Plan of Operations

Carmichael Coal Project

September 2017

adani™

Document Control & Version Control

Document Title:	*Plan of Operations – Carmichael Coal Project*
Document No:	*ADANI_CCP_POP_003_September 2017*
Document Type:	*Plan*
First Issue Date:	*18/09/2017*

Rev Code	*Issue Date*	*Description of Revisions Made*	*Signatures*			
			Originator	*Checked*	*Approved*	*Date*
1	*18/09/2017*	*Revision 01*	*Srinivasa Yarlagadda(SY)*	*GP*		*18/09/2017*
2						
3						

Legal Disclaimer

This document contains confidential information regarding Adani's mine, rail and port projects. The information in this document is of a preliminary nature only and will be subject to change as Adani's mine, rail and port projects are further developed. While every effort has been made to ensure that the information provided in this document is correct, Adani does not make any representations or warranties as to the accuracy or completeness of that information. The User should exercise its own independent judgment (and if necessary seek independent expert advice) before relying on any of the information contained in this document.

Table of Contents

List of Tables

List of Figures

Appendices

1. Introduction

Adani Mining is proposing to develop Carmichael Coal Mine (Mine) which is located in the northern part of the Galilee Basin, Central Queensland. The Mine is located approximately 160 km north-west of the town of Clermont. (Figure 1). The nearest regional centre is Emerald, approximately 300 km south. The mine is accessible via a 90km access road which connects to the Gregory Development Road which is a major inland highway providing links to major coastal cities such as Townsville, Mackay, and Rockhampton.
The Mine will be developed over Mining Leases 70441, 70505 and 70506. Adani Mining Pty Ltd is the holder of the Environmental Authority EPML01470513 (EA) related to the above mentioned Mining Leases.
As per section 287 of the *Environmental Protection Act 1994* (EP Act 1994), the EA holder must not carry out an activity under the relevant lease (Mining Lease) unless a Plan of Operations has been prepared. This Plan of Operations has been developed to meet the condition as per the requirements in section 288 of the EP Act 1994 below:

- a plan showing the where all activities are to be carried on the land (See figure 1 and section 2)
- an action program complying with the conditions of the EA (see section 6 of this plan)
- a rehabilitation program for land disturbed under relevant lease (the rehabilitation program must state a proposed amount of Financial Assurance (FA) for the EA for the plan period) – See section 7 and section 8 of this plan)
- another matter prescribed under an environmental protection policy or a regulation
- a compliance statement for the plan and (the compliance statement must be made by the EA holder; state the extent to which the plan complies with the conditions of EA; state whether or not the amount of FA for the EA has been calculated in accordance with the guideline under section 295 (3) (See section 6 and section 9 of this plan)

2. Project (Mine) Description

The Carmichael Coal Mine (Mine) is a large scale mining operation that will have both Opencut and Underground mines to produce export thermal coal. Mining of coal is timed to commence upon completion of construction of the Coal Handling and Processing Plant (CHPP) and rail link to Abbot Point port.
The Mine involves construction activities to be undertaken at site which includes the following major installations:

- Mine industrial area
- Mine ROM and stockpile area
- CHPP
- Mine access road
- Service roads
- Sewerage treatment plants
- Water treatment plants
- Dams – Tailings; Raw water; Sedimentation; Mine-affected Water
- Reticulation of services for water, power, drainage
- Further investigative drilling required for mine planning and groundwater quantification
- Installation of bores for advanced dewatering of the mine area
- Flood protection levees.

The project commences with the opening of Opencut pits in the central area of the Mining Lease. Coal will be mined using conventional truck / excavator operations. The mined coal is either; crushed and bypasses the CHPP to the product stockpile, or crushed and washed in the

CHPP. The CHPP consists of typical coarse and fines circuits, with product dispatched to product stockpile. Coarse rejects are loaded into an overhead bin for collection by truck and hauled back to the waste dumps to be encapsulated as part of the co-disposal process. Fine tailings are recovered once sufficiently dried and encapsulated into the waste dumps as co-disposal.

3. Term of Plan

The term of previous plan of operations (PoOp) which was submitted is for a period of 6 months from 26 June 2017, and FA was provided and approved on 31 July 2017. This Plan of Operations is a replacement to the approved plan of Operations and includes all activities mentioned in the approved Plan of Operations and also covers some additional activities (which were not covered under the previous Plan of Operations approved 31 July 2017) This plan of operations proposes to carry out the activities mentioned in section 4 below for a period of 12 months commencing from date of approval of Financial Assurance provided for this Plan of Operations. This plan of Operations is based on commitments and conditions contained in the attached Environmental Authority granted under the EP Act 1994.

4. Planned activities

This Plan of Operations will start from date of approval of Financial Assurance provided for this Plan of Operations and will consist of the following activities:

- Re-Establishment of site signage (covered under previous PoOp)
- Re-Commissioning, expansion and operation of existing temporary camp within existing disturbance footprint. (covered under previous PoOp)
- use of existing tracks and muster points within the earlier exploration domain without causing any additional disturbance (covered under previous PoOp)
- adding additional demountable buildings, (covered under previous PoOp)
- Building access tracks to LOX, groundwater investigation and dewatering bores (Covered under this Plan of Operations)
- Preparation of pads for drilling LOX and coal quality, groundwater investigation and dewatering bores (Covered under this Plan of Operations)
- Laying out pipe line network and power lines connecting dewatering bores (Covered under this Plan of Operations)
- Construction of turkeys nest dam(s) for storage of water pumped out from advance dewatering bores (Covered under this Plan of Operations)
- Drilling of LOX and coal quality, geo-tech test pits and bores groundwater investigation and dewatering bores (Covered under this Plan of Operations)
- Drilling of groundwater monitoring bores (Covered under this Plan of Operations)

As a pre-construction activity it is planned to dig geo-tech test pits, drill LOX and coal quality and geo-tech boreholes for mine box cut and infrastructure planning and groundwater investigation purposes. The data obtained from these investigations will be used for mine box cut and, infrastructure planning and to gain additional information on groundwater behaviour in the location of proposed opencut pits. The investigations will lead to design and installation of advanced mine dewatering bores in the ML area prior to excavation of first box cut. The dewatering of the opencut pit areas is required to control the groundwater inflows into opencut mine areas from aquifers consisting of coal seams and associated interburden formations within the Bandanna formation and Colinlea sand stone formations. This will enable the safe and efficient development and operation of the mine.

It is also planned to install additional groundwater monitoring bores in the vicinity of mine infrastructure areas. These bores will be drilled through the unconfined alluvium and/or

tertiary formations consisting of shallow aquifers. This will enable the collection of the baseline groundwater data required prior to the construction of infrastructure facilities.

It is planned to undertake geo-tech investigation by digging test pits and drilling geo-tech holes required for detailed design of infrastructure required for the project. The test pits require minimal disturbance only (sensitive habitats and trees will be avoided) and pits will be back filled and rehabilitated immediately after completion of the investigation activity. No additional access tracks are required for test pitting. The Geo-tech drill holes will utilise the existing tracks and disturbed areas where ever possible and if new tracks are required disturbance will be kept to the minimum required to gain access (sensitive habitats and trees will be avoided). The geo-tech drill holes will be drilled up to 20m deep on a pad size of up to a maximum of 20 x 20m and the pad, geo-tech drill holes and access tracks will be rehabilitated immediately after completion of the investigations.

Preparation of drill pads and access require clearing of vegetation and formation of tracks to enable vehicles and drill rigs to travel to and from in a safe manner. Access tracks will be formed within the existing exploration disturbance domains wherever possible to minimise the extent of new disturbance. Figure 5 shows approximate disturbance corridors. These corridors are larger than actual clearing requirements to allow some flexibility when clearing, to avoid obstacles like large trees, or sensitive environmental or cultural heritage features if encountered.

After completion of initial drilling and testing, dewatering bores will be drilled within the opencut pit areas. Pumps will then be installed in the dewatering bores and an overland pipe line will be laid connecting all the dewatering bores. The ground water pumped out from the dewatering bores will be stored in the temporary turkeys nest dams constructed within the ML area. The overburden generated during the construction of Dam will also be stored near to the dam area. The groundwater will be contained and re-used for dust control and other pre-construction activities required for the project during this period of Plan of Operations.
The Plan of Operations will be further amended in due course of time to include all works related to commencement of construction activities for the Mine and related infrastructure works as described in section 2 above.

Details of the operating mining leases are shown in Table 1 below. The location of these leases is shown in Figure 2.

The underlying land tenure of the Carmichael Coal Project is the Moray Downs Pastoral Lease. A Lease for a term of 30 Years (Lot 662 SP282172) issued under the Land Act 1994 was transferred to Adani Mining Pty Ltd in 2011 and is in place until 2046. The project also overlies a portion of Lignum Station however no mining disturbances are scheduled to occur on this property during the term covered by this Plan of Operations.

4.1 Description of Land disturbed within this plan

The proposed areas of disturbance (within the Mining Lease Areas ML 70441, ML 70506 and ML 70505) are located along the eastern margin of the Galilee Basin, a sequence of Late Carboniferous to Middle Triassic sedimentary rocks of predominantly fluvial origin.
The stratigraphic units which are mapped across the proposed mine lease are the coal-bearing Colinlea Sandstone-Bandanna Formation and the overlying Rewan Group (comprising Rewan Formation and Dunda Beds) with an unconformable and variable veneer of Tertiary and Quaternary sediments. The surface area mostly consists of a sequence of sand, fine gravel and minor clay horizons (Tertiary sediment) which has an average thickness of 40 m, thickest in the eastern and central regions (~ 60 m thick) and thinning towards the high-lying areas to the west (< 5 m thick).

Topography across the Mining Lease area typically slopes towards the east and north-east from a north-west to south-east trending ridge line, west of the Mining Lease area boundary and running parallel to it. The topographic gradient flattens out in the vicinity of the Carmichael River and in eastern parts of the ML area. The ridgeline is bisected by the Carmichael River, which flows west to east through the southern half of the Study Area. A number of tributaries to the west of the lease feed into the Carmichael River (including Surprise Creek, Carmichael Creek, Dingo Creek, Cattle Creek and Dooyne Creek).The Carmichael River is a tributary of the Belyando River, which flows south to north and lies approximately 8 to 10 km to the east of the ML boundary.

The proposed disturbance caused by the activities planned during the term of this PoO will be minimal in nature and therefore is not expected to have significant impacts on areas where state significant biodiversity values (SSBVs), endangered, vulnerable, rare, or near threatened wild species exist. The total disturbance planned in these habitat areas will be a maximum of 38ha and is made up of many small areas (tracks, drill pads, existing quarry etc.) and therefore will not have significant impact on the fragmentation of the habitat. Additionally pre clearance surveys will be completed prior to commencement of any disturbance and any clearing will be done progressively to further reduce any potential impact.

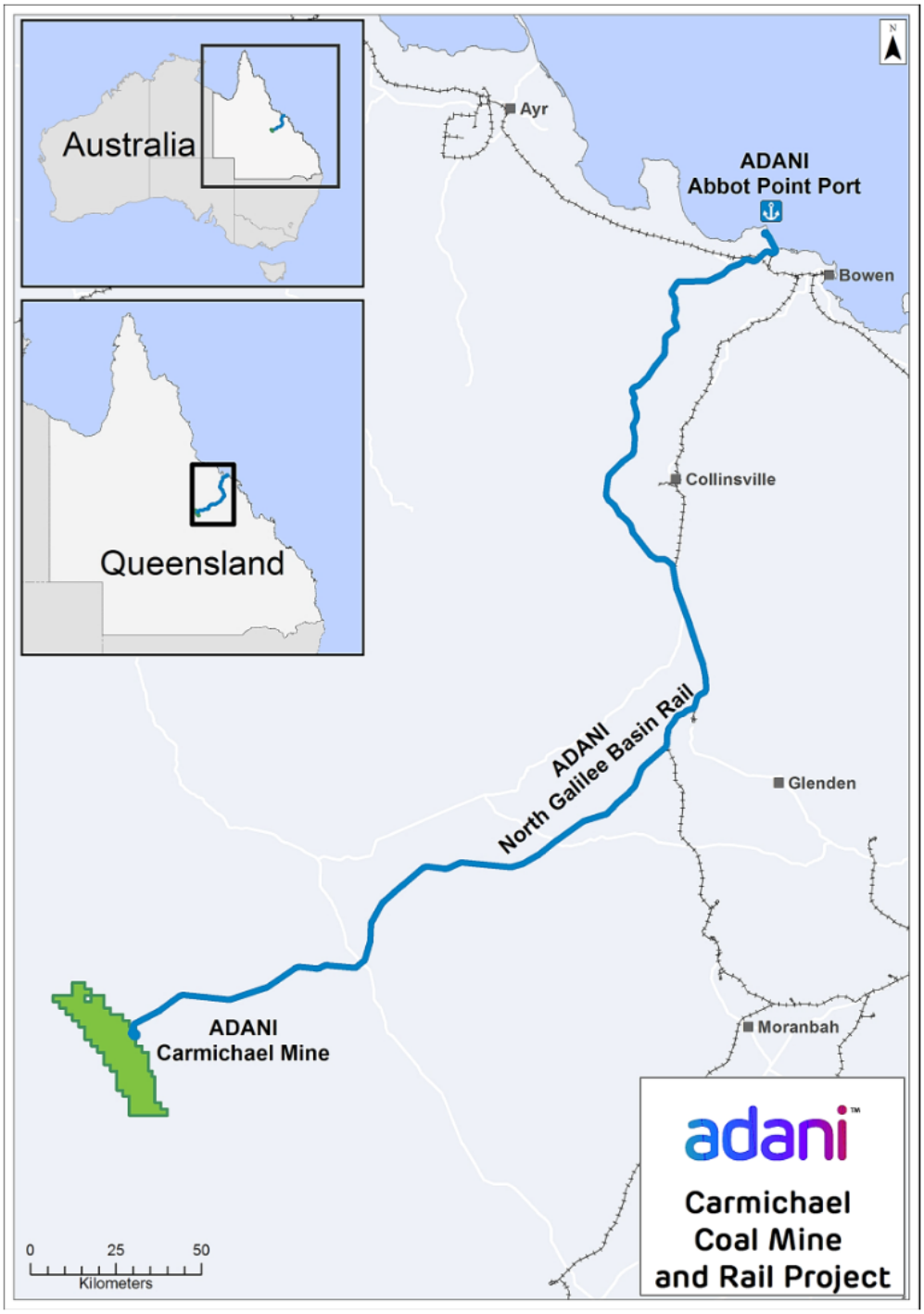


Figure 1 *Carmichael Coal Project Location Map*

Table 1 Description of Land for each Mining Lease area

Plan of Operations –Description of land for each Mining Lease Area			**Environmental Authority number:** EPML01470513 **Project Number**: Carmichael Coal Project **Term of Plan : 12** Months **Commencement Date:** From the date of approval of this plan	
Project Name: Carmichael Coal Project **Location Description:** refer section 1 above **GPS Location** (Lat/long of approx. centre of project): 22°1'31.7" S; 146°21'38.4" E			**Project Controller Name and Contact Details:** Llewellyn Lezar, Head of Mining Operations 07 – 3223 4800 llewellyn.lezar@adani.com.au	
Relevant Mining Lease(s)	**Expiry Date(s)**	**Tenure Holder / Applicant Name & Contact Details:**	**Operational Land** (i.e Lot on Plan)	**Nature and extent of all activities** to be carried out on the operational land
ML70441	30/04/2046	Adani Mining Pty Ltd Level 25 10 Eagle Street Brisbane QLD 4000	Moray Downs Station Lot 662 SP282172	Commissioning, expansion and operation of existing camp. Clearing of vegetation and forming access tracks. Drilling and digging geo-tech test bores and pits, Drilling and installation of advanced dewatering bores. Drilling and installation of groundwater monitoring bores. Construction of water storage dams.
ML70441	30/04/2046	Hewitt Pastoral Property Pty Ltd, C/of Moore Stephens (QLD) Ltd, Level 5, 280 Flinders Street, Townsville QLD 4810	Carmichael Station Lot 1 AY35	Nil
ML70441	30/04/2046	Rae & Bob O'Sullivan	Doongmabulla Station 633 SP 228220	Nil

ML70441	30/04/2046	David Luke	Lignum Station Lot 1/ SP164918	Nil
ML70505	30/04/2046	Adani Mining Pty Ltd Level 25 10 Eagle Street Brisbane QLD 4000	Moray Downs Station Lot 662 SP282172	Commissioning, expansion and operation of existing camp. Clearing of vegetation and forming access tracks. Drilling and digging geo-tech test bores and pits, Drilling and installation of advanced dewatering bores. Drilling and installation of groundwater monitoring bores. Construction of water storage dams.
ML70505	30/04/2046	David Luke	Lignum Station Lot 1/SP164918	Nil
ML70506	30/04/2046	Adani Mining Pty Ltd Level 25 10 Eagle Street Brisbane QLD 4000	Moray Downs Station Lot 662 SP282172	Nil

5. Site Plans

Plan of Operations –Site Plans	**Environmental Authority number:** EPML01470513 **Project Number**: Carmichael Coal Project **Term of Plan :** 12 Months **Commencement Date:** From the date of approval of this plan

Please see following figures:
Figure 2 Mining Lease boundaries water courses and drainage lines
Figure 3 Existing disturbance domains
Figure 4 Accommodation Camp
Figure 5 General Layout for proposed disturbance

