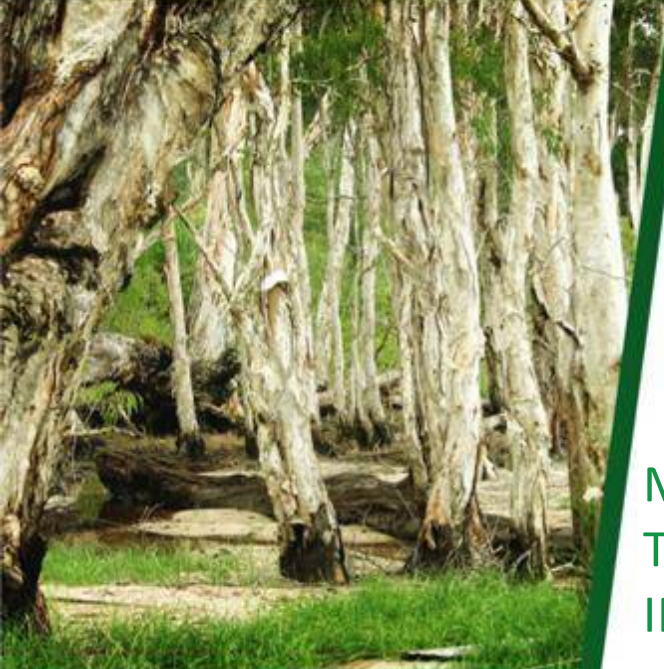


Appendix E – Terrestrial Ecology and Impact Statement



MOORLANDS PROJECT – TERRESTRIAL ECOLOGY AND IMPACT STATEMENT

Cuesta Coal Limited

22 November 2014

Prepared by

Environmental & Licensing Professionals Pty Ltd



DOCUMENT CONTROL SHEET

Environmental & Licensing Professionals Pty Ltd	
Street Address:	Level 27, 288 Edward Street, Brisbane Qld 4000
Postal Address:	GPO Box 559 Brisbane Qld 4001
Phone:	+61 7 3239 9700
Fax:	+61 7 3220 2135
Email:	elp@elp.com.au
Web:	www.elp.com.au

Project:	Moorlands	Issue Date:	22 November 2014
Title:	Moorlands Project – Terrestrial Ecology and Impact Statement		
Project Manager:	Richard Oldham		
Author:	Michele Deveze and Paul O'Callaghan		
Client:	Cuesta Coal Limited		
Client Contact:	Blair Richardson		

Revision Number	Date	Prepared by	Approved by
Rev A	22/09/2013	MD & POC	
Rev B	07/11/2013	MD & POC	RO
00	13/11/2013	MD & POC	RO
01	28/11/2013	MD & POC	RO
02	30/06/2014	MD & POC	RO
03	22/10/2014	MD & POC	RO

Number of Copies									
Revision Number	A	B	C	D	00	01	02	03	04
ELP File	1	1			1	1	1		
Client					1	1	1		
Department							1		

TABLE OF CONTENTS

1	Introduction	1-1
1.1	Purpose	1-1
1.2	Limitations and Assumptions	1-1
2	Project Overview	2-1
2.1	Project Areas	2-1
2.2	The Proponent	2-1
2.3	Overview of Moorlands Project.....	2-1
2.4	Regional Land Use	2-3
2.5	Climate	2-3
2.6	Topography and Hydrology	2-3
2.7	Geology.....	2-3
3	Desktop Review Methods.....	3-1
3.1	Introduction	3-1
3.2	Method	3-1
3.2.1	Previous Surveys	3-4
3.2.2	Excluded Scope	3-5
3.2.3	Limitations of Desktop Searches.....	3-5
4	Desktop Reviews Findings	4-1
4.1	Desktop Review Results	4-1
4.1.1	EPC 775	4-1
4.1.2	EPC 776	4-3
4.1.3	EPC 1738	4-6
4.1.4	Discussion of Potential Environmental Constraints on the Tenements.....	4-9
4.2	Species of State Conservation Significance	4-10
4.2.1	Animals and Plants of State Conservation Significance under the <i>Nature Conservation Act</i> 1992	4-10
4.2.2	Naturalised, Pest, or Invasive Plants and Animals	4-12
4.3	Mapped Vegetation Communities and Essential Habitat.....	4-16
4.3.1	Remnant Regional Ecosystems	4-16
4.3.2	High Value Regrowth Regional Ecosystems	4-17
4.3.3	Essential Habitat	4-21
4.3.4	Environmentally Sensitive Areas.....	4-21
4.3.5	Wetlands, Groundwater, Springs, Riparian Vegetation and Restricted Areas.....	4-21
4.4	Biodiversity Planning Assessment	4-25
4.4.1	Overview of Biodiversity Planning Assessment – Methods and Objectives	4-25
4.4.2	Biodiversity Planning Assessment – Expert Panel Report Brigalow Belt North - Landscape	4-25
4.4.3	Biodiversity Planning Assessment – Expert Panel Report Brigalow Belt South – Fauna and Flora	4-26
4.4.4	BPA Habitat for EVR Taxa, Ecosystem Diversity, and Condition	4-27
4.4.5	BPA State Ecosystem Value, Regional Ecosystem Value and Local Ecosystem Value.....	4-31
4.4.6	BPA Tract Size, Regional Relative Ecosystem Size, and State Relative Ecosystem Size	4-31
4.4.7	BPA Context and Connection	4-31
4.4.8	BPA Core Habitat for Priority Taxa, Corridors and Special Biodiversity Values	4-38

4.4.9	BPA Special Features: Ecological Corridors and Wildlife Refugia, Local Endemism and Variation in Taxa Composition	4-42
4.4.10	BPA Biodiversity Significance	4-47
4.5	Matters of National Environmental Significance	4-49
4.5.1	Threatened Ecological Communities	4-49
4.5.2	Registered National Estate.....	4-50
4.5.3	Nationally Threatened Species (EPBC Act).....	4-50
4.5.3.1	Terrestrial Fauna Species of National Conservation Concern	4-51
4.5.3.2	Terrestrial Flora Species of National Conservation Concern	4-52
4.5.3.3	Migratory Species (Birds).....	4-52
4.5.3.1	Marine Species (Birds)	4-53
4.5.4	RAMSAR Wetlands	4-54
4.5.5	Invasive Plants and Animals	4-54
4.6	National and State Significant Flora and Fauna – Summary.....	4-55
4.6.1	Fauna Species of Key Conservation Concern – Summary	4-55
4.6.2	Flora Species of Key Conservation Concern – Summary	4-55
4.7	Habitat of Key Conservation Concern	4-56
4.8	Weeds and Pest Animals	4-57
5	Field Survey Methods.....	5-1
5.1	Field Survey Rationale	5-1
5.2	Terrestrial Flora Habitat and Vegetation Community Survey Methods.....	5-1
5.2.1	Regional Ecosystems and Ecological Communities	5-1
5.2.2	Regional Ecosystems of Conservation Significance.....	5-2
5.2.3	Essential Habitat and Habitat for Conservation Significant Flora and Species	5-6
5.2.4	Flora Species of Key Conservation Concern	5-6
5.2.5	Wetland Management Areas	5-6
5.3	Terrestrial Fauna Habitat Survey Methods	5-6
5.3.1	Habitat Assessment	5-6
5.4	Terrestrial Fauna Survey Methods.....	5-10
5.4.1	Small Mammal and Pitfall Traps	5-11
5.4.2	Targeted Bird Surveys	5-11
5.4.3	Targeted Reptile Surveys	5-11
5.4.4	Nocturnal Searches	5-11
5.4.5	Motion Sensitive Cameras	5-11
5.4.6	Acoustic Bat Recording	5-11
5.4.7	Targeted Searches for Conservation Significant Species	5-12
5.4.8	Opportunistic Recordings	5-12
5.4.9	Taxonomic Identification	5-12
6	Findings.....	6-1
6.1	Vegetation and Habitat Survey Results	6-1
6.1.1	Regional Ecosystems and Ecological Communities.....	6-1
6.1.2	High Value Regrowth	6-27
6.1.3	Revised RE and TEC Mapping.....	6-27
6.1.4	Habitat Values for Conservation Significant Plants.....	6-43
6.1.5	Watercourses and Wetlands.....	6-45
6.1.6	Habitat Assessments for Conservation Significant Fauna	6-45
6.1.6.1	Brigalow Woodland.....	6-46
6.1.6.2	<i>Acacia</i> sp. Woodland	6-46
6.1.6.3	<i>Eucalyptus</i> sp. Forest/Woodland	6-46

6.1.6.4	Drainage Lines (Riparian)	6-46
6.1.6.5	Semi Evergreen Vine Thicket	6-47
6.1.6.6	Regrowth and Open Paddocks	6-47
6.1.6.7	Artificial Dams	6-47
6.2	Terrestrial Fauna and Flora Survey Results	6-47
6.2.1.1	Identified Terrestrial Flora Species	6-48
6.2.1.2	Identified Conservation Significant Flora	6-48
6.2.1.3	Identified Exotic and Weed Species	6-51
6.2.2	Identified Terrestrial Fauna	6-51
6.2.3	Fauna Assemblage	6-54
6.2.3.1	Amphibians	6-54
6.2.3.2	Reptiles	6-55
6.2.3.3	Birds	6-56
6.2.3.4	Mammals	6-56
6.2.4	Identified Conservation Significant Fauna	6-57
6.2.4.1	Long-eared Bats (<i>Nyctophilus</i> spp.)	6-58
6.2.4.2	Little Pied Bat (<i>Chalinolobus picatus</i>).....	6-58
6.2.4.3	Square-tailed Kite (<i>Lophoictinia isura</i>).....	6-58
6.2.4.4	Rainbow Bee-eater (<i>Merops ornatus</i>).....	6-58
6.2.5	Identified Exotic and Pest Animal Species	6-58
6.2.6	Statistical Analysis	6-59
7	Discussion	7-1
7.1	Matters of National Environmental Significance	7-1
7.1.1	Flora	7-1
7.1.2	Fauna	7-2
7.2	State Significant Biodiversity Values.....	7-6
7.2.1	Flora	7-6
7.2.2	Wetlands and Watercourses.....	7-8
7.2.3	Fauna	7-8
8	Impact Assessment.....	8-1
8.1	Impact Assessment Method and Criteria.....	8-1
8.1.1	Impact Mechanisms	8-1
8.1.2	Impact Type	8-3
8.1.3	Unmitigated and Residual Impact Assessment.....	8-3
8.2	Impact Assessment Results	8-4
8.2.1	Vegetation and Ecological Communities	8-4
8.2.1.1	Endangered and Of Concern Remnant Regional Ecosystems	8-4
8.2.1.2	Critically Limited and Threshold Regional Ecosystems	8-5
8.2.1.3	Essential Habitat and Essential Regrowth Habitat.....	8-5
8.2.1.4	Category A and B Environmentally Sensitive Areas	8-5
8.2.2	Terrestrial Flora Species.....	8-5
8.2.3	Biodiversity Planning Assessment.....	8-5
8.2.4	Terrestrial Fauna Species	8-5
8.3	Impact Management	8-44
8.3.1	Impact Avoidance, Mitigation and Offsetting.....	8-44
8.3.2	Vegetation and Ecological Communities	8-48
8.3.2.1	Endangered and Of Concern Remnant Regional Ecosystems	8-48
8.3.2.2	Critically Limited and Threshold Regional Ecosystems	8-50
8.3.2.3	High Value Regrowth	8-50

8.3.2.4	Essential Habitat and Essential Regrowth Habitat	8-50
8.3.2.5	Category A and B Environmentally Sensitive Areas	8-50
8.3.2.6	General Considerations for Conservation Significant Vegetation Communities	8-50
8.3.2.7	General Considerations for all Remnant Vegetation Communities	8-51
8.3.3	Terrestrial Flora Species	8-51
8.3.4	Terrestrial Fauna Species	8-51
8.3.5	Other Matters of State or National Ecological Significance	8-52
8.3.5.1	Watercourses	8-52
8.3.5.2	Biodiversity Assessment Planning Matters	8-52

