 3 embankment design is presented in Coffey's document, dated March 2007 while the scope of works is dated June 2007. Approval for Stage 3 construction was received from the DSC in late 2007. Stage 3 works commenced in early December 2007 and were completed in mid-2011. By the end of 2007 the main embankment had been raised by only 0.3m, while the northern saddle embankment raising had been raised by approximately 0.5m.

3.7 2008 Activities – Stage 3

Embankment raising by 2m to RL264.0m was continuing, the spillway invert was raised to RL263.0m, the decant trench was backfilled with low permeability clay materials and new areas of the tailings dam floor were covered with low permeability clayey material. The Stage 3 works in 2008 were under the supervision and testing regime of Tritton and Barnson personnel.

3.8 2009 Activities – Stage 3

New areas of the tailings dam floor were covered with compacted low permeability clay material; and construction of the Western Saddle Embankment to RL264.0m was completed. The downstream batter slope of the main embankment was seeded in mid-2009.

3.9 2010 Activities – Stage 3

New areas of the tailings dam floor were covered with low permeability compacted material, final trimming of the Western Saddle Embankment to RL264.0m was completed. An underground paste plant was constructed during 2010, it uses tailings as a feed product on a campaign basis. The plant was commissioned over the period November 2010 to mid-2011.

3.10 2011 Activities

The operations manual was revised and updated (rev 3) titled "*Straits Tritton Mines Tailings Dam 1 Operations and Maintenance Manual & DSC Emergency Action Plans Tritton Copper Mine*", Rev 3b dated 5 October 2011.

During 2011 the following activities were completed: Final trimming of the western saddle embankment, Stage 3 footprint areas were cleared of vegetation and topsoil and covered with low permeability compacted materials, refer to the plan presented in Appendix D.

The Stage 3 construction report was issued by Barnson's dated October 2011. The report was acknowledged by the DSC in correspondence dated 18 January 2012. A hydrogeological assessment was completed by SMEC, titled "Groundwater Assessment and Management Plan, November 2011". A new recovery bore PZH011 was installed on the southern abutment, west of the main embankment with an associated causeway. A long causeway was constructed to PZH012 as it was located inside the dam and was surrounded by tailings and water.

3.11 2012 Activities

Stage 4 construction activities commenced in late 2012, comprising vegetation and topsoil clearing and stockpiling, and an existing topsoil stockpile was relocated. The Stage 4 design report was submitted to the NSW DSC in mid-2010, with acknowledgement from the department received by Straits Tritton on 9 November 2010. The DSC made particular comment on the requirement of an Engineer's "Dam Construction Certificate", and the provision of a construction report containing as built drawings and photographs. The DSC also emphasised the need for appropriate construction supervision, with this is being undertaken by representatives from Straits, Neill's and Barnson's.

A detailed groundwater assessment was undertaken by EES to obtain information in respect to EPA amended licence conditions (U1) requiring a Remedial Action Plan and conceptual site model to be developed. This also included the installation of additional bores during 2012.

3.12 2013 Activities – Stage 4

Stage 4 construction continued during 2013, comprising vegetation and topsoil clearing and stockpiling. A low permeability layer was placed over cleared areas. Construction of the western saddle embankment was completed by late 2013. Setting out of the main embankment and the northern abutment was also completed.

3.13 2014 Activities – Stages 4 and 5

Stage 4 construction continued during 2014. The low permeability layer was continued to be placed over cleared areas. Construction of the main embankment was completed by mid-2014. The northern embankment including the spillway were all but complete by the end of 2014. The only active work area was the western end of the northern embankment which was expected to be completed by early 2015.

Monitoring bores PZH011, PZH012 and PB002, located inside the dam, were decommissioned in June 2014 (last readings May 2014) and were sealed by The Impax Group.

During late 2014 work commenced on a small section of the Stage 5 embankments, namely in the SW corner. These works were commenced to prevent the encroachment of tailings slurry in to this potential work area.

3.14 2015 Activities – Stages 4 and 5

Stage 4 construction was completed by mid-2015 and entailed placement of the low permeability layer over cleared areas. The western end of the northern embankment was completed in early 2015. A construction report was prepared by Barnson titled "*Earthworks Quality Control Construction Report*" dated April 2015.

Confirmation of the Stage 5 embankment design to RL267.5m was received from the DSC in correspondence dated 26 October 2015. A small section of the Stage 5 embankment in the SW corner was completed in mid-2015 and was undertaken to prevent the encroachment of tailings slurry in to this potential work area.

3.15 2016 Activities – Stage 5

Stage 5 construction commenced in mid-2016, entailing the placement of a low permeability layer over cleared areas, the excavation of cut-off trenches and the placement of embankment materials. Construction was being undertaken based on Coffey's design report dated August 2015. Construction was undertaken by Neill's, with earthworks supervision shared between Tritton personnel and Neill's, while compliance testing was undertaken by Barnson's.

3.16 2017 Activities – Stage 5

The Stage 5 construction commenced in mid-2016 and was completed by August 2017. Works completed during 2017 included the placement of a low permeability layer over cleared areas, the excavation of cut-off trenches and the placement of embankment materials. Construction was undertaken by Neill's, with earthworks supervision shared between Tritton personnel and Neill's, while compliance testing was undertaken by Barnson's.

A construction report was prepared by Barnson (2017) titled *'Earthworks Quality Control Construction Report, Stage 5 Works Embankment Raising by 1.5m to 267.5 Tailings Dam 1'*. During 2017 a geotechnical investigation of TD1 was undertaken that included electric friction cone probing, tailings sampling and specialist laboratory testing.

3.17 2018 Activities – Stage 6

The Stage 6 and 7 design report, prepared by CMW Geosciences, was submitted to the regulators on 5th March 2018 by Aeris Resources, the document was acknowledged by DSC on 21st March 2018. Stage 6 construction comprising a 2.5m lift to RL 270.0m, commenced in October 2018 concentrating on the northern and western sides of the facility. Works commenced include embankment crest preparation, cut off excavation and material placement. Construction was undertaken by Neill's, with earthworks supervision shared between Tritton and Neill's personnel, compliance testing was undertaken by Barnson's.

The downstream batter of the western saddle embankment was reprofiled and seeded in late 2018.

3.18 2019 Activities – Stage 6

Stage 6 works continued during 2019 along the northern ,eastern (main embankment) and western sides of the facility. These walls are within 300mm of design height and are awaiting final trim and gravel placement. Works were suspended in mid-November due to the severe drought, resulting in a lack of suitable water. General photos are present in Appendix A. Construction is being undertaken by Neill's, with earthworks supervision shared between Tritton and Neill's personnel, compliance testing was undertaken by Barnson's.

Remobilisation is expected by the end of February 2020 depending on contractor availability.

4 INFORMATION PROVIDED

The following information and data pertaining to the compilation of this surveillance review was provided by Tritton Mine site personnel.

- Copies of Tritton generated dam monitoring information and inspection records.
- Monitoring bore information including water levels and water quality.
- NSW EPA Annual Return for Licence 11254 and Aeris Tritton Operations, 'Annual Environmental Management Report (AEMR) – Tritton, Reporting year ending: 31st December 2018'.
- Production tonnages and water return figures for 2019.
- Operational documentation and procedures were also provided by the mine to allow an assessment of any updates that may be required due to revised government regulations. (reported separately).

Some previously supplied documents provided by Tritton Resources may have been referenced to update this report.

4.1 Tailings Production

The ore being treated is primary ore sourced from the underground operations, the specific gravity of the ore averages 3.0. Production figures for the 2019 calendar year are outlined in the following section. The total dry tonnes of tailings production was advised to be 1,555,245 (dry) tonnes. Discharge to the tailings dam totalled of 1,061, 504 (dry) tonnes of solids, the remaining 493,741 (dry) tonnes were directed to the paste plant for use underground. It was advised that the paste plant has been inoperable for several months resulting in a higher percentage of tailings slurry being directed to the tailings dam. However when to the paste plant is recommissioned a higher percentage of tailings will be directed underground due to a back log of stopes and voids that need to be backfilled. Table 2 summarises tailings production information since the commencement of operations in 2005.

Table 2 - Tailings Production Parameters						
Year	Ore Production (tonnes)	Tailings Solids to Tailings Dam (tonnes)	Cumulative Tailings Solids to TD	Average Slurry Density (%)	Estimated Water Tonnage (tonnes)	Estimated Slurry Weight (tonnes)
2005	715,364	675,598	675,598	45	825,731	1,501,329
2006	818,460	727,038	1,402,636	50	727,038	1,454,076
2007	733,637	659,193	2,061,829	62	404,022	1,137,659
2008	886,676	804,925	2,866,754	62	493,341	1,298,266
2009	915,792	823,113	3,689,867	64	463,001	1,286,114
2010	971,258	892,801	4,582,668	67.6	465,514	1,358,315
2011	1,260,465	958,022	5,540,690	63	562,647	1,520,670
2012	1,242,496	875,870	6,415,560	62	536,824	1,412,694
2013	1,415,264	862,434	7,277,994	63	528,588	1,391,022
2014	1,538,480	1,156,629	8,434,623	64	650,604	1,807,233
2015	1,664,072	1,085,803	9,521,426	63	637,694	1,723,497
2016	1,657,133	1,134,544	10,656,070	62	637,694	1,723,497
2017	1,351,050	797,312	11,453,382	61	509,757	1,307,069
2018	1,629,231	938,024	12,391,306	62	574,918	1,528,979
2019	1,672,226	1,061, 504	13,452,810	63	623,423	1,684,927

The tonnage of tailings solids deposited into the dam, from the time of commissioning, in December 2004, has been estimated at 13,452,810 dry tonnes. The paste plant was commissioned in 2011, a variable percentage of tailings are directed to the paste plant in campaigns. When the plant is not operating the full tailings stream is sent to the tailings dam, when the paste plant is operating small tonnages (volumes) of tailings are sometimes directed to the tailings dam.

At the time of this review tailings were being directed to the tailings dam with deposition being from the southern side of the dam.

5 SITE REVIEW

5.1 General

The site visit was undertaken on Friday 7th February 2019 by an experienced reviewer engaged by CMW Geosciences and involved an initial drive round, and then a walk over review of specific areas and the containment embankments (main, northern and western), downstream batter slopes, downstream toe areas, spillway, spigotting operations, the water recovery systems and discussions with site personnel. Reference should be made to the photographs, presented in Appendix A, as figures A1 to A7.

The findings of the surveillance review are based on a visual review of the facility on the date specified above, site discussions and an assessment of information provided by the mine, the findings of the review are presented in the following sections of this report and are also summarised as bullet points in Section 1.1. Conclusions and recommendations are presented in Sections 12 and 13 respectively.

The site experienced it first measurable rain several days before the review and some remnant ponds of water were still present on berms and lower lying areas. One area on the main embankment will require some reworking as advised verbally to Jamie Barrow. Despite there being water present, the crest area could be trafficked without issue indicating adequate compaction levels (i.e. no significant water softening of the ponded area). Embankments now completely encircle the dam, the embankment crests vary between RL267.5m; the Stage 5 level and RL 270.0 the Stage 6 level. There are four 'named' embankments, the main valley embankment and the northern, southern and western saddle embankments, these have all now merged to be a continuous perimeter embankment. The various dates and stages of embankment construction are presented in the attached s and are summarised in Table 1 presented in Section 3.2. The tailings dam has a surface area of approximately 132,000 m^2 at crest RL267.5m/RL270.0m.

An assessment of the extraction (excavation) of deposited tailings for the potential use as a feed stock (underground backfill) at Aeris's nearby Murrawombie mine was undertaken in June 2018. It has been advised that the use of excavated tailings for backfill will not proceed.

5.2 Main Valley Embankment

Tailings Dam 1 (TD1) is a valley type facility and was formed in Stage 1 by the construction of the main valley embankment.

No notable edge or embankment cracking was observed along the main embankment crest or the intermediate berm, noting the crest has only approximately 300mm of graded formation and wearing course to complete Stage 6. No visual signs of distress in the form of slumping or cracking of the downstream batter slopes was noted where these areas were reviewed.

The intermediate berm was visually assessed to be sloping outwards, there are now numerous breaks in the edge windrow to allow rainfall discharge. The breaks coincide with previous scour locations which have now been treated by way of cutting out, geofabric placement and backfilled with small rocks. It was assessed that the minor erosion scars observed currently do not affect the overall integrity of the embankment. At several locations, evidence of small piping 'holes' were observed where water has accumulated against the downstream edge windrow. One pipe was observed to exist at the base of the slope and this area needs to be treated, as discussed with Jamie while on site. The piping voids are currently only minor and do not pose an overall safety or stability issue for the embankment.

As part of any rehabilitation review the presence of downstream edge windrows will need to be considered as these windrows do result in water concentration and ponding in specific areas.

The batter slopes have been vegetated with grasses and scattered low shrubs (refer to the s) however the harsh dry summer (drought) has resulted in most vegetation perishing.

No trees should be allowed to become established on the embankments, as root penetration can occur and this should be monitored while the facility is active. No trees were noted on the embankment, several were noted in the downstream toe drain. The small trees located in the downstream toe area were removed in early 2018 but some have re-established mainly in or near the toe drain and currently do not compromise the embankment (refer to Figure A1).

Some minor runoff erosion scours were observed particularly on the main embankment intermediate berm, however it was considered that these currently do not have an adverse effect on the overall integrity of the embankment, they were repaired in 2018. The repairs undertaken included 'bogging' out the rill area and the placement of a protective Bidim geomembrane cover with selected small rock.

The erosion scours on the intermediate berm can be attributed to the concentration of rainfall runoff that occurs because the berm has an outwards cross fall and also downstream edge windrows. Thus, water flowing off the berm is restricted by the windrow and only flows down the slope at specific locations where there is a break in the windrow, where some minor erosion has occurred. The

intermediate berm has been segmented by constructing 'speed' bumps to form individual small sub-catchment areas thus reducing the volume of water that can concentrate or flow along the berm to an exit point.

Runoff water has also resulted in some scour of the lower batter slope of the main embankment. These areas have also been treated with matting to assist in minimising further erosion scouring.

It was pleasing to note that the underdrainage system was still discharging a small volume of water after fifteen years of operation. Water recovered from the underdrainage system is discharged into the downstream underdrainage sump (Figure A2). Collected water is pumped over the main embankment and is discharge some distance from the embankment onto the tailings beach (refer to the photos). Due to the recent rain both of the main embankment downstream toe drains had collected water in them. Recovered water was being discharged from the sump onto the tailings beach some distance from the embankment. There was a small volume of water located adjacent to the embankment in a small trench and has accumulated due to the recent rainfall event. The trench should be backfilled with tailings as soon as possible to displace the water. The small decant pond was located several hundred metres away.

The Stage 6 and 7 design stability analyses printouts are presented in Appendix C. Typical features of the tailings dam perimeter embankment and the sloped tailings beach can be seen in the photographs presented in Appendix A.

The area between the embankment toe and the downstream toe drain was reviewed. There were no signs of near surface seepage, with the area being dry and no signs of recent seepage in the way of soil discolouration, salt crusting or distressed vegetation. The photographs show the downstream area including the downstream toe drains, the sump and distressed embankment vegetation due to a paucity of rain over several summer periods. The area near the drain was cleared of low scrub and bushes in late 2017, some small shrubs have regrown, refer to Appendix A. Of note areas of natural vegetation located downstream of the embankment and access road show no signs of visible distress. Several sheep were seen in the toe area of the embankment.

5.3 Northern Saddle Embankment

Construction of this embankment commenced as part of Stage 2 works and includes the spillway which traverses the embankment at right angles. The embankment is currently at the Stage 6 level of RL270.0m while the spillway invert is at RL269.0m with only a wearing course required for completion. There was no water located near the embankment, as the decant pond was several hundred metres away. Figure A3 shows views of the northern embankment and spillway.

It is recommended that when Stage 7 works are undertaken, the spillway and northern embankment are raised last to ensure the spillway is operational if required. It should be noted that under correct operating conditions (which has been the case for the last 15 years) there is a very low risk that the spillway will ever be used due to a high or extreme rainfall event.

5.4 Western Saddle Embankment

Construction of this embankment commenced in 2010 as part of Stage 3 works and were completed in early 2011. A significant length of this embankment is yet to be raised as part of Stage 6 works and is currently at the Stage 5 crest level of RL 267.5m. Photos of the area are presented as Figure A7.

Tailings have been preferentially deposited from the embankment since 2011 allowing an exposed beach to develop. There was no water located against the embankment. There were no signs of visual distress in the way of cracking or slumping. The downstream batter slope was reshaped and seeded during later 2018. The exclusion of sheep has been difficult and some areas of vegetation have been destroyed. No significant erosion scars were apparent.

The construction of this embankment dammed a small ephemeral creek. This small catchment area has been used as a small temporary water storage area for a source of construction water. Provided any water level is maintained at an acceptable level and the embankment is monitored for cracking or slumping the area can temporarily be used for this purpose. If there are any signs of embankment distress the water behind the embankment should be removed and advice sort. The toe area embankment was buttressed several year ago to ensure water can not affect the toe area.

The western saddle embankment batter slope was reprofiled and seeded in late 2018.

5.5 Erosion and Cracking

No severe erosion of the downstream batter slopes of the main, northern or western embankments was observed as shown on the photographs. The previously observed random erosion scars of the downstream batter slopes of the main embankment have been repaired as mentioned previously, Figure A1. It was assessed that minor gullying, where present, does not have an adverse effect on the overall integrity of the embankment. Previous seeding of the downstream batter slope of the main embankment and the establishment of vegetation has assisted in limiting both runoff and any new erosion. The continued establishment of vegetation has been hampered by severe drought conditions, with signs of vegetation distress. It was concluded that the integrity of the embankments was adequate, based on the visual assessment.

During 2018, an erosion and sediment control procedure was developed specifically for the tailings dam, the August 2018 document is titled “Erosion and Sediment Control Procedure – Tritton Tailings Dam 1 – Management Recommendations”. The document comprises tabulated information under the following four headings Background and Scope – Management Objectives – Implementation – Reporting. It was advised that the following actions were implemented based on the development of the Procedure:

- Construction of perpendicular intermediate berms at 100m centre along the downstream berm;
- Geotextile and rock protection to areas of observed erosion; and
- Use of jute mesh and coir logs to assist in sediment control.

5.6 Monitoring Bores

Numerous piezometers and monitoring bores have been installed to allow groundwater levels to be monitored. The original bore installations (PZH001 to PZH010) were located in areas outside any intended tailings inundation areas. Additional bores (PZH011to PZH019) have since been installed around the facility.

Of note bores PHZ011 and PZH012 were installed inside the dam and were decommissioned, due to access issues, in May 2014 following confirmation from the EPA. These two bores were seal and are now covered by tailings. All instrument should again be checked for missing or damaged caps and replaced as necessary. Several bores are shown on Figure A1.

5.7 Future Embankment Raising

To date Stages 1 to 6 have been constructed achieving a crest level of RL267.5m (Stage 5) and RL270.0m (Stage 6). It has been advised that further staged construction (stage 6 and 7) have been approved by the EPA to RL 272.0 in at least two stages. Table 3 summarises completed and planned staged embankment construction activities.

Table 3 - Staged Construction							
	Stage 1-Starter	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
RL	RL260.0 completed	RL262.0 completed	RL264.0 completed	RL266.0 completed	RL267.5 completed	RL270.0 ongoing	RL272.0
Period of Const'n	2004	2006/ 2007	Late 2007/ Early 2011	Mid 2014 to mid-2015	2016 to 2017	Commenced Oct 2018	Pending

A tailings storage strategy study was completed by Coffey (2008), titled *"Additional Production Tonnage, Tailings Storage Facility Tritton Copper Mine*," dated 4 February 2008, reference MWP00100AF-AE, the study examined several storage options, namely continued embankment raising of Tailings Dam 1 or the development of a new tailings dam. The present predictions indicate TD1 can be used to the current end of mine life to the Stage 7 level, provided astute deposition practices are maintained.

5.8 Water Recovery

5.8.1 Tailings Dam Surface Water Recovery System

Water liberated from the deposited tailings slurry is recovered via a pump located at the water recovery pond, refer to Figure A6. The float pump was located on the southern side of the access berm. Recovered water is returned to the processing plant for reuse, however during construction some water is used for moisture conditioning of materials and dust suppression purposes.

A very small water pond was present on the tailings dam surface, Figure A6. No water was being recovered at the time of the visit due to the drought conditions. The pond was located away from any perimeter embankments due to the steeply sloped tailings beaches and preferential deposition from the saddle embankments. Some water (rainfall) was located in an excavation next to the main embankment, it was instructed for this area to be infilled with tailings which will be undertaken when sequencing allows deposition.

The mine advised that a total of 21,930 m^3 (48,560 m^3 in 2018) of water was recovered via the pump system for reuse (mainly to the processing plant). Based on a calculated slurry water inflow of 623,423 m^3, the annual recovery was assessed at 3.5 %, i.e. water returned to the plant as a percentage of total water contained in the discharged tailings slurry. Liberated slurry water is also used during construction and for dust suppression. This compares to previous value of 8.4% in 2018. No significant rainfall events were recorded in 2019.

5.8.2 Return Water Sump

An underdrainage interception system was installed as part of the original construction. This system comprises two lines of slotted pipes surrounded by gravel which have been placed parallel to the inside toe of the main embankment and extend part way up either abutment. One pipe is located on natural ground while the other is located in a shallow trench. Collected water flows by gravity to the lowest point in the valley floor. At the low point these pipes are connected to a solid pipe which is located under the main embankment that discharges water by gravity into a large diameter concrete sump located near the downstream toe of the main embankment (refer to Figure A2).

It was observed that the underdrainage pipe was still discharging a trickle of water into the concrete sump even after 15 years of operation.

The concrete sump comprises concrete pipes stacked vertically on one another; the lower most pipes are solid and act as the pump sump. At ground level, slotted concrete pipes are present; the slots allow any water (rainfall) collected in the downstream toe drain, to pass into the concrete sump for

collection and recovery by the pump. The concrete sump has a dedicated pump that is activated by high and low level floating switches. The downstream toe drains were being pumped dry, (refer to Figure A2) due to the recent rainfall event. The volume of water recovered from the sump during 2019 was not measured.

5.9 Tailings Beaches

It was observed there was a relatively even build-up of the tailings along and against, the perimeter embankments indicating that the active tailings deposition point has been regularly cycled resulting in the formation of relatively steeply sloped beaches that slope away from the embankments towards the water recovery point. The tailings beaches are relatively steep with an average grade of 1(v):60(h), based on January 2006 survey information with no perceived changes since that date.

5.10 Spigotting

The tailings delivery line is welded with Victaulic couplings and spigot off-takes tees located at regular intervals with a single emergency discharge point located at the southern end of the line near the main embankment. The tailings discharge arrangement comprises valved off-takes that are opened and closed in a systematic and cyclic manner to change the active discharge points.

Due to the steep beach slope infilling of the available storage area is further optimised by extending the spigot pipelines out over the tailings beach, with the line supported on empty 200 litre drums. This activity is an operational consideration in optimising the storage capacity of the facility by extending the storage life and extending the time frame between each embankment lift. However a site review by the EPA in later 2018 indicted that the drums should be removed, it was advised that this directive has been changed and that drums can still be used (refer to Figure A5). The removal of this simple system to optimise the storage capacity will have implications of filling unless a cheap alternative can be initiated (i.e. using tailings).

It is apparent that spigotting (deposition) has been undertaken in an acceptable manner due to the presence of well-formed sloped beaches and the fact the water pond was located away from the perimeter embankments. Spigotting was being undertaken from the western side of the dam, refer to A6.

5.11 Seepage

There were no visible signs of near surface seepage in the areas downstream of the embankments, in the way of seepage flows, wet or damp areas, soil discolouration, distressed or dead vegetation. Toe areas were assessed to be dry. Downstream areas are shown in some of the photographs which also show a variable coverage of vegetation.

5.12 Freeboard

The freeboard is the height difference between the embankment crest, the tailings beach level and the operating water level at the decant (water recovery point). Freeboard criteria is defined in the Dams Safety Committee guideline sheet DSC3F “Tailings Dams”. Freeboard is defined under section 4.2.2 Flood Capacity of the guideline and comprises four components which are represented schematically on Figure 5 of this report which shows the nomenclature used and is a copy of the presented in the DSC3F Sheet. The tailings dam complies with Table 3 of the new guideline based on a Significant consequence rating. Each of the freeboard components are defined in the following sections.

Recent survey information was used in assessing the freeboard of the tailings dam. The lowest point on the perimeter confining embankments was at the Stage 5 level of RL267.5 m.

- Embankment crest RL267.5 m – Stage 5 level.

- Spillway invert RL269.0 m.
- Tailings beach level is variable and adjacent to the main embankment it was estimated at RL267.0 m (2.0m freeboard but at the western saddle embankment there is 0.5m freeboard as the crest is at RL 267.5m.
- Water level at the water recovery point was surveyed at RL263.9 m (21/2/20).
- Based on survey information the freeboard has been calculated at 3.6 m.

Please note the mine has added 5,000m to the local RL due to underground mining activities which may be present on some survey information.

Freeboard criteria has been assessed based on the Stage 5 (RL 267.5m) embankments located to along the southern extremity of the facility. For a short period the tailings dam does not have an operational spillway as it has already been raised.

5.12.1 Beach Freeboard

Beach freeboard is defined as the vertical distance between the tailings beach level and the water pond level after adjustment for a 1 in 100 AEP, 72-hour rainfall, estimated at 0.2 m. The beach freeboard has been calculated at 3.1 m, (tailings level of RL267.0 m – RL263.9 m water pond level or 2.9 m with an adjustment of -0.2 m). Beach freeboard can be assessed by reviewing the photographs presented in Appendix A.

5.12.2 Operational Freeboard

The operational freeboard is the vertical distance between the top of the tailings and the spillway level and is required by the DSC to be a minimum of 0.3 m. As the spillway invert is 1.5m above the southern embankment crest there is a non-compliance to this criteria. However the total freeboard at the southern embankment has been assessed as 3.6m (RL267.5m-RL (water level)).

It should be noted that in the 15 years of independent auditing of the Tritton Tailings Dam undertaken to comply with NSW DSC requirements this is the FIRST noted non-compliance recorded by an independent reviewer. This arose only due to drought conditions which was out of the control of the mine and the contractor.

5.12.3 Environmental Containment Freeboard

The environmental containment freeboard is the vertical distance between the operational pond limit and the spillway level and is required by the DSC to be a minimum of 0.3 m. As above this has been assessed based on the southern embankment and based on a surveyed operating pond level of RL263.9 m and southern embankment of RL267.5 m the difference has been calculated at 3.6 m.

5.12.4 Total Freeboard

The total freeboard is the vertical distance between the operational pond level and the crest of the dam. Based on a surveyed operating pond level of RL263.5 m and an embankment level of RL267.5m the total freeboard was assessed at 3.6 m.

5.12.5 Design Rainfall Events

The rainfall freeboard requirement, based on the ½ PMP rain event has been estimated at 0.26m. Rainfall collection into the tailings dam is by incident rainfall over the dam area and runoff from a small upstream catchment area. It has been estimated that the ½ PMP event will produce a water pond approximately 0.8m deep due to the sloped nature of the tailings beaches. The dam has a varying capacity dependent on the tailings filling rate and currently has sufficient capacity to contain the nominated PMP event.

The design includes a spillway has been provided to allow excess water accumulations to be discharged such that the main embankment and the northern and western saddle embankments are not overtopped. A summary of the above freeboard criteria and the current status of the tailings dam at the Tritton Mine are outlined in Table 4. The total freeboard being the height difference between the water pond and the embankment crest was assessed at 3.6 m.

Table 4 - Freeboard Criteria

	Beach Freeboard	Operational Freeboard	Environmental Containment Freeboard	Total Freeboard
DSC requirement	72 hour storm or 0.2m	0.3m	72 hour storm or 0.2m	AEP event
Status Jan 2020	2.9 m	0.3m*	3.6 m	3.6 m

*The operational freeboard at the spillway was assessed to be in excess of 200mm i.e. the tailings beach was 0.20m below the spillway invert level although at the main embankment the tailings were higher compared to the invert level at the spillway. No issues are envisaged with this situation due to a low tailings bund near the spillway invert.

5.13 Spillway

TD1 is now surrounded by perimeter embankments and the catchment reporting into TD1 is from incident rainfall only. The tailings dam has an incident catchment area of 132 ha (RL270.0m). The estimated inflow volume from a 0.5 probable maximum flood (PMF), 3 hour event (0.26 m), assuming a runoff coefficient of 1.0 has been determined at 343,200 m^3.

The current spillway is located through the northern embankment. The spillway has been designed to pass a 0.5 PMF event and has a design capacity of 14 m^3/sec.

The final intended location of the spillway is on the southern/eastern side of the dam excavated through natural ground, refer to the Stage 6 and 7 Design Report.

5.14 Design Rainfall Events

Rainfall design information was provided by the Bureau of Meteorology Hydro-meteorological Advisory Service, Melbourne (BMHAS).

The dam and spillway have been designed to contain and discharge flood events of at least the ½ PMP event. To model this both IDF curves and PMP rainfall event calculations were obtained from the Bureau of Meteorology Hydro-meteorological Advisory Service and confirmed by calculation.

The 1 in 100 year ARI (average recurrence interval) 72-hour rainfall event equates to 191mm of rainfall. This amount of rain could produce a maximum volume of water assessed at 252,120 m^3 assuming a conservative runoff coefficient of 1.0 over the full area of the catchment (132 ha). The 3 hour ½ PMP event indicates a rainfall of 260mm thus a total of 343,200 m^3 of water could be expected to accumulate from this rainfall event assuming a runoff coefficient of 1.0. A rainfall event of this severity (PMF event) would cause major flooding and disruption to the surrounding area. Based on total freeboard of 3.6m the estimated available capacity was assessed to be approximately of 1,500,000 m^3 which is currently sufficient to contain the above PMP event, noting this is not a volume available for tailings storage due to freeboard requirements.