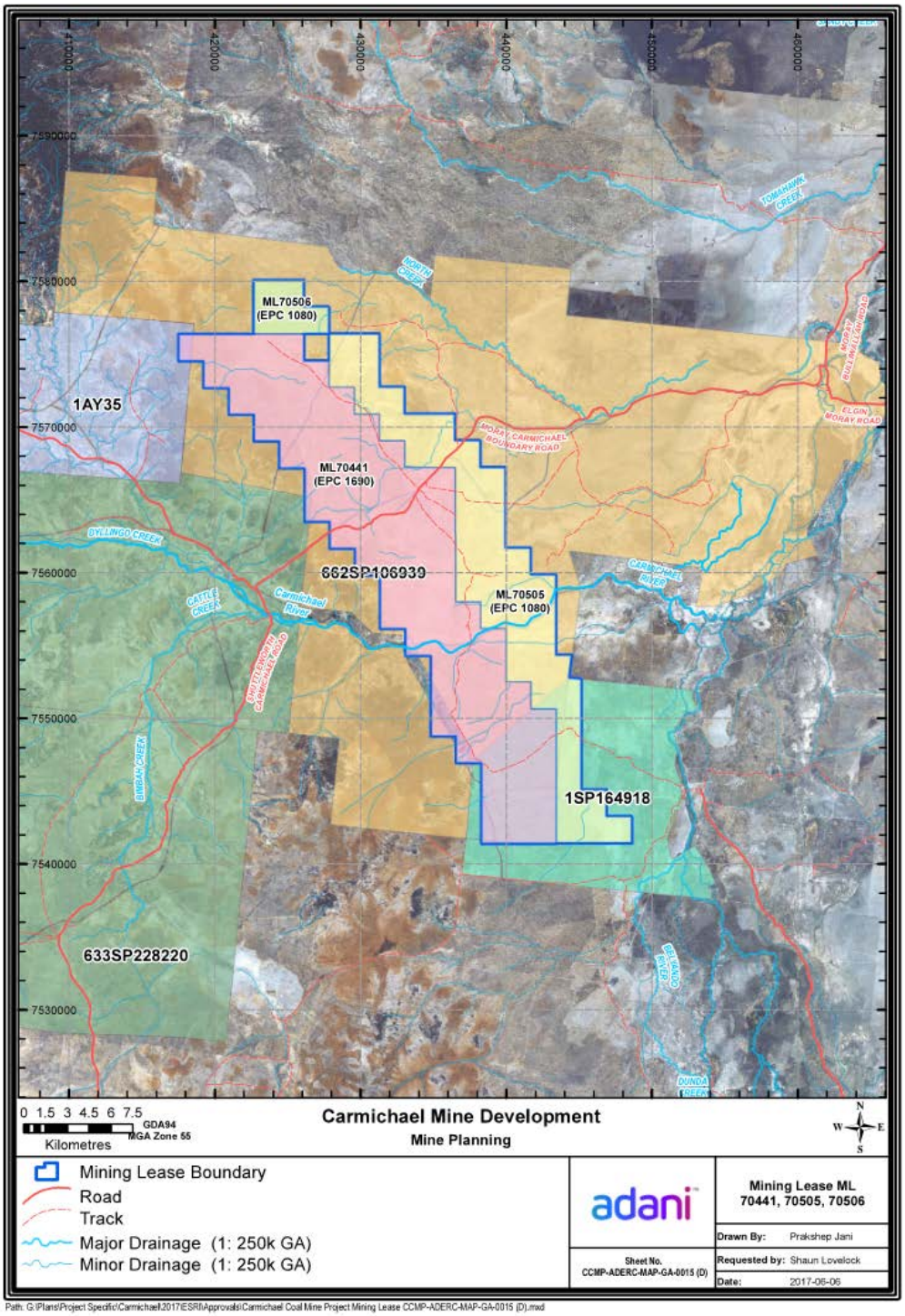


Figure 2 Mining Lease boundaries water courses and drainage lines

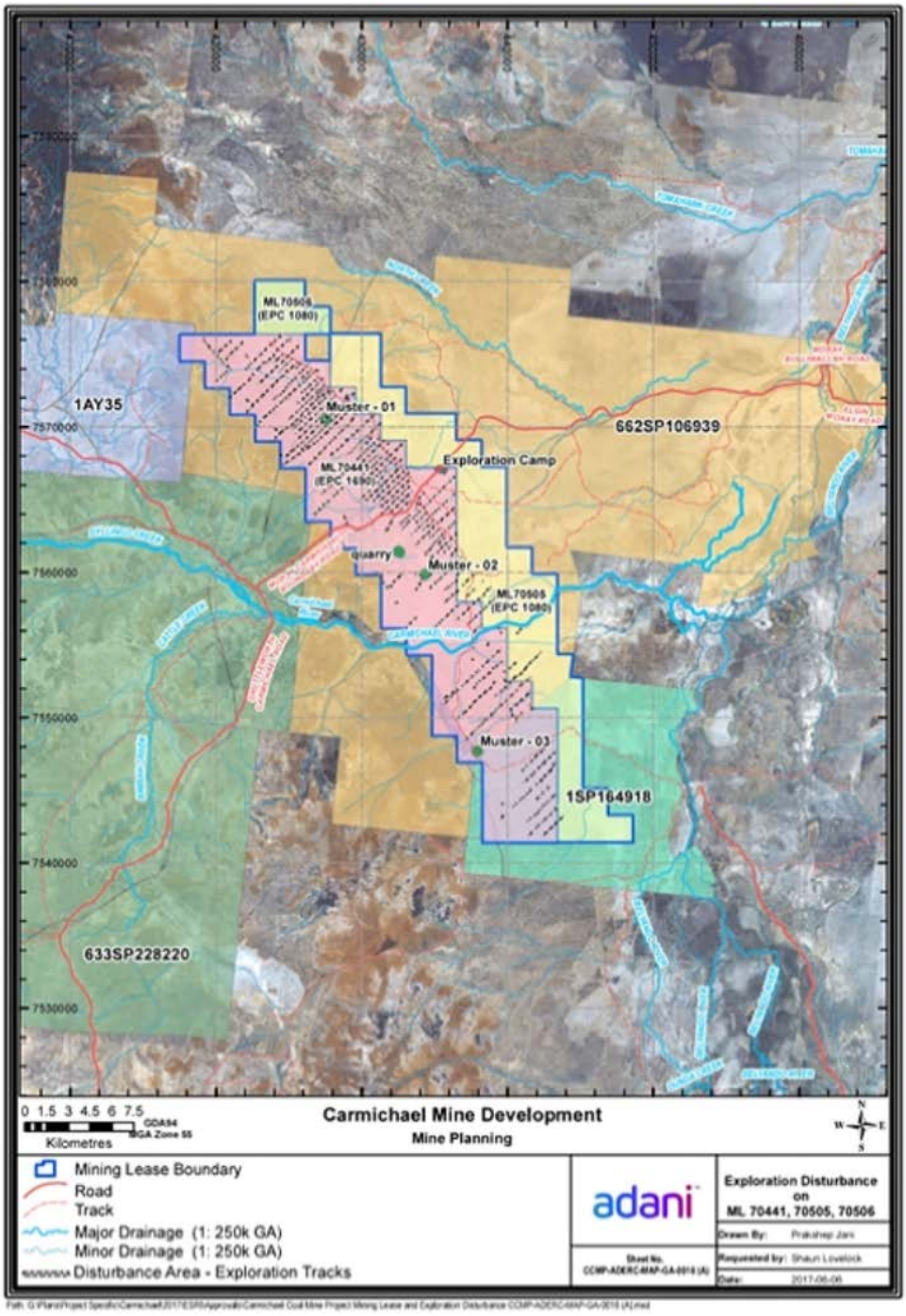


Figure 3 Existing disturbance domains

Figure 4 Accommodation Camp

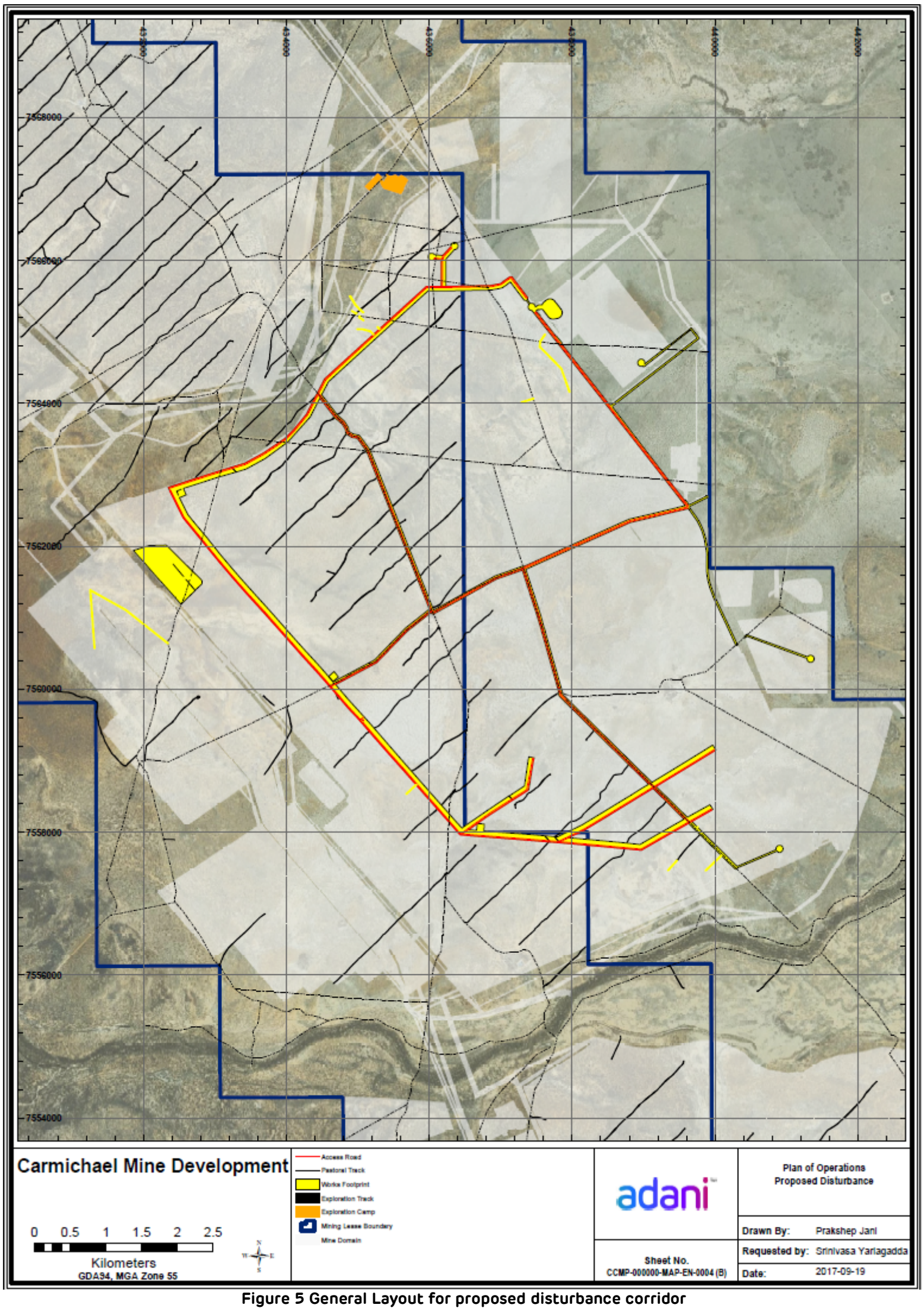


Figure 5 General Layout for proposed disturbance corridor

6. Action Program

The action plan to comply with the conditions of the Environmental Authority EPML01470513, and relevant activities to be undertaken during the period of this Plan of Operations are shown in Table 2 below.

Table 2 Status of Activities Approved under EA EPML01470513 dated 5 June 2017

Activity	Status
Mining Lease activities :	
Schedule 2A, Environmental Protection Regulation 2008: ERA 13 Mining black coal	Not planned during the term of this Plan of Operations
ERA 8 Chemical storage (Threshold 4): Storing 200t or more of chemicals that are solids or gases, in containers of at least 10m^3, other than chemicals mentioned in items 1 to 3 under Schedule 2, Environmental Protection Regulation 2008	Not planned during the term of this Plan of Operations
ERA 8 Chemical storage (Threshold 5): Storing 200m3 or more of chemicals that are liquids, in containers of at least 10m3, other than chemicals mentioned in items 1 to 3 under Schedule 2, Environmental Protection Regulation 2008.	Existing fuel storage facility located at the camp site will be used
ERA 16 Extractive and Screening Activities (Threshold 2(c)): Extracting, other than by dredging, more than 1,000,000t, in a year, from an area.	Not planned during the term of this Plan of Operations
ERA 31 Mineral Processing (Threshold 2(b)): Mineral processing consists of processing, in a year, more than 100,000t of mineral products.	Not planned during the term of this Plan of Operations
ERA 56 Regulated waste storage: receiving and storing regulated waste. Operating a facility for receiving and storing regulated waste for more than 24 hours.	Not planned during the term of this Plan of Operations
ERA 63 Sewage Treatment (Threshold 1(d)): Operating 1 or more sewage treatment works at a site that have a total daily peak design capacity of more than 4000 but not more than 10,000EP.	Existing sewerage treatment plant located at the camp site will be used

Action Program

Plan of Operations – Action Program	**Environmental Authority number:** EPML01470513 **Project Number**: Carmichael Coal Project **Term of Plan : 12** Months **Commencement Date:** From the date of approval of this plan

EA condition	Control Strategy	Action Program
Schedule A – General		
A1 - This environmental authority authorises the environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm	Operate within the site Health Safety and Environment (HSE) system that is compliant with Adani's Environmental Management System.	All mine workers to be inducted to ensure full awareness of environmental procedures and responsibilities. Review HSE policy and procedures at least on an annual basis. Conduct regular inspections and audits of all site activities.
A2 – Scope of Activity The environmental authority holder is approved for a coal extraction rate of up to 74.5 million tonnes per annum Mtpa) of run-of-mine (ROM) coal in accordance with this Environmental authority.	Coal extraction is not planned during the period of this Plan Of Operations	Not applicable during the term of this Plan of Operations. This plan covers ERA 8 and ERA 63 only which relates to recommissioning and expansion of the existing exploration camp, the building of new tracks and drill pads for further investigative drilling, installation of dewatering pumps and piping and construction of a temporary water storage turkeys nest dam.

EA condition	Control Strategy	Action Program
A3 – In carrying out the mining activity authorised by this environmental authority, the holder of this environmental authority must comply with *Table A1: Mining Domains*, and *Figures A1–A2*.	No mining activity will commence during the term of this PoO	This plan covers the recommissioning and expansion of the existing exploration camp, tracks and pads for further investigative drilling, installation of dewatering pumps and piping and construction of a temporary water storage turkeys nest dam. The detail of additional disturbance is shown in Table 3 in this plan. Approved disturbance domains are listed in Table 5 of this plan.

EA condition	Control Strategy	Action Program
A4 The holder of this environmental authority must: a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority; b) maintain such measures, plant and equipment in a proper and efficient condition; c) operate such measures, plant and equipment in a proper and efficient manner; and d) ensure all instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority are properly calibrated	Measurement devices, plant and equipment will be installed, maintained and calibrated as required to ensure compliance with the conditions of the EA.	This plan covers the recommissioning and expansion of the existing exploration camp, tracks and pads for further investigative drilling, installation of dewatering pumps and piping and construction of a temporary water storage turkeys nest dam. Plant and equipment used for activities planned during the term of PoO will be maintained in accordance with manufacturer's recommendations and will be inspected on a daily basis. Operators deployed on plant and machinery will undergo competency training and assessment prior to commencing work on site. Regular inspections will be undertaken to ensure that all equipment is operating in a proper and efficient manner, This requirement will be communicated to all mine workers via the site induction and checked via weekly environmental inspections.

EA condition	Control Strategy	Action Program
Monitoring		
A5 Except where specified otherwise in another condition of this environmental authority, all monitoring records or reports required by this environmental authority must be kept for a period of not less than 5 years.	Compliance with site Environmental Management Plan	All environmental monitoring results will be maintained in electronic format and will be made available on request from the administering authority. The Environment Management Plan consist all details on the procedure for monitoring as applicable for the period of this Plan Of Operations.
Financial assurance		
A6 The activity must not be carried out until the environmental authority holder has given financial assurance to the administering authority as security for compliance with this environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the Act.	Submit the financial assurance in the amount and form required by the administering authority prior to commencing activity.	Financial assurance is calculated based on the *Mining financial assurance calculator (ESR/2015/1824) issued on 13 June 2017* and the Schedule of Rehabilitation in this plan of operations (refer to Table 3). The amount will be submitted in the requested form as per administering authority requirements.
A7 The amount of financial assurance must be reviewed by the holder of this environmental authority when a plan of operations is amended or replaced or the authority is amended.	Review the amount of financial assurance if the plan of operations is amended or replaced or the authority is amended.	The mine management team will ensure that the amount of financial assurance is reviewed if the plan of operations is amended or replaced or the Environmental Authority is amended.

EA condition	Control Strategy	Action Program
Risk management		
A8 The holder of this environmental authority must develop and implement a risk management system for mining activities which mirrors the content requirement of the Standard for Risk Management (ISO31000:2009), or the latest edition of an Australian standard for risk management, to the extent relevant to environmental management, within 3 months from date of issue of this environmental authority.	The mine management team will ensure that the risk management system is developed and implemented.	A risk management system that mirrors the content requirement of the Standard for Risk Management (ISO31000:2009), or the latest edition of an Australian standard for risk management has been developed and will be implemented.
Notification of emergencies, incidents and exceptions		
A9 The holder of this environmental authority must notify the administering authority by written notification within 24 hours, after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this environmental authority.	Compliance with site Environmental Management Plan	Requirements of condition A9 have been incorporated into Adani incident management system to ensure relevant personnel/authorities are notified as required. More details on the procedure for compliance are furnished in the Environment Management Plan.
A10 Within 10 business days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority, including the following: a) results and interpretation of any samples taken and analysed; b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm; and proposed actions to prevent a recurrence of the emergency or incident.	Compliance with site Environmental Management Plan	Requirements of condition A10 have been incorporated into Adani's incident management and investigation system to ensure relevant information is collated and provided. More details on the procedure for compliance are furnished in the Environment Management Plan

EA condition	Control Strategy	Action Program
Complaints		
A11 The holder of this environmental authority must record all environmental complaints received about the mining activities including: a) name, address and contact number of the complainant; b) time and date of complaint; c) reasons for the complaint; d) investigations undertaken; e) conclusions formed; f) actions taken to resolve the complaint; g) any abatement measures implemented; and a) person responsible for resolving the complaint.	Compliance with Adani EMS - all internal and external complaints related to environmental aspects of the construction and operation of the project will be recorded, acknowledged, considered and responded to as soon as is practicable. Complaints and concerns will be treated as incidents and investigated accordingly.	Maintain a Complaints Register that will include: • Responding to all complaints within agreed timeframes • Investigating all complaints within agreed timeframes • Follow-up with complainant on outcomes of investigation and proposed mitigation measures (where applicable) • Implementing corrective and preventative actions as required • Regular review of complaints to identify any trends which may require further corrective action
A12 The holder of this environmental authority must, when requested by the administering authority, undertake relevant specified monitoring within a reasonable timeframe nominated or agreed to by the administering authority to investigate any complaint of environmental harm. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures, where implemented, must be provided to the administering authority within 10 business days of completion of the investigation, or no later than 10 business days after the end of the timeframe nominated by the administering authority to undertake the investigation.	Compliance with site Environmental Management Plan	Requirements of this condition are incorporated into Adani incident management system to ensure relevant monitoring information is collated and provided in the required timeframe. More details on the procedure for compliance are furnished in the Environment Management Plan.

EA condition	Control Strategy	Action Program
Third-party reporting		
A13 The holder of this environmental authority must: a) within 1 year from commencement of Project Stage 1, obtain from an appropriately qualified person a report on compliance with the conditions of this environmental authority; b) obtain further such reports at regular intervals, not exceeding 3 yearly intervals, from the completion of the report referred to above; and c) provide each report to the administering authority within 90 days of its completion.	Collect and maintain all required environmental data as per Environmental Management Plan.	Engage a qualified third party to prepare a report against compliance at timeframes specified by the administrating authority.

EA condition	Control Strategy	Action Program
A14 Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issue of this environmental authority, the holder of this environmental authority must: a) comply with the amended or changed standard, policy or guideline within 2 years of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation or another timeframe approved by the administering authority; and a) until compliance with the amended or changed standard, policy or guideline is achieved, continue to remain in compliance with the corresponding provision that was current immediately prior to the relevant amendment or change.	EMS legal and other requirements procedure and register.	Amend all relevant documents and systems to comply with the amended or changed standard, policy or guideline by way of 6 monthly reviews of legislative changes (and or more frequent if a significant matter), then followed by relevant changes to the EMP and or other site based documents used to achieve compliance with the EA

EA condition	Control Strategy	Action Program
Schedule B – Air		
B1 The release of dust or particulate matter or both resulting from mining activity authorised by this environmental authority must not cause an environmental nuisance at any nuisance sensitive or commercial place.	No mining activities which necessitate release of dust and particulate matter are planned under this Plan Of Operations.	This plan covers the recommissioning and expansion of the existing exploration camp, tracks and pads for further investigative drilling, installation of dewatering pumps and piping and construction of a temporary water storage turkeys nest dam. These activities will not result in the generation of sufficient dust to cause environmental nuisance. Details of Air Quality Management and performance objectives, monitoring, reporting and corrective actions are specified in the Environment Management Plan.

B2 The holder of this environmental authority shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the dust and particulate matter emissions generated by the mining activities do not cause exceedances of the following levels when measured at any sensitive or commercial place: a) Dust deposition of 120 milligrams per square metre per day, averaged over 1 month, when monitored in accordance with the most recent version of Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter—Deposited matter – Gravimetric method. b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, for no more than 5 exceedances recorded each year, when monitored in accordance with the most recent version of either: 1. Australian Standard AS3580.9.6 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM10 high volume sampler with size-selective inlet – Gravimetric method; or 2. Australian Standard AS3580.9.9 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM10 low volume sampler—Gravimetric method. 3. Australian Standard AS3580.9.8 Methods for sampling and analysis of	No mining activities which necessitate release of dust and particulate matter are planned under this Plan Of Operations. Air quality monitoring is not proposed for activities/ works covered by this Plan of Operations as no elevated dust will be generated from planned activities.	This plan covers the recommissioning and expansion of the existing exploration camp, tracks and pads for further investigative drilling, installation of dewatering pumps and piping and construction of a temporary water storage turkeys nest dam. These activities will not result in the generation of sufficient dust to cause environmental nuisance. Details of Air Quality Management and performance objectives, monitoring, reporting and corrective actions are specified in the Environment Management Plan.

EA condition	Control Strategy	Action Program
ambient air – Determination of suspended particulate matter – PM10 continuous direct mass method using a tapered element oscillating microbalance (TEOM) analyser c) A concentration of particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.3:2003 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—Total suspended particulate matter (TSP)—High volume sampler gravimetric method or using an alternative sampling methodology determined in consultation with the administering authority. Note: The exceedances of PM10 above 50 micrograms per cubic metre over a 24-hour averaging time as a result of bushfires, dust storms and fuel reduction burning for fire management purposes are not considered a breach of Condition B2 (b).		

EA condition	Control Strategy	Action Program
Schedule C – Waste		
C1 Unless otherwise permitted by the conditions of this environmental authority or with prior approval from the administering authority and in accordance with a relevant standard operating procedure, waste must not be burnt	Compliance with Environmental Management Plan	The Environmental Management Plan prohibits burning of waste. This requirement will be communicated to all mine workers via the site induction and checked via weekly environmental inspections. Details of waste management and control measures are specified in the Environment Management Plan.
C2 The holder of this environmental authority may burn vegetation cleared in the course of carrying out extraction activities provided the activity does not cause environmental harm at any sensitive place or commercial place.	Compliance with Environmental Management Plan	The Environmental Management Plan prohibits burning of waste unless express permission is given by site Environmental Manager This requirement will be communicated to all mine workers via the site induction and checked via weekly environmental inspections. More details on the procedure for compliance of this condition are furnished in the Environment Management

EA condition	Control Strategy	Action Program
Tailings disposal		
C3 Tailings must be managed in accordance with procedures contained within the current plan of operations. These procedures must include provisions for: a) containment of tailings; b) the management of seepage and leachates both during operation and the foreseeable future; c) the control of fugitive emissions to air; d) a program of progressive sampling and characterisation to identify acid producing potential and metal concentrations of tailings; e) maintaining records of the relative locations of any other waste stored within the tailings; f) rehabilitation strategy; and a) monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of tailings, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.	Not applicable as there will be no tailings disposal during the term of this Plan Of Operations	Not applicable
Acid sulphate soils		
C4 Treat and manage acid sulphate soils in accordance with the latest edition of the Queensland Acid Sulphate Soil Technical Manual.	Not applicable as there will be no tailings disposal during the term of this Plan Of Operations	Not applicable
C5 Scrap tyres are authorised to be stored awaiting disposal or disposed of on the Mining Lease in a manner that minimizes environmental harm. A record must be kept of the number and location for tyres disposed.	Compliance with Environmental Management Plan	Store and dispose of scrap tyres as per Environmental Management Plan. See section 4.4.

