REPORT

NEW HOPE COAL AUSTRALIA

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New Acland Coal Mine
2022 Annual Regulated Dam Safety Review

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TAILINGS.WATER.WASTE.

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EXECUTIVE SUMMARY

Background

A 2022 Regulated Dam Inspection has been undertaken at the New Acland Coal Mine to assess the ongoing safety and serviceability of regulated dams at this site.

A regulated structure means any structure in the SIGNIFICANT or HIGH consequence category as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/193315). In accordance with the Guideline for structures which are dams or levees constructed as part of environmentally relevant activities **[2],** regulated structures are subject to annual inspection and reporting by a suitably qualified and experienced person

Based on the current Consequence Category Assessment (CCA) for all existing and decommissioned dams at the New Acland mine site, the only regulated dam is In-Pit Storage 3 (IPT3), which possesses a SIGNICANT consequence category.

Scope of Work

The scope of the work completed for the Regulated Dams Safety Review was as follows:

- To identify any elements of regulated structures or associated systems that are of concern or are deficient from a dam safety perspective, with emphasis on embankments and hydraulic controls.
- To assess available surveillance/monitoring data that provide background to performance of regulated dams.
- To evaluate available storage capacities for regulated dams, to demonstrate that compliance with relevant EA conditions is achieved.
- To provide recommendations for measures to be taken, as appropriate, to ensure the ongoing safety of the regulated dams.

The following methodology was adopted to address the above scope:

- Discussions were held with relevant operational personnel responsible for ensuring that appropriate regulatory conditions are fulfilled.
- An inspection of IPT3 was undertaken, and a photographic record compiled.
- A hydrological/hydraulic assessment of available storage against containment requirements for IPT3 was undertaken.

In addition, inspection of dams listed in previous versions of the EA for the New Acland Mine was undertaken to assess overall integrity of these structures, particularly assessing the current stage of closure and rehabilitation and identifying any potential areas of concern that require action. These dams are listed below:

- Tailings Storage Facility 1 (TSF1)[2] – Decommissioned and rehabilitated
- TSF1 Extension – Decommissioned and rehabilitated
- Environmental Dam 2 – Removed as a result of past open cut mining

[2] Pond Return Dam forms part of TSF1 and is an operational storage used for transfer of process water from the mining area to the CHPP and is currently active.

- In-Pit Tailings Dam 1 (IPT1) – Decommissioned and rehabilitated
- In-Pit Tailings Dam 2/1 (IPT2/1) - Decommissioned, with landform development commenced and commencement of topsoil placement
- In-Pit Tailings Dam 2/2 (IPT2/2) – Decommissioned, with tailings surface capping substantially completed

The annual inspection and reporting to address the above scope was undertaken by Allan Watson (RPEQ 5721) on 5 October 2022.

Summary of Dam Safety Inspection and Recommendations

A summary of the outcomes from the 2022 inspection and review for IPT3 is provided in **Table ES1.**

TABLE ES1: SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS

Regulated Dam	Aspect/Observation	Outcome and Recommended Action
IPT3	<u>Embankments and General Containment Landform</u> IPT3 is formed within a portion of the past mining area, being developed between a remnant highwall/overburden batter to the east, and by a semi-engineered embankment constructed adjacent to the Centre Pit operations to the west. The crest of the main embankment has been widened to at least 100m (and greater) as a result of Centre Pit backfilling, which forms a buttress to the IPT3 embankment. Along the as-built portion of the embankment crest, grass has established. This growth does not impact on access along the crest, although inhibits inspection of the crest surface. Significant vegetation (trees and shrubs) has established on the upstream batter of the embankment. This vegetation inhibits inspection of this batter surface to some degree, although the height of exposure is limited to 6 to 7m vertical height due to the extent of tailings deposition. No quantifiable amount of tailings has been deposited into IPT3 since the last dam safety inspection in 2021. Past deposition occurred from 5 discharge locations along the embankment to form a tailings beach sloping towards the east and north, reporting to a decant pond adjacent to the ramp into the storage. Tension cracking (up to 100mm width) has previously developed parallel to the crest edge along the mid-section of the main embankment (length of around 400m). This cracking was infilled during past maintenance works with no evidence from the inspection that this cracking has re-formed.	<u>General Conclusion</u> There are no specific concerns in regard to the embankment and general containment landform (including highwall areas). With respect to the embankment, stability is enhanced by the rising tailings level on the upstream side and the widened buttress into Centre Pit on the downstream side. <u>Upstream Batter</u> Despite the extent of vegetation growth on the upstream batter, there appears to be no immediate threat to the security of the embankment, and more likely contributes to reducing erosion across the batter surface. Nonetheless, regular inspections of the embankment batter should be undertaken to ensure that no issues (such as erosion, slumping or displacement) develop. <u>Tailings Deposition</u> The approach to previous tailings into IPT3 is to be encouraged when the operation recommences, which is based on discharge from the embankment. This approach contributed to development of a decant pond within the north-eastern portion of the storage. This pond has been maintained. The use of in-line flocculation for future operation is also encouraged to maximise separation of solid and water, and to facilitate higher tailings densities particularly towards the completion of deposition within the storage. This approach would contribute to final capping and rehabilitation. <u>Decant Recovery</u> Prompt decant water recovery should be continued under current (non-operational) conditions to manage the quantity of water retained within IPT3.

Regulated Dam	Aspect/Observation	Outcome and Recommended Action
IPT3 (con't)	<u>Embankments and General Containment Landform (con't)</u>	<u>Cracking</u> Cracking is not of current concern given that the tailings surface has risen (i.e., the effective embankment height has reduced) and given that no cracking can now be detected. Periodic inspection to confirm that no further cracking is developing is recommended. It is also recommended that grass established along the crest of the embankment, adjacent to the safety windrow, is cleared to enable greater visibility.
	<u>Emergency Spillway</u> The emergency spillway for IPT3 was constructed in 2020, being delayed given that the portion of embankment crest intersected, was previously being used as a mine haul road to Centre Pit. The initial design dimensions of the spillway (30m wide x 1m deep) were adopted in construction, with analysis confirming compliance with the design criteria. Considerable shrub/tree growth has established across the spillway inlet on the adjacent upstream embankment batter. This growth extends 4 to 5m above the crest.	It is recommended that the trees and shrubs established across the spillway inlet on the upstream embankment batter be removed, at least to below the spillway crest level. It is also recommended that in the very unlikely event that the full supply level for the storage is approached, the safety windrow across the crest of the spillway is removed. Although the serviceability of the spillway is not necessarily affected by the presence of the windrow, the efficiency of flow through the spillway would be improved.
	<u>Containment Requirements</u> Hydraulic performance criteria are defined for IPT3 under EPML00335713 (the EA). These criteria have been adopted for the purpose of analysis to confirm the suitability of storage availability. Analyses to quantify these requirements have also been undertaken, with output as follows: • Design Storage Allowance (DSA) 189ML • Mandatory Reporting Level (MRL) RL458.6m It is noted that under the updated EA, the DSA for IPT3 has been increased a1 in 20-year AEP, being greater than under the previous EA (which was based on a 1 in 10-year AEP event)	• The available capacity within IPT3 is estimated to be 1,298ML (as at 1 November 2022), therefore is greater than the DSA. • Measured water level within IPT3 as at 1 November 2022 has been taken as RL453.1m, therefore is lower than the MRL of RL458.6m. DSA and MRL compliance are achieved based on these conditions.

The other dams listed above have been decommissioned and rehabilitated, or otherwise exist as LOW consequence category structures, therefore no longer meet the functions of a regulated dam. **Table ES2** recommends actions in relation to these dams assessed based on the inspection undertaken.

TABLE ES2: SUMMARY OF RECOMMENDATIONS FOR OTHER DAMS INCLUDED IN ANNUAL INSPECTIOM

Dam (Structure)	Recommended Action
TSF1 and TSF1 Extension	For both TSF1 and TSF1 Extension, it is recommended that drainage batter chutes proposed by NAC are installed to direct stormwater runoff from the rehabilitated surface into the adjacent Centre Pit area. This will enable drainage from TSF1 to be diverted away from the drainage bywash between TSF1 and PRD. These works will also enable placement of the final strip of topsoil adjacent to the outer embankment and to establish vegetation within this area.
	The area where the mine haul road has crossed the TSF1 Extension embankment should be monitored over time. Although no observations of concern exist, it is likely that the excavation has intersected the upper portion of the old tailings beach (or at least the margins of the tailings deposit). It may be prudent as part of final rehabilitation works to backfill this shallow excavation and reform the embankment batter.
Pond Return Dam (PRD)	Small trees (wattles) have colonised across the spillway at PRD. Although not an issue, it may be prudent to remove these trees to improve access into the PRD area, and to ensure that any drainage through the spillway is not impeded.
IPT1	No actions recommended
IPT2/1	No actions recommended
IPT2/2	Efforts to close out the remaining area of exposed tailings in IPT2/2 should be made as soon as practicable. Although not a particular risk if this small area remains exposed, until final capping is completed, rehabilitation of this area will not be possible.

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1 INTRODUCTION

1.1 Background

New Acland Coal Mine is an open cut coal mining and processing project, owned and operated by New Acland Coal Pty Ltd (NAC), a wholly owned subsidiary of New Hope Coal Corporation Australia. The New Acland mine site is located approximately 15km northeast of the Jondaryan township, in southern Queensland. Site locality and general site layout details are shown on **Figure 1**.