9 Summary and Recommendations 9-1

9.1	Summary of Findings	9-1
9.1.1	Flora	9-1
9.1.2	Fauna	9-1
9.2	Recommendations	9-2

10 Glossary and Abbreviations 10-1

11 References 11-2

Tables

Table 3-1	Scope of environmental database interrogation.....	3-2
Table 4-1	Summary of Potential Environmental Constraints for EPC 775.....	4-1
Table 4-2	Summary of Potential Environmental Constraints for EPC 776.....	4-4
Table 4-3	Summary of Potential Environmental Constraints for EPC 1738.....	4-7
Table 4-4	Birds, Mammals, Amphibians and Reptiles of Conservation Significance under the NC Act 4-10	
Table 4-5	Plants of Conservation Significance under the NCA	4-12
Table 4-6	Invasive or Naturalised Animals Potentially in the Study Area Sourced from ‘Wildnet’, the Queensland Government Wetland Map Custom Report, and Biosecurity Queensland Database Searches.....	4-13
Table 4-7	Invasive or Naturalised Plants Potentially Present in the Study Area Sourced from ‘Wildnet’, the Queensland Government Wetland Map Custom Report, and Biosecurity Queensland Database Searches	4-13
Table 4-8	Regional Ecosystems Mapped in the Proposed Disturbance Area, Study Area and the EPCs	4-16
Table 4-9	High Value Regrowth Endangered and Of Concern Regional Ecosystems Present in the EPCs, the Study Area, and the Proposed Disturbance Area	4-18
Table 4-10	EPBC Protected Search Matters Search Tool Identified Threatened Ecological Communities (TECs).....	4-49
Table 4-11	Description of TECs and their Corresponding Regional Ecosystems	4-49
Table 4-12	Birds Listed Under the EPBC Act.....	4-51
Table 4-13	Mammals Listed Under the EPBC Act.....	4-51
Table 4-14	Reptiles Listed Under the EPBC Act	4-52
Table 4-15	Plants Listed Under the EPBC Act	4-52
Table 4-16	Migratory Species Listed Under the EPBC Act	4-53
Table 4-17	Marine Species Listed Under the EPBC Act	4-53
Table 4-18	Pest Plants and Animals Indicated by EPBC Search Report to Potentially be Present	4-54

Table 4-19	Plant Species of Conservation Significance that May Occur in the Study Area	4-55
Table 4-20	Summary of Habitat of Particular Conservation Significance Potentially Present in the Study Area	4-56
Table 4-21	Weeds and Pest Animals of Ecological Significance Potentially Occurring in the Study Area	4-57
Table 6-1	Site Description MO0101.....	6-5
Table 6-2	Site Description MO0102.....	6-6
Table 6-3	Site Description MO0103.....	6-7
Table 6-4	Site Description MO0104.....	6-8
Table 6-5	Site Description MO0105.....	6-9
Table 6-6	Site Description MO0106.....	6-10
Table 6-7	Site Description MO0107.....	6-11
Table 6-8	Site Description MO0108.....	6-12
Table 6-9	Site Description MO0109.....	6-13
Table 6-10	Site Description MO0101Q	6-14
Table 6-11	Site Description MO0102Q	6-15
Table 6-12	Site Description MO0103Q	6-16
Table 6-13	Site Description MO0104Q	6-17
Table 6-14	Site Description MO0105Q	6-18
Table 6-15	Site Description MO0106Q	6-19
Table 6-16	Site Description MO0107Q	6-20
Table 6-17	Site Description MO0108Q	6-21
Table 6-18	Site Description MO0109Q	6-22
Table 6-19	Site Description MO0201.....	6-23
Table 6-20	Site Description MO0202.....	6-24
Table 6-21	Site Description MO0203.....	6-25
Table 6-22	Site Description MO0204.....	6-26
Table 6-23	Area of Herbarium mapped, ELP mapped and State mapped Remnant and Regrowth Endangered and Of Concern Regional Ecosystems and Threatened Ecological Communities in Proposed Disturbance Area (including Proposed Transport Route)	6-40
Table 6-24	Area of Threatened Ecological Communities in Proposed Disturbance Area.....	6-43
Table 6-25	The Habitat Requirements for Conservation Significant Plants Indicated for the Location	6-43
Table 6-26	State Government Mapped Watercourse Stream Orders and Buffer Areas in the Proposed Disturbance Area	6-45
Table 6-27	Habitat Type Assessments	6-45
Table 6-28	Naturalised Exotic Plant, Weed or Invasive Plant Species Identified in the Study Area.....	6-51
Table 6-29	Fauna Summary for The Cuesta Moorlands Fauna Surveys, April - October 2013.....	6-51
Table 6-30	Location and Habitat Description of Conservation Significant Fauna Identified During Survey	6-57
Table 7-1	REs Comprising Acacia harpophylla TEC in the Proposed Disturbance Area	7-1
Table 7-2	Acacia harpophylla REs Ground-truthed in the Proposed Disturbance Area	7-7
Table 8-1	Endangered and Of Concern REs and TECs That Will be Directly Affected by Constructing and Operating the Proposed Mine, Transport Route and Infrastructure.....	8-5
Table 8-2	Impact Assessment for Endangered Regional Ecosystems and Threatened Ecological Communities Present on or in Proximity to the Proposed Disturbance Area	8-7
Table 8-3	Impact Assessment for Of Concern Regional Ecosystems Present on or in Proximity to the Proposed Disturbance Area	8-9
Table 8-4	Impact Assessment for Other Remnant Vegetation Present on or in Proximity to the Proposed Disturbance Area	8-11
Table 8-5	Impact Assessment for Environmentally Sensitive Areas Present on or in Proximity to the Proposed Disturbance Area	8-13

Table 8-6	Impact Assessment for Conservation Significant (EPBC, NCA) Plant Species Potentially Present on or in Proximity to the Proposed Disturbance Area	8-15
Table 8-7	Impact Assessment for Biodiversity Assessment Planning Matters Present on or in Proximity to the Proposed Disturbance Area	8-17
Table 8-8	Impact Assessment for Conservation Significant (EPBC, NCA) Fauna Species Present on or in Proximity to the Proposed Disturbance Area	8-19
Table 8-9	Impact Assessment for Conservation Significant (EPBC, NCA) Fauna Species Potentially Present on or in Proximity to the Proposed Disturbance Area	8-21
Table 8-10	Impact Assessment for Amphibians Present on or in Proximity to the Proposed Disturbance Area	8-24
Table 8-11	Impact Assessment for Reptiles Present on or in Proximity to the Proposed Disturbance Area	8-26
Table 8-12	Impact Assessment for Ground Dwelling Birds Present on or in Proximity to the Proposed Disturbance Area	8-28
Table 8-13	Impact Assessment for Hollow Nesting Birds Present on or in Proximity to the Proposed Disturbance Area	8-30
Table 8-14	Impact Assessment for Diurnal Woodland and Forest Birds Present on or in Proximity to the Proposed Disturbance Area.....	8-32
Table 8-15	Impact Assessment for Wetland Birds Present on or in Proximity to the Proposed Disturbance Area	8-33
Table 8-16	Impact Assessment for Arboreal Mammals Present on or in Proximity to the Proposed Disturbance Area	8-36
Table 8-17	Impact Assessment for Terrestrial Mammals Present on or in Proximity to the Proposed Disturbance Area	8-38
Table 8-18	Impact Assessment for Migratory Fauna Species Present on or in Proximity to the Proposed Disturbance Area	8-40
Table 8-19	Impact Assessment for Migratory Fauna Species Potentially Present on or in Proximity to the Proposed Disturbance Area.....	8-42
Table 8-20	Area of ERE, TEC and OCRE and Remnant Watercourse Vegetation to be Cleared within Proposed Disturbance Area	8-49

Figures

Figure 2-1	Location of the Moorlands Project	2-4
Figure 2-2	Defined Project Areas	2-5
Figure 2-3	Proposed and Alternative Locations of Project Activities and Infrastructure	2-6
Figure 4-1	Remnant and Regrowth Regional Ecosystems in the Study Area and Inside the Proposed Disturbance Area	4-19
Figure 4-2	High Value Regrowth Endangered and Of Concern Regional Ecosystems in Relation to the Study Area and the Proposed Disturbance Area	4-20
Figure 4-3	Essential Habitat for <i>Corymbia clandestina</i> , <i>Nettapus coromandelianus</i> , and <i>Chalinolobus picatus</i>	4-22
Figure 4-4	Environmentally Sensitive Areas in the Study Area and Within the Proposed Disturbance Area	4-23
Figure 4-5	Watercourses, Drainage Lines and Wetlands in Study Area	4-24
Figure 4-6	BPA Habitat for EVR Taxa	4-28
Figure 4-7	BPA Ecosystem Diversity	4-29
Figure 4-8	BPA Condition	4-30
Figure 4-9	BPA State Ecosystem Value	4-32
Figure 4-10	BPA Regional Ecosystem Value	4-33
Figure 4-11	BPA Tract Size	4-34

Figure 4-12	BPA State Relative Ecosystem Size	4-35
Figure 4-13	BPA Regional Relative Ecosystem Size.....	4-36
Figure 4-14	BPA Context and Connection.....	4-37
Figure 4-15	BPA Core Habitat for Priority Taxa	4-39
Figure 4-16	BPA Corridors.....	4-40
Figure 4-17	BPA Special Biodiversity Values	4-41
Figure 4-18	BPA Ecological Corridors and Wildlife Refugia	4-43
Figure 4-19	Regional Context of BPA Ecological Corridors	4-44
Figure 4-20	BPA Centres Of Endemism (SF1) and Areas Containing Regional Ecosystems with Distinct Variation in Taxa Composition Associated with Geomorphology and Other Environmental Variables (SF7).....	4-45
Figure 4-21	Sum of all Special Features Scores.....	4-46
Figure 4-22	BPA Biodiversity Significance.....	4-48
Figure 5-1	Flora Survey Routes and Walked Survey Transects for the Moorlands Project	5-3
Figure 5-2	Ground-truthed Regional Ecosystem Mapping Overlaid by Proposed Disturbance Area	5-4
Figure 5-3	Field Survey Sites for Flora and Vegetation Communities in the Study Area and in the Vicinity of the Study Area	5-5
Figure 5-4	Fauna Habitat Mapping.....	5-8
Figure 5-5	Location of Fauna Trap Sites, Anabat Recorder Sites, Movement Detection Camera Sites and Traverses on the Moorlands Study Area	5-9
Figure 6-1	Location of Secondary and Quaternary Assessment Sites and Opportunistic Survey Routes Overlying RE Mapping	6-2
Figure 6-2	Location of Secondary and Quaternary Assessment Sites and Opportunistic Survey Routes Overlying Geology Mapping	6-3
Figure 6-3	Location of Secondary and Quaternary Assessment Sites and Opportunistic Survey Routes Overlying ELP Revised Ground-truthed Regional Ecosystems.....	6-4
Figure 6-4	EHP (Herbarium) Revised Regional Ecosystem Map of the Study Area	6-30
Figure 6-5	EHP (Herbarium) Revised Regional Ecosystem Map of the Haul Route	6-31
Figure 6-6	Proposed Disturbance Area Overlaid on Landsat 5 MSS Captured on the 1st December 1989 Displayed in False Colour	6-32
Figure 6-7	Proposed Disturbance Area Overlaid on Landsat 5 MSS Captured on the 7 th March 1990 Displayed in False Colour.....	6-33
Figure 6-8	Proposed Disturbance Area Overlaid on Landsat 5 TM Captured on the 13th March 1998 Displayed in Natural Colour.....	6-34
Figure 6-9	Proposed Disturbance Area Overlaid on Landsat 5 TM Captured on the 26 th December 1998 Displayed in Natural Colour	6-35
Figure 6-10	Proposed Disturbance Area Overlaid on Landsat 7 ETM+ Captured on the 16 th July 2000 Displayed in Natural Colour	6-36
Figure 6-11	Proposed Disturbance Area Overlaid on Aerial Imagery Captured in 1990 Displayed in Natural Colour	6-37
Figure 6-12	Proposed Disturbance Area Overlaid on Aerial Imagery Captured in 2001 Displayed in Natural Colour	6-38
Figure 6-13	Composite Revised Regional Ecosystem Map of the Study Area	6-39
Figure 6-14	Collection Sites for Potential <i>Corymbia clandestina</i>	6-49
Figure 6-15	Selected Specimens of Potential <i>Corymbia clandestina</i>	6-50
Figure 6-16	Littlejohn's Toadlet (<i>Uperoleia littlejohni</i>) and the Northern Banjo Frog (<i>Limnodynastes terraereginae</i>).....	6-54
Figure 6-17	Lively Rainbow Skink (<i>Carlia vivax</i>) and Carpentaria Snake (<i>Cryptophis boschmai</i>)....	6-55
Figure 6-18	Brown-snouted Blind Snake (<i>Ramphotyphlops wiedii</i>) and a Freckled Monitor (<i>Varanus tristis</i>).....	6-55
Figure 6-19	Wedge-tailed Eagle (<i>Aquila audax</i>) and Budgerigar (<i>Melopsittacus undulates</i>)	6-56
Figure 6-20	Eastern Brushtail Possum (<i>Trichosurus vulpecula</i>).....	6-57