EA condition	Control Strategy	Action Program
Schedule D - Noise		
D1 The holder of this environmental authority must ensure that noise generated by the mining activities approved under this Environmental Authority does not cause the criteria in Table D1 - Noise limits to be exceeded at a sensitive place or commercial place	There are no activities planned during the term of this Plan Of Operations that will lead to the generation of noise levels above the prescribed limits at a sensitive place	Work within the scope of this Plan of Operations.
Airblast overpressure nuisance		
D2 The holder of this environmental authority must ensure that blasting does not cause the limits for peak particle velocity and air blast overpressure in Table D2—Blasting noise limits to be exceeded at a sensitive place or commercial place.	Not applicable as no blasting activities are planned during the term of this Plan Of Operations	Work within the scope of this Plan of Operations.
Monitoring and reporting		
D3 Noise monitoring and recording must include the following descriptor characteristics and matters: a) LAN,T (where N equals the statistical levels of 1, 10 and 90 and T = 15 mins); b) background noise LA90; c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels; d) atmospheric conditions including temperature, relative humidity and wind speed and directions; Effects due to any extraneous factors such as traffic noise; location, date and time of monitoring; and if the complaint concerns low frequency noise, Max LpLIN,T and one third octave band measurements in dB(LIN) for centre frequencies in the 10–200 Hz range.	There are no activities planned during the term of this Plan Of Operations that will lead to the generation of noise levels above the prescribed limits at sensitive receptors. Noise Monitoring will be conducted as required if any complaints are received.	Details of Noise and vibration management and control measures are specified in the Environment Management Plan.

EA condition	Control Strategy	Action Program
Schedule E—Groundwater		
E1 The holder of this environmental authority must not release contaminants to groundwater.	Compliance with Environmental Management Plan	All materials with potential to impact groundwater quality will be managed in accordance with the site EMP's to minimise any potential risks. The requirements of these EMP's will be communicated to all workers via the site induction and checked via regular environmental inspections.
E2 Monitoring and reporting All determinations of groundwater quality, groundwater monitoring and biological monitoring must be performed by appropriately qualified person/s.	Compliance with Environmental management Plan.	Suitably qualified staff/consultants will perform all required monitoring and data analysis.

EA condition	Control Strategy	Action Program
E3 Baseline Monitoring Program A baseline groundwater monitoring program must be developed and certified by an appropriately qualified person and implemented by the holder of this environmental authority and must be provided to the administering authority. The baseline groundwater monitoring program must result in the holder of this environmental authority finalising a groundwater dataset that must be provided to the administering authority at least 30 days prior to commencing any mining activities associated with box cut excavation. The groundwater dataset must: a) contain representative groundwater quality samples from the geological units identified as potentially affected by mining activities including Quaternary alluvium, Tertiary sediments, Bandanna Formation, Colinlea Sandstone, Clematis Sandstone, Rewan Formation, Dunda Beds, and Early Permian sediments; b) include at least 12 sampling events that are no more than 2 months apart over a 2 year period, so as to determine background groundwater quality; c) include background groundwater quality in hydraulically isolated background bore(s); and d) allow for the identification of natural groundwater level trends and groundwater contaminant trigger levels.	Baseline groundwater monitoring program has been developed and certified by a qualified person.	Baseline groundwater monitoring program was implemented in May 2014. The baseline data will be submitted as per the timing specified in EA condition E3. Further details on the baseline data are available in the GMMP submitted as per condition E4 of the EA.

E4 Groundwater Management and Monitoring Program A Groundwater Management and Monitoring Program must be developed and certified by an appropriately qualified person which addresses all phases of the mining operation approved under this environmental authority. The groundwater management and monitoring program must be provided to the administering authority for approval no later than 90 days prior to commencement of Boxcut excavation with the data obtained from baseline monitoring program in condition E3. The groundwater management and monitoring program must be developed to ensure that the plan meets the following objectives: a) Validation of groundwater numerical model (including review of boundary and recharge conditions) to refine and confirm accuracy of groundwater impacts predicted; b) Groundwater level monitoring in all identified geological units present across and adjacent to the mine site to confirm existing groundwater flow patterns and monitor drawdown impacts; c) Identification of groundwater drawdown level thresholds for monitoring the impacts to Groundwater Dependant Ecosystems (including spring complexes and Carmichael River alluvium); d) Monitoring of aquifers in the area to the south of the mining lease that may affect the Mellaluka springs; e) Identify and refine potential impacts on groundwater levels in the Great Artesian Basin Clematis Sandstone and Dunda Beds geological units; f) Estimation of groundwater inflow to mine workings and surface water ingress to groundwater from flooding events using the groundwater model;	Groundwater Management and Monitoring Program (GMMP) will be developed and submitted for approval no later than 90 days prior to commencement of box cut excavation	The GMMP has been submitted as per EA condition E4. The GMMP has details on the baseline data that has been obtained from the baseline groundwater monitoring program. The GMMP also has further detail regarding ongoing groundwater monitoring, plan review & periodic updates of the groundwater impact prediction model.

EA condition	Control Strategy	Action Program
g) Monitoring in any identified source aquifers for alternative water supplies, relevant to any approval issued under the Water Act 2000 for the project; h) Monitoring of geological units throughout all phases of project life including for the period post-closure in accordance with Appendix 1; i) Identifying monitoring bores that will be replaced due to mining activities; and j) To ensure all potential groundwater impacts from mine dewatering and mine water and waste storage facilities (artificial recharge) are identified, mitigated and monitored.		

EA condition	Control Strategy	Action Program
E5 Monitoring Program Review The Groundwater Management and Monitoring Program required under condition E4 must be reviewed by an appropriately qualified person at least every 5 years with a report provided on the outcome of the review to the administering authority by 1st July 2022, and then no later than 1 July every 5 years following. The review must include: a) an assessment of the groundwater management and monitoring program against the objectives in condition E4 b) a review of the adequacy of the monitoring locations, frequencies and groundwater quality triggers specified in Tables E1, E2 and E3 c) a review of the validity of the groundwater monitoring program against the regular model predictions.	Groundwater Management and Monitoring Program implementation.	GMMP will be reviewed at the frequency required by this condition.

E6 Groundwater Model Review The numerical groundwater model in the reports titled "Carmichael Coal Mine and Rail Project SEIS: Report for Mine Hydrogeology Report (13 November 2013" and "Carmichael Coal Mine and Rail Project SEIS: Mine Hydrogeology Report Addendum (24 October 2013)" must be reviewed to incorporate groundwater monitoring data and measured mine dewatering volumes from the Groundwater Management and Monitoring Program in condition E4 and E5. The review must be conducted within two years of commencement of any mining activities associated with box cut excavation and at least every 5 years thereafter, or at other intervals specified by the administering authority in writing, if the observed groundwater levels and groundwater flow rates to surface water are not consistent with those predicted by the groundwater model. The review must provide a revised numerical groundwater model which is based on a transient calibration and includes additional model layers for aquifers below the D seam of the Colinlea Sandstone. The revised model must include: a) Review of the hydrogeological conceptualisation used in the previous model; b) An update of the predicted impacts; c) Revised water balance model; d) Review of assumptions used in the previous model; e) Predictions of changes in groundwater levels for a range of scenarios; f) Information about any changes made since the previous model review, including data changes; g) A report outlining the justification for the refined model and the outputs of the refined model; h) An evaluation of the accuracy of the predicted changes in groundwater levels, groundwater flow rates to surface water and recommended actions to	Groundwater Management and Monitoring Program implementation.	Groundwater Model will be reviewed at the frequency required by this condition.

EA condition	Control Strategy	Action Program
improve the accuracy of the model predictions.		
E7 A report outlining the findings and any recommendations from the review under condition E6 must be completed by an appropriately qualified person and submitted to the administering authority for approval no later than 3 months after the commencement of the model review.	Groundwater Management and Monitoring Program implementation.	Groundwater Model will be reviewed by suitably qualified personnel and any recommendations will be reported as per this condition.
E8 Based on monitoring data collected in Condition E3 the holder of the Environmental Authority must provide the following to the administering authority for approval prior to any mining activities associated with box cut excavation: a) A proposed groundwater monitoring network for detecting potential impacts of the mine operations on groundwater quality. ***Note:*** *this network is to inform Table E1 and E2* b) A groundwater monitoring network for detecting if: 1. Drawdown caused by the mining operation may exceed predictions in the numerical model referred to in condition E6. 2. State significant biodiversity values may be impacted. ***Note:*** *this network is to inform Table E3*	Groundwater Management and Monitoring Program	The GMMP contains all the required information and details required of EA condition E8.
E9 Groundwater quality monitoring Groundwater quality and levels must be monitored at the locations and frequencies defined in Table—E1 Groundwater monitoring locations and frequency for the mine site for quality characteristics identified in Table E2 - Groundwater quality triggers. The monitoring must commence as soon as reasonably practical after approval by the administering authority in condition E8.	Groundwater Management and Monitoring Program	Monitoring will be conducted as per the GMMP submitted.

EA condition	Control Strategy	Action Program
E10 Trigger level investigation If groundwater quality characteristics from groundwater monitoring bores identified as per Table E1—Groundwater monitoring locations and frequency for mine site reach any of the trigger levels stated in Table E2 –Groundwater quality trigger levels, an investigation must be undertaken by the holder of this environmental authority within 14 days of detection to determine if the exceedance is a result of: a) mining activities authorised under this environmental authority; or b) natural variation; or c) neighbouring land use resulting in groundwater impacts. The holder of this environmental authority must provide a report of the investigation to the administering authority via WaTERS within 28 days of completion of the investigation under condition E10.	Groundwater Management and Monitoring Program implementation.	If groundwater monitoring data identifies any actual or potential environmental harm, investigations will be initiated by suitably qualified person/s.
E11 If the investigation under condition E10 determines that the exceedance was the result of mining authorised under this environmental authority, then investigations must be undertaken by the holder of this environmental authority to establish whether environmental harm has occurred or may occur.	Groundwater Management and Monitoring Program implementation.	If investigations determine the cause of any exceedance is/could be from mining activities, suitably qualified person/s will complete further investigations to confirm extent of impacts.

EA condition	Control Strategy	Action Program
E12 If an investigation undertaken in accordance with condition E11 determines that environmental harm has or may occur, the holder of this environmental authority must a) Implement immediate measures to reduce the potential for environmental harm; and b) Develop long-term mitigation measures to address any existing groundwater contamination and prevent recurrence of groundwater contamination. The holder of this environmental authority must provide details of the measures implemented to reduce the potential for environmental harm as well as the long-term mitigation measures, to the administering authority via WaTERS within 28 days after completing the investigation under condition E11.	Groundwater Management and Monitoring Program implementation.	If investigations determine harm has or may occur, suitably qualified person/s will develop investigate suitable mitigation measures to control, or remediate the actual/potential harm.
E13 Groundwater (water levels) In the event that groundwater level fluctuations in excess of the groundwater level thresholds in Table E3 occur at the groundwater monitoring locations in Table E3, an investigation must be instigated within 14 days of detection to determine if the fluctuations are a result of: a) mining activities authorised under this environmental authority; b) pumping from licensed bores; c) seasonal variation; or d) neighbouring land use resulting in groundwater impacts The holder of this environmental authority must provide a report of the investigation to the administering authority via WaTERS within 28 days of completion of the investigation under condition E13.	Groundwater Management and Monitoring Program implementation.	If groundwater monitoring data identifies an exceedance of the Table E3 thresholds, investigations will be initiated by suitably qualified person/s to determine the cause.

EA condition	Control Strategy	Action Program
E14 If the investigation under condition E13 concludes that the trigger exceedance is the result of mining activities authorised under this environmental authority, the holder of this environmental authority must: a) Notify the administering authority via WaTERS within 28 days of detection to determine 1. Whether actual environmental harm has occurred or is likely to occur; 2. Any proposed long-term mitigation measures required to address the affected groundwater resource. Proposed actions to reduce the potential for environmental harm b) Undertake an assessment of the associated impact to SSBVs in accordance with condition I4.	Groundwater Management and Monitoring Program implementation.	If an investigation concludes an exceedance against the EA has been caused by mining activities, Adani will notify the DEHP if any harm has been caused, or is likely to occur and if so will outline suitable mitigation measures. An assessment of whether any impact is expected on State Significant Biodiversity Values (SSBVs) will also be initiated.
E15 When requested, the monitoring data collected in accordance with this schedule must be submitted annually by 1 July to the administering authority via WaTERS.	Groundwater Management and Monitoring Program	Monitoring data will be collated on an ongoing basis and will be submitted annually by 1 July to the administering authority via WaTERS.
E16 Bore construction and maintenance and decommissioning The construction, maintenance and decommissioning of groundwater bores (including groundwater monitoring bores) must be undertaken in a manner that prevents or minimizes impacts to the environment and ensures the integrity of the bores to obtain accurate monitoring.	Groundwater Management and Monitoring Program	All bores will be installed in accordance with minimum construction requirements for water bores in Australia.

EA condition	Control Strategy	Action Program
Schedule F—Water		
Release of contaminants		
F1 Contaminants must not be released to any surface waters except as permitted under the conditions of this environmental authority.	Compliance with Environmental Management Plan	All wastes and chemicals will be stored in accordance with relevant Australian Standards, to minimise any potential impacts to surface water quality. The management of surface and groundwater encountered under this plan is prepared and enclosed as Appendix 1 to this document.
Discharge of mine affected water		
F2 The release of mine affected water to waters must only occur from the release points specified in Table F1 - Mine affected water release points, sources and receiving waters, and depicted in Figure F1: Water release/monitoring locations attached to this environmental authority.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
F3 The release of mine affected water to internal water management infrastructure installed and operated in accordance with a water management plan that complies with condition F28 is permitted.	Groundwater pumped out will be managed as per procedure detailed in the Water Management Plan.	Not applicable. All groundwater pumped out will be contained and reused.
F4 The release of mine affected water to waters in accordance with condition F2 must not exceed the release limits stated in Table F2 - Mine affected water release limits when measured at the monitoring points specified in Table F1 - Mine affected water release points, sources and receiving waters for each quality characteristic.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
F5 The release of mine affected water to waters from the release points must be monitored at the locations specified in Table F1 - Mine affected water release points, sources and receiving waters for each quality characteristic and at the frequency specified in Table F2 - Mine affected water release limits and Table F3 - Release contaminant trigger investigation levels, potential contaminants.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.

EA condition	Control Strategy	Action Program
F6 If quality characteristics of the release exceed any of the trigger levels specified in Table F3 - Release contaminant trigger investigation levels, potential contaminants during a release event, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in Table F3 - Release contaminant trigger investigation levels, potential contaminants and: a) where the trigger values are not exceeded then no action is to be taken; or b) where the downstream results exceed the trigger values specified in Table F3 – Release contaminant trigger investigation levels, potential contaminants for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and 1. if the result is less than the background monitoring site data, then no action is to be taken; or 2. if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority via WaTERS within 90 days of receiving the result , outlining i. details of the investigations carried out ii. actions taken to prevent environmental harm. *Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with F6 (b)(2) of this condition, no further reporting is is required for subsequent trigger events for that quality characteristic*	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.

EA condition	Control Strategy	Action Program
F7 If an exceedance in accordance with condition F6(b)(2) is identified, the holder of the environmental authority must notify the administering authority via WaTERS within 24 hours of receiving the result.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
Mine Affected Water Release Events		
F8 The holder must ensure a stream flow gauging station/s is installed, operated and maintained to determine and record stream flows at the locations and flow recording frequency specified in Table F4–Mine affected water release during flow events.	River gauging stations are in operation and are regularly serviced and calibrated.	River gauging stations will be operated and maintained as per condition F8.
F9 The release of mine affected water to waters in accordance with condition F2 must only take place during periods of natural flow in accordance with the receiving water flow criteria for discharge specified in Table F4 - Mine affected water release during flow events for the release point(s) specified in Table F1 - Mine affected water release points, sources and receiving waters.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
F10 The release of mine affected water to waters in accordance with condition F2 must not exceed the Maximum Release Rate (for all combined release point flows) for each receiving water flow criterion for discharge specified in Table F4 - Mine affected water release during flow events when measured at the monitoring points specified in Table F1 - Mine affected water release points, sources and receiving waters.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
F11 The daily quantity of mine affected water released from each release point must be measured, recorded and reported to the administering authority via WaTERS.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
F12 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.

EA condition	Control Strategy	Action Program
Notification of Release Event		
F13 The environmental authority holder must notify the administering authority via WaTERS as soon as practicable and no later than 24 hours after commencing to release mine affected water to the receiving environment. Notification must include the submission of written advice to the administering authority of the following information: a) release commencement date/time b) details regarding the compliance of the release with the conditions of Department Interest: Water of this environmental authority (that is, contaminant limits, natural flow, discharge volume) c) release point/s d) release rate e) release salinity f) receiving water/s including the natural flow rate.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
F14 The environmental authority holder must notify the administering authority via WaTERS as soon as practicable within twenty four (24) hours after cessation of a release notified under condition F13. The cessation notification must include the submission of written advice to the administering authority of the following information: a) release commencement date/time b) details regarding the compliance of the release with the conditions of Department Interest: Water of this environmental authority (that is, contaminant limits, natural flow, discharge volume) c) release point/s d) release rate e) release salinity f) receiving water/s including the natural flow rate.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.

EA condition	Control Strategy	Action Program
F15 The environmental authority holder must within **twenty eight (28) days** after cessation of a release event notified under Condition F13 provide the following information via WaTERS: a) release commencement and cessation dates and times b) natural flow rate in receiving water; c) volume of water released; d) details regarding the compliance of the release with the conditions of this environmental authority (i.e. contamination limits, natural flow, discharge volume); e) all continuous and in-situ water quality monitoring results (including laboratory analyses); f) any other matters pertinent to the water release event	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
Notification of Release Event Exceedance		
F16 If the release limits defined in Table F2-Mine affected water release limits are exceeded, the holder of the environmental authority must notify the administering authority via WaTERS within 24 hours of receiving the results.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.

EA condition	Control Strategy	Action Program
F17 The environmental authority holder must, within 28 days of a release that is not compliant with the conditions of this environmental authority, provide a report to the administering authority via WaTERS detailing: a) the reason for the release b) the location of the release c) the total volume of the release and which (if any) part of this volume was non-compliant d) the total duration of the release and which (if any) part of this period was non-compliant e) all water quality monitoring results (including all laboratory analyses) f) identification of any environmental harm as a result of the non-compliance g) all calculations h) any other matters pertinent to the water release event.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
Receiving Environment Monitoring and Contaminant Trigger Levels		
F18 The quality of the receiving waters must be monitored at the locations specified in Table F6 -Receiving water upstream background sites and downstream monitoring points for each quality characteristic and at the monitoring frequency stated in Table F5 - Receiving waters contaminant trigger levels.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.

EA condition	Control Strategy	Action Program
F19 If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table F5 - Receiving waters contaminant trigger levels during a release event, the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and: a) where the downstream result is the same or a lower value than the upstream value for the quality characteristic, then no action is to be taken; or b) where the downstream result exceeds the upstream results, complete an investigation into the potential for environmental harm and provide a written report to the administering authority via WaTERS within 90 days, outlining: 1. details of the investigations carried out 2. actions taken to prevent environmental harm.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
F20 Instantaneous continuous monitoring data of flow rate, EC and turbidity during release events from downstream compliance monitoring locations must be submitted to the administering authority via WaTERS together with all in situ and any water quality monitoring results (including all laboratory analyses) in accordance with condition F15.	No release to waters of mine affected water is proposed during the term of this Plan of Operations.	Not applicable. All groundwater pumped out will be contained and reused.
F21 All continuous environmental monitoring systems required by this environmental authority must have an instrument availability of at least 80% except for the continuous monitoring of release points specified in *Table F1 - Mine affected water release points, sources and receiving waters* which must have an instrument availability of at least 90%.	No release to waters of mine affected water is proposed during the term of this Plan of Operations. River gauging stations are in operation and are regularly serviced and calibrated.	River gauging stations will be operated and maintained as per condition F8.

EA condition	Control Strategy	Action Program
F22 All determinations of water quality and biological monitoring must be performed by an appropriately qualified person.	Compliance with Environmental management Plan.	The qualifications of persons for monitoring requirement will be complied while implementing the REMP.
Receiving Environment Monitoring Program (REMP)		
F23 The environmental authority holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site. For the purposes of the REMP, the receiving environment is the waters of the Carmichael River and connected or surrounding waterways within 12 km downstream of the release (this includes the Belyando River, immediately downstream of the confluence with the Carmichael River). The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.	A Receiving Environment Monitoring Program has been developed.	A Receiving Environment Monitoring Program has been developed and will be implemented.
F24 A REMP Design Document that addresses the requirements of the REMP must be prepared and made available to the administrating authority upon request.	Receiving Environment Monitoring Program (REMP) Design Document has been developed.	A Receiving Environment Monitoring Plan Design Document has been provided to DEHP.
F25 A report outlining the findings of the REMP, including all monitoring results and interpretations must be prepared annually and provided to the administrating authority by the 1 July every year. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.	Receiving Environment Monitoring Program Design Document	A report will be provided as required as per Condition F25.

EA condition	Control Strategy	Action Program
Water reuse		
F26 Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as farm dams or tanks, or used directly at properties owned by the environmental authority holder or a third party (with the written consent of the third party).	Water Management Plan.	All groundwater pumped out will be contained and reused. The management of surface and groundwater encountered under this plan is prepared and enclosed as Appendix 1 to this document
Annual Water Monitoring Reporting		
F27 The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority via WaTERS by 1 July each year: a) the date on which the sample was taken b) the time at which the sample was taken c) the monitoring point at which the sample was taken d) the measured or estimated daily quantity of mine affected water released from all release points e) the release flow rate at the time of sampling for each release point f) the results of all monitoring and details of any exceedances of the conditions of this environmental authority g) water quality monitoring data	Water Management Plan (WMP) Receiving Environment Monitoring Program	All groundwater pumped out will be contained and reused therefore there will be no release to waters of mine affected water. However water monitoring will continue during the term of this Plan of Operations for the purposes of obtaining further baseline data.

