

Powerlink Western Downs Transmission Line

Environmental Impact Statement

Final Report

Prepared for: Powerlink Pty Ltd

Date: November 2010
Job Reference: PR24395



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Quality Assurance Statement				
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TABLE OF CONTENTS

Table of Contents	i
Abbreviations and Acronyms	1
Executive Summary	3
1.0 INTRODUCTION	12
1.1 PROJECT TITLE.....	12
1.2 PROJECT PROPONENT	12
1.3 SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT	13
1.3.1 Objectives of the EIS	13
2.0 PROJECT JUSTIFICATION AND FEASIBLE ALTERNATIVES.....	15
2.1 PROJECT JUSTIFICATION	15
2.2 FEASIBLE ALTERNATIVES	15
2.2.1 “Do Nothing” Option.....	15
2.2.2 The Western Downs Substation	16
2.3 TRANSMISSION LINE CONNECTION.....	16
3.0 PROJECT DESCRIPTION	17
3.1 PROJECT LOCATION.....	17
3.2 DESCRIPTION OF THE PROPOSED DEVELOPMENT	17
3.2.1 Physical Details of Structures.....	17
3.2.2 Construction Process	20
3.3 OPERATION AND MAINTENANCE	24
3.3.1 Structures, Conductors and Fittings	25
3.3.2 Easement	25
3.3.3 Weed Management	26
3.3.4 Access Tracks	26
3.4 DECOMMISSIONING DETAILS	26
4.0 RELEVANT LEGISLATION, LAWS & APPROVALS.....	27
4.1 COMMONWEALTH LEGISLATION	27
4.1.1 Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)	27
4.1.2 Australian Heritage Council Act 2003.....	28
4.1.3 Aboriginal & Torres Strait Islander Heritage Protection Act 1984	29
4.1.4 Native Title Act 1993	30
4.2 STATE LEGISLATION & POLICIES	30
4.2.1 Aboriginal Cultural Heritage Act 2003.....	30
4.2.2 Electricity Act 1994	31
4.2.3 Electrical Safety Act 2002.....	32



4.2.4	Environmental Protection Act 1994	32
4.2.5	Fisheries Act 1994	33
4.2.6	Forestry Act 1959	33
4.2.7	Sustainable Planning Act 2009	34
4.2.8	Land Act 1994	36
4.2.9	Land Protection (Pest & Stock Route Management) Act 2002	37
4.2.10	Nature Conservation Act 1992	37
4.2.11	Plant Protection Act 1989	38
4.2.12	Queensland Heritage Act 1992	39
4.2.13	State Planning Policies	39
4.2.14	Transport Infrastructure Act 1994	40
4.2.15	Vegetation Management Act 1999	40
4.2.16	Water Act 2000	41
4.3	LOCAL GOVERNMENT PLANNING SCHEMES & LOCAL LAWS.....	42
4.3.1	Local Laws.....	43
4.4	ASSESSMENT & APPROVAL PROCESS.....	45
5.0	LAND.....	47
5.1	METHODOLOGY	47
5.2	TOPOGRAPHY/GEOMORPHOLOGY	47
5.2.1	Existing Environment.....	47
5.2.2	Potential Impacts	47
5.3	GEOLOGY AND SOILS	48
5.3.1	Existing Environment.....	48
5.3.2	Overview	58
5.3.3	Salinity	58
5.3.4	Acid Sulphate Soils.....	59
5.3.5	Good Quality Agricultural Land.....	59
5.3.6	Mining and Petroleum.....	59
5.3.7	Potentially Contaminated Land.....	60
5.4	POTENTIAL IMPACTS	60
5.4.1	Soil Erosion	60
5.5	MITIGATION MEASURES	61
5.5.1	Soil Erosion	61
6.0	CLIMATE AND AIR QUALITY	69
6.1	EXISTING ENVIRONMENT	69
6.1.1	Climate	69
6.1.2	Air Quality	76
6.2	POTENTIAL IMPACTS	77
6.2.1	Climate	77
6.2.2	Regulatory Environment	78



6.2.3	Air Quality	80
6.3	MITIGATION MEASURES	80
6.3.1	Air Quality	80
7.0	HYDROLOGY	81
7.1	METHODOLOGY	81
7.2	EXISTING ENVIRONMENT	81
7.2.1	Surface Hydrology	81
7.2.2	Sub-surface Hydrology	81
7.2.3	Wetlands.....	82
7.2.4	Flooding.....	82
7.3	POTENTIAL IMPACTS	82
7.3.1	Surface Hydrology and Localised Flooding	82
7.3.2	Water Quality	82
7.3.3	Adjacent Water Use.....	83
7.3.4	Groundwater	83
7.4	MITIGATION MEASURES	83
7.4.1	Surface hydrology.....	83
7.4.2	Water Quality	84
7.4.3	Groundwater	84
8.0	FIRE	87
8.1	BACKGROUND & METHODOLOGY	87
8.2	EXISTING ENVIRONMENT	87
8.3	POTENTIAL IMPACTS	88
8.4	MITIGATION MEASURES	89
9.0	WASTE MANAGEMENT	90
9.1	POTENTIAL WASTE GENERATION DURING CONSTRUCTION & OPERATION.....	90
9.2	MITIGATION MEASURES	91
9.2.1	Solid Waste Disposal.....	92
9.2.2	Liquid Waste.....	92
10.0	FLORA AND FAUNA	93
10.1	METHODOLOGY	93
10.1.1	Background Review.....	93
10.1.2	Field Investigations.....	93
10.2	EXISTING ENVIRONMENT	94
10.2.1	Flora	94
10.2.2	Fauna	99



10.3	POTENTIAL IMPACTS AND MITIGATION	106
10.3.1	Flora Impacts and Mitigation	106
10.3.2	Fauna Impacts and Mitigation	108
11.0	LAND USE & PLANNING	112
11.1	SUSTAINABLE PLANNING ACT 2009	112
11.1.1	IDAS	112
11.1.2	Ministerial Designation	113
11.1.3	Reasons for Proposed Designation	115
11.1.4	Comparison of Planning Processes.....	116
11.2	EXISTING ENVIRONMENT	116
11.2.1	Current Land Use	116
11.2.2	Planning Scheme	117
11.2.3	Planning Scheme - Local Plan	124
11.2.4	Good Quality Agricultural Land.....	124
11.2.5	Future land use.....	124
11.3	POTENTIAL IMPACTS	125
11.3.1	Conflicts with Chinchilla Shire Planning Scheme	125
11.3.2	Changes in Property Value.....	126
11.3.3	Disruptions to Neighbouring Areas and Existing Environments.....	127
11.4	MITIGATION MEASURES	127
11.4.2	Planning Scheme - Local Plan	137
11.4.3	Good Quality Agricultural Land.....	137
11.4.4	Future land use.....	138
11.5	POTENTIAL IMPACTS	138
11.5.1	Conflicts with Wambo Shire Planning Scheme.....	138
11.5.2	Changes in Property Value.....	140
11.5.3	Disruptions to Neighbouring Areas and Existing Environments.....	140
11.6	MITIGATION MEASURES	140
11.7	REGIONAL PLANNING INSTRUMENT	140
11.8	STATE PLANNING SCHEME POLICIES	140
12.0	SOCIO-ECONOMIC ENVIRONMENT	145
12.1	EXISTING ENVIRONMENT	145
12.1.1	Study Area Overview	145
12.1.2	Key Demographic Characteristics	145
12.1.3	Landholders and Land Use	147
12.2	POTENTIAL IMPACT	147
12.3	MITIGATION MEASURES	148



