Adani Mining Pty Ltd

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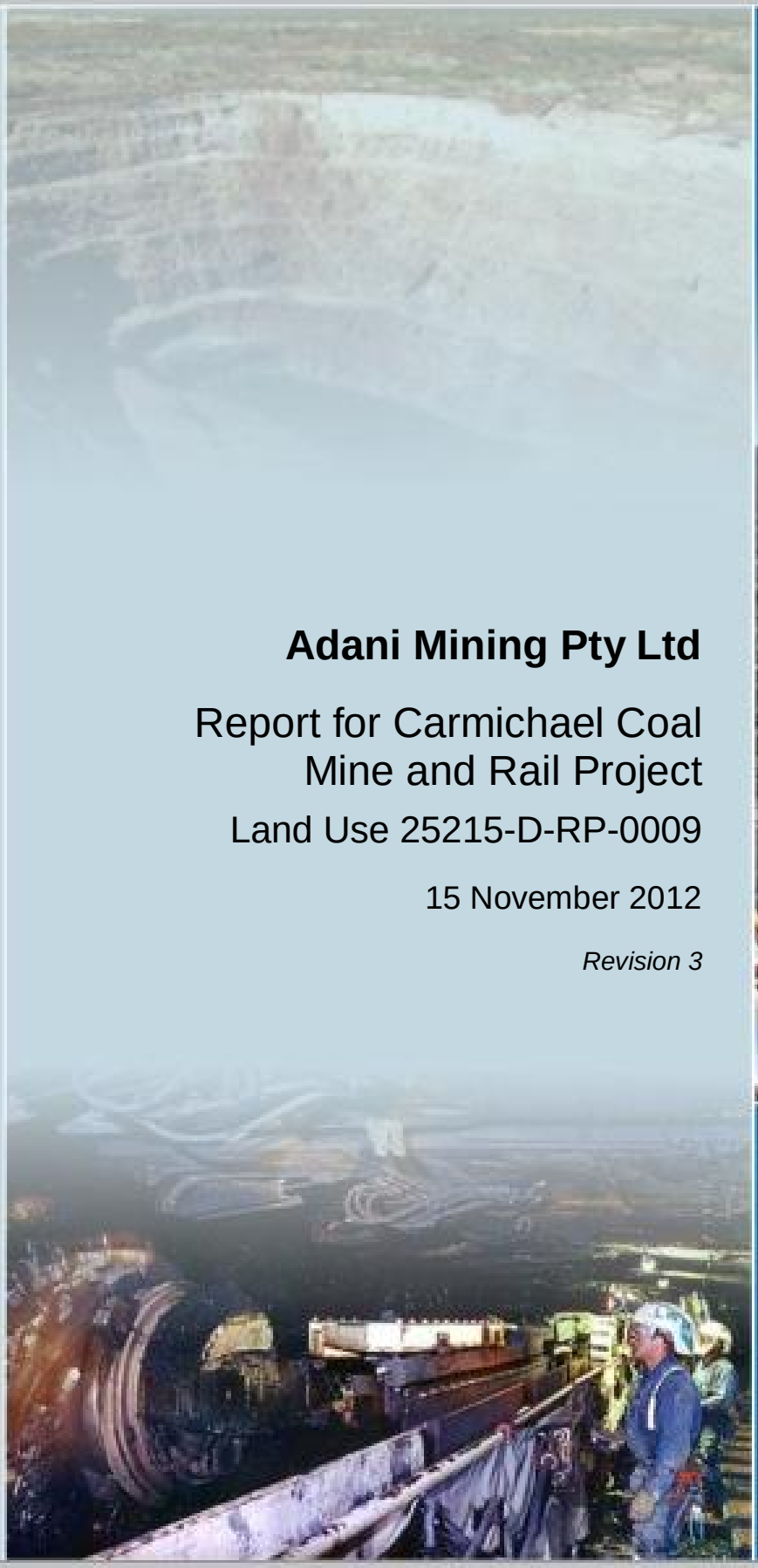

Adani Mining Pty Ltd

Report for Carmichael Coal Mine and Rail Project

Land Use 25215-D-RP-0009

15 November 2012

Revision 3

GHD

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The Report is based on conditions encountered and information reviewed, including assumptions made by GHD, at the time of preparing the Report. Assumptions made by GHD are listed within Section 1.4 of the Report and contained through the Report.

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- *any error in, or omission in connection with assumptions, or*
- *reliance on the Report by a third party, or use of this Report other than for the Purpose.*

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Abbreviations and Glossary

Project Specific Terminology	
Abbreviation	**Term**
the EIS	Carmichael Coal Mine and Rail Project Environmental Impact Statement – refers to the particular document that GHD is preparing to facilitate approval of the Project
The Proponent	Adani Mining Pty Ltd (Adani)
The Project (Mine)	Carmichael Coal Mine and Rail Project: Mine Component
The Project (Rail)	Carmichael Coal Mine and Rail Project: Rail Component

Generic Terminology	
Abbreviation	**Term**
ACH Act	*Aboriginal Cultural Heritage Act 2003*
ARCHAEO	ARCHAEO Cultural Heritage Services
CHMP	Cultural Heritage Management Plan
CSG	Coal seam gas
CTRC	Charters Towers Regional Council
DAFF	Department of Agriculture, Fisheries and Forestry
DATSIMA	Department of Aboriginal and Torres Strait Island and Multicultural Affairs
DEEDI	Department of Employment, Economic Development and Innovation
DEHP	Department of Environment and Heritage Protection
DEO	Desired Environmental Outcomes
DERM	Former Queensland Department of Environment and Resource Management
DIW	Directory of Important Wetlands
DLGP	Department of Local Government and Planning
DNPRSR	Department of National Parks, Recreation, Sport and Racing
DNRM	Department of Natural Resources and Mines
DR	District Road

DSDIP	Department of State Development, Infrastructure and Planning
DTMR	Department of Transport and Main Roads
EIS	Environmental Impact Statement
EP	Exploration Permit
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Area
FIFO	Fly-in-fly-out
GHPL	Grazing Homestead and Perpetual Lease
GIS	Geographic Information Systems
GQAL	Good Quality Agricultural Land
ILUA	Indigenous Land Use Agreement
IPA	*Integrated Planning Act 1997*
IRC	Isaac Regional Council
KRA	Key Resource Area
LGA	Local Government Area
MC	Mining Claim
MDL	Mineral Development Licence
MIW	Mackay, Isaac and Whitsunday
MIWRP	Mackay, Isaac and Whitsunday Regional Plan
ML	Mining Lease
MLA	Mining Lease Application
MR Act	*Mineral Resources Act 1989*
MSEC	Mine Subsidence Engineering Consultants
Mtpa	Million tonnes per annum
NC Act	*Nature Conservation Act 1992*
NH	National Highway
PH	Pastoral Holding

PL	Petroleum Lease
PP	Prospecting Permit
PPL	Petroleum Pipeline Licence
QR	Queensland Rail
RE	Regional ecosystems
RR	Regional Road
SDPWO Act	*State Development and Public Works Organisation Act 1971*
SP Act	*Sustainable Planning Act 2009*
SPP	State Planning Policy
SRN	Stock route network
SSR	State Strategic Road
TOR	Terms of Reference

Executive Summary

Adani Mining Pty Ltd (Adani) is proposing to develop a 60 million tonne (product) per annum (Mtpa) thermal coal mine in the north Galilee Basin approximately 160 kilometres (km) north-west of the town of Clermont, Central Queensland. All coal will be railed via a privately owned rail line connecting to the existing QR National rail infrastructure, and shipped through coal terminal facilities at the Port of Abbot Point and/or the Port of Hay Point (Dudgeon Point expansion). The Carmichael Coal Mine and Rail Project (the Project) will have an operating life of approximately 90 years. The Project is comprised of two major components:

- The Project (Mine): a greenfield coal mine over EPC1690 and part of EPC1080, which includes both open cut and underground mining, onsite infrastructure and associated mine processing facilities (the Mine) and offsite infrastructure.
- The Project (Rail): a greenfield rail line connecting the Mine to the existing Goonyella rail system to provide for export of coal via the Port of Abbot Point and/or the Port of Hay Point (Dudgeon Point expansion).

This report has been prepared for the purposes of providing sufficient information for an informed decision on the potential impacts of the Project (Mine) on land use and tenure within the Project Area and to identify appropriate mitigation measures to address such impacts. Requirements listed within Section 3.2.4 of the Terms of Reference (ToR) for the Project Environmental Impact Statement (EIS) have been provided as part of this report. This report did not consider the Project (Rail) component of the Project.

In order to establish the existing environment of the Project Area and enable an impact assessment upon key elements such as land use, tenure (including mining and petroleum tenure), Environmentally Sensitive Areas (ESAs), existing and proposed infrastructure, cultural heritage and native title a literature review, desktop assessment, community consultation and review of relevant legislation and guidelines has been undertaken.

Given the proposed establishment of the Project (Mine) and associated infrastructure, vegetation clearing and change in land use, the following impacts have been identified as part of this assessment:

- Progressive change of 44,730 ha of land that is currently being used for low intensity cattle grazing to a mining land use, change of approximately 1,820 ha of low intensity cattle grazing land use to an urban / industrial use (i.e.: workers accommodation village and offsite infrastructure area).
- Temporary impact upon one of two existing stock routes, and permanent closure of stock route U385BELY01 over the northern portion of the Project Area
- While the direct change in land use and tenure of the Project Area is essentially unavoidable due to the location of the coal deposit, other Project (Mine) impacts can be managed or alleviated as much as practicable through implementation of relevant management plans, vegetation offsets and landholder negotiations.

1. Introduction

1.1 Project Overview

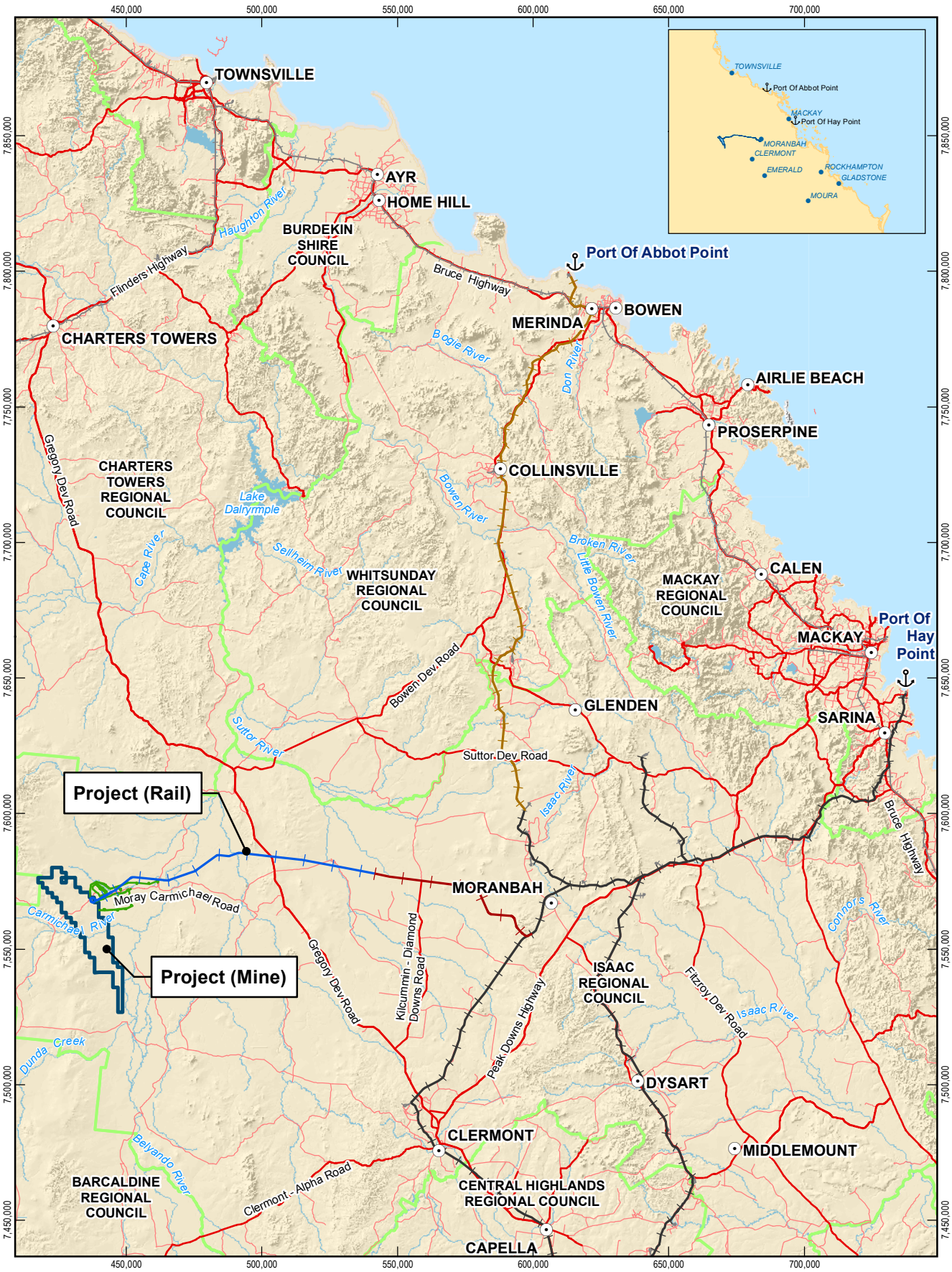
Adani Mining Pty Ltd (Adani) is proposing to develop a 60 million tonne (product) per annum (Mtpa) thermal coal mine in the north Galilee Basin approximately 160 kilometre (km) north-west of the town of Clermont, Central Queensland. All coal will be railed via a privately owned rail line connecting to the existing Queensland Rail National (QR National) rail infrastructure and shipped through coal terminal facilities at the Port of Abbot Point and the Port of Hay Point (Dudgeon Point expansion). The Carmichael Coal Mine and Rail Project (the Project) will have an operating life of approximately 90 years.

The Project consists of two major components:

- The Project (Mine): a greenfield coal mine over EPC1690 and the eastern portion of EPC1080, which includes both open cut and underground mining, on mine infrastructure and associated mine processing facilities (the Mine) and the Mine (offsite) infrastructure including:
  - A workers accommodation village and associated facilities
  - A permanent airport site
  - Water supply infrastructure
- The Project (Rail): a greenfield rail line connecting the Mine to the existing Goonyella and Newlands rail systems to provide for the export of coal via the Port of Hay Point (Dudgeon Point expansion) and the Port of Abbot Point, respectively; including:
  - Rail (west): a 120 km dual gauge portion from the Mine site running west to east to Diamond Creek
  - Rail (east): a 69 km narrow gauge portion running east from Diamond Creek connecting to the Goonyella rail system south of Moranbah

The Project has been declared a 'significant project' under the *State Development and Public Works Organisation Act 1971* (SDPWO Act) for which an Environmental Impact Statement (EIS) is required. The Project is also a 'controlled action' and requires assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Project EIS has been developed with the objective of avoiding or mitigating all potential adverse impacts to environmental, social and economic values and enhancing positive impacts. Detailed descriptions of the Project are provided in Volume 2 Section 2 Description of the Project (Mine) and Volume 3 Section 2 Description of the Project (Rail). Figure 1-1 illustrates the location of the Project.



LEGEND

- Town
- Major Port
- Other Rail Network
- Goonyella System
- Newlands System
- State Road
- Local Road
- Watercourse
- Local Government Area
- Project (Rail)
- Rail (West)
- Rail (East)
- Project (Mine)
- Mine (Offsite)

1:2,000,000 (at A4)

0 10 20 30 40 50

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number 41-25215
Revision L
Date 28-08-2012

Project Location

Figure: 1-1

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Data Source: © Commonwealth of Australia (Geoscience Australia): Town, Railways, Watercourses (2007); DERM: LGA, (2011), Hillshade (2009); DMR: State Roads (2008); Gassman/Hyder: Mine (Offsite) (2012); DME: EPC1690 (2010), EPC1080 (2011); Adani: Alignment Opt9 Rev3 (2012). Created by: BW, JVC

1.2 Purpose of this Report

The purpose of this report is to provide sufficient information for an informed decision on the potential impacts of the Project (Mine) on land use and tenure within the Project Area and to identify appropriate mitigation measures to address such impacts. The Project Area is defined in Section 1.6 of this report.

This assessment does not consider the Project (Rail) component of the Project. This report addresses the criteria of the Terms of Reference (ToR) for the Project EIS outlined in Section 3.2.4, relating to the Project (Mine) only (refer to Table 1-1). For a detailed ToR cross-reference table refer to Appendix A.

Table 1-1 Terms of Reference Cross-reference Table

Terms of Reference Requirements/Section Number	Section of this Report
Section 3.2.4 Land use and tenure	
Identify, with the aid of maps:	
◗ Land tenure	Figure 2-3, Figure 2-4, Figure 2-5 and Figure 4-1 of this report
◗ Existing and proposed infrastructure	Figure 2-5 Section 3 of this report
◗ Zoning and precincts	Section 2.4 and Figure 2-1
◗ Existing land uses and facilities	Section 2.3, Section 2.4 and Figure 2-6 of this report
◗ Provide land suitability maps	Refer to Volume 4 Appendix L Mine Soils Assessment
◗ Agricultural land classes	Figure 2-7 in this report
◗ Areas covered by applications for native title claims	Section 5 and Figure 2-6 in this report
◗ Identify affected stock routes	Figure 3-2 in this report
◗ Residential and recreational areas	Section 2.3.3 of this report and Figure 2-3
◗ Declared water storage catchments	Refer to Volume 4 Appendix P Mine Hydrology Report
◗ Environmentally sensitive areas.	Section 4 and Figure 4-1 of this report
◗ Suitability of the soils mapped in the project area for rain fed, broad acre cropping and beef cattle grazing according to the limitations and land suitability	Refer to Volume 4 Appendix L Mine Soils Assessment

Terms of Reference Requirements/Section Number	Section of this Report
Assess the impact of the Project (Mine) upon the following:	
◗ GQAL or strategic cropping land	Section 2.6, Section 2.7, Section 6.2.3, Section 6.2.5, Figure 2-7 of this report and Volume 4 Appendix L Mine Soils Assessment
◗ Key resource areas	Section 2.5 and Section 6.2.6
◗ Residential and industrial uses	Section 2.3.2, Section 2.3.3 and 6.2.4 of this report
◗ Possible effects on town planning objectives	Refer to Volume 4 Appendix D Project Approvals and Planning Assessment
◗ Constraints to potential developments	Section 3 of this report
◗ Management of the immediate environs of the project including construction buffer zones	Refer to Volume 4 Appendix N1 Mine Terrestrial Ecology Report and Volume 4 Appendix O Mine Aquatic Ecology Report
◗ Native title rights	Section 5 of this report and Volume 1 Section 5 Cultural Heritage
◗ Stock route network	Section 6.3.1 of this report
◗ Land use changes in any areas of high conservation value	Refer to Volume 4 Appendix N1 Mine Terrestrial Ecology Report
◗ Potential issues involved in proximity and/or co-location of other current or proposed infrastructure services, including future road upgrades	Section 3 and Section 6.3 of this report
◗ Identification of any land units requiring specific management measures	Refer to Volume 4 Appendix L Mine Soils Assessment
◗ Impact upon State's coal mineral and petroleum and gas resources and state significant extractive resources	Section 2.3.1, Section 6.2.2 and Figure 2-4

1.3 Objectives

Consistent with Section 3.2.4 of the ToR, the aim of this report is to provide an accurate impact assessment of the Project (Mine) upon the existing environment relating to land use and tenure. This includes:

- Identification of reserves, extractive resource areas and tenure of special interest
- Identification of existing and proposed infrastructure such as gas pipelines, water pipelines, power lines and transport corridors (including local and state controlled roads and rail corridors)
- A description of existing land uses and facilities surrounding the Project Area
- Identification of Native Title claims or Native Title determinations

- Identification of stock routes that are likely to be affected by the Project (Mine)
- Identification of declared water storage catchments and location of the Project (Mine) in relation to any environmentally sensitive areas (ESA)
- Assessment of the existence and nature of potential impacts the Project (Mine) may have upon surrounding residential and recreational areas
- Description of the distance of the Project (Mine) to the nearest residential, recreational and industrial areas
- Assessment of the potential impacts the Project (Mine) upon:
  - Current land use and tenure within and adjacent to the proposed mine and off-site infrastructure
  - Good Quality Agricultural Land (GQAL) and Strategic Cropping Land
  - Coal mineral, petroleum and gas resources that may be presented within or in near proximity the Project Area
  - Stock routes
  - Potential native title rights and interests
  - Existing and proposed infrastructure within or adjacent to the Project Area
  - Impact upon any Key Resource Areas (KRAs) that may be located within or in near proximity to the Project Area

  - The following requirements of Section 3.2.4 of the ToR have been assessed in Volume 4 Appendix L Mine Soils Assessment.
- Assessment of the suitability of the soils mapped in the Project Area for rain fed cropping and beef cattle grazing in accordance with the Queensland Department of Minerals and Energy 1995 *Technical Guidelines for Environmental Management of Exploration and Mining in Queensland*.
- More detailed assessment of Project's impact upon Good Quality Agricultural Land (GQAL) and/or strategic cropping land

  - The following requirements of Section 3.2.4 of the ToR have been addressed in Volume 4 Appendix D Project Approvals and Planning Assessment.
- Identification of applicable State Planning Polices (SPPs) and an assessment of the Project's compatibility against the outcomes of these policies
- Identification of applicable local government planning schemes and an assessment of the Project's compatibility with the Desired Environmental Outcomes (DEO) prescribed by the relevant planning scheme.
- Management of Native Title rights through an Indigenous Land Use Agreement (ILUA) and cultural heritage through a Cultural Heritage Management Plan (CHMP).