EA condition	Control Strategy	Action Program
Water Management Plan		
F28 A Water Management Plan must be developed by an appropriately qualified person and implemented no later than 90 days prior to commencement of project stage 2.	Compliance register.	A Water Management Plan covering the whole ML area will be developed by suitably qualified personnel and implemented with the aims of maximising water use efficiency, quantities of water recycled and water quality. However the management of surface and groundwater encountered under this plan is prepared and enclosed as Appendix 1 to this document
Stormwater and Water sediment controls		
F29 An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.	Environment Management Plan.	Erosion and sediment control measures are outlined in the site EMP however no mining activities will occur during the term of this Plan of Operations. Activities will be limited to the construction of tracks and pads for investigative drilling, dewatering bore pump installation and the construction of a temporary water storage turkeys nest dam. The management of surface and groundwater encountered under this plan is prepared and enclosed as Appendix 1 to this document

EA condition	Control Strategy	Action Program
F30 Stormwater, other than mine affected water, is permitted to be released to waters from: (a) erosion and sediment control structures that are installed and operated in accordance with the Erosion and Sediment Control Plan required by condition F29 (b) water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with condition F28, for the purpose of ensuring water does not become mine affected water.	Environment Management Plan.	All groundwater pumped out will be contained and reused therefore there will not be any mine affected water released to waters during the term of this Plan of Operations.
Schedule G-Sewage Treatment		
G1 The only contaminant permitted to be released to land or to mine affected water storages is treated sewage effluent in compliance with the release limits stated in Table G1 - Contaminant release limits to land or mine affected water storages.	Compliance with Wastewater Management Plan	All sewerage on site will be treated to Class A standard in suitable sewerage treatment plants as per the Wastewater management Plan.
G2 All effluent released from the treatment plant must be monitored at the frequency and for the parameters specified in Table G1 - Contaminant release limits to land or mine affected water storages.	Wastewater Management Plan	All water pumped out of sewerage treatment plants will be monitored as per the Wastewater Management Plan.
G3 The daily volume of effluent release to land or mine affected water storages must be measured and records kept of the volumes of effluent released.	Water Management Plan Flowmeters fitted to sewerage treatment plants	All water pumped out of sewerage treatment plants will be monitored as per the Wastewater Management Plan.
Schedule H – Land and rehabilitation		
H1 Rehabilitation Land disturbed by mining activities authorised under the Environmental Authority must be rehabilitated in accordance with Table H1 (Appendix 2) and Figures H1, H2, H3 and H4.	Compliance with Environmental Management Plan.	All disturbed areas will be rehabilitated in accordance with the Rehabilitation acceptance criteria in Table H1 (Mine infrastructure area domain). The details are provided in the Environmental Management Plan.

EA condition	Control Strategy	Action Program
H2 The rehabilitation completion criteria outlined in Table H1 (Appendix 2) must be reviewed by an appropriately qualified person by the 2nd February 2021 and from then on every 5 years with any proposed amendments or changes submitted to the administering authority for approval.	Compliance with Environmental Management Plan.	Rehabilitation completion criteria outlined in Table H1 will be reviewed by an appropriately qualified person by the 2nd February 2021 and from then on every 5 years with any proposed amendments or changes submitted to the administering authority for approval.
Rehabilitation Monitoring Program		
H3 A Rehabilitation Monitoring Program must be developed and certified by an appropriately qualified person and implemented by the 2nd February 2017. The Monitoring Program must contain a schedule for gathering baseline data from agreed reference sites and conducting rehabilitation trials to support the rehabilitation outcomes detailed in Table H1. Baseline monitoring and rehabilitation trials under this plan must be undertaken at a suitable frequency to ensure that the holder of this Environmental Authority has a representative dataset to enable: • Progressive certification of rehabilitation under chapter 5A of the Environmental Protection Act 1994. • Surrender of the Environmental Authority under Chapter 5 of the Environmental Protection Act 1994. A copy of the Rehabilitation Monitoring Program must be made available to the administering authority upon request.	A Rehabilitation Monitoring Program has been developed.	A rehabilitation monitoring program has been developed and certified by an appropriately qualified person. This RMP will be made available to the administering authority upon request. Rehabilitation reference sites have been identified and baseline surveys will be undertaken prior to the commencement of mining activity.
H4 Rehabilitation must commence progressively in accordance with the plan of operations.	Compliance with Environmental Management Plan.	Rehabilitation will be commenced as soon as practical after a disturbed area becomes available for rehabilitation – when it can be confirmed that no further disturbance to the area is likely.

EA condition	Control Strategy	Action Program
H5 Self-sustaining vegetation and native ecosystem, as per Table H1 (Appendix 2), must be consistent with the reference sites identified in Table H2 and Figure H5	Compliance Rehabilitation Monitoring Program reference sites.	Appropriate rehabilitation completion criteria will be determined as part of the monitoring program, using the reference sites identified in Table H2 & Figure 5 of the EA.
Residual void outcome		
H6 Residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority.	Mine plan	No mining activity is proposed during the term of this Plan of Operations.
H7 Residual voids, as detailed and presented in Figure H1 for Open Cut Pits B, C, D, E, F and G are authorised in accordance with Table H3.	Mine Plan	No mining activity is proposed during the term of this Plan of Operations
Topsoil management plan		
H8 A topsoil management plan must be developed by an appropriately qualified person and implemented	Environmental Management Plan	The minor quantities of top soil stripped during the term of this Plan of Operations will be managed as outlined in the EMP. Details of top soil placement is furnished in the Water Management plan as Appendix 1

H9 Mining Waste and Rejects Management A waste rock, spoil and rejects disposal plan must be developed and include, where relevant, at least: a) effective characterisation of the waste rock, spoil and rejects to predict under the proposed placement and disposal strategy the quality of runoff and seepage generated concerning potentially environmentally significant effects including salinity, acidity, alkalinity and dissolved metals, metalloids and non-metallic inorganic substances; b) a program of progressive sampling and characterisation to identify dispersive and nondispersive spoil and the salinity, acid and alkali producing potential and metal concentrations of waste rock, spoil and rejects; c) a materials balance and disposal plan demonstrating how potentially acid forming and acid forming waste rock, spoil and rejects will be selectively placed and/or encapsulated to minimise the potential generation of acid mine drainage; d) where relevant, a sampling program to verify encapsulation and/or placement of potentially acid-forming and acid-forming waste rock, spoil and rejects; e) how often the performance of the plan will be assessed; f) the indicators or other criteria on which the performance of the plan will be assessed; g) rehabilitation strategy. h) Monitoring or rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of the placed materials, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.	Mine Waste & Tailings Management Plan (MWTMP) Mine Plan Rehabilitation Management Plan	No mining activity is proposed during the term of this Plan of Operations.

EA condition	Control Strategy	Action Program
H10 Reject disposal areas must be designed and constructed to ensure that any runoff or seepage from the reject disposal area is contained within the mine water management system.	Mine design Water Management Plan	No mining activity is proposed during the term of this Plan of Operations.
H11 Contaminated Land Before applying for surrender of a mining lease, the holder of this environmental authority must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the mining lease which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use.	Waste Management Plan (WMP) Hazardous Materials Management Plan (HMMP) Mine Waste & Tailings Management Plan (MWTMP) Water Management Plan Rehabilitation Management Plan	No mining activity is proposed during the term of this Plan of Operations.
H12 Before applying for progressive rehabilitation certification for an area, the holder of this environmental authority must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the area the subject of the application which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use under condition H1.	Rehabilitation Management Plan (RMP)	As part of the RMP, soil sampling and analysis will be completed in any area where potential exists for soil contamination. This analysis will determine the success of remediation measures if any are required.

EA condition	Control Strategy	Action Program
H13 Minimise the potential for contamination of land by hazardous contaminants.	Mine Waste & Tailings Management Plan (MWTMP) Compliance with Environmental Management Plan	All materials with potential to contaminate land or water will be stored and handled in a manner that will minimise the potential to contaminate land or water. All storm water will be managed in a manner, that reduces it's potential to enter, or leave areas where hazardous materials are stored. Details on procedures and controls while dealing with hazardous contaminants are provided in the Environmental Management Plan. This requirement will be communicated to all workers via the site induction and checked via weekly environmental inspections.

EA condition	Control Strategy	Action Program
Chemicals and flammable or combustible liquids		
H14 All flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental harm and maintained in accordance with the current edition of AS 1940—Storage and Handling of Flammable and Combustible Liquids.	Compliance with Environmental Management Plan	All materials with potential to contaminate land or water will be managed in accordance with relevant Australian Standards to minimise the potential to contaminate land or water. For more details on Hazardous materials management plan please see the Environmental Management Plan. This requirement will be communicated to all workers via the site induction and checked via weekly environmental inspections.
H15 All chemicals and flammable or combustible liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian standard exists, such materials must be stored within an effective on-site containment system. The holder of this environmental authority must minimise the potential for contamination of land and waters by diverting stormwater around contaminated areas and facilities used for the storage of chemicals and flammable or combustible liquids.	Compliance with Environmental Management Plan	All materials with potential to contaminate land or water will be managed in accordance with relevant Australian Standards to minimise the potential to contaminate land or water. For more details on Hazardous materials management plan please refer to the Environmental Management Plan. This requirement will be communicated to all workers via the site induction and checked via weekly environmental

EA condition	Control Strategy	Action Program
Schedule 1 – Offsets and biodiversity		
I1 The holder of this environmental authority must provide an offset for impacts on applicable Matters of State Environmental Significance, in accordance with the Carmichael Coal Project Biodiversity Offset Strategy, as approved. The biodiversity offset must be provided: a) prior to impacting on Matters of State Environmental Significance; or b) where a land based offset is to be provided, within 36 months of the later of either of the following: 1. the date of issue of this environmental authority; or 2. the relevant stage identified in the Biodiversity Offset Strategy; or c) where an offset payment is to be provided, within 4 months of the later of either of the following: 1. the date of issue of this environmental authority; or 2. the relevant stage identified in the Biodiversity Offset Strategy	Biodiversity Offset Strategy (BOS)	A BOS has been developed by suitably qualified personnel & approved. Adani will ensure suitable Offset Areas are available and approved within the specified time frame.
Review of Biodiversity Offset Delivery		
I2 The Biodiversity Offset Strategy must be reviewed by the 2nd February 2021, and from then on every 5 years with a report prepared by an appropriately qualified person. The report must: a) Assess the area of Matters of State Environmental Significance proposed to be impacted by the mining activities in the Biodiversity Offset Strategy; and b) Identify the actual on ground areas of Matters of State Environmental Significance impacted by the mining activities.	Biodiversity Offset Strategy (BOS) review	The Carmichael Coal Mine BOS will be reviewed by suitably qualified personnel as per this condition.

EA condition	Control Strategy	Action Program
I3 If an investigation conducted under conditions E13 or E14 of this environmental authority indicates that there is a risk of impacting a Matter of State Environmental Significance, or condition J11 is triggered, the Biodiversity Offset Strategy must be reviewed and a report must be prepared within 3 months by an appropriately qualified person. The report must: a) Assess the area of Matter of State Environmental Significance proposed to be impacted by the mining activities in the Biodiversity Offset Strategy; and Identify the actual on ground areas of Matter of State Environmental Significance impacted by the mining activities.	Groundwater Management and Monitoring Program MNES Management Plan	Groundwater will be monitored as detailed in the GMMP. If this monitoring indicates that any impacts likely to affect state significant biodiversity, investigations will be completed by suitably qualified personnel and a report will be completed within 3 months, detailing the findings.
I4 If the review under condition I2 or I3 finds that the actual areas of disturbance to Matters of State Environmental Significance is different from the area of disturbance as detailed in the Biodiversity Offset Strategy, the holder of the environmental authority must amend the Biodiversity Offset Strategy as per condition I5 and deliver the amended offset requirement within 12 months.	Biodiversity Offset Strategy (BOS)	If a review identifies that areas where impacts were predicted, extend beyond the predicted impact boundaries, the BOS will be amended to ensure suitable offset measures are made available within 12 months.
I5 In response to condition I4 the holder of this environmental authority may apply to the administering authority to amend the Biodiversity Offset Strategy within either 30 days, or a lesser period agreed to by the administering authority, prior to impacting on the applicable Matter of State Environmental Significance.	Biodiversity Offset Strategy (BOS)	In the event that planned activities change in a way that Adani considers it may be necessary to disturb areas considered of state significance to biodiversity, beyond those previously envisaged, Adani will notify the administering authority and seek approval to amend the BOS to address any proposed changes, prior to impacting on these areas.

I6 Black-throated finch (BTF) Species Management Plan (SMP) at Carmichael project The holder of this environmental authority must submit a BTF SMP prepared and certified by a suitably qualified person to the administering authority prior to commencement of project stage 2 for approval. The holder must publish the BTF SMP on its website within 10 business days of receiving the administering authority's approval in writing and implemented. The holder must align the SMP with any Bioregional BTF Management Plan and relevant documentation requirements under the Environmental Protection and Biodiversity Conservation Act 1999 including the BTF Recovery Plan, conservation advice and the threat abatement plan. The submitted BTF SMP must include: a) a baseline research program on the specific nesting and feeding requirements of the species that will be undertaken prior to and during project stage 1; b) a baseline research program to establish whether the BTF at the project site are sedentary, locally migratory or regionally migratory; c) a description of how the results of baseline research program are to be used to determine any changes of classification of and/or impact on BTF habitat; d) details of proposed impacts to BTF habitat from each project stage including impacts from clearing, subsidence, ecological function changes, hydrological changes and weed and pest infestation changes; e) mitigation measures to be undertaken to avoid, mitigate and manage impact resulting from each stage of the project, including rehabilitation of habitat; f) monitoring of watering points that must be conducted for a minimum six (6) hour period	Compliance with Environmental management plan Matters of National Environmental Significance Management Plan (MNESMP) and Black-throated finch (BTF) Species Management Plan (SMP)	Any activities planned during the term of this Plan of Operations that will have direct impact on BTF habitat will be managed as per the BTF SMP.

EA condition	Control Strategy	Action Program
commencing from dawn, to accurately capture BTF utilisation of watering points g) detailed botanical assessment that must occur at all BTF sighting locations in the project area to record habitat values at those locations; h) detailed surveys that must occur across the mining lease area and approved offset areas and must include information on BTF movements. The survey method and effort must be sufficient to accurately describe the BTF home range and detail BTF resource usage patterns between seasons and years (for up to 10 years) and allow robust management actions to be developed for the maintenance of a viable local BTF population i) survey work that should incorporate the usage of call playback and identify all birds present when BTF are encountered; j) specific surveys that must be undertaken during the BTF breeding season and include nest location and assessment of the habitat attributes associated with the breeding locations. The survey method and effort must be sufficient to accurately describe the BTF breeding requirements with consideration to spatial and temporal variation of resources of up to 10 years; and k) survey and monitoring that must be undertaken by experienced ecologists.		

EA condition	Control Strategy	Action Program
I7 The BTF SMP under condition I6 must be reviewed by an appropriately qualified person annually and a report prepared on 1 July each year. The report must: a) assess the plan against the requirements under condition I6; b) include recommended actions to ensure actual and potential environmental impacts are effectively managed for the coming year; c) identify any amendments made to the BTF SMP following the review; d) all revisions of the survey and monitoring program must be carried out in consultation with the BTF recovery team; and any revisions must be independently peer reviewed.	Matters of National Environmental Significance Management Plan (MNESMP) and Black-throated finch (BTF) Species Management Plan (SMP) BTF research and monitoring program	The BTFMP and ongoing research data will be reviewed annually by suitably qualified personnel. On completion of this review, a report will be provided, detailing findings and any recommended actions to reduce actual or potential impacts to the BTF. The MNESMP will be amended accordingly.
I8 The baseline research program must fund a research project to determine the relationship between water sources, woody habitat and the BTF food sources within the mining lease area and approved offset areas to determine the inter-relationships among these factors.	Matters of National Environmental Significance Management Plan (MNESMP) and Black-throated finch (BTF) Species Management Plan (SMP)	The BTF Research Plan has been prepared and submitted for approval. The research plan will be implemented once the plan is approved.
I9The baseline research program under I6 must: a) establish whether the Ten Mile Bore and surrounds are high value habitat for the species; and b) establish management actions to maintain the current BTF population of Ten Mile Bore and surrounds.	Matters of National Environmental Significance Management Plan (MNESMP) and Black-throated finch (BTF) Species Management Plan (SMP)	The BTF Research Plan has been prepared and submitted for approval. The research plan will be implemented once the plan is approved.
I10 The holder of this environmental authority must maintain water troughs for BTF within undisturbed areas and surface areas of underground mining footprint, and repair where necessary troughs, pipes and tanks to a standard that maintains a constant source of water.	Matters of National Environmental Significance Management Plan (MNESMP) and Black-throated finch (BTF) Species Management Plan (SMP)	The BTF Research Plan has been prepared and submitted for approval. The research plan will be implemented once approved.

EA condition	Control Strategy	Action Program
Groundwater Dependent Ecosystems Management Plan		
I11 The proponent must develop and implement a Groundwater Dependent Ecosystems Management Plan (GDEMP) to detail the management of threats to defined environmental values and to report results and corrective actions for each GDE over the full period of mining activities and for a period of five years post mining rehabilitation.	Groundwater Dependent Ecosystems Management Plan (GDEMP) Groundwater Management and Monitoring Program	The GDEMP has been submitted to the administering authority and must be approved prior to commencement of Project Stage 2. Once approved the GDEMP will be implemented. The activities planned during the term of this Plan of Operations will not impact GDEs.
I12 The GDEMP must be approved by the administering authority in writing and the GDEMP published on a website before the commencement of project stage 2.	GDEMP	The GDEMP has been submitted to the administering authority for approval. Once approved the GDEMP will be published on the Adani website.
I13 For the purposes of conditions I11 and I12, the GDEs include the affected Carmichael River riparian zone (ecosystems associated with the Carmichael River between Doongmabulla Springs and the Belyando River, including populations of Waxy Cabbage Palm), the Lignum, Stories and Mellaluka springs and the Doongmabulla, Spring complex.	GDEMP Groundwater monitoring program	The GDEMP include the locations listed in condition I13.

EA condition	Control Strategy	Action Program
I14 A report of the findings of the GDEMP, including all monitoring results and interpretations, must be prepared annually and made available on request to the administering authority. The report must include: a) an assessment of background reference groundwater levels (see condition E9) b) the condition of each GDE compared with previous monitoring results c) the suitability of current groundwater trigger thresholds (as defined in condition E13) d) detail on the effectiveness of avoidance, mitigation and management actions in curtailing adverse impacts on GDE ecosystems e) a description of any adaptive management initiatives implemented f) any offsets required for residual impacts	Groundwater Dependent Ecosystems Management Plan Groundwater monitoring program	The GDEMP has been submitted to the administering authority for approval. Once approved the GDEMP will be implemented and reported as per Condition I14. However it should be noted that the activities planned during the term of this Plan of Operations will not impact GDEs.
Schedule J—Subsidence		
J1 Subsidence is authorised within the subsidence impact area identified in Figure A3.	Subsidence Management Plan (SMP)	Not applicable. No mining activities will occur during the term of this Plan of Operations.
J2 A Subsidence Management Plan must be developed and certified by and appropriately qualified person and implemented by the holder of this environmental authority prior to the commencement of activities that result in subsidence.	Subsidence Management Plan (SMP)	The SMP will be developed by suitably qualified personnel when required. The SMP will be implemented prior to commencement of any activities with the potential to cause subsidence.

EA condition	Control Strategy	Action Program
J3 The Subsidence Management Plan must: a) provide for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity authorised by this environmental authority and to ensure compliance with the conditions of this environmental authority; b) include baseline data; c) describe the proposed impacts of subsidence on any land, Black Throated Finch (BTF) habitat, watercourse and floodplain including but not limited to: 1. physical condition of surface drainage: i. erosion; ii. areas susceptible to higher levels of erosion such as watercourse confluences; iii. incision processes; iv. stream widening; v. tension cracking; vi. lowering of bed and banks; vii. creation of instream waterholes; viii. changes to local drainage patterns; ix. BTF habitat 2. overland flow: i. capture of overland flow by subsided long-wall panels; i. increased overbank flows due to lowering of high bank of watercourses; ii. the portion of local and large scale catchment likely to be captured by subsided long-wall panels and the associated impacts on downstream users;	Subsidence Management Plan (SMP) Mine Plan Matters of National Environmental Significance Management Plan (MNESMP)	The SMP will be developed by suitably qualified personnel when required.

EA condition	Control Strategy	Action Program
J3 (continued) 3. Water Quality: i. Surface water ii. Groundwater 4. Land condition: current land condition to be impacted by subsidence 5. infrastructure: detail of existing infrastructure (pipelines, railway, powerlines and haul roads) should be identified where there is a potential impact from effects of land subsidence; d) propose options for mitigating any impacts associated with subsidence, how these mitigation methods will be implemented, and the extent to which these measures will impact a Matter of State Environmental Significance(s); e) describe cumulative impacts on watercourses, diversions or catchments; f) describe impacts on groundwater; g) quantify the area of on ground impacts to Matters of State Environmental Significance; and h) include a program for monitoring and review of the effectiveness of the Subsidence Management Plan. Guidance material has been provided in Appendix 3 to assist with the development of the Subsidence Management Plan.	Subsidence Management Plan (SMP) Mine Plan MNESMP	

EA condition	Control Strategy	Action Program
J4 The Subsidence Management Plan must be reviewed each calendar year and a report prepared on 1 July each year and certified by an appropriately qualified person. The report must: a) assess the plan against the requirements under condition J3 and the certified reports required under J10; b) include recommended actions to ensure actual and potential environmental impacts are effectively managed for the coming year; and c) identify any amendments made to the Subsidence Management Plan following the review.	Subsidence Management Plan	Not applicable during the term of this Plan of Operations.
J5 The holder of this environmental authority must attach a written response and recommended actions to the review report required by condition J4. The response must detail the actions taken and/or proposed to be taken in order to ensure continuing compliance with this environmental authority.	Subsidence Management Plan annual review report	Not applicable during the term of this Plan of Operations.
J6 The review report required by condition J4 and the written response to the review report required by condition J5 must be submitted to the administering authority upon request.	Subsidence Management Plan annual review report	Not applicable during the term of this Plan of Operations.
J7 Annual Inspection of Subsidence The holder of this environmental authority must arrange for each subsided longwall panel to be inspected annually by an appropriately qualified person, in accordance with conditions J8 through to J10 inclusive. If the appropriately qualified person deems and records under J9 that a subsided longwall no longer has an associated environmental risk, the longwall panel does not need to be reinspected in the future annual inspections under condition J7 to J9.	Subsidence Management Plan annual inspection	Not applicable during the term of this Plan of Operations.
J8 The annual inspection must be conducted between 1 April and 1 November each year.	Subsidence Management Plan annual inspection	Not applicable during the term of this Plan of Operations.