13.0	NOISE AND VIBRATION	149
13.1	EXISTING ENVIRONMENT	149
13.2	POTENTIAL IMPACTS	150
13.3	MITIGATION MEASURES	150
14.0	ELECTRIC AND MAGNETIC FIELDS	152
14.1	EXISTING ENVIRONMENT	152
14.1.1	Explanation & Sources of EMF	152
14.1.2	EMF & Health	153
14.1.3	Existing & Proposed EMF Levels	154
14.2	POTENTIAL IMPACTS	155
14.2.1	Health Concerns	155
14.2.2	Other Possible Impacts	155
14.3	MITIGATION MEASURES	156
15.0	LANDSCAPE CHARACTER AND VISUAL AMENITY	157
15.1	LANDSCAPE	157
15.1.1	Background and Methodology	157
15.1.2	Existing Environment	157
15.1.3	Potential Impacts	157
15.1.4	Mitigation Measures	158
15.2	VISUAL AMENITY	158
15.2.1	Background and Methodology	158
15.2.2	Existing Environment	158
15.2.3	Potential Impacts	158
15.2.4	Mitigation Measures	159
16.0	TRANSPORT INFRASTRUCTURE AND TRAFFIC	160
16.1	EXISTING ENVIRONMENT	160
16.1.1	Road Network	160
16.1.2	Planned Road Upgrades	163
16.1.3	Rail Network	163
16.1.4	Flight Paths and Facilities	164
16.2	POTENTIAL IMPACTS	164
16.2.1	Construction Period	164
16.2.2	Operation and Maintenance Period	164
16.3	MITIGATION MEASURES	164
16.3.1	Construction Phase	164
16.3.2	Access Tracks and Construction Traffic Property Access	165
16.3.3	Maintenance Activities	165
16.3.4	Flight Paths and Facilities	165



17.0	CULTURAL HERITAGE	166
17.1	NON-INDIGENOUS CULTURAL HERITAGE.....	166
17.1.1	Background and Methodology	166
17.1.2	Existing Environment	166
17.1.3	Potential Impacts	168
17.1.4	Mitigation Measures	168
17.2	ABORIGINAL CULTURAL HERITAGE.....	168
18.0	GREENHOUSE GAS EMISSIONS	169
18.1	BACKGROUND AND METHODOLOGY	169
18.2	ADAPTATION PLANNING	169
18.3	GREENHOUSE GAS FOOTPRINT.....	171
18.4	VEGETATION CLEARING	171
18.5	HEAVY VEHICLE FUEL USE	172
18.6	LIGHT VEHICLE FUEL USE.....	173
18.7	ELECTRICITY FOR TEMPORARY SITE AMENITIES	174
18.8	EMISSIONS SUMMARY	174
18.9	POTENTIAL IMPACTS.....	175
18.10	MITIGATION MEASURES	175
18.10.1	Direct GHG Abatement Measures undertaken for the Project.....	175
18.10.2	Other Mitigation Measures	175
19.0	CONSULTATION	176
19.1	GOALS AND OBJECTIVES	176
19.2	ENGAGEMENT STRATEGY	176
19.3	METHODOLOGY	176
19.4	STAKEHOLDERS.....	177
19.4.1	Stakeholder Identification	177
19.4.2	Landowners	178
19.4.3	Federal, State and Local Government Consultation	178
19.5	ENGAGEMENT AND CONSULTATION ACTIVITIES AND MESSAGES	178
19.5.1	Key Messages	178
19.5.2	Engagement and Consultation Activities	179
19.6	OUTCOMES FROM ENGAGEMENT AND CONSULTATION ACTIVITIES.....	181
19.6.1	Draft TOR Stakeholder Workshop	181
19.6.2	Initial Landowner Contact & Face to Face Meetings	182
19.7	CONCLUSIONS	182
20.0	ENVIRONMENTAL MANAGEMENT PLAN	183



21.0	ENVIRONMENTAL COST-BENEFIT SUMMARY	184
21.1	BACKGROUND AND METHODOLOGY	184
21.2	SHORT TERM COSTS AND BENEFITS	184
21.3	LONG TERM COSTS AND BENEFITS	185
21.4	POTENTIAL IMPACTS	186
22.0	POWERLINK ENVIRONMENTAL PERFORMANCE	187
22.1	POWERLINK ENVIRONMENTAL POLICY	187
22.2	RECENT PROJECT PERFORMANCE	187
22.3	GREENHOUSE CHALLENGE PLUS	188
22.4	ENVIRONMENTAL RESEARCH	188
23.0	REFERENCES	190



TABLES

Table 4.1	Impact of the Project on Matters of National Environmental Significance	28
Table 4.2	Summary of the Planning Scheme Provisions for the Study Alignment	43
Table 4.3	Applicable Local Laws	44
Table 4.4	Licence, Permit & Approval That May Be Required	46
Table 5.1	Comparison of Soil Mapping and Field Samples	49
Table 5.2	Summary of Soils Sample Results	55
Table 5.3	Particle Size Analysis	56
Table 5.4	Emerson aggregate Test Class Number Definitions	57
Table 5.5	Classes of Agricultural Land	59
Table 6.1	Average Climatic Data Records for Dalby Airport	70
Table 6.2	Summary of Previous Extreme Weather Events for Study Area	73
Table 6.3	CS Energy Air Quality Data	76
Table 6.4	Projected Climate Change in Project Area (CSIRO et al, 2007) (OCC, 2009)	78
Table 8.1	SPP 1/03 Hazard Rating Assessment	88
Table 9.1	Potential Wastes Generated During Construction & Operational Phases	90
Table 10.1	Regional Ecosystem Descriptions	95
Table 10.2	Likelihood of Significant Flora Species Occurrence	97
Table 10.3	Likelihood of Occurrence of Threatened Fauna Species	102
Table 11.1	Town Planning Summary Table – Former Chinchilla Shire and Wambo Shire	142
Table 14.1	Typical Magnetic Fields from Common Electrical Appliances	152
Table 14.2	ARPANSA Draft EMF Standard for Limits of Exposure – General Public	154
Table 14.3	NHMRC Limits of Exposure – General Public	154
Table 16.1	Road Information	161
Table 18.1	Climate Change Risk and Adaptation summary	170
Table 18.2	Greenhouse Gas (GHG) Sources by Scope	171
Table 18.3	Emissions Summary	174
Table 19.1	Project Stakeholders	177