1.4 Assumptions and Limitations

The project description for the Project (Mine) (refer to Volume 2 Section 2 Description of the Project) informed the development of this report and findings of the impact assessment and mitigation

measures. Matters outside the Project (Mine) as described in Volume 2 Section 2 Description of the Project were not assessed.

1.5 Methodology

The methodology of this report includes:

- A review of the Macro-conceptual Mining Study (Runge, 2011), to ensure an understanding of the location, scale, timing and process of the construction and operation of the Project (Mine).
- A review of the Workers Accommodation Village Land Use Study (Gassman, 2012) to support an understanding of the Workers Accommodation Village land use elements and existing environment.
- A review of a report on the water supply and demand of the Project (Mine) (Hyder 2012) to support an understanding of the offsite water supply infrastructure for the Project (Mine) associated environmental values and potential impacts.
- Determination of the Project Area to clearly define the area of assessment relating to land use and tenure.
- A review of primary data and information to assist in gaining a clear understanding of the existing environment regarding land use and tenure. This included drawing on existing data sets, and undertaking GIS analysis to accurately determine how the Project (Mine) relates with key features. The data reviewed included:
  - Aerial photography (Vekta Aerial Imagery)
  - Topographic (10 m) and cadastral data
  - Title details and tenure information of directly affected properties, such as ownership and rural and mining leases, and licences (title search undertaken on 13 December 2011)
  - Native Title claim areas and determinations
  - Location of existing infrastructure, such as roads, rail lines, gas and water pipelines, stock routes, sensitive receptors and areas of ecological significance
  - Documentation and mapping of the above features that are potentially impacted by the Project (Mine)
- Review of the relevant Regional Plan:
  - *Mackay, Isaac and Whitsunday Regional Plan 2012*
- Review of the relevant infrastructure plans and mining data:
  - Queensland Government, Department of Mines and Energy (2011) Mining and Mineral Projects in Central Queensland
  - *Coal Plan 2030,* Department of Infrastructure and Planning (now known as Department of Employment, Economic Development and Innovation, DEEDI) 2010
  - *Queensland Infrastructure Plan 2011,* Department of Local Government and Planning (DLGP)
- Review of Project specific technical reports to enable a multidisciplinary understanding of the Project (Mine) and the existing environment

- Review of landowner consultation to understand their feedback on the potential impacts and issues associated with the Project (Mine) contained within Volume 1 Section 7 Community Consultation

1.6 The Project Area

The Project Area is defined by land upon which the Project (Mine) components will be developed, which include onsite and offsite infrastructure. An overview of this infrastructure is provided in the following paragraphs, with more detailed descriptions provided within Volume 2 Section 2 Description of the Project. Figure 1-2 demonstrates the location of this infrastructure.

1.6.1 Project (Mine) Onsite Infrastructure

EPC1690 covers 26,016 hectares (ha) and is currently the subject of a mining lease application (MLA70441). The eastern part of EPC1080, which is within the Project (Mine) boundary, covers an area of 18,714 ha. Adani has reached agreement with Waratah Pty Ltd the holder of EPC1080 to conduct exploration activities on the eastern portion of the EPC1080. Adani has obtained consent from Waratah Coal Pty Ltd for Adani to lodge an MLA over the eastern portion of EPC1080.

The onsite infrastructure includes a series of 16 independent open cut pits progressing from north to south, and three underground mines, each with longwalls working on two seam levels. The open cut mine is specifically designed to avoid the Carmichael River having a 500 m wide buffer on either side of the river. The mine workings, open cut and underground and their associated infrastructure will cover almost the entire area of EPC1690. Some out-of-pit dumps will be located within EPC1690 but will be mostly located within EPC1080.

The Mine infrastructure area (MIA), out-of-pit dumps and water management dams will be located within EPC1080 which forms part of the Project Area (refer to Figure 1-2). The coal handling and preparation plant, mine offices and workshops, coal stockpile areas and ancillary activities will also be included in the MIA. Operation of the Mine will require out-of pit-dump capacity of approximately 3 billion m^3 which is proposed to be stockpiled on the eastern portion of the Mine (mostly over EPC1080). For a full list of the on mine infrastructure refer to Volume 2 Section 2 Description of the Project.

1.6.2 Project (Mine) Offsite Infrastructure

The Project (Mine) offsite infrastructure will be constructed on Lot 662 on PH1491, east of the proposed mine, occupying an area of approximately 1,820 ha of land (refer to Figure 1-2). The Project (Mine) offsite infrastructure is required to support construction and operation of the Project (Mine). It is located off the mining lease area approximately 15 km from the mine. Proposed offsite infrastructure included in the scope of the EIS consists of a workers accommodation village, a dedicated airport, a heavy industrial area, rail siding and water supply infrastructure.

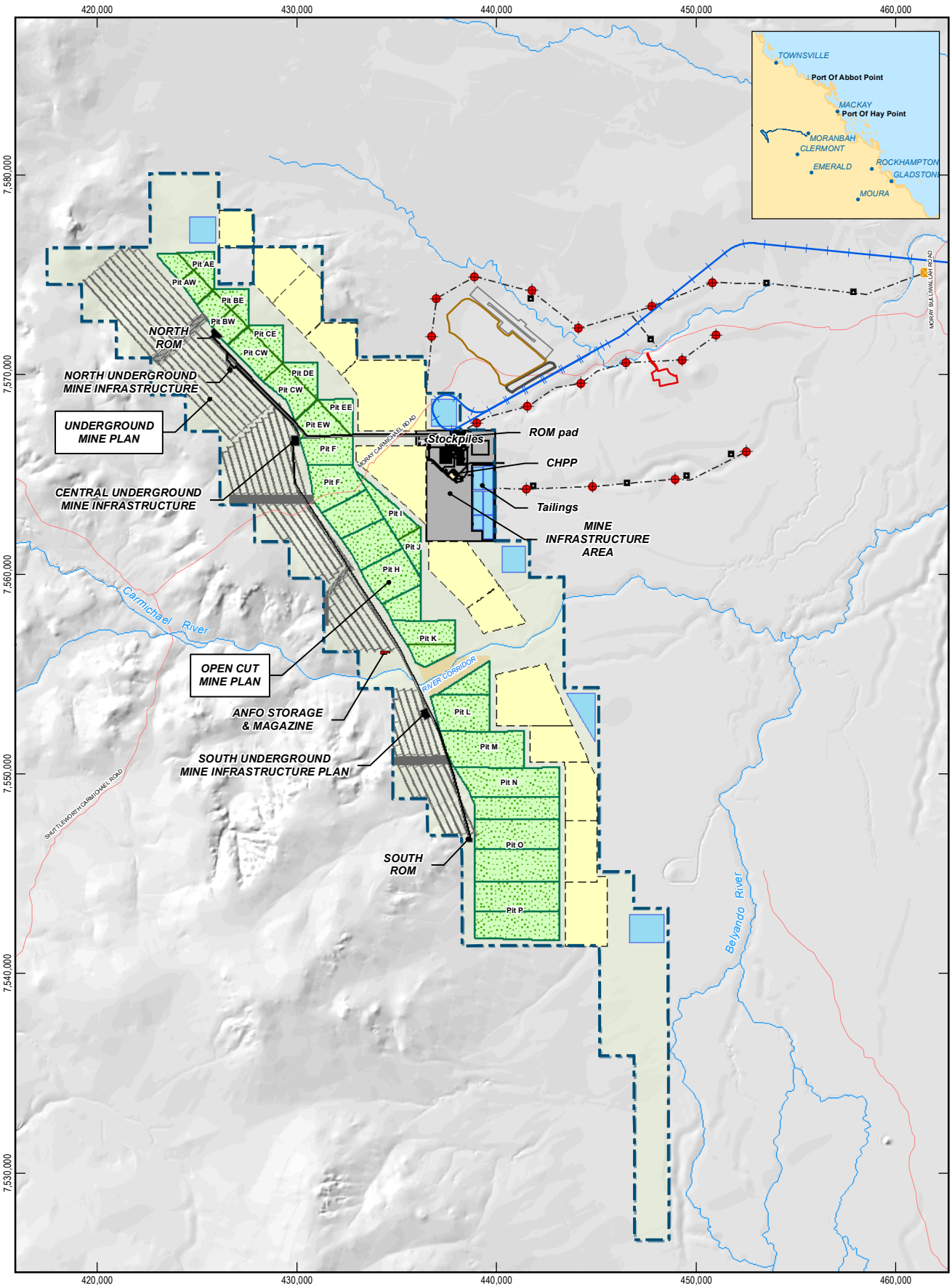
Due to the isolation of the site and the expected life of the Mine, Adani has adopted a strategic approach to planning the proposed offsite mine infrastructure. The workers accommodation village will occupy approximately 74 ha. The workers accommodation village will be constructed over three stages and will accommodate up to 3,000 persons to fully meet the requirements of the operational workforce.

A permanent airport will occupy approximately 298 ha and consist of an airstrip with a length of up to 3,000 m and a width of 300 m, and a landside terminal of up to 3,000 m^2. The permanent airport will be accessed via a private road branching from Moray Carmichael Road and will be positioned approximately 5 km west of the workers accommodation village to allow for efficient transport of employees while minimising noise impacts. Impacts associated with noise and vibration from the airport will be assessed with due consideration to the EPA Guideline *Planning for Noise Control* and Australian Standard *AS2021 Acoustics—Aircraft noise intrusion—Building siting and construction* as part of the detailed design for the Project.

A heavy industrial area occupying approximately 948 ha will be established adjacent to the eastern side of the permanent airport. The heavy industrial area will be utilised for mine machinery maintenance and repairs and other operations associated with the Project (Mine).

The rail siding area of approximately 2.5 – 3 km length and occupying an area of approximately 96 ha will be established adjacent to the southern boundary of the heavy industrial area and permanent airport. The rail siding area will enable multiple trains to utilise the Project (Rail) with minimal interference.

The water supply infrastructure will consist of a series of dams, boreholes, pipelines, storage facilities and pump stations. Details of the offsite water supply infrastructure are provided in Volume 2 Section 2 Description of the Project. The offsite water supply infrastructure will enable the extraction, storage and delivery of water during the construction and operation phases of the Project (Mine). The infrastructure will extend along the waterways North Creek and Belyando River, in the vicinity of other offsite infrastructure.



LEGEND

- Local Road
- River / Watercourse
- Overland Conveyors
- Rail (West)
- Mine (Onsite)
- Open Cut Blocks
- Out of Pit Waste Dumps
- Water Management Dams
- Mine Infrastructure Area
- Mine (Offsite)
- Borehole
- Storage Site (Instream)
- Storage Facility (Offstream)
- Pipeline Network
- Industrial Area
- Rail Siding
- Airport Location
- Workers Accommodation Village

1:275,000 (at A4)

0 2 4 6 8 10

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

Adani Mining Pty Ltd
Carmichael Coal Mine and Rail Project

Project (Mine) Onsite and Offsite Infrastructure

Job Number 41-25215
Revision D
Date 28-08-2012

Figure 1-2

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Level 4, 201 Charlotte St Brisbane QLD 4000 T +61 7 3316 3000 F +61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: GA: Road, River / Watercourse (2007); DME:EPC1690 (2010), EPC1080 (2011); Adani: Alignment Opt9 Rev3 (2012), Mine Layout / Infrastructure (2012); Gassman/Hyder: Mine (Offsite) (2012). Created by: JVC/MS

2. Existing Environment

2.1 Regional Context

2.1.1 Overview

The Project Area is located approximately 160 km north-west of the town of Clermont, in Central Queensland (refer to Figure 1-1). It is located within the Galilee Basin, Central Queensland. Mining is one of the dominant land uses and industries in the region, mostly associated with coal mining in the Bowen Basin. This has shaped the demographic and economic characteristics of the region.

The Project Area is located predominantly in the Mackay, Isaac and Whitsunday Region regional planning areas, with approximately 46,383 ha of the Project Area being part of the Mackay, Isaac and Whitsunday (MIW) Region and approximately 167 ha being part of the Northern Region of Queensland (refer to Figure 2-1). The Mackay, Isaac and Whitsunday Regional Plan 2012 (MIWRP) covering the Mackay, Isaac and Whitsunday region is applicable to the majority of the Project Area.

For the purposes of this assessment, it is appropriate to consider that the regional context constitutes the area subject to the Regional Plan affecting the Project Area, in this case the MIWRP.

The following is noted:

- Section 1.10 of the Project ToR states that the Project (Mine) should be assessed against the Central West Regional Plan. The Central West covers the regional council areas of Barcaldine, Barcoo, Boulia, Blackall-Tambo, Diamantina, Longreach and Winton. The Barcaldine council area is the closest regional council area to the Project (Mine), located 30 km from the boundary. Therefore it is assessed that there is no impacts from the Project (Mine) in this Regional Plan area, and it is not further discussed in this assessment.
- No regional plan has yet been prepared for the Northern Region (DSDIP, 2012) as such an assessment of impacts arising (noting against regional plan of the 167 ha of the Project Area is located within the Northern Region) cannot be undertaken against a regional plan for that area. However, as this is a very small proportion of the overall project, and there are no distinct community or land use changes associated with the regional boundary, it is considered that assessment against the MIWRP provides an adequate level of assessment.

2.1.2 Review of Mackay, Isaac and Whitsunday Regional Plan 2011-2031

Department of State Development, Infrastructure and Planning (DSDIP) (2012) reports that regional planning plays a key role in helping Queensland meet the challenges associated with:

- Managing rapid growth
- Population change
- Economic development
- Protecting the environment and infrastructure provision across multiple local government areas

Regional plans are statutory instruments under the SP Act and operate in conjunction with planning schemes, state planning regulatory provisions and state planning policies (DSDIP, 2012). An overview of the relevant regional plan has been undertaken in the following sections, with an assessment of the Project (Mine) against the desired regional outcomes contained within Volume 4 Appendix D Project Approvals and Planning Assessment.

The MIWRP was prepared for the purposes of managing the growth and change within the MIW region in the most sustainable manner (DLGP, 2012a). This statutory plan provides a policy framework to guide decision making for managing the region's growth and management until 2031 (DLGP, 2012a). The region consists of the Mackay, Isaac and Whitsunday Local Government Areas (LGAs). The MIWRP describes the region as a significant growth area, having one of the fastest growing regional economies in Queensland. Key economic drivers are mining, agriculture and tourism. Tourism activities are most dominant within the Whitsunday Regional Council LGA, with key tourist and service centres of Airlie Beach and Cannonvale area providing access to the Whitsunday Islands. Due to the presence of the nation's largest coal deposit, Bowen Basin, coal mining is the major industry and largest employer in the region (DLGP, 2012a). Sugar, horticulture and grazing industries are spread throughout the region.

The MIWRP identifies regional land use patterns which provide a spatial description of the desired regional outcomes for the region (DLGP, 2012b). These land use patterns include:

- Regionally significant environmental features
- Regional land use categories
- Land that can accommodate urban development up to and beyond 2031
- Land that is protected from further urban development
- Regionally significant economic areas and infrastructure corridors
  - The MIWRP identifies three types of land use categories within the region, these being:
- **Regional landscape and rural production area**

This category identifies land with regional landscape, rural production or values such as cultural and landscape heritage values, extractive resources of economic significance, including mining and forestry plantations, GQAL, strategic cropping land and others. This designation is intended to protect land from urban or rural residential development or other development that may be inconsistent with the identified values. As shown in Figure 2-1 this is the predominant land use category across the MIW Region.

- **Urban footprint**

This footprint identifies land that has capacity to meet the region's forecasted urban development needs until 2031. It concentrates urban growth in locations that have access to infrastructure, provide transportation choices and employment options. This land is concentrated within the existing major townships as shown in Figure 2-1.

- **Rural living area**

This area of land constitutes locations that are designated for rural residential development in accordance with applicable local government planning schemes. As indicated in Figure 2-1, this land use category occupies only a small portion of the overall region. The region largely consists of the regional landscape and rural production land use, which is associated with significant biodiversity value, regional ecosystems, national parks, forests, coastal wetlands, extractive resources of economic significance including mining and forestry plantations and land that is unsuitable/not required for urban or rural residential use.

An assessment of the Project (Mine) compatibility with the desired regional outcomes of the MIWRP has been undertaken within Volume 4 Appendix D Project Approvals and Planning Assessment.

LEGEND

- Town
- Major Port
- Other Rail Network
- Goonyella System
- Newlands System
- State Road
- Local Road
- Watercourse
- MIW Region
- Local Government Area
- Regional Landuse Category (Draft)
  - Urban Footprint
  - Rural Living Area
  - Regional Landscape and Rural Production Area
- Mine (Onsite)
- Mine (Offsite)
- Rail (West)
- Rail (East)

1:2,000,000 (at A4)

0 10 20 30 40 50

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

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Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number 41-25215
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Date 28-08-2012

Regional Land Use Categories

Figure: 2-1

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Data Source: DERM: LGA (2011); DMR: State Roads (2008); DME:EPC1690 (2010), EPC1080 (2011); Adani: Alignment Opt9 Rev3 (2012); DLGP: Regional Landuse (Draft MIWRP, 2011).

Created by: TH

Regional Cities and Towns

Within the Whitsunday Regional Council LGA area, major regional centres include Airlie Beach, Cannonvale, Proserpine, Bowen and the Whitsunday Islands. Moranbah is the major regional centre of the Isaac Regional Council (IRC) LGA, while Clermont, Dysart, Middlemount, Glenden and Nebo are the district rural activity centres (DLGP, 2012a). These towns have mainly been established for the purposes of supporting the mining industry, with Moranbah known as the main mining town while Dysart, Middlemount and Glenden are now also servicing the rural population and industries such as cattle grazing, grain crop production and sunflower fields. The MIWRP reports a low diversity of private land ownership in these towns, particularly Glenden and Middlemount as most houses are owned by the mining companies.

Emerald and Charters Towers are outside the Isaac Regional Council however they are both within reasonable proximity of the Project (Mine) and in the future once road infrastructure is improved, there may be the potential to operate bus-in bus-out from Emerald or Charters Towers if existing residents seek employment at the mine.

Key cities and towns within the region relevant to the development and operation of the Project include the following:

Mackay

Having a population of 121,400 people and an annual growth rate of 2.4 per cent, Mackay is the primary centre of the Mackay Regional Council LGA and the primary urban centre for the Region (DLGP, 2012a). Mackay provides a broad range of high level services and functions for the region including a university campus, base hospital and the region's main air and sea ports (DLGP, 2012a).

Over the past 10 years, Mackay has established itself as a significant contributor to the mining industry acting as a major service centre to mines within the Bowen Basin. It is the location of choice for many mining service companies that supply and consult to the mine operators as well as a base for fly-in-fly-out (FIFO) and drive-in-drive-out workforces. Mackay is also strategically located to the largest Queensland coal export port at the Port of Hay Point to its south.

Moranbah

Located approximately 200 km east of the Project Area, Moranbah has a population of approximately 7,100 people (Queensland Places, 2011). Moranbah was originally established as a purpose built mining town in the early 1970s, and is the major regional activity and service centre for mining and gas industries in the IRC LGA (DLGP, 2012a). The MIWRP states that Moranbah's role as the primary service centre will be maintained and further enhanced in the future.

Clermont

Clermont is located 320 km west of Rockhampton and 100 km north of Emerald. Clermont has a strong history as a cattle grazing and grain producing community and has since diversified into servicing the mining industry with several coal mines located close by (DLGP, 2012a). Clermont is the closest community to the Project Area and serves as a secondary (after Moranbah) commercial and service centre for the IRC LGA (DLGP, 2012a).

Emerald

Emerald is located 100 km south of Clermont at the intersection of the Capricorn Highway and Gregory Highway. Emerald is a large service town to the mining and agricultural industries. The census population in 2011 was 13,222 (Central Highlands Regional Council 2012).

Charters Towers

Charters Towers is located approximately 250 km north of the Project Area. Charters Towers region had a population of 13,000 in 2011 with the population concentrated in the town centre. Projected population growth over the next 20 years is expected to be subdued (1,984 additional residents). There is limited mining activity in Charters Towers.