Based on the above information it has been recommended that the dam be operated with a minimum operational freeboard of between 250 mm to 300 mm to adequately contain the projected ½ PMP rainfall event. This 250 mm freeboard is in addition to the water storage capacity available in the depressed cone area surrounding the water recovery point, refer also to section 5.8. The recent survey confirms there is adequate freeboard capacity. It should be further noted that the design spillway invert is 1.0 m lower than the embankment crest.

It was advised that the site can typically expect 2,000 mm of evaporation during the year ranging from 40 mm in the winter period to 350 mm in summer.

DSC guideline DSC3B "Acceptable Flood Capacity for Dams" is considered applicable to the Tritton Copper Mine Tailings Dam but it should be noted that the dam is situated in an isolated location, there is limited threat to human life and that any flood threat potential is limited. Despite the low consequences, the dam has been designed to contain rainfall events, as highlighted above and the operations manual is focused on maintaining adequate freeboard to contain rainfall events and if necessary high rainfall events can be passed by a spillway. During 2019 annual mean evaporation was 2,210 mm and the total annual rainfall was 67.5 mm. No significant rainfall events were advised during 2019 and in fact drought conditions have been experienced for at least the last year.

6 TAILINGS PROPERTIES

6.1 2006 Review

As part of the 2006 design review, hand held pocket penetrometer tests were undertaken along the beach area adjacent to the main embankment. Only those areas where safe access was available were tested, which ranged from dry hard areas to soft damp areas. The values obtained were used to assist in determining or confirming strength parameters for the stability analyses that were undertaken for the Stage 3 design report reference Coffey "*Design Report – Stage 3 Tailings Storage Facility 1 Tritton Resources Limited"* dated March 2007, reference MH00100AD Rev 1.

The penetrometer results obtained, ranged from 0.75kg/cm^2 in areas of recent deposition that had only partially dried to 4kg/cm^2 in areas where dried tailings beach areas were present, noting that overnight rain had wet all beach areas. The mine regularly relocates the tailings slurry deposition point away from the embankment prior to the commencement of any staged construction to allow all tailings areas to dry and gain strength. This aspect of spigotting can be seen in Figure A4, where extended spigot lines are visible.

The mine also sample and test the tailings discharge in respect to grading. A 2006 averaged particle size distribution indicates a P_{60} of 33µm, P_{70} of 57µm a P_{80} of 91µm and a P_{90} of 147µm. These values are consistent with the design values estimated prior to commissioning. Two tube samples were obtained from the beach area near the main embankment in January 2007. Test results are summarised in Table 5.

Table 5 – 2007 Tailings Laboratory Results

	Sand fraction > 75 microns	Silt/ clay fraction < 75 microns	Dry Density	Cohesion	Phi
Tube 1	34%	66%	1.72t/m^3	3kPa	20.5°
Tube 2	25%	75%	1.87t/m^3	5kPa	22.5°

The laboratory gradings are within the limits advised for average particle sizes measured as a discharge from the processing plant with due allowance for segregation when the tailings are deposited. The strength parameter information supplemented existing information and was used in the Stage 3 design assessment. The previous stability analyses use a lower cohesion value but a higher phi value for the tailings.

6.2 Stage 6 and 7

A geotechnical investigation was performed by Barnson Pty Ltd in September 2017, which was based on a scope prepared by CMW Geosciences Pty Ltd, setting out minimum requirements. The investigation comprised the following:

- Sampling of existing borrow areas comprising Sheather's Pit, Yarran Pit and Existing Dam Stockpile;
- Undisturbed tube sampling of insitu tailings from the tailings beaches adjacent to the CPT probe locations (i.e. at the surface of the tailings);
- Laboratory testing comprising: particle size distribution (PSD) tests, standard compaction (SMDD) tests, undrained triaxial tests, Atterberg limits determinations, laboratory constant head permeability tests and moisture content tests; and
- Truck mounted Cone Penetration Testing (CPT) through the deposited tailings stored in TD1 at 6 locations.

The CPT testing was conducted by Probedrill Pty Ltd based on a CMW Geosciences scope. The CPT results and interpretation of the CPT results are referenced or included in Section 8 of this report. The results of the CPT testing indicated the tailings were typically soft to firm silty sands / sandy silts with intermittent layers of firm to stiff clayey silt / silty clay.

The results of the classification tests on the tailings samples indicated the samples were a non-plastic sandy silt.

The results of the consolidated undrained triaxial testing on the tailings materials gave an average of the results of cohesion, 0 kPa and angle of internal friction of 37.2^{o}. An inferred angle of internal friction of 30^{o} from the CPT probing was utilised in stability analyses. From the triaxial testing of undisturbed tube samples of near surface tailings, the dry densities varied between 1.60 t/m^3 to 1.89 t/m^3 with an average of 1.73t/m^3 (i.e. similar to densities recorded in previous sampling and testing regimes in 2007).

7 GROUNDWATER MONITORING

As part of the start-up operation of TD1, four (4) monitoring bores were installed at various locations around the perimeter of the dam at the completion of the Stage 1 embankment in mid-2004, which was before the dam was commissioned in December 2004. Three embankment piezometers (PZH005 to PZH007) were installed in May 2007.

A further five (5) piezometers/bores (PZH008 to PZH012 and PB001) were installed in September 2007. PZH013, PZH014 and PZH015 were installed in 2010, while PZH016 and PZH017 were installed in 2011/2012. A pumping bore (PB002) was installed in 2011 near PZH011.

PZH006 and PZH007 have shallow holes drilled adjacent to them, extending to a depth of at least 15m. Bores located in the valley immediately downstream of the main embankment include PZH010, PZH002, PZH013 and PZH015, refer to 4. Bores PZH001 and PZH003 are also located adjacent to the main embankment but on the northern and southern abutments respectively.

A total of nineteen (19) monitoring bores are read, the approximate locations are shown on Figure 4. No bores are now pumped based on approvals from the regulators. Installation details are summarised in Table 6.

Table 6 - Monitoring Bore Installation Information

Bore number	Easting	Northing	RL(m)	Depth (m)	Year Installed	Initial water level (RLm)	Initial water level-depth (m)
PZH001	474,405* (31,753)	6,528,393 (20,800)	264.487 (5,262)	90	2004	186.84	Dry*
PZH002	474,614* (31,915)	6,528,016 (20,420)	254.412 (5,262)	90	2004	186.66	61.5
PZH003	474,838* (31,980)	6,527,350 (19,665)	267.995 (5,267)	90	2004	181.50	Dry*
PZH004	473,302* (30,540)	6,527,591 (20,180)	269.521 (5,267)	90	2004	187.47	Dry*
PZH005	474,471	6,528,181	264.784	N/A	2007	230.68	34.17
PZH006D	474,548	6,527,994	264.588	N/A	2007	214.97	49.65
PZH006S	474,548	6,527,994	264.588	N/A	2008	248.12	16.34
PZH007D	474,625	6,527,811	264.817	N/A	2007	195.40	69.45
PZH007S	474,625	6,527,811	264.817	N/A	2008	252.71	12.66
PZH008	474,364	6,528,516	262.422	100	2007	202.28	60.22
PZH009	474,315	6,528,385	263.016	100	2007	211.06	52.02
PZH010	474,517	6,528,212	258.169	100	2007	207.20	51.05
PZH011D	474,490	6,527,559	264.205	100	2007	225.73	38.17
PZH011S	474,490	6,527,559	264.205	4.5	2007	Dry	Dry
PZH012	474,490	6,527,559	264.205	100	2007	200.20	38.17
PZH013	474,683	6,527,976	254.609	40	2010	Dry	Dry
PZH014	474,579	6,528,579	256.722	73	2010	197.10	59.62
PZH015	474,813	6,527,889	256.081	73	2010	187.93	68.15
PZH016	473,598	6,527,569	N/A	N/A	2012	N/A	N/A
PZH017	473,742	6,527,949	N/A	N/A	2012	N/A	N/A
PZH018	474,137*	6,528,676*	N/A	N/A	2012	N/A	N/A
PZH019	474,700*	6,526,889*	N/A	N/A	2012	N/A	N/A
PZH020	N/A	N/A	N/A	N/A	2012	N/A	N/A
PZH021	474,724*	6,528,613*	N/A	N/A	2012	N/A	N/A
PZH022	472,786*	6,526,984*	N/A	N/A	2012	N/A	N/A
PZH023	473,480*	6,525,879*	N/A	N/A	2012	N/A	N/A
PB001	474,396	6,528,406	263.920	110	2007	N/A	43.78
PB002	474,491*	6,527,527*	N/A	N/A	2011	N/A	N/A

Note:
(*) – Dry but the holes were moist and natural ingress of water may have occurred with time after their installation, rather than them being affected by seepage from the tailings dam.
(#) – Digitised (approximated) from bore location map (EES, 2013) and map received 4 February 2016.
N/A – Information not available to Coffey.

Table 7 provides a broad summary of the general location of the bores in respect to the orientation of the TD.

Table 7 - General Monitoring Bore Location

Southern Abutment	Below Main Embankment	Northern Abutment	In Main Embankment	West side of TD	South side of TD	Comments
PB002#	PZH002	PB001	PZH005	PZH004*	PZ019*	(*) - Some distance from the tailings dam (TD)
PZH003	PZH010	PZH001	PZH006S	PZH012#		
PZH011S#	PZH013	PZH008	PZH006D	PZH016		(#) - decommissioned in June 2014
PZH011D#	PZH015	PZH009	PZH007S	PZH017		
		PZH014*	PZH007D	*		
		PZH021*				

Photographs of some of the monitoring bores and piezometers are presented in Appendix A.

During 2013 Tritton engaged Environmental Earth Sciences (EES) to undertake a further groundwater review and to produce a Conceptual Site Model (CSM) based on EPA condition U1 "*Tailings Storage Facility Remedial Action and Contingency Plan Development"*, with various reporting dates to June 2013 (Condition U1.5) for the submission of a Remedial Action Plan (RAP). Environmental Strategies were engaged and provided a Remedial Action Plan for Tailings Dam (ML1544), their report is dated 26 June 2013 which complies with the above nominated reporting date.

During 2019, groundwater levels and groundwater quality were measured on a quarterly basis. An assessment of the monitoring bore water level and quality information is presented in the following sections.

7.1 Water Levels

Instruments PZH001 to PZH004 have been read on a monthly basis since November 2004. Subsequent bores have also been read mainly on a monthly basis since they were installed with a start date of either June 2007 (PZH005 to PZH007) or October 2007 (PHZ008 to PZH011 and PB001). Pumping from PB001 commenced on the 20 March 2009, adjacent bores being PZH001, PZH008 and PZH009, pumping has been discontinued based on a groundwater review by EES.

In 2019, water levels were gauged from 24 (there are 19 readings altogether) monitoring points located in the vicinity of the tailings dam. Tabular and graphical plots covering both the past 12 months readings of 2019 and previous readings are presented in Appendix B. Water level trends for the bores are summarised in Table 8 for the 2019 calendar year, while historical trends since installation are summarised in Table 9.

7.1.1 Groundwater Trends for the 2019 Calendar Year

Table 8 outlines trends determined for water level changes determined for the 2019 calendar year.

Table 8 - Water Level Changes - 2019 Calendar Year

Monitoring Bore Number	Nov/Dec 2019 Reading	Nov/Dec 2018 Reading	Water Level Change During 2019 (m)
PZH001	13.09	12.07	-1.02
PZH002	29.93	29.21	-0.72
PZH003	63.41	62.51	-0.90
PZH004	No reading	No reading	N/a
PZH005	13.18	12.29	-0.89
PZH006S	No reading	No reading	N/a
PZH006D	37.81	36.95	-0.86
PZH007S	No reading	No reading	N/a
PZH007D	46.09	42.52	-3.57
PZH008	19.71	18.98	-0.73
PZH009	16.19	15.53	-0.66
PZH010	No reading	No reading	N/a
PZH011	decommissioned	decommissioned	N/a
PHZ012	decommissioned	decommissioned	N/a
PZH013	No reading	No reading	N/a
PZH014	47.39	46.87	-0.52
PZH015	50.31	49.71	-0.60
PZH016	No reading	No reading	N/a
PZH017	44.64	44.73	+0.09
PZH018	20.75	19.38	-1.37
PZH019	95.21	96.79	+1.58
PZH020	72.44	73.03	+0.59
PZH021	48.16	50.55	+2.39

Note: N/a – Not applicable.

The following water level trends have been assessed for the period December 2018 to December 2019.

- No readings were recorded for seven (7) bores.
- Groundwater level falls were recorded in eleven (11) bores, the largest fall was recorded on southern abutment of the main embankment at PZH007 (-3.57m). Water level falls varied from -0.52m in PZH014 to -3.57 in PZH007.
- Measured groundwater levels in 2019 indicated rises in PZH017, PZH019, PZH020 and PZH021. The largest water level rise during 2019 was +2.39m in PZ0021, noting the water table is in excess of 48m depth. At 48m depth the groundwater is unlikely to be hydraulically connected to the dam.
- The piezometers in the main embankment PZH005, PZH006 and PZH007 all recorded water level falls over 2019 between -0.4 m and -0.66 m
- The closest water level to the surface was recorded in PZH005 at 13.18 m, while the deepest measurement was recorded in PZH019 at 95.21 m.
- PZH002 is located downstream of the main embankment (refer to Figure 4) in the lowest point of the valley. The groundwater table in this bore was recorded at 29.93 mbgl (29.21 mbgl in 2018). During the year the water level records indicated a fall of -0.31 m, following a previous fall of -0.33 m in 2018.

Environmental Protection Licence notes that if a 5m water level rise occurs after October 2008 then pumping shall commence in PZH001. Pumping bore (PB001) was installed close to PZH001, refer to the Figure 4. Pumping commenced in March 2009 when the 5m water rise trigger was reached. Pumping initially lowered groundwater levels in the immediate area which did show rapid rebounds when the pump was not operating. Pumping has been discontinued with water levels showing a gradual fall.

Pumping bore PB002 was installed near PZ011 in 2011 which is located within the tailings dam and resulted in continued safety and access issues. Both bores were sealed in June 2014.

Groundwater reviews were previously undertaken by Earth Environmental Science (EES) in 2012 and 2013. The latter report (EES) concluded that groundwater migrates in an easterly direction. Mounding is restricted to the TD footprint with a sharp gradient to the east. Bores are showing a general water level rise with some water levels appearing to have plateaued.

The Remedial Action Plan (RAP) submitted to the EPA in 2013 identified that some groundwater changes are a result of ‘compression’ of the underlying aquifer. A six (6) monthly review of the RAP was reportedly undertaken in April 2014 (Coffey Mining, 2015).

7.1.2 Trends since Installation (variable dates) to 2019

Table 9 outlines historical trends determined for water level changes since regular readings were commenced which in some bores was March 2005 (or when installed) to December 2018. The following historical water level trends are noted.

- Overall groundwater level rises have been recorded in the all the bores except PZH020.
- The largest water level rise since installation has been recorded in PZH001 of + 64.56 m (noting that the groundwater was at 13.09 mbgl in December 2019). The water level fell in this bore during 2018 and 2019.
- A water level fall of -0.32 m was recorded in PZH020. The groundwater levels observed at PZH020 are likely to be representative of deeper groundwater regime that may not be connected hydraulically to the upper groundwater regime situated underneath the tailings dam.

Note: N/a – Not applicable.

Table 9 - Water Level Changes Since Installation			
Monitoring Bore Number	Initial Reading (m)	Nov/Dec 2019 Reading	Change (m) Since Installation to Nov/Dec 2019
PZH001	77.65 (03/2005)	13.09	+ 64.56
PZH002	61.5 (03/2005)	29.93	+ 31.57
PZH003	86.5 (03/2005)	63.41	+ 23.09
PZH004	82.85 (03/2005)	No reading	N/a
PZH005	34.17 (06/2007)	13.18	+ 21.99
PZH006S	16.34 (02/2008)	No reading	N/a
PZH006D	49.65 (06/2007)	37.81	+ 11.84
PZH007S	12.66 (02/2008)	No reading	N/a
PZH007D	69.45 (06/2007)	46.09	+ 23.36
PZH008	60.22 (10/2007)	19.71	+ 40.51
PZH009	52.02 (10/2007)	16.19	+ 35.83
PZH010	51.05 (10/2007)	No reading	N/a
PZH011	38.17 (10/2007)	decommissioned	N/a
PZH012	62.01 (10/2007)	decommissioned	N/a
PZH013	Dry	No reading	N/a
PZH014	59.62	47.39	+ 12.23
PZH015	67.15	50.31	+ 16.84
PZH016	No reading	No reading	N/a
PZH017	77.86 (09/2012)	44.64	+ 33.23
PZH018	37.059 (01/2013)	20.75	+16.309
PZH019	102.08 (09/2012)	95.21	+ 6.87
PZH020	72.115 (01/2013)	72.44	- 0.325
PZH021	60.91 (01/2013)	48.16	+ 12.75

7.2 Groundwater Quality

Routine monthly water samples are taken from the decant pond (TSW02) and process water dam (TSW09). There were four (4) rounds of groundwater sampling from fifteen (15) monitoring bores in 2018. There are no prescribed water quality criteria outlined in the regulatory guidelines which only specify that the sampling and testing regime be undertaken on a three monthly basis.

A detailed review of water quality test results is usually undertaken by EES who previously concluded the groundwater chemistry has a signature of NaCl > MgSO4 > CaHCO3 with a mean pH of 7 and a

salinity of 8,300mg/L TDS and regular SO4 concentration > 2,000mg/L (up to > 6,000mg/L). Geochemical signatures and concentrations have been reportedly stable over the last 5 years.

No decant water testing results for 2019 were provided for review.

The following 2019 water quality trends are summarised for the bores, graphical plots are presented in Appendix B.

- The lowest pH reading of 3.99 was recorded in PZH019 (04/2019), the highest reading of 8.42 was recorded in PZH019 (01/2019).
- The lowest TDS reading was 5,590mg/l in PHZ020 (01/2019) whilst the highest reading was 20,200mg/l in PZH018 (10/2019).
- Sulphate as SO_4 2- varied between 643 mg/l in PZH19 (01/2019) to 3,920 mg/l in PZH018 (10/2019).
- Copper was generally recorded as >0.001mg/l with a high of 0.17mg/l in PZH007 (03/2019).
- Lead readings were mostly 0.001mg/l to 0.029mg/l (PZH007, 03/2019).

The information was provided in tabular and graphical form for each of the bores. The results were generally similar to last year with discernible trends for the analytes that were tested for the bores. EES (2013) reported water geochemistry had been stable for 5 years.

7.3 Environmental Strategies (2013) Remedial Action Plan

The following section provides a summary of Section 6 “Remediation Action Plan” referenced in the EES (2013) report for the TSF located within ML1544.

- There is no evidence of surface water impacts.
- There is no evidence of groundwater impacts.
- As there is no evidence of contamination no remedial actions are required.
- If impacts are identified the contingency plan should be followed, including a detailed analysis and initiating a tier 1 and 2 remediation acceptance criteria.
- Cease pumping from PB001 and PB002.
- Continue monitoring of the facility.

The RAP was submitted to the EPA in June 2013 and was acknowledge by the EPA in correspondence dated 19 July 2013. Correspondence dated 23 July 2014 confirmed a 6 monthly review of the RAP had been completed and submitted to the EPA by 30 April 2014.

It was noted that EPA concurred with the recommendation to cease pumping at PB001 and PB002 in EPA’s letter ref. LIC07/2379, DOC14/38361 dated 14 July 2014. A copy of the letter from EPA to Tritton Resources Pty Ltd is enclosed in Appendix D.

8 STABILITY ANALYSES

8.1 Method of Analysis

Stability analyses were undertaken to assess the stability of the TD1 embankment up to an intended Stage 7 stage with a crest RL272.0m (i.e. 20m embankment height). The analyses were undertaken in general accordance with ANCOLD (2012). The analyses presented in the CMW (2018) Design Report were reviewed as part of this surveillance review. Note the crest is currently at RL267.5 the stage 5 level and the stability analyses presented here are for future embankment raises.

The computer software package 'Slide' was utilised to undertake the analyses. Slide is a two-dimensional slope stability program for evaluating the safety factor of circular and non-circular failure surfaces in soil and rock slopes. The stability of the slip surfaces for static loading was assessed using vertical slice limit equilibrium methods and simplified Bishop method.

The following cases were examined in the stability analyses:

- Case 1: Static Analysis - Downstream failure of the TD embankment, future crest level of RL272m (20m embankment height) under drained condition based on limit equilibrium method.
- Case 2: Static Analysis - Downstream failure of the TD embankment, future crest level of RL272m (20m embankment height) under undrained condition based on limit equilibrium method.

A post-seismic analysis was not required as the tailings have been assessed as non-liquefiable at the design earthquake loads. In addition, in compliance with ANCOLD (2012) and in lieu of pseudo static analyses, a deformation assessment was performed (refer Section 8.5). The phreatic surface adopted in the cases was a 'worst' case phreatic surface emanating from a pond near the embankment and a saturated toe, noting that these conditions have never been experienced at the dam. The phreatic surface inferred and modelled in the stability analyses within the embankment was at least 3m to 4m above the measure level in the highest piezometer, refer to Section 7. Furthermore, the phreatic surface inferred from the CPT plots (CPT3 and CPT4 located adjacent to the highest embankment profile) was located approximately 9m below the tailings surface (Sept. 2017).

ANCOLD (2019) was reference with respect to earthquake design. The analyses conducted generally comply with the requirements of ANCOLD (2019).

8.2 Parameters

The parameters adopted in the analyses were based the geotechnical investigation undertaken by Barnson's (CMW scope) and the recently completed CPT data interpretation (refer to Appendix C). Table 10 provides a summary of the strength parameters used in the stability analyses.

Table 10 Summary of Strength Parameters*

Material Type	Bulk Density (kN/m³)	Undrained	Effective Strength Parameter *	
		Cohesion Su (kPa)	Cohesion C' (kPa)	Friction Angle Φ' (Degrees)
Tailings (Drained)	18	-	0	30
Tailings (Undrained)	18	40	-	-
Embankment	18.5	-	5	30
Foundation	18.5	-	25	33
Bedrock	18.5	-	25	33

8.3 Results of the Stability Analyses

The results of the stability analyses for the various cases examined are summarised in Table 11, with the computer printouts presented in Appendix C.

Table 11 - Results of Stability Analyses		
Case	**Factor of Safety**	**Recommended Minimum Factors of Safety***
1	2.14	1.5
2	1.51	1.5

*Note: Recommended factors of safety in accordance with ANCOLD (2012).

The stability analyses indicate that the cases examined have adequate factors of safety (FOS) for the drained and undrained conditions under an assumed worst case scenario (i.e. elevated phreatic surface) when compared with the recommended minimum factors of safety in ANCOLD (2012). The actual FOS are expected to be higher than the s quoted in the above table when modelling a lower phreatic surface as inferred from current (2018) piezometer readings.

8.4 General Comments in Respect to Stability

The tailings dam has been designed to provide temporary water storage following extreme storm events. If water does extend to the embankment, which is considered very unlikely, it is anticipated this will be a temporary occurrence given 'continuous' water removal from the tailings dam. The tailings dam should be operated in such a manner as to ensure that the `normal' return water pond is kept a minimum of 200m away from the main embankment and perimeter embankments at all times.

8.5 Deformation analysis

Figure 6 in ANCOLD (2012) provides guidance on deformation assessment dependent on whether liquefaction occurs. Based on the liquefaction assessment carried out, liquefaction of the tailings forming the foundation of the upstream embankment raises is unlikely for the design earthquake loads that have been assessed. A preliminary assessment of embankment deformation due to an earthquake was estimated using the Swaisgood (2003) method. This method utilises an empirical formula based on observed crest settlement resulting from analysed 'real' earthquakes, with no liquefaction.

Permanent displacements or settlements, expected for a 20m high embankment, were estimated for a Magnitude 6 earthquake, corresponding to a loading of 0.08g for 1 in 1,000 AEP MDE event. The MDE (or Safety Evaluation Earthquake, SEE) adopted is as per ANCOLD (2019) for Significant consequence facilities.

From the analysis, it is concluded that for the highest embankment section (worst case), the deformation due to an MDE event is likely to be in the order of 35mm. Such deformation is within acceptable criteria when compared with the operational freeboard of 300mm.

8.6 Liquefaction

8.6.1 General

Liquefaction is a complex process that typically occurs in loose, saturated coarse silt to fine grained sandy soils whereby dynamic loading, such as from an earthquake, results in the build-up of pore water pressures. When the pore water pressure exceeds the overburden stress, the effective stress reduces to zero and the soil inter-granular contact stresses reduce to zero resulting in a loss of shear strength. At this point, the soil is said to have liquefied and behaves like a fluid.

If liquefaction of the deposited tailings underlying the upstream embankment raise occurs, the reduction in saturated strength may result in failure or settlement of the upstream embankment into the liquefied tailings.

Static liquefaction can also occur in tailings storage facilities triggered by factors such as slope instability and high rates of tailings / construction rates of rise. Given the relatively low rate of construction and filling rate, static liquefaction is not considered likely to be an issue for TD1.

This section provides assessment of cyclic liquefaction occurring in the deposited tailings that provide the foundation for the upstream raise from RL 259.7 to RL 269.5.

The cyclic liquefaction assessment was carried out using Geologismiki software, CLiq, using the recent CPTU data (2017). CLiq outputs provide consistent output results by applying the National Centre for Earthquake Engineering Research (NCEER) method (Youd et al, 2001; Robertson & Wride, 1998). It also includes the latest assessment procedure developed by Robertson (2010) which is applicable to all soil types combining a check for cyclic liquefaction (sands) and cyclic softening (clays).

8.6.2 Input Parameters

The earthquake parameters relied upon for this assessment were based on a Maximum Design Earthquake (MDE) for a Significant consequence category (ANCOLD, 2012) as presented in Section 3.2. The following cases were examined for liquefaction assessment:

Case 1

- Design Earthquake Magnitude = 5.5;
- Maximum Design Earthquake (MDE), 1:475-year, Peak Ground Acceleration (PGA) = 0.06g (ref: AS 1170.4-2007) (SEE in ANCOLD 2019 is the same); and
- Phreatic surface at top of tailings (never expected to occur).

Case 2

Case 2 examined a Significant consequence category storage (refer DSC3F Guidelines).

- Design Earthquake Magnitude = 6;
- MDE, 1: 1,000-year, Peak Ground Acceleration (PGA) = 0.08g (ref: AS 1170.4-2007); and
- Phreatic surface at top of tailings (never expected to occur).

Case 3

Case 3 examined a Significant consequence category storage (refer DSC3F Guidelines).

- Design Earthquake Magnitude = 6;
- MDE, 1: 1,000-year, Peak Ground Acceleration (PGA) = 0.08g (ref: AS 1170.4-2007); and
- Phreatic surface 4m below top of tailings, similar to stability analyses presented in Section 8. The phreatic surface from the CPT plots (CPT3 and 4 adjacent the highest embankment) was inferred to be approximately 9m below the tailings surface (Sept. 2017).

The CPT probes and thus results were performed through deposited tailings to depths of between 5m and 15m. The probes were located adjacent to the embankments around the facility in the area where future upstream embankment construction would occur. The details of the locations of the CPTU's and the results are presented in Appendix C.

8.6.3 Results

The CPT results identified that the tailings generally comprise layers of silty sand and sandy silt with intermittent layers of clayey silt and silty clay.

The FoS for liquefaction is assessed based on a ratio of the cyclic resistance ratio, determined by CPT strength profile, and the cyclic stress ratio, determined by the earthquake event.

The phreatic surface adopted in Cases 1 and 2 assumed a surface at the top of the tailings, with all tailings material been fully saturated. Case 3 assumed a phreatic surface 4m below the top-surface. Noting however that is NOT the actual case with TD1 with the phreatic surface being well below the tailings beach surface generally in excess of 12m depth or not being present at all in the tailings profile.

A summary of the liquefaction assessment results is presented in Table 12.

Table 12: Summary of Liquefaction Assessment Results					
CPTU	**Average Cone Tip Resistance, q_c (MPa)**	**Description of tailings**	**Factor of Safety for liquefaction potential (Case1)**	**Factor of Safety for liquefaction potential (Case 2)**	**Factor of Safety for liquefaction potential (Case 3)**
CPTU01	0.5 to 2.5	Soft to firm silty sand/sandy silt intermittent layers of firm clayey silt/ silty clay	>1.5	Generally >1 with several discrete layers just below <1	>1.5
CPTU02	0.9 to 3.8	Soft to firm silty sand/sandy silt intermittent layers of stiff clayey silt/ silty clay	>1.5	Generally >1 with several discrete layers just below <1	>1.2
CPTU03	2.1 to 4.9	Soft to firm silty sand/sandy silt intermittent layers of stiff clayey silt/ silty clay	>1.5	Generally >1 with several discrete layers just below <1	>1.0
CPTU04	1.1 to 3.5	Soft to firm silty sand/sandy silt intermittent layers of stiff clayey silt/ silty clay	>1.5	Generally >1 with several discrete layers just below <1	>1.0
CPTU05	0.4 to 2.5	Soft to firm silty sand/sandy silt intermittent layers of firm clayey silt/ silty clay	>1.5	Generally >1 with several discrete layers just below <1	>1.5
CPTU06	0.4 to 3.5	Soft to firm silty sand/sandy silt intermittent layers of firm clayey silt/ silty clay	>1.5	Generally >1 with several discrete layers just below <1	>1.3

Based on the results of the liquefaction assessment summarised in Table 12, the tailings material is generally considered to be non-liquefiable for the earthquake loads adopted. Only in the Case 2 'worst case' scenario, was there potential for liquefaction in discrete minor (thin) layers, with the Factor of Safety for liquefaction just below 1. It is important to highlight that for the assessment a worst-case scenario has been considered, with the tailing material fully saturated below surface level. Provided operational practices, particularly regarding water management (i.e. that water pond is located around the water recovery point well away from the perimeter embankments), as described in this TD Design Report, Operations Manual and Annual Surveillance Review, are followed, it is considered the tailings underlying the proposed upstream raise have a low risk of liquefaction (refer to Case 3).

9 MANAGEMENT OF THE TAILINGS DAM

The overall management of the tailings dam was assessed as being of a high standard. However unfortunately the regular sequence of embankment raising has been interrupted and the spillway is currently non-operational due to varying embankment crest levels. To avoid this scenario in Stage 7 works the spillway embankment will be raised last.