FIGURES

Figure 1.1	Location	14
Figure 3.1	Indicative Tower Structures	19
Figure 5.1	Topography	50
Figure 5.2	Geology	51
Figure 5.3	Soils	52
Figure 5.4	QGAL	63
Figure 5.5a	Coal Exploration Permits	64
Figure 5.5b	Petroleum Exploration permits	65
Figure 5.5c	Petroleum Lease Applications	66
Figure 5.5d	Mining Tenements	67
Figure 5.5e	Mineral Development Licences	68
Figure 6.1	Mean Annual 9am Wind Speed Vs Direction for Dalby Airport (1992-2008) (BoM, 2005a)	72



Figure 6.2	Mean Annual 3pm Wind Speed Vs Direction for Dalby Airport (1992-2008) (BoM, 2005a).....	73
Figure 6.3	Australian Average Annual Thunder Days (BOM, 2005c)	74
Figure 6.4	Australian Average Annual Lightning Ground Flash Density (BOM, 2005b)	75
Figure 6.5	Australian Average Annual Tropical Cyclone Incidents (BOM, 2006).....	75
Figure 7.1	Rivers and Creeks	85
Figure 7.2	Floodplain Mapping	86
Figure 10.1	Regional Ecosystems in the Study Area.....	96
Figure 10.2	Survey Sites and EVR Locations.....	111
Figure 11.1	Chinchilla Planning Scheme - Zoning.....	128
Figure 11.2	Chinchilla Planning Scheme – Features Map 1	129
Figure 11.3	Chinchilla Planning Scheme – Features Map 2	130
Figure 16.1	State Controlled and Local Roads near the Study Area	160
Figure 16.2	Roads Crossed by the Transmission Line Alignment	161
Figure 16.3	Heavy Vehicle Restrictions near the Site.....	162
Figure 16.4	The Westlander Rail Route	163
Figure 16.5	Rail Line near the Study Area.....	163
Figure 18.1	Emissions Break-Down Pie Chart for Transmission Line	174

PHOTO PLATES

Plate 5.1	Significant erosion adjacent to Kogan Creek	53
Plate 5.2	Erosion which is likely to be associated with the Braemar Creek Dam.	54

APPENDICES

Appendix A	Final Terms of Reference	A
Appendix B	Designation Checklist	B
Appendix C	Corridor Selection Report	C
Appendix D	Transmission Line Access Tracks Standard.....	D
Appendix E	Terrestrial Species Lists	E
Appendix F	Environmental Management Plan	F
Appendix G	Draft EIS Submissions and Responses.....	G



ABBREVIATIONS AND ACRONYMS

°C	Degrees Celsius
ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
Air NEPM	Commonwealth National Environment Protection (Ambient Air Quality) Measure
Air Toxics NEPM	Commonwealth National Environment Protection (Air Toxics) Measure
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASS	Acid Sulphate Soils
BoM	Bureau of Meteorology
CASA	Civil Aviation Safety Authority
CLR	Contaminated Land Register
cm	Centimetre
CPRS	Carbon Pollution Reduction Scheme
DBH	Diameter Breast Height
DEO	Desired Environmental Outcome
DEWHA	Department of Environment , Water, Heritage and the Arts
DHLGP	Department of Housing, Local Government and Planning (now DLGPSR)
DLGPSR	Department of Local Government, Planning, Sport and Recreation
DME	Department of Mines and Energy
DMR	Department of Main Roads
DERM	Department of Environment and Resource Management
DoD	Department of Defense
DPI&F	Department of Primary Industries & Fisheries
DSM	Demand Side Management
EIS	Environmental Impact Statement
EMA	Emergency Management Australia
EMF	Electric and Magnetic Fields
EMP	Environmental Management Plan
EMR	Environmental Management Register
EPA	Environmental Protection Agency
EPBC	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPC	Exploration Permit Coal
EPP (Air)	Environmental Protection Policy for Air
ERA	Environmentally Relevant Activity
ESAA	Electricity Supply Association of Australia
EWPs	Environmental Work Plans
DIP	Department of Infrastructure and Planning
GHG	Greenhouse Gas
GIS	Geographic Information System
GQAL	Good Quality Agricultural Land
GPS	Global Positioning System
ha	hectare(s)
hrs/d	hours per day



Hz	Hertz
IDAS	Integrated Development Assessment System
IPA	<i>Integrated Planning Act 1997</i>
IRTM	Interactive Resource and Tenure Maps
kg/m	kilogram per metre
km	kilometre(s)
km/h	kilometres per hour
kV	kilovolt(s)
LDR	Low Density Residential Area
LPA	<i>Land Protection (Pest and Stock Route Management) Act 2002</i>
LRA	Land Resource Area
LRAM	Land Resource Assessment and Management
m	metre(s)
MPEBD	Maximum Permissible Evident Built Development
mG	milligauss
mm	millimetre(s)
MNES	Matters of National Environmental Significance
MRET	Mandatory Renewable Energy Target
m/s	metre (s) per second
NCA	<i>Nature Conservation Act 1992</i>
NGERS	National Greenhouse and Energy Reporting Scheme
NHMRC	National Health and Medical Research Council
OUM	Office of Urban Management
PAR	Preferred Alignment Report
PAWC	Plant Available Water Capacity
<i>pers com</i>	personal communication
PVC	Poly Vinyl Chloride
QETC	Queensland Electricity Transmission Corporation
QLD	Queensland
QLUMP	Queensland Land Use Mapping Program
QNI	Queensland New South Wales Interconnector
QPWS	Queensland Parks and Wildlife Service
RE	Regional Ecosystem
SPA	<i>Sustainable Planning Act 2009</i>
SPP	State Planning Policies
TLF	Transmission Loss Factor
TOR	Terms of Reference
UCG	Underground Coal Gasification
UXO	Unexploded Ordinance
V/m	Volts per metre
WDRC	Western Downs Regional Council
WDS	Western Downs Substation
XLPE	Cross Linked Poly Ethylene



EXECUTIVE SUMMARY

INTRODUCTION AND KEY RECOMMENDATIONS

This Environmental Impact Statement (EIS) presents an assessment for a proposed transmission line between the existing Queensland New South Wales Interconnector (QNI) line easement and the proposed Western Downs Substation located in the vicinity of the Kogan Creek Power Station on the Darling Downs near Chinchilla. This forms one component of an overall development project to link the Western Downs Substation to Halys Substation near Tarong.

Powerlink Queensland, a Transmission Network Service Provider, is the Project proponent.

From the detail contained within this EIS, it has been demonstrated that the proposed placement of the transmission line will provide the least overall impact for all of the issues considered.

PROJECT JUSTIFICATION

Through Powerlink Queensland Planning Studies, it is indicated that electricity use in Southern Queensland has exhibited very strong growth during the past ten years, and further growth is expected to continue over the next ten years.