2.1.3 Coal Development within the Galilee and Bowen Basins

The *Coal Plan 2030* (DIP, 2010) reports that from a global perspective, coal is identified as a secure source of fuel supply that can significantly facilitate future economic growth. Projections indicate that the global coal demand is set to increase at an annual rate of 1.9 per cent until 2030, with major coal import demand stemming from China and India (DIP, 2010). DIP (2010) reports that Queensland has large reserves of coal, and Central Queensland is identified as a world-ranked producer and exporter of black coal and a major centre for mineral processing (Mining and Safety, 2011). The Bowen Basin produces coal, gold, silver, limestone, coal seam gas (CSG), magnesite and gemstones. There are approximately 50 coal mines, 25 mineral mines and 30 medium to large quarries currently operating within the Galilee and Bowen Basins.

The Galilee Basin is located immediately west of the Bowen Basin and contains many of the same extensive, thick and laterally continuous Permian coal measures. However, due to a lack of essential infrastructure such as water, power and rail as well as distance from coastal port locations, the Galilee Basin has only recently been targeted for development of large-scale mining projects (DIP, 2010). A significant number of coal mine projects are now at various stages of investigation or development. Mining, energy and gas projects currently proposed to be developed within the IRC LGA, across the Galilee and Bowen Basins are summarised in Table 2-1 and depicted in Figure 2-2.

Table 2-1 Mining, Energy and Gas Projects within Isaac Regional Council LGA

Project Name/Company	Status	Proposed Start-Up	Distance to Project Area
Coal/Mineral Projects within IRC LGA			
Alpha Coal Mine and Rail	New project, EIS approved	2015	Over 100 km to the south of the Project Area
Kevin's Corner Coal Mine	New Project, EIS in progress	2016	Over 100 km to the south of the Project Area
Galilee Coal Mine and Rail	New Project, EIS in progress	2016	Over 100 km to the south of the Project Area
South Galilee Coal Mine	New Project, EIS in progress	2016	Over 100 km to the south of the Project Area
Cavil Ridge open cut	EIS approved	2014	Over 200 km to the east of the Project Area
Moranbah South underground	New project, pre-feasibility underway	2017	Over 200 km to the east of the Project Area
Grosvenor underground	New project, EIS completed	2013	Over 200 km to the east of the Project Area
Moranbah CSG	Expansion, in progress	2014	Over 200 km to the east of the Project Area
Goonyella open cut	Expansion, EIS in progress	2014	Over 200 km to the north-east of the Project Area
Peak Downs open-cut	Expansion, EIS commenced	2014	Over 200 km east-south of the Project Area
Winchester South open-cut	New project, pre-feasibility to start Q2 2012	2016	Over 200 km to the east of the Project Area
Saraji East	New project, EIS process, On hold	2016	Over 200 km to the east-south of the Project Area
Twin Hills Gold-Silver Underground	Redevelopment, on-hold	2011	Less than 100 km to the north-east of the Project Area
Anthony Molybdenum	New project, scoping study in progress	2015	Approximately 100 km to the east-south of the Project Area
Energy Projects within IRC LGA			
Moranbah CSG	Expansion, in progress	2014	More than 200 km to the east of the Project Area
Norwich Park CSG	New project, EIS commenced	2014	More than 300 km to the east-south of the Project Area

Project Name/Company	Status	Proposed Start-Up	Distance to Project Area
Gas Pipelines			
Proposed Arrow Bowen Gas Pipeline	New project, EIS commenced	2016	Over 200 km to the east of the Project Area. Commencing at Gladstone, it traverses Gladstone Regional Council, Rockhampton Regional Council and Isaac Regional Council from an easterly direction to the north of Central Queensland
Proposed Central Queensland Gas Pipeline	New project, feasibility study completed, on-hold	2014	Approximately 200 km to the east of the Project Area. Commencing at Gladstone, it traverses the Central Highlands Regional Council and IRC before ending at Moranbah
Proposed Bow Energy Gas Pipeline	New project, EIS commenced	2017	Commences at Rockhampton, traverses the Central Highlands Regional Council

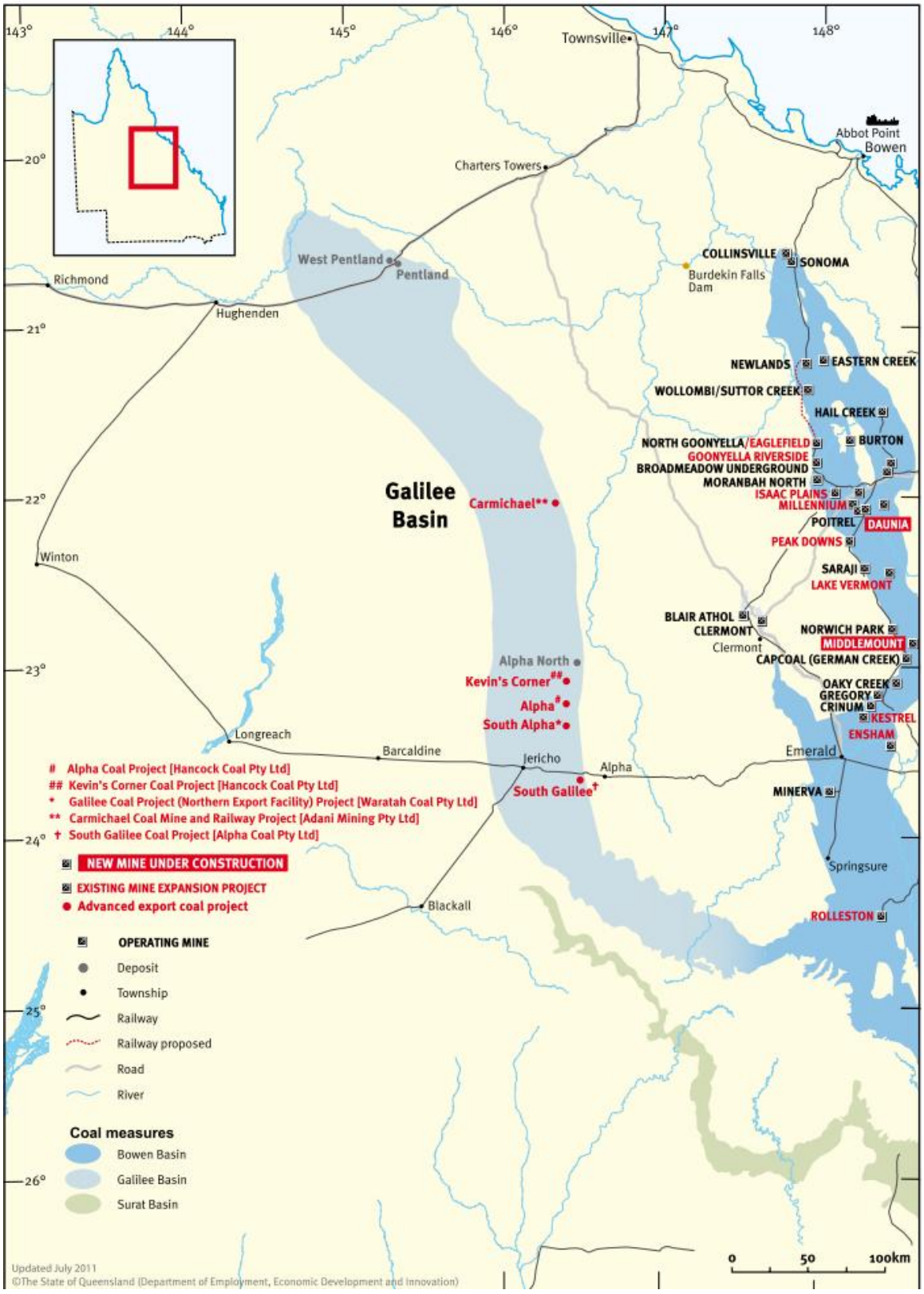
2.2 Local Context

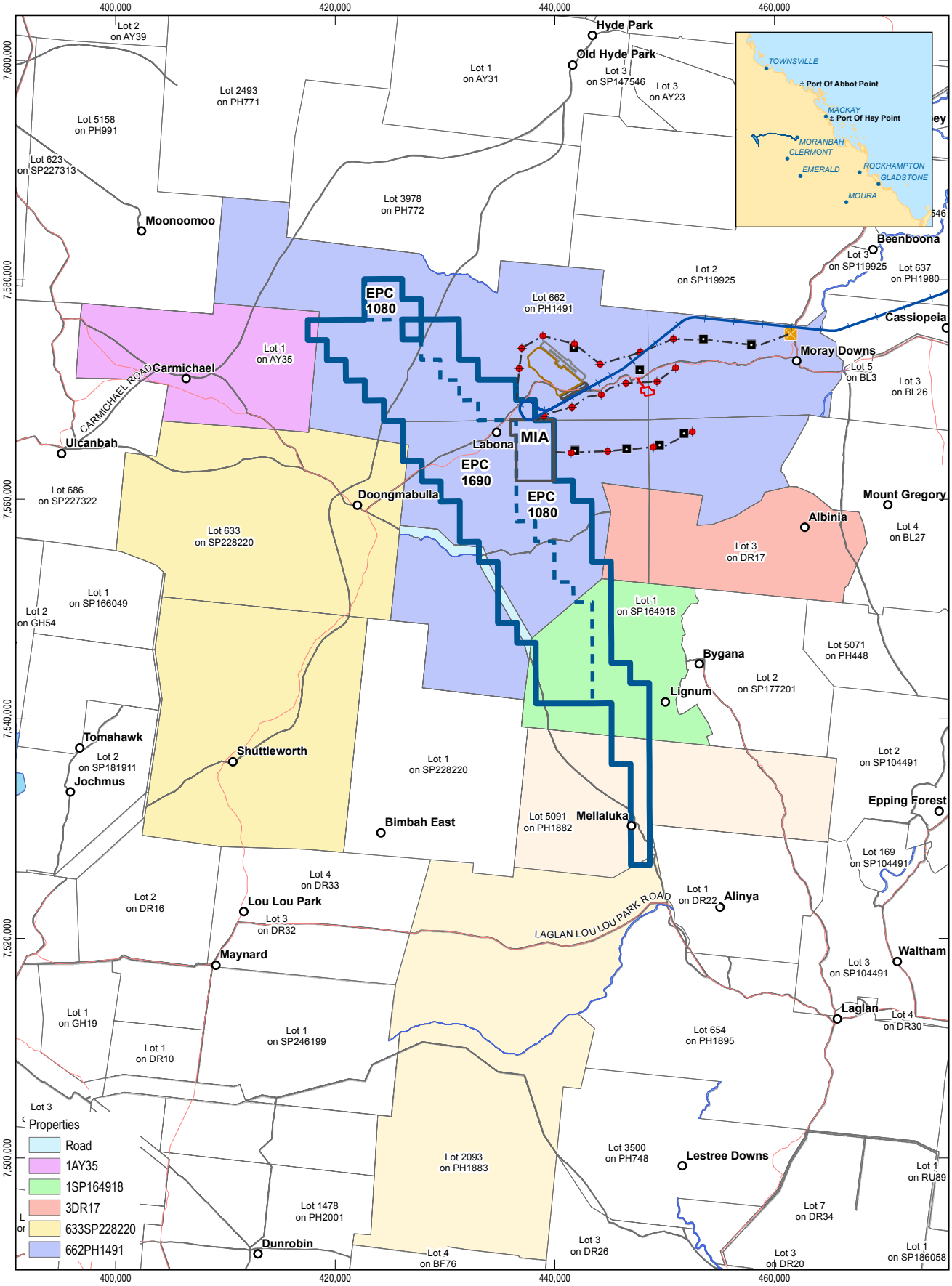
For the purposes of this assessment, the local context is defined as the Project Area and immediately adjacent parcels of land, infrastructure, communities and land use. As illustrated in Figure 2-3, the local context is defined by the following:

- Project Area consisting of Project (Mine) onsite and offsite infrastructure
- Surrounding tenements detailed in Table 2-2, which are predominantly coal deposits
- Moray Carmichael Road that traverses the central portion of Project (Mine)

The Project Area is described in detail within Section 1.6 of this report.

Figure 2-2 Queensland Coal – Western Central Queensland Projects (DEEDI, 2011)





LEGEND

- Homestead
- State Road
- Local Road
- Cadastre
- Waterway
- Rail (West)
- Mine (Onsite)
- Mine Infrastructure Area
- Mine (Offsite)
- Borehole
- Storage Site (Instream)
- Storage Facility (Offstream)
- Pipeline Network
- Airport Location
- Rail Siding
- Industrial Area
- Workers Accommodation Village

1:500,000 (at A4)

0 5 10 15 20

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

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Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number 41-25215
Revision B
Date 10-10-2012

Local Context

Figure 2-3

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Data Source: GA: Homesteads, Roads (2007); DME: EPC 1690 (2010)/EPC 1080 (2011); DERM: Cadastre (2010), Adani: Alignment Opt9 Rev3 (2012); Gassman/Hyder: Mine (Offsite) (2012). Created by: BW,MS

2.3 Tenure and Land Use Patterns

Tenure typically refers to a lease or freehold which conveys possession of land to a person (DERM, 2010). In Queensland, leasehold land is administered under the *Land Act 1994*, by the Minister for Natural Resources and Mines (DNRM). The object of the *Land Act 1994* requires land to be managed for the benefit of the people of Queensland by having regard to seven principles. These principles are sustainability, evaluation, development, community purpose, protection, consultation and administration (DERM, 2010).

Rural leasehold land is land leased for agricultural, grazing or pastoral uses, and excludes leases over land within a reserve, state forest, timber reserve, national park, or other *Nature Conservation Act 1992* (NC Act) tenures (DERM, 2010). Land use refers to the primary use of the land which may require authorisation by the State and local government authorities.

Mining tenure and other resource tenures may be overlaid on underlying land tenure and may affect land use and activities.

2.3.1 Mining and Resource Tenure

Under Section 8 of the *Mineral Resources Act 1989* (MR Act), the State owns gold, coal and all minerals on or below the surface of the land in Queensland. The MR Act provides the legislative framework for exploration, development and mining tenure (Queensland Government, Mining and Safety 2011). A permit, claim, licence or lease may, among other things, authorise prospecting, exploration, mining, processing or transport of materials (including coal) under the provisions of the MR Act and royalties are payable to the State government for resources extracted on a commercial basis. Mining activities may not be carried out where the appropriate tenure is not in place. Under the MR Act the holder of the mining tenure has rights of access and rights to explore and develop land for the purpose of mining activities. The MR Act establishes provision for the management of rights held by the holder of the underlying tenure under the *Land Act 1994*.

Several different mining tenements are granted and administered under the MR Act, as follows:

- **Prospecting Permit**

A Prospecting Permit (PP) entitles the holder to prospect for and/or hand-mine for minerals and/or peg a mining lease or mining claim on the available land. A prospecting permit cannot be used to mine coal resources but may be used to enable the holder to apply for a higher order coal tenement. There are two types of prospecting permits, namely a parcel prospecting permit and a district prospecting permit.

- **Exploration Permit**

An Exploration Permit (EP) is issued for the purposes of exploration, allowing the permit holder to determine the existence, quality and quantity of minerals on, in or under land by methods such as prospecting, geophysical surveys and other methods. This permit may then lead to an application for a mineral development licence or mining lease.

- **Mineral Development Licence**

A Mineral Development Licence (MDL) allows the holder to undertake geoscientific programs, mining feasibility studies, environmental, engineering and design studies so as to evaluate the potential for development of the defined resource.

- **Mining Claim**

A Mining Claim (MC) is granted to holders of prospecting permits to carry out small scale operations, which can be up to one hectare in area and can be granted for minerals other than coal.

- **Mining Lease**

A Mining Lease (ML) is granted for mining operations that entitle the holder to machine-mine specified minerals and carry out activities associated with mining or promoting the activity of mining. Where there are exploration permits over land held by parties other than the applicant for a mining lease, permission is required from holders of these exploration permits.

Adani currently holds one permit for exploration of coal, namely EPC1690 and has an agreement with Waratah Coal Pty Ltd, the holder of EPC 1080 to conduct exploration activities on the eastern portion of EPC 1080. Further to this, a Mining Lease Application (MLA) No. 70441 has been lodged over the EPC1690 tenement. An additional MLA will be lodged over eastern part of EPC1080. Adani has obtained an irrevocable consent from Waratah Coal Pty Ltd for Adani to lodge the MLA over the eastern portion of EPC 1080 which will be utilised for out-of-pit disposal and water management dams (Figure 2-4).

Review of the Queensland Government data illustrates that the Project Area is surrounded by a number of coal and petroleum exploration tenures, which are detailed in Table 2-2 and graphically represented in Figure 2-4. This information is current as of 28 September 2011 and may be subject to change.

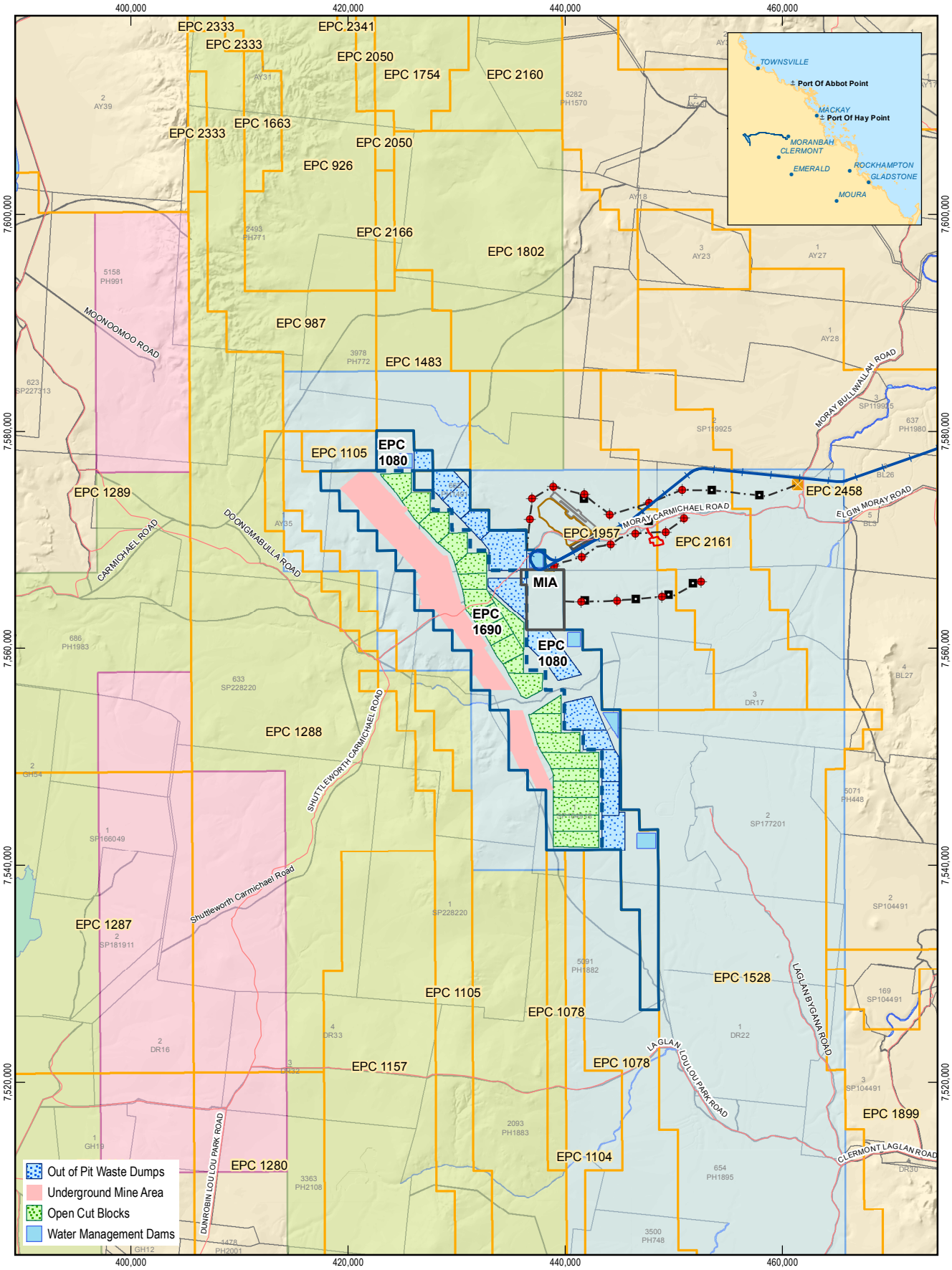
- **Petroleum Pipeline Licence**

A Petroleum Pipeline Licence (PPL) is required for the construction of a petroleum pipeline outside of a Petroleum Lease (PL). The tenements are administered under the Queensland *Petroleum and Gas (Production and Safety) Act 2004*.