EA condition	Control Strategy	Action Program
J9 At each annual inspection, the condition of each subsided longwall panel must be assessed by an appropriately qualified person. The inspection must include assessments of the structural, geotechnical and hydraulic adequacy of the subsided longwall panel and the adequacy of the works with respect to the Subsidence Management Plan.	Subsidence Management Plan annual inspection	Not applicable during the term of this Plan of Operations.
J10 For each inspection required under condition J9, copies of a report certified by the an appropriately qualified person, including any recommendations to ensure the integrity of each subsided longwall panel, must be provided to the administering authority upon request.	Subsidence Management Plan annual inspection report	Not applicable during the term of this Plan of Operations.
J11 If the review under J4 or J7 indicates that the impact to Matters of State Environmental Significance caused by mining activities authorised under this environmental authority differs from the area of disturbance detailed in the Biodiversity Offset Strategy, the holder of this environmental authority must undertake a review in accordance with conditions I4 and I5.	Subsidence Management Plan Biodiversity Offset Strategy (BOS)	Not applicable during the term of this Plan of Operations.
Schedule K—Dams and levees		
Consequence Category **K1** The consequence category of any regulated structure must be assessed by a suitably qualified and experienced person in accordance with the Manual for Assessing Consequence 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.	Mine infrastructure design- to have a Consequence Category Assessment (CCA) completed.	It is proposed to build a temporary turkey's nest dam (for storing and re-use of the water pumped during groundwater investigations and from advanced dewatering bores). The consequence category assessment for the proposed turkeys nest dam has been completed and the proposed structure is assessed to be of a low consequence category.

EA condition	Control Strategy	Action Program
K2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.	CCA report and certification.	The construction of the Turkeys nest da will not be commenced until the certification is provided.
K3 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 Consequence Categories and Hydraulic Performance of Structures (EM635).	CCA report and certification	The construction of the Turkeys nest da will not be commenced until the certification is provided.
Design and Construction of a Regulated Structure		
K4 All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).	Mine Infrastructure design team to do CCA and make the design and construction as a regulated structure.	Not relevant for this plan of operations, as the Dam is assessed not to be a regulated structure.
K5 Construction of a regulated structure is prohibited unless the holder of this environmental authority has submitted a consequence category assessment report and certification to the administering authority which has been certified by a suitably qualified and experienced person for the design and design plan and the associated operating procedures in compliance with the relevant condition of this authority.	Mine Infrastructure design team to do CCA and make the design and construction as a regulated structure.	Not relevant for this plan of operations, as the Dam is assessed not to be a regulated structure
K6 Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), and must be recorded in the Register of Regulated Structures.	Regulated structure certification Register of Regulated Structures	Not relevant for this plan of operations, as the Dam is assessed not to be a regulated structure.

EA condition	Control Strategy	Action Program
K7 Regulated structures must: a) be designed and constructed in accordance with and conform to the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635); b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of: 1. floodwaters from entering the regulated dam from any watercourse or drainage line; and 2. wall failure due to erosion by floodwaters arising from any watercourse or drainage line. c) For dams associated with a failure to contain; have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.	Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)	Not relevant for this plan of operations, as the Dam is assessed not to be a regulated structure.
K8 Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that: a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure; b) construction of the regulated structure is in accordance with the design plan.	Regulated structure certification	Not relevant for this plan of operations.

EA condition	Control Strategy	Action Program
Operation of a regulated structure **K9** Operation of a regulated structure**,** except for an existing structure, is prohibited unless: a) the holder of this environmental authority has submitted to the administering authority: 1. one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition K6; 2. a set of 'as constructed' drawings and specifications; 3. certification of those 'as constructed drawings and specifications' in accordance with condition K8; and 4. where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan; b) the requirements of this environmental authority relating to the construction of the regulated structure have been met; c) the holder has entered the details required under this environmental authority into a Register of Regulated Structures; and d) there is a current operational plan for the regulated structure	Regulated structure certification	Not relevant for this plan of operations.
K10 Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.	Regulated Structures Operations Plan (RSOP)	Not relevant for this plan of operations.

EA condition	Control Strategy	Action Program
Mandatory Reporting Level **K11** Conditions K11 to K15 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain—overtopping'.	Mandatory reporting levels (MRL) marked in all Regulated Structures certified as "high consequence"	Not relevant for this plan of operations.
K12 The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.	Mandatory reporting levels marked with survey pegs	Not relevant for this plan of operations.
K13 The holder of this environmental authority must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.	Mandatory reporting levels RSOP	Not relevant for this plan of operations.
K14 The holder of this environmental authority must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.	Mandatory reporting levels RSOP	Not relevant for this plan of operations.
K15 The holder of this environmental authority must record any changes to the MRL in the Register of Regulated Structures.	Mandatory reporting levels RSOP	Not relevant for this plan of operations.
Design storage allowance		
K16 The holder of this environmental authority must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.	Regulated Structures Operations Plan (RSOP) Annual Inspections	Not relevant for this plan of operations.
K17 By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).	Mandatory reporting levels (MRL) Annual Inspections	Not relevant for this plan of operations.

EA condition	Control Strategy	Action Program
K18 The holder of this environmental authority must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.	RSOP Annual Inspections	Not relevant for this plan of operations.
K19 The holder of this environmental authority must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.	RSOP Annual Inspections	Not relevant for this plan of operations.
Annual Inspection **K20** Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.	RSOP Annual Inspections	Not relevant for this plan of operations.
K21 At each annual 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.	Regulated Structure Design RSOP Annual Inspections	Not relevant for this plan of operations.
K22 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).	Annual Inspection Report	Not relevant for this plan of operations.

EA condition	Control Strategy	Action Program
K23 The holder of this environmental authority must: a) Within 20 business days of receipt of the annual inspection report, provide to the administering authority: 1. The recommendations section of the annual inspection report; and 2. 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 holder, provide this to the administering authority within 10 business days of receipt of the request.	Annual Inspection Report	Not relevant for this plan of operations.
Transfer arrangements **K24** The holder of this environmental authority must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.	Annual Inspection Report Register of Regulated Structures	Not relevant for this plan of operations.

EA condition	Control Strategy	Action Program
Decommissioning and rehabilitation **K25** Dams must not be abandoned but must be either: a) decommissioned and rehabilitated to achieve compliance with condition (K26); or b) be left in-situ for a beneficial use(s) provided that: 1. it no longer contains contaminants that will migrate into the environment; and 2. it contains water of a quality that is demonstrated to be suitable for its intended beneficial use(s); and 3. the administering authority, the holder of this environmental authority and the landholder agree in writing that the dam will be used by the landholder following the cessation of the environmentally relevant activity(ies).	Rehabilitation Plan	Not applicable during the term of this Plan of Operations.

K26 After decommissioning, all significantly disturbed land caused by the carrying out of the environmentally relevant activity(ies) must be rehabilitated to meet the following final acceptance criteria: a) the landform is safe for humans and fauna; b) the landform is stable with no subsidence or erosion gullies for at least three (3) years; c) any contaminated land (e.g. contaminated soils) is remediated and rehabilitated; d) not allowing for acid mine drainage; e) there is no ongoing contamination to waters (including groundwater); f) rehabilitation is undertaken in a manner such that any actual or potential acid sulfate soils on the area of significant disturbance are treated to prevent or minimise environmental harm in accordance with the Instructions for the treatment and management of acid sulfate soils (2001); g) all significantly disturbed land is reinstated to the pre-disturbed soil suitability class; h) for land that is not being cultivated by the landholder: 1. groundcover, that is not a declared pest species is established and self-sustaining; 2. vegetation of similar species richness and species diversity to pre-selected analogue sites is established and self-sustaining; and 3. the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance caused by carrying out the resource activity(ies); and a) for land that is to be cultivated by the landholder, cover crop is	Rehabilitation Plan	Not applicable during the term of this Plan of Operations.

EA condition	Control Strategy	Action Program
revegetated, unless the landholder will be preparing the site for cropping within 3 months of resource activities being completed.		
Register of Regulated Structures **K27** A Register of Regulated Structures must be established and maintained by the holder for each regulated dam.	Register of Regulated Structures	Not relevant for this plan of operations
K28 The holder must provisionally enter the required information in the Register of Regulated Structures when a design plan for a regulated dam is submitted to the administering authority.	Register of Regulated Structures	Not relevant for this plan of operations.
K29 The holder must make a final entry of the required information in the Register of Regulated Structures once compliance with condition K9 has been achieved.	Register of Regulated Structures	Not relevant for this plan of operations.
K30 The holder must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.	Register of Regulated Structures	Not relevant for this plan of operations.
K31 All entries in the Register of Regulated Structures must be endorsed by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.	Register of Regulated Structures	Not relevant for this plan of operations.
K32 The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Structures, in the electronic format required by the administering authority.	Register of Regulated Structures	Not relevant for this plan of operations.

7. Schedule of Disturbance and Rehabilitation

Plan of Operations –Schedule of Disturbance and Rehabilitation	***Environmental Authority number:*** *EPML01470513* ***Project Number****: Carmichael Coal Project* ***Term of Plan :*** *12 Months* ***Commencement Date:*** From the date of approval of this plan

The following Table 3 *table tabulates the annual disturbance and rehabilitation to occur throughout the term of this Plan of Operations.*

Table 3 Summary of Disturbance and Rehabilitation

Description	*Prior to commencement of this plan (Actual)*	*During this plan Period*	*Total disturbance under this Plan*
Camp[1]	*10.5ha*	*0.0ha*	*10.5 ha*
Quarry area[2]	*1.5 ha*	*35.5.0 ha*	*37.0 ha*
Existing Exploration tracks	*115*	*0.0 ha*	*115.00 ha*
Proposed tracks[3]	*Nil*	*23.91 ha*	*23.91 ha*
Proposed Pipe line [3]	*Nil*	*13.68 Ha*	*13.68 ha*
Proposed Pads and Lay down areas[4]	*Nil*	*25.3 ha*	*25.3 ha*
Rehabilitation processes complete	*0.0*	*0.0ha*	*0.0*
Water storage dam[5]	*0.0*	*12.0*	*12.0 ha*
Overburden area from Water storage Dam		*4.0 ha*	*4.0 ha*
First year care & maintenance completed	*Nil*	*Nil*	*0.00*
Second year care & maintenance completed	*Nil*	*Nil*	*Nil*
TOTAL DISTURBANCE	*127.00 ha*	*114.39 ha*	*241.29 ha*
Successfully Rehabilitated	*0.00 ha*	*Nil*	

**Note:*
[1]: The camp consists of 8.7 ha of accommodation and laydown area plus 1.7 ha of sewage effluent dispersion area
[2]: Additional disturbance of up to 35.5 ha allowed for quarry area to supply material for preparation/maintenance of access tracks to bores
[3]; the proposed tracks will be up to a maximum of 6m wide for travel (39.85 km) and up to 4m for laying pipe line (34.2 km)
[4]; up to 88 drill pads and 3 lay down pads. Each drill pad will be a maximum of 50X50m and Lay down areas will be a maximum of 100x100m. For about 30 geo-tech bores the pad size will be up to 20x20m
[5]; A new water storage turkeys nest dam will be constructed

8. Schedule of Rehabilitation Costs

Table 4 Schedule of Rehabilitation Costs

Description of Disturbance	A. WORK REQUIRED to achieve the rehabilitation objectives (i.e. method/ machinery/supplies/ services/no. persons/time)	B. COST (per unit) (third party cost to achieve rehabilitation objectives)	C. Unit	D. Quantity/ Maximum Area Disturbed and not Rehabilitated	E. Cost to Rehabilitate the Maximum Area of Disturbance (BxD)
Camp	(a) Disconnect and terminate all services (Water, electricity, gas etc at point of attachment to site) (Lumpsum)	$ 35,000.00	Item	2	$ 70,000.00
	(b) Disconnect and terminate services at remote areas (pump stations, remote workshops, sewage treatment plant etc)(Lumpsum)	$ 10,000.00	Item	4	$ 40,000.00
	© Demolish and remove small buildings (camps, administration buildings, accommodation, bath house etc)(Lumpsum)	$ 407,000.00	Item	1	$ 407,000.00
	(d) Remove concrete pads & footings (>0.3 m thickness)and dumping in void	$ 65.00	m2	200	$ 13,000.00
	(e) Remove fence for effluent dispersal area	$ 20.00	m	500	$ 10,000.00
	(f) Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip	$ 2,045.00	ha	8.7	$ 17,791.50
	(g) Source, cart and spread topsoil (@ 0.2 m) haul distance <1 km (qty required -99,400 M3 of top soil @ 3.26 per m3 for camp area, overburden storage area and quarry area.	$ 3.26	m3	99400	$ 324,044.00
	(h) Direct seeding with native trees, shrubs and grass species for 229.29 Ha	$ 2,500.00	ha	229.29	$ 573,225.00
Tracks	Unsealed roads, Vehicle parkup areas-Minor earth works, dams, pipe line areas - final trim and deep rip	$ 1,080.00	ha	183.59	$ 198,277.20
Pipe line	Remove above ground pipe line connecting dewatering bores	$ 12.00	m	34200	$ 410,400.00
Decommissioning Bores	Boreholes- Back fill open bore holes with cuttings - 40 exploration bores and 30 Geotech holes	$ 300.00	Unit	70	$ 21,000.00
	Boreholes- Cap and seal open bore holes with cuttings -40 dewatering bores	$ 7,956.00	Unit	40	$ 318,240.00
Quarry	Major bulk pushing to achieve grades and inclusive of volumes of material required for reshaping using dozer	$ 1.14	m3	15000	$ 17,100.00
	General reshaping pushing /trimming to achieve the stable final land form for Quarry area and Dam Overburden storage area	$ 3,760.00	ha	41	$ 154,160.00
Water storage areas	Clean water dams / sediment control structures to be retained after closure – make safe and minor earthworks	$ 10,500.00	Unit	2	$ 21,000.00
	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (haul distance <1km)- for 0.2m thick sediment in a dam area of 12 ha= 24,000 cu.m	$ 3.55	m3	24000	$ 85,200.00
Rehabilitation processes complete		-		-	-
First year care & maintenance		Nil		-	-
Second year care & maintenance		Nil		-	-
TOTAL DISTURBANCE				236.69	-
Successfully Rehabilitated				0	-
				Total cost	$ 2,680,437.70

Calculation of Financial Assurance

Total cost to rehabilitate the maximum area of disturbance at any time during the term of the plan of operations:	$	2,680,437.70
Total cost to rehabilitate plus 10% for Project Management :	$	268,043.77
Total cost to rehabilitate plus 5% for monitoring cost:	$	134,021.89
Total cost to rehabilitate including Project Management and Monitoring :	$	3,082,503.36
FINANCIAL ASSURANCE REQUIRED	**$**	**3,082,503.36**

CERTIFICATION

I certify that this Plan of Operations complies with all of the conditions of the environmental authority EPML01470513, the determination of this Financial Assurance is correct and all associated information is accurate and has been calculated in accordance with the guideline under section 295(3)(b).

Environmental Authority Representative Name and Role: Llewellyn Lezar (Mine Operations Manager)

Environmental Authority Representative signature:

Date: 28-09-2017

Extract from Adani financial assurance calculation spreadsheet (portion only-Sheet-1).

ASSUMPTIONS;
The PoOp covers existing disturbance at the camp and accommodation site due to earlier exploration program.
(1) There is 115ha of tracks, 1.5 ha of quarry area 8.7 Ha of camp area and 1.7 ha of effluent dispersal field. totalling to 127 ha which is currently treated as already disturbed land.
(2) A new area of 23.91 ha is required for providing access tracks (39.85 km x 6m wide) to carry out additional drilling for LOX and coal quality, geotech and groundwater bores.
(3) A new area of 22.3 ha is required as pad area (50mX50m per pad for 88 bores and 30x 30m for 30 bores)for drilling about 40 LOX and coal quality bores, 48 groundwater bores for monitoring and advanced dewatering and 30 geotech investigation bores .
(4) A new area of 3 ha is required for preparing three laydown areas of 100m x 100m
(5) A new area of 12 ha is required for building an interim water storage area and 4 Ha for storage of overburden generated while constructing the dam.
(6) A new area of 13.68 ha of area is required for laying pipeline (34.2 km) connecting dewatering bores and the water storage dam.
(7)The Quarry will be expanded by 35.5ha (100mX 100m) to source material for forming new access tracks, drill pads and pipe line work.
(8) It is assumed that camp area (8.7 ha) require removal of all existing camp infrastructure (consisting of vehicle park-up areas with windrows and/or small earthen bunds) with minor earthworks, final trim and deep rip and direct seeding native tree/shrub/grass species.
(9) The camp consists of dismountable building blocks standing on pillars/ screwed poles and will be taken away in blocks. Assumed $ 407,000 to dismantle and remove all the building blocks from camp.
(10) The pipes supplying the effluent to the dispersal field will be pulled and fencing will be removed before rehabilitation
(11) The pipe line connecting all dewatering bores to water storage dam will be pulled and removed before rehabilitation.
(12) All bores (i.e. 40 LOX and coal quality bores, 30 Geotech bores and 40 groundwater production bores) except the groundwater monitoring bores will be decommissioned as per Australian standards after ceasing of the intended usage
(13) The quarry area will be about 1.5 ha (110 x 135m) with about 50% of area below ground by 4m deep. Dozer push is required to backfill 50% of quarry area up to 2m deep to achieve uniform grade across the total area.
(14) The 37 ha (including 35.5 ha expanded quarry area) will be rehabilitated by general rip and push to obtain uniform grade.
(15) General reshaping and pushing/trimming is required to the filled in quarry area to achieve a final land form design.
(16) All disturbed areas (area-of 183.59 ha consisting of tracks, pipe line, pads, lay down areas and overburden areas) will be ripped before seeding with native trees, shrubs and grasses.
(17) The Dam area will be cleaned and strengthened and will be handed over to the land owner for usage with stock water purpose
(18) The FA liability is calculated only on the Infrastructure Tab and Other Tab and all other tabs are not applicable for the proposed activities in this PoOp.

Extract from Adani financial assurance calculation spreadsheet (portion only- Sheet-2).

Open Cut & Underground Mine Operations:

Domain 1: Infrastructure

Overall Operation Total: **$3,082,104**
Domain Total: **$2,340,851**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

(1) There is 177.89 ha of tracks, pads and pieline areas, 37ha of quarry area,8.7 Ha of camp area, 12 ha of dam area, 4 ha of dam overburden storage area and 1.7 ha of effluent dispersal field as existing disturbance.

(2) It is assumed that camp area (8.7 ha) require removal of all existing camp infrastructure (consisting of vehicle park-up areas with windrows and/or small earthen bunds)

with minor earthworks, final trim and deep rip and direct seeding with native trees, shrubs and grass species.

(3) It is asumed that the effluent dispersal area require pulling out all dispersant fluid pipes and fences and direct seeding with native trees, shrubs and grass species

(3) It is asumed that reshaped quarry area and existing tracks, drill pads will be deep ripped and direct seeding with native trees, shrubs and grass species.

Legend:

Alternate rate has been used

Input from site optional (if information available)

Input mandatory (where applicable)

Default Rate where an alternative is not provided

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Termination of Services and Demolition Works	Disconnect and terminate all services (Water, electricity, gas etc. at point of attachment to site)	**Y**	2	Item	**$35,000**		**$70,000**	**Two units of work is assumed for disconnecting all electrical connections for the camp**	For disconnection of all services, at building boundaries, physical cut at the distribution centre.
	Disconnect and terminate services at remote areas (i.e., pump stations, remote workshops, sewage treatment plant, etc.)	**Y**	4	Item	**$10,000**		**$40,000**	**Two units of work is assumed for disconnecting all sewer and water connections for the camp**	Used for infrastructure remote from primary connection (i.e., pump stations, remote workshops, sewage treatment plant, etc.)
	Removal of low/medium voltage powerlines including disconnection, rolling up the wires and removing the poles - does not include the removal of substations	**N**		km	**$15,000**				Applies to power lines on stobie, concrete or similar poles.
	Removal of powerlines including disconnection, rolling up the wires and removing the poles) - does not include the removal of substations	**N**		km	**$1,000,000**				Applies to power lines on steel tower and steel lattice structures assuming 3 towers / km.
	Demolish and/or remove substations in an enclosed building	**N**		m2	**$600**				Assumes single story and includes segregation of materials for scrap.
	Demolish and remove switchyard - does not include decontamination, removal of oil etc.	**N**		m2	**$55.00**				Includes all switchgear and transformers etc.
	Demolish and remove demountable structures (camps, administration buildings, accommodation, bath house etc.)	**Y**	1	m2	**$40.00**	$407,000.00	**$407,000**	**No demolition required, only removal and transport of standard camp unit blocks and transportation of all stumps and concrete to rubbish yard. Quotation obtained from a Contractor local to the cam area.**	Crib huts, temporary offices and other non-permanent structures. Includes removal of concrete stumps.
	Demolish and remove small buildings (camps, administration buildings, accommodation, bath house etc.)	**N**		m2	**$77.00**				Assumes no greater than 2 stories high.
	Demolish and remove light industrial buildings (light vehicle workshop, warehouse/store, transfer station etc.)	**N**		m2/floor	**$115.00**				Must be calculated per floor/level (Assume 1 floor/level = 3-4 m).