Spigotting has been undertaken in an adequate and orderly manner with a relatively even build-up of tailings immediately adjacent to the perimeter embankments. Where steep beaches have developed, the spigots off-take pipes have been extended across the tailings beach to utilise available capacity. The use of drums to support the extended spigot pipes has been reassessed based on recent (2018) EPA comments and it was advised (verbally) that the continued use of drums is appropriate.

There was a small water pond on the dam which assists in reducing possible seepage, the pond was located away from the perimeter embankments. Water was observed in a trench near the main embankment and the trench should be infilled with tailings as soon as practical to displace the water (rain water).

Copies of inspection sheets are included in Appendix B.

There are several pipes that occasionally discharge water into the dam (the return water sump and underground water). These pipes have been extended further out onto the tailings beaches such that water flows to the decant pond.

Another point of note is the correct preparation of the embankments when construction commences will be correct embankment preparation, namely entailing visual inspection of all work areas, removal of any disturbed materials, scarifying and watering.

9.1 Operations Manual

An operations manual has been in use since the tailings dam was commissioned in 2004. A draft operations manual was in use until November 2005. The draft document was reviewed in October 2005 by operational staff and Coffey and was updated to a finalised document to reflect actual site operational procedures. The manual covers general operational considerations as well as inspection forms which are filled out by various staff members, refer to Appendix B. The operations manual also contains an Emergency Action Plan. The operations manual was again reviewed, updated and reissued during 2011. The following provides a summary of the operations manual revisions that have been undertaken since the commissioning of the tailings dam.

- Rev 1 was issued in Draft in 2004.
- Rev 2 was issued in July 2005.
- Rev 3a was issued May 2011 as draft.
- Rev 3b was issued in September 2011 following receipt of client comments.
- Rev 3 entailed an overall review and text revisions as required. In particular, the following changes are noted: Updating to comply with DSC guidelines and Adoption of MOP requirements and in particular water management and environmental sampling.
- Rev 4 reviewed, revised as required, dated May 2016
- Rev 5 reviewed, revised as required, dated June 2018

This document will be reviewed as part of an assessment for compliance to new 2019 government regulations. It is understood a guide is being produced specifically for these plans.

10 DOCUMENTATION REVIEW

10.1 Environmental Protection correspondence

The Resources Regulator conducted an audit during 2019 and an AEMR review meeting was not conducted. The following table (specific to the TSF only) provides findings from the regulator audit and Tritton comments and proposed actions.

Relevant approval	Condition #	Condition description	Compliance status	Comment	Action
DA 41/98	9	The Tailings Storage Facility shall be designed, constructed, operated, monitored, maintained and finally stabilised so as to: (a) be in accordance with the documents referred to in conditions 1(g) and 1(h) of Schedule 2; (b) be otherwise in accordance with the EIS, the supplementary document prepared in response to Government submissions, and the document titled “Nord Australex Nominees/Straits Mining Joint Venture – Tailings Storage Facility Preliminary Design Report”; (c) ensure that water received in the facility is evaporated, retained, or reused and that there is no overflow of tailings water to the environment unless approved by EPA; and (d) ensure that there is no excessive seepage or leakage from the facility, and that any leakage or seepage is managed in accordance with the requirements of EPA and DRE.	Non-compliant	Historically some waste that has been contaminated with sulphide material from the processing of ore material has been placed in the TSF.	Waste is no longer disposed of in the TSF.

Relevant approval	Condition #	Condition description	Compliance status	Comment	Action
DA 41/98	23	Prior to the construction of the tailings dam, and following consultation with the DRE and EPA, the Applicant shall prepare a Management and Monitoring Plan for the Tailings Dams to the satisfaction of the Secretary. The Plan shall be prepared by a suitably qualified person and be submitted to the Department one month prior to the commencement of the works. The Plan shall include but not be limited to:	Non-compliant		Upon the next revision of the TSF manual Tritton will address requirements of this condition, in consultation with DRE and EPA.
DA 41/98	23(i)	A full list of chemicals and reagents and their concentrations to be released into the tailings dams and the expected dilutions of those chemicals and reagents after release;			
DA 41/98	23(ii)	A toxic profile of these chemicals and reagents (i.e. in tailings water);			
DA 41/98	23(iii)	An assessment of expected effects of the chemicals and reagents on the species of concern, particularly threatened species;			
DA 41/98	23(iv)	Ameliorative measures and contingency planning measures to ensure adverse impacts on wildlife are minimised;			
DA 41/98	23(v)	Provisions for on-going monitoring of the chemical and reagent concentrations of the tailings dam and wildlife use of the dam; and			
DA 41/98	23(vi)	The monitoring component of the plan shall also include provision for the monitoring of wildlife usage of the alternative water supply required by Condition 22.			

TSF Embankment Erosion

Erosion and sediment control monitoring conducted during 2019 was primarily concerned with the TSF embankment wall rehabilitation areas. Photo monitoring is the primary method of monitoring given the on-going reshaping of active stockpiles and the limited relief of the site topography. In addition Tritton have established three transect dimension monitoring points, two on the TSF embankment wall and one on an analogue site within the mine lease. Cross sections of each of the monitoring points are provided in Cross Section Graphs 1-3.

To address erosion concerns on the TSF main embankment wall, Tritton in conjunction with its TSF engineers, CMW developed an erosion and sediment control procedure specific to TSF. In 2018 Tritton implemented actions from the procedures which included;

- Construction of intermediate berms at 100m centres to limit the concentration of water flowing over the embankment wall;
- Addition of geotextile and rock protection to windrow break points;
- Installation of jute mesh and coir logs to provide ground cover protection to existing erosion.

Additionally, in response to a lack of revegetation success on the TSF western embankment wall Tritton undertook a second attempt in December 2018 to establish vegetation. Whilst Tritton didn't receive enough rainfall to allow for seed germination, the hydroseeding provided surface ground protection against erosion throughout 2019.

Minimal erosion was recorded over the reporting period however due to a lack of rainfall in 2019 further monitoring is required to determine its effectiveness.

10.2 Environmental Protection Licence 11254

It is understood that there has been no recent changes to the licence conditions. The following EPA document, dated 19 March 2015 was previously reviewed, comments have been made, where considered appropriate, in respect to issues that pertain to the Tailings Dam, namely:

EPA licence 11254, originally dated 6 September 2005 with a variation notice 1100794 dated 2 July 2008 with an anniversary date of 29 July 2010. A notice of variation 1507629 was issued on 19 October 2012, a further notice of variation 1513390, file number LIC07/2380 was issued on 11 April 2013, a copy is attached in Appendix D. The 2013 variation related to condition U1.3. The latest variation notice, 1527789, for EPA licence no. 11254 is dated 19 March 2015.

A copy of the recent Annual Return for Licence 112254 dated August 2019 and is attached in Appendix D. This document provides a summary of monitoring and provides details on non-compliances.

Non compliances included:

- No sampling of monitoring points PZH004, PZH013, PZH022 and PZH023.
- These monitoring points (bores) were not sampled as they were dry.

11 DAMS SAFETY LEGISLATION

11.1 New NSW Dam Safety Act

During 2019, there were changes in NSW dam safety legislation, which included enactment of Dams Safety Act 2015 and new Dams Safety Regulations 2019. The new regulations in respect to dams includes the Tritton tailings dam, TD1.

Aeris Tritton Coper mine has engaged CMW to undertake a review of their current procedures and where necessary update their documentation to comply with any 'gaps' that may now be present in the current documentation. It is planned to have updated requirement submitted to the mine in DRAFT format by end of April 2020 for review and approval.

11.2 DSC2C Form D15 (August 2009) checklist

The 'old' DSC's Form D15 is no longer required under the new act. The 2015 act requires:

The owner of a declared dam is to publish on an annual basis a report demonstrating the owner's compliance with the dams safety standards. Any such report is to be made publicly available at the main office of the owner and on the owner's public website (if any).

This report fulfills this requirement.

- Conclusions are outlined in Section 12 of this report. A surveillance summary is provided in Section 1.1.
- Recommendations are also outlined in Section 13 of this report.
- Dam details are outlined in various sections of this report and on the Figures.
- Consequence assessment covering failure consequences needs to be reviewed utilising the NSW Dam Safety risk criteria.
- The operations manual and procedures will need to be updated to comply with the 2019 regulations .
- Emergency plans – the existing EAP/ERP plan appended to the operations manual need additional details.

12 CONCLUSIONS

There were no observations made in respect to the tailings dam that required urgent attention in that they could affect the short term integrity of the dam, however, several items do need to be actioned as outlined in the recommendations section of this report.

The Tailings Dam (TD1), at the time of the visit and review in February 2019, was being managed adequately with respect to tailings deposition. The following comments are made:

- Records confirm that regular inspections of the dam are being undertaken by mine personnel. Random copies of inspection sheets are included with this report in Appendix B.
- Embankment raising and extensions were being undertaken in a timely manner until water shortages resulted in a suspension of construction activities so as to ensure construction would only be undertaken to comply with the specification and in particular moisture conditioning. The spillway requirement has thus been temporarily compromised until the remaining embankments have been raised.
- The water pond was considered to be of an acceptable size (small to non-existent) a consequence of drought conditions.
- Piezometer water level and water quality information has continued to be regularly monitored and graphed (refer to Appendix B). Piezometer water level and water quality information is submitted as part of Aeris' EPL and AEMR reporting regimes to several regulators. The historic trends have also been submitted to other third parties for TD1 seepage assessments e.g. Environmental Strategies.

- Provided the operations and maintenance manual procedures continue to be followed and the specified freeboard criteria is maintained, Tailings Dam 1 can be safely operated. Care to undertaken Stage 7 construction in a sequential manner and ensure the spillway embankment is raised last.
- The information gathered for the monitoring bores (water levels and water quality) show a variation in both water level changes (falls in piezometers on the main embankment) while water quality results largely remained static with no discernible trends.
- There were no visible signs of seepage.

13 RECOMMENDATIONS

There is one recommendation that requires close monitoring as outlined below. The other following points simply reinforce the ongoing good operational practises the mine undertakes and are not to be construed as a practise that is not undertaken.

- Close monitoring is required should a significant rainfall event is forecast. Based on the drought conditions the southern embankment is lower than the spillway and could be overtopped under a very rare great than PMP rainfall event. Noting if a PMP event was to occur the whole area would be inaccessible due to roads being inundated with several metres of water. The general area would be classed as a 'state of emergency' simply from the PMP rainfall event and not any overtopping that may occur.
- Additional piezometers should be installed in the embankments and the embankment stability should be reviewed based on this additional piezometer monitoring. It is recommended that a minimum of three (3) piezometers be installed at the Stage 5 crest level and aligned with piezometers PZ005, PZ006, PZ007. The reason for this recommendation is that no piezometer associated with the main (highest) embankment has a tip within the deposited tailings that now support each staged upstream embankment raise.
- Several monitoring bores previously had missing or damaged caps. All bores should be regularly inspected, damaged or missing caps should be replaced. The bores that were inspected had caps but instrumentation needs to be well maintained.
- Groundwater data should be assessed at the time of the reading. A trigger rise (fall) value should be adopted such that the information can be reviewed by site personnel or an outside organisation. It is understood that at present, groundwater data is reviewed by internal personnel throughout the year.
- Any rainfall runoff collected behind the western saddle embankment should be monitored, the temporary use of this area as a source of construction water is considered acceptable in the short term. The embankment crest should be monitored (visually) for any signs of distress in the way of cracking or slumping. Of note the mine has placed a berm along the downstream toe to prevent water ponding against the original embankment toe.

14 REFERENCES AND REPORTS

The following provides a summary of standards, references and reports that are applicable to the Tritton Mine Tailings Dam. Some of these documents have been used in the preparation of this surveillance report.

1. ANCOLD (1994). "Guidelines on Dam Safety Management".
2. ANCOLD (2012). "Guidelines on Tailings Dams Planning, Design, Construction, Operation and Closure".
3. ANCOLD (2019). "Guidelines for Design of Dams and Appurtenant Structures for Earthquake".
4. Barnson (2011). "Construction Report Stage 3".
5. Barnson (2015). "Construction Report Stage 4".
6. Barnson (2017). "Construction Report Stage 5".
7. Coffey Geosciences Pty Ltd (2004). DRAFT Operations Manual report titled "Tailings Storage Facility Operations and Maintenance Manual & DSC Emergency Action Plan" dated November 2004.
8. Coffey Geosciences Pty Ltd (2004). Construction Report titled "Stage 1 to RL260.0m Tailings Storage Facility Construction Report Tritton Copper Project", reference PS6253.02-AG-construction report rev 2, dated 17 November 2004.
9. Coffey Geosciences Pty Ltd surveillance reports (2005, 2006). Reference P6926.02-AC-surv1-rev 2 dated 27 June 2006 and MH00100AC-surv2rep, dated June 2007.
10. Coffey Geosciences Pty Ltd (2006). Design Report titled "Stage 2 Design Report Tailings Storage Facility 1, Tritton Resources Limited", reference P6926.03-BB-stage 2 design report, dated 19 July 2006.
11. Coffey Mining Pty Ltd (2007). Design Report titled "Design Report Stage 3 Tailings Storage Facility 1, Tritton Resources Limited", reference MH00100AD-stage 3 design report rev 1, dated March 2007.
12. Coffey Mining Pty Ltd. Numerous Surveillance Reports (2007 to 2016).
13. Coffey Mining Pty Ltd (2010). Design Report titled "Stage 4 Design Report Tailings Storage Dam 1, Straits Tritton Copper Mine", reference MWP00100AN-stage 4 design report rev 1, dated 30 August 2010.
14. Coffey Mining Pty Ltd (2015). Design Report titled "Stage 5 Design Report Tailings Storage Dam 1, Straits Tritton Copper Mine NSW", reference MWP00100AW-Stage 5 Design Report Rev 0, dated 10 August 2015.
15. CMW Geosciences Pty Ltd (2018). "Raising of TD1, Stages 6 and 7 Tritton Mine, NSW DSC Design Report" ref PER2017-0066AB Design Report dated 9 March 2018.
16. CMW Geosciences Pty Ltd (2019). 2018 Calendar Year Surveillance Report.
17. CMW Geosciences Pty Ltd (2018). "TD1 Tailings Excavation Tritton Mines, NSW, Operational Guidelines, dated 6 June 2018.
18. Dams Safety Committee guidelines, proformas and documents.
19. Environmental Earth Sciences (2013). "Conceptual Site Hydrogeological Model for ML1544 Tailings Storage Facility" Tritton Copper Mine, dated 26 March 2013.

20. Environmental Strategies (2013). "Remedial Action Plan Tailings Storage Facility (ML1544)", dated 26 June 2013.

21. Kevin Morgan and Associates (2009). Report titled "Evaluation of Monitoring Data Tailings Impoundment Piezometers Tritton Mine".

22. SMEC report (2008). "Tritton Copper Mine Tailings Storage Facility, Groundwater Investigation, project no. 3001442, dated 4 February 2008.

23. SMEC (2011). "Tritton Copper Mine Tailings Storage Facility – Groundwater Assessment and Management Plan" dated 3 November 2011 rev 2 ref 30011076.

24. Soil & Rock Engineering Pty Ltd (2004). Geotechnical Investigation report titled "Tailings Storage Facility Geotechnical Investigation, Tritton NW of Nyngan, NSW", reference mkd6253_01tsfrep, dated 15 January 2004.

25. Soil & Rock Engineering Pty Ltd (2004). Design Report titled "Design Report Tailings Storage Facility 1 Tritton Copper Project, Revision 1", reference ig6253_01_2003 arep.doc, dated 2 March 2004, rev 1.

26. Tritton Mine. Reports titled "Tailings Storage Facility Operations and Maintenance Manual & DSC Emergency Action Plan" Rev 2, Rev3, Rev3a, Rev 4 various dates.

27. Straits Tritton Mines (Aeris Resources) (2018), document titled "Erosion and Sediment Control Procedures - Tritton Tailings Dam 1 – Management Recommendations".

28. Straits Tritton Mines revised Operations Manual tilted "Tailings Dam 1 Operations and Maintenance Manual & DSC Emergency Action Plans", Tritton Mine Rev 5, dated June 2018.

14.1 Previously reviewed documents

- NSW Department of Panning Tritton Copper Mine DA 41/98 MOD 4: Notice of Modification, Section 96(2) of the Environmental Planning & Assessment Act 1979, dated 19 December 2007.
- Department of Planning Notice of Modification DA41/98 MOD4, dated 21 December 2007.
- Mining Operations Plan Conditions of Development Consent Appendix I, II and III, undated copy.

For and on behalf of
CMW Geosciences Pty Ltd

Ian Grieve
Principal Consultant

For and on behalf of
CMW Geosciences Pty Ltd

Christopher Hogg
Principal Tailings Engineer

Distribution: 1 copy to Aeris Resources (electronic)
Original held by CMW Geosciences Pty Ltd

Tritton Resources Limited

PROJECT LOCATION PLAN

FIGURE 1

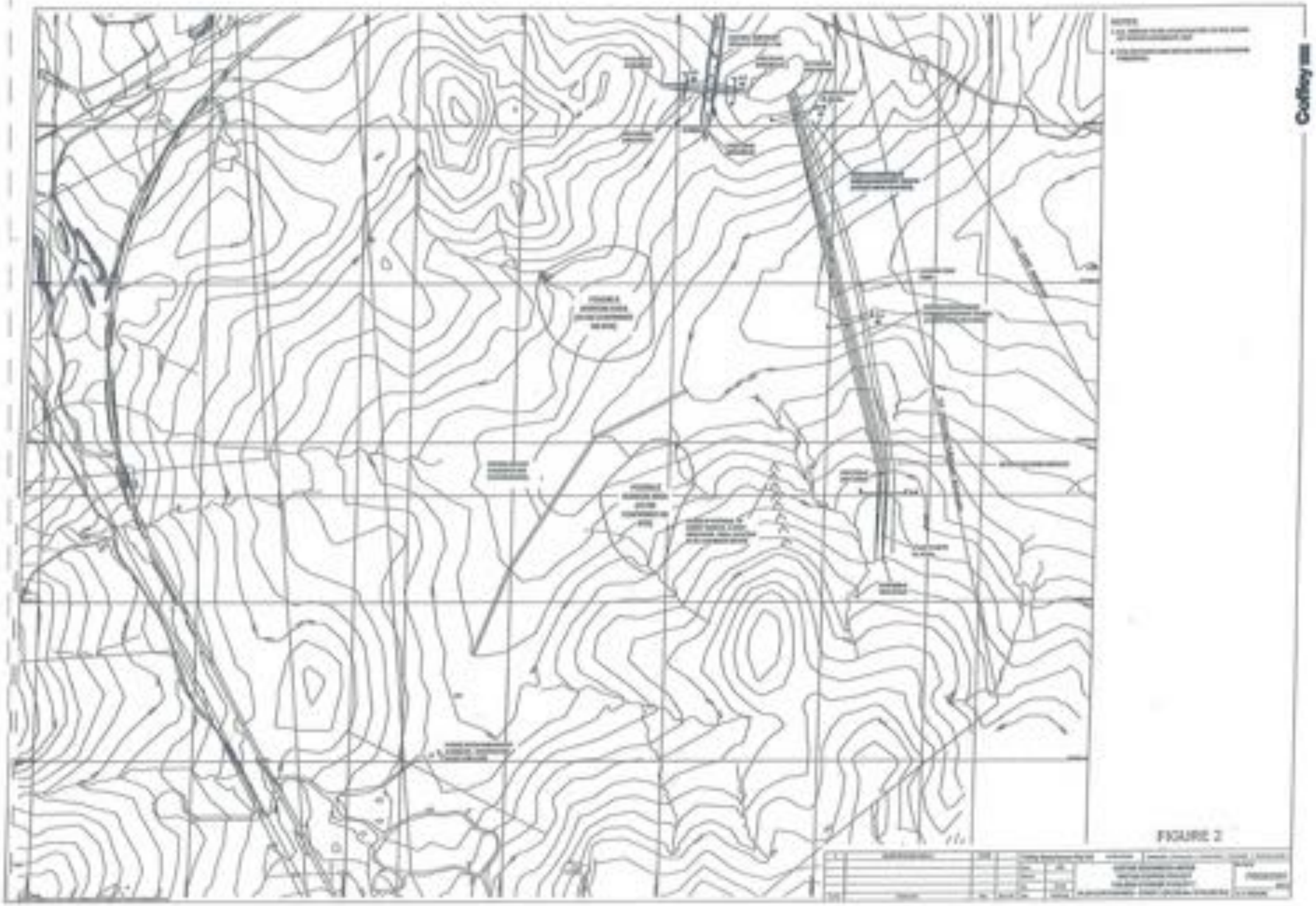
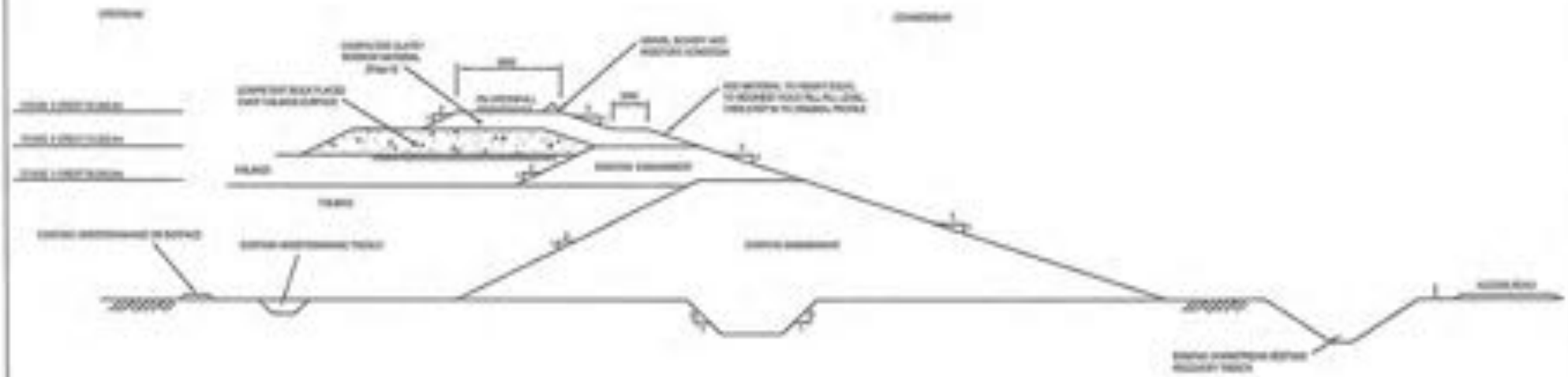
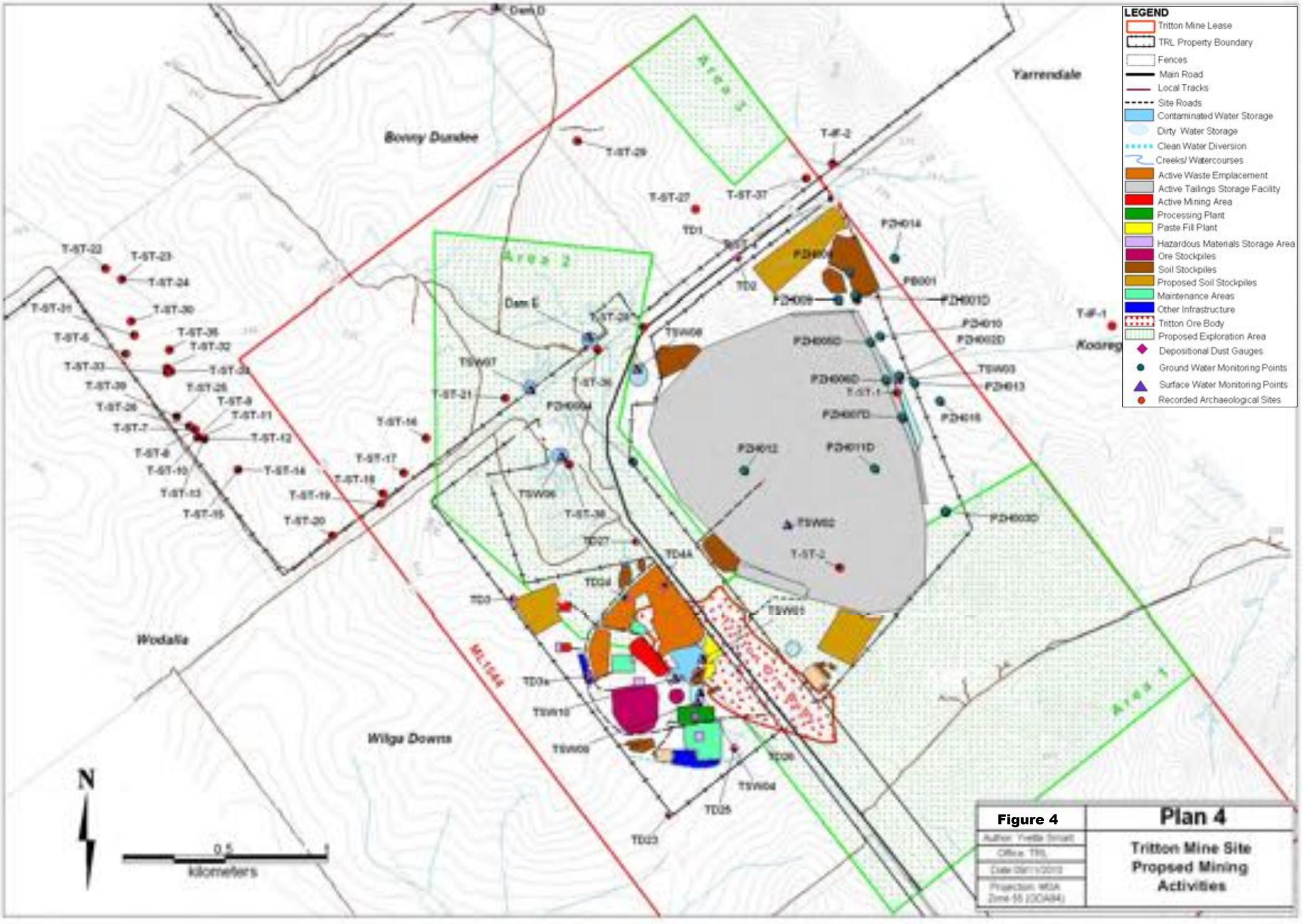


FIGURE 2



coffey mining SPECIALISTS FROM BOARDROOM TO MINE FACE	Drawn	PP	TRITTON RESOURCES LIMITED TRITTON COPPER PROJECT TAILINGS STORAGE FACILITY 1 TYPICAL EMBANKMENT CROSS SECTION
	Approved	IG	
	Date	24/09/07	
	Scale	NTS	

Original Size	A4
Project no:	MH00130AD
Drawing	FIGURE 3


LEGEND
Tritton Mine Lease
TRL Property Boundary
Fences
Main Road
Local Tracks
Site Roads
Contaminated Water Storage
Dirty Water Storage
Clean Water Diversion
Creeks/ Watercourses
Active Waste Emplacement
Active Tailings Storage Facility
Active Mining Area
Processing Plant
Paste Fill Plant
Hazardous Materials Storage Area
Ore Stockpiles
Soil Stockpiles
Proposed Soil Stockpiles
Maintenance Areas
Other Infrastructure
Tritton Ore Body
Proposed Exploration Area
Depositional Dust Gauges
Ground Water Monitoring Points
Surface Water Monitoring Points
Recorded Archaeological Sites
Bovey Dundee
Yarrendale
Wodalla
Wilga Downs
Area 1
Area 2
Area 3
Dam 5
Dam 6
ML1648
N
0 5
kilometers
Figure 4
Plan 4
Tritton Mine Site
Propsed Mining
Activities