Table 2-2 Mining and Petroleum Tenures (Queensland Government, Department of Mines and Energy, 2011)

Tenure	Holder	Location in Relation to Project Area	Status
Tenure Held By Adani			
MLA70441	Adani Mining Pty Ltd	Project (Mine)	Application
EPC1690	Adani Mining Pty Ltd	Project (Mine)	Granted
Exploration Permit For Coal			
EPC2166	Spinifex Rural Management Pty Ltd	Within 20 km	Application
EPC2458	Civil & Mining Resources Pty Ltd	Within 20 km	Application

Tenure	Holder	Location in Relation to Project Area	Status
EPC2161	Rem Resources Pty Ltd	Within 20 km	Application
EPC1957	Mining Investments One Pty Ltd	Within 20 km	Application
EPC1105	Waratah Coal Pty Ltd	Runs parallel to the western side of Project (Mine), specifically EPC1690	Application
EPC926	Vale Coal Exploration Pty Ltd	Within 20 km	Granted
EPC987	Macmines Austasia Pty Ltd	Within 20 km	Granted
EPC1802	Wellington Owen Reginald	Within 20 km	Granted
EPC1289	Waratah Coal Pty Ltd	Within 20 km	Granted
EPC1288	Waratah Coal Pty Ltd	Within 20 km	Granted
EPC1483	Matilda Coal Pty Ltd	Within 20 km	Granted
EPC1080	Waratah Coal Pty Ltd	To the east and west of EPC1690	Granted
EPC1528	Vale Coal Exploration Pty Ltd	Within 20 km	Granted
EPC1104	Vale Coal Exploration Pty Ltd	Runs immediately from the southern boundary of EPC1690 south	Granted
EPC1078	Vale Coal Exploration Pty Ltd	Runs immediately from the southern boundary of EPC1690 south	Granted
EPC1157	Waratah Coal Pty Ltd	Within 20 km	Granted
Exploration Permit For Minerals			
EPM19295	Gold Fields Australasia Pty Ltd	Within 20 km	Application
Exploration Permit For Petroleum			
EPP1044	Queensland Energy Resources Limited	The entire area of EPC1690 is overlapped by this EPP. It also extends further east, south and to the west.	Granted
EPP744	Comet Ridge Ltd	Located to the west of the EPC1690	Granted
EPP1015	Queensland Energy Resources Limited	Within 20 km	Granted
Petroleum Pipeline Licence			
PPL172	Energy World Corporation Limited	Traversing the Project Area	Not granted and non-current



LEGEND

- State Road
- Local Road
- Cadastre
- Waterway
- EPC Boundary
- EPP 744
- EPP 1015
- EPP 1044
- Rail (West)
- Mine (Offsite)
- Mine Infrastructure Area
- Mine (Offsite)
- Borehole
- Storage Site (Instream)
- Storage Facility (Offstream)
- Pipeline Network
- Airport Location
- Rail Siding
- Industrial Area
- Workers Accommodation Village

1:500,000 (at A4)

0 5 10 15 20

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

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Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number 41-25215
Revision B
Date 12-10-2012

Mining and Petroleum Tenure

Figure 2-4

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Data Source: GA: Roads, Homesteads (2007); DME: EPC1690 (2010), EPC1080 (2011), EPC and EPP Boundary (2012); DERM: Cadastre (2010);Adani: Alignment Opt9 Rev3 (2012); Gassman/Hyder: Mine (Offsite) (2012). Created by: BW.

2.3.2 Project Area Tenure and Land Use

The Project (Mine) lies across six leasehold properties, namely the Moray Downs, Carmichael, Albinia, Lignum, Doongmabulla and Mellaluka properties, all of which are operated as cattle stations (refer to Figure 2-3). Adani has purchased the leasehold for Moray Downs and is in discussions with landowners to secure mining rights over other affected properties using processes set out in the MR Act.

Lot details and encumbrances and interests currently affecting properties covered by the Project (Mine) are listed in Table 2-3 and Table 2-4 respectively. Adani currently holds EPC1690 and has lodged a MLA over this land (MLA70441). EPC1690 runs north-west to south-east, covering approximately 45 km in length and approximately 7 km in width (see Figure 2-5).

The tenure of the subject parcels of land is leasehold. As identified in Table 2-3, the majority of the subject parcels are on a Grazing Homestead and Perpetual Lease (GHPL) and Pastoral Holding (PH). A GHPL is an ongoing tenure issued for the purposes of grazing and/or agricultural purposes in accordance with the *Land Act 1994*, while a PL is a term lease issued for pastoral purposes. The surrounding land use is typically farmland, predominantly livestock with some cropping. There are some improvements existing within the Project (Mine) as part of these cattle properties, including fences, bores, dams and access tracks.

Lot 662 on PH1491 (Moray Downs property) contains the Labona and Moray Downs homesteads. The Labona homestead is located within the central eastern portion of the Mine and will be demolished as part of the construction phase of the mine. The Moray Downs homestead is not within the mine area located 22.6 km from the eastern boundary. Refer to Section 6.2.4 for further information. The Mellaluka homestead is located on the southern boundary of the EPC1080. Adani does not intend to utilise this portion of the Project Area for stockpiling or mining purposes. This may be the subject of further future assessment should Adani wish to utilise the relevant portion of the Project Area. In the future, impacts of expansion of the Mine into this area will be assessed, and will include an assessment of additional impacts on Mellaluka homestead. Figure 2-5 illustrates the tenure of the Project (Mine) and surrounding area.

Table 2-3 Project Area Land Use and Tenure

Project Component	Property Details	Area (ha) within the Property	Current Land Use	Current Tenure/Category of Tenure
Mine Area	Lot 1 on AY35 (Carmichael)	167	Cattle grazing	Leasehold (Grazing Homestead Perpetual Lease)
	Lot 1 on SP164918 (Lignum)	4,242	Cattle grazing	Leasehold (Grazing Homestead Perpetual Lease)
	Lot 662 on PH1491 (Moray Downs)	20,857	Cattle grazing	Leasehold (Pastoral Holding)
	Lot 633 on SP228220	64	Cattle grazing	Leasehold (Pastoral

Project Component	Property Details	Area (ha) within the Property	Current Land Use	Current Tenure/Category of Tenure
	(Doongmabulla)			Holding)
Road Easements	Several properties	686	Road	Road easement
	Total area of EPC1690 including road easements: 26,016 ha			
	Total area of EPC1690 excluding road easements: 25,330 ha			
Out-of-pit Spoil Disposal	Lot 662 on PH1491 (Moray Downs)	12,065	Cattle grazing	Leasehold (Pastoral Holding)
	Lot 1 on SP164918 (Lignum)	4,059	Cattle grazing	Leasehold (Grazing Homestead Perpetual Lease)
	Lot 3 on DR17 (Albinia)	119	Cattle grazing	Leasehold (TL)
	Lot 5091 on PH1882 (Mellaluka)	2,339	Cattle grazing	Leasehold (PPH)
	Lot 2093 on PH1883 (Madison)	47	Cattle grazing	Leasehold (TL)
Road Easements traversing	Several properties	85	Road	Road easement
	Total area for part of EPC1080 including road easements: 18,714 ha			
	Total area for part of EPC1080 excluding road easements: 18,629 ha			
Mine offsite infrastructure: Workers accommodation village	Lot 662 on PH1491 (Moray Downs)	74	Cattle grazing	Leasehold (Pastoral Holding)
Mine offsite infrastructure: Permanent airport	Lot 662 on PH1491 (Moray Downs)	298	Cattle grazing	Leasehold (Pastoral Holding)
Mine offsite infrastructure: Rail siding area	Lot 662 on PH1491 (Moray Downs)	96	Cattle grazing	Leasehold (Pastoral Holding)
Mine offsite infrastructure: Heavy industrial area	Lot 662 on PH1491 (Moray Downs)	948	Cattle grazing	Leasehold (Pastoral Holding)
Mine offsite infrastructure: Water supply infrastructure	Lot 662 on PH1491 (Moray Downs)	413	Cattle grazing	Leasehold (Pastoral Holding)

Project Component	Property Details	Area (ha) within the Property	Current Land Use	Current Tenure/Category of Tenure
	Total area for PH1491: 1,820 ha (Not 1,829 ha due to overlap of offsite infrastructure footprints)			
Total land area of Project Area (including easements and offsite infrastructure): 46,550 ha				

Table 2-4 Encumbrances and Interests

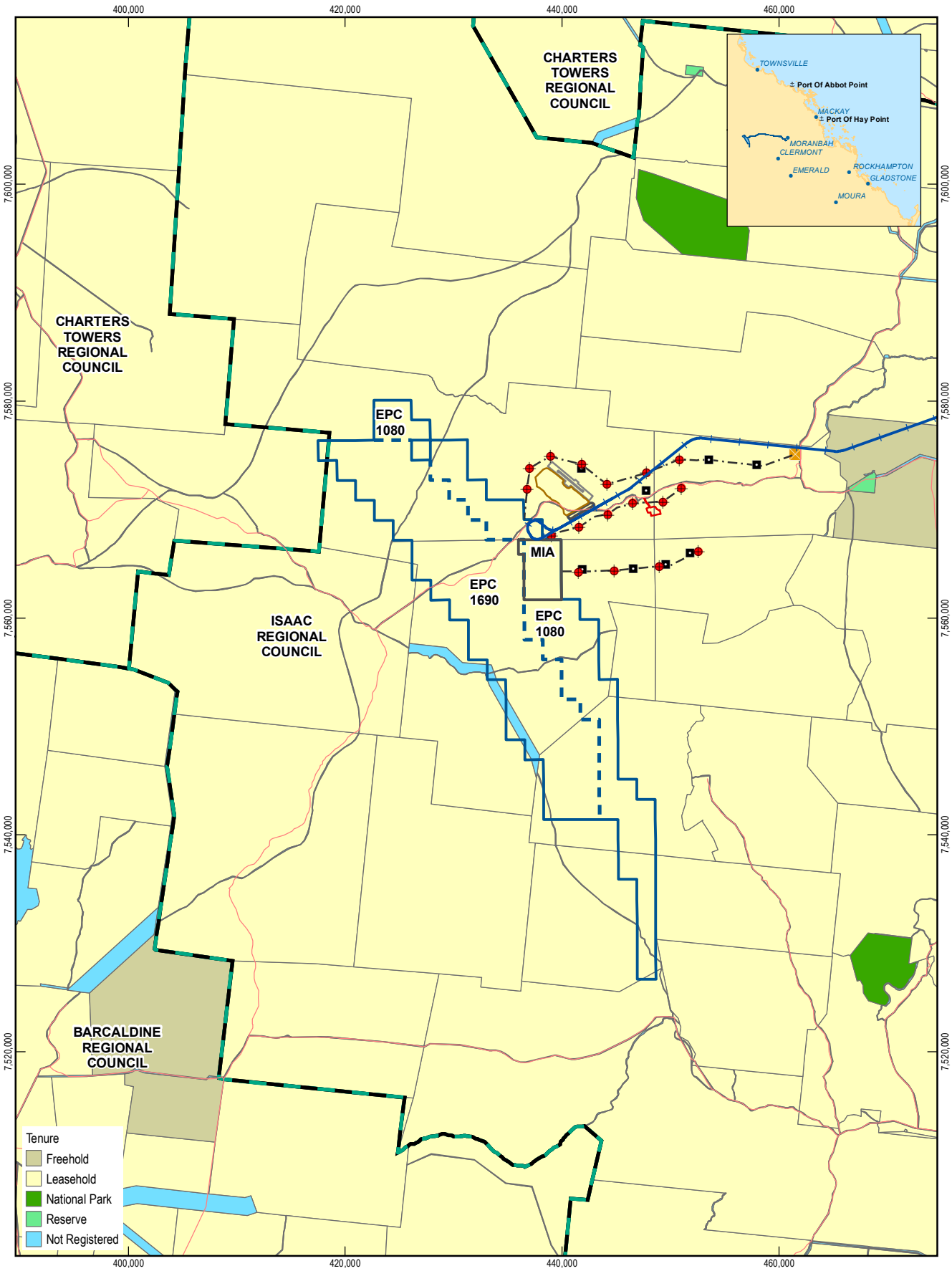
Project Component	Subject Property	Easement
Mine Area	Lot 1 on AY35	Rights and interests reserved to the Crown Lease No.17655213 Nature Refuge No.704134903
	Lot 1 on SP164918	Rights and interests reserved to the Crown Lease No.40040496 Nature Refuge No. 708488668
	Lot 662 on PH1491	Rights and interests reserved to the Crown Lease No.17665183
	Lot 633 on SP228220	Rights and interests reserved to the Crown Lease No.17665175
Out-of-pit Spoil Disposal	Lot 662 on PH1491	Rights and interests reserved to the Crown Lease No.17665183
	Lot 1 on SP164918	Rights and interests reserved to the Crown Lease No.40040496 Nature Refuge No. 708488668
	Lot 3 on DR17	Rights and interests reserved to the Crown Lease No.40061637
	Lot 5091 on PH1882	Rights and interests reserved to the Crown Lease No.17669158
	Lot 2093 on PH1883	Rights and interests reserved to the Crown Lease No. 40058661
Mine offsite infrastructure: Mine village (including onsite services and amenities) and mine airstrip	Lot 662 on PH1491	Rights and interests reserved to the Crown Lease No.17665183

2.3.3 Homesteads

A total of ten homesteads are located immediately within/surrounding the Project Area. Eight homesteads are more than 1.4 km away from the Project Area, while two, namely the Labona and Mellaluka homesteads, are located immediately within the Project Area (refer to Table 2-5). The Labona homestead will be demolished as part of the Project (Mine) construction activities. The Mellaluka homestead will remain as this portion of the Project Area will not be utilised for mining activities. Should Adani wish to utilise this portion of EPC1080, the impact upon the Mellaluka homestead will be reassessed as part of an assessment of the impacts of expanding the mining activity.

Table 2-5 Homesteads Immediately Within or Surrounding Project Area

Homestead Name	Land Use	Tenure	Location/Distance to Project (Mine)
Immediately within Project Area			
Lot 662 on PH1491 Labona	Rural	Leasehold	Within central eastern portion of Project (Mine), specifically EPC1690
Lot 5091 on PH1882 Mellaluka	Rural	Leasehold	On the southern boundary of Project (Mine), specifically EPC1080
Surrounding the Project Area			
Lot 662 on PH1491 Moray Downs	Rural	Leasehold	22.6 km east of the Project (Mine), specifically EPC1080
Lot 663 on SP228220 Doongmabulla	Rural	Leasehold	5.77 km west of Project (Mine), specifically EPC1690
Lot 1 on AY 35 Carmichael	Rural	Leasehold	11 km west of Project (Mine), specifically EPC1690
Lot 1 on SP228220 Bimbah East	Rural	Leasehold	18 km to the south west of Project (Mine), specifically EPC1690
Lot 1 on SP164918 Lignum	Rural	Leasehold	1.4 km to the east of Project (Mine), specifically EPC1080
Lot 2 on SP177201 Bygana	Rural	Leasehold	4.9 km to the east of Project (Mine), specifically EPC 1080
Lot 5158 on PH991 Moonoomoo	Rural	Leasehold	17 km north west of Project (Mine), specifically EPC1690
Lot 3 on DR17 Albinia	Rural	Leasehold	17.9 km east of Project (Mine), specifically EPC1080



LEGEND

- Town
- State Road
- Local Road
- Local Government Area
- Rail (West)
- Mine (Onsite)
- Mine Infrastructure Area
- Mine (Offsite)
- Borehole
- Storage Site (Instream)
- Storage Facility (Offstream)
- Pipeline Network
- Airport Location
- Rail Siding
- Industrial Area
- Workers Accommodation Village

1:500,000 (at A4)

0 5 10 15 20

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

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Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Project Area
Tenure

Job Number 41-25215
Revision A
Date 12-10-2012

Figure 2-5

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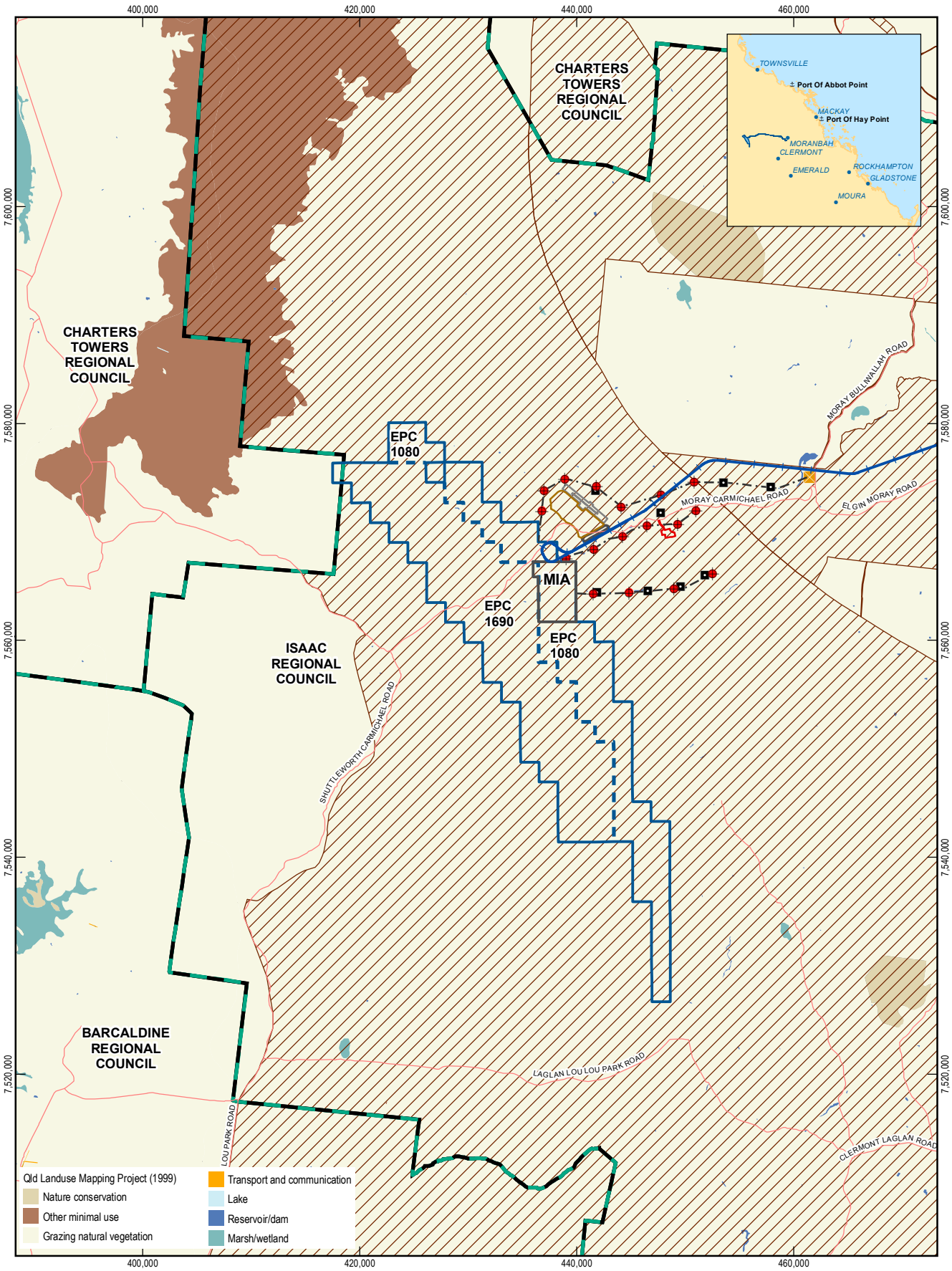
Data Source: GA: Roads (2007); DME: EPC 1690 (2010)/EPC 1080 (2011); DERM: Cadastre, Tenure, LGA (2010); Adani: Alignment Opt9 Rev3 (2012); Gassman/Hyder: Mine (Offsite) (2012). Created by: BW, MS



LEGEND

- Town
- State Road
- Local Road
- Local Government Area
- Native Title Register
- Rail (West)
- Mine (Onsite)
- Mine Infrastructure Area
- Mine (Offsite)
- Borehole
- Storage Site (Instream)
- Storage Facility (Offstream)
- Pipeline Network
- Airport Location
- Rail Siding
- Industrial Area
- Workers Accommodation Village

1:500,000 (at A4)

0 5 10 15 20

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

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Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number 41-25215
Revision D
Date 12-10-2012

Project Area Land Use

Figure 2-6

Path: G:\41\25215\GIS\Maps\MXD\100_Planning\41-25215_115_rev_d.mxd
Level 4, 201 Charlotte St Brisbane QLD 4000 T +61 7 3316 3000 F +61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: GA: Roads (2007); DME: EPC 1690 (2010)/EPC 1080 (2011); DERM: Cadastre, LGA (2010), Landuse (1999), Adani: Alignment Opt9 Rev3 (2012); Gassman/Hyder: Mine (Offsite) (2012) . Created by: BW,MS

2.4 Local Government Zoning

The Project is located across two regional LGA,councils, with the majority of the proposed mining lease area in the IRC LGA and a small area in the north-west within the Charters Towers Regional Council (CTRC) LGA. Development within the relevant part of the IRC LGA is regulated through the *Planning Scheme for Belyando Shire 2009* while development within the relevant part of the CTRC LGA is regulated through the *Planning Scheme for Dalrymple Shire 2006* (refer to Figure 2-6).