Figure 6-21	The Head of a Wild Dog (Evidence found at Site 6)	6-59
Figure 6-22	Cole Rarefaction Species Accumulation Curves for All Vertebrate Fauna Taxa and for Each Major Group Over the Two Seasons of Survey Sampling.	6-60
Figure 6-23	Species Accumulation Curve for Sites 1-5	6-61
Figure 6-24	Species Accumulation Curve for Sites 6-9 and Incidental Sightings	6-61
Figure 7-1	Location of Threatened Ecological Communities within the Moorlands Study Area	7-4
Figure 7-2	Recently Chained Brigalow (<i>Acacia harpophylla</i>) adjacent to Site 7	7-5
Figure 7-3	<i>C. citriodora</i> at Site 2 with scratch marks.	7-6
Figure 8-1	Areas of Conservation Significance that may be Affected by Direct and Indirect Impacts Associated with Mine Construction and Operation	8-2
Figure 8-2	Impact Assessment Matrix	8-4
Figure 8-3	Composite Revised Regional Ecosystem Mapping Overlaid by Proposed Disturbance Area	8-45
Figure 8-4	Composite Revised Regional Ecosystem Mapping for the Proposed Transport Routes	8-46
Figure 8-5	Composite Revised Regional Ecosystem Mapping for the Northern Water Infrastructure and Eastern Access Road	8-47
Figure 8-6	Wildlife Refugia, Context and Connection, and Ecological Corridors	8-54
Figure 8-7	BPA Mapped State Level Corridor Overlying Satellite Imagery	8-55

Appendices

Appendix 1 – EPBC Protected Matters Reports
Appendix 2 – Wildnet Report
Appendix 3 – Essential Habitat Information for the Locations in Close Proximity to the Study Area
Appendix 4 – Conservation Significant Fauna Potentially Occurring on the Moorlands Study Area
Appendix 5 – Descriptions and Listing Advice for Conservation Significant Plant Species Potentially Present on the Moorlands Study Area
Appendix 6 – Habitat Assessment Forms
Appendix 7 – Fauna Trap Site Locations
Appendix 8 – Supplementary Fauna Survey List
Appendix 9 – Descriptions of Ground-truthed Vegetation and Threatened Ecological Communities
Appendix 10 – Likelihood of Occurrence
Appendix 11 – Identified Flora Species Recorded
Appendix 12 – Identified Fauna Species Recorded
Appendix 13 – Bat Call Analysis
Appendix 14 - Post Survey Likelihood of Occurrence Assessment of Conservation Significant Fauna on the Cuesta Moorlands Proposed Disturbance Area

1 INTRODUCTION

1.1 Purpose

Cuesta Coal Limited (Cuesta) is the proponent of the Moorlands Project (the Project). It is Cuesta's intention to lodge an application for a site-specific Environmental Authority (EA) with the Queensland Department of Environment and Heritage (EHP) for the proposed mine and infrastructure. Environmental and Licensing Professionals Pty Ltd (ELP) has been engaged by Cuesta to undertake an ecological assessment of the site in respect of terrestrial fauna and flora.

The ecological assessment will support Cuesta's EA application and will also be used as part of the Project's referral to the Commonwealth Department of the Environment (DotE) (formerly the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)). This referral will indicate if the Project may have a significant impact on Matters of National Environmental Significance (MNES) and accordingly, whether it requires approval as a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

This document combines the findings of the autumn fauna and flora surveys conducted by ELP between 25 April to 1 May 2013, and the spring fauna and flora surveys conducted by ELP from 9 to 18 September 2013. An additional vegetation survey along three proposed transport route options was conducted between 30 July and 3 August 2013. Although not directly contributing data to the baseline terrestrial ecology survey, the transport route survey provided broad context for the baseline terrestrial ecology and provided the opportunity for opportunistic fauna sightings.

1.2 Limitations and Assumptions

Because of access restrictions, only certain parts of the proposed Study Area were accessed for the autumn fauna and flora surveys. The whole Proposed Disturbance Area was accessible for the spring surveys.

Aerial imagery of the areas not surveyed in autumn indicated extensive areas of vegetation that may contain threatened ecological communities (TECs), endangered regional ecosystems (EREs), or conservation significant fauna or flora. This area was surveyed in the spring survey and the findings are discussed further in **Section 6**.

To the best of ELP's knowledge, the information contained in this document is accurate at the date of issue; however, no assurance is given by ELP as to the veracity of third party data sets. In addition, no warranty is given regarding the possibility of future changes in the condition of the site. Site and environmental conditions may be subject to change and this will require the advice to be reviewed and updated on a regular basis.

This advice has been prepared in accordance with the scope and proposed uses outlined in this document. It should not be relied upon for any other purpose.

ELP does not accept responsibility for any loss or damage incurred as a result of relying upon the information contained in this advice.

2 PROJECT OVERVIEW

2.1 Project Areas

The Moorlands Project (the Project) is situated in the western Bowen Basin and is located 30 km to the northwest of the town of Clermont within the Isaac Regional Council (IRC) (**Figure 2-1**). The Moorlands Project includes parts of Exploration Permits for Coal (EPCs) 1738, 775, 2013 and 776, and a Parcel Prospecting Permit (PPP) for a single subblock (**Figure 2-1**).

The following area definitions will be referred to throughout the report:

The Survey Area - The Survey Area comprises 32,277 ha of land within and surrounding the Cuesta EPCs, rail spur and load out facilities, and a broad area to the south-east of the proposed mine surrounding the existing Blair Athol Coal Mine.

The Study Area - The Study Area comprises 13,566 ha and is defined as the combined extent of the following:

- entire exploration permit for coal (EPC) 775 tenement area (wholly owned by a Cuesta subsidiary)
- entire EPC 776 tenement area (wholly owned by a Cuesta subsidiary)
- northern section of EPC 1738 tenement area (wholly owned by a Cuesta subsidiary)
- site access road corridor between the MIA and the Gregory Developmental Road, within EPC 2013
- proposed transport route corridor running between the Goonyella rail network and the Project's CHPP for a product coal haul road, including the train loading facility, rail loop and product haul road extension, within EPC2013
- subblock CLER2274 B (surrounded by EPC 776, EPC 1738 and EPC 2013) for which a parcel prospecting permit (PPP) application will be lodged.

The Proposed Disturbance Area - The Proposed Disturbance Area comprises 1,268 ha and includes the area underlying the proposed mine infrastructure including:

- the open pit(s) and overburden dumps
- water infrastructure including dams, weirs and pipelines
- transport routes and haul roads
- rail spur and train load out facilities
- coal handling and preparation plant
- workshops, administration buildings and storage areas.

These three areas are defined by the boundaries shown in **Figure 2-2**. The proposed and alternative locations of Project activities and infrastructure is shown in **Figure 2-3**.

2.2 The Proponent

The Project proponent is Cuesta Coal Limited, an ASX listed coal exploration company with a pipeline of coal projects ranging from development to greenfield exploration. Overall, the company holds a portfolio of EPCs or tenements located across the West Bowen, Surat, Clarence/Moreton, and Galilee Basins of Queensland, Australia.

2.3 Overview of Moorlands Project

Run-of-mine (ROM) coal will be processed at a coal handling and preparation plant (CHPP) which will be developed on the mine site. Product coal will be carried along the transport corridor to a rail loop that

accesses the existing Goonyella rail network between Linc Energy's (formerly Rio Tinto's) nearby Blair Athol Coal Mine and the Port of Hay Point. The Blair Athol Coal Mine is located on ML 1881 and ML 1804 and does not form part of the area assessed for this study. The mine footprint within the Proposed Disturbance Area is provided in **Figure 2-3**.

The proposed Project comprises an open cut coal mine with a production rate of approximately 1.9 million tonnes per annum (Mtpa) of ROM coal. The proposed location of mine infrastructure is shown in **Figure 2-3**. The base case is for mining to be conducted as a single open pit commencing in the north with a final void in the south. Cuesta is considering an alternative mine plan to commence mining simultaneously in the north and the south of the proposed pit area, with a final void in the centre of the pit. The combined maximum extent of the proposed and alternative mine plans has been considered for the purposes of assessing impacts and is shown in figures in this report. This provides a realistic, worst case scenario for assessment of impacts to terrestrial ecology.

The Project will include:

- a CHPP and adjacent product coal stockpile area
- a mine infrastructure area (MIA), including administration facilities, workshops, servicing facilities, bunded fuel storage, water collection and control, and explosives storage and preparation facilities
- ROM coal stockpile area and ROM dump station
- ROM coal haul roads and waste rock haul roads
- product coal transport along a dedicated haul road to the train loading facility, and Blair Athol Coal Mine
- a train loading facility comprising product coal stockpile, train loading bin, rail loop and rail spur
- a staged co-disposal dam for management of coarse and fine rejects from the CHPP
- water harvesting infrastructure - two weirs on watercourses within the tenement area, an offstream storage dam to store water harvested from weirs (the water harvest dam), and associated pipework and pumps
- mine affected water dams, sediment affected water dams, clean (raw) water dams, and associated pipework and pumps required to management of water
- drainage line diversions and installation of permanent and temporary drainage
- construction camp along the site access road
- sewage and waste management facilities, for the ongoing use of the operational workforce, including packaged sewage treatment plant, using treated effluent for irrigation
- a water treatment plant to treat water to potable quality
- a site access road with main gate and security building
- civil earthworks, including foundation construction and bunding
- topsoil stockpiles to temporarily store soils before reuse in rehabilitation
- trenching and laying reticulated services (power, communications, water), including alongside the product coal haul road
- a power line along the product coal haul road, installation of site power lines and substation, and connection to the electricity supply grid
- road formation construction, surfacing and finishing unsealed roads, and with culverts where required to cross drainage lines.

It is anticipated that the coal will be mined using conventional open-cut mining and processing techniques, including drilling, blasting, excavators, trucks, shovels, and dozer push methods. The mine will be serviced by administration and workshop facilities. Trucks will haul product coal to the train loading facility.

2.4 Regional Land Use

At State planning level, the Isaac Region (including the Study Area) is situated in the Mackay, Isaac and Whitsunday Region within the Isaac Regional Council (IRC) Local Government Area (**Figure 2-1**). As part of the Queensland's local government reform process, on 15 March 2008, the Belyando, Broadsound, and Nebo Shires amalgamated to form the IRC .

The region covers an area of approximately 59,000 square kilometres and has an estimated resident population of 23,000 people with an additional non-resident population of 19,800 (KPMG 2011). The population is spread across the larger towns of Clermont, Coppabella, Dysart, Glenden, Middlemount, Moranbah, Nebo, and St Lawrence. The region also includes the smaller communities of Carmila, Clairview, Clarke Creek, Greenhill, Ilbilbie, Kilcummin, Mackenzie River, Mistake Creek, and Valkyrie.