The New Acland coal mining operation has accessed economic coal measures of the Walloon Coal Measures, as part of the Surat-Moreton Basin. Mining commenced in 2002, following acquisition of the site from Shell Coal Australia Pty Ltd. Mining has occurred from four pits, located within 2 mining leases (ML50170 and ML 50216) covering a total area of some 2,278ha.

Open-cut mining has employed conventional truck and shovel methods. ROM coal has been washed through the coal handling and processing plant (CHPP), located within the mining lease. The product coal has been railed to the Port of Brisbane, some 250km to the east.

Both coarse reject and fine reject (tailings) have been produced from CHPP processing of ROM coal at New Acland. Coarse reject has typically been trucked for co-disposal with mine overburden within former mining voids, as well as for rehabilitation of tailings emplacements. Tailings have been disposed as a slurry within operational tailings storages. Rejects production rates as a proportion of total ROM coal feed to the plant have been typically as follows:

- Coarse Reject 25 to 35%
- Fine Reject (Tailings) 15 to 20%
- Total Reject Production 40 to 55%

1.2 Current Project Status

The New Acland operation has previously produced up to 5.2 million tonnes per annum (mtpa) of thermal coal product. Mining and processing temporarily ceased by June 2022 awaiting regulatory approvals for ongoing (Stage 3) development to be secured.

NAC has indicated that coal production will recommence in July 2023 and will ramp up to full production over a period of some 18 months thereafter.

1.3 Annual Inspection of Regulated Dams (Structures)

1.3.1 Regulatory Context

A regulated structure means any structure in the SIGNIFICANT or HIGH consequence category as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/193315) **[1]**. In accordance with the Guideline for structures which are dams or levees constructed as part of environmentally relevant activities **[2],** regulated structures are subject to annual inspection and reporting by a suitably qualified and experienced person

1.3.2 EA Conditions relevant to Regulated Dams

Regulatory approvals for Stage 3 development of the New Acland project were secured during the second half of 2022. The ongoing development and operation of the project is therefore now covered by Environmental Authority (EA) Permit No EPML00335713 (effective date 26 August 2022, coinciding with granting of the new mining lease).

Requirements of the EA related to annual inspections are reproduced in **Table 1** in relation to the following:

- Conditions J1 to J3 Regulated Dams and Levees (Consequence Category Assessment)
- Conditions J24 to J27 Annual Inspection Report

TABLE 1 : EA CONDITIONS RELEVANT TO REGULATED DAM ANNUAL INSPECTION

No	Condition
Regulated Dams and Levees	
J1	*The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the Manual for Assessing Categories and Hydraulic Performance of Structures (EM635) at the following times:* *a) prior to the design and construction of the structure, if it is not an existing structure; or* *b) if it is an existing structure, prior to the adoption of this schedule; or* *c) prior to any change in its purpose or the nature of its stored contents.*
J2	*A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence for more than one structure.*
J3	*Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the Manual for Assessing Consequences Categories and Hydraulic Performance of Structures (EM635).*
Annual Inspection Report	
J24	*Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.*
J25	*At each inspection the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure.*
J26	*The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).*
J27	*The environmental authority holder must:* *a) Within twenty (20) business days of receipt of the annual inspection report provide to the administering authority:* *i. the recommendation section of the annual inspection report; and* *ii. if applicable, any actions being taken in response to those recommendations; and* *b) If, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the environmental authority holder, provide this information to the administering authority within ten (10) business days of receipt of the request.*

1.4 Scope of Annual Inspection

1.4.1 Regulated Dams Register

A Consequence Category Assessment (CCA) in relation to all existing and decommissioned dams at the New Acland mine site was completed to comply with Condition J1 of the EA (refer **Section 1.3.2**), and identifies all dams that are regulated.

A Register of Regulated Dams is maintained by NAC, informed by the CCA. The dam(s) contained on the register is limited to:

- In-Pit Storage 3 (IPT3) SIGNIFICANT Consequence

1.4.2 Scope Outline

In accordance with EA conditions as outlined in **Section 1.3.2**, NAC has commissioned ATC Williams Pty Ltd (ATCW) to undertake a 2022 Annual Inspection for regulated dams (structures), with the requisite annual inspection report presented herein.

The 2022 annual dam safety inspection was undertaken by Mr Allan Watson (RPEQ 5721) from ATCW. The inspection was carried out on 5 October 2022. The scope of the inspection and associated dam safety review was as follows:

- To identify any elements of regulated structures or associated systems that are of concern or are deficient from a dam safety perspective, with emphasis on embankments and hydraulic controls.
- To assess available surveillance/monitoring data that provide background to performance of regulated dams.
- To evaluate available storage capacities for regulated dams, to demonstrate that compliance with relevant EA conditions is achieved.
- To provide recommendations for measures to be taken, as appropriate, to ensure the ongoing safety of the regulated dams.

The following methodology was adopted to address the above scope:

- Discussions were held with NAC personnel responsible for ensuring that appropriate regulatory conditions are fulfilled.
- An inspection of all regulated dams was undertaken, and a photographic record compiled.
- A hydrological/hydraulic assessment of available storage against containment requirements for regulated dams was undertaken.

Based on **Section 1.4.1**, the above scope of works has applied to IPT3 being the only regulated structure at the New Acland site. In addition, a review of the status of dams that were referred to in the previous version of the EA has been undertaken, the purpose being to assess overall integrity of these structures, particularly assessing the current stage of closure and rehabilitation, where relevant. These dams are listed below:

- Tailings Storage Facility 1 (TSF1)[3] – Decommissioned and rehabilitated
- TSF1 Extension – Decommissioned and rehabilitated
- Environmental Dam 2 – Removed as a result of past open cut mining
- In-Pit Tailings Dam 1 (IPT1) – Decommissioned and rehabilitated
- In-Pit Tailings Dam 2/1 (IPT2/1) - Decommissioned, with landform development commenced and commencement of topsoil placement
- In-Pit Tailings Dam 2/2 (IPT2/2) – Decommissioned, with tailings surface capping substantially completed

In the context of the current EA, consideration for excluding these dams from future annual inspections will be made.

[3] Pond Return Dam forms part of TSF1 and is an operational storage used for transfer of process water from the mining area to the CHPP and is currently active.

1.5 Structure of Report

Based on the scope and methodology of the inspection as described in **Section 1.2**, the structure of this review report is as follows:

Section 2.0: Provides a description of IPT3, also describing current conditions.

Section 3.0: Describes the other dams addressed as part of the annual inspection.

Section 4.0: Summarises the assessment of compliance with EA nominated hydraulic performance criteria for IPT3

Section 5.0: Presents the results of the inspection undertaken on IPT3, including a review of operational aspects.

Section 6.0 Summarises significant outcomes from the inspection and dam safety assessment and provides recommendations for further action, as related to regulated dam IPT3. A summary of recommended actions for the other dams included in the annual inspection is also provided, addressing potential or emerging issues.

A series of plans are also attached that locate the New Acland Coal Mine site and shows the current conditions associated with each dam inspected as part of this dam safety review.

2 DESCRIPTION OF IN-PIT TAILINGS DAM 3 (IPT3)

2.1 IPT3 Design

The design of IPT3 was prepared in 2013 **[1]** based on the *Code of Environmental Compliance for Environmental Authorities for High Hazard Dams Containing Hazardous Waste* (2012), being the predecessor of the Manual **[1].**

The as-built and operational layout of IPT3 is shown on **Figure 004**.

2.2 IPT3 Construction

IPT3 was constructed during 2014 and 2015, and commissioned in 2015/16.

The IPT3 storage is formed by a semi-engineered embankment as a western partition within the Centre Pit, as shown in **Figure 004**. Key features of embankment construction are described as follows:

- The embankment was constructed using run-of-mine (ROM) waste rock material, typically comprising weathered mudstone/sandstone, with the embankment founded onto an insitu floor;
- Mine waste was placed and compacted utilising the mobile mining fleet. The inner batter was progressively shaped and trimmed; and
- Over time, the downstream batter of the embankment was buttressed by mine waste, placed as part of the ongoing Centre Pit operation.

The as-constructed embankment configuration is summarised as follows:

- Embankment crest level — RL 460m
- Upstream Batter — 1.5(H) to 1(V) slope
- Downstream Batter — The as-constructed downstream batter was 2(H) to 1(V) prior to buttressing as part of Centre Pit development
- Embankment Crest Width — Based on current (July 2022) survey as shown on **Figure 004**, the embankment crest width (northern portion) is at least 100m, buttressed as part of Centre Pit development, transitioning onto a downstream batter with slope of around 10(H) to 1(V). The southern portion of the embankment is in excess of 250m wide.
- Drainage catchment reporting to IPT3 — 32.2ha
- Total As-Constructed Storage Capacity (to proposed emergency spillway level of RL459m) — 6,850ML (pre-deposition)

The northern and southern ends of the storage are formed by a portion of highwall, with the eastern edge comprising an exposed batter of the overburden waste dump area.

2.3 Construction of IPT3 Emergency Spillway

Construction of the IPT3 emergency spillway was initially deferred, permitting the proposed spillway alignment to be used as part of the Centre Pit haul road. A tailings level of RL449m (10m below the design emergency spillway level of RL459m) was adopted as a trigger, whereby as tailings reached this level, construction of the spillway was to be undertaken. This trigger level was reached during 2019, with emergency spillway construction completed in June 2020, which included the provisions:

- The spillway was extended across the full width of embankment buttressing to ensure daylighting into Centre Pit. The total length of the spillway channel is therefore around 100m.
- The spillway section adjacent to the upstream crest edge of the IPT3 embankment incorporates “cut out” bunds to provide a safety windrow.