Approximately 167 ha of the Project Area is located within the CTRC LGA and 46,383 ha within the IRC LGA. The Project Area is located within the rural zone under both the *Planning Scheme for Belyando Shire 2009* and the *Planning Scheme for Dalrymple Shire 2006.* Establishment of the Mine within the CTRC LGA is not subject to the provisions of either planning scheme, as development located within a mining lease is exempt from SP Act requirements. An assessment of the relevant planning scheme provisions has been undertaken and is set out within Volume 4 Appendix D Project Approvals and Planning Assessment.

2.5 Key Resource Areas

Key Resource Areas (KRA) are defined as locations across Queensland that contain important extractive materials of State or regional significance. A KRA encompasses an extractive resource and onsite processing area, the associated transport route and a separation area around the resource, processing area and the transport route (DEEDI, Mines and Energy, 2011).

Review of the Queensland Government, Mining and Safety Key Resource Area Maps (2010) identified the following KRAs within the MIW region:

- KRA 26 – Foxdale, Whitsunday Shire
- KRA 23 – The Cedars, Mackay
- KRA 24 – Farleigh, Mackay
- KRA 33 – Waitara, former Nebo Shire
- KRA 37 – West Euri Creek, Bowen

The closest KRA to the Project is KRA 33 Waitara, which is located within the former Nebo Shire, approximately 250 km to the east of the Project (Mine). Assessment indicates that the Project will not have an impact upon any KRAs, refer to Volume 4 Appendix D Project Approvals and Planning Assessment for further information.

2.6 Good Quality Agricultural Land

The purpose of the SPP 1/92 Development and the Conservation of Agricultural Land is to address the conservation of GQAL. GQAL is defined as ‘Class A’ agricultural land, and in some cases includes “Class B” agricultural land, under the Agricultural Land Class ranking (refer to Volume 4, Appendix D Project Approvals and Planning Assessment for more detail regarding SPP 1/92).

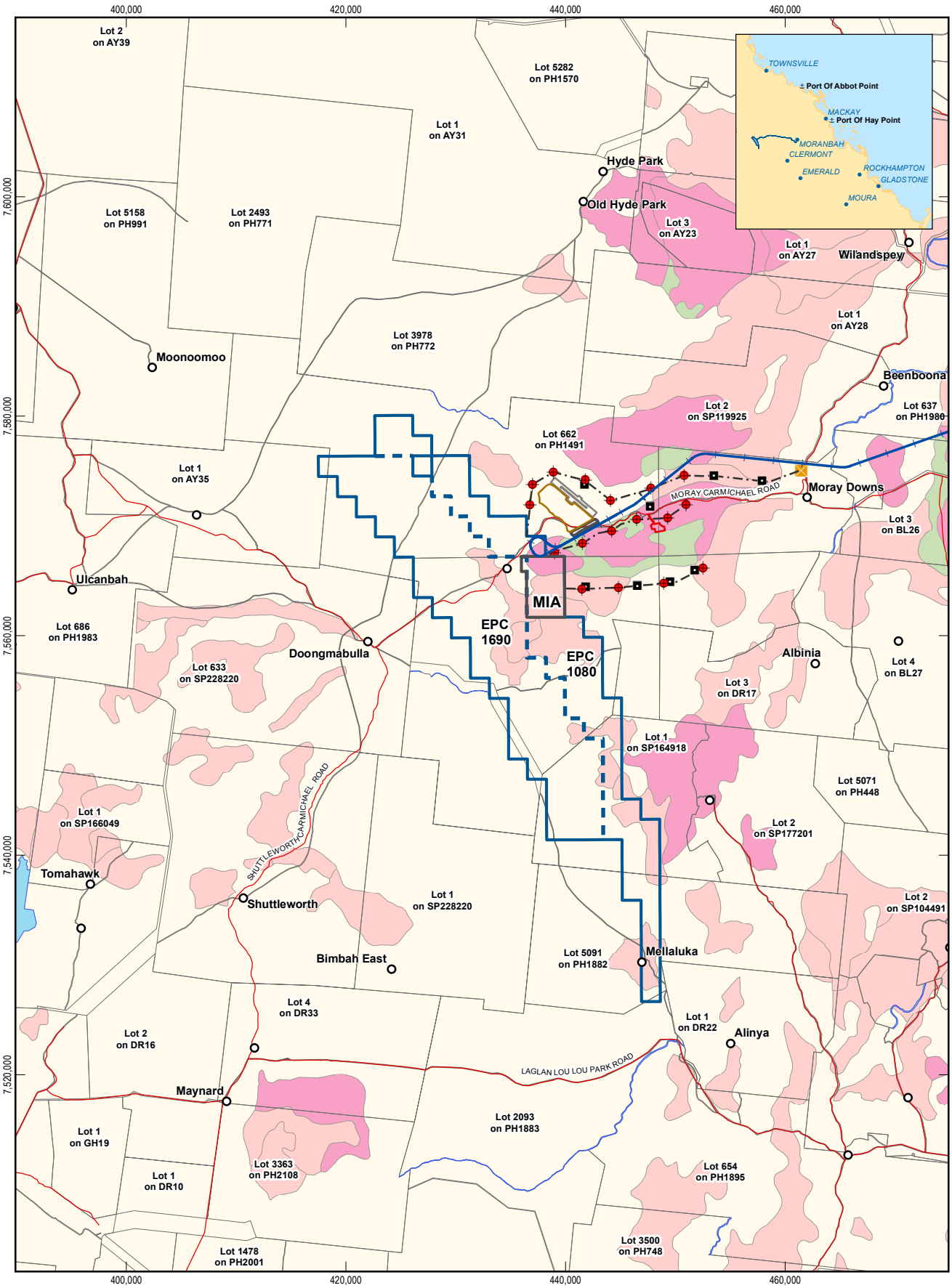
A soil survey has been undertaken over EPC1690 (refer to Volume 4 Appendix L Mine Soils Assessment). The survey did not identify the presence of Class A or B GQAL which confirms the Department of Natural Resources Management (DNRM) mapping for the area (refer to Figure 2-7). The DNRM mapping identifies the presence of C1 GQAL and the soil survey confirmed and delineated the extent of C1 GQAL. Approximately 964 ha of C1 GQAL (identified as Class 3 inTable 7 in Volume 4 Appendix L Mine Soils Assessment) is present within EPC1690, specifically to the north of the Carmichael River and south of the Cabbage Tree Creek.

As a result of this analysis, it is concluded that the EPC1690 contains limited GQAL and as such has been assessed as “breeding country” with limited agricultural potential. Accordingly, an assessment of only the grazing suitability has been undertaken for the EPC1690 (refer to Volume 4 Appendix L Mine Soils Assessment).

GQAL mapped on DNRM mapping within EPC1080 is generally consistent with the limited GQAL dentified within EPC1690, with the exception of 694 ha of potential Class B GQAL. DNRM mapping for the offsite infrastructure area indicates that there is 392 ha of potential Class A GQAL and 1,227 ha of potential Class B GQAL. Further soil studies are proposed to be undertaken prior to commencement of construction to assess the potential occurrence of GQAL in EPC1080 and the offsite infrastructure area.

2.7 Strategic Cropping Land

Queensland Government policy considers that the best cropping land, defined as strategic cropping land, is a finite resource that must be conserved and managed for the longer term. In view of this policy, planning and approval powers have been developed to protect strategic cropping land from development that would lead to its permanent alienation or otherwise diminished productivity. The Project (Mine) is not in close proximity to any known or potential strategic cropping land (refer to Volume 4 Appendix L Mine Soils Assessment for further information).



LEGEND

- Homestead
- Local Road
- Cadastre
- Waterway
- Rail (West)
- Mine (Offsite)
- Mine Infrastructure Area

Mine (Offsite)

- Borehole
- Storage Site (Instream)
- Storage Facility (Offstream)
- Pipeline Network

- Airport Location
- Rail Siding
- Industrial Area
- Workers Accommodation Village

GQAL

- A
- B
- C1

1:500,000 (at A4)

0 5 10 15 20

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

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Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number 41-25215
Revision D
Date 16-10-2012

Good Quality Agricultural Land

Figure 2-7

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Level 4, 201 Charlotte St Brisbane QLD 4000 T +61 7 3316 3000 F +61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: GA: Homesteads, Local Road (2007); DME: EPC 1690 (2010)/EPC 1080 (2011); DERM: Cadastre (2011); Adani: Alignment Opt9 Rev3 (2012); Gassman/Hyder: Mine (Offsite) (2012); Belyando Shire Council Planning Scheme: GQAL (2008). Created by: BW, MS

3. Existing and Proposed Infrastructure

3.1 Overview

The purpose of this section is to present a review of relevant literature and available public information regarding existing and proposed infrastructure within and surrounding the Project Area. This review will enable an assessment of the potential impacts of the Project (Mine) upon such infrastructure and development of mitigation measures to avoid or alleviate such impacts.

3.2 Queensland Infrastructure Plan 2011

The newly gazetted *Queensland Infrastructure Plan 2011* sets the strategic platform to guide the planning, prioritisation and sequencing of infrastructure within Queensland. It identifies the infrastructure needed to support and further encourage growth across Queensland's major regional economic zones of minerals, coal and energy, gas, agriculture, tropical expertise and tourism (Queensland Government, 2011). The Plan identifies the MIW region as one of the fastest growing economies in Queensland due to its strong mining, manufacturing, agriculture and tourism sectors that have developed on the basis of an abundance of natural resources from the Bowen and Galilee Basins. As a result of the economic growth of these sectors, several infrastructure projects are being planned for the region to support these sectors (see Section 3.3.2 and Section 3.7.2).

3.3 Road Infrastructure

In addition to the *Queensland Infrastructure Plan 2011*, the Department of Transport and Main Roads (DTMR) is developing an integrated regional transport plan to support the MIWRP (DTMR 2012a). The draft *Connecting Mackay, Issac and Whitsunday 2031* will be the first overarching transport framework to manage development, growth and change in the region and will identify strategies to assist the Queensland Government to provide safe, connected, efficient, integrated and sustainable transport network (DTMR 2012a).

A safe and efficient local and regional road network is critical to the construction and operation of the Project (Mine). This section outlines existing and proposed road infrastructure within and surrounding the Project Area. State-controlled road infrastructure is governed by the *Transport Infrastructure Act 1994* (TI Act) which is administered by the State government through DTMR. DTMR has jurisdiction over roads of State or regional significance and has four administrative classifications in its hierarchy of roads. These are:

- National Highway (NH)
- State Strategic Road (SSR)
- Regional Road (RR)
- District Road (DR)

Local roads are governed by the *Local Government Act 2009* and administered by the local governments, in this case the IRC.

3.3.1 Existing Roads

Existing road infrastructure within and surrounding the Project Area includes state-controlled roads and local roads (Table 3-1). In rural locations, many properties have unsealed, graded or sealed roads that provide access to areas of that property or other properties, which may not be gazetted. Several un-gazetted tracks have been developed throughout the Project Area.

The main access to the Project (Mine) is via Gregory Developmental Road - Elgin-Moray Road (state-controlled) and Moray Carmichael Road (local). The Moray Carmichael Road traverses the Project Area, passing the existing Labona Homestead and providing a direct connection from the Gregory Developmental Road to the Doongmabulla Homestead (refer to Figure 2-3). This road traverses the Project Area from the west to the east and will be used to establish the proposed access road from the Mine to the Project (Mine) offsite infrastructure area. This road is a local road and is under the control of the IRC. No other roads run directly across the Project (Mine) footprint.

Homesteads surrounding the Project Area are accessed via existing unsealed roads. Properties to the north of the Project Area are accessed via the Carmichael Road, homesteads to the east via the Moray Carmichael Road, homesteads to the south via Shuttleworth Carmichael Road, Laglan Lou Lou Park Road and Laglan Bygana Roads, homesteads to the west are accessed via the Shuttleworth Carmichael Road and Carmichael Road (refer to Figure 2-3). Table 3-1 details the existing road infrastructure within a radius of approximately 100 km of the Project Area. For further detail regarding the road network refer to Volume 4 Appendix W Mine Transport.

Table 3-1 Existing Road Infrastructure

Road Name	Road Authority	Classification
Gregory Developmental Road (Charters Towers to Clermont)	DTMR	State Strategic Road
Bowen Developmental Road (Collinsville – Belyando Crossing)	DTMR	District Road
Kilcummin Diamond Downs Road	DTMR	District
Suttor Developmental Road (Nebo-Mount Coolon)	DTMR	Regional Road
Peak Downs Highway (Clermont – Nebo)	DTMR	State Strategic Road
Moray Carmichael Road	IRC	Local Road
Moray Bulliwallah Road	IRC	Local Road
Elgin Moray Road	IRC	Local Road
Carmichael Road	CTRC	Local Road
Shuttleworth Carmichael Road	IRC	Local Road
Laglan Lou Lou Park Road	IRC	Local Road
Laglan Bygana Road	IRC	Local Road
Golden Downs Avon Road	IRC	Local Road

3.3.2 Proposed Road Projects

Based on the review of the *Queensland Infrastructure Plan (*2011), there are no planned road upgrades in the immediate vicinity to the Project Area. Road upgrades to the Bruce Highway at Mackay, Sarina and Proserpine as well as Peak Downs Highway (Nebo to Mackay) Walkerston bypass pre-project works, Forgan Bridge over Pioneer River (Mackay Slade Point Road) duplication is planned however are not relevant to the Project (Mine).

DTMR is working to reconstruct more than 300 kilometres of disaster-damaged roads in MIW region over the next few years, following cyclone and rain events of 2010 and 2011 (DTMR 2012b). The works are being undertaken at a number of sites including the following roads relevant to the Project (Mine):

- 47 km of Suttor Developmental Road
- 36 km of Bowen Developmental Road
- 12 km of Gregory Developmental Road between Clermont and Belyando Crossing
- Reconstruction works are expected to be completed in late 2013.

3.3.3 Road Upgrades Required for the Project (Mine)

A Traffic and Transport Assessment has been undertaken for the Project and is included in Volume 4 Appendix W Mine Transport. It has identified the following road upgrades that will be undertaken to facilitate the construction and operation of the Project (Mine):

- Re-alignment of the Moray Carmichael Road between the Project Area and the Gregory Developmental Road
- Realignment of the Moray Carmichael Road at the site to eliminate two crossings of North Creek and eliminate the need for a grade separated crossing of the Project (Rail) alignment
- Community access roads to allow vehicular access into and through the workers accommodation village

Refer to Volume 4 Appendix W Mine Transport for further information regarding proposed or existing road infrastructure within the Project Area.

3.4 Rail Infrastructure

3.4.1 Existing Infrastructure

The provision of rail infrastructure is governed by the TI Act which provides a framework to allow rail transport infrastructure to be constructed, maintained, operated and managed safely, effectively and efficiently. QR National currently operates and manages the largest rail service within the Bowen Basin servicing multiple mines to the Abbot Point Coal Terminal, Hay Point Coal Terminal and the Port of Gladstone (QR National, 2011). The nearest existing railway to the Project (Mine) is the Blair Athol Branch Line of the Goonyella Coal Rail System (Goonyella rail system) which runs south from Wotonga to Blair Athol and is located approximately 200 km south-east of the Project (Mine). The Goonyella rail system primarily services more than 30 coal mines in the northern and central areas of the Bowen Basin and transports coal to the two export terminals at the Port of Hay Point, the

Dalrymple Bay Coal Terminal and the Hay Point Services Coal Terminal (DIP, 2010). The system also connects through the Newlands rail system to the Port of Abbot Point.

Recent upgrades to the Goonyella rail system include the Northern Missing Link (part of the Goonyella to Abbot Point expansion project). The Northern Missing Link connects the Goonyella rail system to the Newlands systems, and saw expansion and upgrade of the existing track along the Newlands rail system.

3.4.2 Proposed Rail Projects

In addition to the Project (Rail), the following proposed railway lines are planned to be developed within the IRC LGA to service the Galilee Basin:

- Proposed Alpha Coal Project (Railway) stretching north-east from the Alpha Mine to the Port of Abbot Point
- Proposed Waratah Coal Railway stretching north-east from the Alpha Mine to the Port of Abbot Point
- Central Queensland Integrated Rail Project, including upgrades to the Newlands rails system to minimise the extent of new railway linking the Galilee basin to the Goonyella rail system

Potential impacts of the Project (Mine) upon the abovementioned proposed rail lines are assessed in Section 6.3.3 of this report.

3.4.3 Rail Works Required for the Project (Mine)

Adani will develop a privately owned rail line connecting to existing rail infrastructure at Moranbah, and then export coal through the coal terminal facilities at the Port of Abbot Point and/or the Port of Hay Point (refer to Volume 3 Section 2 Description of the Project for more information). Environmental impacts associated with the rail component of the Carmichael Coal Project are assessed separately in Volume 3.

The proposed rail siding area is situated at the western end of the Project (Rail) alignment. As the Project (Rail) involves the development of a single line, a rail siding area is necessary for multiple trains to utilise the line without interference. While the intent of the rail siding area is to improve the functionality of the Project (Rail) alignment to transport coal from the Mine, it is envisaged that the proposed alignment will ultimately be used for additional purposes, such as fuel delivery. The rail siding area will be adjacent to the heavy industrial area in order to co-locate activities of similar amenity and allow the maximum potential of the Project (Rail) alignment to be achieved.

3.5 Airports and Landing Strips

There is one international airport (Townsville), two domestic airports (Mackay and Proserpine), one regional airport (Emerald) and numerous additional local airstrips (Moranbah, Clermont, Bowen and Collinsville) in the vicinity of the Project. Those within the vicinity of the Mine are Mackay, Proserpine, Emerald, Clermont, Charters Towers and Moranbah (refer Figure 3-1):

- Mackay Airport has two asphalt surfaced runways, and operates flights to Brisbane, Sydney, Melbourne, Gladstone, Rockhampton, Townsville and Cairns . Airlines operating from Mackay Airport include Jetstar, Pel-Air (cargo), Qantas, Tiger Airways and Virgin Australia.

- Proserpine Airport is located approximately 10 km south of Proserpine and has two runways. Jetstar Airways and Virgin Australia currently operate daily flights between Proserpine and Brisbane.
- Emerald Airport is located approximately 6 km from the town of Emerald and has two runways. Australian Air Express, Qantaslink - Sunstate Airlines and Virgin Australia currently operate flights between Emerald and Brisbane.
- Clermont Airport has two runways, one 1,068 m (gravel) and the other 1,311 m (asphalt). There are no commercial flights operating in or out of Clermont Airport.
- Charters Towers Airport has two runways, one 1,005 m (gravel) and the other 1,737 m (asphalt). There are no commercial flights operating in or out of Charters Towers Airport.
- Moranbah Airport is located off Goonyella Road, approximately 6 km south of Moranbah. The airport has one runway which is 1,524 m long. Qantaslink, Sunstate Airlines and Skytrans operate between Moranbah and Brisbane, Cairns, Townsville and Sunshine Coast.

There are a number of private and commercial landing strips/airfields in the IRC LGA, however most are privately owned and only service the local requirements of Dysart, Middlemount and Clermont (DLGP,2011b, pg. 27). Key airstrips surrounding the Project Area are on the Laglan, Beresford and Albro properties located to the south of the Project Area.

The Project (Mine) airport will comprise an airstrip and a landside terminal (refer to Section 1.6.2) to service the Project (Mine) FIFO workforce. The airport will be situated approximately 4 km north-east of the Project Area. No other airports are proposed to be constructed in close proximity to the Project Area.

3.6 Ports

It is anticipated that the following existing ports could be utilised for both the transfer of supplies and equipment during construction and the export of coal in the Project's operational phase:

- Townsville – major port with nine working berths currently accommodates international shipping and supporting warehousing facilities
- Mackay – port with four working berths currently accommodates international shipping and supporting warehousing facilities
- Hay Point – dedicated coal export facility
- Abbot Point – dedicated coal export facility with planned general cargo handling facility
- Bowen – limited facilities and not current used as an active cargo port mainly functions as a domestic facility and a base for tug boats that service the Abbot Point coal terminal

For further information regarding airports, landing strips and ports, refer to Volume 4 Appendix W Mine Transport.

LEGEND

- Town
- Major Port
- Airport International
- Airport Other
- State Road
- Local Road
- Existing Rail Network
- Project (Mine)
- Mine (Offsite)
- Rail (West)
- Rail (East)

1:2,500,000 (at A4)

0 20 40 60 80 100

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

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Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number	41-25215
Revision	F
Date	16-10-2012

Project Area Ports and Airports

Figure: 3-1

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Level 4, 201 Charlotte St Brisbane QLD 4000 T +61 7 3316 3000 F +61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: GA: Gazetted Names (2008) - Airports/Ports; DMR: State Roads (2008); DME:EPC1690 (2010), EPC1080 (2011); Adani: Alignment Opt9 Rev3 (2012); Gassman/Hyder: Mine (Offsite) (2012). Created by: BW,JVC.

3.7 Gas and Water Supply Infrastructure

3.7.1 Existing Gas and Water Supply Infrastructure

SunWater's Burdekin to Moranbah pipeline terminates at Moranbah, approximately 200 km east of the Project Area.