The traditional industries of the Isaac Region have been sugar, beef, agriculture, and mining, however, aquaculture, and fruit and vegetable growing are newer developments (community plan 2009-2019). Mining is the dominant industry in the region, with more IRC residents working in mining than in any other industry. The regional economy is underpinned by one of the largest coal deposits in Australia and supplies Queensland with approximately half of all coal produced and three quarters of the total value of coal exports (IRC website).

2.5 Climate

The region has a subtropical climate, with hot dry summers and mild winters. January has the highest average monthly temperature (34.3°C) and July has the lowest average minimum temperature (6.7°C). Rainfall at Clermont is seasonal and extremely variable. The annual Clermont rainfall from 1871 to 2012 ranges from 122 mm to 1,295 mm, with a median annual rainfall of approximately 631 mm. The December to March period accounts for 60% of the annual mean rainfall. The wettest month is January whilst the driest month is September.

2.6 Topography and Hydrology

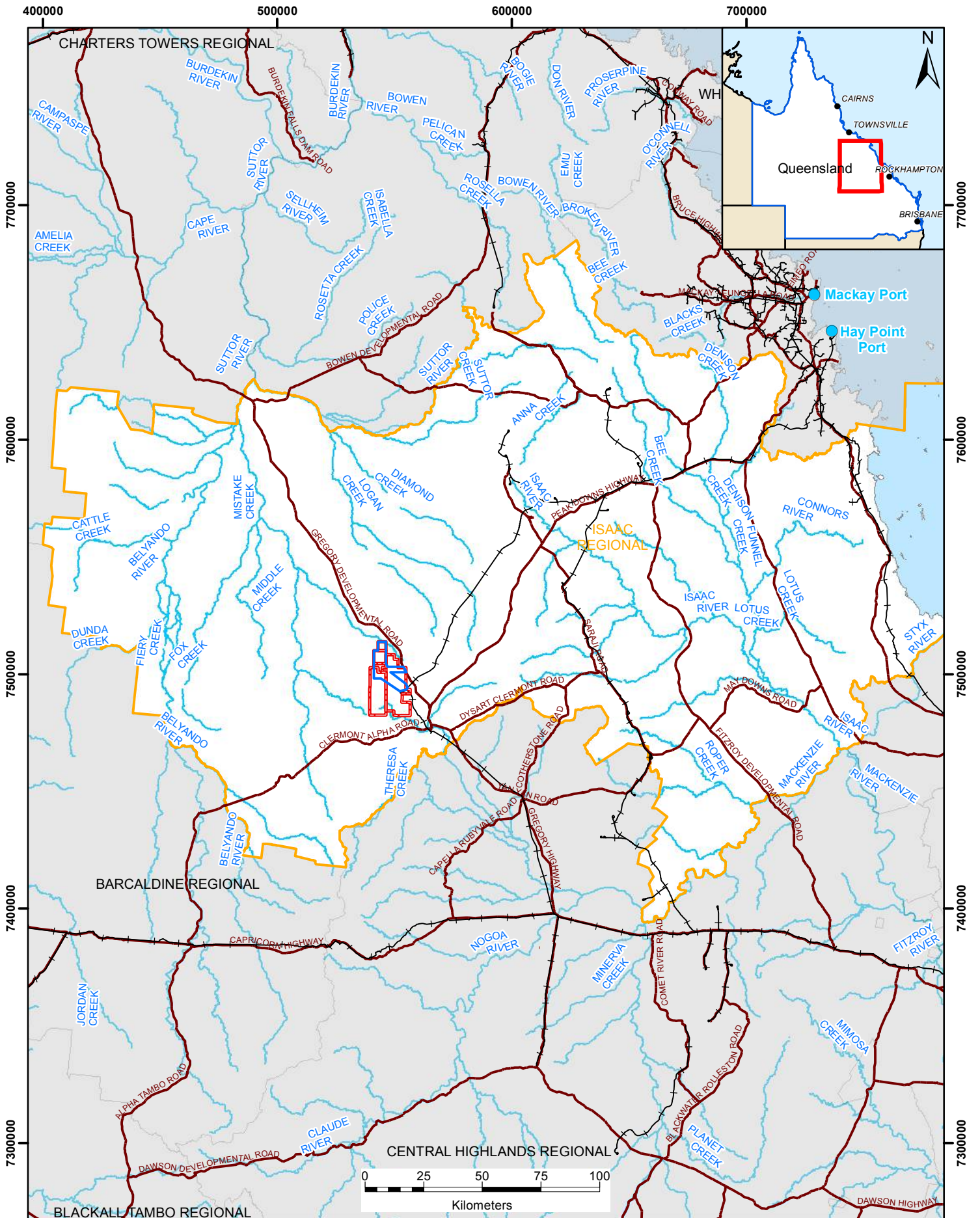
The Survey Area has gently undulating topography, and ranges from about 280 m above Australian Height Datum (AHD) in the north of EPC 776, up to about 430 m AHD in the southern part of EPC 1738.

Major drainage features within the Survey Area include: Western Creek, located in the west, and Brigalow Creek. Brigalow Creek and Western Creek are ephemeral watercourses that flow north through the Study Area. Brigalow Creek flows into Miclere Creek and then into Mistake Creek which is part of the eastern headwaters of the Belyando River. The Belyando River discharges into the Suttor River system which continues north and is joined by Rosetta Creek before entering into the Burdekin Falls Dam impoundment (**Figure 2-1**).

The Burdekin Basin covers an area of approximately 129,700 km². The area of catchment on Brigalow Creek upstream from the proposed mine site is around 60 km².

2.7 Geology

The Study Area lies in the western part of the Bowen Basin in the Moorlands and Bendemeer Basins. Locally, the Bendemeer Basin is assessed as a north south trending Permian basin some 13 km long and 1 km to 2.5 km wide. The basin is understood to be a fault bound graben up to 400 m thick (Xenith Consulting, 2013).



Legend

- Study Area
- PPP and EPC's 775, 776, 1738 & 2013
- Towns
- Ports
- Isaac Regional Council Government Area
- Main Road
- Railways
- Major Watercourses

Location of the Moorlands Project

Figure 2-1

Cuesta Coal Moorlands Project



Date: 21/07/2014

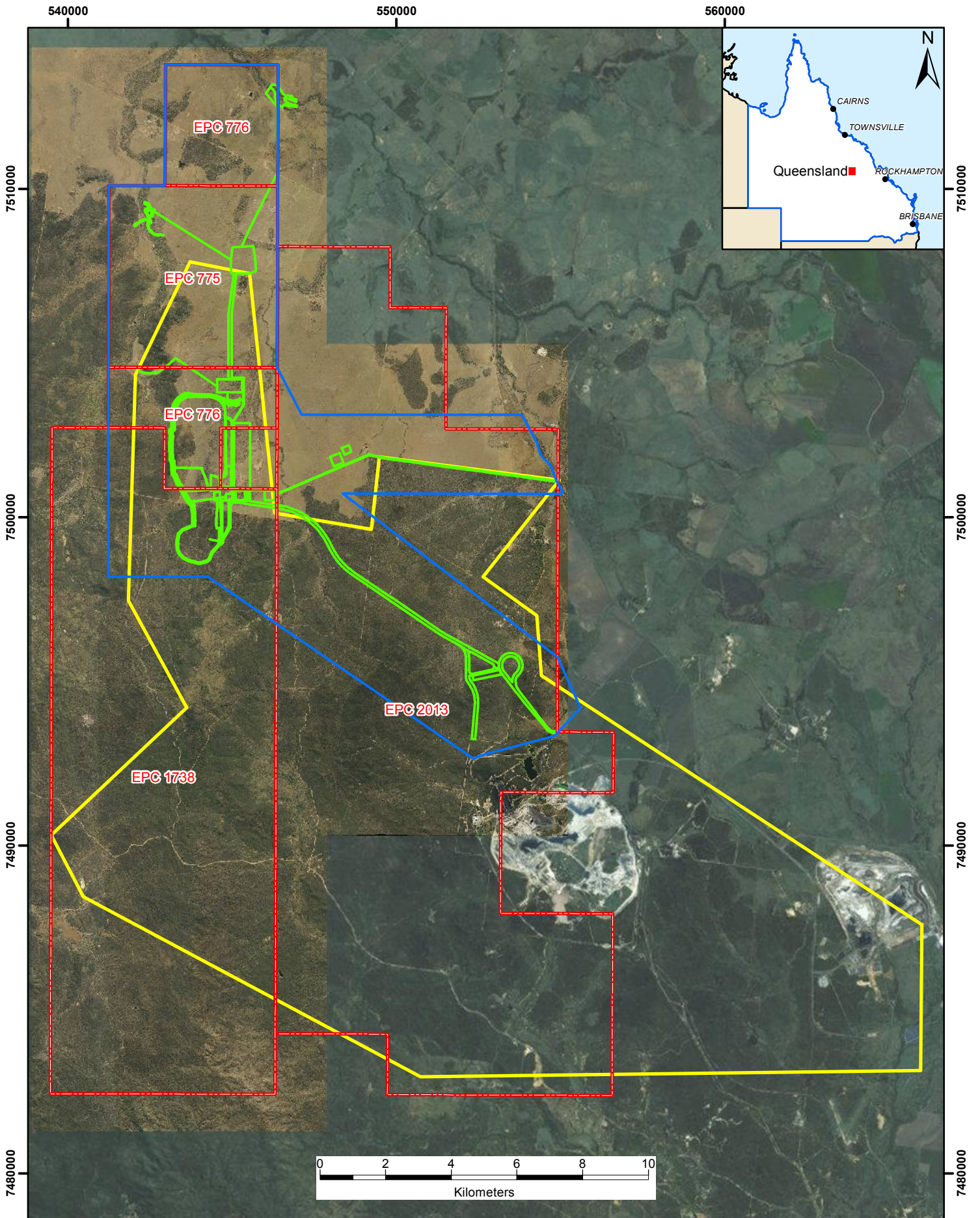
Author: Christopher Maddox

Revision: R1

Map Scale: 1:2,100,000

Coordinate System: GDA 1994 MGA Zone 55

ELP gives no warranty in relation to the data (including accuracy, reliability, completeness or suitability) and accept no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of or reliance upon the data. Data must not be used for direct marketing or be used in breach of privacy laws. Tenures © Department of Mines and Energy - MERLIN Mining Tenures Database (2014). Local Government Areas © State of Queensland (Department of Natural Resources and Mines) 2014. State Boundaries, Towns, Ports, Roads, Railways and Watercourses © Geoscience Australia (2009).