The location of the emergency spillway is shown on **Figure 004**.

2.4 Status of IPT3/Operational Aspects

2.4.1 IPT3 Embankment

The geometry of the IPT3 embankment has not changed since construction, other than emplacement of a safety bund, some 2 m height and 5m width along the upstream embankment edge.

The crest of the embankment has been sheeted, with access available along the full length of the embankment and safety bund. This access road is some 10m wide and is currently well grassed.

The upstream batter of the embankment has experienced some erosion over the period of operation, as a result of rainfall and stormwater runoff. Erosion rilling is not severe. Across the length of the upstream batter, a significant growth of shrubs/small trees and grass undergrowth has self-propagated. This growth inhibits a clear view of the exposed portion of the batter, although there is significant exposure to assess batter condition, noting that the exposed (vertical) batter height is now limited to around 6 to 7m.

The current condition of the IPT3 embankment is shown on **Photo 1**.

PHOTO 1: CURRENT CONDITION OF IPT3 EMBANKMENT

Typical Upstream Embankment Batter Conditions

Typical Condition of Embankment Crest

It is noted that no portion of the as-built downstream batter remains exposed due to the extent of buttressing placed in conjunction with Centre Pit operation.

2.4.2 Emergency Spillway

The emergency spillway, as described in **Section 2.3**, remains in as-built form. The current condition of the spillway is shown on **Photo 2**, with key observations being:

- Heavy grass growth across the crest of the spillway, particularly within the zone of the embankment. Further towards Centre Pit, grass growth is less established.
- Very heavy shrub growth on the upstream batter of IPT3 directly adjacent to the spillway.
- Adjacent to the cut-out bunds, on the downstream edge, tailings delivery and return water pipelines are supported on concrete plinths

PHOTO 2: CURRENT CONDITION OF IPT3 EMERGENCY SPILLWAY (FROM NORTHERN EDGE)

Spillway from Northern Edge

Upstream Embankment Edge of Spillway

2.4.3 General Condition of Tailings Emplacement

Through the period of operation, tailings have been deposited into IPT3 via single point discharges, configured as follows:

- Initially from the north-eastern end of the storage discharging towards the south, with the delivery line located on a ramp that remains in the northern corner.
- In 2017, two additional discharge points were located at the south-eastern corner of the storage, depositing towards the north.
- In 2019, 5 additional single points of discharge were established along the western storage embankment, with beaching towards the northeast (in the direction of the access ramp).

The inspection indicates that no appreciable deposition has occurred into IPT3 since November 2021 (date of the previous dam safety review). The current tailings beach has therefore remained unchanged over the past 12 months, with the beach sloping generally towards the east and north forming a decant pond against the access ramp. A pump has been established on the ramp for decant water recovery purposes.

Further observations from the dam inspection and review of available data are as follows:

- Based on the survey presented in **Figure 004**, the tailings beach within IPT3 falls generally from south to north and east to west, with a low point formed within the north-eastern corner. An overall beach slope of around 0.7% has been formed.
- The tailings beach is substantially exposed (i.e. not water covered), with a large portion of this beach, particularly within the northern portion of the storage, supporting a thick reed growth. Within the southern portion, possibly where coarser tailings have been deposited, reeds have not established.
- A ponton mounted pump is established on the ramp into the storage, located at the northern end of the area. It is understood that water from IPT3 is actively recovered for use in site activities (such as dust suppression through the current non-operational period).
- Other than the IPT3 embankment, the principal exposure around the storage is the remnant section of highwall. These sequences appear to be subject to considerable surface erosion, however no major displacement or slips across this near vertical batter has been observed.

Photo 3 shows IPT3 under current conditions showing the tailings beach configuration

PHOTO 3: CURRENT TAILINGS STORAGE CONDITION OF IPT3

View from southern end of embankment

View from central portion of embankment

Decant Pond Extent

Decant Pump

2.4.4 Deposition and Decant Recovery Aspects

As indicated in **Section 2.4.3**, no appreciable deposition has occurred into IPT3 since November 2021.

Whilst deposition has temporarily ceased, it is understood that the flocculent dosing system previously used for in-line dosing of tailings discharge to facilitate segregation of solids and water, will remain and be re-commissioned with future deposition. **Photo 4** shows the layout of the flocculent dosing system.

PHOTO 4: FLOCCULENT DOSING SYSTEM

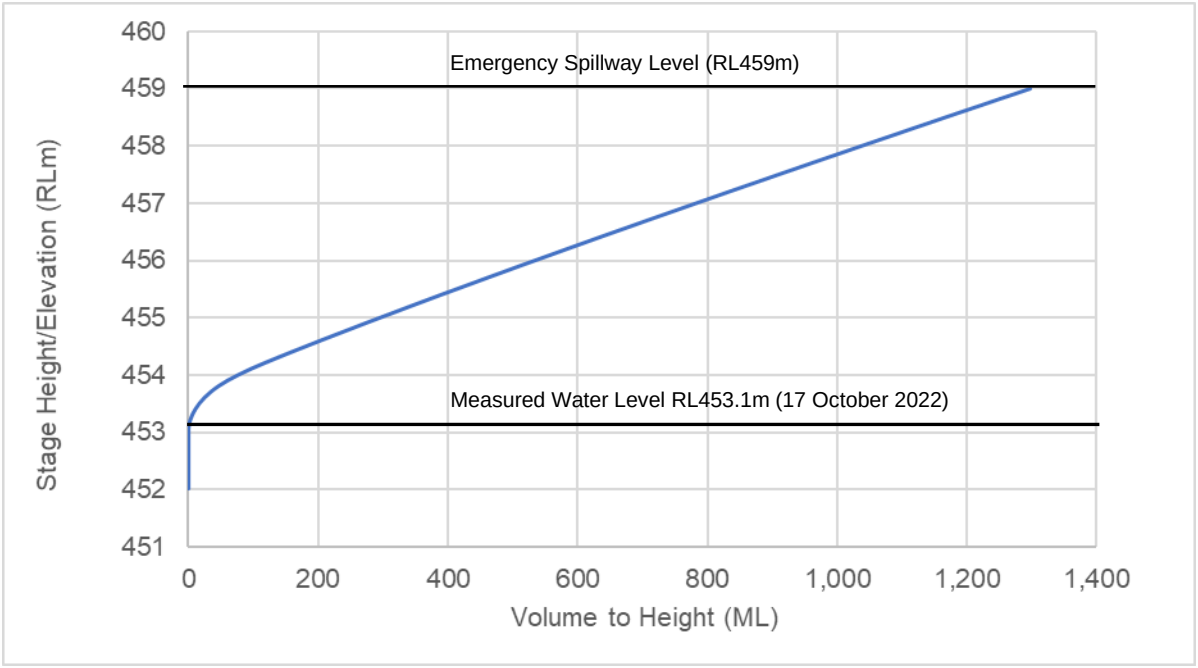
As also described in **Section 2.4.3**, a pontoon mounted pump is located at the access ramp at the north-eastern corner of the IPT3 storage. Water is being actively recovered, typically via standpipe to water trucks for on-site use. It is also understood that a return water line from IPT3 to the CHPP remains (refer **Section 3.2**).

NAC has advised that the decant pond water level as at 17 October 2022 was RL453.1.

2.4.5 IPT3 Storage Capacity

NAC has provided July 2022 survey for the tailings beach in IPT3. This survey is shown on **Figure 004** and given that no deposition has occurred since this time, has been used as a basis for a storage analysis. Results of this analysis are presented in the form of a storage curve provided as **Graph 1**.

GRAPH 1: STORAGE ANALYSIS FOR IPT3



It is noted that survey has been taken to the decant pond surface, therefore ignores the available storage capacity if the pond was dewatered. This is a conservative position.

Based on **Graph 1,** the available storage capacity (above the surveyed tailings beach/decant pond level) to the emergency spillway level of RL459m based on the July 2022 survey is calculated to be

1,298ML. Given that no further deposition within IPT3 will occur until the second half of 2023, it can be assumed that this storage capacity will exist as at 1 November 2022.

In summary, the following storage conditions have been adopted as at 1 November 2021:

- Decant pond water level — RL453.1m[4]
- Available storage capacity (above tailings beach level) — 1,298ML

By comparison with the tailings beach survey completed in 2021, it is noted that the IPT3 capacity has increased. Whilst some deposition has occurred over this period, a net increase in storage would have resulted from consolidation of the tailings beach over this period.

[4] Refer **Section 2.4.4**

3 OTHER DAMS INCLUDED IN ANNUAL INSPECTION

3.1 Out-of-Pit Tailings Storage Facilities

3.1.1 Overview

The precinct that contains Tailings Storage Facility 1 (TSF1) and TSF1 Extension is located within the north-western portion of the NAC land holding, and directly south of the coal handling and preparation plant (CHPP), as shown on **Figure 1**.

Tailings Storage Facility 1 (TSF1) was constructed as part of mine development around 2001 as the "start-up" tailings storage facility for the New Acland operation. This storage was augmented around 2004 with construction of the TSF1 Extension. TSF1 and TSF1 Extension were accessed for tailings deposition until 2007, at which time tailings deposition was transferred to in-pit storages (refer **Section 2.3**).

During operation of TSF1 and TSF1 Extension, a decant pond was formed in the north-western portion of TSF1, by construction of an earthfill partition through the storage. The decant pond is referred to as the Pond Return Dam and remains as the principal process water pond for the CHPP (refer **Section 2.2**).