The existing transfer capability of Powerlink's network between Central Queensland and Southern Queensland, as well as between Bulli (between Millmerran and Goondiwindi), South West, and South East Queensland, is described by limit equations which dynamically maximise the transmission capability available to electricity market participants at any time. With projected electricity demand growth, it has been identified that the required power transfer between the Bulli and South West zones will reach the capability of the existing network from summer 2010/11. These limitations can be addressed by augmenting substation plant until 2012/13 after which a major transmission line augmentation is required between these zones. In addition to power transfer limitations, fault level limitations at the Braemar Substation are forecast to coincide. These will impose limits on the capability of that facility to meet system and security limits.

Powerlink is required to develop its network to meet the security and reliability standards of the National Electricity Rules, the *Queensland Electricity Act 1994* and the terms of its transmission licence. Powerlink has undertaken an assessment of options and carried out consultation as required by the National Electricity Rules prior to approving the option which has the lowest net present value cost, in accordance with the Australian Energy Regulator's regulatory test. Under this assessment, it was found that the option which satisfied the Regulatory Test involved establishment of the Western Downs Substation by 2012/13 and subsequent transmission line to join the facility to the existing transmission network near Tarong. A corridor selection and preliminary alignment report was developed as part of this project to determine the most suitable corridor and a preliminary alignment within this corridor for the transmission line between Western Downs and an existing easement adjacent to the QNI.



LEGISLATION AND APPROVALS

Relevant Federal and State legislation, codes and local government planning provisions applicable to the proposed Project have been discussed. In addition, assessment of the relevant approval process and the possible permits, licences and approvals that may be required are also detailed. The transmission line development is considered to be community infrastructure as defined under the *Sustainable Planning Act 2009* and consequently Ministerial designation as 'Community Infrastructure' under that Act will be sought.

SUMMARY OF THE DESCRIPTION OF POTENTIAL IMPACTS AND MITIGATION MEASURES

The impact that the proposed Project may have on a range of physical, biological and social environmental factors was analysed and mitigation measures provided, where necessary. The following provides a summary of the main potential impacts and mitigation measures. More detailed mitigation measures have been provided within the EIS and Environmental Management Plan (EMP).

Geology and Soils

The study alignment is located on Kumbarilla sandstone geology and is contained within an ironbark/ bull oak land resource area. All soils along the study alignment are similar from an agronomic and soil chemistry perspective and are characterised by low water holding capacity with increasing salinity and sodicity with depth. Soils are classified as Sodosol (texture contrast soils with a sodic upper B horizon) with the major difference across the site being a varying depth of the surface A horizon (<15cm to 40cm). The study alignment crosses land classified as Good Quality Agricultural Land. No potential sources of contamination were found throughout the Study Corridor.

The terrain along the study corridor is level to gently undulating with fertile floodplains associated with the Condamine River in the eastern portion of the study corridor.

The primary soils' issue for the transmission line is the management of the sodic subsoils such that earthworks and construction do not initiate tunnel erosion processes. In order to manage these soils, management of clearing, reduction of water flows and the application of gypsum will occur (where required).

Climate and Air Quality

Rainfall in Southern Queensland is considered highly variable and subject to extended periods of drought, followed by intensive rainfall. Maximum temperatures often reach 30°C in the summer months, and minimum temperatures often fall below 5 °C over winter. Annual wind data collected by the Dalby Airport weather station indicated that the study alignment is typically subjected to prevailing easterly winds for most of the year, with the average wind speed of approximately 12km per hour (BoM, 2009).

The data shows that severe storms (including high winds, hail and inundation with flash flooding) are the most common atypical events for the area. The daily average air quality data collected from the Kogan Creek Whyte monitoring station shows that whilst there were 3 PM10 exceedances in ambient guidelines within the 2008-2009 monitoring period, the objective for PM10 allows for an exceedance on 5 days per annum for environmental values to still be protected.



Due to the rural location of the Project, dust and odour are not expected to be a significant nuisance to ecologically sensitive areas, or to the neighbouring residents.

Mitigation measures for reducing dust emissions during both the construction and operational phases include reducing the length of unsealed tracks, use of recycled water during construction on high traffic areas and application of mulch on exposed areas during construction.

Hydrology

The transmission line falls within the Condamine River Catchment and is located 2.5km west of Kogan Creek, a tributary of the Condamine River. Watercourses which are traversed by the study alignment include Braemar Creek and Kogan Creek and a number of associated minor tributaries. Braemar Creek, which is also a tributary of the Condamine River, was identified as being highly modified. These creeks are typically considered ephemeral, flowing only in direct response to rainfall and as such restricting potential impacts to times of extreme flows.

One DERM referable wetland occurs within 100m of the study corridor (DERM, 2009). The existing Kogan to Braemar Transmission Easement traverses the referable wetland at allotment K on SP172844. At the time of the site inspection no discernible wetland features were observed within the location of the mapped wetland. The large non-riverine wetland associated with the Condamine floodplain is located north of the eastern extent of the study alignment, however the mapped wetland is not located within 100m of the study alignment.

Floodplain mapping indicates that the majority of the study corridor is subject to flooding with the exception of a portion west of Kogan Creek. There is potential for erosion of exposed soils if water flows are concentrated and impedance of flows across the study corridor should be minimised and sheet flow conditions (as would naturally occur) maintained as much as possible. The minor floods that can be expected to traverse the study corridor will need to be directed around tower pads and access tracks.

Groundwater is estimated to be moderately deep (>10m) associated with a regional groundwater system. The alignment would not be expected to be at risk of groundwater rise or salinity.

Fire

Bushfire hazard along the transmission line is deemed to be “low to medium” and the prevailing fire regimes are unlikely to be significantly altered due to the Project. The most probable time for a fire to occur is during construction due to fugitive sparks, however the risk of such an event occurring is considered low. Mitigation measures as nominated in a Bushfire Management Plan and use of fire resilient materials during construction where possible, are proposed. The line is unlikely to be at risk from bushfires due to resilient materials and maintenance regimes to limit vegetation regrowth and fuel loads.



Waste Management

Liquid and solid waste sources are likely to be generated during the construction and operational phases of the Project. The majority of the wastes for the Project will be generated by the construction phase of the transmission line. Waste production during the operational phase of the Project will be minimal and associated with scheduled maintenance activities of the transmission line and easements. Mitigation measures to reduce the risk and potential impact from waste sources are provided.

Flora and Fauna

Flora

Approximately 40% of the study alignment runs through mapped remnant Regional Ecosystems (RE). From ecological and conservation perspectives, the most significant RE includes areas of Endangered and Of Concern vegetation on alluvium and clay plains adjacent to the major watercourses that intersect the study alignment (Kogan and Braemar Creeks). The significance of the Endangered remnant on Braemar Creek, immediately below a dam on the creek, is enhanced by the presence of at least one Rare fauna species and an abundance of arboreal mammals. Re-routing of the alignment through this area has avoided this remnant and habitat area.