		Demolish and remove industrial buildings (workshops, tyre change and servicing area etc. - not CHPP)	**N**		m2/floor	**$176.00**				Must be calculated per floor/level (Assume 1 floor/level = 3-4 m).
		Demolish and remove processing equipment (i.e., washery, crushers, mills, furnaces, agglomeration, electrowinning, floatation, sizing stations, rotary breakers etc.) - include the area of each floor of the structure	**N**		m2/floor	**$265.00**				Must be calculated per floor/level (Assume 1 floor/level = 3-4 m).
		Remove stacker or reclaimer (i.e., radial, luffing etc.) - does not include remove rails, ballast and conveyor etc.	**N**		Item	**$1,000,000**				Apply this rate for the removal of each radial and/or luffing (or similar) stacker or reclaimer.
		Demolish and remove bucket wheel stacker/reclaimer or wing stacker - does not include remove rails, ballast and conveyor etc.	**N**		Item	**$2,500,000**				Apply this rate for the removal of each bucket wheel stacker reclaimer.
		Remove rails and ballast for stacker and/or reclaimer - does not include the conveyor system	**N**		m	**$75.00**				Apply this rate for removing the rails and ballast/footings when rail mounted stacker reclaimers are present.
		Collapse, cut and remove ~5000 t silo / bin / hopper	**N**		Item	**$100,000**				Enter the number of large silos to be removed.
		Collapse, cut and remove ~3000 t silo / bin / hopper	**N**		Item	**$85,000**				Enter the number of medium silos to be removed.
		Collapse, cut and remove ~1250 t silo / bin / hopper	**N**		Item	**$65,000**				Enter the number of small silos to be removed.
		Demolish and remove on-ground conveyors and gantries (scrap only – does not include dismantling for reuse at another site)	**N**		m	**$285.00**				Enter the length of conveyors that are on the ground.
		Demolish and remove overhead conveyors and gantries (scrap only – does not include dismantling for reuse at another site)	**N**		m	**$370.00**				Enter the length of conveyors that are elevated >5 but <10 m off the ground.
		Demolish and remove elevated conveyors and gantries (scrap only – does not include dismantling for reuse at another site)	**N**		m	**$1,150**				Enter the length of conveyors that are elevated >10 m off the ground.
		Demolish reclaim tunnel, cut reo and expose reclaim conveyor, then collapse into the reclaim tunnel void (Does not include excavation to expose reclaim tunnel, removal of conveyor or backfilling void)	**N**		m2	**$80.00**				Apply this rate to the area of the roof of the reclaim tunnel to be "punched in" to expose the conveyor for removal - does not include excavation of material to expose the structure.
		Remove and demolish conveyor from reclaim tunnel (Does not include excavation and demolition of reclaim tunnel roof)	**N**		m	**$150.00**				This rate applies to conveyors in reclaim tunnels that do not have canopies or protection from the elements .
		Demolition of reclaim tunnel concrete (Assumes complete removal of concrete structure and local disposal)	**N**		m	**$950.00**				If a reclaim tunnel is to be completely removed.
		Dismantle on-ground conveyors for reuse/resale	**N**		m	**$750.00**				If the intention is to re-use the conveyor in another location, the cost is ~2.5x the demolition cost.
		Dismantle overhead conveyors for reuse/resale	**N**		m	**$1,000**				If the intention is to re-use the conveyor in another location, the cost is ~2.5x the demolition cost.
		Demolish and remove above ground small tank clean (Fuel storage, thickener etc. 3 - 9 m diameter)	**N**		Item	**$10,000**				This includes removing all tanks (i.e., fuel storage, thickener, flocculation tanks etc.) from the site including an associated pipework and pumps, etc.
		Demolish and remove above ground medium tank clean (Fuel storage, thickener etc. 10 - 15 m diameter)	**N**		Item	**$30,000**				This includes removing all tanks (i.e., fuel storage, thickener, flocculation tanks etc.) from the site including an associated pipework and pumps, etc.

		Demolish and remove above ground large tank clean (Fuel storage, thickener etc. 16 - 25 m diameter)	N		Item	$45,000			This includes removing all tanks (i.e., fuel storage, thickener, flocculation tanks etc.) from the site including an associated pipework and pumps, etc.
		Demolish and remove above ground extra large tank clean (Fuel storage, thickener etc. 26 - 50 m diameter)	N		Item	$85,000			This includes removing all tanks (i.e., fuel storage, thickener, flocculation tanks etc.) from the site including an associated pipework and pumps, etc.
		Demolish and remove above ground extra extra large tank clean (Fuel storage, thickener etc. >50 m diameter)	N		Item	$100,000			This includes removing all tanks (i.e., fuel storage, thickener, flocculation tanks etc.) from the site including an associated pipework and pumps, etc.
		Removal of small underground tank (<5000 L) - including pipes, bunds etc.	N		Item	$21,000			Apply this rate only for small underground tanks.
		Removal of large underground tank (>5000 L) - including pipes, bunds etc.	N		Item	$30,000			Apply this rate only for large underground tanks.
		Remove small underground pipe - ~300 mm pipes	N		m	$25.00			Apply this rate for small underground pipes that will be removed.
		Remove medium underground pipe - ~500 mm pipes	N		m	$60.00			Apply this rate for medium underground pipes that will be removed.
		Remove large underground pipe - 1 m pipes	N		m	$165.00			Apply this rate for large underground pipes that will be removed.
		Remove above ground pipe - supported	Y	34200	m	$12.00		$410,400	**to remove 34.2 km pipe line connecting dewatering bores to interim water storage dam**	Assumes pipes are located in close proximity to infrastructure.
		Remove above ground pipe - unsupported	N		m	$15.00			Assumes pipes are used for water transfer between pits (or similar) and remotely located.
		Remove rail, road, water course overpass	N		Item	$350,000			Provisional sum for significant civil structure.
		Remove bitumen (aprons, sealed areas) for dumping in a void on-site	N		m2	$10.00			Apply this rate to all bitumen sealed areas within the domain.
		Remove bitumen (airstrip) for dumping in a void on-site	N		m2	$20.00			Apply this rate for airstrips.
		Remove concrete pads & footings (<0.3 m thickness) and dumping in void	N		m2	$15.00			Enter the total area of the buildings where concrete footings are estimated to be <0.3 m thick.
		Remove concrete pads & footings (>0.3 m thickness)and dumping in void	Y	200	m2	$65.00		$13,000	**Removal of concrete pads at the camp kitchen area**	Enter the total area the workshops and buildings where concrete footings are estimated to be >0.3 m thick.
		Crush concrete to make road aggregate - 75 mm	N		tonne	$10.00			Apply this rate if the option to produce aggregate is required for waste concrete.
		Crush concrete to make road aggregate - 50 mm	N		tonne	$14.50			Apply this rate if the option to produce aggregate is required for waste concrete.
		Crush concrete to make road aggregate - 30 mm	N		tonne	$15.50			Apply this rate if the option to produce aggregate is required for waste concrete.
		Remove fence (cyclone/wire fence)	Y	500	m	$20.00		$10,000	**Removal of fence for effluent dispersal field**	Apply this rate for the removal of security fencing (or similar) that will be removed.
							Subtotal	**$950,400**		
	Rail Infrastructure	Remove rail loop and spur, ballast etc.	N		m	$55.00				This item includes the pulling up and removal of railway line and sleepers from site (cost per metre).
		Collapse, cut and remove rail loading bins	N		Item	$65,000				Enter the number of rail loading bins/hoppers present on site.
		Remove train loading facilities	N		m2	$265.00				Apply this rate to area of infrastructure (not including bins/hoppers) used for rail loading.
		Reshape rail spur and load out areas	N		ha	$2,800				Enter the total area of the rail spur that is required to be reshaped.
							Subtotal	**$0**		

Roads, Tracks and Park-up Areas	Remove bitumen (roads, parking areas) and dump in a void on-site	**N**		m2	**$10.00**				Enter the total area of any bitumen car parks (or similar).
	Remove stabilised material (blue metal, aggregate etc.) from roadways and dump in a void on-site (Select Haul Distance from list)	**N**		m3	**Select from List**		**FALSE**	**Select Haul Distance Here**	Enter the total volume of any stabilised area (or similar).
	Replace stabilised material (blue metal, aggregate etc.) in existing roadway following removal of contaminated material	**N**		m3	**$10.40**				In the event that a roadway is to be retained, this allows for carting the material from an on-site stockpile and placing. (assumes suitable material is stockpiled on-site and not required to be sourced externally)
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip	**Y**	183.59	ha	**$1,080**		**$198,277**	**To prepare tracks, pads, pipeline and dam overburden storage areas of 183.59 ha for rehabilitation**	Enter the total area of unsealed roads (or similar).
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	**N**		ha	**$3,290**				Enter the total area of unsealed roads (or similar).
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	**N**		ha	**$4,440**				Enter the total area of unsealed roads (or similar).
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip	**Y**	8.7	ha	**$2,045**		**$17,792**	**To prepare camp area of 8.7 ha for rehabilitation**	Enter the total area of unsealed roads (or similar).
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	**N**		ha	**$4,255**				Enter the total area of unsealed roads (or similar).
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	**N**		ha	**$5,405**				Enter the total area of unsealed roads (or similar).
						Subtotal	**$216,069**		
Contaminated Materials	Undertake a preliminary site investigation. This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple studies should be included.	**N**		Cluster	**$15,000**				If the operation produces hazardous contaminants or includes notifiable activities (in relation to contaminated land), the cost of completing a site investigation report to verify that the conditions of the environmental authority have been met in accordance with EP Act 1994 section 326BA. A cluster may include: - Mine infrastructure (i.e., fuel / chemical store, workshop, vehicle wash-down, sewage treatment etc.) - Processing plants (i.e., ore and product storage, mine waste storage and disposal, rail load-out etc.) - Remote pit-top facilities (i.e., vehicle re-fuel, sewage treatment, secondary workshop, chemical storage etc.)

		Undertake an intrusive site investigation. This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple intrusive investigations should be included.	**N**		Cluster	**$100,000**			Contamination investigation is required if land is recorded in the environmental management / contaminated land registers, the hazardous contaminant is in a concentration that can potentially cause serious or material environmental harm and a person, animal or other part of the environment may become exposed to the hazard (EP Act 1994 section 326BA). A cluster area where it is highly anticipated that contamination has occurred (i.e., underground tanks / pipes that are known to have leaked, chemical stores with earthen bunds, around ineffective oil/water separators etc.) and further field work is required involving intrusive investigation.
		Removal and off-site treatment of hydrocarbon contaminated water from workshops, bunded areas and sumps.	**Y**		L	**$0.35**		**$0**		This includes the removal of contaminated water from bunded areas and sump using a vacuum truck and disposing of the water to a licensed facility.
		Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (Select Haul Distance from list)	**N**		m3	**Select from List**		**FALSE**	**Select Haul Distance Here**	Enter the total area of any process facility / stockpile area (or similar).
		Load, cart and disposal of low level contaminated material (Hydrocarbons (unsuitable for land farming), Nitrates, Lead, Copper etc.) off-site to a licensed landfill. Add $50 / m3 for cartage to regional landfill	**N**		m3	**$200.00**				Allows for disposal fee and cartage.
		Load, cart and dispose of high level contaminated material (PCB's, Dioxins, Mercury etc.) off-site to a licensed local landfill. Add $50 / m3 for cartage to regional landfill	**N**		m3	**$700.00**				Allows for disposal fee and cartage.
		On-site remediation of hydrocarbon contaminated soils (Select volume from list) - manual land farming	**N**		m3	**Select from List**		**FALSE**	**Select Volume Here**	Where an assessment has been made to confirm that bioremediation is possible the total volume of material can be included for on-site land farming.
		Mobilisation of cement stabilisation plant and equipment for hydrocarbon (i.e., PAH, long chain hydrocarbons, etc.) contaminated soil treatment	**N**		Item	**$150,000**				Required if treatment of contamination is in excess and required to be fast tracked
		On-site remediation of hydrocarbon contaminated soils - using a mobile treatment unit	**N**		m3	**$165.00**				Required if treatment of contamination is in excess and required to be fast tracked
		Remove and dispose of asbestos (Select Volume from list)	**N**		m3	**Select from List**		**FALSE**	**Select Volume Here**	Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
		Removal and disposal of plastic liner (i.e. dam, leach pad etc.)	**N**		m2	**$1.00**				This rate includes cutting, removal and on-site disposal of liner.
							Subtotal	**$0**		
	Bulk Earthworks / Structural Works	Major bulk pushing to achieve grades nominated in the approval/permit – 50m-100m push length	**Y**	15000	m3	**$1.14**		**$17,139**	**> 50m - 100m < push** **The quarry has about 50 % area (out of existing 110mx 135m foot print) below ground level. To achieve a uniform slope in quarry area dozer push is required from higher**	This item includes the volume of material requiring major reshaping using a dozer to make safe an area and enable the establishment of rehabilitation.

								elevation side into the area below ground level.	
		General reshaping and pushing/trimming to achieve final landform design	**Y**	41	ha	**$3,760**		**$154,149**	**Reshaping the ground profile of 37 ha in the quarry area and 4 ha of overburden stored from Dam construction by way of dozer push and levelling.**	This rate can be applied to general disturbance areas that are located on graded landforms that may require some level of re-contouring for stability purposes.
		Structural works and / or water management for soil conservation on rehabilitated landforms (i.e., construction of contour banks, drop structures, run-off channels etc.)	**N**		ha	**$1,788**				This item is for rehabilitated landforms requiring water management / soil conservation works (banks, & drains, etc.) minimise the potential for erosion. May not be required for some applications (i.e., low-gradient slopes, some soil types etc.)
		Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	**N**		m2	**$35.00**				Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available).
							Subtotal	**$171,289**		
	Rehabilitation	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (Select Haul Distance from List)	**N**		m3	**Select from List**		**FALSE**	**Select Haul Distance Here**	This includes sourcing, carting and spreading of a suitable volume material to cap the dam, void etc. The material must have appropriate chemical & physical properties.
		Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	**N**		ha	**$1,620**				This item includes the area requiring minor reshaping, rock raking and deep ripping to enhance revegetation program. It will generally include doing minor reshaping works to tidy up the site.
		Deep rip hard stand / lay down areas (includes ripping in 2 directions)	**N**		ha	**$1,080**				This item includes deep ripping in 2 directions and may be required where single ripping will not adequately break up soils to enhance revegetation.
		Source, cart and spread growth media - haul distance <1 km	**Y**	99400	m3	**$3.26**		**$323,668**	**< =1km** **To rehab 8.7 Ha of camp area @ 0.2 thick growth media=17400 M3 +rehab of 37 ha of Quarry area @0.2 m thick growth media+= 74,000 M3 + to rehab 4 ha of overburden storage area generated from the construction of Dam = 8,000 M3**	Includes sourcing from on-site stockpiles, carting and spreading of a suitable volume of topsoil to cover the disturbance footprint.
		Direct seeding / fertiliser (pasture grass species)	**N**		ha	**$1,350**				This includes direct seeding of non native pasture grass species with the principal aim of returning the land to a stable, sustainable grazing land use. It is different to using pasture grasses in temporary erosion and sediment control.
		Direct seeding / fertiliser (native tree/shrub/grass species)	**Y**	229.29	ha	**$2,500**		**$573,225**	**Total area to be seeded includes all disturbance of 229.29 ha except 12 ha Water storage dam.**	This rate includes acquiring a diverse mix of native tree & shrub species appropriate for the area (including understorey), mixing and treating the seed (i.e. smoke and heat as required) and applying the seed at a rate between 4 - 10kg/ha (as applicable).
		Planting mature trees (>15 cm)	**N**		Item	**$20.00**				This includes the seedling, fertiliser tablet, weed mat and guard - small tube stock.
		Planting tube stock (<15 cm)	**N**		Item	**$10.00**				This includes the seedling, fertiliser tablet, weed mat and guard - small tube stock.
		Hydro-seeding with mulch and bitumen tack	**N**		m2	**$1.80**				Areas that require additional stabilisation.

	Single application of fertiliser (pasture)	N		ha	$420.00				If additional fertilising is required - assumes a rate of ~0.2 - 0.25 t / ha.
	Single application of fertiliser (trees)	N		ha	$140.00				If additional fertilising is required - assumes a rate of ~0.2 - 0.25 t / ha.
	Amelioration - lime (or similar)	N		ha	$860.00				This includes adding a soil ameliorant prior to preparation of seed bed for rehabilitation or assist stabilising dispersive soils.
	Amelioration - gypsum	N		ha	$250.00				This includes adding a soil ameliorant prior to preparation of seed bed for rehabilitation or assist stabilising dispersive soils.
	Amelioration - recycled gypsum	N		ha	$125.00				This includes adding a soil ameliorant prior to preparation of seed bed for rehabilitation or assist stabilising dispersive soils.
	Topdressing amelioration with biosolids / organic amendments	N		ha	$1,015				Enter area required for treatment with biosolids.
	Construct no-climb stock fence around rehabilitated areas	N		m	$10.00				This item include the construction of a no-climb stock fence around the site to prevent stock and unauthorised persons entering the site while it is being rehabilitated.
	Construct standard stock fence around rehabilitated areas	N		m	$5.00				This item include the construction of a standard stock fence around the site to prevent stock and unauthorised persons entering the site while it is being rehabilitated.
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	N		m3	$71.40				Enter volume of material to be imported onto site suitable for use in filling voids and / or capping.
	Supply from external sources virgin excavated natural material (VENM) for growth media etc.	N		m3	$80.80				Enter volume of material to be imported onto site suitable for use as topdressing / growth media.
						Subtotal	$896,893		
Maintenance of Subsidence Impacted and/or Rehabilitated Areas	Maintenance of rehabilitated areas	N		ha	$2,000				All areas that have been rehabilitated and need maintaining (i.e., where revegetation was unsuccessful) whether previously disturbed or proposed to be disturbed and rehabilitated within the FA period.
	Minor earthworks and ripping or Maintenance of mine subsidence areas	N		ha	$1,620				Enter total area requiring minor earthworks. Enter only total area experiencing surface expression of subsidence effects (i.e. cracking, sink holes etc.) that have not previously undergone successful remedial works.
	Land management of undisturbed areas (i.e., weed management, feral animal control, erosion and sediment control works etc.)	N		ha	$450.00				Enter area requiring land management.
	Pest management on buffer lands, non-disturbed, and rehabilitated areas	N		ha	$150.00				This item covers the costs associated with the management of pests on the site.
						Subtotal	$0		
Water Management	On-site treatment of contaminated water due to high salt (includes removal of metals etc., brine disposal and cost of mobile water treatment unit)	N		ML	$3,600				Enter total volume of water to be treated in order to comply with the aproval conditions.

		On-site treatment of contaminated water due to low pH (incudes removal of metals etc., neutralisation treatments and cost of mobile water treatment unit	**N**		ML	**$1,500**			Enter total volume of water to be treated in order to comply with the aproval conditions.
		Clean water dams / sediment control structures to be retained after closure – make safe and minor earthworks	**Y**	2	Item	**$10,500**		**$21,000**	**To strengthen the water storage dam and make it safe with minor earth works**	Enter number of minor water management structures (i.e. small sediment dams) to remain after closure
		Remove sediments from the floor of the dam to enable it to be converted into clean water structure (haul distance <1km)	**Y**	24000	m3	**$3.55**		**$85,200**	**< =1km** **Assuming 0.2m of sediment from the dam area of 12 ha=**	This includes removal of sediment (potentially contaminated) from dams, and appropriate disposal on-site to enable either backfilling of the structure or conversion to clean water dam.
		Water pumping/transfer between pits	**N**		ML	**$115.00**				Enter the volume of water that is required to be pumped/transferred on site.
		Removal of evaporation fans and / or other water transfer and management infrastructure	**N**		Item	**$25,000**				Provisional sum for removal of water management infrastructure.
							Subtotal	**$106,200**		
	Additional Items	Other 1 <insert>	**N**			**This is deliberately left blank**				This item includes **<<to be added by the operator>>**
		Other 2 <insert>	**N**							This item includes **<<to be added by the operator>>**
		Other 3 <insert>	**N**							This item includes **<<to be added by the operator>>**
		Other 4 <insert>	**N**							This item includes **<<to be added by the operator>>**
		Other 5 <insert>	**N**							This item includes **<<to be added by the operator>>**
		Other 6 <insert>	**N**							This item includes **<<to be added by the operator>>**
		Other 7 <insert>	**N**							This item includes **<<to be added by the operator>>**
		Other 8 <insert>	**N**							This item includes **<<to be added by the operator>>**
		Other 9 <insert>	**N**							This item includes **<<to be added by the operator>>**
		Other 10 <insert>	**N**							This item includes **<<to be added by the operator>>**
							Subtotal	**$0**		
	Total Rehabilitation Costs for Domain							**$2,340,851**		

Extract from Adani financial assurance calculation spreadsheet (portion only- Sheet-3).