A general layout for Out-of-Pit Tailings Storage Facilities is shown on **Figure 002**.

3.1.2 TSF1

Development Description

TSF1 was developed as an out-of-pit storage within the western portion of the TSF1 precinct (refer **Figure 002**). The storage was formed by engineered earthen fill embankments that extend generally east to west and south to north. It is understood that earth fill used in embankment construction was sourced from within the storage area, and possibly from construction of the adjacent spill channel.

An estimate of the external embankment configuration for TSF1 is as follows:

- Batter Slope — Downstream — 2(H) to 1(V)
  Upstream — 1.5(H) to 1(V)
- Crest Width — 4 to 5m
- Crest Level — RL457.0m

The off-storage catchment reporting to TSF1 is limited to a small area around the northern margin of the tailings beach area.

The emergency spillway for the storage, with a crest level of RL455.6m, was constructed at the end of the south - north embankment section (at the north-western corner of the storage), but now forms part of Pond Return Dam (refer **Section 3.2**).

Tailings were deposited into TSF1 to a maximum practical extent, generally at an elevation within 1m of the embankment crest. It is evident that tailings deposition occurred from the north-eastern margin, with a completed beach falling towards the embankment along the western and southern edges. A beach slope estimated to be between 0.5 and 2.0% was achieved. The likely maximum depth of tailings within the storage is 10m.

TSF1 Rehabilitation

Following deposition into TSF1 the tailings beach was permitted to dry and consolidate. Capping works as part of rehabilitation for TSF1 (and TSF1 Extension – refer **Section 3.1.3**) commenced in June 2012. These works comprised a sequenced earthworks program, described as follows:

- Dewatering of the tailings surface to enhance exposure to air-drying to enable access for capping layer construction.
- Placement of a minimum 1.0m nominal thick layer of coarse rejects (referred to as the primary layer). The reject comprised coarse sized sandstone/siltstone and coal fragments, with minimal fines.
- Placement of a minimum 1.0m secondary layer of either coarse rejects or coarse overburden material over the primary layer.
- Placement of layers of mine overburden as a subsurface capping horizon (principally to reduce the potential for moisture infiltration into the underlying tailings).
- Placement of a topsoil layer for revegetation purposes.

Earthworks, topsoil placement and revegetation were completed during 2017/18, with the only remaining works being formalisation of drainage chutes on external batter surfaces together with placement of a final strip of topsoil adjacent to proposed chute locations. In the absence of these chutes, surface drainage from the rehabilitated surface of TSF1 continues to report to either Pond Return Dam to the west via an armoured bywash, or onto TSF1 Extension to the east.

It is noted that no specific rehabilitation works to external batter slopes of the TSF1 embankments has been undertaken, although these batters remain well grassed.

The current condition of TSF1 following rehabilitation works is shown on **Figure 002**.

Photo 5 shows the typical condition of the rehabilitated surface of TSF1.

PHOTO 5: CONDITION OF TSF1 REHABILITATION – FROM WESTERN EDGE

3.1.3 TSF1 Extension

Development Description

TSF1 Extension was developed as a separate storage to TSF1, formed by engineered embankments along the south-eastern margins and the common eastern TSF1 embankment. A similar construction approach to TSF1 is understood to have been adopted. An estimate of the embankment configuration for TSF1 Extension is as follows:

- Batter Slope 2(H) to 1(V)
- Crest Width 4 to 5m
- Crest Level RL456.7m

The off-storage catchment of the TSF1 Extension area extends to the northeast and is limited by the existing mine haul road (refer **Figure 002**).

The emergency spillway for TSF1 Extension was located at the south-eastern corner of the storage, which discharged to a spill channel that flows east to west along the outer southern edge of TSF1 Extension.

Tailings were placed within TSF1 Extension to a maximum practical extent, generally at an elevation within 1m of the embankment crest. It is noted that tailings deposition occurred from the north-eastern margin, with a completed beach falling towards the embankment forming the western and southern edges. A beach slope of between 0.5 and 2.0% has been estimated. The likely maximum depth of tailings within the storage is 12m.

TSF1 Extension Rehabilitation

Rehabilitation works within TSF1 Extension commenced in June 2012 and were completed around 2017/18. The emergency spillway for TSF1 Extension was infilled as part of capping works.

Similar to TSF 1 described in **Section 3.1.2**, earthworks, topsoil placement and revegetation have been completed, with the only remaining works being formalisation of drainage chutes on external batter surfaces. In the absence of these chutes, surface drainage from the rehabilitated surface reports onto TSF1 to the west or onto an access road that traverses the eastern margin of the area (which reports to Centre Pit to the south).

No specific rehabilitation works to external batter slopes of the TSF1 Extension embankments has been undertaken, although these batters remain well grassed.

Post-Rehabilitation Modifications

The rehabilitated TSF1 Extension was modified during the period between 2018 and 2019 with construction of a mine access road into the now complete Centre Pit located to the south. The access road traverses the eastern margin of the area, through the embankment (to the west of the previous location of the spillway) and along the southern edge of the embankment. This access road comprised a small depth of excavation into the tailings, with the bulk of the formation formed by filling beyond the storage embankment.

In terms of the pit extents, a separation distance between the TSF1 Extension embankment and the edge of the open cut has been retained. It is evident that the eastern extent of the Centre Pit followed the southern edge of the access road and approached the toe of the eastern portion of the TSF1 Extension embankment. Although the separation distance at this location has been minimised, there has been no evidence of any displacement or instability of the remnant embankment since completion of this portion of the pit in 2018. Furthermore, a degree of backfill into this portion of the pit has been undertaken.

The current condition of TSF1 Extension following rehabilitation works is shown on **Figure 002**.

Photo 6 shows the typical condition of the surface of TSF1 Extension.

PHOTO 6: CURRENT CONDITION OF TSF1 EXTENSION

View onto TSF1 Extension from Eastern Edge

View from TSF1 Extension Embankment from Haul Road

3.2 Pond Return Dam (PRD)

3.2.1 Configuration of PRD

The Pond Return Dam (PRD) is contained within the north-western portion of TSF1 (as described **in Section 3.1.2**), and accommodates the emergency spillway initially formed for TSF1, at its northern edge. As a result of the rehabilitated form of TSF1, the emergency spillway services only the PRD.

The embankments that form the PRD comprise the following:

- The northern and western embankments were constructed as part of TSF1, with estimated configuration as follows:

Batter Slope	Downstream	2(H) to 1(V)
	Upstream	1.5(H) to 1(V)
Crest Width		4 to 5m
Crest Level		RL456.5m

- The southern embankment was formed after the commencement of tailings deposition into TSF1, as a partition using earthen fill to the same crest level as TSF1, with batter slopes of the order of 1.5(H) to 1(V) and crest width of around 3m. It is understood that this embankment is founded on a previously placed tailings beach.

The configuration of the emergency spillway located along the northern edge of the storage is as follows:

- Width 11m
- Batter Slopes 10 (H) to 1(V)
- Crest Level RL455m

PRD has been used as a surge storage primarily for makeup process water to the CHPP. Inputs to PRD have been sourced from a range of site water sources, primarily residual void areas. It is also understood that pump return access from PRD to IPT3 exists through the CHPP.

In addition, this dam is subject to runoff from a small portion of the capped TSF1 surface, which reports via a rock fill armoured batter drain at the south-western corner of the storage. The effective drainage catchment reporting to PRD (including footprint area) based on available survey data is around 12ha. It is noted that subject to construction of batter chutes across the remnant TSF1 and TSF1 Extension batters to manage drainage from the rehabilitated landform, the catchment from TSF1 into PRD will be diverted.

3.2.2 Operational Conditions for PRD

NAC has reported that a nominal feed rate of process water to the CHPP from the PRD is some 12ML per day, with additional available transfer capacity to other storages of 4ML/day.

Operationally, a range of operating pond water levels within PRD is maintained, ranging between 1m and 3.2m below the spillway level (RL455.6m). These operating levels are therefore:

- High Water Level RL454.6m
- Low Water Level RL452.4m

When the plant is not running, the maximum transfer capacity of 16ML/day may be diverted through the plant, into the tailings delivery line, and into IPT3 (as an emergency measure). It is understood that alternative arrangements under such emergency conditions can also be made to divert discharge into residual voids where IPT3 capacity is threatened, such that capacity within PRD is maintained.

The PRD is shown on **Figure 002**. **Photo 7** shows the current condition of the storage and spillway.

PHOTO 7: LAYOUT OF PRD

PRD from Northern Edge

External PRD Embankment from West

PRD Spillway

3.3 In-Pit Tailings Storage Facilities

3.3.1 Overview

On completion of tailings deposition into the out-of-pit storages (TSF1 and TSF1 Extension, refer **Section 3.1**), in-pit tailings storage development within the western margin of the North Pit commenced. Three storages, IPT1, IPT2/1 and IPT2/2 were formed in sequence. As these in pit storages reached capacity, IPT3 (refer **Section 2**) was constructed within the eastern portion of Centre Pit, to the south of IPT 2/2. Each in-pit storage (IPT1, IPT2/1 and IPT2/2) is formed by a combination of insitu (unmined/high wall) sequences, overburden dumps and semi-engineered embankments (formed also as haul roads).

The extents of the In-Pit Tailings Dam Precinct and layout of in-pit dams are shown on **Figures 003** and **004**.