One significant plant species (*Philotheca sporadica* - classified as Vulnerable under Federal EPBC and State NCA legislation) was known by Powerlink and Conics, prior to this study, to occur in the general vicinity of the study area. Indeed, this species was recorded at two locations within the study area during the field investigations undertaken by Conics. Several other significant species recorded on state and federal databases may also be present but were not detected during this study.

Four declared weed species, listed under the *Land Protection (Pest and Stock Route Management) Act 2002* (LPA), were identified during the ecological assessment.

Fauna

Much of the study area is vegetated with remnant woodlands that provide habitat for a range of fauna species. Whilst historic management activities (e.g. clearing, logging and grazing) have degraded the overall habitat condition in some of the remnant vegetation areas, these habitats remain structurally diverse and retain much of their original species composition. Several previously-cleared areas contain quite dense regrowth woodland that adds to the habitat diversity of the study area and cleared pasture lands provide limited habitat potential for grassland-dependent species.

Despite the diversity of habitats available, particularly from a structural viewpoint, overall fauna diversity appears to be relatively low throughout the study area. 83 vertebrate fauna species were observed in the study area, including: 60 birds, 13 mammals (including 8 bats) and 10 reptiles. Most of these species were found in the native woodland areas, with only a small number of disturbance-tolerant species observed in the developed farming and grazing areas.

One Rare species [Little Pied Bat (*Chalinolobus picatus*)] listed under the NCA, was recorded within the study area during this survey.



Five introduced fauna species were identified in the study area during the field surveys. It is highly likely that two other introduced species also inhabit parts of the study area.

The removal of vegetation to make way for the transmission line easement has the potential to impact upon flora and fauna species, both directly and indirectly, through the disturbance of habitat particularly during increased activity levels during construction. These impacts are discussed as well as potential mitigation measures.

Land Use

Classification of current and future land use was determined from observation, consultation and literature review. The Study Area has historically been predominantly used for stock grazing. There are seven existing residences within 750m of the proposed transmission line.

The Study Area is located within the municipal boundaries of Western Downs Regional Council. On 15th March 2008, Western Downs Regional Council was formed with the amalgamation of Wambo, Dalby Town, Chinchilla, Murilla, Tara and Taroom Shires. Prior to the amalgamation, the Study Area was situated within Chinchilla Shire and Wambo Shire. The Study Area is subject to the *Chinchilla Shire Planning Scheme* and the *Wambo Shire Planning Scheme*.

The proposed transmission alignment is zoned 'Rural' under both the Chinchilla and Wambo Planning Schemes, and does not have any other planning restrictions. The proposal is unlikely to conflict with the strategic directions of the Planning Schemes. Furthermore, the proposal is not considered to compromise the purpose of the *Rural Zone* in both schemes.

Socio-economic Environment

Key demographic characteristics of the Western Downs Regional Council are described in the EIS. Agriculture is the economic base of both the Chinchilla and Wambo Districts. Chinchilla has particular economic strengths in beef and pork production, wool growing, and horticulture being traditional industries in the local economy, whereas Wambo is heavily reliant on cotton and grain production. The energy and resources industry (i.e. coal mining, coal seam gas extraction and associated power generation) is currently developing within the area. The transmission line will potentially impact on 34 allotments. Of these allotments, the majority have a rural zoning and are utilised for farming cattle.

As the existing landholders carry out pastoral enterprises, they are not anticipated to experience significant negative impacts due to the proposed transmission line, as their grazing practices can largely continue. Given the remoteness of the area, the community profile of the surrounding area is not anticipated to be impacted significantly by the development of a transmission line. It is anticipated that development of the proposed transmission line will have little social impact on how the area functions.

The increase in economic activity during construction will be a benefit to the surrounding community by generating additional employment opportunities and enhancing the overall economic capacity of the Western Downs region. This has the potential to generate indirect community benefits through additional economic contribution to the region.



Noise and Vibration

The Study Alignment predominantly passes through rural and rural residential areas with generally acceptable background noise levels. An exception to this is where the Study Alignment traverses close to the existing Kogan Creek Power Station (approximately 1.5km to the north-east). The acoustic environment of this section of the Study Alignment is dominated by the noise of the existing Kogan Creek Power Station. During field investigations, the power station was clearly audible along this section of the Study Alignment. Due to the size of the power station, its associated noise is expected to be significant in comparison to the expected noise emanating from the proposed transmission line. Seven noise sensitive receptors have been identified from aerial photography and regional investigations within 750m of the proposed transmission line. Of these, one house was within 250m of the proposed alignment however it is currently unoccupied.

Noise associated with the Project would mainly arise as a result of the construction phase and would generally be associated with heavy vehicle movements and general construction noise. During maintenance, potential noise sources will include routine inspections (vehicle and helicopter), repairs and vegetation and erosion management activities. Due to the large separation distance to sensitive receptors, and proposed construction works being carried out at appropriate times, there is a low potential for adverse noise impacts during the construction phase.

A number of mitigation measures including effective mufflers for trucks and machinery and keeping the public informed of construction and maintenance schedules have been recommended to minimise the potential noise impact of the proposed Project.

EMF

Electric and magnetic fields (EMF) occur in nature, in all living things and as a consequence of anthropogenic sources. Electric fields are caused by voltages (volts) and can be found near any electrical appliance that is switched on at the power outlet. Magnetic fields are caused by the flow of energy (current) through a conductor.

The transmission of electricity via the proposed Project will produce electric and magnetic fields which may raise public health concerns. The recommended exposure levels set by the Australian Government's Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and the National Health and Medical Research Council (Australia) (NHMRC) have been outlined within the EIS along with the predicted EMF levels for the area immediately surrounding the proposed transmission line.

Currently, there are a number of high voltage transmission lines and distribution power lines traversing the area surrounding the proposed transmission line which, together with domestic sources, contribute to the background levels of EMF. Current levels of EMF are well below the ARPANSA Draft Standard as well as the NHMRC limits of exposure and modeling indicates that even with the installation of the proposed transmission line, increases in field levels would be limited to areas immediately adjacent to the transmission line. Taking into account the impact of the proposed transmission line, field levels would remain well below the ARPANSA Draft Standard and the NHMRC limits of exposure with field levels outside the proposed alignment corridor (to 30m either side of the centerline) experiencing only minor increases above current background levels.



Landscape Character and Visual Amenity

The landscape containing and surrounding the study corridor is characterised by:

- Very low density and generally small scale development;
- Long straight rural roads with open or filtered views of the rural landscape;
- The meandering Condamine River, associated floodplains and riparian vegetation;
- Open flat or undulating rural plains comprising cropping land;
- Undulating grazing land and vegetated foothills; and
- Dry eucalypt woodland.

As approximately 40% of the study alignment follows an existing transmission line corridor, only a relatively small amount of existing vegetation will have to be cleared. No significant changes to the existing topography are required. Existing screening vegetation will be retained where possible, particularly where the route crosses existing roads. The development of the proposed transmission line route will not change the overall landscape character or visual amenity of the study area.