Open Cut & Underground Mine Operations:

Domain 7: Other Management Issues

Overall Operation Total: **$3,082,104**
Domain Total: **$339,240**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

About 80 bores installed for advanced dewatering and LOX and coal quality will need to be decommissioned

Legend:

Alternate rate has been used

Input from site optional (if information available)

Input mandatory (where applicable)

Default Rate where an alternative is not provided

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Roads, Tracks and Park-up Areas	Remove bitumen (roads, parking areas) and dump in a void on-site	**Y**		m2	**$10.00**		**$0**		Enter the total area of any bitumen car parks (or similar).
	Remove stabilised material (blue metal, aggregate etc.) from roadways and dump in a void on-site (Select Haul Distance from list)	**Y**		m3	**Select from List**			**Select Haul Distance Here**	Enter the total volume of any stabilised area (or similar).
	Replace stabilised material (blue metal, aggregate etc.) in existing roadway following removal of contaminated material	**Y**		m3	**$10.40**		**$0**		In the event that a roadway is to be retained, this allows for carting the material from an on-site stockpile and placing. (assumes suitable material is stockpiled on-site and not required to be sourced externally)
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip	**Y**		ha	**$1,080**		**$0**		Enter the total area of unsealed roads (or similar).
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	**Y**		ha	**$3,290**		**$0**		Enter the total area of unsealed roads (or similar).
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	**Y**		ha	**$4,440**		**$0**		Enter the total area of unsealed roads (or similar).
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip	**Y**		ha	**$2,045**		**$0**		Enter the total area of unsealed roads (or similar).
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	**Y**		ha	**$4,255**		**$0**		Enter the total area of unsealed roads (or similar).
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	**Y**		ha	**$5,405**		**$0**		Enter the total area of unsealed roads (or similar).

						Subtotal	$0		
Mining and LOX and coal quality Works	Boreholes – backfill open boreholes with cuttings	**Y**	70	Item	**$300.00**		**$21,000**	**There are 40 LOX and coal quality holes and 30 geotech holes for backfilling**	This rate includes backfill of boreholes with drill cuttings.
	Boreholes – cap and seal open boreholes - goaf drainage etc.	**Y**		Item	**$6,960**		**$0**		170 - 200 m deep holes - includes cutting steel collar 6 m below surface and completely fill with concrete.
	Boreholes – cap and seal open boreholes 150 - 400 mm	**Y**	40	Item	**$7,956**		**$318,240**	**There are 40 dewatering bores to be de-commissioned**	150 - 450 m holes - completely fill with concrete.
	Boreholes – cap and seal open boreholes - vertical gas drainage, surface-to-in-seam gas drainage etc.	**Y**		Item	**$15,000**		**$0**		Pre-drainage boreholes.
	Boreholes – cap and seal service boreholes for UG operations and/or grout (with concrete) cap and seal bore holes (i.e. where sealing aquifers)	**Y**		Item	**$45,000**		**$0**		Includes large diameter boreholes used for supplying electricity (66kV), compressed air, water, solsenic etc. Includes multi skin sleaves to prevent aquifer mixing.
	Install gate or grill over the adit (Where site might be used by bats)	**Y**		Item	**$10,000**		**$0**		This rate includes installation of gate or grill.
						Subtotal	$339,240		
Rehabiliation (For other rehabilitation no previously covered)	Source, cart and spread growth media (Select Haul Distance from List)	**Y**		m3	**Select from List**			**Select Haul Distance Here**	Includes sourcing from on-site stockpiles, carting and spreading of a suitable volume of topsoil to cover the disturbance footprint.
	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	**Y**		ha	**$1,620**		**$0**		This item includes the area requiring minor reshaping, rock raking and deep ripping to enhance revegetation program. It will generally include doing minor reshaping works to tidy up the site.
	Direct seeding / fertiliser (pasture grass species)	**Y**		ha	**$1,350**		**$0**		This includes direct seeding of non native pasture grass species with the principal aim of returning the land to a stable, sustainable grazing land use. It is different to using pasture grasses in temporary erosion and sediment control.
	Direct seeding / fertiliser (native tree/shrub/grass species)	**Y**		ha	**$2,500**		**$0**		This rate includes acquiring a diverse mix of native tree & shrub species appropriate for the area (including understorey), mixing and treating the seed (i.e. smoke and heat as required) and applying the seed at a rate between 4 - 10kg/ha (as applicable).
	Planting mature trees (>15 cm)	**Y**		Item	**$20.00**		**$0**		This includes the seedling, fertiliser tablet, weed mat and guard - small tube stock.
	Planting tube stock (<15 cm)	**Y**		Item	**$10.00**		**$0**		This includes the seedling, fertiliser tablet, weed mat and guard - small tube stock.
	Amelioration - lime (or similar)	**Y**		ha	**$860.00**		**$0**		This includes adding a soil ameliorant prior to preparation of seed bed for rehabilitation or assist stabilising dispersive soils.
	Amelioration - gypsum	**Y**		ha	**$250.00**		**$0**		This includes adding a soil ameliorant prior to preparation of seed bed for rehabilitation or assist stabilising dispersive soils.
	Amelioration - recycled gypsum	**Y**		ha	**$125.00**		**$0**		This includes adding a soil ameliorant prior to preparation of seed bed for rehabilitation or assist stabilising dispersive soils.
	Topdressing amelioration with biosolids / organic amendments	**Y**		ha	**$1,015**		**$0**		Enter area required for treatment with biosolids.

	Construct no-climb stock fence around rehabilitated areas	Y		m	$10.00		$0		This item include the construction of a no-climb stock fence around the site to prevent stock and unauthorised persons entering the site while it is being rehabilitated.
	Construct standard stock fence around rehabilitated areas	Y		m	$5.00		$0		This item include the construction of a standard stock fence around the site to prevent stock and unauthorised persons entering the site while it is being rehabilitated.
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	Y		m3	$71.40		$0		Enter volume of material to be imported onto site suitable for use in filling voids and / or capping.
	Supply from external sources virgin excavated natural material (VENM) for growth media etc.	Y		m3	$80.80		$0		Enter volume of material to be imported onto site suitable for use as topdressing / growth media.
						Subtotal	$0		
Maintenance of Subsidence Impacted and/or Rehabilitated Areas	Maintenance of rehabilitated areas	Y		ha	$2,000		$0		All areas that have been rehabilitated and need maintaining (i.e., where revegetation was unsuccessful) whether previously disturbed or proposed to be disturbed and rehabilitated within the FA period.
	Minor earthworks and ripping or Maintenance of mine subsidence areas	Y		ha	$1,620		$0		Enter total area requiring minor earthworks. Enter only total area experiencing surface expression of subsidence effects (i.e. cracking, sink holes etc.) that have not previously undergone successful remedial works.
	Create cut-through to re-establish natural water courses/drainage channels following subsidence	Y		Item	$3,000		$0		Enter total number of cut-throughs of the surface expression of chain pillars to re-establish natural drainage pathways.
	Existing rehabilitation repair - minor	Y		ha	$1,200		$0		Enter total area requiring minor repairs.
	Existing rehabilitation repair - moderate	Y		ha	$1,700		$0		Enter total area requiring moderate repairs.
	Existing rehabilitation repair - major	Y		ha	$2,500		$0		Enter total area requiring major repairs.
	Existing rehabilitation repair - total failure of intended landform	Y		ha	$40,000		$0		Enter only specific area of landform requiring re-construction following failure of intended design.
	Land management of undisturbed areas (i.e., weed management, feral animal control, erosion and sediment control works etc.)	Y		ha	$450.00		$0		Enter area requiring land management.
	Pest management on buffer lands, non-disturbed, and rehabilitated areas	Y		ha	$150.00		$0		This item covers the costs associated with the management of pests on the site.
						Subtotal	$0		
Mobilisation and Demobilisation	Mobilisation & Demobilisation (Select Distance to site from list)	Y		Item	Select from List			Select Distance Here	This is to cover the cost of the contractor/s mobilising / demobilising suitable plant and equipment. Apply once per completed FA calculator.
						Subtotal	$0		
Additional Items	Other 1 <insert>	N			This is deliberately left blank				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	N							This item includes **<<to be added by the operator>>**
	Other 3 <insert>	N							This item includes **<<to be added by the operator>>**
	Other 4 <insert>	N							This item includes **<<to be added by the operator>>**
	Other 5 <insert>	N							This item includes **<<to be added by the operator>>**
	Other 6 <insert>	N							This item includes **<<to be added by the operator>>**
	Other 7 <insert>	N							This item includes **<<to be added by the operator>>**

	Other 8 <insert>	N							This item includes <<to be added by the operator>>
	Other 9 <insert>	N							This item includes <<to be added by the operator>>
	Other 10 <insert>	N							This item includes <<to be added by the operator>>
						Subtotal	$0		
Total Rehabilitation Costs for Domain							**$339,240**		

	Monitoring and record keeping summary				
Data and information	**Method of record keeping to be used**				**Frequency**
	Site plans	**Journal**	**Photographs**	**Other**	
Topsoil stripping and stockpiling (e.g. record topsoil stockpiles, location and age)	✓	✓			Monthly
Area disturbed and rehabilitation (e.g. map of the area of disturbance and photos of rehabilitation)	✓		✓		Monthly
Pre and post-mine landform (e.g. record photographs of the area prior to and following mining)	Not applicable				
Water discharge quality (e.g. note colour of discharge water from sediment dams)		✓			Event based
Dam maintenance (e.g. record of dam maintenance such as sediment removal)		✓			Quarterly
Record of complaints (e.g. air, noise, etc.) (e.g. record in journal any complaints received by adjoining land owner, actions taken and the outcomes of the action)		✓			Event based
Site specific conditions (e.g. record of monitoring to demonstrate compliance with any site specific conditions)		✓			Monthly
Remediation of contaminated land (e.g. record of current and remediated contaminated land)	✓	✓			Annual
Waste Management (e.g. record of waste taken to a regulated waste collection depot)		✓			Monthly
Rehabilitation quotes, estimates and actual costs	✓				Annual
Others – relevant to performance category	NA				

Table 4 Approved Mine Disturbance Domains

Mine Domain	Location	Domain Area (ha)	Disturbance Areas			Maximum Disturbance Area (ha)
			Year 1–10	Year 11–20	Year 21–60	
Open-cut voids and slopes	See Figure A1	8331.55	3729.56	2011.95	2590.04	**8331.55**
Underground mining and subsidence boundary	See Figure A1	7786.76	1931.95	3030.16	2824.65	**7786.76**
Mine infrastructure	See Figure A1	2032.77	1911.13	110.42	11.22	**2032.77**
Out-of-pit spoil dumps	See Figure A1	8308.69	6603.10	1670.80	34.79	**8308.69**
Water storage areas, including MAW dams, raw water dams	See Figure A1	817.53	813.47	4.06	0	**817.53**
Stream diversions	See Figure A1	472.68	412.34	60.34	0	**472.68**
Tailings drying cell	See Figure A1	216.17	216.17	0	0	**216.17**
Carmichael River corridor and levees	See Figure A1	1799.02	50.78	0	0	**50.78**
Carmichael River	See Figure A1	1748.24	0	0	0	**0**
Exploration*	See Figure A2	NA*	44	0	0	**44**
Total						**28 060.93**

Appendices

Appendix 1 Water Management Plan

Adani Mining Pty Ltd

Water Management for the Advanced Pit Dewatering Borefield

September 2017

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

Executive summary

Adani have requested that GHD develop a strategy required for the purpose of assessing the existing groundwater potential within the initial mine pits (Pits D and E) and propose a design for dewatering the groundwater before commencement of box cut excavation. Before implementation of the Pit Dewatering Borefield, GHD are to develop a Water Management Plan to outline water control measures for both the internal flow of water through the borefield pipeline network to an interim water storage dam, as well as manage outside surface water influences.

The Advanced Pit Dewatering Borefield Water Management Plan considers water control throughout vegetation clearing, topsoil and grubbing disturbance, exploration and production borehole drilling, the pumping and pipeline network, designated water fill points and the interim water storage dam. This specific Advanced Pit Dewatering Borefield Water Management Plan is intended to be considered in isolation to any other concurrent or future mining activities. Therefore, GHD recommends this report forms part of a larger site wide Water Management Plan which will be prepared in future before commencement of full scale operation at the mine.

This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.3 Scope and limitations and the assumptions and qualifications contained throughout the Report. Key control measures that manage water during the Advanced Pit Dewatering Borefield Project are:

Boreholes and Borehole Pad Design

The proposed boreholes are located on the western boundary of the Mine Domain, into Bandanna formation and Colinlea sandstone formations (Betts creek beds) to target the main high yielding coal seam aquifers. It is planned to drill up to 80 bores (40 investigation bores required for mine planning and 40 groundwater bores for design and construction of dewatering bores.) Due to the dewatering drawdown pressure differential near the collar of a borehole, combined with the multi-screen aquifer design, a high borehole casing strength is required. The borehole pad is designed to mimic the natural topography cross fall with a sediment basin at the low point to reduce ponding. In low-lying regions, such as towards the Carmichael River, a raised pad is required to elevate the borehole collar together with critical generator power, in the event of local flooding.

Water Pipe Flow Network

Water pumped from the boreholes will be metered and will travel along the main pipeline network to supply the interim water storage dam. Along this pipeline there exists up to four, one-way valve water fill points. Early leak detection in pipelines is measured by differential water flow at designated monitoring stations. Air release valves at pipeline high points aim to reduce pipeline pressure build up, therefore minimising risk of an uncontrolled water pipeline burst.

Dam Storage

An interim water storage dam with an operating capacity of 250ML is to contain water pumped from the production boreholes. Water storage curves will determine a safe operational water usage limit, controlled by instrumentation.

Risk Management has identified key risks to the success of the Advanced Pit Dewatering Borefield Program. To control adverse effects of a major rain event, borehole pads elevate critical infrastructure; capped boreholes control the water flow in a secure pipeline network; access track barriers divert surface water runoff and dam slope stability design mitigates dam break.

Table of contents

Figure index

Appendices

1. Introduction

1.1 Site Overview

The topography of the Galilee Basin encompasses a major ridge line trending north-west to south-east, 8km west of the Carmichael mine lease. From here, the elevation flattens towards the Carmichael River and eastern parts of the lease. The Carmichael River runs from east to west, through the mine lease and major ridge. The Doongmabulla Spring Complex and several tributary creeks (Surprise Creek, Carmichael Creek, Dingo Creek, Cattle Creek and Dooyne Creek) flow into the Carmichael River from the west. Furthermore, to the east, Belyando River flows from south to north and is also a main tributary to the Carmichael River. Carmichael River has the potential to flood and the location of Borefield infrastructure has been considered.

1.2 Purpose of this report

The purpose of this report is to detail the Water Management Plan for the specific infrastructure works related to conduct further investigations at the project such as drilling additional holes for mine planning and groundwater studies. After the initial investigations the Advanced Pit Dewatering Borefield project will be designed and constructed to extract groundwater from the underlying coal seam aquifers within the mine lease area (approved (mine domain) as per the approved Plan of Operations). The groundwater pumped out will be piped to an interim water storage dam and will be used for the early construction activities.

This specific Advanced Pit Dewatering Borefield Water Management Plan is intended to be considered in isolation to any other concurrent or future mining activities. Therefore, GHD recommends this report forms part of a larger site wide Water Management Plan.

1.3 Scope and limitations

This report: has been prepared by GHD for Adani Mining Pty Ltd and may only be used and relied on by Adani Mining Pty Ltd for the purpose agreed between GHD and the Adani Mining Pty Ltd as set out in section 1.2 Purpose of this report.

This Water Management Plan report for the Advanced Pit Dewatering Borefield Project outlines:

- Infrastructure works required during the Borefield Project
- Water Management during the three stages of infrastructure testing, commissioning and operation
- Identifies specific Water Risk Management controls

GHD otherwise disclaims responsibility to any person other than Adani Mining Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report, refer to 1.4 Assumptions*. GHD disclaims liability arising from any of the assumptions being incorrect.*

1.4 Assumptions

Assumptions underlying the Advanced Pit Dewatering Borefield Water Management Plan are as follows:

1. Existing exploration or pastoral tracks will be used to gain access to the new borehole locations. Where no existing tracks are available new access tracks will be prepared for suitability as dry weather tracks. Though it is not planned to sheet the entire length of the new access tracks, some soft spots/ low lying areas may be sheeted with material obtained from the onsite quarry to protect the track from washouts from rainfall events.
2. The Interim Water Storage Dam is a suitable capacity to contain the dewatering boreholes flow rate.
3. During the groundwater investigation works (including pump tests, flow tests, yield tests) water is allowed to freely release with consideration given to draining that doesn't cause soil erosion or damage any tracks.
4. The 1 in 50 ARI Flood Maps used to position the southern access boreholes is indicative of the flood depth and area extent of flooding.

2. Infrastructure Works

Planned infrastructure works as part of the Advanced Pit Dewatering Borefield Project are outlined in this Chapter 2. The general layout showing the proposed disturbance for this advanced Pit Dewatering Borefield project is provided in Appendix A. An overview of the network water flow diagram is given below in Figure 2-1. The Borefield Project encompasses drilling into the underground coal seam aquifer waters, pumping the water through boreholes and piping the water to the Interim Water Storage Dam. A series of water fill points are located throughout the pipeline.

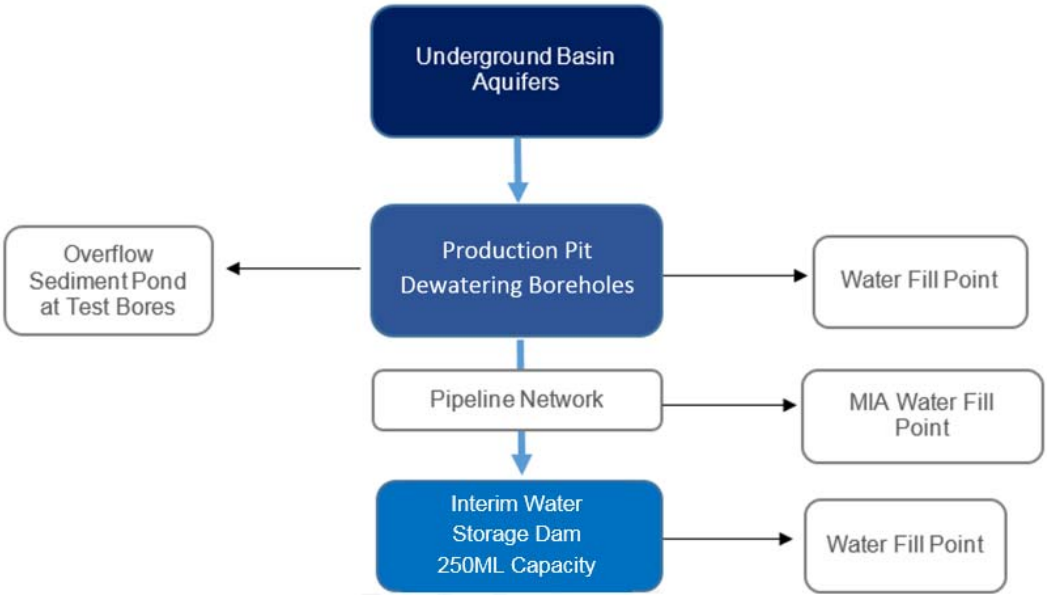


Figure 2-1: Network Water Flow Diagram

2.1.1 Vegetation

Before any disturbance of land is approved, Cultural Heritage (CH), Flora and Fauna surveys will be completed by suitably qualified professionals to identify and mitigate any areas requiring it. Vegetation clearing will be necessary in some areas where there are no pre-existing pastoral or exploration tracks, to enable access to bore sites. Clearing will also be required for preparing drill pads, Lay down areas and a water storage dam. For the access tracks, stripped vegetation and topsoil will be pushed to the higher side of the access track. This vegetation stockpile will act as a barrier to surface water runoff from the higher land elevations and assists in protecting the access track from erosion. Any clearing will be limited to the minimum amount necessary to enable the required activities to be completed safely and to minimize the total disturbance.

2.1.2 Topsoil & Grubbing

For critical infrastructure works, such as the borehole pad, laydown pad areas and dam footprint, the topsoil becomes part of the disturbance footprint. Managing the topsoil disturbance footprint and consideration of topsoil protection long term is essential to reduce mine rehabilitation costs. Top soil from drill pads, laydown areas and dam footprint areas will be stockpiled separately for future rehabilitation usage.

2.1.3 Borehole Access Tracks

Access tracks connect the boreholes across site. Although these access tracks are mostly dry weather only, allowance has been made to stockpile vegetation on the up gradient side of the

track assisting in protecting the track from the surface storm water runoff. Additionally, water can be diverted off the access track via whoa-boys and spur drains at regular intervals on the access tracks, to reduce ponding on access tracks. Though it is not planned to sheet the entire length of the new access tracks some soft spots/low lying areas may be sheeted with material from the onsite quarry to protect the track from washouts from rainfall events. The material required for the above purpose will be sourced from the Redhill quarry present within the future disturbance area of Open-cut Pits.

2.1.4 Boreholes and Borehole Pads

A typical borehole pad layout connected to an access track can be seen in Figure 2-2: Borehole Pad Design with typical water flow directional arrows, below.

- Key ways to direct water flow are considered in the borehole pad design:
- The borehole pad will be a maximum of 50m by 50m with a natural fall to the down gradient side of the site topography to reduce surface water ponding.
- Where ever there is risk of local flooding in low lying topography (particularly in the south side near to the Carmichael River) the borehole collar and other critical infrastructure (generator and electrical controls used for pumping) will be situated on a raised platform.
- Drilling sumps will be sized to ensure all drilling fluids are retained in the sump and surface run off will be diverted away from the sumps to prevent any potential for drilling mud to flow into the adjoining areas.
- A sediment basin will be prepared in the lowest corner of the drill pad to reduce any sediment load in water flowing off the pad during the bore commissioning phase, or rain events stage.
- The pipeline (in blue) is anchored on to one side of the borehole access track. For a detailed elevation view of the pipeline connections, please refer to Figure 2-3: Typical Borehole Pad with Pipeline Cross-section. Storm water passage conduits/drainage breaks will be provided at regular intervals under the pipe line to prevent any water trapping on the road due the reason of pipeline acting as a dam.
- Water is diverted off the access track via whoa-boys and spur drains at regular intervals to keep the surface run off away from the drill pads and access tracks.
- The stripped vegetation is stockpiled on the up gradient side of the access track corridor and drill pad, assisting in the protection of the access tracks and pads from water flow from higher elevations.
- The topsoil stripped from the drill pad areas will be stacked to the lower side of the pad, which will be preserved for future rehabilitation usage.