Approximate timing for development of these in-pit tailings dam has been as follows:

- IPT1 2009
- IPT2/1 2011
- IPT2/2 2012

3.3.2 In-Pit Tailings Dam 1 (IPT1)

Development

IPT1 was formed by construction of bund walls to form the southern and eastern extents of the storage. It is understood that the bunds were constructed as part of the mining operation using mine overburden. The nominal external bund configuration comprised a crest width of between 30 and 50m and batter slopes of 35 degrees. A full supply level of RL467m resulted, with an emergency spillway formed at the south-eastern corner, reporting to a decommissioned haul road.

The pit floor on which perimeter bunds were constructed rose from a nominal level of RL430m on the southern margin to RL441m on the northern margin.

Tailings deposition within IPT1 occurred substantially from the eastern end, with campaigns from single point discharge locations along the northern and southern margins. A low point within the beach formed at the western end, from which decant water was extracted. The final campaigns of deposition into the storage ceased in 2014/15, with an upper tailings beach level within the eastern end of around RL467m (broadly coincident with the spillway crest).

IPT1 Rehabilitation

Capping works across the completed IPT1 tailings surface commenced in 2015. The general capping approach, which has subsequently been adopted for IPT2/1 and IPT2/2, was as follows:

- Remove ponded water from the surface of the tailings beach.
- Place and spread a layer of coarse reject across the exposed tailings surface, generally advancing either east to west or west to east. (Any heave of tailings occurring within the centre of storage was allowed to stabilise, then later capped.)
- Place, spread and compact a “sealing layer” (clayey mine overburden) across the coarse reject layer. (Where the tailings surface was sufficiently competent, the coarse reject layer in small areas was omitted, with the “sealing layer” placed directly onto dried tailings.)
- Place mine overburden across the capped tailings surface to create a final landform, either by pushing down from perimeter embankments or by hauling and placing using mine plant from active mining areas.
- On reaching a final landform profile, place topsoil and revegetate by seeding.

The IPT1 rehabilitation works, including seeding/revegetation, were substantially completed by 2019.

The final landform drains generally to the southwest. To assist in drainage control, a series of contour drains/swales have been formed across the slope, with these drains directed into a rock armoured drainage channel. The current condition of IPT1 is shown in **Figure 003**. **Photo 8** shows the general layout of this area.

PHOTO 8: REHABILITATED CONDITION IPT1

View from North Eastern Corner

3.3.3 In-Pit Tailings Dam (IPT) 2 (formed by IPT2/1 and IPT2/2)

Development Description

IPT2 was formed as 2 cells (namely IPT2/1 and IPT2/2), separated by an internal wall (mine waste embankment).

IPT2/1 and IPT2/2 were formed by embankments constructed within the mine pit using mine overburden placed as part of the mining operation, using a similar approach to IPT1. Minimum crest levels for bunds on the southern and eastern margins of each storage were as follows:

- IPT2/1 Southern Bund Crest Level RL 460m
  Eastern Bund Crest Level RL 457m
- IPT2/2 Southern Bund Crest Level RL 462m
  Eastern Bund Crest Level RL 456m

Based on a nominal floor level of RL425m (from SKM, 2009), embankment heights forming each individual storage were of the order of 35m.

Beyond these embankments, the western portion of each storage and the southern edge of IPT2/2 were formed by insitu high walls. The length of high wall along the southern margin was further raised by overburden placement to form a mine haul road.

Tailings deposition within IPT2/1 occurred predominantly from the eastern edges, and thereafter from multiple single point spigots from both the northern and southern edges. This deposition layout formed a low point in the tailings beach generally along the western edge, at which decant pumping systems were established. Deposition within IPT2/2 occurred similarly to IPT2/1, with discharge predominantly from the northern embankment. The decant location was within the south-western corner of the storage.

Deposition into IPT2/1 ceased in 2016, and into IPT2/2, ceased in 2017. At this time, deposition transferred into IPT3.

IPT2/1 Rehabilitation

Capping works of the tailings surface within ITP2/1 commenced in 2017 using a similar approach to IPT1 (refer **Section 2.3.2**). These works, including seeding/revegetation, were substantially completed by 2021.

The final landform drains generally to the southwest, tying into the IPT1 final landform on the northern edge.

The current condition of IPT2/1 is shown in **Figure 003**. **Photo 9** shows the general layout of this area.

PHOTO 9: REHABILITATED CONDITION IPT2-1

View from Eastern Edge of ITP1 looking towards IPT2-1

IPT2/2 Rehabilitation

Capping within IPT2/2 commenced around 2018, at a time soon after the start of capping of IPT2/1, with a similar capping approach to IPT1 and IPT2/1 adopted. Concurrent capping works continued within IPT2/1 and IPT2/2. **Figure 003** indicates that a portion of tailings remains exposed, with these tailings supporting a significant reed growth. The width of exposed tailings is currently less than 300m (east to west), located generally in the centre of the former storage area.

It is understood that capping works will continue while the site remains non-operational, with a view to complete the rehabilitation of IPT2/2 within the next 2 years.

The remaining area of exposed tailings in IPT2/2 as at the time of inspection (October 2022) is shown on **Photo 10.**

PHOTO 10: REMAINING PORTION OF CAPPING REQUIRED IN IPT2/2

4 CONTAINMENT AND FREEBOARD ASSESSMENT FOR IPT3

4.1 Hydraulic Performance Criteria

Based on the CCA for New Acland storages, consequence categories assessed for the dams considered as part of this dam safety review are as follows:

- Tailings Storage Facility 1 (TSF1) – LOW
- TSF1 Extension – LOW
- Pond Return Dam (PRD) – LOW
- In-Pit Tailings Dam 1 (IPT1) – – LOW
- In-Pit Tailings Dam 2/1 (IPT2/1) – LOW
- In-Pit Tailings Dam 2/2 (IPT2/2) – LOW
- In-Pit Tailings Dam 3 (IPT3) – SIGNIFICANT

This indicates therefore that the only regulated structure at the New Acland site is IPT3 with a SIGNIFICANT consequence category. In accordance with the Manual **[1]**, minimum containment and freeboard requirements exist for IPT3, along with hydraulic performance criteria, summarised in **Table 2**.

TABLE 2: HYDRAULIC PERFORMANCE CRITERIA – IPT3

Name of Regulated Dam	Assigned Consequence Category	Design Storage Allowance (DSA) Critical Wet Period	Spillway Capacity Critical Design Storm	Mandatory Reporting Level (MRL)
IPT3	SIGNIFICANT	0.05 AEP 4-month wet season	AEP 0.001	AEP 0.01, 72-hour event

4.2 Assessment of Compliance against Hydraulic Performance Criteria

A review of compliance against hydraulic performance criteria for IPT3, based on **Section 4.1**, is presented below:

4.2.1 Design Storage Allowance

The *Design Storage Allowance* (DSA) is defined as the excess storage as at 1 November of each year to provide for process inputs for the coming year, plus runoff from the critical wet season. The basis for DSA assessment from the Manual **[1]** for a SIGNIFICANT consequence category storage is outlined below:

- Critical wet season 4 months
- Annual Exceedance Probability (AEP) 0.05 (1 in 20-year AEP)[5]
- DSA determined by adding the process inputs for the wet season period and the rainfall runoff (assuming no losses) for the critical wet season period. As per **Section 2.4.3**, production at the New Acland project will not re-commence until the second half of 2023 (i.e. beyond the 2022/23 wet season), therefore process inputs for the purpose of DSA assessment can be ignored.

A summary of DSA requirements for IPT3 based on the above conditions, using the method of deciles, is provided in **Table 3**.

TABLE 3: DESIGN STORAGE ALLOWANCE (DSA) FOR IPT3

Regulated Dam	IPT3
Critical Wet Period	4 months
Design Risk (**Table 2**)	0.05 (1 in 20 year AEP)
Runoff from Design Critical Wet Period	
- Rainfall Total	590mm
- Catchment Area	32.2ha
- Runoff Coefficient	1.0
- Calculated Runoff	189ML
Storage demand for process inputs over design critical wet period	0ML
DSA	189ML

Based on the DSA assessment above, a comparison between available storage capacity in IPT3 and DSA requirements is summarised in **Table 4**.

TABLE 4: COMPARISON BETWEEN AVAILABLE STORAGE CAPACITY AND DSA REQUIREMENTS FOR IPT3

Regulated/ Active Dam	IPT3
Water Level (As at 1 November 2022)	RL453.1m
Available Storage Capacity	1,298ML Refer **Section 2.4.5**
DSA	189ML

It is noted that based on the storage analysis presented in **Section 2.4.5**, the IPT3 water level would need to be around RL458m to threaten the DSA.

[5] Note that the design criteria for DSA based on the current EA is greater than under the previous EA, increasing from a 1 in 10 year to 1 in 20 year AEP.

4.2.2 Emergency Spillway Requirements

An emergency spillway is a mandatory requirement for any regulated dam. IPT3 therefore requires a spillway and based on a SIGNIFICANT consequence category, is to be designed for a return interval of between 1 in 100 and 1 in 1,000-year event of critical duration **[1]**.

Dimensional details for emergency spillways to accommodate an upper bound design AEP of 1 in 1,000 are summarised in **Table 5**.

TABLE 5: DETAILS OF EMERGENCY SPILLWAY FOR IPT3

Emergency Spillway Level	Existing Spillway Dimensions
RL459m	30m x 1.0m

As indicated in **Section 2.4.2**, the emergency spillway was constructed in June 2020, with these works including extension of the spillway across the embankment buttressing to daylight into the Centre Pit. The spillway channel length is around 100m.

Measures were also incorporated to provide safe movement along the embankment crest, with the placement of a cut-out safety windrow.