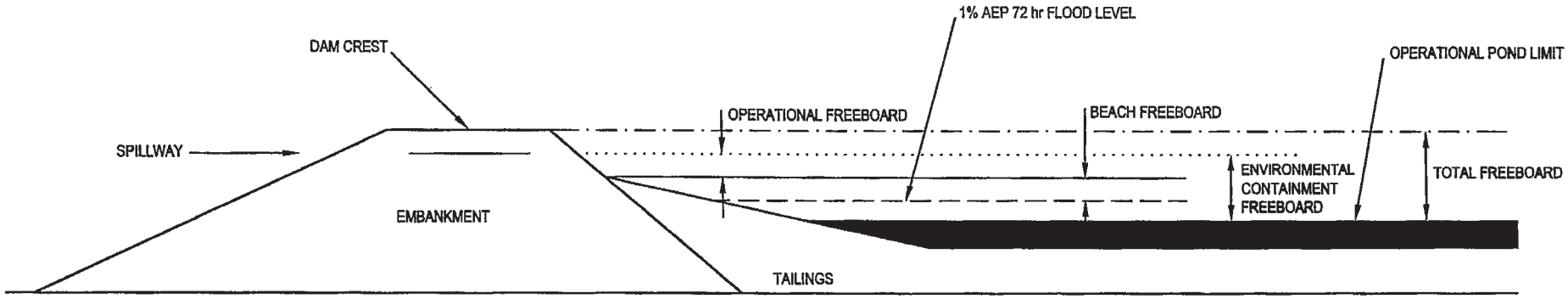
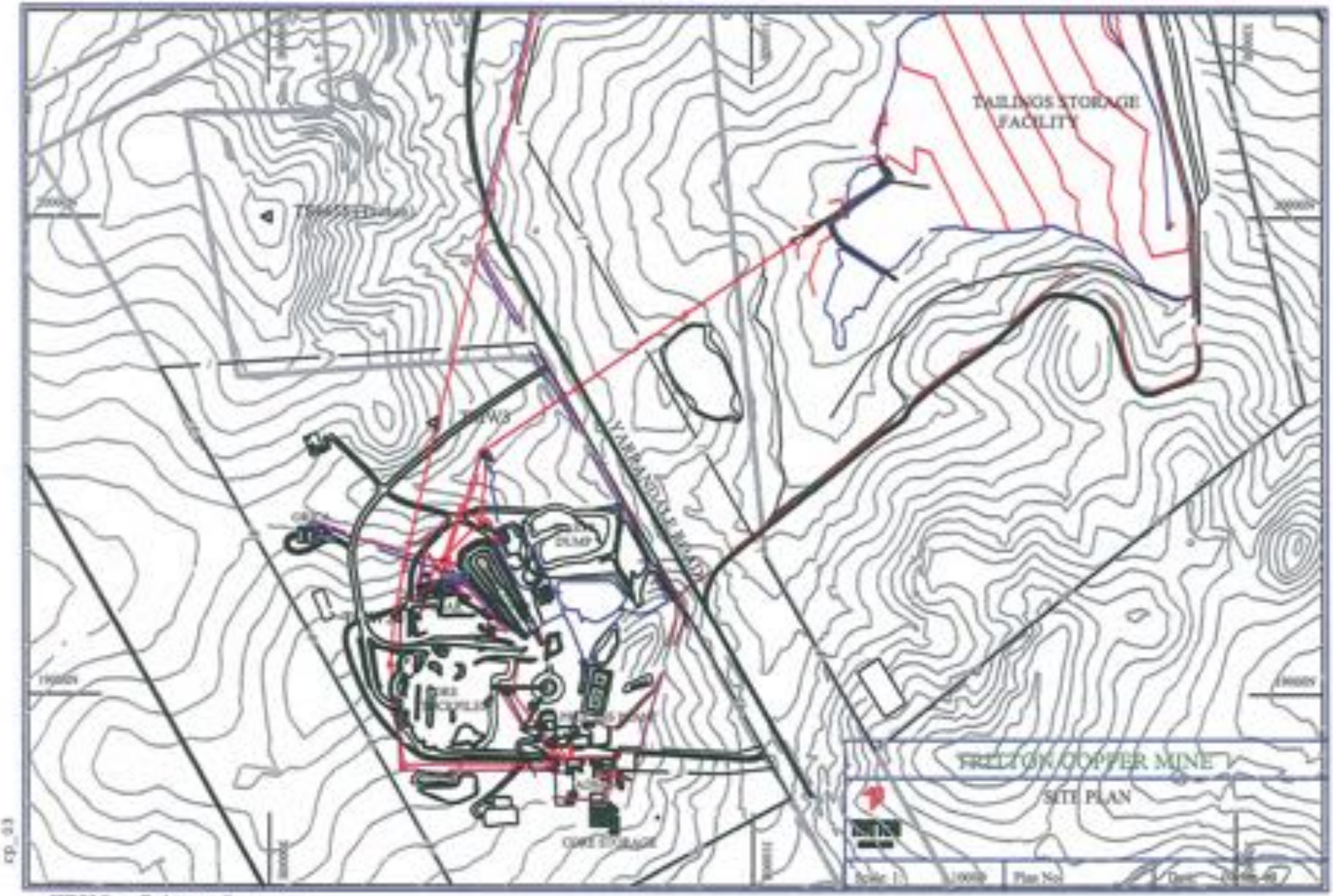


Figure 5

Drawn	MF	coffey	Client:	AERIS TRITTON OPERATIONS	
Approved	IG		Project:	TRITTON COPPER PROJECT TAILINGS DAM 1	
Date	24/03/2017		Title:	FREEBOARD	
Scale	NTS		Project no: PERGE199655	Figure no: 7	Rev:
Original size	A4				

F:\MINE\Projects\Straits Tritton Copper\MINEWPER00100AW_Stage 5 Design and Documentation\9. Figures\MINEWPER100AW Fig 7.pdf



SURPAC - Tritton Resources

Figure 6

NSW GOVERNMENT | Dams Safety

Dam Information Form

1. Name of dam: Tailings Dam 1

2. Location of dam:

   a) Place Name: Tailings Dam 1

   b) CMA/LPMA/Other Topographic Series Map Series Name: _____

   Number: _____

   c1) Geographic Co-ordinates: Latitude: _____ Longitude: _____

   c2) **[OR]** Projected Co-ordinates: Grid: MGA ☐ AMG ☑ Other ☐ (please tick)

   Zone (if known): 54 ☐ 55 ☐ 56 ☐ Other ☐ (please tick)

   Easting 474,500 m Northing 6,527,300 m

   (Note: DSC prefers Geographic data in decimal degrees)

   d) Please attach a copy of the appropriate Topographic Map showing the outline of the area covered by full supply level (indicating Reduced Level) of the dam and any further augmentation.

   e) Approximate Elevation (mAHD): 472 ☑ Crest ☐ FSL

3. River/Stream: No named creeks/streams nearby

4. Owner: Aeris Tritton Mine Phone No.: 02 6838 1100

   Address: Tritton Mine, Yarrandale Road, Hermidale NSW 2837

   Owner's Representative: CMW Geosciences Phone No.: 08 6555 4920

   Address: Unit 3 / 29 Flynn Street Wembley WA 6014

5. Catchment Area: 0.13 km^2

6. Dam Height: 20m m

7. Storage Volume: 12,000 ML

   a) Material stored (attach details): Mine tailings

8. Purpose of Dam: storage of tailings slurry

9. Type of Dam (i.e. concrete gravity, zoned earthfill, etc.): Compacted earth-fill. Starter embankment raised using upstream construction methods.

10. Design Flood Assessment

Inflow Flood Peak: 33 m^3/s Annual Exceedance Probability 0.5 PMF

Method: _____ Date: 2018

a) Spillway Type: Stage spillway: weir at northern embankment. Final: Chan

11a. Sunny Day Consequence Category: (if known) (please tick the appropriate box)

Refer Declared dams consequence category assessment and determination methodology

☐ Extreme ☐ High A ☐ High B ☐ High C ☑ Significant ☐ Low ☐ Very Low

Reasons for assessment (including PLL or PAR): PAR<1, Extent of impact less than 300m. No impact to plant or other mine infrastructure

11b. Flood Consequence Category: (if known) (please tick the appropriate box)

Refer Declared dams consequence category assessment and determination methodology

☐ Extreme ☐ High A ☐ High B ☐ High C ☑ Significant ☐ Low ☐ Very Low

Reasons for assessment (including PLL or PAR): PAR<1 (based on low traffic per Potential for tailings and water flow to Yarrandale Road.

12. Names of and River Distances to Downstream Dams: None within 10km

The following data is required for existing dams only

13. Engineered by: Soil & Rock Engineering (2004), then Coffey. Stages 6 and

14. Constructed by: Wilde Earthmoving (2004). Supervision of stages by Barnsc

15. Year of completion: Stage 2 (2007), Stage 3 (2008-2010), Stage 4 (2013-14)

16. Frequency of surveillance inspections: Annually

17. Date of last inspection: February 2019

18. Was a surveillance report prepared? Yes, dated 1 April 2019

Name:	Chris Hogg
Signature and Date	
Designation (Owner, Manager, Consultant etc)	Consultant

NSW GOVERNMENT | Dams Safety

Declared Dam Owners Address Form

Explanation

Owners of Declared Dams are required to provide this information and to notify Dams Safety NSW of any changes.

The focus of the Dams Safety Act 2015 is on owners of dams taking actions to ensure the safety of their dams. It is therefore important for Dams Safety NSW to have accurate information about declared dam owners. However, in some cases it may be more convenient if Dams Safety NSW contacted, or provided copies of correspondence to, a nominated person. Spaces are provided to enable you to nominate these persons.

The full contact details for the declared dam owner must be provided**. In all cases official correspondence will be addressed to this person**. For small organisations, or dams owned by individuals, this may be all the information required.

There is no need to enter contact details more than once. Simply mark the box "As above" or similar. Relevant section of the Act and regulation are reproduced on the last page of this form.

In relation to the following dam(s): [Write dam names here]

Tailings Dam 1

.....

.....

I advise that the following information is correct to the best of my knowledge

(Signed)..... Date 2018

1. The owner of these dams in terms of S 4(1) of the Dams Safety Act 2015 is:

Organisation/Person Tritton Resources Pty Ltd .....

This organisation:

- ☐ Owns the land on which the dam is located*
- ☑ Manages the dam
- ☐ Maintains the dam
- ☐ Holds the Mining Lease on which the dam is located
- ☐ Operates the dam

Tick all that apply

** If you (or your organisation) do not own the land please advise the name and address of the landowner below*

The following organisations may also be owners of the dam in terms of S 4(1) of the Act:

.....

.....

.....

2. Official correspondence should be addressed to:

Name .....

Organisation Aeris Trittom Mines ..... **

Position General Manager .....

Mail (Line 1) Yarrandale Road .....

(Line 2) .....

(Line 3) .....

City Hermidale ..... State NSW ..... PCode 2831 .....

Ph 02 6838 1100 ..... FAX 02 6838 1101 ..... Mobile .....

Email INSERT .....

** *This will be the same as the owner organisation listed on page 1*

3. The following person may be contacted to discuss the status of the dam, arrange for site visits/audit, or for other informal queries:

Name .....

Organisation Aeris Tritton Mines ..... **

Position Processing Manager .....

Mail (Line 1) Yarrandale Road .....

(Line 2) .....

(Line 3) .....

City Hermidale ..... State NSW ..... PCode 2831 .....

Ph 02 6838 1112 ..... FAX 02 6838 1101 ..... Mobile 0448 688 826 .....

Email jbarrow@tritton.com.au .....

☐ Please mark official correspondence to “Attention of” this person ***

OR

☑ Please provide copies of official correspondence (“cc:”) to this person

*** *You can only tick this box once on this form. Cross check Q3, Q4 and Q5*

4. The following person provides specialist dam safety advice on the dam (is identified as a 'competent person' under section 3 (1) of Regulation) and may be contacted informally if there are technical queries in relation to the dam:

Name .....

Organisation .....

Position .....

Mail (Line 1) .....

(Line 2) .....

(Line 3) .....

City ..... State ..... PCode .....

Ph ..... FAX ..... Mobile .....

Email .....

☐ Please mark official correspondence to "Attention of" this person***

OR

☐ Please provide copies of official correspondence ("cc:") to this person

*** *You can only tick this box once on this form. Cross check Q3, Q4 and Q5*

5. The following person is located at the dam and may be contacted in an emergency situation for advice on the status of the dam (ideally this person would be located close to the dam):

Name Jamie Barrow

Organisation Aeris Tritton Mines

Position Processing Manager

Mail (Line 1) Yarrandale Road

(Line 2) .....

(Line 3) .....

City Hermidale State NSW PCode 2831

Ph 02 6838 1112 FAX 02 6838 1101 Mobile 0448 688 826

Email jbarrow@tritton.com.au

☑ Please mark official correspondence to "Attention of" this person***

OR

☐ Please provide copies of official correspondence ("cc:") to this person

*** *You can only tick this box once on this form. Cross check Q3, Q4 and Q5*

Dams Safety Act 2015

4 (1) ***owner***, in relation to a dam, means any person or public authority who, whether solely or with some other person or public authority, owns, controls, operates, manages or maintains the dam and includes, in relation to a proposed dam, any person or public authority who, whether solely or with some other person or public authority, proposes to build the dam.

Dams Safety Regulation 2019

3(1) ***competent person*** means, for a person exercising a function in relation to a dam, a person who—

(a) has acquired through training, qualification or experience substantial knowledge and skills in dam design and risk analysis in relation to that type of dam, and

(b) is—

(i) registered under a law that provides for the registration of professional engineers, or

(ii) a member (or is qualified to be a member) of Engineers Australia with the status of Chartered Professional Engineer, or

(iii) entered on the National Professional Engineers Register administered by the Institution of Engineers Australia, or

(iv) the holder of professional qualifications in a relevant speciality or is registered in a relevant speciality by an Australian professional organisation.

Appendix A
Photographs A1 to A7

Main embankment batter slope with erosion protection, coir matting.

PZH002D and S suite of bores downstream of main embankment.

Small trees downstream of main embankment, not distressed.

View of downstream sump. Recent rain in toe drains.

Downstream batter slope main embankment and downstream toe drain looking south.

Underdrainage recovery sump still receiving underdrainage flow after 15 years of operation.

Downstream batter slope main embankment and downstream toe drain looking north.

Sump receiving toe drain water southern side and underdrainage inflow.

Northern embankment looking towards spillway area.

Intermediate berm main embankment looking south.

Piping crack northern end of intermediate berm, .

View along spillway channel. Recent rain on embankment.

Main embankment looking south.

Looking south along main embankment crest.

Downstream sump water discharge well out onto tailings beach.

Looking across tailings dam from main embankment showing small decant pond.

Looking east over tailings dam.

Sump downstream of western embankment used for construction purposes.

Extended spigot pipes supported on drums.

Solar panel for pressure drop trigger.

Floating pump south side of causeway.

Looking along decant accessway toward water pond.

Decant water recovery pond.

Looking along decant accessway toward western embankment.

Sump downstream of western embankment.

Stockpile of old tailings for backfill trial (did not proceed).

Small crack in western embankment (yet to be raised).

General view over tailings dam looking north north-west.

Appendix B
Monitoring Information

Tritton GW
6/03/2020

DATE	Arsenic	Barium	Beryllium	Calcium	Cadmium	Chloride	Cobalt	Chromium	Copper	EC µS/cm	Iron	Mercury	Potassium	Magnesium	Manganese	Sodium	Nickel	Lead	pH	Sulphate	Total Dissolved Solids	Vanadium	Zinc
Stock Watering Triggers *	0.5	-	-	1000	0.01	-	1	1	1	6000	N/A	0.002	-	-	N/A	-	1	0.1	6 – 9	1000	4000	-	20
Irrigation Triggers #	2	-	0.5	-	0.05	350	0.1	1	5	6000	10	0.002	-	-	10	230	2	5	6 – 9	-	-	0.5	5
PZH001																							
25/02/2019	0.001	0.012	<0.001	142	0.0001	4380	<0.001	<0.001	0.024	15200	0.26	<0.0001	8	508	0.026	2440	0.002	<0.001	7.77	2330	12000	<0.01	0.035
30/05/2019	0.002	0.016	<0.001	143	0.0001	3850	0.002	<0.001	0.029	15900	0.28	<0.0001	8	547	0.036	2640	0.003	0.002	7.71	2320	10100	<0.01	0.07
23/08/2019	<0.001	0.014	<0.001	146	<0.0001	3930	<0.001	<0.001	0.018	15000	0.08	<0.0001	8	540	0.024	2490	0.003	<0.001	7.23	2110	10200	<0.01	0.03
27/11/2019	0.002	0.016	<0.001	151	0.0004	4220	<0.001	0.001	0.026	15000	<0.05	<0.0001	13	686	0.015	2600	0.034	<0.001	7.37	2240	10200	<0.01	0.062
Average	0.0017	0.0145	<0.001	145.5	0.0002	4095	0.002	0.001	0.0243	15275	0.207	<0.0001	9.25	570.25	0.02525	2542.5	0.0105	0.002	7.52	2250	10625	<0.01	0.0493
PZH002																							
25/02/2019	0.003	0.022	<0.001	158	0.0003	3830	<0.001	0.001	0.024	13700	3.32	<0.0001	12	378	0.084	2220	0.003	<0.001	7.75	1840	9420	<0.01	0.041
9/05/2019	0.002	0.019	<0.001	154	0.0002	3800	<0.001	<0.001	0.008	13800	0.95	<0.0001	11	387	0.048	2230	0.003	<0.001	7.83	1920	8640	<0.01	0.034
26/08/2019	0.001	0.022	<0.001	166	0.0002	3420	<0.001	<0.001	0.01	13400	1.27	<0.0001	12	409	0.057	2340	0.002	<0.001	7.43	1570	8780	<0.01	0.028
27/11/2019	0.001	0.022	<0.001	171	0.0004	3470	<0.001	<0.001	0.011	13500	<0.05	<0.0001	15	456	0.046	2620	0.006	<0.001	7.73	1860	8360	<0.01	0.051
Average	0.0018	0.0213	<0.001	162.3	0.00028	3630	<0.001	0.001	0.01325	13600	1.847	<0.0001	12.5	407.5	0.059	2352.5	0.0035	<0.001	7.685	1798	8800	<0.01	0.039
PZH003																							
25/02/2019	<0.001	0.02	<0.001	232	0.0002	5730	0.01	0.002	0.016	18300	0.91	<0.0001	28	624	0.196	2900	0.015	0.001	7.7	1810	13500	<0.01	0.072
9/05/2019	<0.001	0.02	<0.001	232	0.0004	6030	0.008	0.001	0.016	18400	0.77	<0.0001	28	644	0.206	2900	0.013	<0.001	7.74	2270	12300	<0.01	0.095
26/08/2019	0.001	0.02	<0.001	216	0.0011	5140	0.008	0.003	0.054	18300	0.81	<0.0001	29	650	0.192	2940	0.015	0.002	7.46	1830	12500	<0.01	0.161
27/11/2019	<0.001	0.019	<0.001	251	0.0011	5180	0.005	<0.001	0.036	18500	<0.05	<0.0001	29	658	0.15	3020	0.014	<0.001	7.67	2370	12100	<0.01	0.157
Average	0.001	0.0198	<0.001	232.75	0.0007	5520	0.008	0.002	0.0305	18375	0.83	<0.0001	28.5	644	0.186	2940	0.0143	0.0015	7.64	2070	12600	<0.01	0.121
PZH005																							
25/02/2019	0.002	0.017	<0.001	146	0.0004	5430	0.002	<0.001	0.048	16400	0.06	<0.0001	12	632	0.238	2470	0.039	<0.001	7.6	1390	12100	<0.01	0.077
30/05/2019	0.002	0.017	<0.001	155	0.0005	4750	0.001	0.001	0.034	17300	0.06	<0.0001	12	686	0.019	2670	0.032	<0.001	7.48	1310	10700	<0.01	0.074
26/08/2019	0.003	0.017	<0.001	154	0.0005	4860	0.004	0.002	0.048	16500	0.4	<0.0001	12	652	0.044	2490	0.031	0.004	7.43	1340	11000	<0.01	0.07
27/11/2019	0.001	0.014	<0.001	142	0.0001	5250	<0.001	<0.001	0.02	16300	<0.05	<0.0001	8	563	0.025	2630	0.003	<0.001	7.29	1200	10800	<0.01	0.045
Average	0.002	0.0163	<0.001	149.2500	0.0004	5072.5	0.002333	0.0015	0.0375	16625	0.1733	<0.0001	11	633.25	0.0815	2565	0.0263	0.004	7.45	1310	11150	<0.01	0.0665
PZH006																							
25/02/2019	0.002	0.023	<0.001	138	<0.0001	3090	0.006	0.001	0.005	11500	0.8	<0.0001	7	465	0.194	1650	0.005	0.002	7.36	2310	8320	<0.01	0.012
30/05/2019	0.002	0.024	<0.001	140	<0.0001	2620	0.007	<0.001	0.006	12000	0.45	<0.0001	7	496	0.203	1740	0.005	0.004	7.12	2220	6740	<0.01	0.035
26/08/2019	0.002	0.024	<0.001	139	0.0003	2740	0.007	<0.001	0.007	11000	0.55	<0.0001	7	482	0.212	1650	0.005	0.006	6.96	2290	7700	<0.01	0.018
27/11/2019	0.001	0.024	<0.001	140	0.0002	2680	0.008	<0.001	0.011	11200	<0.05	<0.0001	8	507	0.221	1810	0.008	<0.001	7.27	2130	7610	<0.01	0.037
Average	0.00175	0.02375	<0.001	139.25	0.00025	2782.5	0.007	0.001	0.00725	11425	0.6	<0.0001	7.25	487.5	0.2075	1712.5	0.006	0.004	7.18	2237.5	7593	<0.01	0.0255
PZH007																							
7/03/2019	0.004	0.181	<0.001	123	0.0014	3180	0.02	0.018	0.17	12100	7.88	<0.0001	25	351	0.371	2090	0.072	0.029	7.84	1720	8030	0.02	0.252
25/06/2019	0.002	0.052	<0.001	119	0.0005	4560	0.015	0.002	0.079	16200	0.61	<0.0001	25	570	0.248	3630	0.108	0.012	7.35	2340	10800	<0.01	0.12
24/09/2019	0.004	0.097	<0.001	131	0.0008	3820	0.023	0.003	0.087	15200	1.23	<0.0001	23	445	0.213	2750	0.083	0.006	7.79	2560	10300	<0.01	0.189
19/12/2019	0.001	0.058	<0.001	119	0.0009	4410	0.016	<0.001	0.043	17200	<0.05	<0.0001	24	531	0.259	3370	0.1	<0.001	7.89	2800	10700	<0.01	0.127
Average	0.0028	0.097	<0.001	123	0.0009	3992.5	0.0185	0.0077	0.095	15175	3.24	<0.0001	24.25	474	0.273	2960	0.091	0.0157	7.72	2355	9958	0.02	0.172

DATE	Arsenic	Barium	Beryllium	Calcium	Cadmium	Chloride	Cobalt	Chromium	Copper	EC µS/cm	Iron	Mercury	Potassium	Magnesium	Manganese	Sodium	Nickel	Lead	pH	Sulphate	Total Dissolved Solids	Vanadium	Zinc
Stock Watering Triggers *	0.5	-	-	1000	0.01	-	1	1		6000	N/A	0.002	-	-	N/A	-	1	0.1	6 – 9	1000	4000	-	20
Irrigation Triggers #	2	-	0.5	-	0.05	350	0.1	1		6000	10	0.002	-	-	10	230	2	5	6 – 9	-	-	0.5	5
PZH008																							
7/03/2019	0.011	0.021	<0.001	151	<0.0001	4100	<0.001	<0.001	0.018	14300	0.35	<0.0001	12	522	0.061	2300	0.001	<0.001	7.61	1800	9250	<0.01	0.028
26/06/2019	0.012	0.018	<0.001	148	<0.0001	4220	<0.001	<0.001	0.01	14600	0.12	<0.0001	10	508	0.058	2290	<0.001	<0.001	7.23	1630	9160	<0.01	0.026
9/09/2019	0.01	0.019	<0.001	146	<0.0001	4160	<0.001	<0.001	0.01	14300	0.09	<0.0001	9	542	0.053	2500	<0.001	<0.001	7.46	1740	10600	<0.01	0.024
19/12/2019	0.009	0.022	<0.001	157	0.0006	3950	0.002	<0.001	0.015	15100	<0.05	<0.0001	11	536	0.049	2450	0.002	<0.001	7.76	1730	7930	<0.01	0.037
Average	0.0105	0.02	<0.001	150.5	0.0006	4108	0.002	<0.001	0.013	14575	0.187	<0.0001	10.5	527	0.055	2385	0.0015	<0.001	7.52	1725	9235	<0.01	0.029
PZH009																							
7/03/2019	<0.001	0.052	<0.001	159	0.0011	5350	0.003	0.002	0.047	17900	0.46	<0.0001	20	619	0.106	2970	0.016	<0.001	7.72	2320	12000	<0.01	0.089
26/06/2019	<0.001	0.047	<0.001	172	0.001	5710	0.004	<0.001	0.04	18400	0.11	<0.0001	16	606	0.257	3120	0.016	<0.001	7.35	2180	12200	<0.01	0.077
9/09/2019	<0.001	0.058	<0.001	168	0.001	5550	0.009	<0.001	0.035	18300	0.21	<0.0001	16	644	0.265	3320	0.02	<0.001	7.53	2100	14400	<0.01	0.106

Tritton GW
6/03/2020

DATE	Arsenic	Barium	Beryllium	Calcium	Cadmium	Chloride	Cobalt	Chromium	Copper	EC µS/cm	Iron	Mercury	Potassium	Magnesium	Manganese	Sodium	Nickel	Lead	pH	Sulphate	Total Dissolved Solids	Vanadium	Zinc
Stock Watering Triggers *	0.5	-	-	1000	0.01	-	1	1	1	6000	N/A	0.002	-	-	N/A	-	1	0.1	6 – 9	1000	4000	-	20
Irrigation Triggers #	2	-	0.5	-	0.05	350	0.1	1	5	6000	10	0.002	-	-	10	230	2	5	6 – 9	-	-	0.5	5
19/12/2019	<0.001	0.053	<0.001	179	0.0012	5100	0.008	0.021	0.03	19300	0.15	<0.0001	18	637	0.261	3280	0.016	<0.001	7.88	2280	11800	<0.01	0.087
Average	<0.001	0.053	<0.001	169.5	0.0011	5427.5	0.006	0.012	0.038	18475	0.23	<0.0001	17.5	626.5	0.222	3173	0.017	<0.001	7.62	2220	12600	<0.01	0.090
PZH014																							
6/03/2019	0.001	0.006	<0.001	178	0.0002	4680	<0.001	0.001	0.008	15500	0.17	<0.0001	16	584	0.003	2470	0.004	<0.001	7.46	1800	10200	<0.01	0.014
17/06/2019	<0.001	0.006	<0.001	186	0.0002	4450	<0.001	0.001	0.003	12700	0.05	<0.0001	13	563	0.005	2590	0.002	<0.001	7.42	1590	10500	<0.01	0.01
9/09/2019	<0.001	0.006	<0.001	175	0.0002	4830	<0.001	0.001	0.002	15700	0.06	<0.0001	13	602	<0.001	2740	0.003	<0.001	7.4	1600	9910	<0.01	0.007
13/12/2019	<0.001	0.009	<0.001	189	0.0004	4610	<0.001	0.001	0.012	13700	0.08	<0.0001	15	570	0.011	2520	0.003	<0.001	7.3	1710	7935	<0.01	0.048
Average	0.001	0.00675	<0.001	182.0	0.0003	4643	<0.001	0.001	0.006	14400	0.09	<0.0001	14.25	579.75	0.004	2580	0.003	<0.001	7.40	1675	10203	<0.01	0.020
PZH015																							
6/03/2019	<0.001	0.013	<0.001	185	0.0004	5290	<0.001	0.084	0.03	18100	0.28	<0.0001	30	647	0.01	2990	0.168	<0.001	7.6	2580	12500	<0.01	0.038
17/06/2019	<0.001	0.012	<0.001	200	0.0003	5050	<0.001	0.087	0.029	14400	0.3	<0.0001	24	632	0.01	3160	0.122	<0.001	7.48	2420	12600	<0.01	0.032
9/09/2019	<0.001	0.014	<0.001	201	0.0003	5520	<0.001	0.007	0.019	18600	<0.05	<0.0001	26	661	0.002	3360	0.107	<0.001	7.49	2420	14600	<0.01	0.029
13/12/2019	<0.001	0.013	<0.001	217	0.0003	5120	0.002	0.008	0.014	16700	0.19	<0.0001	26	676	0.04	3330	0.009	0.004	7.34	2710	12900	<0.01	0.025
Average	<0.001	0.013	<0.001	200.8	0.0003	5245	<0.001	0.0465	0.023	16950	0.29	<0.0001	26.5	654.0	0.016	3210	0.102	<0.001	7.48	2533	13150	<0.01	0.031
PZH017																							
7/01/2019	<0.001	0.033	<0.001	101	<0.0001	3440	<0.001	<0.001	0.002	12300	0.63	<0.0001	12	286	0.096	2150	<0.001	<0.001	8.12	651	7390	<0.01	0.014
30/04/2019	<0.001	0.03	<0.001	115	0.0001	3570	0.012	<0.001	0.031	10400	1.38	<0.0001	14	323	0.117	2390	0.008	<0.001	8.1	1150	7300	<0.01	0.111
23/07/2019	<0.001	0.032	<0.001	101	<0.0001	3530	<0.001	<0.001	0.001	13800	1	<0.0001	12	278	0.086	2090	<0.001	<0.001	7.77	675	7260	<0.01	0.011
8/10/2019	<0.001	0.031	<0.001	98	0.0003	3480	<0.001	<0.001	0.012	12800	<0.05	<0.0001	13	264	0.087	1980	0.008	<0.001	8.24	776	8840	<0.01	0.026
Average	<0.001	0.032	<0.001	103.8	0.0002	3505	0.012	<0.001	0.0115	12325	1.00	<0.0001	12.75	287.75	0.0965	2152.5	0.008	<0.001	8.06	813	7698	<0.01	0.041