3.7.2 Proposed Gas and Water Supply Infrastructure

The Queensland Infrastructure Plan (2011) identifies the following proposed water and gas pipelines within the MIW region, none of which are within the Project Area:

- Burdekin to Moranbah pipeline augmentation
- Connors River Dam and pipelines to Moranbah
- A 7km supply pipeline will branch from approximately half way along the main pipeline.
- Proposed Arrow Bowen Gas Pipeline
- Proposed Central Queensland Gas Pipeline
- Proposed Bow Energy Gas Pipeline
- Proposed Abbot Point LNG Project pipeline

In July 2012, SunWater announced that it would not proceed with the Connors River Dam and Pipelines Project.

In addition to the above infrastructure is SunWater's proposed Gorge Weir to Byerwen Pipeline. The pipeline runs adjacent to existing Burdekin to Moranbah Pipeline. Construction of the pipeline is expected to commence in 2013 (SunWater, 2012).

Energy World's proposed Abbot Point LNG pipeline traverses the Project Area and is subject to a PPL however this is non current (DNRM, 2012).

3.7.3 Water Supply Infrastructure Proposed for the Project (Mine)

An initial water supply assessment was undertaken to determine potential sources of water to meet estimated demands. This assessment identified that adequate water could be sourced from the following sources:

- Flood harvesting from the Belyando River
- In-steam storages on North Creek and Obungeena Creek
- Groundwater bores in the vicinity of the off-site infrastructure area.

Some overland flow harvesting may also be used through capture in stormwater systems.

Preliminary water balance results indicate that raw water supply requirements may be as low as 4 GL/annum however, further design and modelling is required to confirm this and water supply requirements may be as high as 10 GL/annum. Initial modelling undertaken on the Belyando system indicates that this maximum quantity of water can be extracted without affecting downsteam environmental flow objectives. Raw water will be stored in a 20 GL storage dam to be located at the

central MIA. The various sources of water will be transported to the raw water storage dam from smaller storages via a system of pumps and pipes

Details of the water supply infrastructure proposed for the Project (Mine) are as follows:

- **MIA Raw Water Storage**

A 20 GL raw water storage will be located at the central MIA and will be designed, constructed and operated in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*. Dam walls are expected to be about 6 m above ground surface. The storage will be lined to prevent seepage.

- **Belyando River Flood Harvesting**

The operation of a large scale flood harvesting extraction is proposed on the upper reaches of the Belyando River. A 5 GL balancing storage dam will be established on the footprint of a disused quarry and a pump and pump inlet will be constructed on the bank of the Belyando River to pump water to the balancing storage when flood flows exceed 430 ML/day. The pump will have a maximum capacity of 250 ML/day, although this may be revised downwards once a detailed water balance has been undertaken.

The proposed Belyando River pump station will be located on the Moray Anabranch on the western riverbank. The pump station will consist of four centrifugal, submersible pumps operating in Duty / Assist / Assist / Standby configuration within a channel excavated to river invert depth, providing a combined flow rate of approximately 200 ML/day. When the water level associated with the required minimum flow in the river is reached the pumps will operate and discharge to the proposed 5 GL storage located near the existing quarry site.

- **In-stream Storage Extractions**

There are eight existing farm dams on watercourses in the vicinity of the off-site infrastructure area, four on North Creek and four on Obungeena Creek. These will be enlarged to a capacity of about 250 ML each and used to capture flow from these watercourses. Captured flow will be transferred to the raw water storage dam at the central MIA.

- **Groundwater Extraction**

Surface water supply will be supplemented with groundwater supplies in the highland sub-artesian declared area through a series of boreholes. Initial studies indicate that adequate water is available for groundwater extraction of around 1.5 to 2.5 GL per annum, however further hydrogeological assessment is required to confirm this.

3.8 Energy and Telecommunication

3.8.1 Existing Infrastructure

No electricity or telecommunication easements traverse the proposed Project Area.

Ergon Energy is responsible for electricity supply to the Mackay area, under its Distribution Authority, and has identified emerging limitations in the electricity network supplying Moranbah and the surrounding area (Ergon Energy, 2011a, pg. 4).

The existing power supply in Moranbah is comprised of Powerlink Queensland's T34 Moranbah substation which has three 132/66/11 kV transformers supplying the Moranbah township and coal mine customers in the surrounding Bowen Basin (Ergon Energy, 2011a, pg 6). Ergon Energy owns and operates the 66 kV switchyard in T34 Moranbah substation, which connects four privately-owned and two Ergon Energy-owned 66 kV feeders. These supply the coal mines in the area (Ergon Energy, 2011a, pg. 6).

The nearest existing electricity line to the proposed Project (Mine) is an existing high voltage electricity line, which runs in a north-south direction parallel to the existing Wotonga – Blair Athol Mine branch line.

Telecommunication services in the MIW region are currently provided by Telstra (RP Data, 2011) with towers located at the following locations:

- Within Lot 2 on SP119925, approximately 13 km east of the EPC1690 and 10 km east of the EPC1080
- Within Lot 4 on SP116046, approximately 55 km east of the EPC1690 and 52 km east of the EPC1080
- Within Lot 1 on SP210553, approximately 93 km east of the EPC1690 and 89 km east of the EPC1080

3.8.2 Proposed Energy and Telecommunications Projects

With continued development of the mining industry in the Bowen Basin, there is increased demand on the electricity supply network in the Moranbah area. A number of new coal mines have requested connection to Ergon Energy's 66 kV network, and many coal mine customers have requested increases in their Agreed Demands (Ergon Energy, 2011b, pg. 33).

Ergon Energy has not proposed any projects to connect and supply future mining projects. However, Ergon Energy expects that augmentation of the network will be required to maintain reliable supply (Ergon Energy, 2011b, pg. 33). Ergon Energy has proposed to implement demand-side measures throughout 2012 and 2013 and defer establishment of a new 66/11kV substation beside Powerlink Queensland's T34 Moranbah substation until November 2014 (Ergon Energy 2011c, pg. 3).

Galilee Power, a subsidiary of Waratah Coal, has proposed a 900 MW coal-fired power station 30 km north-west of Alpha to be completed by 2017 to *provide energy support for Industrial Development in the northern economic triangle* (Galilee Power 2009, pg. 5).

Powerlink Queensland has proposed a substation (Surbiton Hill) 50 km north of Alpha and associated easements for a 275 kV transmission line between the proposed substation and the existing substation near Emerald (Lilyvale), and two 132 kV transmission lines between the proposed substation and the proposed Alpha and Kevin's Corner mining leases.

3.8.3 Power and Telecommunications Infrastructure for the Carmichael Coal Project

The power supply for the Mine, workers accommodation village, airport and services will be via one or more of the following potential options:

- A dual circuit 275 kV electricity transmission line, including substations
- A dual circuit 132 kV electricity transmission line, including substations

A base-load diesel generator supply will be required for construction and early mine operation until the 132 kV or 275 kV electricity transmission line/s become available.

Adani is currently investigating power supply options via a number of alternative source locations including:

- Powerlink via the new Surbiton Substation fed from Lilyvale in the south
- Powerlink via the Moorevale South Substation (near Moranbah) supplied from the existing Nebo Substation to the east. Powerlink project yet to be committed and developed
- Powerlink via the Strathmore Substation (near Collinsville)
- Copperstring Project supplied via the proposed Pentland Substation. This project is yet to be committed and developed and the environmental impact statement process under the *State Development and Public Works Organisation Act 1971* is currently on hold.

Depending upon which power supply option is chosen, a transmission line will be installed to meet the Project's requirements.

As the preferred option has yet to be identified, assessment of impacts of any new transmission line has not been undertaken in this EIS. Once the transmission line option and alignment is identified, an environmental assessment of one or more of the transmission line options will be undertaken by Adani or the service provider as required in order to gain statutory approvals. Refer to Volume 2 Section 2 Description of the Project for further details.

As the existing Telstra towers provide only very limited services to rural properties it will be necessary to establish extensive telecommunications services via a number of routes and technologies to support the mine, rail, workers accommodation village and all other associated infrastructure.

Interim energy requirements of the workers accommodation village will be provided by a power generation facility adjacent to the settlement.

3.9 Stock Routes

The stock route network (SRN) is a network of stock routes and reserves for travelling stock in the State. The term 'stock route' describes a particular use of part of the State's road network (DERM, 2009b). Management of the SRN is shared between State and local government, with local government being responsible for its day to day management and the DNRM as the custodian of the land, providing support, guidance and strategic direction for management (DERM, 2009b).

In Queensland, stock routes are not designated by easements or land parcels. Stock routes may be roads declared under regulation to be a stock route or routes that are ordinarily used for moving stock on foot (DERM, 2009b). Stock routes may be designated over roads, in which case the road may also be used as a transport corridor for vehicles or a communication and utility infrastructure corridor for phone, power and gas lines.

The Land Protection(Pest and Stock Route Management) Act provides for the management of the SRN, recognising that the network has multiple uses with the primary purpose being for travelling stock (Section 98 (2) (a)) (DERM, 2009b). Lease or permits to occupy may be granted over a reserve for travelling stock or over part of a stock route. In these circumstances, conditions are placed on the lease or permit to protect the access rights of travelling stock. However, drovers encounter difficulties where there is a lack of compliance with the lease or permit conditions. Additionally, unauthorised

occupation of land adjoining or making up the network may have similar impact upon drovers. As a result of any such pressures, parts of the network may become isolated or alienated if drovers find alternative routes (DERM, 2009b).

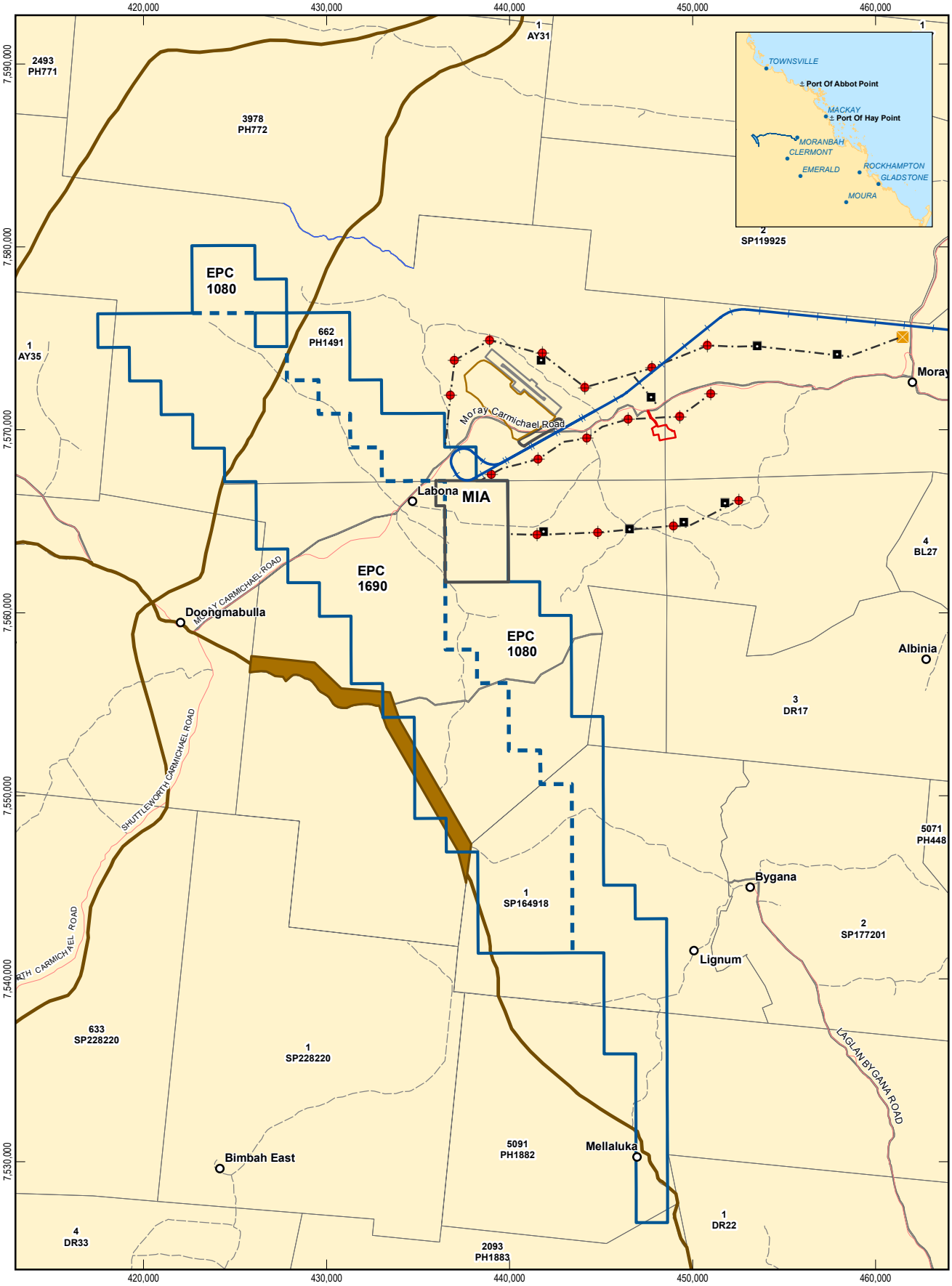
Stock routes are divided into four classifications for operational and management purposes (DERM, 2011). According to DERM (2011) classifications are determined by permit data and are classified by average usage over a five year period (refer to Table 3-2)

Table 3-2 Thresholds for Stock Route Classifications

Classification	Cattle equivalent for a five year period
Primary	> 9,000
Secondary	3,000-9,000
Minor	<3,000
Inactive	Local and unrecorded movements

On the basis of DERM (2010) data, it has been identified that the Project Area has two main stock routes passing through it. The subject stock routes are shown on Figure 3-2 and described as follows:

- Stock Route U385BELY01 runs across the northern end of both the Project (Mine) and EPC1080 (running from west to north). This stock route will run over the portion of the Project (Mine) to be developed for open cut mining.
- Stock Route U303BELY02, which runs on the south-western boundary of the Project (Mine). This stock route runs over the portion of the Project (Mine) to be developed for underground mining. It will also run through the southern portion of EPC1080, which at this stage is unlikely to be utilised for stockpiling or mining activities. Should this portion of the Project Area be utilised for either mining or stockpiling, impact upon this stock route will be reassessed.



LEGEND

- Homestead
- Local Road
- Track
- Stock Route
- Cadastre
- Waterway
- Rail (West)
- Mine (Onsite)
- Mine Infrastructure Area
- Mine (Offsite)
- Borehole
- Storage Site (Instream)
- Storage Facility (Offstream)
- Pipeline Network
- Airport Location
- Rail Siding
- Industrial Area
- Workers Accommodation Village

1:300,000 (at A4)

0 5 10

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number 41-25215
Revision B
Date 17-10-2012

Offsite Infrastructure

Figure 3-2

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Level 4, 201 Charlotte St Brisbane QLD 4000 T +61 7 3316 3000 F +61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: GA: Homesteads, Local Roads, Tracks (2007), Stock Route (2010); DME: EPC 1690 (2010)/EPC 1080 (2011); DERM: Cadastre (2011), Adani: Alignment Opt9 Rev3 (2012); Gassman/Hyder: Mine (Offsite) (2012). Created by: BW

4. Environmentally Sensitive Areas

4.1 Introduction

According to Section 4 of the Code of Environmental Compliance for Mining Lease Projects (DERM, 2001) the term environmentally sensitive areas refers to *locations, however large or small, that have environmental values that contribute to maintaining biological diversity and integrity, have intrinsic or attributed scientific, historical or cultural heritage value, or are important in providing amenity, harmony or sense of community*.

There are three categories of environmentally sensitive areas, Category A, Category B and Category C, each of which are defined, protected and administered under different State or Federal legislation and agencies (refer to Table 4-1).

Table 4-1 Category A, Category B and Category C Environmentally Sensitive Areas

Land area classification	Administering legislation	Administering Authority
CATEGORY A Environmentally Sensitive Areas		
National Parks (Scientific) National Parks National Parks (Aboriginal Land) National Parks (Torres Strait Islander Land) National Parks (Recovery) and Conservation Parks Forest Reserves	*Nature Conservation Act 1992*	Department of National Parks, Recreation, Sport and Racing (DNPRSR)
Wet Tropics Area	*Wet Tropics World Heritage Protection and Management Act 1993*	Wet Tropics Management Authority
Restricted Areas (includes Constructed Water Reservoirs)	*Mineral Resources Act 1989*	DNRM
Great Barrier Reef Region	*Great Barrier Reef Marine Park Act 1975 (Commonwealth)*	Great Barrier Reef Marine Park Authority
Marine Parks (other than general use zones)	*Marine Parks Act 2004* (Qld)	DNPRSR

Land area classification	Administering legislation	Administering Authority
CATEGORY B Environmentally Sensitive Areas		
Coordinated Conservation Areas Wilderness Areas World Heritage Management Areas International Agreement Areas An area of Critical Habitat or Major Interest identified under a Conservation Plan Areas subject to an Interim Conservation order	*Nature Conservation Act 1992*	DNPRSR
An area subject to following conventions: a) Convention on the Conservation of Migratory Species of Wild Animals (Bonn 23 June 1979) b) Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar, 2 February 1971) c) Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris, 16 November 1972)	International Conventions	Department of Environment and Heritage Protection (DEHP)
General use zones of a Marine Park	*Marine Parks Act 2004*	DNPRSR
An Area to the Seaward Side of the highest Astronomical Tide	Nil	DEHP
◗ Place of Cultural Heritage Significance	*Queensland Heritage Act 1992*	DEHP
◗ Protected Areas ◗ Registered Places ◗ Restricted Zones	*Queensland Heritage Act 1992*	DEHP
Designated Landscape Area (other than the area known as the “Stanbroke Pastoral Holding)”	*Aboriginal Cultural Heritage Act 2003*	Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA)

Land area classification	Administering legislation	Administering Authority
Feature Protection Area, State Forest Park or a Scientific Area	*Forestry Act 1959*	DNPRSR
Fish Habitat Area A place in which a Marine Plant is situated	*Fisheries Act 1994*	Department of Agriculture, Fisheries and Forestry (DAFF)
Endangered Regional Ecosystems An area of High Nature conservation Value	Nil	DNRM
CATEGORY C Environmentally Sensitive Area		
Nature Refuges Resource Reserves	*Nature Conservation Act 1992*	DEHP
Declared Catchment Areas Declared Irrigation and Irrigation Project Areas Water Reservoirs and Drainage Areas	*Water Act 2000*, various Water Board Acts	DNRM and/or Relevant Storage Operator or Board
River Improvement Areas	*River Improvement Trust Act 1940*	DNRM and the Relevant River Trust
Designated Landscape Area – Stanbroke	*Aboriginal Cultural Heritage Act 2003*	DATSIMA
Historic Mining Sites	Nil (Inter Departmental Notifications)	DEHP and DNRM
State Forest or Timber Reserves	*Forestry Act 1959*	DAFF
DPI research sites	Nil (Inter Departmental Notifications)	DAFF
Critical Areas and Public Purpose Reserves	*Land Act 1994*	DNRM
Areas under Coastal Management Plans and Control Districts	*Coastal Protection and Management Act 1995*	DEHP
An area subject to a State Planning Policy that the policy declares is in need of environmental protection.	*Sustainable Planning Act 2009*	Department of State Development, Infrastructure and Planning (DSDIP)
Erosion Prone Areas and Costal Management Districts	*Coastal Protection and Management Act 1995*	DEHP