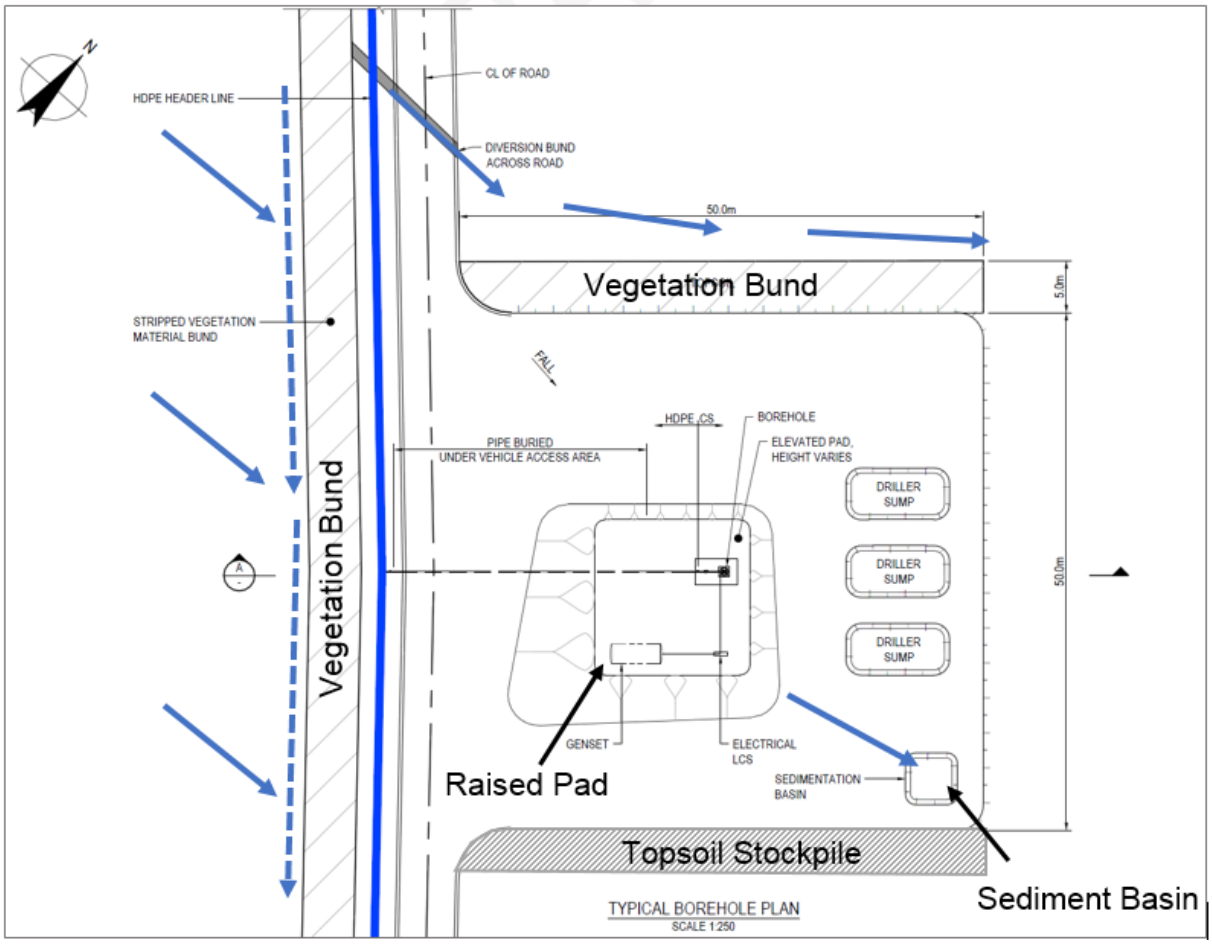


Figure 2-2: Borehole Pad Design with typical water flow directional arrows

2.1.5 Laydown Pads

Laydown pads for temporary storage of construction materials etc. are included in the land disturbance footprint. Three laydown pads at a maximum of 100 by 100 metres will be constructed along the western boreholes access track. Laydown areas will be designed similarly to the drill pads regarding vegetation/topsoil placement and include a sedimentation basin at the lowest point, to control water flows and quality on and off the laydown areas.

2.1.6 Pumps and Piping

Each production borehole will have a down-the-hole submersible bore pump to extract groundwater. A typical cross-section of the bore pump and the borehole pad is seen below in Figure 2-3. The main pipeline will run along one side of the access track, protected from traffic via a material bund barrier. To connect the submersible borehole pump to the main pipeline, as per Figure 2-3, the connector pipe will be buried under the road and re-surface next to the borehole. In this way, the connector pipe is protected from local traffic disturbance.

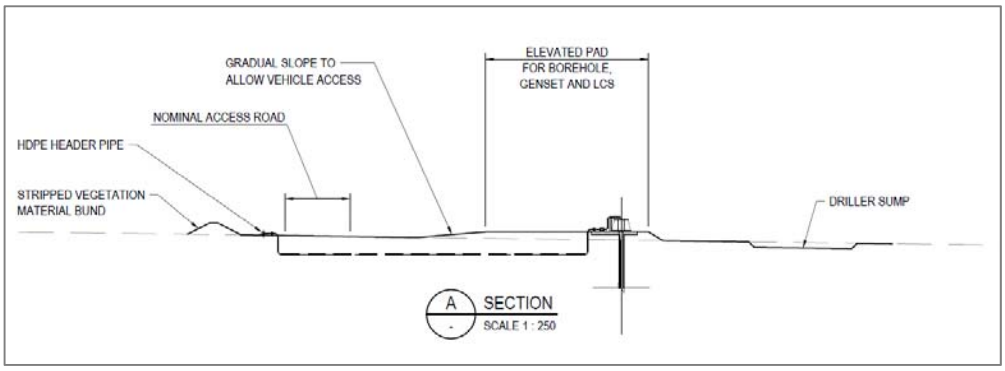


Figure 2-3: Typical Borehole Pad with Pipeline Cross-section

As per the network water flow diagram in Figure 2-1, water pumped from the borehole, will travel along the main pipeline network to supply the Interim Water Storage Dam. Along the main pipeline network it is proposed to provide up to 4 water fill points (near to the test boreholes, MIA and at Interim Water Storage Dam). A typical water fill point plant setup is given below Figure 2-4 whereby water is controlled by a one-way operational valve with a shutoff point. Water runoff from these fill points will be controlled in a similar manner to drill pads and laydown areas (sediment traps/diversion bunds etc.

Figure 2-4: A typical water fill point setup

2.1.7 Dam

An important infrastructure component of the Advanced Pit Dewatering Project is the Interim Water Storage Dam, to contain the water pumped from the boreholes. The Interim Water Storage Dam is to have a total operating capacity of up to 250ML. As per the EA requirements under Schedule K, a consequence category assessment will be completed and submitted with the Plan of Operations for approval by the DEHP, prior to construction.

An analysis of the minimum dam capacity required of the dam to handle bore dewatering flow rates from the production boreholes will be completed in the detailed engineering design phase. The detailed dam design will account for wind and wave run up, freeboard and spillway design in the event of storm water surge. An indicative preliminary design of the Interim Water Storage Dam, can be seen below in Figure 2-5.

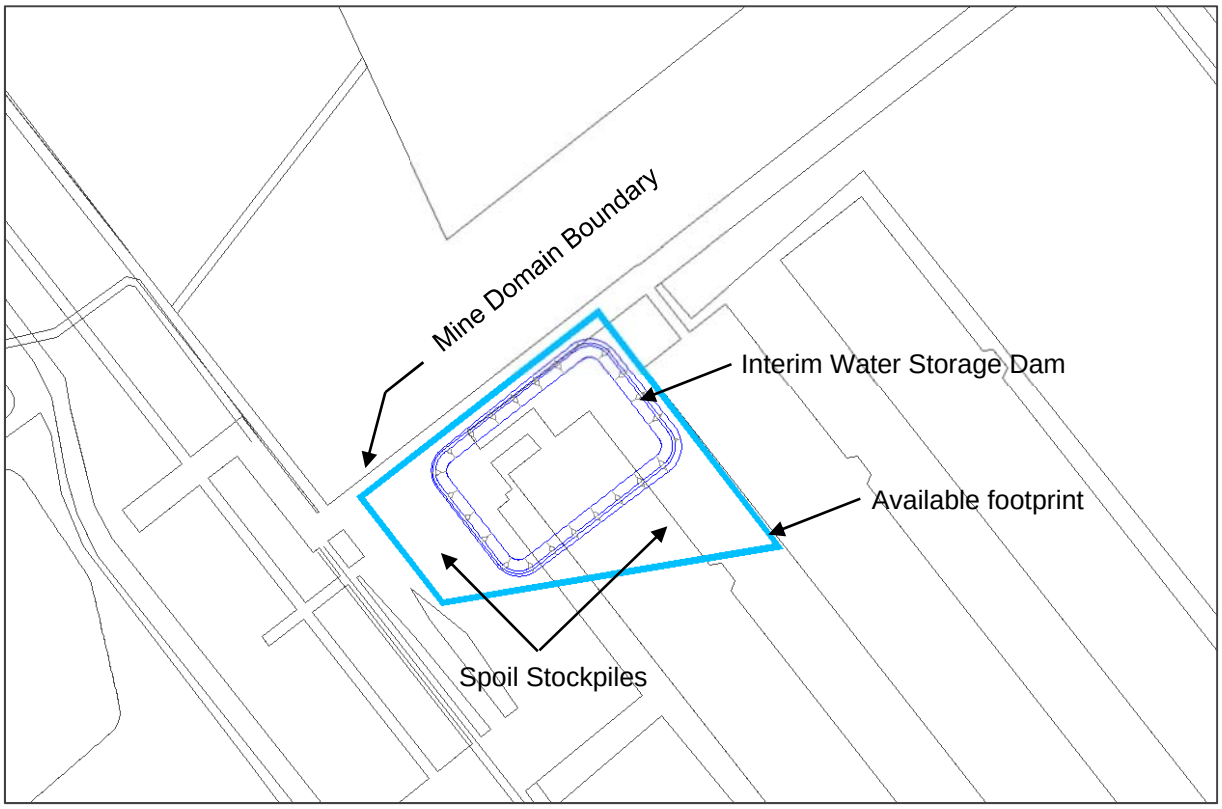


Figure 2-5: Interim Water Storage Dam Design

The available working footprint is delineated by the light blue boundary line in Figure 2-5 and concept Interim Water Storage Dam design is shown as a darker blue. The footprint will first require cultural heritage clearing, followed by vegetation clearing and topsoil stockpiling before any construction can begin.

The dam is to be excavated into the ground and cut material of approximately 300,000 BCM is to form part of the embankment height, while excess material is to be stored in spoil stockpiles directly to the south-west and south-east as indicated on Figure 2-5. This tertiary spoil stockpile height will be assessed by geotechnical to ensure stability and drainage control. Once the spoil stockpiles are complete, topsoil can be carefully placed over these spoil mounds to rehabilitate the local dam footprint area. From here, native seeding can be spread across the mounds to encourage grass growth.

3. Water Management in Construction and Operational Phases

3.1 Testing

3.1.1 Exploration Boreholes

In this program up to 40 exploration bores for further exploration /mine planning purpose and 40 bores for groundwater investigations will be drilled. Initially in the preliminary works six exploration boreholes will be drilled to assess water yield and assist in developing a groundwater model to better predict water flow rates. These six exploration holes will be installed in the disturbance domains as approved in the Plan of Operations. A sediment pond on the pad is to capture excess water overflow.

In addition to the above, approximately 8 groundwater monitoring bores will be installed near to the infrastructure areas to monitor any ground water contamination.

3.1.2 Drilling

During drilling activity the driller sumps will be sized as to hold the drill cutting water on the drill pad itself. Surface water run off on the drill pads will be diverted away from the driller sumps to prevent overflowing of the drill cutting water.

3.1.3 Trial Dewatering Boreholes

Once the preliminary six exploration boreholes have been drilled, data obtained will form the basis for the numerical groundwater model to predict water yield volumes for the main production boreholes. Once the numerical model has been populated and reviewed, two trial production boreholes will be chosen from these exploration bores. During the pump test, drainage will be controlled to ensure water discharged will be diverted away from access tracks towards good ground cover and the hose will be moved periodically to spread the water over a larger area to prevent scouring, or localized flooding.

3.2 Commissioning

3.2.1 Boreholes

The exploration bore holes will be drilled mostly up to weathered coal subcrop line for mine planning purposes. The groundwater monitoring bores will be drilled down to the shallow alluvium/tertiary aquifers in the vicinity of infrastructure facilities for monitoring of any potential groundwater contamination.

With the groundwater numerical model populated from the two test boreholes, borehole water yield rate will be better understood. Here, targeting the highest yielding boreholes will be the priority for dewatering Pits D and E. The pumping of groundwater from dewatering bores will be from multiple acquirers within the coal seam formations. To facilitate pumping from different aquifers the bore holes will be constructed with multiple screens with reinforced slotting design to prevent damage that may arise due to adverse pressure differentials.

During the drilling of all of the boreholes the water management involves a sediment basin at the lowest pad corner to capture water overflow.

All dewatering bores, groundwater investigation bores and monitoring bores will be constructed as per legislation outlined in “Minimum Construction Requirements for Water Bores in Australia, Feb, 2012”.

3.2.2 Pumps and Pipeline Network

The main pipeline flowing into the Interim Water Storage Dam is to be located to one side of the access track.

Connector pipes will run from the main pipeline to each borehole. Connector pipes will be laid out prior to each borehole commissioning and connect to the main network once the production borehole has been tested. Note, a sediment basin is to be located on each borehole pad to capture any water overflow.

3.2.3 Dams

The Interim Water Storage Dam is to contain the water inflow from the 40 production boreholes for the purpose of dewatering Pits D and E of the mine. The Interim Water Storage Dam will be constructed as a turkey's nest dam with the storage capacity created by excavating below ground with minimal projection above ground, required for freeboard and spillway.

As consequence category assessment (CCA) will be completed for the Interim Water Storage Dam and be certified by a suitably qualified person to comply with condition K1 of the mine EA.

3.3 Operation

3.3.1 Overview of Flow Network

Once the Dewatering Borefield Project is commissioned, the operating flow of water is to be controlled as per Figure 2-1: Network Water Flow Diagram.

3.3.2 Pumps and Pipeline

Two key operational controls in the management of borehole pipeline water across site are:

- Early leak detection in pipelines by measuring differential water flow at designated monitoring stations.
- Air release valve at pipeline high points to reduce pipeline pressure build up, therefore minimising risk of an uncontrolled water pipeline burst.

3.3.3 Dam

A dam operating plan will dictate acceptable capacity of dam fill level based on inflow supply and operational demand to maintain water balance and keep a pre-determined acceptable level of water in the dam. At the concept design, the CCA has not been finalised and therefore it is assumed that up to 250 ML of operational volume will be stored in the dam, available for operational use. The volume of the dam could change once further geotechnical investigation and testing is complete and will be provided with the plans as required to be submitted under the detailed design document, as per the Environmental Authority conditions.

Further, instrumentation will be installed to control the operating plan, with regular review of flow rates.

4. Risk Management in Flooding Events

4.1.1 Critical Infrastructure Placement

Borehole pads will be designed in a manner to protect critical bore dewatering infrastructure from potential flooding events. The pad will be sloped to one side and the borehole collar will be on a raised platform. All related electrical infrastructure will also be sited on this raised platform.

Special consideration has been given to the flood corridor of the Carmichael River, which encroaches on the nearby southern boreholes. Access tracks have been located outside the 1 in 50 predicted flood

4.1.2 Borehole Capping

To avoid surface water runoff accumulating at the borehole collar and potentially impacting the groundwater quality, the borehole collar will be sealed and connected to a closed pipeline once commissioned. During the testing phase, the borehole will be capped, with a lockable steel monument. As outlined in 4.1.1, the borehole collar will be on a raised platform where topography indicates a potential for flooding.

4.1.3 Access Tracks Surfacing

To aid in barrier protection for dry weather borehole access tracks, a vegetation bund is placed on to one side of the access track and a topsoil stockpile place on the other side of the borehole pad. Drainage rows will be cut along borehole access tracks to encourage water to drain off the track, still within the approved mine domain. Additionally, to protect or repair the access tracks, placement of local material can act as road sheeting to maintain the integrity of the access track. Note, the access tracks are designed as dry roads, with the above considerations to aid in protection from rainfall events.

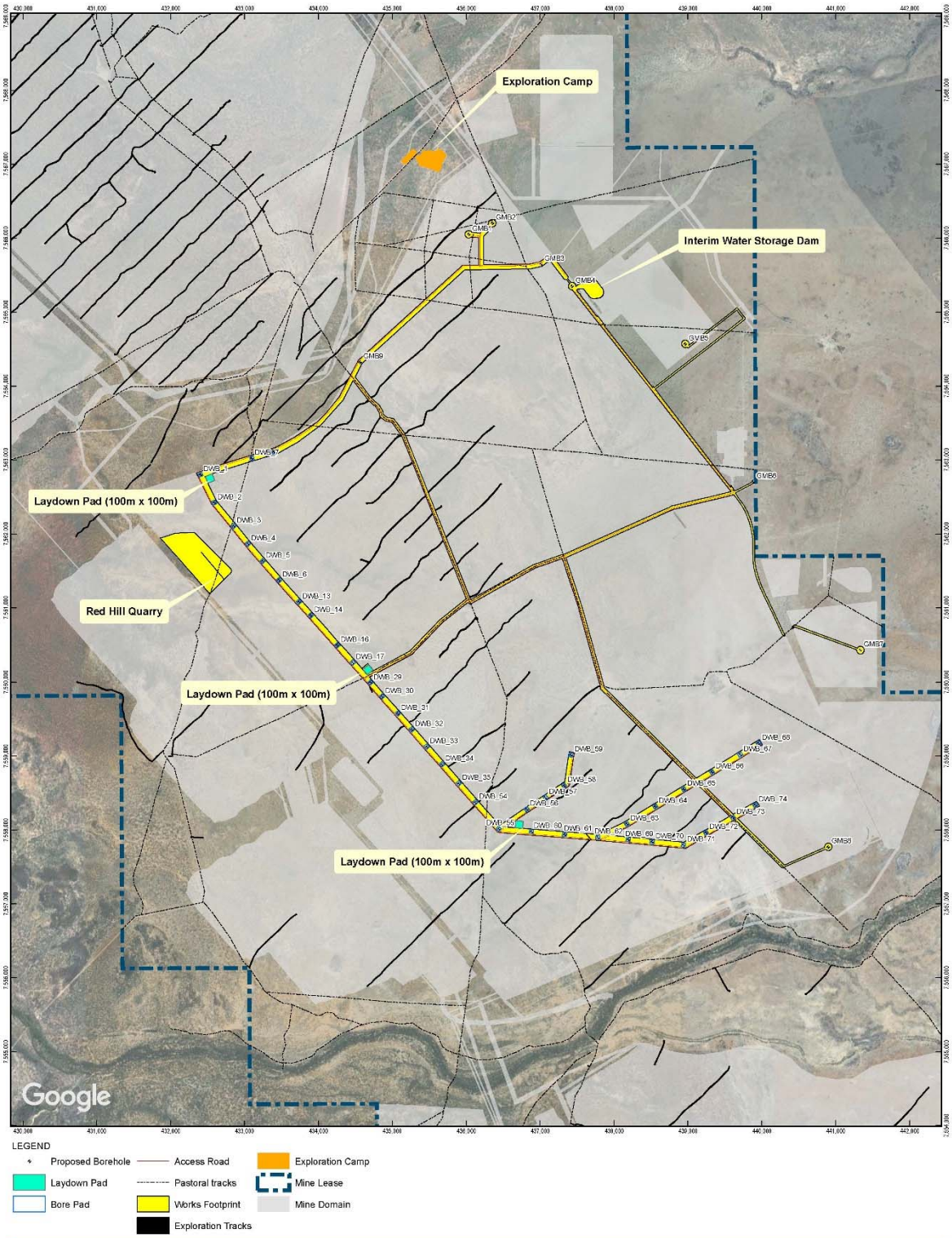
4.1.4 Dam Stability

In the detailed design and planning phase, the Interim Water Storage Dam will address key stability risks. Typical dam design analysis includes:

- wind and wave run up, freeboard and spillway design in the event of a storm surge
- slope stability of the dam embankments given site specific material
- CCA Assessment to determine appropriate design standard to adequately mitigate associated risks of potential dam break
- Dam capacity control with instrumentation
- Geotechnical investigations to assist in final dam wall design and construction specifications

Appendices

Appendix A – Mine Domain Borefield Layout



Paper Size A3

0 250 500 1,000 1,500 2,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

Adani Pty Ltd

Mine Domain
Bore Field Layout

Job Number 41-31075
Revision D
Date 23 Aug 2017

Figure 1

G:\41\31075\GIS\Maps\MXD\41_31075_005_rev_d.mxd

145 Ann Street Brisbane QLD 4000 Australia T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data source: Google Earth Pro; Web Service 2017; Adani: SEIS Mine Layout/2014/2017; GHD: Works Area/2017. Created by:mstanley

GHD

Level 9
145 Ann Street
T: 61 7 3316 3000 F: 61 7 3316 3333 E: bnemail@ghd.com

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Draft A	Jessica Lancini	Karl Wolski		Paul Greaney		
Draft B	Jessica Lancini	Karl Wolski		Paul Greaney		
Draft C	Jessica Lancini	Karl Wolski		Paul Greaney		
Draft D	Jessica Lancini	Karl Wolski		Paul Greaney		
Draft E	Jessica Lancini	Karl Wolski		Paul Greaney		
Final 1.0	Jessica Lancini	Karl Wolski		Paul Greaney		

www.ghd.com