DATE	Arsenic	Barium	Beryllium	Calcium	Cadmium	Chloride	Cobalt	Chromium	Copper	EC µS/cm	Iron	Mercury	Potassium	Magnesium	Manganese	Sodium	Nickel	Lead	pH	Sulphate	Total Dissolved Solids	Vanadium	Zinc
Stock Watering Triggers *	0.5	-	-	1000	0.01	-	1	1		6000	N/A	0.002	-	-	N/A	-	1	0.1	6 – 9	1000	4000	-	20
Irrigation Triggers #	2	-	0.5	-	0.05	350	0.1	1		6000	10	0.002	-	-	10	230	2	5	6 – 9	-	-	0.5	5
PZH018																							
7/01/2019	<0.001	0.029	<0.001	292	0.0001	8280	0.002	0.002	0.01	25100	0.66	<0.0001	27	867	0.27	4560	0.002	<0.001	7.83	2530	19000	<0.01	0.028
29/04/2019	<0.010	0.033	<0.010	314	<0.0010	8150	<0.010	<0.010	0.012	20600	0.32	<0.0001	29	849	0.277	4490	<0.010	<0.010	8.01	3200	16800	<0.10	<0.050
11/07/2019	0.002	0.028	<0.001	298	0.0001	7900	0.001	0.003	0.002	15900	0.33	<0.0001	31	839	0.259	4380	0.004	<0.001	7.56	2970	17300	<0.01	0.024
4/10/2019	0.002	0.003	<0.001	252	0.0005	8510	<0.001	<0.001	0.022	29200	<0.05	<0.0001	30	876	0.013	4770	0.005	<0.001	8.15	3920	20200	<0.01	0.065
Average	0.002	0.02325	<0.001	289	0.0002	8210	0.0015	0.0025	0.0115	22700	0.436667	<0.0001	29.25	857.75	0.20475	4550	0.0037	<0.001	7.8875	3155	18325	<0.01	0.039
PZH019																							
7/01/2019	0.006	0.024	<0.001	77	<0.0001	3260	0.004	<0.001	0.005	11900	0.23	<0.0001	8	293	0.068	1960	0.025	<0.001	8.42	643	7110	<0.01	0.026
29/04/2019	0.006	0.02	<0.001	84	<0.0001	3290	0.006	<0.001	0.009	4230	0.17	<0.0001	9	335	0.047	2160	0.033	<0.001	3.99	875	6500	<0.01	0.029
9/05/2019	0.006	0.022	<0.001	76	<0.0001	3730	0.003	<0.001	0.002	11600	0.25	<0.0001	8	281	0.046	1850	0.019	<0.001	7.62	847	6580	<0.01	0.019
11/07/2019	0.004	0.024	<0.001	77	0.0001	3100	0.005	<0.001	0.012	8570	0.08	<0.0001	9	283	0.061	1900	0.018	<0.001	7.39	886	6100	<0.01	0.026
8/10/2019	0.003	0.026	<0.001	74	<0.0001	3280	0.002	<0.001	0.006	11800	0.08	<0.0001	9	265	0.053	1760	0.019	<0.001	8.33	721	9300	<0.01	0.057
Average	0.005	0.023	<0.001	77.6	<0.0001	3332	0.004	<0.001	0.0068	9620	0.162	<0.0001	8.6	291.4	0.055	1926	0.0228	<0.001	7.15	794.4	7118	<0.01	0.0314
PZH020																							
7/01/2019	<0.001	0.012	<0.001	110	0.0002	3690	<0.001	<0.001	0.02	13500	0.08	<0.0001	34	321	0.096	2400	0.003	<0.001	8.2	920	5590	<0.01	0.064
30/04/2019	<0.001	0.032	<0.001	110	0.0001	3550	0.002	<0.001	0.014	10500	1.58	<0.0001	14	322	0.096	2400	0.004	<0.001	8.19	1240	7410	<0.01	0.117
23/07/2019	<0.001	0.012	<0.001	109	0.0004	3840	0.002	<0.001	0.034	15000	0.24	<0.0001	34	316	0.042	2320	<0.001	<0.001	7.64	1400	8050	<0.01	0.101
8/10/2019	<0.001	0.02	<0.001	105	0.0006	3880	0.002	<0.001	0.017	14000	0.11	<0.0001	32	295	0.089	2200	0.005	<0.001	8.24	856	11100	<0.01	0.108
Average	<0.001	0.019	<0.001	109	0.0003	3740	0.002	<0.001	0.021	13250	0.50	<0.0001	28.5	314	0.081	2330	0.004	<0.001	8.0675	1104	8038	<0.01	0.098
PZH021																							
7/01/2019	0.001	0.066	<0.001	234	<0.0001	4770	<0.001	<0.001	0.007	16300	7.5	<0.0001	13	582	1.27	2610	<0.001	<0.001	7.84	1540	11700	<0.01	0.024
29/04/2019	0.001	0.066	<0.001	246	<0.0001	4220	<0.001	<0.001	0.002	13800	6.82	<0.0001	14	590	1.26	2580	<0.001	<0.001	8.03	1830	10700	<0.01	0.008
11/07/2019	0.002	0.069	<0.001	231	0.0001	4700	0.002	<0.001	0.012	10800	6.22	<0.0001	15	576	1.25	2560	0.001	<0.001	7.41	1870	10200	<0.01	0.016
11/10/2019	0.001	0.056	<0.001	220	0.0005	4940	0.003	<0.001	0.006	17200	4.69	<0.0001	14	519	1.11	2250	0.002	<0.001	8.08	1730	10200	<0.01	0.04
Average	0.00125	0.06425	<0.001	232.75	0.0003	4657.5	0.0025	<0.001	0.00675	14525	6.3075	<0.0001	14	567	1.2225	2500	0.0015	<0.001	7.84	1742.5	10700	<0.01	0.022

Tritton GW
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DATE	Arsenic	Barium	Beryllium	Calcium	Cadmium	Chloride	Cobalt	Chromium	Copper	EC µS/cm	Iron	Mercury	Potassium	Magnesium	Manganese	Sodium	Nickel	Lead	pH	Sulphate	Total Dissolved Solids	Vanadium	Zinc
Stock Watering Triggers *	0.5	-	-	1000	0.01	-	1	1	1	6000	N/A	0.002	-	-	N/A	-	1	0.1	6 – 9	1000	4000	-	20
Irrigation Triggers #	2	-	0.5	-	0.05	350	0.1	1	5	6000	10	0.002	-	-	10	230	2	5	6 – 9	-	-	0.5	5
									0.001	4230								0.001	3.99	643	4000		
									0.17	29200								5	8.42	3920	20200		

Tritton GW
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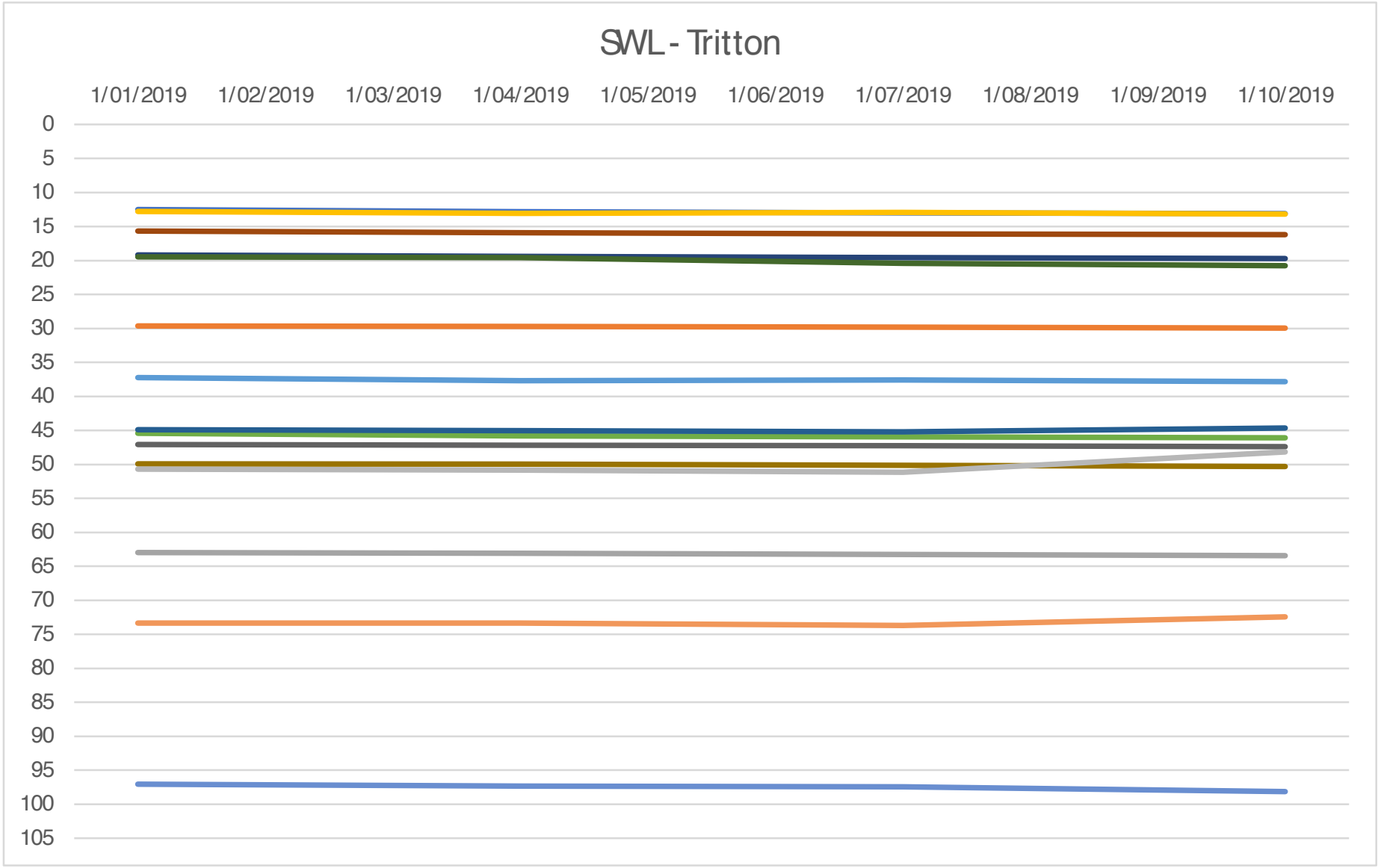
Variable	Unit	Site	Sample Point	Date	Data Point
SWL	m	TRL	PZH001	25/02/2019	12.51
SWL	m	TRL	PZH001	30/05/2019	12.82
SWL	m	TRL	PZH001	23/08/2019	12.97
SWL	m	TRL	PZH001	27/11/2019	13.09
SWL	m	TRL	PZH002	25/02/2019	29.62
SWL	m	TRL	PZH002	9/05/2019	29.71
SWL	m	TRL	PZH002	26/08/2019	29.81
SWL	m	TRL	PZH002	27/11/2019	29.93
SWL	m	TRL	PZH003	25/02/2019	62.96
SWL	m	TRL	PZH003	9/05/2019	63.07
SWL	m	TRL	PZH003	26/08/2019	63.22
SWL	m	TRL	PZH003	27/11/2019	63.41
SWL	m	TRL	PZH005	25/02/2019	12.78
SWL	m	TRL	PZH005	26/08/2019	13.06
SWL	m	TRL	PZH005	30/05/2019	12.95
SWL	m	TRL	PZH005	27/11/2019	13.18
SWL	m	TRL	PZH006	25/02/2019	37.24
SWL	m	TRL	PZH006	26/08/2019	37.68
SWL	m	TRL	PZH006	30/05/2019	37.56
SWL	m	TRL	PZH006	27/11/2019	37.81
SWL	m	TRL	PZH007	7/03/2019	45.43
SWL	m	TRL	PZH007	25/06/2019	45.82
SWL	m	TRL	PZH007	24/09/2019	45.96
SWL	m	TRL	PZH007	19/12/2019	46.09
SWL	m	TRL	PZH008	7/03/2019	19.18
SWL	m	TRL	PZH008	25/06/2019	19.41
SWL	m	TRL	PZH008	9/09/2019	19.59
SWL	m	TRL	PZH008	19/12/2019	19.71
SWL	m	TRL	PZH009	7/03/2019	15.68
SWL	m	TRL	PZH009	25/06/2019	15.91
SWL	m	TRL	PZH009	9/09/2019	16.06
SWL	m	TRL	PZH009	19/12/2019	16.19
SWL	m	TRL	PZH014	6/03/2019	47.06
SWL	m	TRL	PZH014	17/06/2019	47.16
SWL	m	TRL	PZH014	9/09/2019	47.27
SWL	m	TRL	PZH014	10/12/2019	47.39
SWL	m	TRL	PZH015	6/03/2019	49.93
SWL	m	TRL	PZH015	17/06/2019	49.98
SWL	m	TRL	PZH015	9/09/2019	50.16
SWL	m	TRL	PZH015	10/12/2019	50.31
SWL	m	TRL	PZH017	7/01/2019	44.91
SWL	m	TRL	PZH017	30/04/2019	45.04
SWL	m	TRL	PZH017	23/07/2019	45.22
SWL	m	TRL	PZH017	8/10/2019	44.64
SWL	m	TRL	PZH018	7/01/2019	19.45
SWL	m	TRL	PZH018	29/04/2019	19.56
SWL	m	TRL	PZH018	11/07/2019	20.42
SWL	m	TRL	PZH018	4/10/2019	20.75
SWL	m	TRL	PZH019	7/01/2019	97.04

Tritton GW
6/03/2020

Variable	Unit	Site	Sample Point	Date	Data Point
SWL	m	TRL	PZH019	29/04/2019	97.34
SWL	m	TRL	PZH019	9/05/2019	97.41
SWL	m	TRL	PZH019	11/07/2019	98.12
SWL	m	TRL	PZH019	8/10/2019	95.21
SWL	m	TRL	PZH020	7/01/2019	73.31
SWL	m	TRL	PZH020	30/04/2019	73.32
SWL	m	TRL	PZH020	23/07/2019	73.71
SWL	m	TRL	PZH020	8/10/2019	72.44
SWL	m	TRL	PZH021	7/01/2019	50.71
SWL	m	TRL	PZH021	29/04/2019	50.82
SWL	m	TRL	PZH021	11/07/2019	51.14
SWL	m	TRL	PZH021	11/10/2019	48.16

Tritton GW
6/03/2020



Appendix C
Stability Analyses

GeoLogismiki
Geotechnical Engineers
Merarhias 56
http://www.geologismiki.gr

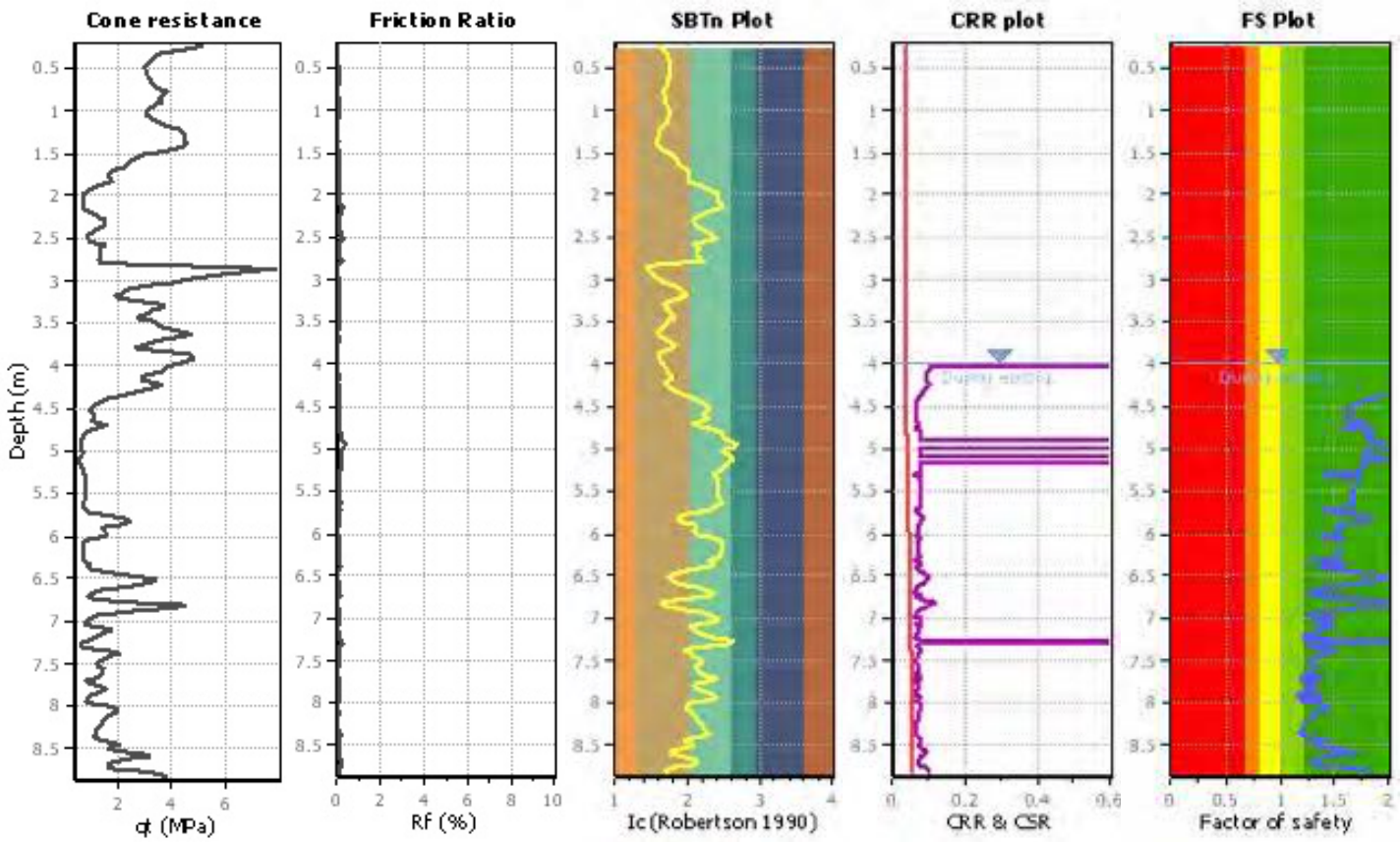
LIQUEFACTION ANALYSIS REPORT

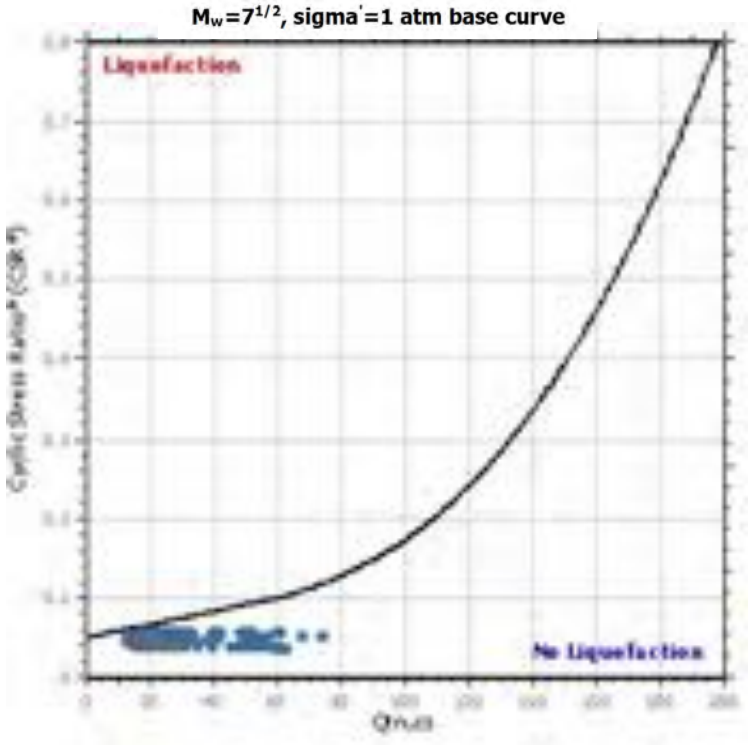
Project title : **Location :**

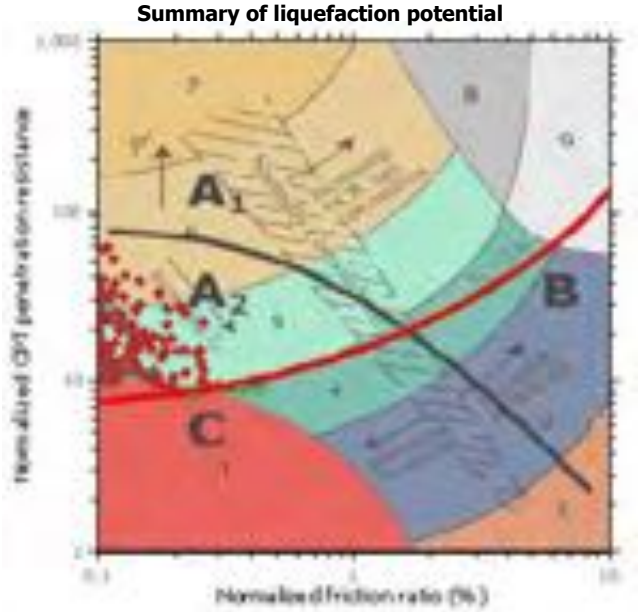
CPT file : AR0002M3

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.10	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

GeoLogismiki
Geotechnical Engineers
Merarhias 56
http://www.geologismiki.gr

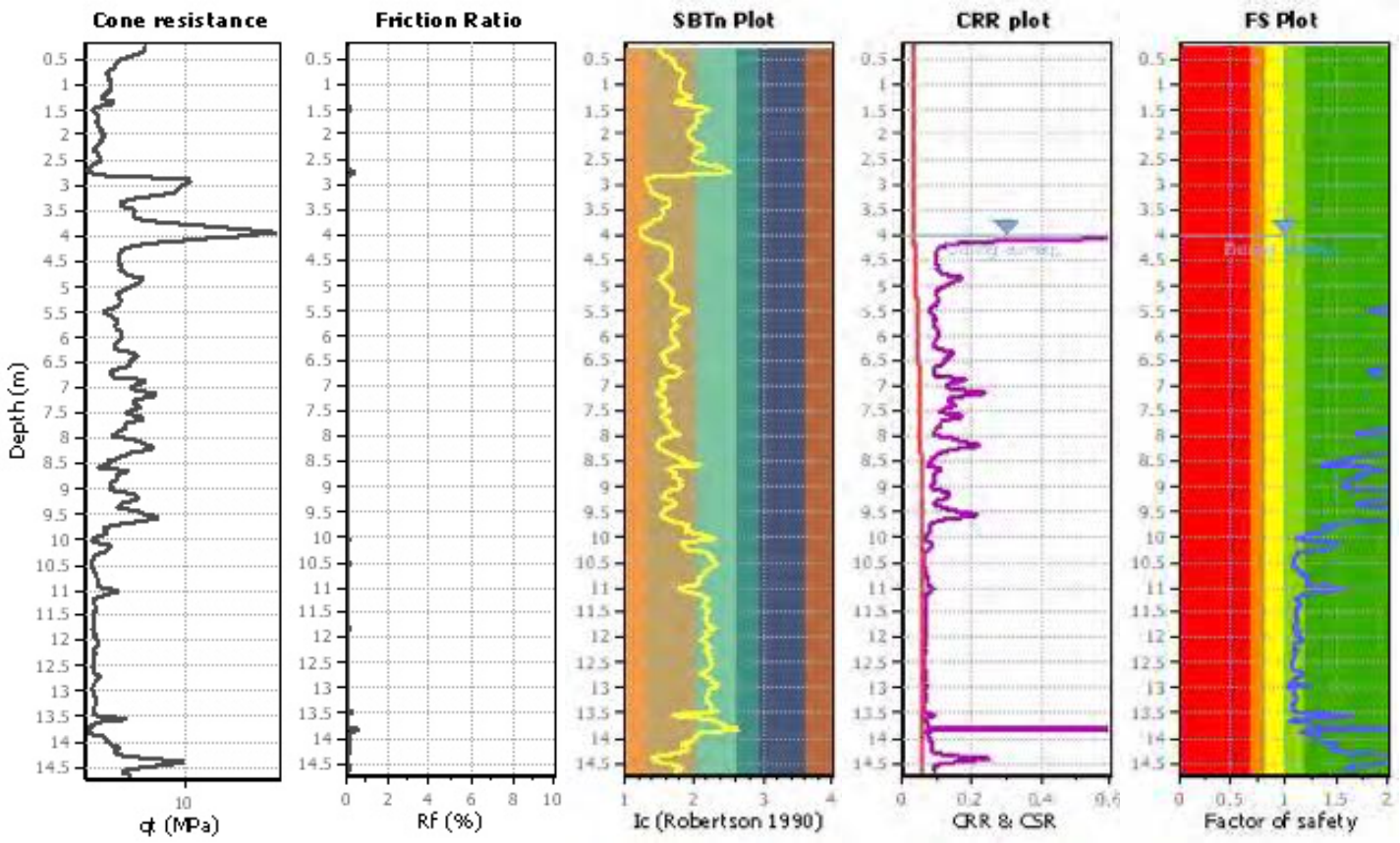
LIQUEFACTION ANALYSIS REPORT

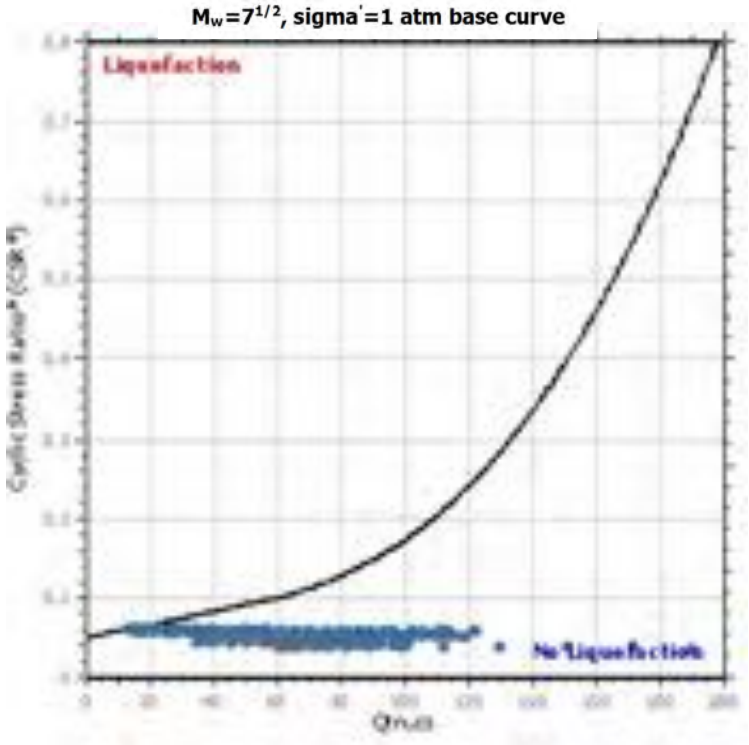
Project title : **Location :**

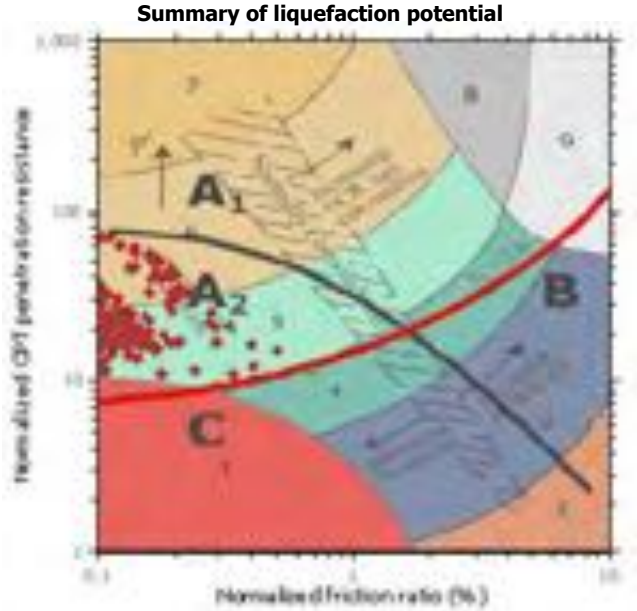
CPT file : AR0003M3

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.10	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