The closest point the proposed transmission line route comes to the Warrego Highway and the Kogan Condamine Road will be screened by existing vegetation and intervening topography. Views of the remainder of the proposed transmission lines will be predominantly screened from local trafficked roads by existing vegetation other than at road crossings and sections of road where the corridor travels parallel with the road.

The roads where visual impact will be greatest are generally less trafficked routes so will have very low visual exposure. However, the transmission lines along a short section of the Warra Kogan Road (approximately 2km) will have a moderate level of visual exposure and therefore drivers may experience a moderate visual impact, particularly during the construction phase.

There are 7 houses within 750m of the study alignment which may also be impacted.

Mitigation measures proposed to help reduce visual impacts from the proposed Project include encouraging natural revegetation of buffers and ensuring the removal of existing woodland vegetation outside of the immediate construction site area is minimised.

Transport Infrastructure and Traffic

The proposed transmission line alignment crosses four local roads and one State controlled road.

During the construction phase, a minor increase of traffic volumes on the roads adjacent to the alignment is expected to occur because of the necessary transport of materials, equipment and personnel. Previous projects of this nature generated a maximum of 20–30 vehicle movements per day. These volumes are considered unlikely to affect traffic flows in the area. Traffic during the operational phase will be minimal except where major works are required.

It is anticipated that traffic movements to and from the site will utilise the Warrego Highway, Warra Kogan Road, Dalby Kogan Road, Kogan North Road, Banana Bridge Road, Taylors Road and Healys Crossing Road. Where possible, direct access to the transmission line will be provided via easements.



It is proposed that the anticipated route to be used by construction vehicles must be inspected by both Powerlink and Council prior to the commencement of the construction works. The access to the transmission line must be cleared of any obstacles or constraints and the surface is to be maintained to ensure that access to the site can be achieved even under periods of wet weather.

Non-Indigenous Cultural Heritage

Whilst the region surrounding the study area has numerous sites and places of cultural heritage significance, there is an absence of significant sites in the vicinity of the study alignment. The Project is not expected to impact upon areas or objects of social importance or cultural significance. With consideration of the broader context of the area surrounding the Project corridor, the proposed development is not expected to have an impact on the lifestyle of local residents, or on the appeal of places frequently visited within the region. The likely presence of remnants of cultural heritage has not been dismissed, however.

The impact of the proposed development on matters of cultural significance is expected to be negligible. However, if during construction, historic relics are discovered, work should cease until an appropriately qualified heritage assessor has been afforded the opportunity to assess any objects of possible heritage value, *in situ*.

Powerlink have conducted a separate internal assessment of Aboriginal Cultural Heritage.

Greenhouse Gas Emissions

Greenhouse gas emissions to be generated as a result of this project have been considered. Scope 1 emissions (e.g. fuel use) associated with the project total approximately 34 000t CO₂e. 97% of these emissions are associated with the loss of carbon sink as a result of vegetation clearing. Mitigation measures to help minimise greenhouse gas impacts as a result of this project include management strategies for site preparation, material selections and transport, plant and equipment and auxiliary emissions.

Environmental Management Plan

An EMP has been prepared to prevent or minimise potential environmental impacts identified by the EIS. Environmental management strategies for the Project's potential impacts, including control measures and responsible persons, are included in the EMP.

Environmental Cost-Benefit Summary

An environmental cost-benefit summary has been undertaken for the Project. Short and long-term costs and benefits have been examined including:

- Decreased land use impact;
- Effect on high conservation areas;
- Greenhouse gas emissions; and
- Employment and economic capacity.

The development of this transmission line is considered to have minimal short term and long term environmental impacts both on the properties located along the study alignment and within the surrounding area.



The short term economic benefit related to the proposed transmission line will be an estimated 150 construction related jobs. The long term economic benefits potentially include additional employment related to the ongoing maintenance of the transmission line and an increase in the overall economic value of the region as a result of the operation of the transmission line.

Summary and Recommendations

A broad range of physical, biological and social environmental factors have been considered by this EIS. Overall it is concluded that while the Project may result in localised impacts on some of the factors investigated, the need for the Project has been adequately demonstrated and all feasible alternatives have been explored. In addition, where relevant, potential issues have been identified, quantified and mitigation measures have been developed/recommended for consideration or adoption during the detailed design phase of the Project. An EMP has also been prepared to detail methods and strategies to prevent or minimise the potential for environmental harm.

Provided Powerlink follows the recommendations contained within this EIS and associated EMP and continues to work with the community and other stakeholders to further mitigate potential impacts, there does not appear to be any physical, social or environmental issues that would prevent this Project from being recommended to the Minister for the Department of Employment, Economic Development and Innovation for designation.



1.0 INTRODUCTION

Conics Pty Ltd has been commissioned by Powerlink Queensland to prepare an Environmental Impact Statement (EIS), including an Environmental Management Plan (EMP), for the proposed Western Downs Transmission Line (the Project), in the Kogan district of Western Downs Regional Council (WDRC) (**Figure 1.1**).

The proposed transmission line will connect the existing Queensland New South Wales Interconnector (QNI) line easement to the proposed Western Downs Substation. The proposed Western Downs Substation is located in the vicinity of the Kogan Creek Power Station on the Darling Downs near Chinchilla.

This EIS and EMP has been developed following consultation and input on a draft EIS and EMP from a range of stakeholders. **Section 19** discusses this further.

1.1 PROJECT TITLE

The project has been identified as the Western Downs Substation Establishment and Connection Project. The Western Downs substation has been the subject of a separate EIS process undertaken by Conics. The final EIS for the substation was released in February 2010.

1.2 PROJECT PROPONENT

Powerlink owns, develops, operates and maintains Queensland's high voltage transmission network that extends 1,700km from north of Cairns to the New South Wales border. As a Transmission Network Service Provider in the National Electricity Market, and holder of a Transmission Licence in Queensland, Powerlink is required to develop its network to meet the security and reliability standards of the National Electricity Rules, the Queensland Electricity Act 1994 (the Electricity Act), and the terms of its Transmission Licence. In addition to these strong legal obligations, the Australian Energy Regulator has implemented network reliability benchmarks for Powerlink, whereby failure to meet those benchmarks results in financial penalties.

Of particular relevance is Powerlink's Transmission Licence, which requires Powerlink to develop the network in a timely manner to meet future forecast demands, such that the forecast peak demand can be met, even with the most critical network element out of service. This is known as the N-1 network planning criterion.

Contact details for the proponent are:

Powerlink Queensland

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PO Box 1193, Virginia, Queensland, 4014, Australia

Telephone: (07) 38602111, Facsimile: (07) 38602100

Website: www.powerlink.com.au

Powerlink Queensland is the registered business name of the Queensland Electricity Transmission Corporation Limited, ABN 82 078 849 233.



1.3 SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

The scope of this EIS is to investigate potential environmental, economic and social impacts of the proposed transmission line, as well as undertake community consultation, in accordance with the Terms of Reference (TOR) (**Appendix A**) and the *Electricity Act 1994*. A TOR checklist is included in **Appendix B** to ensure all TOR items are addressed in the EIS.