It has been assessed that the as-constructed geometry of the emergency spillway, taking into account the longer channel length and the presence of the cut-out safety windrow, exceeds the capacity required to meet the design criteria.

4.2.3 Mandatory Reporting Level

The basis for determination and application of the Mandatory Reporting Level (MRL) for regulated dams is as follows:

> *The volume of water below the spillway crest equivalent to the AEP (design risk) 72-hour storm.*

The MRL for any storage is a level within any storage that, when reached, reporting to the administering authority is required, with corrective action to be prompted such that risk of release is minimised

The design risk for a SIGNIFICANT consequence storage from **Section 4.1** is a 1 in 10-year AEP.

A summary of MRL details for IPT3 is provided in **Table 6**.

TABLE 6: MRL FOR IPT3

Regulated Dam	IPT3
Design Risk (**Table 2**)	0.01
Rainfall Total	225mm
Catchment Area	32.2ha
Runoff Coefficient	1.0
Equivalent Volume (ESS)	72.5ML
Depth below Spillway Level to achieve Volume	0.4m
Emergency Spillway Level	RL459.0m
MRL	RL458.6m

5 RESULTS OF INSPECTIONS AND ASSESSMENT FOR IPT3

5.1 Operational and Monitoring Plan

Operation of IPT3 is based on maintaining the long-term integrity and operating effectiveness of the storage, across the following aspects:

- Pipeline integrity
- Pump (slurry or water) operation
- Tailings deposition location/Beach development
- Water pond levels
- Structural integrity of retaining structures or embankments
- Presence of severe erosion of earthworks surfaces
- Presence of seepage from embankment or other surfaces (particularly sediment laden seepage)
- Integrity/serviceability of emergency spillways

5.2 Inspection and Monitoring Results for IPT3

The 2022 annual inspection undertaken by ATCW was based on the critical operational management aspects listed in **Section 5.1**, supported by background and further advice on operational matters provided by NAC. A summary of observations made during the inspection, reporting on the current status or condition of IPT3, is provided in **Table 7**. This summary is prepared generally in relation to the following aspects:

- Storage Embankments
- Seepage and Drainage
- Emergency Spillway
- Pumps and Pipework
- Other Aspects (if relevant or not otherwise covered in previous descriptions)

TABLE 7: SUMMARY OF INSPECTION AND MONITORING OUTCOMES –IPT3

Aspect	Observations and Monitoring Results
Storage Embankments	The storage embankment forming the western margin of IPT3 has been constructed using mine overburden/waste rock material. The exposed portion of this embankment comprises the upstream (inner) batter and the crest. Along the full length of the inner embankment crestline, a safety berm, some 2m high and in excess of 5m wide has been formed. The internal batter was neatly trimmed as part of construction, and by inspection from a distance (eastern edge of the storage), as well as from the embankment crest (looking down onto the batter), appears to remain in good condition with no evidence of any movement or displacement. Some downslope erosion has formed, with rill depths less than 200mm (estimated), at spacing generally greater than 1m. Given that this batter has been formed now for several years, and experienced a number of wet seasons, it is considered that the surface has performed well. Furthermore, the exposure of the upstream batter has reduced significantly to a vertical height of between 6 and 7m, as a result of tailings deposition. Colonisation and growth of small trees (mainly wattles) and shrubs has occurred across the upstream batter and over the crest of the safety windrow. This has been evident in past years, although tree growth over the past 2 years has increased significantly. The embankment crest possesses a width of greater than 100m (and in locations up to 500m), resulting from backfilling within the adjacent Centre Pit. It is also noted that in all downstream areas, the backfill batter slope has been flattened to no steeper than 10%. In all places, the backfill acts to buttress and stabilise the embankment. The as-built embankment crest has been sheeted to allow all-weather access, and over the past 12 months has established a grass covering. Tension cracking had previously been observed parallel to the crest edge along the mid-section of the embankment (length of around 400m). Particular note of these areas was made during the current inspection, with no cracking observed.
Seepage and Drainage	No seepage downstream of the IPT3 embankment, beyond the extent of pit backfilling, has been reported.
Emergency Spillway	The emergency spillway was constructed in 2020. Emergency spillway design details are summarised in **Section 4.2.2**. It is noted that a grass growth has established across the spillway crest. Closely spaced shrub and small tree growth have also colonised on the upstream embankment batter directly adjacent to the spillway, which appear to have reached some 4 to 5m above the spillway crest.
Pumps and Pipework	Pipework exists around the IPT3, associated with both tailings deposition and decant water recovery. The main tailings delivery line is located along the inner crest edge of the main embankment, generally at the outer toe of the safety windrow. Five deposition sites along the embankment have been formed, generally as a shallow cut out through the safety windrow, with the discharge line draped over the internal embankment batter to discharge at the tailing beach level. A parallel pipe delivering flocculant to the discharge point has also been placed. Beyond the storage, tailings discharge lines are either buried or contained within bunds formed adjacent to IPT2/1 and IPT2/2. These are provided to contain any discharge from a pipe rupture. Water recovery from the storage occurs from the northern corner, using a pontoon mounted centrifugal pump, which has been established on the internal ramp at the north-eastern corner of the storage. The pump feeds a

Aspect	Observations and Monitoring Results
	standpipe located outside the IPT3 area which is accessed by water trucks for dust suppressions purposes.
Other	• Only minor amounts of tailings have been deposited into IPT3 over the past 12 months. No significant change in the tailings beach configuration has therefore occurred over this period. • An MRL marker is located along the access ramp into the IPT3 storage. • A tailings beach sloping generally south (east) to north (west) has resulted from deposition that has occurred from the IPT3 embankment. • Currently, the tailings beach is substantially exposed (i.e., above water), with a large portion of this beach supporting reed growth. The areas where reeds do not exist are more towards the south, possibly where coarser tailings have deposited.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 IPT3

A summary of the outcomes from the 2022 inspection and review for regulated dams is provided in **Table 8**. These outcomes have been presented in relation to IPT3 as the only regulated dam within the New Acland project site.

TABLE 8: SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS FOR REGULATED DAMS

Regulated Dam	Aspect/Observation	Outcome and Recommended Action
IPT3	Embankments and General Containment Landform IPT3 is formed within a portion of the past mining area, being developed between a remnant highwall/overburden batter to the east, and by a semi-engineered embankment constructed adjacent to the Centre Pit operations to the west. The crest of the main embankment has been widened to at least 100m (and greater) as a result of Centre Pit backfilling, which forms a buttress to the IPT3 embankment. Along the as-built portion of the embankment crest, grass has established. This growth does not impact on access along the crest, although inhibits inspection of the crest surface. Significant vegetation (trees and shrubs) has established on the upstream batter of the embankment. This vegetation inhibits inspection of this batter surface to some degree, although the height of exposure is limited to 6 to 7m vertical height due to the extent of tailings deposition. No quantifiable amount of tailings has been deposited into IPT3 since the last dam safety inspection in 2021. Past deposition occurred from 5 discharge locations along the embankment to form a tailings beach sloping towards the east and north, reporting to a decant pond adjacent to the ramp into the storage. Tension cracking (up to 100mm width) has previously developed parallel to the crest edge along the mid-section of the main embankment (length of around 400m). This cracking was infilled during past maintenance works with no evidence from the inspection that this cracking has re-formed.	General Conclusion There are no specific concerns in regard to the embankment and general containment landform (including highwall areas). With respect to the embankment, stability is enhanced by the rising tailings level on the upstream side and the widened buttress into Centre Pit on the downstream side. Upstream Batter Despite the extent of vegetation growth on the upstream batter, there appears to be no immediate threat to the security of the embankment, and more likely contributes to reducing erosion across the batter surface. Nonetheless, regular inspections of the embankment batter should be undertaken to ensure that no issues (such as erosion, slumping or displacement) develop. Tailings Deposition The approach to previous tailings into IPT3 is to be encouraged when the operation recommences, which is based on discharge from the embankment. This approach contributed to development of a decant pond within the north-eastern portion of the storage. This pond has been maintained. The use of in-line flocculation for future operation is also encouraged to maximise separation of solid and water, and to facilitate higher tailings densities particularly towards the completion of deposition within the storage. This approach would contribute to final capping and rehabilitation. Decant Recovery Prompt decant water recovery should be continued under current (non-operational) conditions to manage the quantity of water retained within IPT3.

Regulated Dam	Aspect/Observation	Outcome and Recommended Action
IPT3 (con't)	<u>Embankments and General Containment Landform (con't)</u>	<u>Cracking</u> Cracking is not of current concern given that the tailings surface has risen (i.e., the effective embankment height has reduced) and given that no cracking can now be detected. Periodic inspection to confirm that no further cracking is developing is recommended. It is also recommended that grass established along the crest of the embankment, adjacent to the safety windrow, is cleared to enable greater visibility.
	<u>Emergency Spillway</u> The emergency spillway for IPT3 was constructed in 2020, being delayed given that the portion of embankment crest intersected, was previously being used as a mine haul road to Centre Pit. The initial design dimensions of the spillway (30m wide x 1m deep) were adopted in construction, with analysis confirming compliance with the design criteria. Considerable shrub/tree growth has established across the spillway inlet on the adjacent upstream embankment batter. This growth extends 4 to 5m above the crest.	It is recommended that the trees and shrubs established across the spillway inlet on the upstream embankment batter be removed, at least to below the spillway crest level. It is also recommended that in the very unlikely event that the full supply level for the storage is approached, the safety windrow across the crest of the spillway is removed. Although the serviceability of the spillway is not necessarily affected by the presence of the windrow, the efficiency of flow through the spillway would be improved.
	<u>Containment Requirements</u> Hydraulic performance criteria are defined for IPT3 under EPML00335713 (the EA). These criteria have been adopted for the purpose of analysis to confirm the suitability of storage availability. Analyses to quantify these requirements have also been undertaken, with output as follows: • Design Storage Allowance (DSA) 189ML • Mandatory Reporting Level (MRL) RL458.6m It is noted that under the updated EA, the DSA for IPT3 has been increased a1 in 20-year AEP, being greater than under the previous EA (which was based on a 1 in 10-year AEP event)	• The available capacity within IPT3 is estimated to be 1,298ML (as at 1 November 2022), therefore is greater than the DSA. • Measured water level within IPT3 as at 1 November 2022 has been taken as RL453.1m, therefore is lower than the MRL of RL458.6m. DSA and MRL compliance are achieved based on these conditions.