GeoLogismiki
Geotechnical Engineers
Merarhias 56
http://www.geologismiki.gr

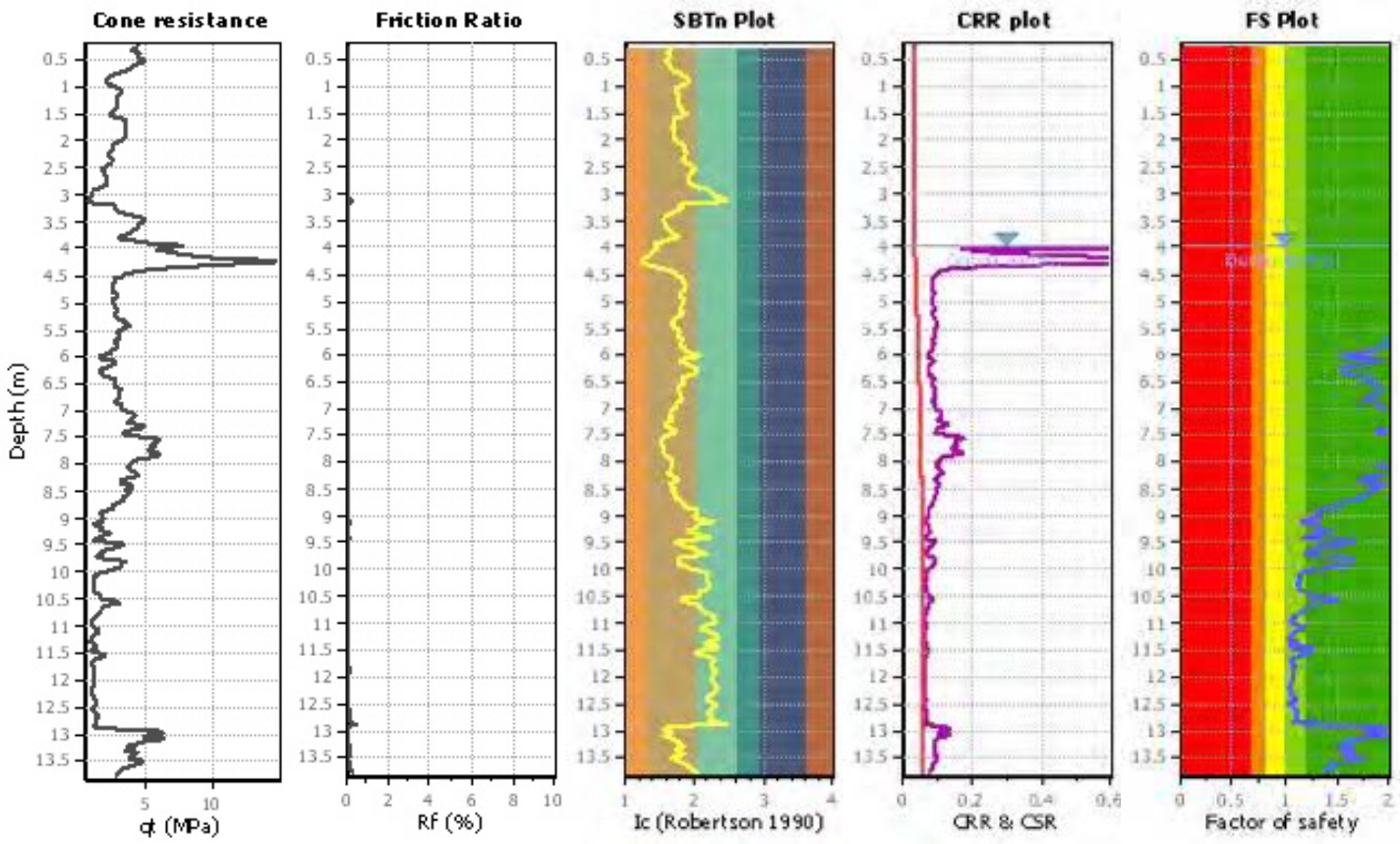
LIQUEFACTION ANALYSIS REPORT

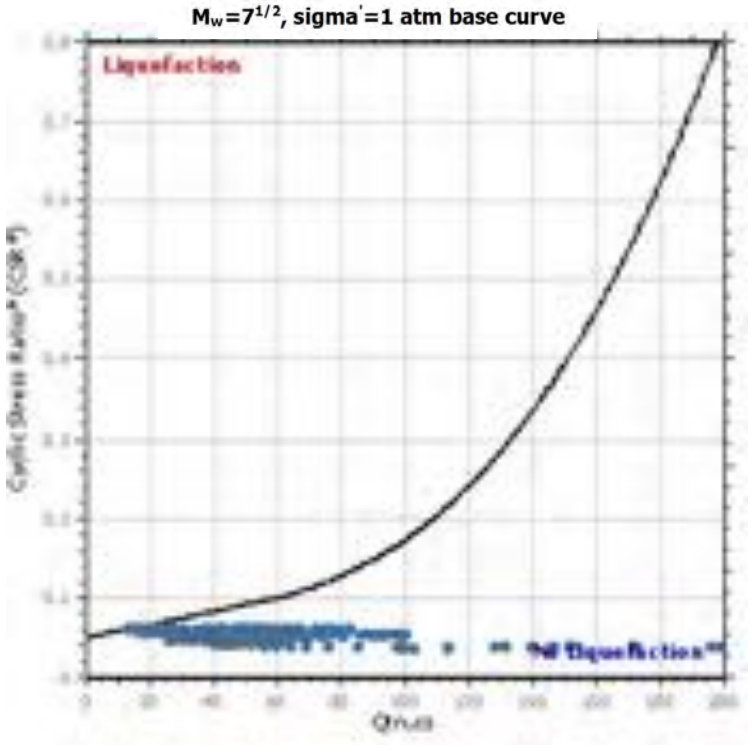
Project title : **Location :**

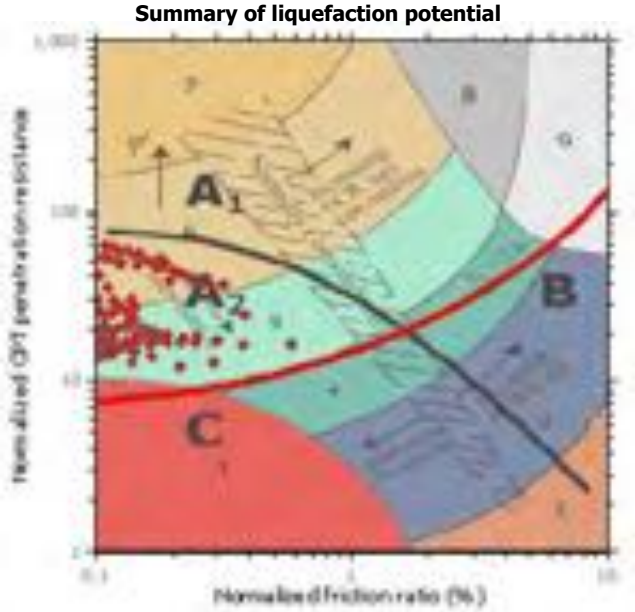
CPT file : AR0004M3

Input parameters and analysis data

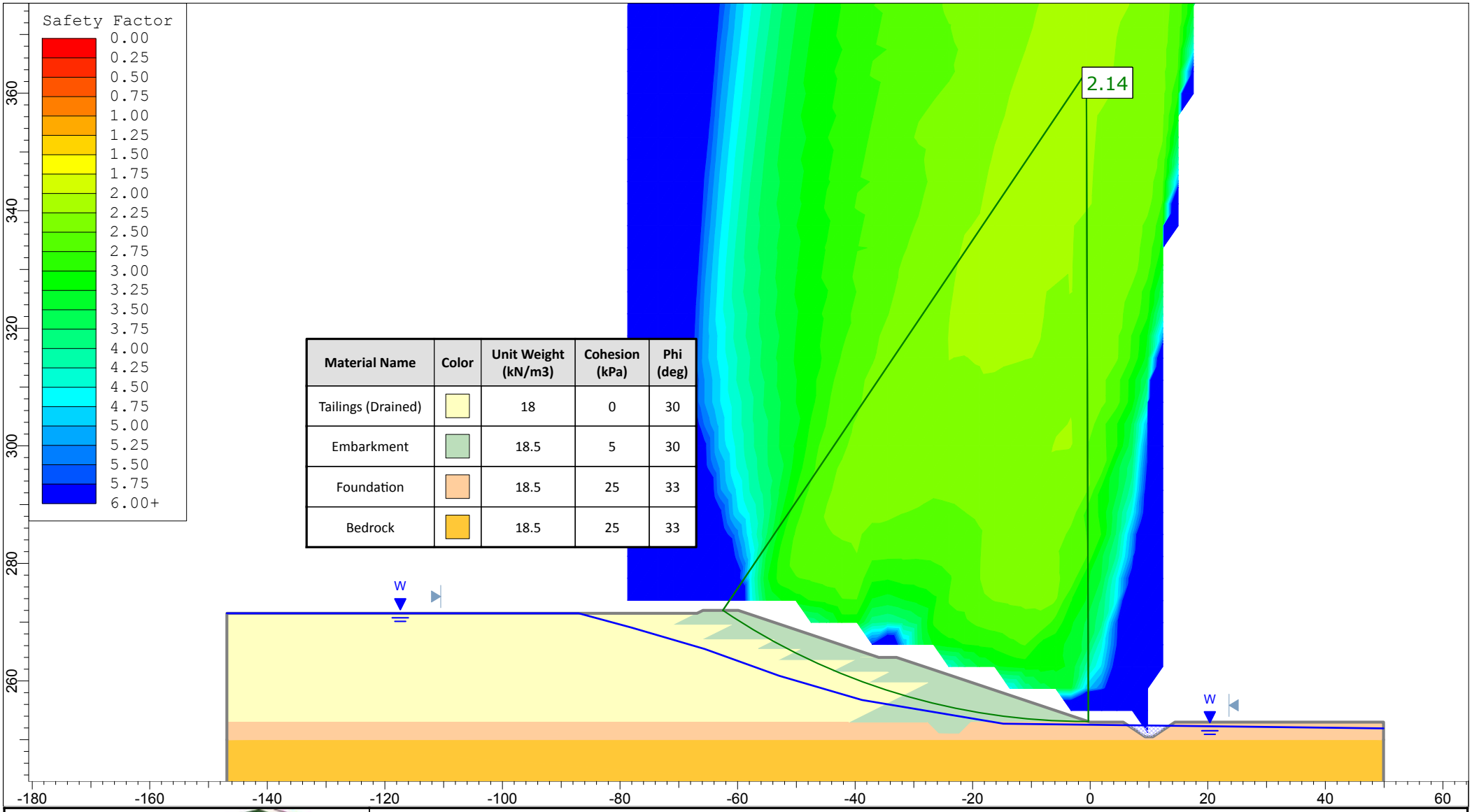
Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	4.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.10	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

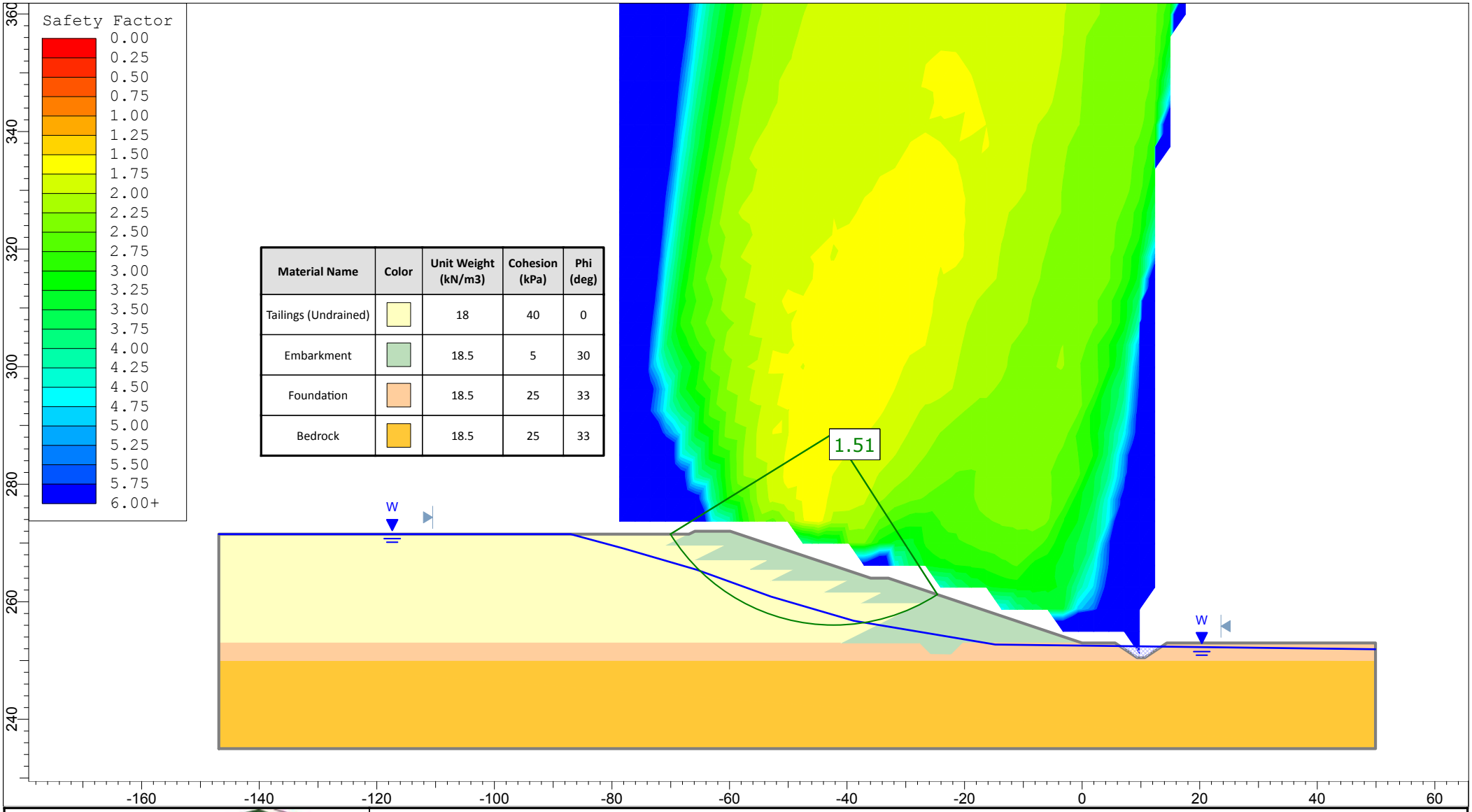


Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)
Tailings (Drained)		18	0	30
Embarkment		18.5	5	30
Foundation		18.5	25	33
Bedrock		18.5	25	33

CMW Geosciences

SLIDEINTERPRET 7.026

Project	Tritton Copper Tailings Dam				
Analysis Description	Main Embarkment Crest RL272 Drained Stability Analysis				
Drawn By	MS	*Scale*	1:900	*Company*	Aeris Tritton Operations
Date	21/11/2017, 12:26:24 PM			*File Name*	Tritton Copper Tailings (Drained).slim



Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)
Tailings (Undrained)		18	40	0
Embarkment		18.5	5	30
Foundation		18.5	25	33
Bedrock		18.5	25	33

CMW Geosciences

SLIDEINTERPRET 7.026

Project	Tritton Copper Tailings Dam				
Analysis Description	Main Embarkment Crest RL272 Undrained Stability Analysis				
Drawn By	MS	*Scale*	1:900	*Company*	Aeris Tritton Operations
Date	21/11/2017, 12:26:24 PM			*File Name*	Tritton Copper Tailings (Undrained2).slim

Appendix D
Design Information and Correspondence

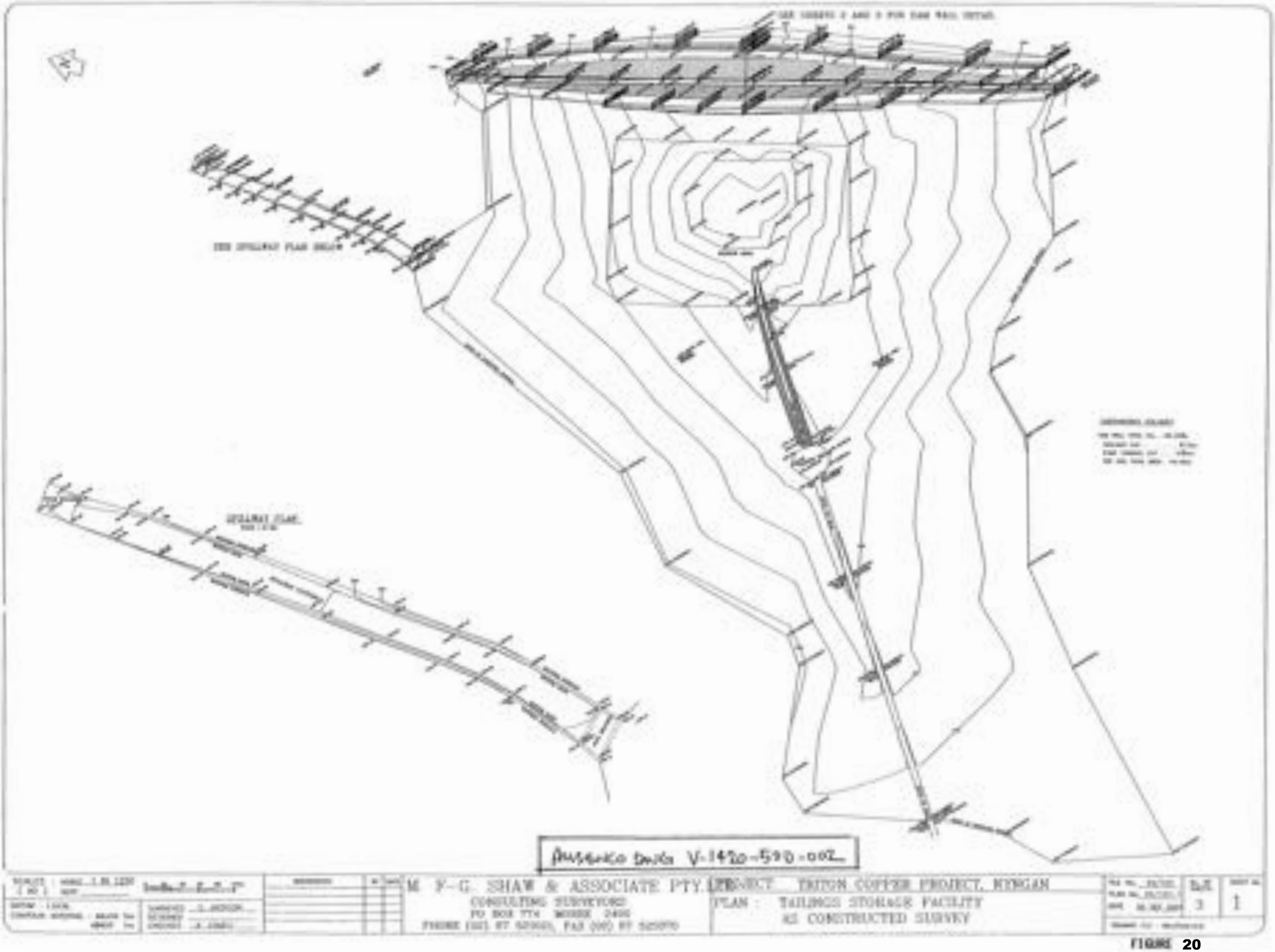

M F-G SHAW & ASSOCIATE PTY. LTD.
CONSULTING SURVEYORS
PO BOX 774 MOREE 2400
PHONE (067) 57 5200, FAX (067) 57 5207
PROJECT TRITON COPPER PROJECT, MINGAN
PLAN : TAILINGS STORAGE FACILITY
AS CONSTRUCTED SURVEY
SHEET 1

FIGURE 20

5261.2

5261.6

5261.0

5259.0

5262.0

5257.8

5261.0

5257.8

5260.3

5262.1

(Supplied by others)

drawn	RP
approved	AS
date	16/04/08
scale	1:2000
original size	A4

coffey mining
GROUNDED IN TECH
BEARINGS FOR MINE FACE

client	STAATS TROTTUM (PTY) LTD
project	SURVEILLANCE REVIEW
title	STAGE 2 AS CONSTRUCTED DETAILS
project no.	WWP00005AA
fig no.	21
rev	

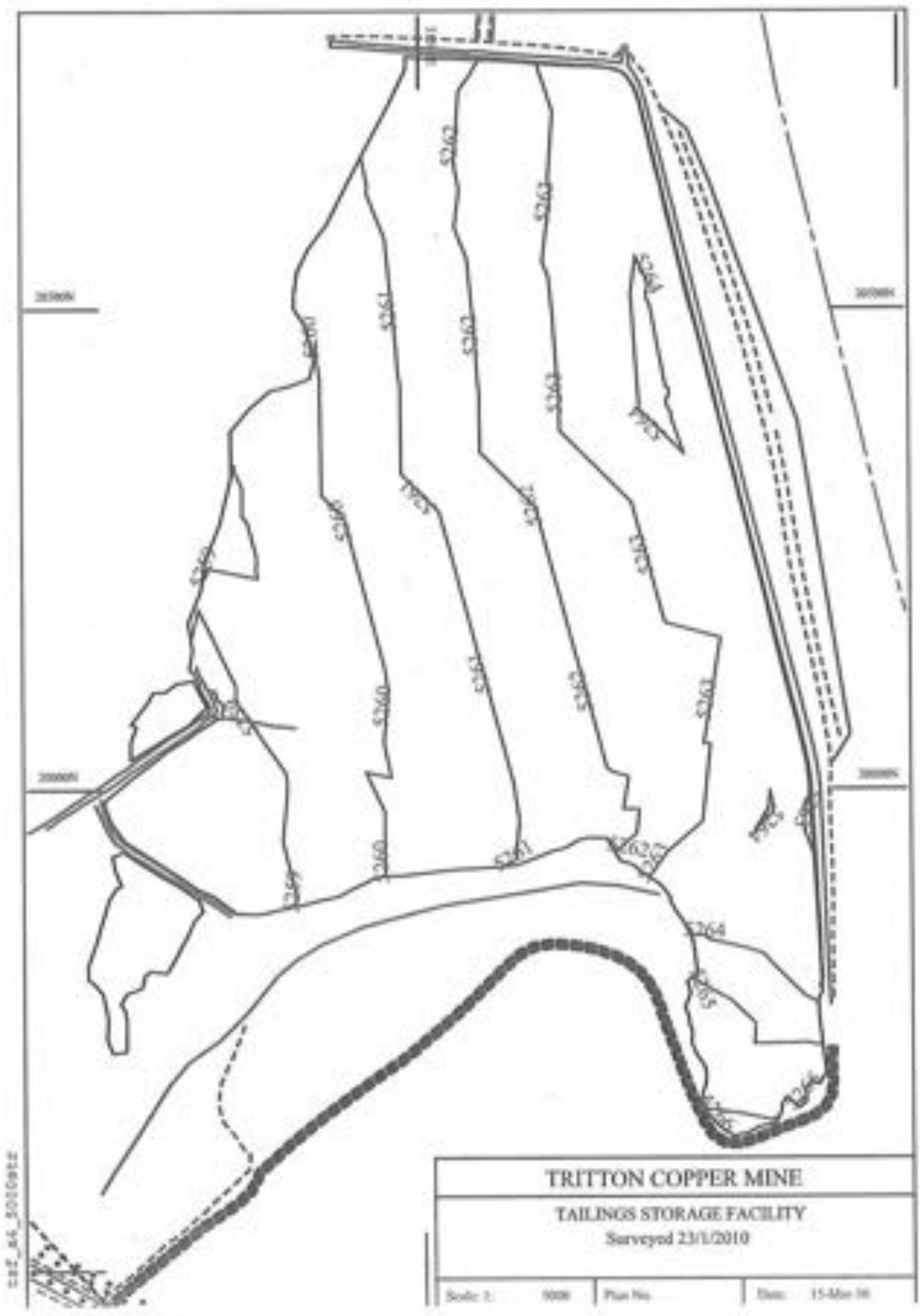

TRITTON COPPER MINE
TAILINGS STORAGE FACILITY
Surveyed 23/1/2010

Figure 22

EXISTING SPILLWAY
GRADE 1:150
(NO WORK REQUIRED)

RAISE AND EXTEND NORTHERN
SADDLE EMBANKMENT
FROM RL264.0m TO RL266.0m

DETAIL F AND G

31,246,881mE
20,736,787mN

NORTHERN SADDLE
EMBANKMENT

31,551,826mE
20,696,002mN

PZH008 (2007)
PZH009 (2007)
PB001 (2007)
PZH001 (2004)

31,707,165mE
20,751,172mN

TCP FREEHOLD PURCHASE BOUNDARY

MINE LEASE BOUNDARY

PZH005S/PZH005D
(2007)

PZH006S/PZH006D
(2007)

PZH002 (2004)

MAIN EMBANKMENT

EXISTING SUMP PUMP
(NO WORK REQUIRED)

MAIN EMBANKMENT
STAGE 4 CREST RL266.0m

EXISTING DOWNSTREAM
SEEPAGE RECOVERY TRENCH
(ACCESS ROAD ADJACENT)

PZH004 (2004)

PZH007S/PZH007D
(2007)

PZH003 (2004)

EXTEND MAIN EMBANKMENT
INCLUDING TOE DRAIN AND ROAD
FROM RL264.0m TO RL266.0m

ROAD ACCESS

PZH011D (2007)

31,925,839mE
19,710,881mN

30,897,567mE
19,559,548mN

STAGE 4 CREST RL 266.0m

CLEARING MAY BE REQUIRED
UP TO RL266m

WESTERN SADDLE
EMBANKMENT

31,284,879mE
19,366,339mN

EXTEND AND RAISE EMBANKMENT
TO RL266.0 m (BOTH SIDES)

30,000mE 30,500mE 31,000mE 31,500mE 32,000mE 32,500mE 33,000mE

20,500mN 20,000mN 19,500mN 19,000mN

Figure 23

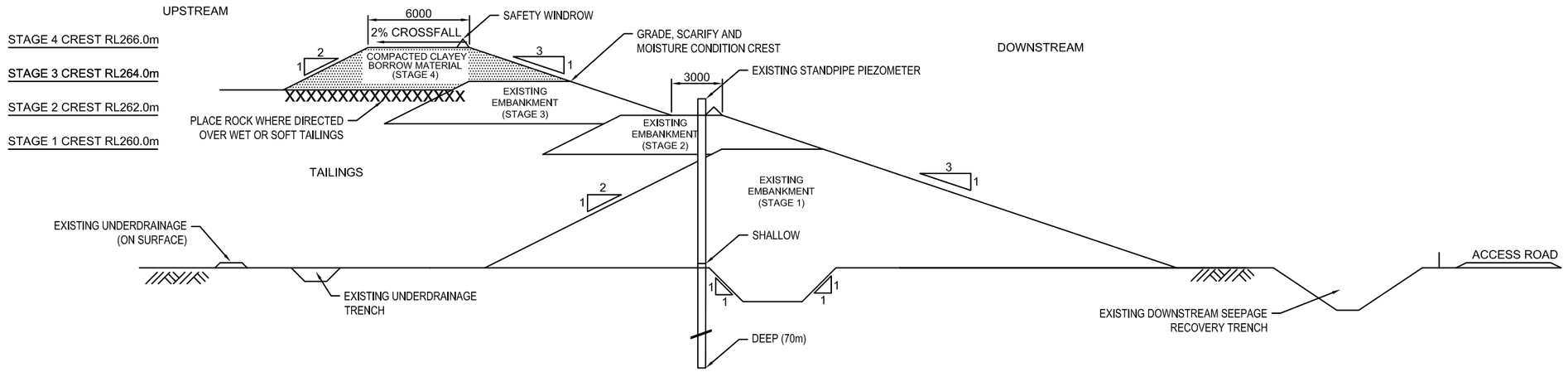
rev no	revision note	date	approved
1	ISSUED FOR TENDERING	17/09/12	IG

Drawn:	CLG
Approved:	IG
Date:	17/09/12
Scale:	NTS
Original size:	A1

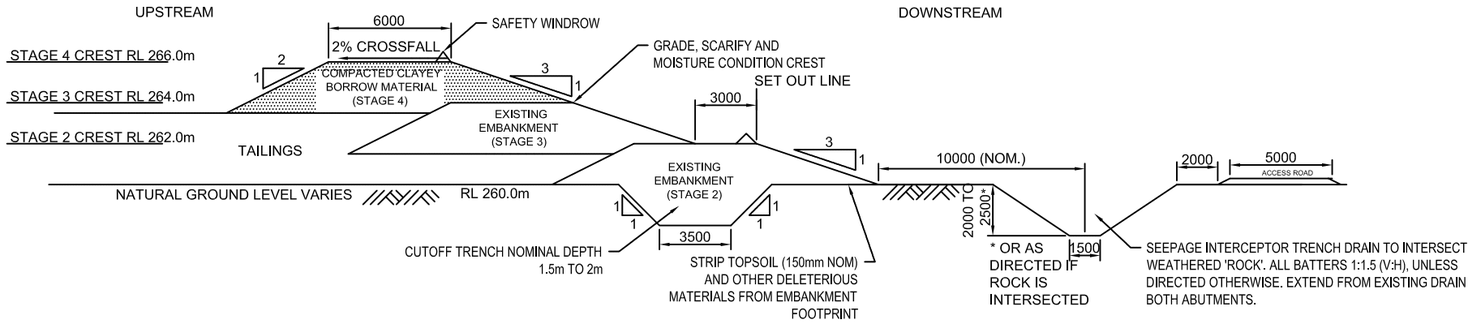
coffey mining
SPECIALISTS FROM BOARDROOM TO MINE FACE

Client: STRAITS TRITTON RESOURCES LIMITED
Project: TRITTON COPPER PROJECT
TAILINGS DAM 1
Title: PLAN EMBANKMENT RAISING - STAGE 4 (RL264.0m TO RL266.0m)
Project no: MWP00100AQ
Dwg no: MWP00100AQ-01
Rev: 1

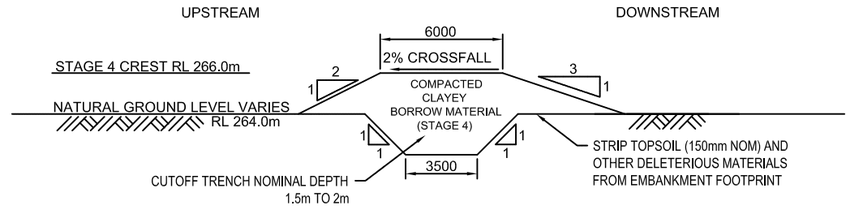
REF:
DWG: F:\MINE\Projects\Straits Tritton Copper\MINE\WPER00100AQ_Stage 4 Lift TSF1\Figures\MWP00100AQ_01 Rev1.dxf



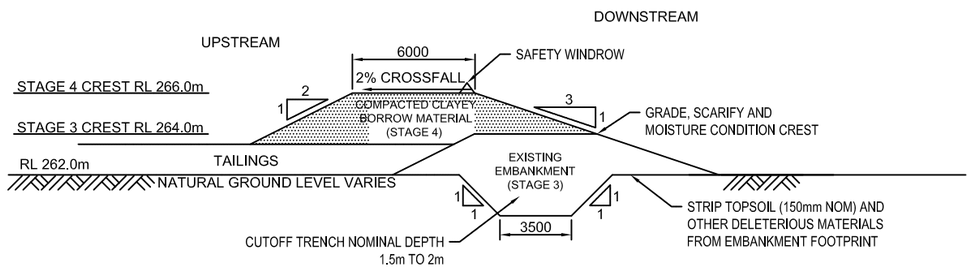
A 01 MAIN EMBANKMENT RAISE - STAGE 4
TYPICAL SECTION OVER TAILINGS
SCALE 1:150



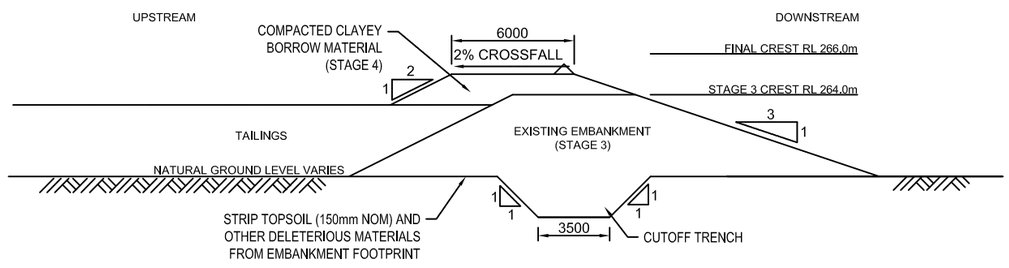
B 01 MAIN EMBANKMENT EXT. RAISE - STAGE 4
SECTION OVER NATURAL GROUND RL 260.0m TO RL 262.0m
SCALE 1:150