Specifically, this EIS:

- Identifies the environmental (including natural, social and economic) values of the Project corridor;
- Assesses the potential impact of the Project on these values; and
- Provides recommendations to mitigate any potential impacts resulting from the Project.

It is noted however, that some aspects of the EIS (e.g. the social environment) have a wider potential impact and, as such, require a broader assessment therefore the scope for such issues is based on the Project Locality area. It should be noted that Aboriginal Cultural Heritage is being assessed separately by Powerlink and therefore does not form part of this EIS.

1.3.1 Objectives of the EIS

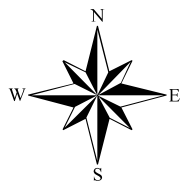
The objectives of the EIS are as follows:

- Provision of a description of the relevant aspects of the existing social, economic, natural and built environment;
- To provide information on the proposal and development process to the community and decision makers;
- To comprehensively identify and evaluate all relevant issues associated with the proposal;
- To identify all potential environmental impacts (short, medium and long term) of the development;
- To recommend construction, operational, maintenance and decommissioning measure required to minimise or compensate for adverse impacts and enhanced benefits;
- To consult with the community and relevant stakeholders in the process of identifying, assessing and responding to the impacts of the proposal;
- To identify all necessary licences, planning and environmental approvals including approval requirements pursuant to the federal *Environment Protection and Biodiversity Conservation Act 1999* and State, *Sustainable Planning Act 2009*, *Environmental Protection Act 1994*, *Vegetation Management Act 1999*, and other legislation;
- To provide recommendations on the need for, and contents of any environmental management plans and / or operational plans to minimise/mitigate adverse effects; and
- To provide an input to the decision-making process, assisting with the determination of whether to accept or modify the proposal, approve it with conditions or carry out further studies.

Powerlink Western Downs EIA Study Alignment

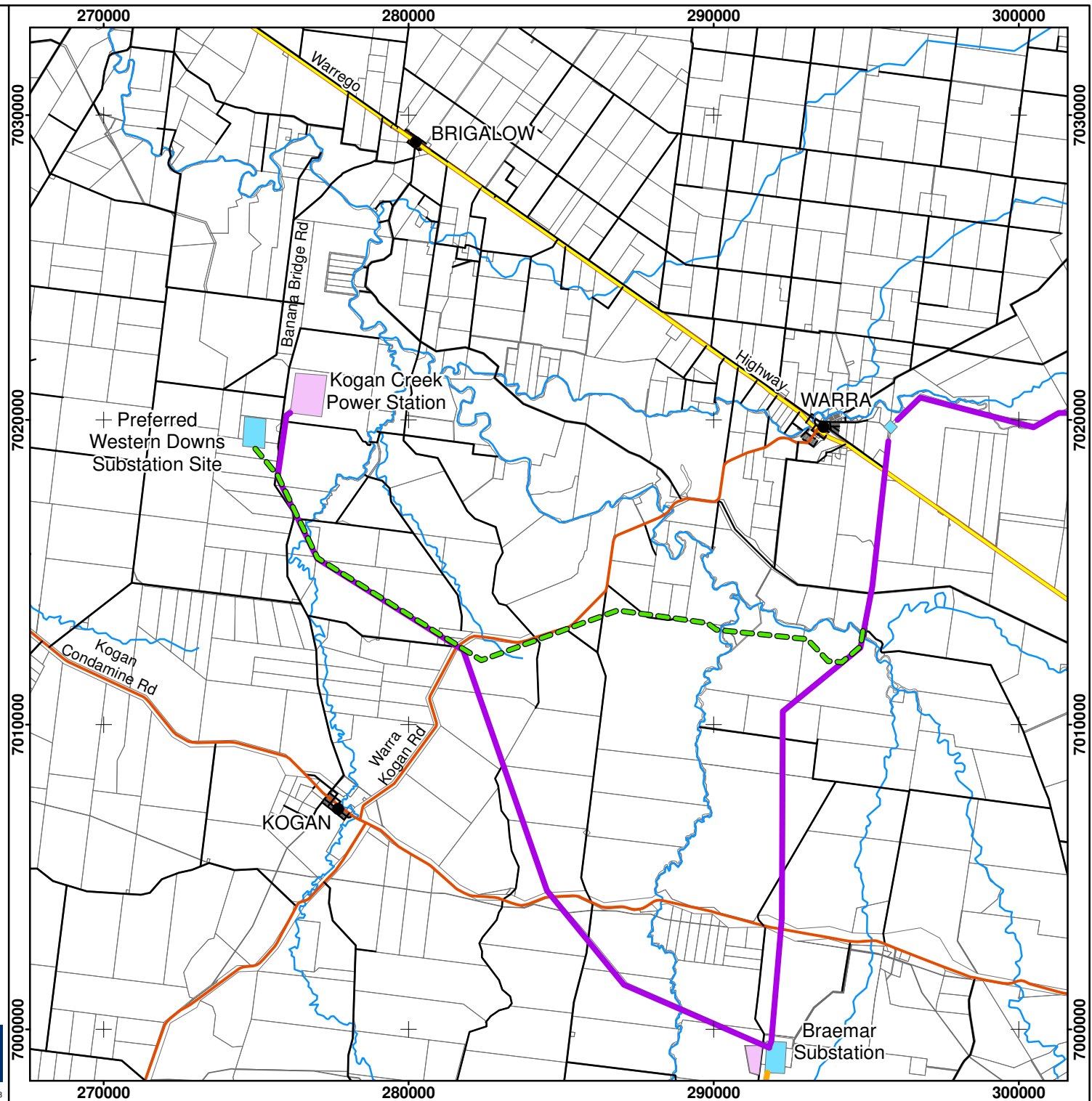
Figure 1.1

- Study Alignment
- 275 kV
- 330 kV
- Power Station
- Sub-station
- Highway
- Main Road
- Local Road
- Watercourse
- Cadastre



0 1,000 2,000 4,000 6,000 8,000
Metres

Scale 1 : 180 000
Datum / Projection: GDA94 MGA Zone 56





2.0 PROJECT JUSTIFICATION AND FEASIBLE ALTERNATIVES

2.1 PROJECT JUSTIFICATION

Electricity use in South-East and Southern Queensland has exhibited very strong growth during the past ten years and growth is expected to continue over the next ten years, due to population growth and the on going uptake of domestic air-conditioning.

Powerlink recognises the importance of maintaining a reliable electricity supply to its customers. Routine planning investigations have been carried out to identify the most appropriate course of action to meet future supply requirements in Southern Queensland.

The existing transfer capability of Powerlink's network between Central Queensland and Southern Queensland, as well as between Bulli (between Millmerran and Goondiwindi), South West, and South East Queensland, is described by limit equations which dynamically maximise the transmission capability available to electricity market participants at any time. With projected electricity demand growth, it has been identified that the required power transfer between the Bulli and South West zones will reach the capability of the existing network from summer 2010/11. These limitations can be addressed by augmenting substation plant until 2012/13 after which a major transmission line augmentation is required between these zones. In addition to power transfer limitations, fault level limitations at the Braemar Substation are forecast to coincide. These will impose limits on the capability of that facility to meet system and security limits.