Legend

- Study Area
- PPP and EPC's 775, 776, 1738 & 2013
- Proposed Disturbance Area
- Survey Area

Defined Project Areas

Figure 2-2

Cuesta Coal Moorlands Project



Date: 7/07/2014

Author: Christopher Maddox

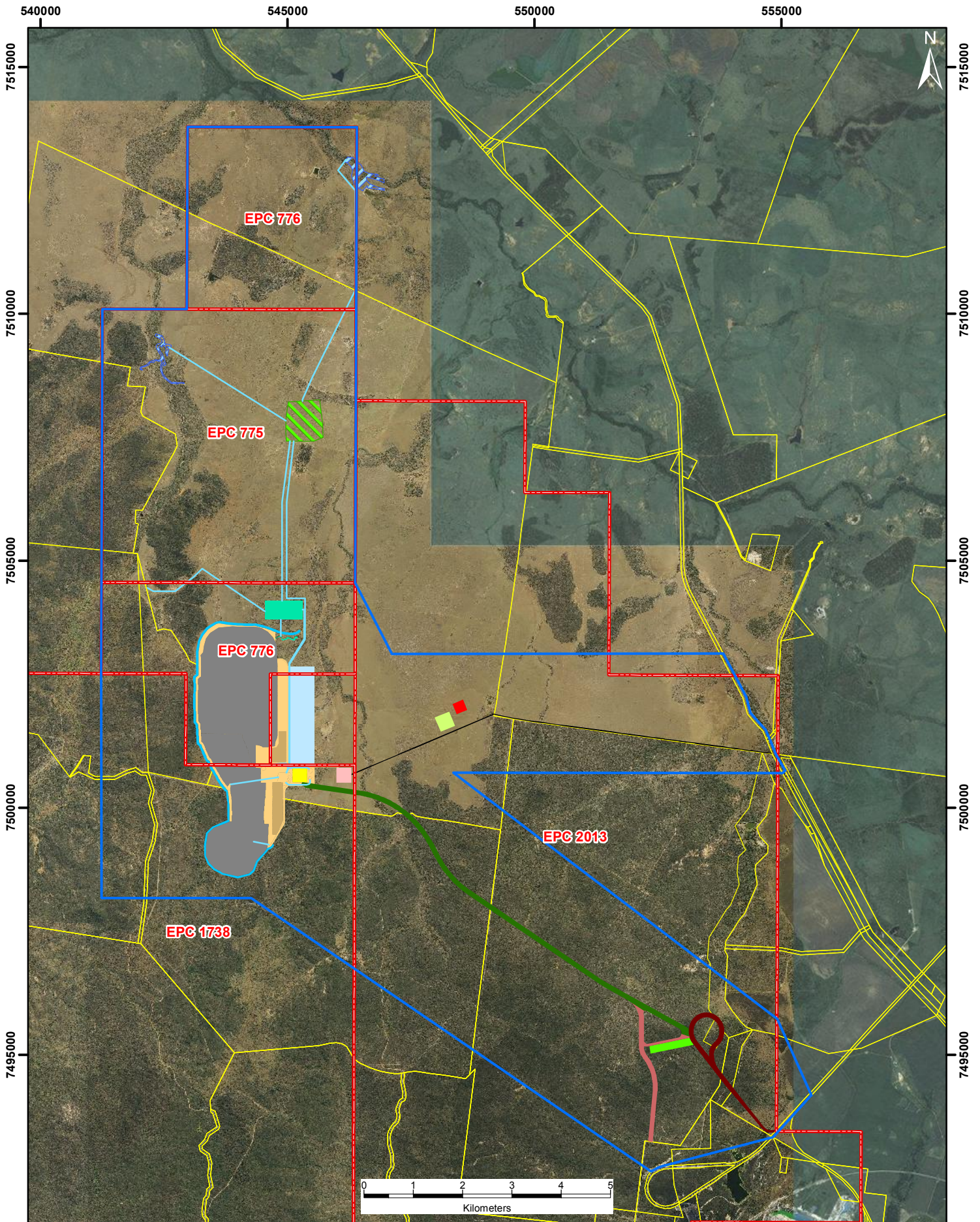
Map Scale: 1:150,000

Revision: R1

Coordinate System: GDA 1994 MGA Zone 55

G:\CLIENTS\A-TO-D\Cuesta Moorlands Project\GIS\Maps\BPA\CUEGEN_Fig_2_DefinedAreas_140707.mxd

Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) [2013]. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws. ELP gives no warranty in relation to the data (including accuracy, reliability, completeness or suitability) and accept no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of or reliance upon the data. Tenures © Department of Mines and Energy - MERLIN Mining Tenures Database (2014). State Boundaries and Towns © Geoscience Australia (2006). World Imagery - Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.



Legend

- Study Area
- PPP and EPC's 775, 776, 1738 and 2013
- Cadastre
- Pit and Waste Rock Dumps
- Irrigation Area
- Construction Camp
- Site Access Road
- General Disturbance Area
- Topsoil Stockpiles
- Co-disposal Dam
- MIA
- Mine Water Dam
- Product Coal Haul Road
- Product Coal Haul Road Extension
- ROM Pad, Product Coal Pad and CHPP
- Rail Loop and Rail Spur
- Train Loading Facility
- Weirs
- Harvest Dam
- Clean Water Diversion/Bund
- Water Transfer Pipelines

Proposed Locations of Project Activities and Infrastructure

Figure 2-3

Cuesta Coal Moorlands Project



Date: 9/07/2014

Author: christopher.wright

Map Scale: 1:100,000

Coordinate System: GDA 1994 MGA Zone 55

Revision: R1

Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) (2013). In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws. ELP gives no warranty in relation to the data (including accuracy, reliability, completeness or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of or reliance on the data. World Imagery - Service Layer Credits: Source: Esri, i-cubed, USDA, USGS, AEX, Geocode, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community. Tenures © Department of Mines and Energy - MERLIN Mining Tenures Database (2014). Cadastre © State of Queensland (Department of Natural Resources and Mines) 2014. 20cm Aerial Imagery © State of Queensland (Department of Natural Resources and Mines) (2013).

3 DESKTOP REVIEW METHODS

3.1 Introduction

Comprehensive desktop reviews of the Study Area were done before planning the field trips. The findings are summarised in **Section 4**. The results of the desktop and field surveys done by ELP (2013) were used to determine which conservation significant species were likely to occur on site, and consequently informed the methods for the targeted fauna, flora, vegetation and habitat surveys.

The desktop review (ELP 2012a) of terrestrial flora and fauna ‘known to be present’ and ‘likely to be present’ in the Study Area was generated from information in the datasets listed in **Table 3-1**. Unless otherwise stated, the desktop review area was generally a 25 km radius from a central point within the Study Area.

The scope of work included a search of publicly available environmental and mining databases and preparation of preliminary constraints mapping using GIS. The databases and methods of interrogation are described in **Table 3-1**. The assessment provides an initial review of environmental data which identifies potential risks and constraints to Project development, and informs environmental studies including surveys for habitats of conservation significant species, and to focus targeted fauna and flora surveys.

3.2 Method

Desktop studies addressed:

- a. The status of the tenements in relation to their compliance with the conditions of the *Mineral Resources Act 1989* (Qld) (MR Act).
- b. Potential environmental constraints such as:
 - Category A, B, and C Environmentally Sensitive Areas (ESAs),
 - conservation significant ecosystems or habitat,
 - registered historical cultural heritage sites,
 - protected areas such as National Parks,
 - other protected areas such as Wetland Management Areas, existing in or adjacent to the tenements, and
 - conservation significant plants and animals potentially present in the tenements.
- c. Native Title considerations.
- d. Indigenous Cultural Heritage considerations.
- e. Historical Cultural Heritage considerations.

For the purposes of this Terrestrial Ecology Report, only the matters indicated under ‘b. Potential environmental constraints’ will be addressed.

Table 3-1 Scope of environmental database interrogation

Database	Method of interrogation	Variation in Method
Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) Protected Matters Online Search Tool	A search of the general Study Area using the Protected Matters Search Tool based on a central coordinate (Appendix 1). http://www.environment.gov.au/epbc/pms/index.html	A broad EPBC report was generated on 02/02/2012 and on 27/09/2013 an EPBC report for the Project Disturbance Area was generated. Both are referred to in this discussion. ¹
EHP 'Wildlife Online' (Wildnet)	Wildlife Online generates species lists based on data contained within WildNet for geographic areas of Queensland including national parks, state forests and local government areas (LGAs) (Appendix 2).	
Department of Environment and Heritage Protection (EHP) mapped Environmentally Sensitive Areas (ESA) – Mining Activities	A search of the EHP ESA mapping using the online mapping tool: http://www.ehp.qld.gov.au/licences-permits/maps_of_environmentally_sensitive_areas.php GIS working draft maps were produced from databases obtained from various data sources and organisations.	
EHP mapped High Value Regrowth Vegetation – Version 2.1, Vegetation Management Act Regional Ecosystems and Remnant - Version 6.1 and EHP mapped Vegetation Management Act Essential Habitat – Version 3.1	A search of the EHP High Value Regrowth Vegetation mapping, Vegetation Management Act Regional Ecosystems and Remnant mapping and Vegetation Management Act Essential Habitat mapping using the online mapping tool: http://www.EHP.qld.gov.au/wildlife-ecosystems/biodiversity/regional_ecosystems/introduction_and_status/regional_ecosystem_maps/index.php http://www.EHP.qld.gov.au/wildlife-ecosystems/biodiversity/regional_ecosystems/introduction_and_status/regional_ecosystem_maps/index.php Working draft maps based on data acquired from EHP.	EPC 1738 referred to Versions 2, 6 and 3 respectively
EHP mapped Property Maps of Assessable Vegetation (PMAV)	A search of the EHP Property Maps of Assessable Vegetation (PMAV) mapping using the online mapping tool: http://www.EHP.qld.gov.au/wildlife-ecosystems/biodiversity/regional_ecosystems/introduction_and_status/regional_ecosystem_maps/index.php Working draft maps based on data acquired from EHP.	
EHP mapped Great Barrier	Working draft maps based on EHP data .	

¹ For completeness, all EPBC Searches generated for the Moorlands Project are included in Appendix 1 as they all informed fauna and flora surveys conducted over the extent of the survey area.

Database	Method of interrogation	Variation in Method
Reef (GBR) Catchment		
EHP mapped Wetlands	A search of the EHP WetlandMaps based on coordinates generally central to the Lot with a buffer, using the online mapping tool: http://www.epa.qld.gov.au/wetlandinfo/site/MappingFandD/WetlandMapsAndData/WetlandMaps.html Working draft maps based on EHP data .	
EHP mapped Groundwater	Working draft maps based on EHP data .	
EHP mapped Referable Wetlands	A search of the EHP Referable Wetland mapping by Lot on Plan numbers using the online mapping tool: http://www.ehp.qld.gov.au/ecosystems/wetlands/referable-wetlands-form.php Working draft maps based on data acquired from EHP. For referable wetlands, GIS data was sourced from EHP and interrogated in house. This information was cross checked against the EHP information published online (as interactive mapping searching against lot on plan references). For tenements with more than 20 lots, a QA sample was taken to verify the GIS data based on the 10 largest lots (by area).	
Interactive Resource Tenure Maps (IRTM) and EHP mapped Wild Rivers Area	A search of the EHP Wild Rivers mapping by Lot on Plan number using the online mapping tool: http://www.ehp.qld.gov.au/wildrivers/wildrivers-map.php#lotform Cross-checked with Wild Rivers mapping within IRTM. http://mines.industry.qld.gov.au/geoscience/interactive-resource-tenure-maps.htm Working draft maps based on EHP data .	
Department of Natural Resources and Mines (DNRM) mapped Strategic Cropping Land (SCL)	A search of the DNRM SCL mapping by Lot on Plan number using the online mapping tool: http://www.nrm.qld.gov.au/land/planning/strategic-cropping/request-map.php#lot Cross-checked with SCL mapping within IRTM. http://mines.industry.qld.gov.au/geoscience/interactive-resource-tenure-maps.htm Working draft maps based on EHP/DNRM data .	

Database	Method of interrogation	Variation in Method
Mapped Stock Routes, Railways and Roads	Initial review based on state controlled roads mapping from the Department of Transport and Main Roads. http://www.tmr.qld.gov.au/Travel-and-transport/Maps-and-guides/Queensland-state-controlled-roads-and-region-maps.aspx Working draft maps based on DNRM, TMR, IRTM and EHP data. State roads identified from: http://www.tmr.qld.gov.au/Travel-and-transport/Maps-and-guides/Queensland-state-controlled-roads-and-region-maps.aspx Cross checked against Geoscience 250k railway layer.	
IRTM mapped Constrained Areas	Initial review based on mapping in IRTM. http://mines.industry.qld.gov.au/geoscience/interactive-resource-tenure-maps.htm Working draft maps based on DNRM data .	
IRTM mapped Restricted Areas	Initial review based on mapping within IRTM. http://mines.industry.qld.gov.au/geoscience/interactive-resource-tenure-maps.htm Working draft maps based on DNRM data acquired .	
IRTM mapped Sterile Land	Initial review based on mapping within IRTM. http://mines.industry.qld.gov.au/geoscience/interactive-resource-tenure-maps.htm Working draft maps based on DNRM data acquired .	
Files held by Hannigan & Associates Pty Ltd	Data Room	Specific to EPCs 775 and 776

3.2.1 Previous Surveys

The Bowen Basin, located in central Queensland, is the most important Permian coal basin in Queensland. The Basin has the highest volume of coal in Queensland and is of greatest commercial importance. Accordingly, there are a high number of existing and proposed coal, mineral and infrastructure developments in the region. Projects in the same bioregion which have made terrestrial ecological data publically available include:

- Newlands Extension Project – approximately 160 km north-east
- Codrilla coal mine – approximately 135 km north-east
- Springsure Creek coal mine – approximately 175 km south-west
- Caval Ridge coal mine – approximately 85 km north-east.