D 01 MAIN EMBANKMENT EXT. RAISE - STAGE 4
SECTION OVER NATURAL GROUND RL 264.0m TO RL 266.0m
SCALE 1:150



C 01 MAIN EMBANKMENT EXT. RAISE - STAGE 4
SECTION OVER NATURAL GROUND RL 262.0m TO RL 264.0m
SCALE 1:150



E 01 NORTH AND SOUTH SADDLE EMBANKMENT RAISE - STAGE 4
TYPICAL SECTION
SCALE 1:150

Figure 24

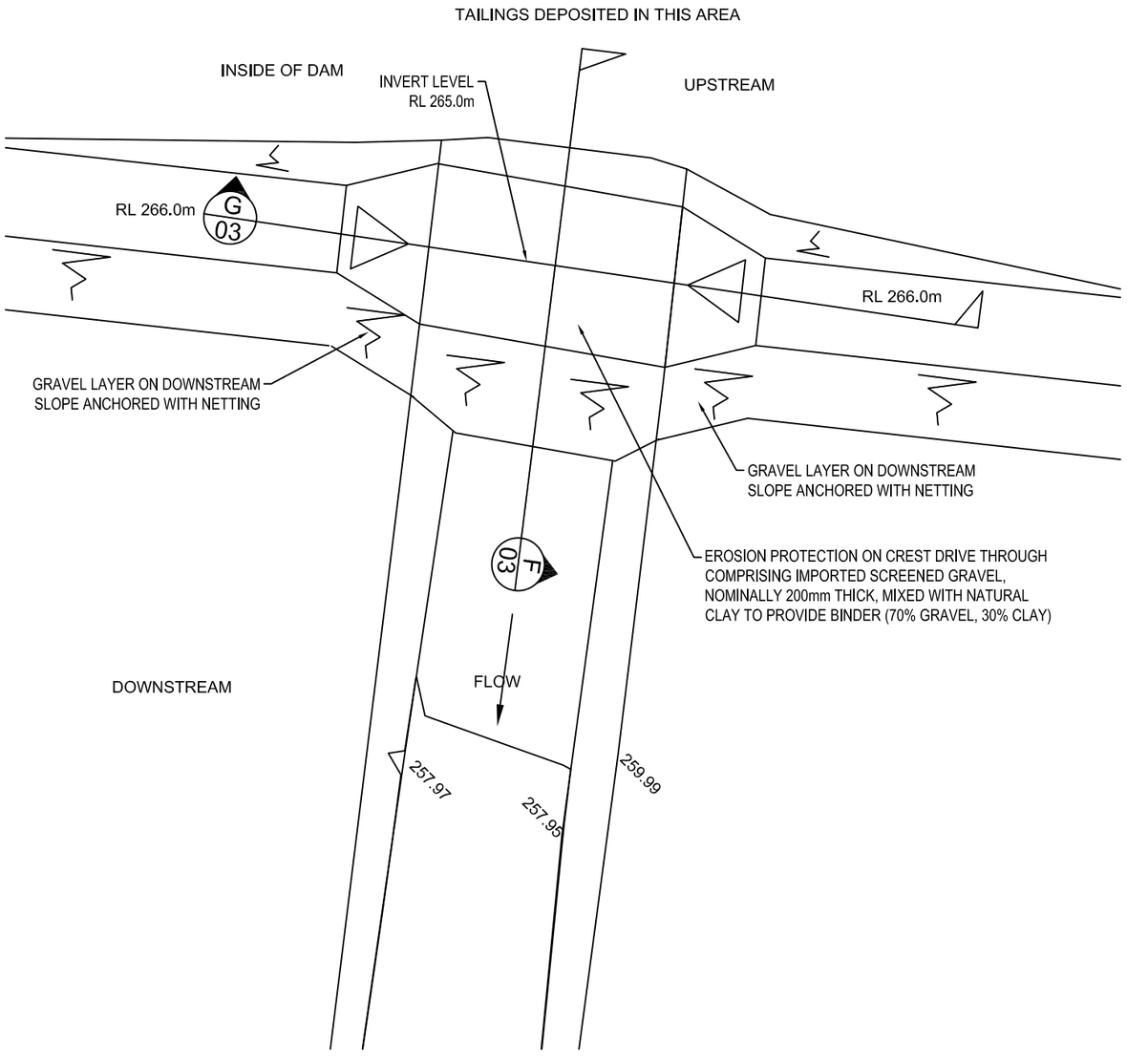
rev no	revision note	date	approved
1	ISSUED FOR TENDERING	17/09/12	IG

Drawn: CLG
Approved: IG
Date: 17/09/12
Scale: AS SHOWN
Original size: A1

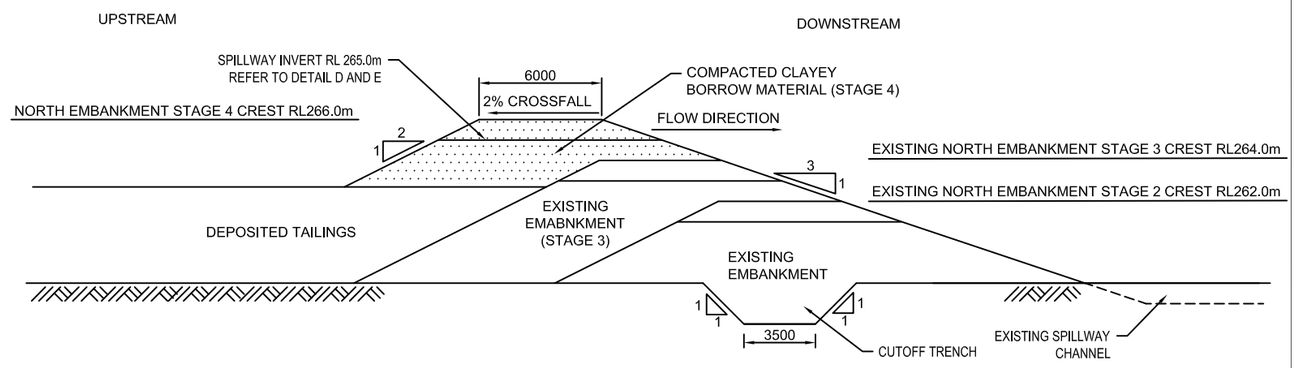
coffey mining
SPECIALISTS FROM BOARDROOM TO MINE FACE

Client: STRAITS TRITTON RESOURCES LIMITED
Project: TRITTON COPPER PROJECT TAILINGS DAM 1
Title: SECTIONS AND DETAILS - STAGE 4
Project no: MWP00100AQ
Dwg no: MWP00100AQ-02
Rev: 1

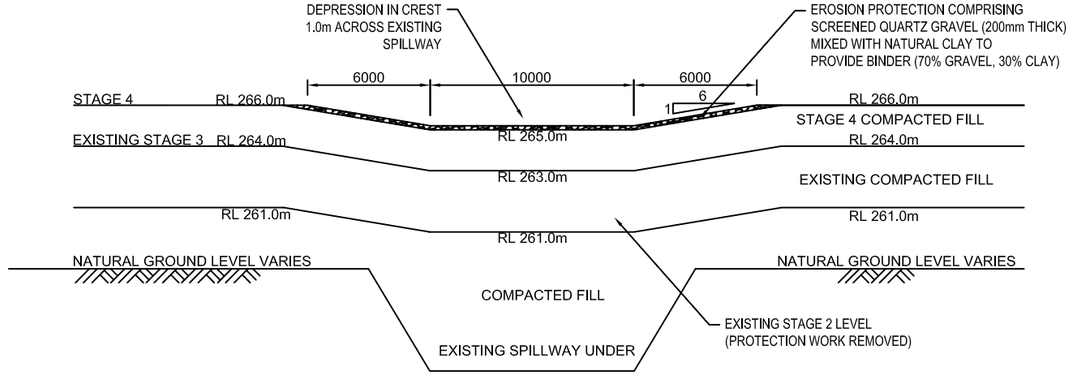
REF:
DWG: F:\MINE\Projects\Straits Tritton Copper\MINE\WPER00100AQ_Stage 4 Lift TSF1\Figures\MWP00100AQ_02 Rev1.dsf



- NORTH SADDLE EMBANKMENT - STAGE 4
- PLAN VIEW ACROSS EXISTING SPILLWAY
SCALE 1:200



F
03
NORTH SADDLE EMBANKMENT - STAGE 4
SPILLWAY AREA CROSS-SECTION
SCALE 1:150



G
03
NORTH SADDLE EMBANKMENT - STAGE 4
SPILLWAY DETAIL SECTION
SCALE 1:150

Figure 25

rev no	revision note	date	approved
1	ISSUED FOR TENDERING	17/09/12	IG

Drawn:	CLG
Approved:	IG
Date:	17/09/12
Scale:	AS SHOWN
Original size:	A1

coffey mining
SPECIALISTS FROM BOARDROOM TO MINE FACE

Client: STRAITS TRITTON RESOURCES LIMITED
Project: TRITTON COPPER PROJECT
TAILINGS DAM 1
Title: SPILLWAY SECTIONS AND DETAILS - STAGE 4
Project no: MWP00100AQ
Dwg no: MWP00100AQ-03
Rev: 1

REF:
DWG: F:\MINE\Projects\Straits Tritton Copper\MINE\WPER00100AQ_Stage 4 Lift TSF1\Figures\MWP00100AQ_03 Rev1.dsf

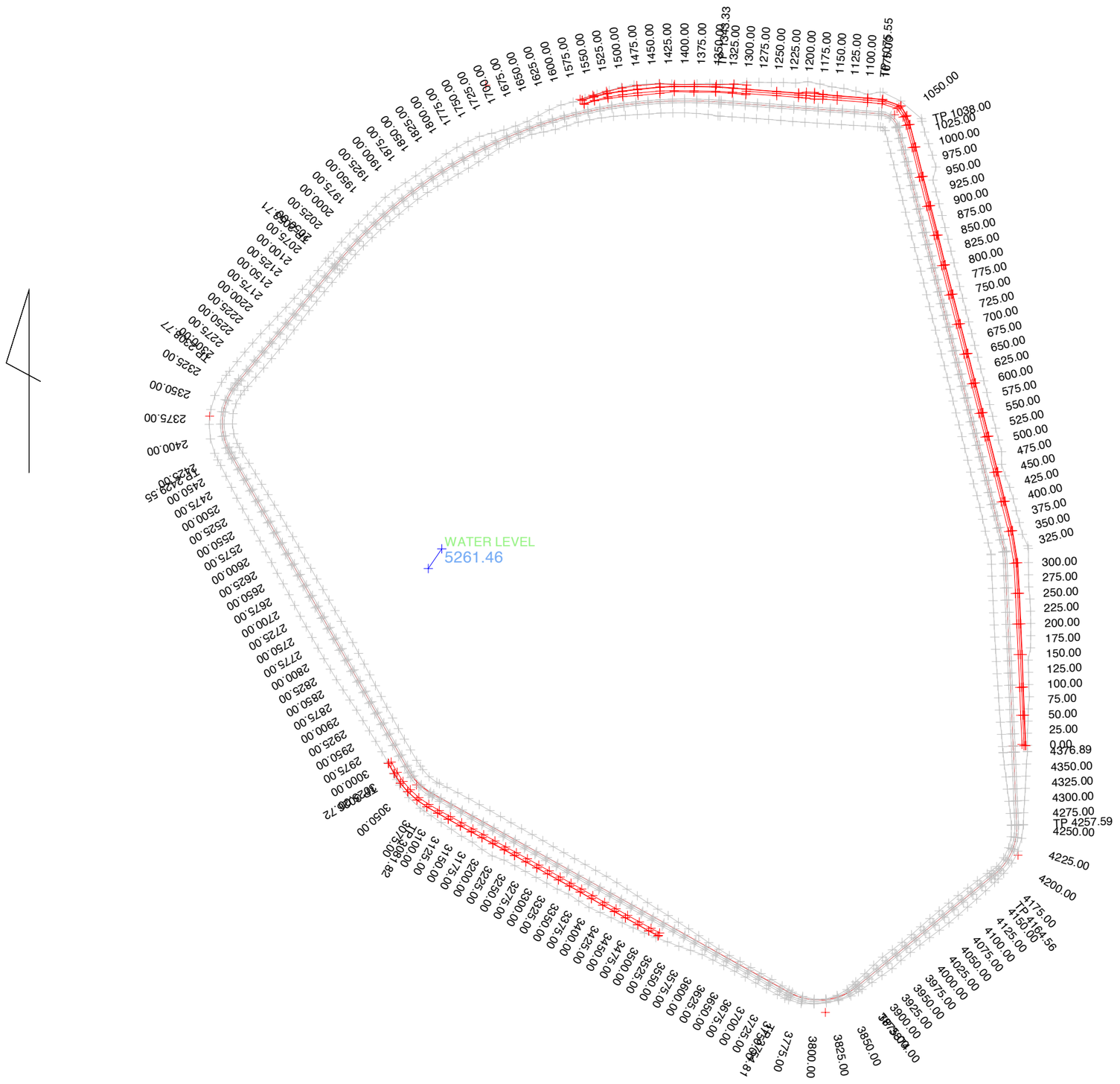
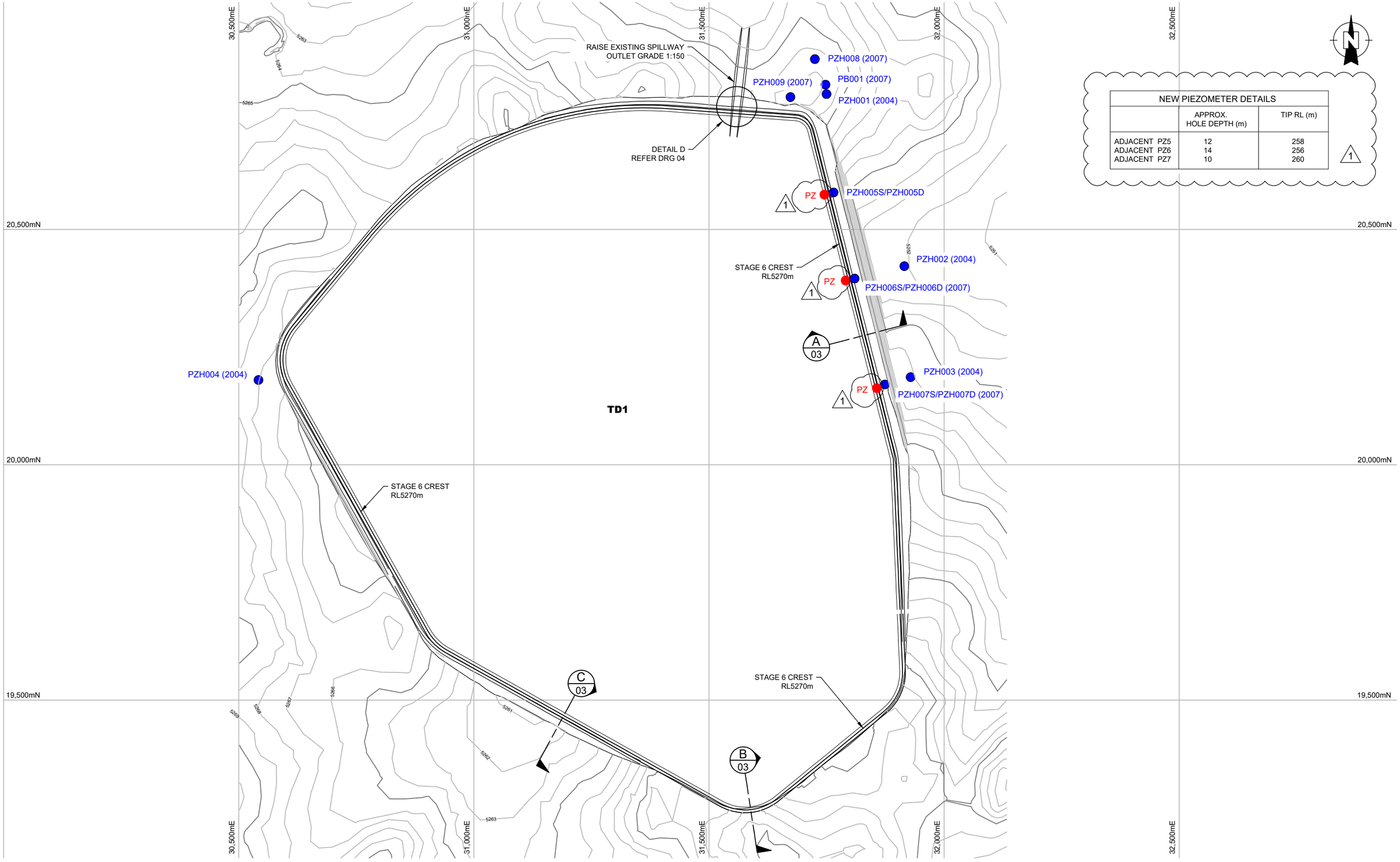


FIGURE 26

ISSUE STATUS	COORD SYSTEM	SURVEY	DESIGN	**DUNCAN PRIESTLEY CIVIL ENGINEERING**	DRAWING	Total Sheets: 23
	MGA Zone 55	DUNCAN PRIESTLEY CIVIL ENGINEERING	CIVIL ENGINEERING	**TRITTON TAILINGS DAM**	TRITDAM S4 ASBUILT - MP ASB266	
11/03/2015	HEIGHT DATUM			**STAGE 4 ALIGNMENT RL5273**	PLAN NUMBER	**Sheet Number: 2**
	AHD	SURVEYED: D Priestley	DESIGNED: D Priestley	**ASBUILT RL 266**		

A3



NEW PIEZOMETER DETAILS		
	APPROX. HOLE DEPTH (m)	TIP RL (m)
ADJACENT PZ5	12	258
ADJACENT PZ6	14	256
ADJACENT PZ7	10	260

1

LEGEND:

- PZH004 — EXISTING PIEZOMETER
- PZ — PROPOSED PIEZOMETER
- 1 — REV. 1

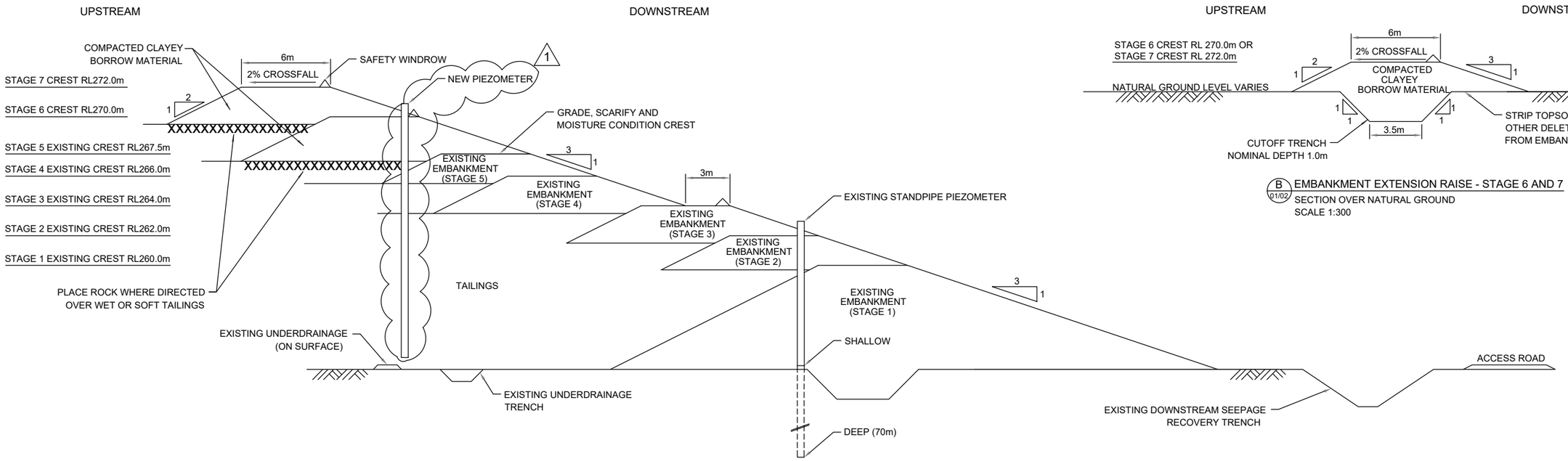
NOTES:

1. EXISTING DECANT ACCESSWAY TO BE RAISED AS REQUIRED BY SITE DICTATED CONDITIONS

1:7500 0 75 150 225 300 375 m

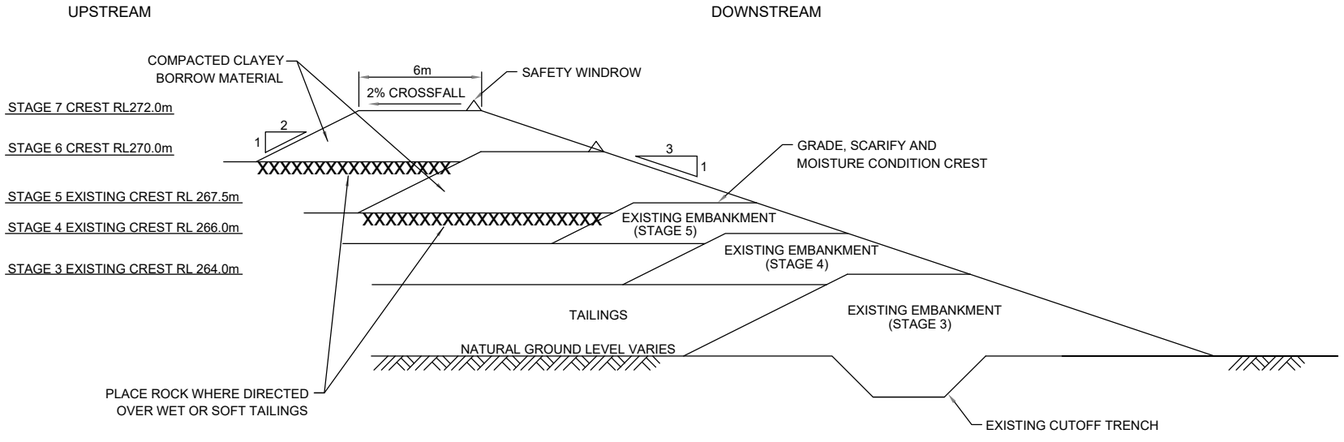
CMW Geosciences

CLIENT: TRITTON RESOURCES PTY LTD		DRAWN: DE	PROJECT: PER2017-0066
PROJECT: RAISING OF TD1, STAGES 6 AND 7 TRITTON COPPER MINE		CHECKED: CH	DRAWING: 01
		REVISION: 1	SCALE: 1:7500
TITLE: GENERAL ARRANGEMENT - STAGE 6		DATE: 09.11.17	SHEET: A3 L

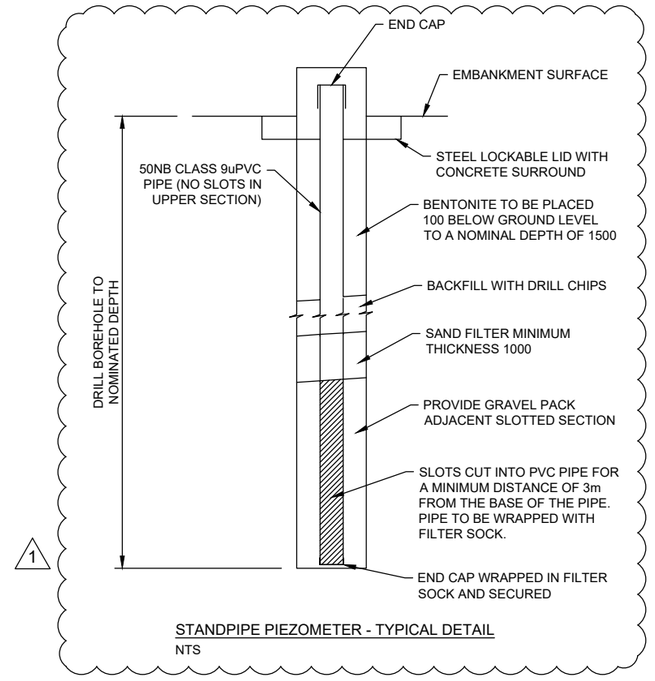


A 01/02 MAIN EMBANKMENT RAISE - STAGE 6 AND 7
TYPICAL SECTION OVER TAILINGS
SCALE 1:300

B 01/02 EMBANKMENT EXTENSION RAISE - STAGE 6 AND 7
SECTION OVER NATURAL GROUND
SCALE 1:300



C 01/02 NORTH AND WEST SADDLE EMBANKMENT RAISE - STAGE 6 AND 7
TYPICAL SECTION
SCALE 1:300



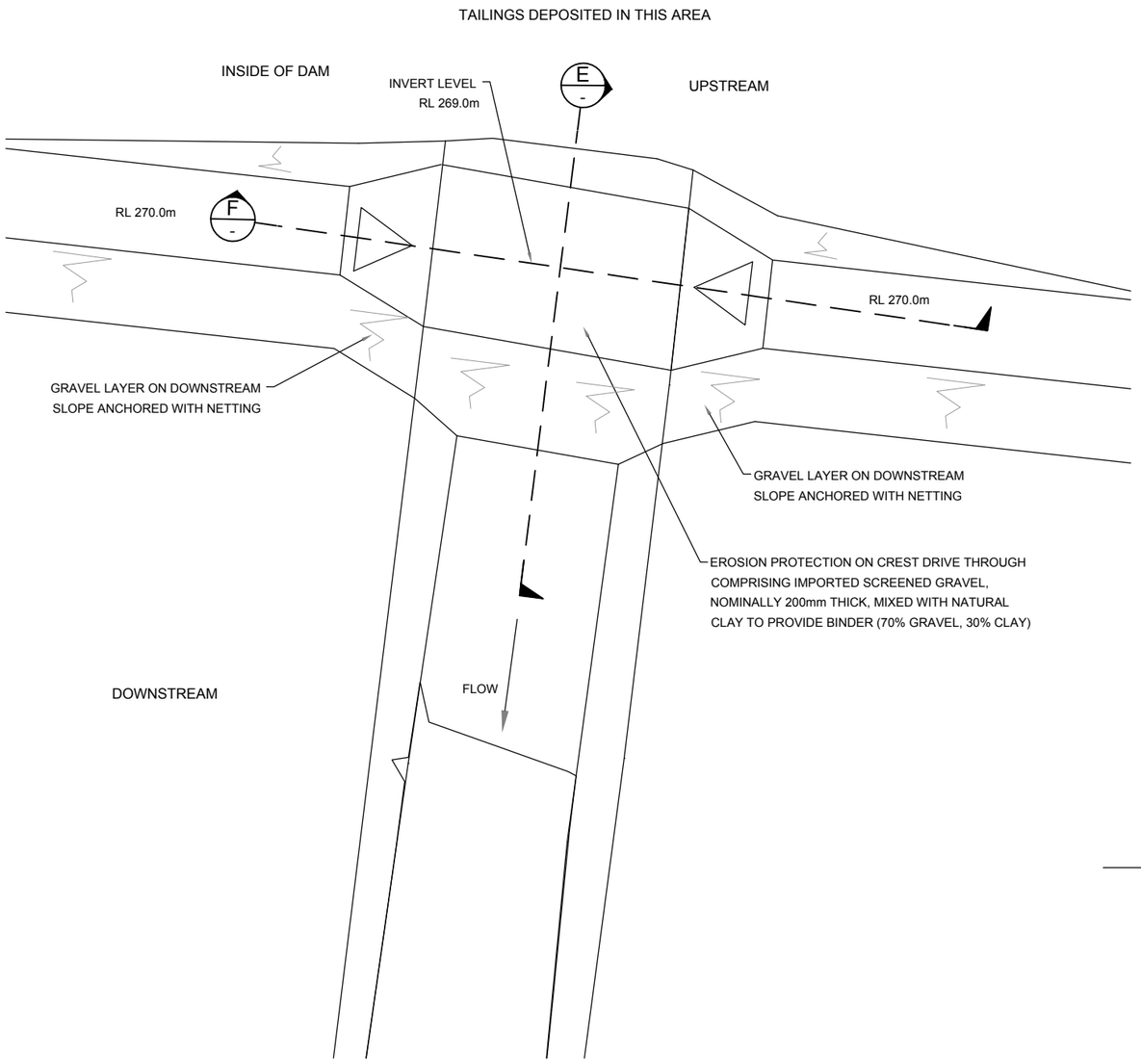
STANDPIPE PIEZOMETER - TYPICAL DETAIL
NTS

LEGEND:

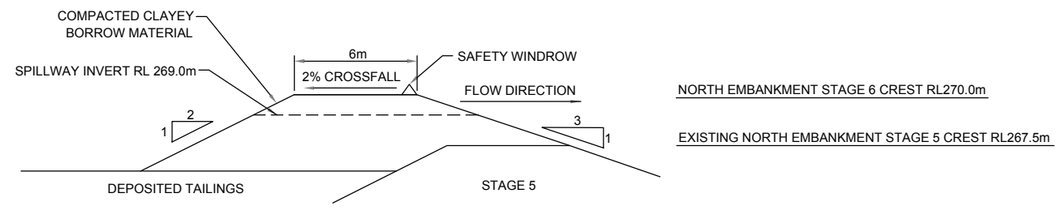
1 REV. 1

1:300 0 3 6 9 12 15 m

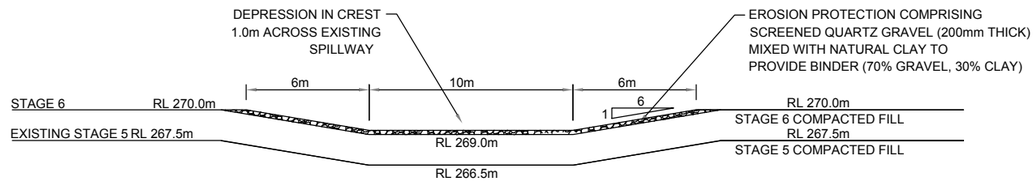
CMW Geosciences	CLIENT: TRITTON RESOURCES PTY LTD	DRAWN: DE	PROJECT: PER2017-0066
	PROJECT: RAISING OF TD1, STAGES 6 AND 7 TRITTON COPPER MINE	CHECKED: CH	DRAWING: 03
		REVISION: 1	SCALE: AS SHOWN
	TITLE: SECTIONS SHEET 1	DATE: 09.11.17	SHEET: A3 L



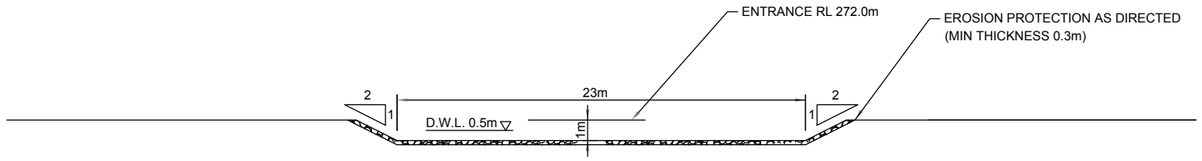
D 01 NORTH SADDLE EMBANKMENT - STAGE 6
PLAN VIEW ACROSS EXISTING SPILLWAY
SCALE 1:300



E - NORTH SADDLE EMBANKMENT - STAGE 6
SPILLWAY AREA CROSS-SECTION
SCALE 1:300



F - NORTH SADDLE EMBANKMENT - STAGE 6
SPILLWAY DETAIL SECTION
SCALE 1:300



G 02 CLOSURE SPILLWAY - STAGE 7
SPILLWAY DETAIL SECTION
SCALE 1:300

1:300 0 3 6 9 12 15 m

CMW Geosciences	CLIENT: **TRITTON RESOURCES PTY LTD**	DRAWN: DE	PROJECT: PER2017-0066
	PROJECT: **RAISING OF TD1, STAGES 6 AND 7 TRITTON COPPER MINE**	CHECKED: CH	DRAWING: 04
		REVISION: 0	SCALE: AS SHOWN
	TITLE: **SECTIONS S□ EET □**	DATE: 09.11.17	SHEET: A3 L

Annual Return

TRITTON RESOURCES LIMITED

Licence 11254

A. Statement of Compliance - Licence Details

ALL Licence holders must check that the Licence details in Section A are correct.