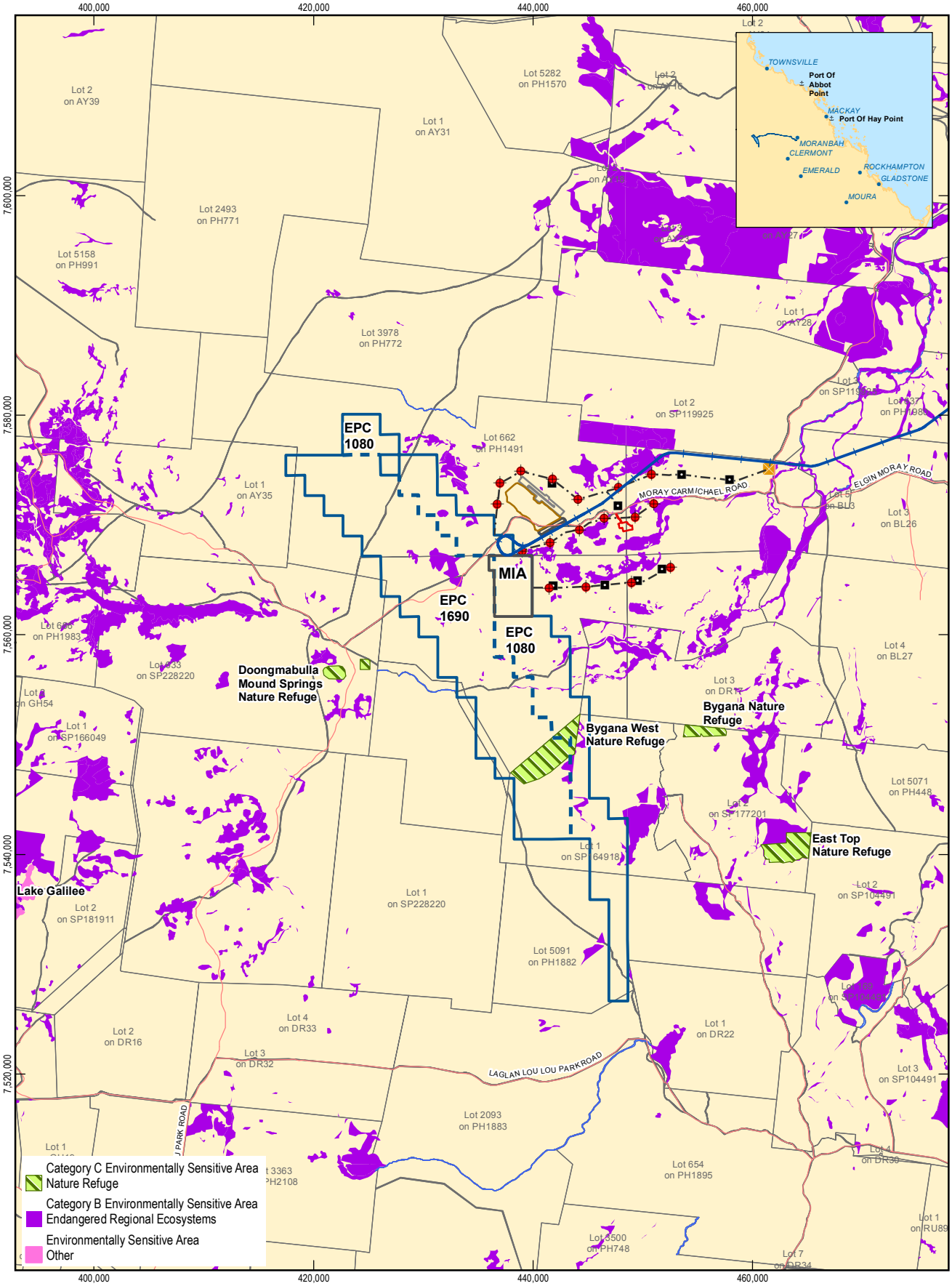
Land area classification	Administering legislation	Administering Authority
Areas of open land occupied by the Bureau of Sugar Experiment Stations to conduct research	*Sugar Industry Act 1999*	DAFF

Search of the DEHP Environmentally Sensitive Area (ESA) mapping for the Project Area identified the following ESAs within or in close proximity to the Project (Mine):

- Category B – Endangered Regional Ecosystems located throughout the Project Area. The endangered REs are mainly concentrated within the northern portion of the Project Area (refer to Figure 4-1) Section 4.1.3 of this report provides an overview of these REs, with detailed impact assessment included within Volume 4 Appendix N1 Mine Terrestrial Ecology Report.
- Category C – Bygana West Nature Refuge located within the southern extent of the Project Area (refer to Figure 4-1). Section 1.1.1 of this report provides an overview of this nature refuge, with detailed impact assessment included within Volume 4 Appendix N1 Mine Terrestrial Ecology Report.
- Other - Wetland listed as Directory of Important Wetlands, these wetlands include the Doongmabulla Springs which are located 11 km west of the Project Area and Lake Galilee which is located over 40 km to the south-west of the Project Area. Refer to Section 4.1.3 of this report for an overview of these wetlands and a detailed impact assessment within Volume 4 Appendix O Mine Aquatic Ecology Report.

It is noted that no Category A ESAs are present within, near or downstream to the Project Area within a 50 km radius.

Potential impacts and mitigation measures for ESAs are not discussed in this report. Refer to Volume 4 Appendix N1 Mine Terrestrial Ecology Report for further detail on Project (Mine) impacts on ESAs and proposed mitigation measures.



LEGEND

- Town
- State Road
- Local Road
- Cadastre
- Waterway
- Rail (West)
- Mine (Onsite)
- Mine Infrastructure Area
- Mine (Offsite)
- Borehole
- Storage Site (Instream)
- Storage Facility (Offstream)
- Pipeline Network
- Airport Location
- Rail Siding
- Industrial Area
- Workers Accommodation Village

1:500,000 (at A4)

0 5 10 15 20

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

Adani Mining Pty Ltd

Carmichael Coal Mine and Rail Project

Job Number 41-25215
Revision B
Date 28-08-2012

Environmental Protection Reg (2008)
Environmentally Sensitive Areas

Figure 4-1

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Level 4, 201 Charlotte St Brisbane QLD 4000 T +61 7 3316 3000 F +61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: GA: Mainlands, Localities, Roads (2007); DME: EPC1690 (2010)/EPC1080 (2011); DMR: State Roads (2010); DERM: Environemntally Sensitive Areas, Cadastre (2010); Adani: Alignment Opt9 Rev3 (2012); Gassman/Hyder: Mine (Offsite) (2012). Created by: BW.

4.1.1 Category B - Endangered Regional Ecosystems

According to the Queensland Government (DERM 2011) regional ecosystems (REs) are vegetation communities that are associated with a particular combination of geology, land form and soil in a bioregion[1]. On the basis of satellite imagery, aerial photography and on-ground studies, the Queensland Herbarium has mapped the extent of REs across Queensland. REs are declared under the Queensland VM Regulation and are classified as endangered, of concern and least concern.

Terrestrial ecology fieldwork undertaken as part of the Project EIS, identified the following areas of types of REs within the Project Area: (categorised into EPC1690 and EPC1080):

- REs with a biodiversity status of endangered are classified as Category B ESAs. The DERM ESA Map for Mining Activities (refer to Figure 4-1) identifies a number of patches of Category B ESA areas as present within the Project Area, specifically the EPC1690 component. Six (6) RE types classified as Category B ESAs have been identified within the EPC1690 covering an area of approximately 1054 ha. Refer to Volume 4 Appendix N1 Mine Terrestrial Ecology Report for further information.
- DEHP ESA Map for Mining Activities identifies a number of patches of Category B ESAs as occurring within the EPC 1080. Five RE types classified as Category B ESAs (10.4.3, 11.3.1, 11.4.5, 11.4.6 and 11.4.8), are mapped within the EPC 1080 and cover an area of 832 ha, based on DEHP Version 6.1 Certified RE mapping (refer to Figure 4-1). Field verifications of the DEHP Version 6.1 Certified RE mapping identified that four REs (10.4.3, 11.3.1, 11.4.6 and 11.4.9), classified as Category B ESAs were present within the EPC 1080. The field verified Category B ESA REs cover a total area of 318 ha and an additional 6 ha mapped (based on DERM certified RE) that has not been field verified. Refer to Volume 4 Appendix N1 Mine Terrestrial Ecology Report for further information.

Refer to Figure 4-1 for the location of the abovementioned REs within the Project Area. Potential impacts on the above REs and proposed mitigation measures are discussed in Volume 4 Appendix N1 Mine Terrestrial Ecology Report.

4.1.2 Category C - Nature Refuge

As previously identified, ESA Category C – Bygana West Nature Refuge is located within the southern extent of the Project Area. In accordance with Section 14 of the NC Act a nature refuge is a class of a protected area. The DEHP administers the creation of nature refuges and defines a nature refuge as a *voluntary agreement between a landowner and the Queensland Government that acknowledges a commitment to manage and preserve land that contains significant conservation values while allowing compatible and sustainable land uses to continue* (DERM 2011).

The 1,487 ha Bygana West Nature Refuge extends in an approximately south-west to north-east direction across the southern part of the Project (Mine) onsite infrastructure area, to the south of the Carmichael River (refer to Figure 4-1). The northern border extends for 8.2 km while at its widest point the nature refuge is 2.4 km.

[1] DERM (2011) reports that Queensland is divided into 13 bioregions, based on broad landscape patterns that reflect the major underlying geology, climate patterns and broad groupings of plants and animals.

As documented in the Queensland Nature Conservation (Protected Areas) Amendment Regulation (No. 1) 2005, Bygana West Nature Refuge is characterised by the following values:

- Contains endangered RE 11.4.6 (*Acacia cambagei woodland on Cainozoic clay plains*), which was confirmed during the field survey as present within the Project Area
- Contains endangered RE 11.4.8 (*Eucalyptus cambageana woodland to open forest with Acacia harpophylla or A. argyrodendron on Cainozoic clay plains*) – this RE has low representation in the protected areas estate and was not observed within the Project Area, although it may be present elsewhere in the Nature Refuge.
- Contains other REs that are poorly represented in the protected area estate
- Due to its location at the boundary of the Brigalow Belt and Desert Uplands bioregions, Bygana West has potential to support high diversity of species and REs
- Contains suitable habitat for a variety of animals, including the koala - a special least concern species under the NC Act

The following four fauna habitat types were identified in the field and mapped as occurring in the Bygana West Nature Refuge:

- *Ironbark-box grassy woodlands and open woodlands on grey sand plains*
- *Yellow jacket and rough-leaved bloodwood shrubby low open woodland on red sand plains*
- *Tall mixed shrubland on red sand plains and over ferricrete*
- *Gidgee and/or brigalow shrubby woodland, sometimes with Dawson's gum emergents, on clay and loam plains*

During the terrestrial ecology fieldwork, disturbance due to weeds, erosion and cattle access was not obvious at Bygana West Nature Refuge, although cattle grazing does occur in the Nature Refuge. Habitats were typically in good condition, and retained connectivity to remnant vegetation to the north-west, west, south and east. Fauna diversity was similar to that from other open woodland habitats in the Project Area, comprising a variety of common woodland and grassland birds, reptiles and ground-dwelling mammals. The black-throated finch (southern) and squatter pigeon (southern) were observed near the southern boundary of the nature refuge – it is likely that both species utilise habitats within the nature refuge. One koala was recorded during the terrestrial ecology field work. It is considered likely that this species occurs at a low density (refer to Volume 4 Appendix N1 Mine Terrestrial Ecology Report for further detail on terrestrial ecology field studies).

No other nature refuges are directly located within the Project Area. However, the following nature refuges are located within general vicinity of the Project Area, this being a radius of 10 to 16 km away from the Project Area. These include:

- Doongmabulla Mound Springs Nature Refuge, located approximately 10 km west of the Project Area, on Lot 633 on PH1478 (refer to Figure 4-1)
- Bygana Nature Refuge, located approximately 25 km south-east of the Project Area, on Lot 2 on SP177201 (refer to Figure 4-1). The Bygana Nature Refuge retains connectivity to the Bygana West Nature Refuge via an east-west belt of remnant vegetation that is bisected by the Belyando River to the immediate west of Bygana Nature Refuge.

- East Top Nature Refuge, located approximately 35 km south-east of the Project Area, on Lot 2 on SP177201 (refer to Figure 4-1).

For further information regarding nature refuges within or in vicinity to the Project Area, refer to Volume 4 Appendix N1 Mine Terrestrial Ecology Report. Potential impacts on the Bygana West Nature Refuge and proposed mitigation measures are also discussed in Volume 4 Appendix N1 Mine Terrestrial Ecology Report.

4.1.3 Wetlands of National Significance

According to the Commonwealth of Australia (2001, pg.11), a wetland may be considered nationally important if it meets at least one of the following criteria:

1. *It is a good example of a wetland type occurring within a biogeographic region in Australia;*
2. *It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex;*
3. *It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevails.*
4. *The wetland supports 1% or more of the national populations of any native plant or animal taxa.*
5. *The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level.*
1. *The wetland is of outstanding historical or cultural significance.*

The Directory of Important Wetlands (DIW) lists all wetlands of national significance within Australia. The DIW has been created by the Convention on Wetlands, more commonly known as the Ramsar Convention.

Search of the DEHP Wetland Information (2010) identified no wetlands of national significance within the Project Area. However, the following wetlands of national significance are located within the surrounds of the Project Area:

- Doongmabulla Springs located approximately 10 km west of the Project Area
- Lake Galilee located in a different catchment 40 km to the west of the Project Area

Doongmabulla Springs

The Doongmabulla Springs are located on a 400 ha site approximately 10 km west of the Project Area. Being of national significance, these springs are a good example of an active artesian spring which is a rare community type. The site is currently and historically has been used for watering domestic stock and existing key threats are identified as trampling and grazing by stock and feral animals, as well as aquifer drawdown (SEWPaC, 2010). The site supports an unusual habitat type which is distinct from the surrounding arid region (DERM, 2010). Further detail on Doongmabulla Springs is provided in Volume 4 Appendix N2 Doongmabulla Springs Report. Potential impacts on the Doongmabulla Springs and proposed mitigation measures are discussed in Appendix N1.

Lake Galilee

Lake Galilee is located over 40 km to the south-west of the Project Area and is not in the same drainage basin. As a result this lake is not considered to be connected to the Project Area. Refer to Volume 4 Appendix O Mine Aquatic Ecology Report for more detailed information on this wetland.

5. Cultural Heritage and Native Title

5.1 Aboriginal Cultural Heritage Act 2003

The main purpose of the *Aboriginal Cultural Heritage Act 2003 (Qld)* (ACH Act) is to *provide effective recognition, protection and conservation of Aboriginal cultural heritage* (Section 5 of the ACH Act). A person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage (the 'cultural heritage duty of care') (Section 23 (1)).

A cultural heritage assessment has been undertaken by ARCHAEO Cultural Heritage Services (ARCHAEO) as part of the Project EIS, refer to Volume 1 Section 5 Cultural Heritage. The assessment was conducted at bore pads and other early infrastructure across the Mine (specifically the EPC1690 component). The assessment located 39 culturally significant sites, including several large sites incorporating numerous scattered artefacts at high density, against a continuous background scatter of lower density.

Large sites of special significance were located in areas with major waterways, such as the Carmichael River, Cabbage Tree Creek and a network of creeks and associated gilgai or soaks running roughly southerly across an area north of the Carmichael River (northern creek system). Scattered artefacts located away from these major waterways tended to be of lower density

Potential impacts of the Project (Mine) onsite and offsite infrastructure upon the identified cultural heritage matters will be appropriately mitigated or avoided through implementation of Cultural Heritage Management Plans (CHMP). Refer to Volume 1 Section 5 Cultural Heritage for further information regarding cultural heritage.

5.2 Native Title Act 1993

In accordance with Section 3 of the Commonwealth *Native Title Act 1993* (NT Act) the main objects of the NT Act are to:

- *To provide for the recognition and protection of native title; and*
- *To establish ways in which future dealings affecting native title may proceed and to set standards for those dealings; and*
- *To establish a mechanism for determining claims to native title; and*
- *To provide for, or permit, the validation of past acts, and intermediate period acts, invalidated because of the existence of native title.*

According to National Native Title Tribunal (2011), native title is the recognition by Australian law that some Indigenous people have rights and interests in their land that come from their traditional laws and customs. In essence, native title rights give rights to indigenous people to:

- *Live on the area;*
- *Access the area for traditional purposes, like camping or to do ceremonies;*
- *Visit and protect important places and sites;*
- *Hunt, fish and gather food or traditional resources like water, wood and ochre; and*
- *Teach law and custom on country.* (National Native Title Tribunal, 2011).

A Native Title search has been undertaken on the Project Area, which identified that a Native Title Claim exists over the site, namely the Wangan and Jagalingou Native Title Claim (QC04/5; QUD85/04; accepted for Registration on 5 July 2004). The Native Title Claim boundary is depicted in Figure 2-6.

Adani is currently undertaking negotiations with the Native Title claimants as per the following:

- Negotiations are currently being undertaken with the Wangan and Jagalingou People
- Early works agreements are in place with all Aboriginal parties, with early works managed for the Wangan and Jagalingou People through a CHMP
- A CHMP for the life of the Project has been established with the Wangan and Jagalingou People and approved by the Chief Executive
- Adani are progressing Native Title negotiations with relevant parties. Indigenous Land Use Agreements (ILUAs) and extinguishment assessments are being progressed.

6. Potential Impacts and Mitigation Measures – Construction and Operation Phases

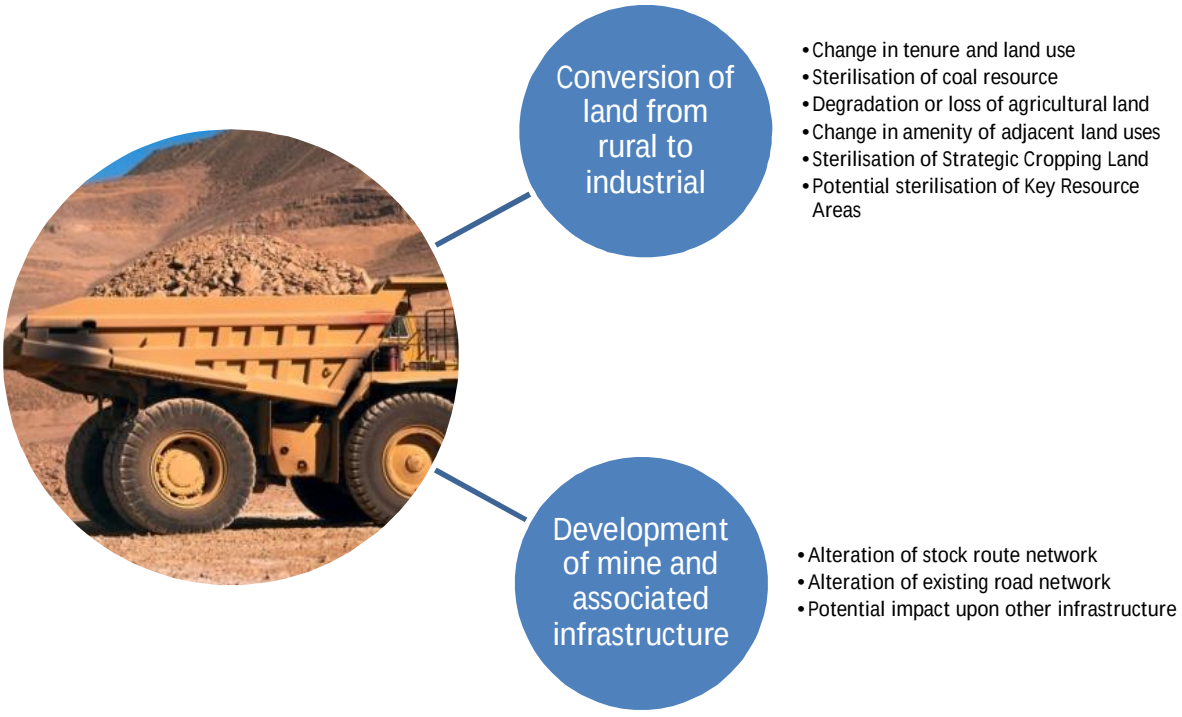
6.1 Introduction

The construction and operation of the Project (Mine) has potential to result in direct permanent changes to the land use and tenure of the Project Area. While other environmental impact studies classify the potential impacts on the basis of the construction and operational phases of the Project (Mine), land use and tenure impacts are generally consistent across both phases. As such this section considers the potential impacts of the Project (Mine) throughout both phases of the Project (Mine). An overview of key impacts is presented in Figure 6-1.

The assessment of the potential impacts has been based on the existing environment information presented in Section 2, 3, 4 and 5 of this report. Potential impacts have been analysed on the basis of desktop analysis, technical studies undertaken as part of Volume 2 and consultation with relevant stakeholders (refer Volume 1 Section 7 Community Consultation). For more detailed impacts and mitigation measures regarding each of the technical studies refer to corresponding sections in Volume 2 of the Project EIS.

Potential impacts and mitigation measures for ESAs are not discussed in this report. Refer to Volume 4 Appendix N1 Mine Terrestrial Ecology Report for further detail on Project (Mine) impacts on ESAs and proposed mitigation measures.

Figure 6-1 Conceptual Overview of Potential Environmental Impacts



6.2 Conversion of Land from Rural to Industrial

6.2.1 Change in Tenure and Land Use

5.2.1.1 Potential Impacts

The potential impacts of the Project (Mine) upon land use include:

- Over the life of the Project (Mine), there will be a progressive change of 44,730 ha low intensity cattle grazing land use to a mining land use. This area of land will be developed for the purposes of establishing the Project (Mine), including mining activities, spoil disposal and onsite infrastructure
- Change of 74 ha of low intensity cattle grazing land use to a residential land use for the purposes of the workers accommodation village. This change is likely to occur within the first construction year of the Project (Mine)
- Change of 298 ha of existing low intensity cattle grazing land use to special use (aviation) for the purposes of the permanent airport. This change is likely to occur within the first construction year of the Project (Mine)
- Change of 948 ha of existing low intensity cattle grazing land use for the purposes of establishing the heavy industrial area to be utilised for mine machinery maintenance and repairs, bulk fuel storage and other operations associated with the Project (Mine). This change is likely to occur within the first construction year of the Project (Mine)
- Change of 95 ha of existing low intensity cattle grazing land use for the purposes of establishing the rail siding area. This change is likely to occur within the first construction year of the Project (Mine)
- Change of up to 413 ha of existing low intensity cattle grazing land use for the purposes of establishing water supply infrastructure. This change is likely to occur within the first construction year of the Project (Mine)

Adani has lodged a mining lease application over EPC1690. Once a mining lease is granted Adani will have rights to establish mining activities over this area. Whilst Adani will have a lease to mine the property, the underlying lease hold tenure remains in place and compensation is paid to landholders. As stated in Section 2.3.1, a mining lease gives the holder the right to carry out the exploration or mining activity. The mining lease over EPC1690 impacts on the respective landholders as they lose the use of the land in its current form as it undergoes a permanent change from a rural use to a mining use.