6.2 Other Dams included in Annual Inspection

The other dams included in the annual inspection have included:

- Tailings Storage Facility 1 (TSF1) – Decommissioned and rehabilitated
- TSF1 Extension – Decommissioned and rehabilitated
- Pond Return Dam (part of TSF1 – Operational process water pond
- In-Pit Tailings Dam 1 (IPT1) – Decommissioned and rehabilitated
- In-Pit Tailings Dam 2/1 (IPT2/1) - Decommissioned, with landform development commenced and commencement of topsoil placement
- In-Pit Tailings Dam 2/2 (IPT2/2) – Decommissioned, with tailings surface capping substantially completed

As indicated, each of these dams, other than PRD, have been decommissioned, having no further application as a dam or storage and are in an advanced state of rehabilitation. All have been identified as LOW consequence category structures, and as such, are not regulated.

It is noted that , given the status of each of these dams, consideration will be given to exclude these dams from future annual inspections. Notwithstanding, **Table 9** recommends further actions in relation to these areas.

TABLE 9: SUMMARY OF RECOMMENDATIONS FOR OTHER DAMS INCLUDED IN ANNUAL INSPECTIOM

Dam (Structure)	Recommended Action
TSF1 and TSF1 Extension	For both TSF1 and TSF1 Extension, it is recommended that drainage batter chutes proposed by NAC are installed to direct stormwater runoff from the rehabilitated surface into the adjacent Centre Pit area. This will enable drainage from TSF1 to be diverted away from the drainage bywash between TSF1 and PRD. These works will also enable placement of the final strip of topsoil adjacent to the outer embankment and to establish vegetation within this area.
	The area where the mine haul road has crossed the TSF1 Extension embankment should be monitored over time. Although no observations of concern exist, it is likely that the excavation has intersected the upper portion of the old tailings beach (or at least the margins of the tailings deposit). It may be prudent as part of final rehabilitation works to backfill this shallow excavation and reform the embankment batter.
Pond Return Dam (PRD)	Small trees (wattles) have colonised across the spillway at PRD. Although not an issue, it may be prudent to remove these trees to improve access into the PRD area, and to ensure that any drainage through the spillway is not impeded.
IPT1	No actions recommended
IPT2/1	No actions recommended
IPT2/2	Efforts to close out the remaining area of exposed tailings in IPT2/2 should be made as soon as practical. Although not a particular risk if this small area remains exposed, until final capping is completed, rehabilitation of this area will not be possible.

7 REFERENCES

DES (2016), Department of Environment and Science, Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1933), March 2016

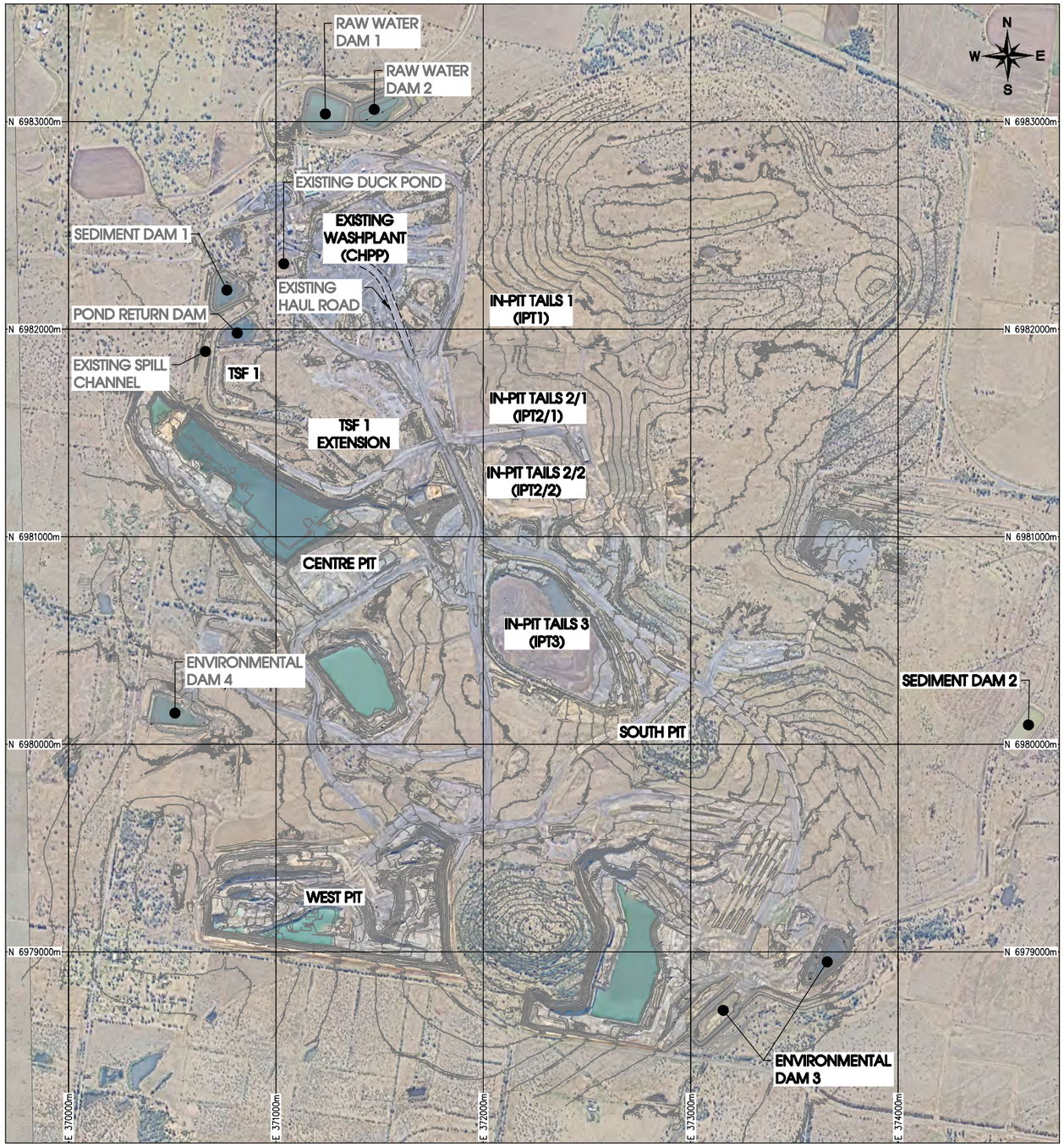
[2] DES (2022), Department of Environment and Science, Guideline Structures which are dams or levees constructed as part of environmentally relevant activities, ESR/2016/1934 • Version 9.02, April 2022

CONDITIONS OF REPORT

1. This report must be read in its entirety.
2. This report has been prepared by ATCW for the purposes stated herein and ATCW's experience, having regard to assumptions that can reasonably be expected to make in accordance with sound professional principles. ATCW does not accept responsibility for the consequences of extrapolation, extension or transference of the findings and recommendations of this report to different sites, cases, or conditions.
3. This document has been prepared based in part on information which was provided to ATCW by the client and/or others and which is not under our control. ATCW does not warrant or guarantee the accuracy of this information. The user of the document is cautioned that fundamental input assumptions upon which the document is based may change with time. It is the user's responsibility to ensure that these assumptions are valid.
4. Unless specifically agreed otherwise in the contract of engagement, ATCW retains Intellectual Property Rights over the contents of the document. The client is granted a licence to use the report for the purposes for which it was commissioned.