However, because of the distance from the Study Area that the studies occurred, this data was not used for the terrestrial ecology desktop assessment. It is unlikely that there would be correspondence

between the habitats and flora and fauna communities in these sites and the Study Area, therefore the data would not reflect the ecological environment in the Study Area.

3.2.2 Excluded Scope

The following aspects were not included in the scope of work for desktop assessment:

- land access considerations
- validation of results using aerial photograph interpretation
- investigation of contaminated land
- identification and location of sensitive receptors (e.g. dwellings, schools, churches)
- investigation into the status of expenditure commitments
- department enquiries.

3.2.3 Limitations of Desktop Searches

Desktop searches were based upon public information made available through government websites, and on information contained in the Data Room.

Much of the data prepared and provided by the Department of Environment and Heritage Protection (EHP) and the Department of Natural Resources and Mines (DNRM), is prepared using remote sensing and other methods of estimating types, characteristics and extent of environmental resources. GIS mapping should be considered as an estimate to be confirmed with onsite surveys.

4 DESKTOP REVIEWS FINDINGS

4.1 Desktop Review Results

Three separate desktop reviews were prepared (ELP 2012a): EPC 775, EPC 776 and EPC 1738. The tabulated results are presented below in **Table 4-1** and are discussed in **Section 4.1.4**

4.1.1 EPC 775

Table 4-1 provides a summary of the database search outcomes for EPC 775. A discussion of the findings of the database searches is presented in **Sections 4.2, 4.3, 4.4** and **4.5**, and a summary of the key findings is presented in **Sections 4.6, 4.6.1, 4.6.2, 4.7** and **4.8**.

Table 4-1 Summary of Potential Environmental Constraints for EPC 775

Search: EPC 775	Result:
EPBC Act Protected Matters Online Search Tool. Area Search Co-ordinates used (tenement extent). Perimeter Coordinates: -22.56507,147.40123, -22.51523,147.40118, - 22.51518,147.45105, -22.5652,147.45121 Buffer Distance: 1km.	0 x World Heritage Properties. 0 x National Heritage Places. 0 x Wetland of International 0 x Great Barrier Reef Marine Park. 0 x Commonwealth Marine Areas. 3x Threatened ecological communities: <ul style="list-style-type: none"> • Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant), (endangered), community known to occur within area. • Natural Grasslands of the Queensland Central Highlands and the Northern Fitzroy basin (endangered) community may occur within area. • Weeping Myall Woodlands (endangered), community likely to occur within area. 12 x Threatened species. 9 x Migratory species. 0 x Commonwealth Lands. 0 x Commonwealth Heritage Places. 8 x Marine species. 0 x Whales and other Cetaceans. 0 x Critical Habitats. 0 x Commonwealth Reserves. 0 x Places on the Register of the National Estate Areas (RNE). 0 x State and Territory Reserves. 0 x Regional Forest Agreements. 8 x Invasive species. 0 x Nationally Important Wetland.
EHP mapped Environmentally Sensitive Areas (ESA) – Mining Activities Centred on Tenure EPC 775	Classifications within tenement boundary: <ul style="list-style-type: none"> • 0 x Category A. • 14 x Category B – endangered regional ecosystems (biodiversity status) (with 500m Category B buffers). • 1 x Category C (State Forests), Blair Athol State Forest.

Search: EPC 775	Result:
<p>EHP mapped Vegetation.</p> <p><u>Data sources:</u></p> <ul style="list-style-type: none"> • Vegetation Management Act - High Value Regrowth Vegetation (Version 2.1). • Vegetation Management Act – Essential Habitat (Version 3.1). • Vegetation Management Act - Regional Ecosystems and Remnant (Version 6.1). • Property Maps of Assessable Vegetation (PMAV). <p>Search based on Tenure EPC 775 area.</p>	<p>Classifications within tenement boundary:</p> <p>Remnant vegetation</p> <ul style="list-style-type: none"> • 14 x polygons remnant vegetation containing endangered regional ecosystems. • 3 x polygons remnant vegetation containing of concern regional ecosystems. • 7 x polygons remnant vegetation containing least concern regional ecosystems. • Present - VMA remnant watercourses. • 0 x polygons VMA Great Barrier Reef Wetlands. • 0 x VMA Essential Habitat. <p>Regrowth vegetation</p> <ul style="list-style-type: none"> • 6 x polygons endangered regrowth Vegetation. • 3 x polygons of concern regrowth Vegetation. • 2 x polygons least concern regrowth Vegetation. • 0 x polygons Regrowth watercourses. • 0 x polygons VMA Great Barrier Reef Regrowth Wetlands. • 0 x polygons VMA Essential regrowth habitat. <p>Other</p> <ul style="list-style-type: none"> • 2 x polygons PMAV Category X areas present. • 1 x polygons National Parks, Conservation Areas, State Forest or reserves (Blair Athol State Forest).
<p>EHP mapped Draft SPP Great Barrier Reef (GBR) Catchment.</p>	<p>The tenement is within the GBR catchment.</p>
<p>Good Quality Agricultural Land (GQAL).</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • GQAL Category B present • GQAL Category C1 present • GQAL Category C2 present • GQAL Category C3 present
<p>EHP mapped Wetlands. Based on tenement area EPC 775.</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • 0 x Marine System. • 0 x Estuarine System. • Riverine System Drainage Lines and Creek Channels. • 0 x Lacustrine System. • 0 x Palustrine System (e.g. vegetated swamps) wetland regional ecosystems. • 0 x GBR Wetland Protected Area – Trigger Area. • 0 x Wetland Management Area and Wetland Trigger Areas. • 0 x Springs.

Search: EPC 775	Result:
	<ul style="list-style-type: none"> • 12 x polygons remnant regional ecosystems 1-50% Wetland (mosaic units).
EHP mapped Referable Wetlands.	<p>Wetland classifications mapped within tenement boundary:</p> <p>GBR Wetland Protection Areas:</p> <ul style="list-style-type: none"> • 0 x Wetland. • 0 x Trigger Area. <p>Wetland Management Areas:</p> <ul style="list-style-type: none"> • 0 x Wetland. • 0 x Trigger Area.
IRTM and EHP mapped Wild Rivers Area	IRTM - Tenement is outside Wild Rivers Area
IRTM and EHP mapped Strategic Cropping Land (SCL).	<p>IRTM - Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • Present - SCL Mapped (Excised) Trigger Areas within SCL Management Area. • 0 x SCL Mapped Trigger Areas within SCL Protected Area.
EHP Mapped Groundwater.	<ul style="list-style-type: none"> • There are no observation bores within the tenement. • The tenement is within the Highlands Subartesian Area. • The tenement boundary is not intersected by any Groundwater Alluvium Boundary areas.
Mapped Stock Routes, Railways, Roads and state controlled roads.	<p>Identified within the tenement:</p> <ul style="list-style-type: none"> • Stock Routes: <ul style="list-style-type: none"> ▪ 0 x Primary. ▪ 0 x Secondary. ▪ 0 x Minor. ▪ 0 x Unused/Inactive. • Roads: <ul style="list-style-type: none"> ▪ 0 x Highway. ▪ 0 x Main Road. ▪ 0 x Local Roads. ▪ 0 x Tracks. • Rail: <ul style="list-style-type: none"> ▪ 0 x Rail present on site. • Power: <ul style="list-style-type: none"> ▪ 0 x Ergon Power Network.
IRTM mapped Constrained Areas.	Present within tenement (Blair Athol State Forest).
IRTM mapped Restricted Areas.	Present within tenement. (Restricted Area Number 394 to facilitate future release of land for exploration).
IRTM mapped Sterile Land.	Not Present within tenement.
IRTM mapped Urban Restricted Areas.	Not Present within tenement.

4.1.2 EPC 776

Table 4-2 provides a summary of the database search outcomes for EPC 776. A discussion of the findings of the database searches is presented in **Sections 4.2, 4.3, 4.4** and **4.5**, and a summary of the key findings is presented in **Sections 4.6, 4.6.1, 4.6.2, 4.7** and **4.8**.

Table 4-2 Summary of Potential Environmental Constraints for EPC 776

Search: EPC 776	Result:
<p>EPBC Act Protected Matters Online Search Tool.</p> <p>Area Search Co-ordinates used (tenement extent).</p> <p>Perimeter Coordinates:</p> <p>North Area -22.51506,147.41795, -22.4818,147.41767, -22.48189,147.45119, -22.5148,147.45092</p> <p>South Area -22.59837,147.41839, -22.58192,147.41778, -22.58127,147.401, -22.56499,147.40133, -22.56521,147.45071, -22.58148,147.45095, -22.58223,147.43418, -22.59816,147.43423</p> <p>Buffer Distance: 1km.</p>	<p>0 x World Heritage Properties. 0 x National Heritage Places. 0 x Wetland of International Significance. 0 x Great Barrier Reef Marine Park. 0 x Commonwealth Marine Areas.</p> <p>3x Threatened ecological communities:</p> <ul style="list-style-type: none"> • Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant), (endangered), community known to occur within area. • Natural Grasslands of the Queensland Central Highlands and the Northern Fitzroy basin (endangered) community may occur within area. • Weeping Myall Woodlands (endangered), community likely to occur within area. <p>14 x Threatened species. 9 x Migratory species. 0 x Commonwealth Lands. 0 x Commonwealth Heritage Places. 8 x Marine species. 0 x Whales and other Cetaceans. 0 x Critical Habitats. 0 x Commonwealth Reserves. 0 x Places on the Register of the National Estate Areas (RNE). 0 x State and Territory Reserves. 0 x Regional Forest Agreements. 8 x Invasive species. 0 x Nationally Important Wetland.</p>
<p>EHP mapped Environmentally Sensitive Areas (ESA) – Mining Activities Centred on Tenure EPC 776</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • 0 x Category A. • 17 x Category B – endangered regional ecosystems (biodiversity status) (with 18 x 500m Category B buffers). • 1 x Category C (State Forests) Blair Athol State Forest.
<p>EHP mapped Vegetation.</p> <p><u>Data sources:</u></p> <ul style="list-style-type: none"> • Vegetation Management Act - High Value Regrowth Vegetation (Version 2.1). • Vegetation Management Act – Essential Habitat (Version 3.1). • Vegetation Management Act - Regional Ecosystems and Remnant (Version 6.1). • Property Maps of Assessable Vegetation 	<p>Classifications within tenement boundary:</p> <p>Remnant vegetation</p> <ul style="list-style-type: none"> • 17 x polygons remnant vegetation containing endangered regional ecosystems. • 4 x polygons remnant vegetation containing of concern regional ecosystems. • 4 x polygons remnant vegetation containing least concern regional ecosystems. • Present - VMA remnant watercourses.