Adani will also lodge a mining lease application for EPC 1080. This area is to be used for placement of overburden from open cut mining activities, and also for location of the main mine infrastructure area.

Adani holds the lease for the Moray Downs property, on which the off-site infrastructure components are located. Adani will seek a preliminary approval to amend the planning scheme under the *Sustainable Planning Act 2009* in order to allow the development of the off-site infrastructure. Adani will also seek to vary the tenure of the land under the *Land Act 1994* as the current lease does not allow the type of development proposed. This is discussed further in Volume 4 Appendix D Project Approvals and Planning Assessment.

5.2.1.2 Mitigation Measure

The impacts of the Project (Mine) upon current land use and tenure are unavoidable due to the location of the coal deposit. Under the MR Act, landholders affected by mining are entitled to compensation for loss of use of the land and other effects of mining. As compensation agreements are private agreements between a mining proponent and a landholder, further information on compensation agreements is not provided here. Landholders have the opportunity to lodge objections in relation to mining lease applications, in which case, the Land Court will determine whether the mining activity should go ahead and also make rulings in relation to compensation agreements if required.

Progressive rehabilitation of the Project Area will be undertaken, with the first round of rehabilitation planned to be undertaken from 2018-2027, particularly within Pit I of the open cut mining area. Post mining land use is likely to be restricted to cattle breeding country, given the physical properties of the soil, the difficulty of ameliorating those physical properties and the lack of reliable rainfall or irrigation water. Volume 4 Appendix L Mine Soils Assessment identifies potential measures to ameliorate soil physical properties, while Volume 2 Section 2 Description of the Project identifies potential rehabilitation methods.

6.2.2 Sterilisation of Coal Resource

6.2.2.1 Potential Impacts

Establishment of the Project (Mine) offsite infrastructure will require approximately 1,820 ha of land. This infrastructure is proposed to be established over EPC1957. A geological investigation has been conducted and a report issued from Xenith Consulting stating that the likelihood of viable coal being present under EPC 1957 is low (refer to Volume 4 Appendix Z1 Xenith Rail Easement Study). Further, the off-site infrastructure will largely be removed at the completion of the mining program and therefore does not represent a permanent sterilisation of this resource.

The eastern side of EPC1080 will be utilised for the out-of-pit dump spoil making it unlikely that this area could be utilised economically for mining in the future. Xenith consulting conducted a geological investigation over this area. The eastern side of EPC1080 is considered likely to be the eastern extent of the Permian coal seam. It is unlikely Permian age coal exists to the east of the EPC1080 (refer to Volume 4 Appendix Z1 Xenith Rail Easement Study).

6.2.2.2 Mitigation Measure

Adani will undertake ongoing consultation with the holder of the EPC1957 in regards to project timing and progress in order to minimise where possible any sterilisation of coal resource which may be present.

6.2.3 Degradation or Loss of Agricultural Land

6.2.3.1 Potential Impacts

As described in Section 2.6 of this report, the following areas of GQAL are likely to be affected by the Project (Mine):

- Class A GQAL occupying 392 ha of the offsite infrastructure area
- Class B GQAL:

- occupying 694 ha of EPC1080
- occupying 1,227 ha of the offsite infrastructure area

- Class C1 GQAL:
  - occupying 964 ha of EPC1690
  - occupying 6,783 ha of EPC1080
  - occupying 130 ha of the offsite infrastructure area

- Additional soil sampling is proposed to be conducted prior to commencement of construction for the Project (Mine) onsite infrastructure area, specifically the EPC1080 and the Project (Mine) offsite infrastructure area to further assess potential impacts upon GQAL.

- The loss of Class A and Class B GQAL is small and will not have an impact on agricultural development within the area.

6.2.3.2 Mitigation Measure

There is limited impact to GQAL and this is unavoidable. Post mining land use is likely to be restricted to cattle breeding country, given the physical properties of the soil, the difficulty of ameliorating those physical properties and the lack of reliable rainfall or irrigation water. Volume 4 Appendix L Mine Soils Assessment identifies potential measures to ameliorate soil physical properties, while Volume 2 Section 2 Description of the Project identifies potential rehabilitation methods.

6.2.4 Change in Amenity of Adjacent Land Uses

6.2.4.1 Potential Impacts

A total of ten homesteads are located within or surrounding the Project Area (within approximately a 20 km radius). Eight homesteads are located more than 1.4 km away from the Project Area (seven of these are more than 4 km away), while two, namely the Labona and Mellaluka homestead are located immediately within the Project Area (refer to Table 2-5). Labona homestead has been acquired and will be demolished as part of the Project (Mine) construction activities. On this basis it is no longer identified as a sensitive receptor. The Mellaluka homestead is located within the southern portion of EPC1080 which is not currently planned to be utilised for stockpiling or mining activities. On this basis, the Project (Mine) is unlikely to affect this homestead. However, should Adani wish to utilise this portion of EPC1080, the impact upon the Mellaluka homestead will be reassessed.

The Project (Mine) will not generate land use related impacts upon the homesteads outside of the Project Area. The construction and operation of the Project (Mine) is unlikely to generate noise and vibration and dust related impacts upon the identified homesteads, however some changes to amenity may occur closer to the boundary of the mine activities (see Volume 4 Appendix U Mine Noise and Vibration and Volume 4 Appendix S Mine Air Quality Assessment). Further to this, no significant landscape and visual impacts upon these homesteads is predicted (see Volume 4 Appendix K Mine Landscape and Visual Assessment).

Road access to properties will be maintained at all time during operations. The Moray Carmichael Road will be re-aligned as required during operations but will remain open providing public access west of the Mine. Re-alignment of the road is not expected to impact road users.

No other residential or industrial uses are located within or in near proximity to the Project Area.

6.2.4.2 Mitigation Measure

Refer to Volume 2 Section 7 Air Quality and Volume 2 Section 9 Noise and Vibration regarding management of dust, noise and vibration impacts upon sensitive receptors.

6.2.5 Sterilisation of Strategic Cropping Land

6.2.5.1 Potential Impacts

As discussed within Section 2.7 of this report, no strategic cropping land is located within the Project Area as such the Project (Mine) will not have an impact upon strategic cropping land.

6.2.5.2 Mitigation Measure

No mitigation measure is applicable as the Project (Mine) will not have an impact upon strategic cropping land.

6.2.6 Sterilisation of Key Resource Areas

6.2.6.1 Potential Impacts

The Project (Mine) is not located in close proximity to any KRAs within the MIW region as such impacts have been assessed as unlikely to be generated. Refer to Volume 4 Appendix D Project Approvals and Planning Assessment for further detail regarding KRAs within the MIW region.

6.2.6.2 Mitigation Measure

No mitigation measures are applicable as no Project (Mine) impacts are anticipated.

6.3 Development of Mine and Associated Infrastructure

6.3.1 Alteration of Stock Route Network

6.3.1.1 Potential Impacts

The Project (Mine) impacts on two stock routes. As identified in Figure 3-2:

- Stock Route U385BELY01 runs across the northern end of both the Project (Mine) and EPC1080 (running from west to north). This stock route will run over the portion of the Project (Mine) to be developed for open cut mining.
- Stock Route U303BELY02, which runs on the south-western boundary of the Project (Mine). This stock route runs over the portion of the Project (Mine) to be developed for underground mining. It will also run through the southern portion of EPC1080, which at this stage is unlikely to be utilised for stockpiling or mining activities. Should this portion of the Project Area be utilised for either mining or stockpiling, impact upon this stock route will be reassessed.

Stock Route U383BELY01 is likely to be closed as it will interfere with the proposed open cut mining operations. Adani is currently undertaking further investigations and discussions with DNRM regarding re-alignment of this stock route.

Stock Route U303BELY02 is likely to be affected by the Project (Mine) as the stock route traverses the south-western boundary of the Project Area, which is to be used for underground mining operations. An investigation report into likely mine subsidence provided by Mine Subsidence

Engineering Consultants (MSEC), predicts a maximum of 7.5 m of subsidence at the surface over the shallow longwalls with the total subsidence decreasing with depth. Surface cracking may also occur. This stock route will be realigned during underground mining operations to avoid areas impacted by subsidence. The stock route may be realigned to its original alignment once mining is complete, subsidence has occurred and the land surface is stable.

6.3.1.2 Mitigation Measure

Adani has undertaken relevant consultations with the IRC in March 2011 regarding the affected stock routes, with the key discussion points including:

- The existing stock routes traversing the Project Area have been confirmed
- Preservation of stock route access as part of the Project (Mine) is recommended
- Coordination with nearby roads and level crossings is recommended
- Adani will be undertaking further consultations with IRC and DNRM in order to avoid causing undue disruption to the use of the subject stock routes.

Adani will request DNRM to designate a stock route deviation outside of the Project Area prior to closing the current alignment of the stock route. This will avoid delays and disruption to stock route use.

6.3.2 Alteration of Existing Road Network

6.3.2.1 Potential Impacts

Road access to the Mine site (specifically to the boundary of EPC1080) will be via the Moray Carmichael Road which is approximately 80 km of currently unsealed local roads off the Gregory Developmental Road. Adani has entered into an agreement with IRC regarding the long term maintenance and development of the entire lengths of the Elgin Moray and the Moray Carmichael Roads which run from the intersection of the Gregory Developmental Road west through the Mine to intersect with the Shuttleworth Carmichael Road (as identified within Section 3.3). The roads will be upgraded in stages and maintained to a similar engineering standard as the Gregory Development Road.

Access east to west will be maintained during the operation of the Project (Mine) however, the alignment of the Moray Carmichael Road may vary during this time depending on the mining activities. Realignment of the Moray Carmichael road near the site of the workers accommodation village is also planned.

Refer to Volume 4 Appendix W Mine Transport Assessment for further information regarding alterations of the existing road network.

6.3.2.2 Mitigation Measure

The alignment of the Moray Carmichael Road running through the Mine may move from time to time to accommodate mining activity, however it will continue to be open to the public and meet a required engineering standard.

Adani will also work with IRC and landholders along the route to realign the road in places to provide a better alignment to accommodate mining traffic.

Adani is also working with the DTMR in the design of grade separated road/rail crossing points and intersection improvements. Additional and improved signage around intersections and road/rail crossings will also be developed and installed to comply with DTMR requirements.

Ultimate road closure of the Moray Carmichael Road will not be considered and the utility of Moray Carmichael Road as a public road link will be maintained at all times.

6.3.3 Potential Impact upon Other Infrastructure

6.3.3.1 Potential Impacts

No other known existing infrastructure (rail, airports, landing strips, ports, gas and water pipelines or electricity and telecommunication easements) is present within or in near vicinity to the Project Area, as such no other impacts are likely to be generated.

The Project (Mine) is not in close proximity to any known proposed infrastructure as such no impact will be generated by the Project (Mine).

6.3.3.2 Mitigation Measure

No mitigation measures are applicable.

6.4 Summary

The Project (Mine) will have a direct impact upon the current land use and tenure of the Project Area. A progressive shift from the current cattle grazing land use to a mining related land use will occur throughout the life time of the Project (Mine). These Project (Mine) impacts are unavoidable due to the location of the coal deposit. The mining lease over EPC1690 and EPC1080 impacts on the respective landholders who lose the use of the land in its current form as it undergoes a permanent change from a rural use to a mining use. Compensation is payable under the MR Act for this loss. However, the Project (Mine) will be decommissioned upon completion of the Project (Mine) life and the Project Area will be rehabilitated progressively to a state consistent with the surrounding habitat.

The Project (Mine) will not have an impact upon strategic cropping land, as there is no presence of strategic cropping land within the Project Area. No Project (Mine) impacts will be generated upon KRAs as the Project (Mine) is not in proximity to any KRAs identified within the MIW. The Project (Mine) will have an impact upon extents of Project Area consisting of Class A, B and C1 GQAL. There is limited impact to GQAL and this is unavoidable. The rehabilitation following completion of mining will seek to reinstate soils to current levels of productive use.

As detailed in Volume 4 Appendix U Mine Noise and Vibration and Volume 4 Appendix S Mine Air Quality Report, the construction and operation of the Project (Mine) is unlikely to generate noise and vibration or significant dust related impacts upon the identified homesteads, however some changes to amenity may occur closer to the boundary of the mine activities. Road access to properties will be maintained at all time during operations. The Moray Carmichael Road will be re-aligned as required during operations but will remain open providing public access west of the Mine. Re-alignment of the road is not expected to impact road users.

The construction of the Project (Mine) will require closure of the stock route traversing the northern portion of the Project Area. However, no significant impacts are likely to be generated upon the use of the route if a stock route deviation is created outside of the Project Area. The stock route

traversing the south-western boundary of the Project Area is likely to be affected by subsidence as this area to be used for underground mining operations. This stock route will be realigned during underground mining operations and reintroduced once mining is complete, subsidence has occurred and the land surface is stable.

Existing public roads will be enhanced to cater for current traffic, and traffic generated by the Project (Mine). Public roads leading to, and running through, the Project (Mine) will be upgraded and maintained by Adani in accordance with agreements with IRC. No other existing infrastructure is located within or near the Project Area and as such no other impacts are likely to be generated.

The Project (Mine) will not generate an impact upon proposed infrastructure as it is not in close proximity to any known planned infrastructure.

7. Conclusion

The purpose of this report was to provide sufficient information to allow an informed decision to be made about the impacts of the Project (Mine) on land use and tenure within the Project Area and to prescribe appropriate mitigation measures to alleviate or avoid such impacts. This report has been prepared in accordance with the requirements of the Project ToR Section 3.2.4, relating to the Project (Mine) only.

This report provided an assessment of the Project (Mine) against the following broad land use related factors:

- Land use and tenure of the Project Area, including mining tenure
- Residential and industrial uses
- Resource sterilisation
- GQAL and strategic cropping land
- KRAs
- Existing and proposed infrastructure
- ESAs were identified in this report and potential impacts on ESAs and proposed mitigation measures are discussed in Volume 4 Appendix N1 Mine Terrestrial Ecology Report.
- The report identified the following potential impacts of the Project (Mine):
- Progressive change of land use from low intensity cattle grazing to:
  - Mining land use for Project (Mine) onsite infrastructure (44,730 ha)
  - Residential land use for workers accommodation village (74 ha)
  - Airport land use for the purposes of the permanent airport (298 ha)
  - Industrial land use mine machinery maintenance and repairs, bulk fuel storage and other operations associated with the Project (Mine) (948 ha)
  - Railway Activities land use for the rail siding area (95 ha)
  - Land use for the purposes of the offsite water supply infrastructure (413 ha)
- Potential changes to amenity at homesteads close to the boundary of mine activities
- No other impacts upon residential or industrial uses
- Potential sterilisation of Class A, B, C1
- No impact upon KRAs
- Realignment and upgrading of Moray Carmichael Road
- No impact upon existing or proposed infrastructure
- Temporary impact upon one of the two existing stock routes, and permanent relocation of stock route U385BELY01 over the northern portion of the Project Area.

While the Project (Mine) will have unavoidable impacts upon the current land use and tenure of the Project Area, the development of the Project (Mine) will be undertaken with appropriate management plans in place to regulate the development as much as practicable.

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Appendix A

Terms of Reference Cross-reference

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Terms of Reference Requirement/Section Number	Section of this Report
Section 3.2.4 Land use and tenure	
Identify, with the aid of maps:	
◗ Land tenure, including reserves and extractive resource areas, tenure of special interest such as protected areas and forest reserves, identification of existing and proposed gas infrastructure, water pipelines, power lines and transport corridors, including local roads, state-controlled roads and rail corridors	Figure 2-3, Figure 2-4, Figure 2-5, Figure 4-1 and Section 3 of this report
◗ Zoning and precincts of applicable local government planning schemes, development schemes and regional plans	Section 2.4 and Figure 2-1 of this report
◗ Existing land uses and facilities surrounding the project	Section 2.3, Section 2.4 and Figure 2-6 of this report
◗ Provide land suitability maps of the mapped soil units and an agricultural land class map according to the *Planning Guideline: The Identification of Good Quality Agricultural Land*[2]. Comment on and assess any variation with the GQAL mapping shown in the planning scheme for the former Belyando Shire as required under *State Planning Policy 1/92: Development and the Conservation of Agricultural Land*[3]. Identify any land shown as strategic cropping land on current trigger maps	Refer to Volume 4 Appendix L Mine Soils Assessment
◗ Areas covered by applications for native title claims or native title determinations, providing boundary descriptions of native title representative body/ies. The proponent should also identify whether there are any necessary notifications required to the representative body/ies or evidence that native title does not exist	Section 5 and Figure 2-6 in this report
◗ Include the identification of affected stock routes in consultation with Stock Route Management Unit staff of the Department of Environment and Resource Management (DERM). Consider the impacts of this project on the management and operation of the Stock Route Network. Include potential impacts that are identified during the EIS process as the footprint of the development is finalised.	Section 3.9 and Figure 3-2 in this report
◗ Distance of the project from residential and recreational areas	Section 2.3.3 and Figure 2-3 of this report
◗ Details should be provided on the location of proposed water pipelines, power lines and transport corridors, including local roads, state-controlled roads and rail corridors within and servicing the mining development that may impact on the Stock Route Network	Section 3, Figure 3-1 and Figure 3-2

[2] Department of Primary Industries and Department of Housing, Local Government and Planning, *Planning guidelines: The identification of good quality agricultural land*, 1993.

[3] Available from: www.dip.qld.gov.au/docs/ipa/spp1_92.pdf

Terms of Reference Requirement/Section Number	Section of this Report
◗ Declared water storage catchments	Refer to Volume 4 Appendix P mine Hydrology Report
◗ Location of the project in relation to environmentally sensitive areas.	Section 4 and Figure 4-1 of this report
◗ Assess the suitability of the soils mapped in the project area for rain fed, broad acre cropping and beef cattle grazing according to the limitations and land suitability classification system in Attachment 2 of the Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.	Refer to Volume 4 Appendix L Mine Soils Assessment
Assess the impact of the Project (Mine) upon the following:	
◗ Detail the potential for the construction and operation of the project to change existing and potential land uses of the project site and adjacent areas.	Section 6.2 of this report.
◗ Describe the impacts on surrounding land uses and human activities and strategies for minimisation.	Section 6.2 of this report.
◗ GQAL or strategic cropping land with particular reference to any residual impacts on the area, class or productivity of such land	Section 2.6, Section 2.7, Section 6.2.3, Section 6.2.5, Figure 2-7 of this report and Volume 4 Appendix L Mine Soils Assessment
◗ Key resource areas (refer to *State Planning Policy 2/07: Protection of Extractive Resources* and its associated guideline)	Section 2.5 and Section 6.2.6 of this report
◗ Residential and industrial uses	Section 6.2 of this report
◗ Possible effect on town planning objectives and controls, including local government zoning and strategic plans	Volume 4 Appendix D Project Planning and Approvals Assessment
◗ Constraints to potential developments	Section 6.3.3 of this report
◗ Management of the immediate environs of the project including construction buffer zones	Volume 4 Appendix N1 Mine Terrestrial Ecology Report
◗ The identification of the potential native title rights and interests likely to be impacted upon by the project and the potential for managing those impacts by an Indigenous land use agreement or other native title compliance outcomes	Section 5 of this report
◗ Mitigation strategies for potential adverse impacts of the project on the state's stock route network in consultation with DERM's Stock Route Management Unit	Section 3.9, Section 6.3.1 and Figure 3-2

Terms of Reference Requirement/Section Number	Section of this Report
◗ Proposed land use changes in any areas of high conservation value and information on how easement widths and vegetation clearance in sensitive environmental areas will be minimised	Section 4 of this report and Volume 4 Appendix N1 mine Terrestrial Ecology Report
◗ Potential issues involved in proximity and/or co-location of other current or proposed infrastructure services	Section 3 of this report
◗ Potential impacts on future road upgrades	Section 3.3 of this report
◗ Identification of any land units requiring specific management measures.	Section 2.6 and Section 2.7 of this report and Volume 4 Appendix L Mine Soils Assessment
◗ Avoid sterilisation of, or impact on, any of the State's coal mineral and petroleum and gas (including coal seam gas) resources and state significant extractive resources arising from the construction of the project or related infrastructure. If impact on or sterilisation of these resources is argues as unavoidable, justification should be provided.	Section 2.3.1, Section 6.2.2 and Figure 2-4 of this report.

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