FIGURES

SURVEY NOTES:
1. GRID COORDINATE SYSTEM IN USE AMG-56 AGD84.
   HEIGHT DATUM AHD
2. SURVEY DATA & AERIAL IMAGERY PROVIDED BY NEW HOPE GROUP.
   FILE NAME: X_Acland_210730_1m_Conts.dwg
   DATE OF SURVEY: 21.07.2021
3. AERIAL IMAGERY PROVIDED BY NEW HOPE GROUP
   FILE NAME: Acland_July9_2022.jpg
   DATE OF IMAGERY: 09 JULY 2022



SITE LOCALITY

DRAWING LIST

DRAWING NO.	DRAWING TITLE	REVISION
FIGURE - 001	EXISTING SITE LAYOUT SHOWING - EXISTING DAMS / FEATURES	A
FIGURE - 002	LAYOUT OF OUT-OF-PIT TAILINGS DAMS - AND ENVIRONMENTAL DAM 2	A
FIGURE - 003	LAYOUT OF IN-PIT TAILINGS DAM	A
FIGURE - 004	LAYOUT OF IN-PIT TAILINGS DAM 3	A

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A	ISSUED FOR REVIEW	-	CLC	AW	AW

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DATE OCT. 2022
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2022 ANNUAL REGULATED DAM SAFETY REVIEW
EXISTING SITE LAYOUT SHOWING
EXISTING DAMS / FEATURES

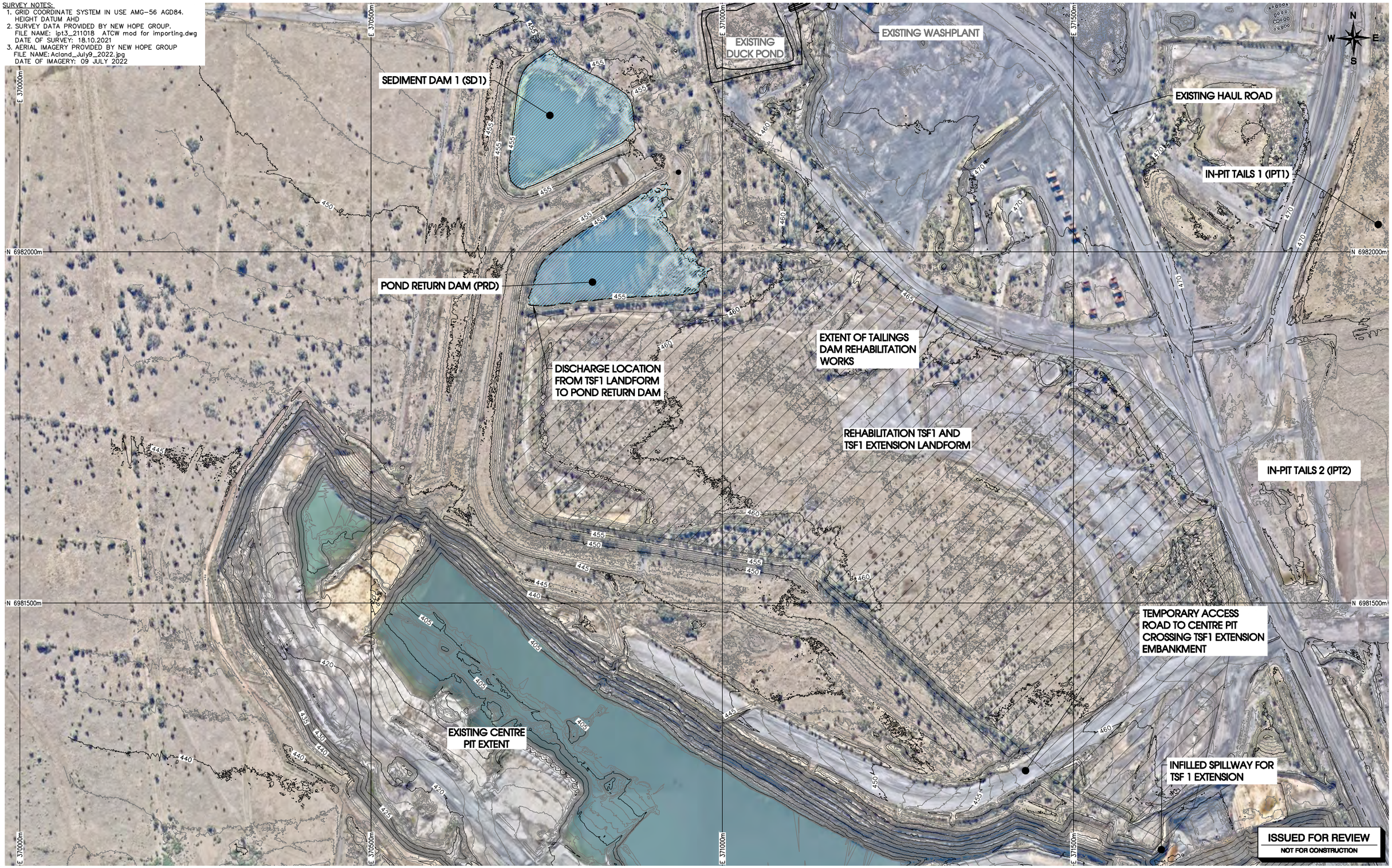
DWG. No. FIGURE - 001
SHEET SIZE A3 Rev. A

SHEET 1 OF 1

\\atcbnemvpfs04\Synergy1\Synergy\Projects\111\111319 New Acland Coal Mine\19 2022 Regulated Dams Inspection\CADD\CAD\111319-19-FIG-001.dwg

Printed on: Tuesday, 25 October 2022 10:05:36 AM By: Hai Nguyen

SURVEY NOTES:
1. GRID COORDINATE SYSTEM IN USE AMG-56 AGD84. HEIGHT DATUM AHD
2. SURVEY DATA PROVIDED BY NEW HOPE GROUP. FILE NAME: ipt3_211018 ATCW mod for importing.dwg DATE OF SURVEY: 18.10.2021
3. AERIAL IMAGERY PROVIDED BY NEW HOPE GROUP FILE NAME: Acland_July9_2022.jpg DATE OF IMAGERY: 09 JULY 2022



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2022 ANNUAL REGULATED DAM SAFETY REVIEW
LAYOUT OF OUT-OF-PIT TAILINGS DAMS AND ENVIRONMENTAL DAM 2

DWG. No. FIGURE - 002

SHEET SIZE A3 | Rev. A

SHEET 1 OF 1

SURVEY NOTES:
1. GRID COORDINATE SYSTEM IN USE AMG-56 AGD84. HEIGHT DATUM AHD
2. SURVEY DATA PROVIDED BY NEW HOPE GROUP. FILE NAME: ipt3_211018 ATCW mod for importing.dwg DATE OF SURVEY: 18.10.2021
3. AERIAL IMAGERY PROVIDED BY NEW HOPE GROUP FILE NAME: Acland_July9_2022.jpg DATE OF IMAGERY: 09 JULY 2022

EXISTING HAUL ROAD

IN-PIT TAILS 1 (IPT1)

IN-PIT TAILS 2/1 (IPT2/1)

IN-PIT TAILS 2/2 (IPT2/2)

TEMPORARY ACCESS ROAD TO CENTRE PIT

REMAINING AREA OF EXPOSED TAILINGS BEACH (AS AT DATE OF SURVEY)

INFILLED SPILLWAY FOR TSF 1 EXTENSION

E 371500m
E 372000m
E 372500m
E 373000m
N 6982000m
N 6981500m

N
W E
S

LEGEND

APPROXIMATE EXTENT OF FORMER W-PIT TAILINGS DAMS

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2022 ANNUAL REGULATED DAM SAFETY REVIEW
LAYOUT OF IN-PIT TAILINGS DAM

DWG. No. FIGURE - 003

SHEET SIZE A3 | Rev. A

SHEET 1 OF 1

M:\Synergy\Projects\111\111319 New Acland Coal Mine\19 2022 Regulated Dams Inspection\CADD\CAD\111319-19-FIG-003.dwg

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SURVEY NOTES:
1. GRID COORDINATE SYSTEM IN USE AMG-56 AGD84. HEIGHT DATUM AHD
2. SURVEY DATA PROVIDED BY NEW HOPE GROUP. FILE NAME: ipt3_220731.dxf DATE OF SURVEY: 31 July 2022
3. AERIAL IMAGERY PROVIDED BY NEW HOPE GROUP FILE NAME: Acland_July9_2022.jpg DATE OF IMAGERY: 09 JULY 2022

MINE HAUL ROAD

CENTRE PIT ACCESS RAMP

EMERGENCY SPILLWAY. CREST LEVEL RL 459m. (REPORTING TO CENTRE PIT)

CENTRE PIT

MINE HAUL ROAD

IN-PIT TAILS 3 (IPT3) FULL SUPPLY LEVEL RL 460m

EXTENT OF PONDED WATER (AT TIME OF CAPTURE)

IPT3 EMBANKMENT (CREST LEVEL RL 460.0m NOM.)

E 371500m
E 372000m
E 372500m
E 373000m
N 6981000m
N 6980500m
N 6980000m

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2022 ANNUAL REGULATED DAM SAFETY REVIEW
LAYOUT OF IN-PIT TAILINGS DAM 3

DWG. No. FIGURE - 004

SHEET SIZE A3 | Rev. A

SHEET 1 OF 1

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APPENDICES

APPENDIX A – FORM OF CERTIFICATION

Form of certification (Annual Dams Inspection)

Name of Registered Professional Engineer providing certification:

Allan Watson

Address of Registered Professional Engineer providing certification:

ATC Williams
1 / 446 Enoggera Road
Alderley QLD 4051

Statement of relevant experience

I hereby state that I am a Registered Professional Engineer of Queensland (Number 5721) and meet the requirements of the definition of 'suitably qualified and experienced person'.

Statement of certification

All relevant material relied upon by me is provided and/or referenced in the attached report "New Hope Coal Australia. New Acland Coal Mine – 2022 Annual Inspection for Regulated Structures; Reference 111319.19R01Rev-0" dated November 2022.

This annual inspection report was prepared in relation to the regulated dams at the New Acland Coal Mine, with reference to Environmental Authority (EA) Permit No EPML00335713 (effective date 26 August 2022). Assessment of the dams addressed in the dam safety review was completed in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (March 2016), published by the administering authority.

I, Allan Watson, declare that the information provided as part of this certification is true to the best of my knowledge. I acknowledge that it is an offence under section 480 of the Environmental Protection Act 1994 to give the administering authority a document containing information that I know is false, misleading or incomplete in a material particular.

Signed:

Allan Watson RPEQ 5721
Date: 16 November 2022