Search: EPC 776	Result:
<p>(PMAV).</p> <p>Search based on Tenure EPC 776 area.</p>	<ul style="list-style-type: none"> • 0 x polygons VMA Great Barrier Reef Wetlands. • 0 x VMA Essential Habitat. <p>Regrowth vegetation</p> <ul style="list-style-type: none"> • 1 x polygons endangered Regrowth Vegetation. • 0 x polygons of concern regrowth Vegetation. • 0 x polygons least concern regrowth Vegetation. • 0 x polygons regrowth watercourses. • 0 x polygons VMA Great Barrier Reef regrowth wetlands. • 0 x polygons VMA essential regrowth habitat. <p>Other</p> <ul style="list-style-type: none"> • 3 x polygons PMAV Category X areas present. • 1 x polygons National Parks, Conservation Areas, State Forest or reserves (State Forest) Blair Athol State Forest).
<p>EHP mapped Draft SPP Great Barrier Reef (GBR) Catchment.</p>	<p>The tenement is within the GBR catchment.</p>
<p>Good Quality Agricultural Land (GQAL).</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • GQAL Category C1 present • GQAL Category C2 present • GQAL Category C3 present
<p>EHP mapped Wetlands. Based on tenement area EPC 776.</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • 0 x Marine System. • 0 x Estuarine System. • Riverine System Drainage Lines and Creek Channels. • 2 x Lacustrine System. • 0 x Palustrine System (e.g. vegetated swamps) wetland regional ecosystems. • 0 x GBR Wetland Protected Area – Trigger Area. • 0 x Wetland Management Area and Wetland Trigger Areas. • 0 x Springs. • 7 x polygons remnant regional ecosystems 1-50% Wetland (mosaic units).
<p>EHP mapped Referable Wetlands.</p>	<p>Wetland classifications mapped within tenement boundary:</p> <p>GBR Wetland Protection Areas:</p> <ul style="list-style-type: none"> • 0 x Wetland. • 0 x Trigger Area. <p>Wetland Management Areas:</p>

Search: EPC 776	Result:
	<ul style="list-style-type: none"> • 1 x Wetland. • 1 x Trigger Area.
IRTM and EHP mapped Wild Rivers Area	IRTM - Tenement is outside Wild Rivers Area
IRTM and EHP mapped Strategic Cropping Land (SCL).	IRTM - Classifications within tenement boundary: <ul style="list-style-type: none"> • Present - SCL Mapped (Excised) Trigger Areas within SCL Management Area. • 0 x SCL Mapped Trigger Areas within SCL Protected Area.
EHP Mapped Groundwater.	<ul style="list-style-type: none"> • There are no observation bores within the tenement. • The tenement is within the Highlands Subartesian Area. • The tenement boundary is intersected by the Belyando – Suttor Rivers Area Groundwater Alluvium Boundary.
Mapped Stock Routes, Railways, Roads and State controlled roads.	Identified within the tenement: <ul style="list-style-type: none"> ▪ Stock Routes: <ul style="list-style-type: none"> ▪ 0 x Primary. ▪ 0 x Secondary. ▪ 0 x Minor. ▪ 0 x Unused/Inactive. ▪ Roads: <ul style="list-style-type: none"> ▪ 0 x Highway. ▪ 0 x Main Road. ▪ 0 x Local Roads. ▪ 0 x Tracks. ▪ Rail: <ul style="list-style-type: none"> ▪ 0 x Rail present on site. ▪ Power: <ul style="list-style-type: none"> ▪ 0 x Ergon Power Network.
IRTM mapped Constrained Areas.	<ul style="list-style-type: none"> • Present within tenement (Blair Athol State Forest).
IRTM mapped Restricted Areas.	<ul style="list-style-type: none"> • Present within tenement. (Restricted Area Number 394 to facilitate future release of land for exploration).
IRTM mapped Sterile Land.	Not Present within tenement.
IRTM mapped Urban Restricted Areas.	Not Present within tenement.

4.1.3 EPC 1738

Table 4-3 provides a summary of the database search outcomes for EPC 1738. A discussion of the findings of the database searches is presented in **Sections 4.2, 4.3, 4.4** and **4.5**, and a summary of the key findings is presented in **Sections 4.6, 4.6.1, 4.6.2, 4.7** and **4.8**.

Table 4-3 Summary of Potential Environmental Constraints for EPC 1738

Search: EPC1738	Result: Tenement
<p>EPBC Act Protected Matters Online Search Tool</p> <p>Area Search Co-ordinates used (approximate tenement extent):</p> <p>-22.58333,147.38333 -22.58333,147.45 -22.76667,147.45 -22.76667,147.38333</p> <p>Buffer Distance: 1km</p>	<p>0 x World Heritage Properties: 0 x National Heritage Places: 0 x Wetland of International Significance 0 x Great Barrier Reef Marine Park 0 x Commonwealth Marine Areas</p> <p>4x Threatened ecological communities:</p> <ul style="list-style-type: none"> • Brigalow (<i>Acacia harpophylla</i> dominant and co dominant) (endangered). • Natural Grasslands of the Queensland Central Highlands and Northern Fitzroy Basin (endangered). • Semi-evergreen vine thickets of Brigalow Belt (North and South) and Nandewar Bioregions (endangered). • Weeping Myall Woodlands (endangered). <p>13 x Threatened species 12 x Migratory species</p> <p>0 x Commonwealth Lands: 0 x Commonwealth Heritage Places</p> <p>11 x Marine species</p> <p>0 x Whales and other Cetaceans 0 x Critical Habitats 0 x Commonwealth Reserves 0 x Places on the Register of the National Estate Areas (RNE) 0 x State and Territory Reserves 0 x Regional Forest Agreements</p> <p>8 x Invasive species 0 x Nationally Important Wetland</p>
<p>EHP mapped Environmentally Sensitive Areas (ESA) – Mining Activities</p> <p>Centred on Tenure EPC1738</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • Category A - No Areas • Category B - endangered regional ecosystems (biodiversity status) (3 Areas) • Category C – State Forests
<p>EHP mapped High Value Regrowth Vegetation – Version 2.1, (Vegetation Management Act)</p> <p>Based on Tenement Area</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • High value regrowth vegetation containing of concern regional ecosystems • Vegetation Management Act remnant vegetation • Other Watercourse
<p>EHP mapped Property Maps of Assessable Vegetation (PMAV)</p> <p>Based on Tenement Area</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • 0 x Category A areas • 0 x Category B areas (offsite - within 250m to east) • 0 x Category C areas • 1 x Category X areas
<p>Vegetation Management Act - Regional Ecosystems and Remnant - Version 6.1</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • remnant vegetation containing endangered regional ecosystems

Search: EPC1738	Result: Tenement
Based on Tenement Area	<ul style="list-style-type: none"> • remnant vegetation containing of concern regional ecosystems • remnant vegetation that is a least concern regional ecosystem • Non remnant vegetation • Vegetation Management Act Essential Habitat • PMAV category X area • National Park, Conservation Area State Forest and other reserves. • Watercourses • 0 x Remnant vegetation under Section 20AH of the Vegetation Management Act • 0 x Plantation Forest • 0 x Dam/reservoir • 0 x Great Barrier Reef Wetlands
<p>Vegetation Management Act – Essential Habitat Version 3.1</p> <p>Based on Tenement Area</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • remnant vegetation containing endangered regional ecosystems • remnant vegetation containing of concern regional ecosystems • remnant vegetation that is a least concern regional ecosystem • Non remnant vegetation • Vegetation Management Act Essential Habitat • Vegetation Management Act Essential Habitat Species Records • PMAV category X area • National Park, Conservation Area State Forest and other reserves. • 0 x Remnant vegetation under Section 20AH of the <i>Vegetation Management Act 1999</i> • 0 x Plantation Forest • 0 x Dam/reservoir • 0 x Great Barrier Reef Wetlands
EHP mapped Draft SPP Great Barrier Reef (GBR) Catchment	<ul style="list-style-type: none"> • None present in tenement. • Tenement is inside GBR catchment.
<p>EHP mapped Wetlands</p> <p>Based on Tenement Area</p>	<p>Classifications within tenement boundary:</p> <ul style="list-style-type: none"> • Riverine System (e.g. river and creek channels) • 2 x Lacustrine System (e.g. Lakes) • 1 x Palustrine System (e.g. vegetated swamps) wetland regional ecosystems • 1 x Wetland Management Areas and 1 x Wetland Trigger Areas • Ecosystems 1-50% Wetland (mosaic units) • 0 x Marine System • 0 x Estuarine System • 0 x Springs
EHP mapped Referable Wetlands	<ul style="list-style-type: none"> • Wetland management areas mapped in the

Search: EPC1738	Result: Tenement
	tenement
IRTM and EHP mapped Wild Rivers Area	Tenement is outside Wild Rivers Area
IRTM and EHP mapped Strategic Cropping Land (SCL)	<ul style="list-style-type: none"> • Strategic Cropping Land within SCL Management Area.
EHP Mapped Groundwater	<p>There are no observation bores within the tenement.</p> <p>The tenements area does not intersect Groundwater Alluvium Boundaries</p> <p>The tenement is not within a Groundwater Management Area</p>
Mapped Stock Routes, Railways, Roads and state controlled roads	<p>Identified within the tenement:</p> <ul style="list-style-type: none"> ▪ Stock route ▪ Local roads
IRTM mapped Constrained Areas	Identified within the tenement:
IRTM mapped Restricted Areas	Identified within the tenement:
IRTM mapped Sterile Land	None identified within tenement
IRTM mapped Urban Restricted Areas	None identified within tenement

4.1.4 Discussion of Potential Environmental Constraints on the Tenements

Environmental matters of note across all three tenements include:

- EPBC TECs
 - Brigalow (*Acacia harpophylla* dominant and co-dominant), (endangered)
 - Highlands and Northern Fitzroy Basin Semi-evergreen Vine Thickets of Brigalow Belt. (endangered)
 - Natural Grasslands of the Queensland Central Highlands and the Northern Fitzroy basin (endangered)
 - Weeping Myall Woodlands (endangered)
- EPBC threatened species
- EPBC migratory species
- EPBC marine species
- EPBC invasive species
- Category B ESAs – endangered regional ecosystems (biodiversity status)
- Category C ESA (State Forests), Blair Athol State Forest
- remnant vegetation containing endangered regional ecosystems
- remnant vegetation containing of concern regional ecosystems
- remnant vegetation containing least concern regional ecosystems
- high value regrowth vegetation containing of concern regional ecosystems
- endangered regrowth vegetation
- of concern regrowth vegetation
- least concern regrowth vegetation
- PMAV Category X areas present
- *Vegetation Management Act 1999* (VMA) essential habitat

- *Vegetation Management Act 1999* (VMA) essential habitat species records
- Riverine system drainage lines and creek channels
- lacustrine systems
- palustrine system
- VMA remnant watercourses
- remnant regional ecosystems 1-50% wetland (mosaic units)
- Wetland Management Areas
 - wetlands
 - trigger Areas
- the tenement is within the GBR catchment
- the tenement is within the Highlands Subartesian Area
- the tenement boundary (EPC 776) is intersected by the Belyando–Suttor Rivers Area Groundwater Alluvium Boundary
- SCL mapped trigger areas within SCL Management Area
- GQAL Category B present
- GQAL Category C1 present
- GQAL Category C2 present
- GQAL Category C3 present
- stock route
- IRTM mapped Constrained Areas present within tenement (Blair Athol State Forest)
- IRTM mapped Restricted Areas present within tenement (Restricted Area Number 394 to facilitate future release of land for exploration).

Further discussion about indicated species of State conservation significance, mapped vegetation communities, Matters of National Environmental Significance (MNES), State Significant Biodiversity Values (SSBVs), Commonwealth and State significant flora and fauna species, habitat of key conservation concern, and weeds and pest animals, is presented in **Sections 4.2 to 4.8**.

Conservation significant ecosystems, plant or animal species, and invasive plants and animals were field surveyed and are discussed in this report. It should be noted that the desktop analysis did not include a formal or specific analysis of the potential environmental constraints within the proposed transport routes (**Figure 2-3**), although, prior to undertaking field work in this area, the same data sources were accessed to provide background information on matters of conservation significance potentially occurring in the area.

4.2 Species of State Conservation Significance

4.2.1 Animals and Plants of State Conservation Significance under the *Nature Conservation Act 1992*

The conservation significant animals and plants presented in **Table 4-4** and **Table 4-5** were indicated by data searches, including ‘Wildlife OnLine’ (‘WildNet’) (**Appendix 2**), as potentially being present on, or close to the Study Area. If these species are found present in the Proposed Disturbance Area, there may be a need to seek approval from the State or Commonwealth, as appropriate, to disturb and operate in these areas.