If there are changes to any of these details, **you must advise Environment Protection Authority (EPA) and apply as soon as possible for a variation to your Licence or for a Licence transfer.**

Licence variation and transfer application forms are available on the EPA website at: http://www.epa.nsw.gov.au/licensing-and-regulation/licensing or from regional offices of the EPA, or by contacting by telephone 02 9995 5700.

If you are applying to vary or transfer your Licence, you must still complete and submit this Annual Return.

A1. Licence holder

Licence number : 11254

Licence holder : TRITTON RESOURCES LIMITED

Trading name (if applicable) : AERIS RESOURCES LTD

ABN : 88 100 095 494

ACN : 100 095 494

Reporting period : From: 30-7-2018 To: 29-7-2019

A2. Premises to which Licence Applies (if applicable)

Common name (if any) : TRITTON COPPER MINE

Premises : YARRANDALE ROAD HERMIDALE 2831 NSW

A3. Activities to which Licence Applies

Mining for minerals

A4. Other Activities (if applicable)

Mineral Processing or Metallurgical Works

Waste Facilities - solid & inert waste landfilling

Crushing, Grinding or Separating Works

A5. Fee-Based Activity Classifications

Note that the fee based activity classification is used to calculate the administrative fee.

Fee-based activity	Activity scale	Unit of measure
Mining for minerals	> 500,000.00 - 2,000,000.00	T annual production capacity

A6. Assessable Pollutants (if applicable)

Note that the identification of assessable pollutants is used to calculate the **load-based fee.**
The following assessable pollutants are identified for the fee-based activity classifications in the licence:

B. Monitoring and Complaints Summary

B1. Number of Pollution Complaints

Pollution Complaint Category	Complaints
Air	0
Water	0
Noise	0
Waste	0
Other	0
Total complaints recorded by the licensee during the reporting period	**0**

B2. Concentration Monitoring Summary

For each concentration monitoring point identified in your licence, details are displayed below. If concentration monitoring is not required by your licence, **no data** will appear below.
If data was provided from an uploaded file, the file name will be displayed below instead of any data.
Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

Monitoring Point 12

Groundwater monitoring point, Piezometer labelled as "PZH-001" on map titled "Tritton Copper Project Bore Monitoring Locations" submitted to the EPA 25 April 2008 (DOC08/19282).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.001	0.00275	0.006
Barium	milligrams per litre	4	4	0.012	0.019	0.036
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0001	0.000125	0.0002
Chloride	milligrams per litre	4	4	3850	4162.5	4380

Chromium	milligrams per litre	4	4	0.001	0.00125	0.002
Cobalt	milligrams per litre	4	4	0.001	0.00175	0.002
Conductivity	microsiemens per centimetre	4	4	10000	14075	15900
Copper	milligrams per litre	4	4	0.016	0.0245	0.029
Iron	milligrams per litre	4	4	0.26	0.71	1.72
Lead	milligrams per litre	4	4	0.001	0.00125	0.002
Manganese	milligrams per litre	4	4	0.026	0.10275	0.277
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
Nickel	milligrams per litre	4	4	0.002	0.00625	0.016
pH	pH	4	4	7.56	7.6825	7.77
Sulfate	milligrams per litre	4	4	2020	2180	2330
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.035	0.06125	0.08

Monitoring Point 13

Groundwater monitoring point, Piezometer labelled as "PZH-002" on map titled "Tritton Copper Project Bore Monitoring Locations" submitted to the EPA 25 April 2008 (DOC08/19282).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.001	0.00225	0.003
Barium	milligrams per litre	4	4	0.019	0.021	0.022
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0002	0.000225	0.0003
Chloride	milligrams per litre	4	4	3450	3632.5	3830
Chromium	milligrams per litre	4	4	0.001	0.001	0.001
Cobalt	milligrams per litre	4	4	0.001	0.00125	0.002

Conductivity	microsiemens per centimetre	4	4	10000	12700	13800
Copper	milligrams per litre	4	4	0.009	0.01575	0.024
Iron	milligrams per litre	4	4	0.88	1.6375	3.32
Lead	milligrams per litre	4	4	0.001	0.001	0.001
Manganese	milligrams per litre	4	4	0.048	0.095	0.188
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
Nickel	milligrams per litre	4	4	0.003	0.00375	0.006
pH	pH	4	4	7.41	7.665	7.83
Sulfate	milligrams per litre	4	4	1840	1880	1920
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.034	0.0485	0.065

Monitoring Point 14

Groundwater monitoring point. Piezometer labelled as "PZH-063" on map titled "Tritton Copper Project Bore Monitoring Locations" submitted to the EPA 25 April 2008 (DOC08/19282).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.001	0.0015	0.003
Barium	milligrams per litre	4	4	0.02	0.02075	0.023
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0002	0.00065	0.0012
Chloride	milligrams per litre	4	4	5040	5470	6030
Chromium	milligrams per litre	4	4	0.001	0.00175	0.002
Cobalt	milligrams per litre	4	4	0.008	0.01025	0.013
Conductivity	microsiemens per centimetre	4	4	12400	16850	18400
Copper	milligrams per litre	4	4	0.016	0.0365	0.064

Iron	milligrams per litre	4	4	0.46	1.4625	3.71
Lead	milligrams per litre	4	4	0.001	0.00225	0.004
Manganese	milligrams per litre	4	4	0.196	0.2215	0.262
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
Nickel	milligrams per litre	4	4	0.013	0.0155	0.018
pH	pH	4	4	7.37	7.605	7.74
Sulfate	milligrams per litre	4	4	1810	2175	2370
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.072	0.77125	2.71

Monitoring Point 15

Groundwater monitoring point, Piezometer labelled as " PZH-004" on map titled "Tritton Copper Project Bore Monitoring Locations" submitted to the EPA 25 April 2008 (DOC08/19282).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	0	dry	dry	dry
Barium	milligrams per litre	4	0	dry	dry	dry
Beryllium	milligrams per litre	4	0	dry	dry	dry
Cadmium	milligrams per litre	4	0	dry	dry	dry
Chloride	milligrams per litre	4	0	dry	dry	dry
Chromium	milligrams per litre	4	0	dry	dry	dry
Cobalt	milligrams per litre	4	0	dry	dry	dry
Conductivity	microsiemens per centimetre	4	0	dry	dry	dry
Copper	milligrams per litre	4	0	dry	dry	dry
Iron	milligrams per litre	4	0	dry	dry	dry
Lead	milligrams per litre	4	0	dry	dry	dry

Manganese	milligrams per litre	4	0	dry	dry	dry
Mercury	milligrams per litre	4	0	dry	dry	dry
Nickel	milligrams per litre	4	0	dry	dry	dry
pH	pH	4	0	dry	dry	dry
Sulfate	milligrams per litre	4	0	dry	dry	dry
Vanadium	milligrams per litre	4	0	dry	dry	dry
Zinc	milligrams per litre	4	0	dry	dry	dry

Monitoring Point 16

Groundwater monitoring point, Piezometer labelled as "PZH-005" on map titled "Tritton Copper Project Bore Monitoring Locations" submitted to the EPA 25 April 2008 (DOC08/19282).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.002	0.00275	0.004
Barium	milligrams per litre	4	4	0.016	0.017	0.018
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0004	0.000475	0.0006
Chloride	milligrams per litre	4	4	4750	5155	5430
Chromium	milligrams per litre	4	4	0.001	0.001	0.001
Cobalt	milligrams per litre	4	4	0.001	0.0025	0.004
Conductivity	microsiemens per centimetre	4	4	10400	15125	17300
Copper	milligrams per litre	4	4	0.033	0.042	0.053
Iron	milligrams per litre	4	4	0.06	0.155	0.41
Lead	milligrams per litre	4	4	0.001	0.00175	0.003
Manganese	milligrams per litre	4	4	0.019	0.19525	0.318
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001

Nickel	milligrams per litre	4	4	0.032	0.0385	0.044
pH	pH	4	4	7.48	7.5525	7.6
Sulfate	milligrams per litre	4	4	940	1247.5	1390
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.074	0.12475	0.218

Monitoring Point 17

Groundwater monitoring point, Piezometer labelled on map "PZH-006" on map titled "Tritton Copper Project Bore Monitoring Locations" submitted to the EPA 25 April 2008 (DOC08/19282).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.002	0.002	0.002
Barium	milligrams per litre	4	4	0.023	0.02375	0.024
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0001	0.0001	0.0001
Chloride	milligrams per litre	4	4	2620	2892.5	3090
Chromium	milligrams per litre	4	4	0.001	0.001	0.001
Cobalt	milligrams per litre	4	4	0.005	0.00625	0.007
Conductivity	microsiemens per centimetre	4	4	7260	10465	12000
Copper	milligrams per litre	4	4	0.005	0.007	0.009
Iron	milligrams per litre	4	4	0.15	0.49	0.8
Lead	milligrams per litre	4	4	0.002	0.003	0.004
Manganese	milligrams per litre	4	4	0.18	0.1955	0.205
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
Nickel	milligrams per litre	4	4	0.005	0.00525	0.006
pH	pH	4	4	7.12	7.2375	7.36

Sulfate	milligrams per litre	4	4	2060	2215	2310
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.012	0.02675	0.035

Monitoring Point 18

Groundwater monitoring point, Piezometer labelled as "PZH-007" on map titled "Tritton Copper Project Bore Monitoring Locations" submitted to the EPA 25 April 2008 (DOC08/19282).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.001	0.002	0.004
Barium	milligrams per litre	4	4	0.052	0.114	0.181
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0005	0.000975	0.0014
Chloride	milligrams per litre	4	4	2720	3510	4560
Chromium	milligrams per litre	4	4	0.002	0.00725	0.018
Cobalt	milligrams per litre	4	4	0.007	0.013	0.02
Conductivity	microsiemens per centimetre	4	4	11100	13250	16200
Copper	milligrams per litre	4	4	0.071	0.1025	0.17
Iron	milligrams per litre	4	4	0.42	2.415	7.88
Lead	milligrams per litre	4	4	0.007	0.01375	0.029
Manganese	milligrams per litre	4	4	0.194	0.28225	0.371
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
Nickel	milligrams per litre	4	4	0.05	0.0735	0.108
pH	pH	4	4	7.35	7.655	7.93
Sulfate	milligrams per litre	4	4	1490	1812.5	2340
Vanadium	milligrams per litre	4	4	0.01	0.0125	0.02

Zinc	milligrams per litre	4	4	0.12	0.17575	0.252

Monitoring Point 19

Groundwater monitoring point, Piezometer labelled as "PZH-008" on map titled "Tritton Copper Project Bore Monitoring Locations" submitted to the EPA 25 April 2008 (DOC08/19282).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.008	0.01075	0.012
Barium	milligrams per litre	4	4	0.018	0.01925	0.021
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0001	0.0001	0.0001
Chloride	milligrams per litre	4	4	3840	4080	4220
Chromium	milligrams per litre	4	4	0.001	0.001	0.001
Cobalt	milligrams per litre	4	4	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	14300	14525	14600
Copper	milligrams per litre	4	4	0.01	0.0155	0.021
Iron	milligrams per litre	4	4	0.12	0.2225	0.35
Lead	milligrams per litre	4	4	0.001	0.001	0.001
Manganese	milligrams per litre	4	4	0.045	0.0575	0.066
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
Nickel	milligrams per litre	4	4	0.001	0.001	0.001
pH	pH	4	4	7.23	7.465	7.72
Sulfate	milligrams per litre	4	4	1630	1767.5	1800
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.026	0.029	0.034

Monitoring Point 20

Groundwater monitoring point, Piezometer labelled as "PZH-009" on map titled "Tritton Copper Project Bore Monitoring Locations" submitted to the EPA 25 April 2008 (DOC08/19282).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.001	0.001	0.001
Barium	milligrams per litre	4	4	0.046	0.0485	0.052
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.001	0.001075	0.0011
Chloride	milligrams per litre	4	4	4940	5367.5	5710
Chromium	milligrams per litre	4	4	0.001	0.00125	0.002
Cobalt	milligrams per litre	4	4	0.001	0.00375	0.007
Conductivity	microsiemens per centimetre	4	4	17900	18150	18400
Copper	milligrams per litre	4	4	0.04	0.05025	0.061
Iron	milligrams per litre	4	4	0.11	0.23	0.46
Lead	milligrams per litre	4	4	0.001	0.001	0.001
Manganese	milligrams per litre	4	4	0.106	0.18225	0.257
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
Nickel	milligrams per litre	4	4	0.016	0.01625	0.017
pH	pH	4	4	7.35	7.5925	7.81
Sulfate	milligrams per litre	4	4	2180	2232.5	2320
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.077	0.09	0.104

Monitoring Point 22

Groundwater monitoring point, Piezometer labelled as "PZH013" on map titled "Plan 4: Tritton Mine Site Proposed Mining Activities" received by the EPA on 17/12/10 (DOC10/57214).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	0	dry	dry	dry
Barium	milligrams per litre	4	0	dry	dry	dry
Beryllium	milligrams per litre	4	0	dry	dry	dry
Cadmium	milligrams per litre	4	0	dry	dry	dry
Chloride	milligrams per litre	4	0	dry	dry	dry
Chromium	milligrams per litre	4	0	dry	dry	dry
Cobalt	milligrams per litre	4	0	dry	dry	dry
Conductivity	microsiemens per centimetre	4	0	dry	dry	dry
Copper	milligrams per litre	4	0	dry	dry	dry
Iron	milligrams per litre	4	0	dry	dry	dry
Lead	milligrams per litre	4	0	dry	dry	dry
Manganese	milligrams per litre	4	0	dry	dry	dry
Mercury	milligrams per litre	4	0	dry	dry	dry
Nickel	milligrams per litre	4	0	dry	dry	dry
pH	pH	4	0	dry	dry	dry
Sulfate	milligrams per litre	4	0	dry	dry	dry
Vanadium	milligrams per litre	4	0	dry	dry	dry
Zinc	milligrams per litre	4	0	dry	dry	dry

Monitoring Point 23

Groundwater monitoring point, Piezometer labelled as "PZH014" on map titled "Map 4: Tritton Mine Site Proposed Mining Activities" received by the EPA on 17/12/10 (DOC1857214).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.001	0.001	0.001
Barium	milligrams per litre	4	4	0.006	0.00625	0.007
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0001	0.000175	0.0002
Chloride	milligrams per litre	4	4	4350	4587.5	4870
Chromium	milligrams per litre	4	4	0.001	0.001	0.001
Cobalt	milligrams per litre	4	4	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	12700	14950	15800
Copper	milligrams per litre	4	4	0.003	0.007	0.012
Iron	milligrams per litre	4	4	0.05	0.105	0.17
Lead	milligrams per litre	4	4	0.001	0.001	0.001
Manganese	milligrams per litre	4	4	0.003	0.00625	0.01
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
Nickel	milligrams per litre	4	4	0.002	0.00275	0.004
pH	pH	4	4	7.15	7.395	7.55
Sulfate	milligrams per litre	4	4	1590	1680	1800
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.01	0.014	0.019

Monitoring Point 24

Groundwater monitoring point, Piezometer labelled as "PZH015" on map titled "Map 4: Tritton Mine Site Proposed Mining Activities" received by the EPA on 17/12/18 (DOC18/57214).

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.001	0.001	0.001
Barium	milligrams per litre	4	4	0.012	0.01325	0.014
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0003	0.00045	0.0006
Chloride	milligrams per litre	4	4	4940	5180	5440
Chromium	milligrams per litre	4	4	0.042	0.07125	0.087
Cobalt	milligrams per litre	4	4	0.001	0.001	0.001
Conductivity	microsiemens per centimetre	4	4	14400	17275	18500
Copper	milligrams per litre	4	4	0.029	0.0295	0.03
Iron	milligrams per litre	4	4	0.11	0.2425	0.3
Lead	milligrams per litre	4	4	0.001	0.001	0.001
Manganese	milligrams per litre	4	4	0.006	0.0095	0.012
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
Nickel	milligrams per litre	4	4	0.122	0.21375	0.321
pH	pH	4	4	7.28	7.505	7.66
Sulfate	milligrams per litre	4	4	2320	2457.5	2580
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.032	0.04325	0.057

Monitoring Point 25

Groundwater monitoring point, Piezometer labelled as "PZH017" on TRIM DOC15/9798 submitted to the EPA on 13 Jan 2015.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.001	0.001	0.001
Barium	milligrams per litre	4	4	0.03	0.03175	0.033
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0001	0.0001	0.0001
Chloride	milligrams per litre	4	4	3440	3507.5	3570
Chromium	milligrams per litre	4	4	0.001	0.001	0.001
Cobalt	milligrams per litre	4	4	0.001	0.00375	0.012
Conductivity	microsiemens per centimetre	4	4	10400	12225	13800
Copper	milligrams per litre	4	4	0.001	0.0105	0.031
Lead	milligrams per litre	4	4	0.001	0.001	0.001
Manganese	milligrams per litre	4	4	0.086	0.10025	0.117
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
pH	pH	4	4	7.6	7.8975	8.12
Sulfate	milligrams per litre	4	4	651	846.75	1150
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.011	0.047	0.111

Monitoring Point 26

Groundwater monitoring point, Piezometer labelled as "PZH018" on TRIM DOC15/9798 submitted to the EPA on 13 Jan 2015.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.001	0.0035	0.01

Barium	milligrams per litre	4	4	0.028	0.02975	0.033
Beryllium	milligrams per litre	4	4	0.001	0.00325	0.01
Cadmium	milligrams per litre	4	4	0.0001	0.000325	0.001
Chloride	milligrams per litre	4	4	7900	8127.5	8280
Chromium	milligrams per litre	4	4	0.001	0.004	0.01
Cobalt	milligrams per litre	4	4	0.001	0.00375	0.01
Conductivity	microsiemens per centimetre	4	4	15900	21825	25700
Copper	milligrams per litre	4	4	0.002	0.0085	0.012
Lead	milligrams per litre	4	4	0.001	0.00325	0.01
Manganese	milligrams per litre	4	4	0.259	0.26975	0.277
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
pH	pH	4	4	7.48	7.72	8.01
Sulfate	milligrams per litre	4	4	2530	2820	3200
Vanadium	milligrams per litre	4	4	0.01	0.0325	0.1
Zinc	milligrams per litre	4	4	0.024	0.03375	0.05

Monitoring Point 27

Groundwater monitoring point. Piezometer labelled as "PZH019" on TRIM DOC15/9798 submitted to the EPA on 13 Jan 2015

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	5	0.004	0.0052	0.006
Barium	milligrams per litre	4	5	0.02	0.0228	0.024
Beryllium	milligrams per litre	4	5	0.001	0.001	0.001
Cadmium	milligrams per litre	4	5	0.0001	0.00014	0.0003
Chloride	milligrams per litre	4	5	3100	3322	3730

Chromium	milligrams per litre	4	5	0.001	0.001	0.001
Cobalt	milligrams per litre	4	5	0.003	0.0048	0.006
Conductivity	microsiemens per centimetre	4	5	4230	9600	11900
Copper	milligrams per litre	4	5	0.002	0.0076	0.012
Lead	milligrams per litre	4	5	0.001	0.001	0.001
Manganese	milligrams per litre	4	5	0.046	0.0568	0.068
Mercury	milligrams per litre	4	5	0.0001	0.0001	0.0001
pH	pH	4	5	3.99	6.958	8.42
Sulfate	milligrams per litre	4	5	643	799.2	886
Vanadium	milligrams per litre	4	5	0.01	0.01	0.01
Zinc	milligrams per litre	4	5	0.019	0.0298	0.049

Monitoring Point 28

Groundwater monitoring point, Piezometer labelled as "PZH920" on TRIM DOC15/9798 submitted to the EPA on 13 Jan 2015.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	5	0.001	0.001	0.001
Barium	milligrams per litre	4	5	0.012	0.016	0.032
Beryllium	milligrams per litre	4	5	0.001	0.001	0.001
Cadmium	milligrams per litre	4	5	0.0001	0.000225	0.0004
Chloride	milligrams per litre	4	5	3550	3720	3850
Chromium	milligrams per litre	4	5	0.001	0.001	0.001
Cobalt	milligrams per litre	4	5	0.001	0.0016	0.002
Conductivity	microsiemens per centimetre	4	5	10500	13140	15000
Copper	milligrams per litre	4	5	0.014	0.0232	0.034

Lead	milligrams per litre	4	5	0.001	0.001	0.001
Manganese	milligrams per litre	4	5	0.042	0.0996	0.15
Mercury	milligrams per litre	4	5	0.0001	0.0001	0.0001
pH	pH	4	5	7.47	7.82	8.2
Sulfate	milligrams per litre	4	5	920	1192	1400
Vanadium	milligrams per litre	4	5	0.01	0.01	0.01
Zinc	milligrams per litre	4	5	0.064	0.0856	0.117

Monitoring Point 29

Groundwater monitoring point. Piezometer labelled as "PZH021" on TRIM DOC15/9798 submitted to the EPA on 13 Jan 2015.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	4	0.001	0.00125	0.002
Barium	milligrams per litre	4	4	0.066	0.06725	0.069
Beryllium	milligrams per litre	4	4	0.001	0.001	0.001
Cadmium	milligrams per litre	4	4	0.0001	0.0001	0.0001
Chloride	milligrams per litre	4	4	4220	4627.5	4820
Chromium	milligrams per litre	4	4	0.001	0.001	0.001
Cobalt	milligrams per litre	4	4	0.001	0.00125	0.002
Conductivity	microsiemens per centimetre	4	4	10800	14375	16800
Copper	milligrams per litre	4	4	0.002	0.0075	0.012
Lead	milligrams per litre	4	4	0.001	0.001	0.001
Manganese	milligrams per litre	4	4	1.25	1.26	1.27
Mercury	milligrams per litre	4	4	0.0001	0.0001	0.0001
pH	pH	4	4	7.38	7.665	8.03

Sulfate	milligrams per litre	4	4	1540	1695	1870
Vanadium	milligrams per litre	4	4	0.01	0.01	0.01
Zinc	milligrams per litre	4	4	0.008	0.02125	0.037

Monitoring Point 30

Groundwater monitoring point, Piezometer labelled as "PZH022" on TRIM DOC15/9798 submitted to the EPA on 13 Jan 2015.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	0	dry	dry	dry
Barium	milligrams per litre	4	0	dry	dry	dry
Beryllium	milligrams per litre	4	0	dry	dry	dry
Cadmium	milligrams per litre	4	0	dry	dry	dry
Chloride	milligrams per litre	4	0	dry	dry	dry
Chromium	milligrams per litre	4	0	dry	dry	dry
Cobalt	milligrams per litre	4	0	dry	dry	dry
Conductivity	microsiemens per centimetre	4	0	dry	dry	dry
Copper	milligrams per litre	4	0	dry	dry	dry
Lead	milligrams per litre	4	0	dry	dry	dry
Manganese	milligrams per litre	4	0	dry	dry	dry
Mercury	milligrams per litre	4	0	dry	dry	dry
pH	pH	4	0	dry	dry	dry
Sulfate	milligrams per litre	4	0	dry	dry	dry
Vanadium	milligrams per litre	4	0	dry	dry	dry
Zinc	milligrams per litre	4	0	dry	dry	dry

Monitoring Point 31

Groundwater monitoring point, Piezometer labelled as "PZH023"on TRIM DOC15/9796 submitted to the EPA on 13 Jan 2015.

Pollutant	Unit of measure	No. of samples required	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Arsenic	milligrams per litre	4	0	dry	dry	dry
Barium	milligrams per litre	4	0	dry	dry	dry
Beryllium	milligrams per litre	4	0	dry	dry	dry
Cadmium	milligrams per litre	4	0	dry	dry	dry
Chloride	milligrams per litre	4	0	dry	dry	dry
Chromium	milligrams per litre	4	0	dry	dry	dry
Cobalt	milligrams per litre	4	0	dry	dry	dry
Conductivity	microsiemens per centimetre	4	0	dry	dry	dry
Copper	milligrams per litre	4	0	dry	dry	dry
Lead	milligrams per litre	4	0	dry	dry	dry
Manganese	milligrams per litre	4	0	dry	dry	dry
Mercury	milligrams per litre	4	0	dry	dry	dry
pH	pH	4	0	dry	dry	dry
Sulfate	milligrams per litre	4	0	dry	dry	dry
Vanadium	milligrams per litre	4	0	dry	dry	dry
Zinc	milligrams per litre	4	0	dry	dry	dry

B3. Volume or Mass Monitoring Summary

For each volume or mass monitoring point identified in your licence, details are displayed below. If volume or mass monitoring is not required by your licence, **no data** will appear below.
If data was provided from an uploaded file, the file name will be displayed below instead of any data.
Note that this does not exclude the need to conduct appropriate volume or mass monitoring of assessable pollutants are required by load-based licensing (if applicable).

C. Statement of Compliance - Licence Conditions

C1. Compliance with Licence Conditions

Were all conditions of the licence complied with (including monitoring and reporting requirements)?	No

C2. Details of Non-Compliance with Licence

Licence condition number not complied with ▼
M2.2
Summary of particulars of the non-compliance ▼
Groundwater monitoring points 15 "PZH-004",22 "PZH013", 30 "PZH022" and 31 "PZH023" were not sampled
Further details on particulars of non-compliance, if required ▼
Number of times occurred ▼
16
Date(s) when the non-compliance occurred, if applicable ▼
Cause of non-compliance ▼
Monitoring points were dry thus samples were unable to be collected
Action taken or that will be taken to mitigate any adverse effects of the non-compliance ▼
N/A
Action taken or that will be taken to prevent a recurrence of the non-compliance ▼
N/A
Uploaded Document Name ▼
Uploaded Document Description ▼

D. Statement of Compliance - Load Based Fee Calculation

If you are not required to monitor assessable pollutants by your licence, **no data** will appear below.

If assessable pollutants have been identified on your licence, the following worksheets for each assessable pollutant will determine your load based fee for the licence fee period to which this Annual Return relates.

Loads of assessable pollutants must be calculated using any of the methods provided in EPA's Load Calculation Protocol for the relevant activity. A Load Calculation Protocol would have been already sent to you with your licence. If you require additional copies, you can download the Protocol from the EPA's website or you can contact us on telephone 02 9995 5700.

You are required to keep all records used to calculate licence fees for four years after the licence fee was paid or became payable, whichever is the later date.

E. Statement of Compliance - Requirement to Prepare PIRMP

Have you prepared a Pollution Incident Response Management Plan (PIRMP) as required under section 153A of the Protection of the Environment Operations (POEO) Act 1997?	**Yes**
Is the PIRMP available at the premises?	**Yes**
Is the PIRMP available in a prominent position on a publicly accessible website?	**Yes**
Address of the web page where the PIRMP can be accessed ▼	
https://www.aerisresources.com.au/	
Has the PIRMP been tested?	**Yes**
The PIRMP was last tested on	**13-9-2018**
Has the PIRMP been updated?	**Yes**
The PIRMP was last updated on	**25-9-2018**
Number of times the PIRMP was activated in this reporting period?	**0**
The PIRMP was activated on	

F. Statement of Compliance - Requirement to Publish Pollution Monitoring Data

Are there any conditions attached to your licence that require pollution monitoring to be undertaken as required under section 66(6) of the Protection of the Environment Operations (POEO) Act 1997?	**Yes**
Do you operate a website?	**Yes**
Is the pollution monitoring data published on your website in accordance with the EPA's written requirements for publishing pollution monitoring data?	**Yes**
Address of the web page where the pollution monitoring data can be accessed ▼	
https://www.aerisresources.com.au/	

G. Statement of Compliance - Environment Management System and Practices

Do you have an ISO 14001 certified Environmental Management System (EMS) OR any other system that EPA considers is equivalent to the accountability, procedures, documentation and record keeping requirements of an ISO 14001 certified EMS?	**No**

Have you conducted an assessment of your activities and operations to identify the aspects that have a potential to cause environmental impacts and implemented operational controls to address these aspects?	**Yes**
Have you established and implemented an operational maintenance program, including preventative maintenance?	**Yes**
Do you keep records of regular inspections and maintenance of plant and equipment?	**Yes**
Do you conduct regular site audits to assess compliance with environmental legal requirements and assess conformance to the requirements of any documented environmental practices, procedures and systems in place?	**Yes**
Are the audits of documented environmental practices, procedures and systems undertaken by a third party?	**Yes**
Have you established and implemented an environmental improvement or management plan?	**Yes**
Do you train staff in environmental issues that may arise from your activities and operations and keep records of this	**Yes**

H. Signature and Certification

This Annual Return may only be signed by person(s) with legal authority to sign it as set out in following categories: an Individual, a Company, a Public authority or a Local council.

It is an offence to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of $250,000 for a corporation and $120,000 for an individual.

I/We

- declare that the information in the Monitoring and Complaints Summary in Section B of this Annual Return application is correct and not false or misleading in a material respect, and
- certify that the information in the Statement and Compliance in sections A, C, D, E, F, G and H and any other pages attached to Section C is correct and not false or misleading in a material respect.

Signature		**Signature**	
Name	R.A. BRANSBURY	**Name**	W.A. Lisuschogne

Position	CEO
Date	13 / 8 / 19

Declaration

I declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and

I certify that the information in the Statement of Compliance in section A,C,D,E,F and G and any pages attached to Section C is correct and not false or misleading in a material respect.

Position	CHAIRMAN
Date	13 / 8 / 19

Declaration

I declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and

I certify that the information in the Statement of Compliance in section A,C,D,E,F and G and any pages attached to Section C is correct and not false or misleading in a material respect.