Table 4-4 *Birds, Mammals, Amphibians and Reptiles of Conservation Significance under the NC Act*

Group	Family	Scientific Name	Common Name	NCA Status	EPBC Status	Source
Reptile	Chelidae	<i>Rheodytes leukops</i>	Fitzroy River Turtle, Fitzroy	V	V	EPBC Search Tool

Group	Family	Scientific Name	Common Name	NCA Status	EPBC Status	Source
			Tortoise, Fitzroy Turtle, White-eyed River Diver			
Reptiles	Elapidae	<i>Denisonia maculata</i>	Ornamental Snake	V	V	EPBC Search Tool
Reptiles	Elapidae	<i>Furina dunmalli</i>	Dunmall's Snake	V	V	Wildnet; EPBC Search Tool
Reptiles	Pygopodidae	<i>Paradelma orientalis</i>	Brigalow Scaly-foot	V		EPBC Search Tool
Reptiles	Scincidae	<i>Egernia rugosa</i>	Yakka Skink	V	V	EPBC Search Tool
Reptiles	Scincidae	<i>Lerista allanae</i>	Allan's Lerista, Retro Slider	E	E	EPBC Search Tool
Birds	Accipitridae	<i>Erythroriorchis radiatus</i>	Red Goshawk	E	V	Wildnet; EPBC Search Tool
Birds	Accipitridae	<i>Lophoictinia isura</i>	Square-tailed Kite	NT		Wildnet
Birds	Anatidae	<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose	NT		Wildnet; Queensland Government Wetland Map Custom Report
Birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-Necked Stork	NT		Wildnet; Queensland Government Wetland Map Custom Report
Birds	Columbidae	<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern subspecies)	V	V	Wildnet; EPBC Search Tool
Birds	Meliphagidae	<i>Melithreptus gularis</i>	Black-chinned Honeyeater	NT		Wildnet
Birds	Passeridae	<i>Poephila cincta cincta</i>	Black-throated Finch (southern)	E	E	EPBC Search Tool
Birds	Ploceidae	<i>Neochmia ruficauda ruficauda</i>	Star Finch (eastern)	E	E	EPBC Search Tool
Birds	Rostratulidae	<i>Rostratula australis</i>	Australian Painted Snipe	V	E	Wildnet; EPBC Search Tool
Mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	Special LC	V	Queensland Government Wetland Map Custom Report;

Group	Family	Scientific Name	Common Name	NCA Status	EPBC Status	Source
						EPBC Search Tool
Mammals	Vespertilionidae	<i>Chalinolobus picatus</i>	Little Pied Bat	NT		Wildnet
Mammals	Vespertilionidae	<i>Nyctophilus corbeni</i>	South-eastern Long-eared Bat	V	V	EPBC Search Tool

Table 4-5 Plants of Conservation Significance under the NCA

Group	Family	Scientific Name	NCA Status	EPBC Status	Source
Higher dicots	Asteraceae	<i>Trioncinia retroflexa</i>	E		Wildnet
Higher dicots	Myrtaceae	<i>Corymbia clandestina</i>	V	V	EPBC 02/02/12 Search; Wildnet; Queensland Government Wetland Map Custom Report
Monocots	Poaceae	<i>Dichanthium queenslandicum</i>	V	E	Wildnet; EPBC Search 30/10/12
Monocots	Poaceae	<i>Digitaria porrecta</i>	NT	E ²	EPBC Search 30/10/12

4.2.2 Naturalised, Pest, or Invasive Plants and Animals

A summary of the pest, invasive or naturalised exotic animals and plants indicated by 'Wildnet' and 'Biosecurity Queensland' as potentially occurring on the site is presented in **Table 4-6** and **Table 4-7**. Where relevant, their pest status is indicated in the table.

Under the National Weeds Strategy, 32 introduced plants were identified as Weeds of National Significance (WONS). This list of 32 WONS was developed based on their invasiveness, potential for spread and environmental, social and economic impacts. National management strategies and manuals have been published for all of these species.

Additionally, in Queensland under the *Land Protection (Pest and Stock Route Management Act) 2002* (Qld) (LP Act), weed species are categorised as Class 1, Class 2 or Class 3. There are specific responsibilities associated with each class of pest:

Class 1

A Class 1 pest is one that has the potential to become a very serious pest in Queensland in the future. All landholders are required to keep their land free of Class 1 pests. It is a serious offence to introduce, feed, keep, release, supply (including give or sell), move or transport Class 1 pests without a permit.

Class 2

A Class 2 pest is one that is established in Queensland, but to a limited extent, and/or its potential economic, environmental or social impact is serious. All landholders must keep their land free of Class 2

² This species was delisted from the EPBC Act on the 14/12/13

pests. It is an offence to introduce, feed, keep, release, take, supply (including give or sell), move or transport Class 2 pests without a permit.

Class 3

A Class 3 pest is one that is established in parts of Queensland is widespread and/or its potential economic, environmental or social impact is not serious. It is an offence to introduce, feed, release, supply (including give or sell), move or transport a Class 3 pest.

Species not declared under the LP Act may be declared by local government under local laws.

Table 4-6 Invasive or Naturalised Animals Potentially in the Study Area Sourced from ‘Wildnet’, the Queensland Government Wetland Map Custom Report, and Biosecurity Queensland Database Searches

Group	Family	Scientific Name	Common Name	Source	LPA Status
Amphibians	Bufonidae	<i>Bufo marinus</i>	Cane Toad	Biosecurity Queensland	
Amphibians	Bufonidae	<i>Rhinella marina</i>	Cane Toad	Wildnet	
Reptile	Gekkonidae	<i>Hemidactylus frenatus</i>	House Gecko	Wildnet	
Birds	Anatidae	<i>Anas platyrhynchos</i>	Northern Mallard	Wildnet	
Birds	Columbidae	<i>Columba livia</i>	Rock Dove	Wildnet	
Birds	Passeridae	<i>Passer domesticus</i>	House Sparrow	Queensland Government Wetland Map Custom Report	
Mammals	Bovidae	<i>Bos Taurus</i>	European Cattle	Wildnet	
Mammals	Canidae	<i>Vulpes vulpes</i>	Fox	Wildnet; Biosecurity Queensland	Class 2
Mammals	Canidae	<i>Canis lupus familiaris</i>	Wild Dog	Wildnet; Biosecurity Queensland	Class 2
Mammals	Felidae	<i>Felis catus</i>	Cat	Wildnet	Class 2
Mammals	Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit	Wildnet; Queensland Government Wetland Map Custom Report	Class 2
Mammals	Muridae	<i>Mus musculus</i>	House Mouse	Wildnet	

Table 4-7 Invasive or Naturalised Plants Potentially Present in the Study Area Sourced from ‘Wildnet’, the Queensland Government Wetland Map Custom Report, and Biosecurity Queensland Database Searches

Group	Family	Scientific Name	Common name	Source	LPA Status	WONS Status
Higher Dicots	Acanthaceae	<i>Ruellia simplex</i>	Mexican petunia	Wildnet		
Higher Dicots	Amaranthaceae	<i>Gomphrena celosioides</i>	Gomphrena weed	Wildnet		
Higher Dicots	Apocynaceae	<i>Cascabela thevetia</i>	Yellow oleander	Wildnet; Biosecurity Queensland	Class 3	

Higher Dicots	Apocynaceae	<i>Cryptostegia grandiflora</i>	Rubber vine	Biosecurity Queensland	Class 2	WONS
Higher Dicots	Asteraceae	<i>Aster subulatus</i>	Wild Aster	Wildnet; Queensland Government Wetland Map Custom Report		
Higher Dicots	Asteraceae	<i>Cirsium vulgare</i>	Spear thistle	Wildnet		
Higher Dicots	Asteraceae	<i>Parthenium hysterophorus</i>	Parthenium	Biosecurity Queensland	Class 2	WONS
Higher Dicots	Asteraceae	<i>Xanthium spinosum</i>	Bathurst burr	Wildnet		
Higher Dicots	Asteraceae	<i>Zinnia peruviana</i>	Wild zinnia	Wildnet		
Higher Dicots	Boraginaceae	<i>Heliotropium amplexicaule</i>	Blue Heliotrope	Wildnet; Queensland Government Wetland Map Custom Report		
Higher Dicots	Cactaceae	<i>Harrisia</i> spp. syn. <i>Eriocereus</i> spp.	Harrisia Cactus	Biosecurity Queensland	Class 1/ Class 2	
Higher Dicots	Cactaceae	<i>Opuntia tomentosa</i>	Velvety tree pear	Wildnet, Biosecurity Queensland	Class 1/ Class 2	
Higher Dicots	Caesalpiaceae	<i>Parkinsonia aculeata</i>	Parkinsonia	Wildnet	Class 2	WONS
Higher Dicots	Caesalpiaceae	<i>Senna occidentalis</i>	Coffee Senna	Wildnet; Queensland Government Wetland Map Custom Report		
Higher Dicots	Crassulaceae	<i>Bryophyllum delagoense</i> .	Mother of millions	Wildnet; Biosecurity Queensland	Class 2	
Higher Dicots	Euphorbiaceae	<i>Euphorbia hirta</i>		Wildnet Queensland Government Wetland Map Custom Report		
Higher Dicots	Euphorbiaceae	<i>Jatropha gossypifolia</i>	Bellyache bush	Biosecurity Queensland	Class 2	WONS
Higher Dicots	Fabaceae	<i>Crotalaria juncea</i>	Sunhemp	Wildnet		
Higher Dicots	Fabaceae	<i>Stylosanthes humilis</i>	Townsville stylo	Wildnet		
Higher Dicots	Fabaceae	<i>Alysicarpus vaginalis</i>		Wildnet		
Higher Dicots	Malvaceae	<i>Abutilon guineense</i>		Wildnet		
Higher Dicots	Malvaceae	<i>Malvastrum americanum</i> subsp. <i>americanum</i>		Wildnet		

Higher Dicots	Malvaceae	<i>Sida spinosa</i>	Spiny sida	Wildnet		
Higher Dicots	Mimosaceae	<i>Leucaena leucocephala</i>	Leucaena (naturalised)	Biosecurity Queensland		
Higher Dicots	Mimosaceae	<i>Vachellia farnesiana</i>	Mimosa bush	Wildnet		
Higher Dicots	Mimosaceae	<i>Vachellia nilotica</i>	Prickly acacia	Wildnet; Biosecurity Queensland	Class 2	WONS
Higher Dicots	Oxalidaceae	<i>Oxalis corniculata</i>		Wildnet		
Higher Dicots	Papaveraceae	<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Mexican poppy	Queensland Government Wetland Map Custom Report		
Higher Dicots	Portulacaceae	<i>Portulaca oleracea</i>	Pigweed	Wildnet		
Higher Dicots	Solanaceae	<i>Datura ferox</i>	Fierce thornapple	Wildnet		
Higher Dicots	Solanaceae	<i>Datura metel</i>	Devil's Trumpet	Wildnet		
Higher Dicots	Solanaceae	<i>Solanum seafortianum</i>	Brazilian nightshade	Wildnet		
Higher Dicots	Solanaceae	<i>Solanum torvum</i>	Devil's Fig	Wildnet; Queensland Government Wetland Map Custom Report		
Higher Dicots	Tamaricaceae	<i>Tamarix aphylla</i>	Athel pine (naturalised)	Biosecurity Queensland	Class 3	WONS
Higher Dicots	Verbenaceae	<i>Lantana montevidensis</i>	Creeping lantana	Wildnet	Class 3	
Higher Dicots	Verbenaceae	<i>Verbena halei</i>	Creeping lantana	Wildnet		
Monocots	Poaceae	<i>Bothriochloa pertusa</i>	Indian bluegrass	Wildnet		
Monocots	Poaceae	<i>Cenchrus ciliaris</i>	Buffel grass	Wildnet, Queensland Government Wetland Map Custom Report		
Monocots	Poaceae	<i>Chloris inflata</i>	Purpletop chloris	Wildnet		
Monocots	Poaceae	<i>Chloris virgata</i>	Feathertop rhodes grass	Wildnet		
Monocots	Poaceae	<i>Cynodon dactylon</i>	Green couch	Wildnet		
Monocots	Poaceae	<i>Dichanthium aristatum</i>	Angleton grass	Wildnet		
Monocots	Poaceae	<i>Echinochloa colona</i>	Awnless barnyard grass	Wildnet, Queensland Government Wetland Map Custom Report		
Monocots	Poaceae	<i>Eragrostis</i>		Wildnet;		