Powerlink has undertaken an assessment of options and carried out consultation as required by the National Electricity Rules prior to approving the option which has the lowest net present value cost, in accordance with the Australian Energy Regulator's regulatory test. Under this assessment, it was found that the option which satisfied the regulatory test involved establishment of Western Downs substation by 2012/13, and construction of a 275kV double circuit transmission line to connect this substation to the existing network by developing Halys Substation near Tarong.

2.2 FEASIBLE ALTERNATIVES

2.2.1 "Do Nothing" Option

In proposing this Project, Powerlink has also considered, and rejected on the grounds of Powerlink's mandated legal obligations for reliability, a 'do nothing' option. As previously noted, the expected population growth of South-east Queensland region, and ongoing increased use of air-conditioning, will result in increased load and peak demands. Establishment of further generation capacity within the South West Queensland sector will exacerbate the network limitations described above.

Under the *Electricity Act 1994*, the National Electricity Rules and the terms of its Transmission Licence, Powerlink is obliged to reinforce or augment the existing network where necessary to ensure reliability and quality of supply. The forecast increased electricity demand in the area therefore makes action non-discretionary.

Even if the demand growth proved to be slower than forecast, the identified short-term and long-term network limitations will still emerge, albeit slightly later than forecast. It is therefore strategically prudent (and consistent



with the principles of the South-East Queensland Regional Plan) to undertake the required development. A similar conclusion applies if the demand growth proves to be higher than forecast.

2.2.2 The Western Downs Substation

Powerlink is currently acquiring the Western Downs Substation (WDS) site off Banana Bridge Road, opposite the Kogan Creek Power Station. When initially constructed, this substation will connect to the powerstation, the Braemar Substation, and through to the Halys Substation. The connections to the first two facilities will be achieved by redirecting the current transmission lines which link these sites into the WDS. The connection to the Halys Substation will require the construction of approximately 130km of 275kV transmission line. A major portion of this line is to be constructed on existing easements acquired in the late 1990s for the QNI. This report addresses the section between the WDS and QNI, and involves the acquisition of easements for the construction of approximately 25km of new line.

2.3 TRANSMISSION LINE CONNECTION

The existing transmission line between Tarong substation and Braemar substations is a part of the QNI. The QNI provides one link between Queensland and the National Grid in the other States along the eastern seaboard, Tasmania and South Australia. Between Tarong and Braemar, the existing transmission line easement has sufficient width to accommodate one additional line on the western/northern side of the existing line. For the transmission connection between WDS and the Halys area (20km west of Tarong), it is proposed to maximise the use of this vacant easement, and acquire a new easement to accommodate the connection between the WDS and this existing easement. Initial investigations indicated that this easement would be approximately 25km long and intersect the QNI in the Warra/Condamine River area.

These investigations also indicated that a line departing the QNI easement in the Warra area to the north of the Condamine River would encounter significant dryland and irrigated cultivation in the Warra, Cooranga Creek and Condamine River areas. Consequently consideration was only given to route corridors which depart from the existing QNI easement south of the Condamine River.

In consideration of the location of residences, terrain, vegetation, coal resources, irrigation, line length and other rural land use restrictions, three alternative corridors were identified and evaluated between the QNI easement and the notional location for the WDS in the vicinity of the Kogan Creek Power Station. A comprehensive Corridor Selection and Preliminary Alignment Report was prepared to compare these options. The report has been included as **Appendix C**. This report concluded that, on balance and in consideration of the assessment factors, the central of the three corridors is preferred. This study alignment is shown on the figures throughout the report.

This report also identified a preliminary alignment within this corridor. This alignment was the starting point for consultation with landowners within the study corridor.



3.0 PROJECT DESCRIPTION

3.1 PROJECT LOCATION

This document addresses the acquisition and planning approval for a 275kV transmission line connection (the Connection) between the WDS and the existing QNI easement. This line forms one component of a larger overall development project which includes establishment of the WDS, and the linking of this substation to the existing transmission network at Halys Substation near Kumbia, in the South Burnett.

The western end of the Connection is located at the WDS site adjacent to the Kogan Creek Power Station approximately 53km north west of Dalby on the Darling Downs. The eastern end of the Connection is the existing easement containing the QNI in the vicinity of the Condamine River, south of the town of Warra.

The Connection is located within the Local Authority of the Western Downs Regional Council.

Figure 1.1 indicates the Braemar / Kogan Creek / Tarong locality. This area lies within Powerlink's South West Queensland (SWQ) network sector.

Previous environmental documentation and approvals have been prepared for the Western Downs Substation site (Conics 2010) and the existing easement containing the QNI (ERM 1998).

3.2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development is classified as Electrical Works in accordance with Schedule 2 of the Sustainable Planning Regulations 2010. These works include the acquisition of the easement between the WDS site, and a partially vacant easement containing the QNI, near Warra. This easement may be cleared and will contain a 275kV, double circuit, transmission line which will predominantly utilise steel lattice towers, but may include steel or concrete poles. The project will also include on and off easement access tracks, creek and stream crossings, fencing as required and other works necessary for construction, operation and maintenance of the electrical works.

High voltage transmission lines consist of a series of towers between which conductors and earth wires are strung. For the purposes of this project, a 275kV double circuit transmission line with two earth wires will be constructed within a 60 m wide easement.

3.2.1 Physical Details of Structures

3.2.1.1 Transmission Towers

Transmission towers are used to keep the high voltage conductors (wires) separate from each other, and clear of the ground and other obstacles. Requirements for minimum clearance between energised conductors and various types of obstacles are specified in the Electrical Safety Regulation 2002.

The span distance between adjacent towers and the height of the towers is determined by the surrounding topography, clearance requirements and structural loading limits. Towers are fabricated in a range of designs to



allow for the most optimum height to be provided at each site. Typically, shorter towers are found on elevated areas such as hills, with taller towers being used near gullies, on flatter terrain or where additional clearance is required over mid-span obstacles such as roads or sensitive areas such as Regional Ecosystems, riparian vegetation or rare and threatened flora/fauna.

Various designs of conventional self-supporting lattice steel towers have been used in Queensland for over 50 years and are the standard form of support structure for high voltage infrastructure construction adopted throughout the state. Individual structure components are fabricated from galvanised steel angle sections (members) and steel plate and are bolted together. Each tower leg is supported by its own foundation. The two principle structure types in use are suspension and tension towers.

3.2.1.2 Suspension Towers

Suspension towers are used where the transmission line follows a straight route or has a very small deviation angle (up to 2 degrees). They are designed to carry the weight (vertical load) of the conductors, and withstand transverse (horizontal) wind load on the conductors, and conductor tension resulting from the small angles, earth wires and the structure itself. The structural details of a typical double circuit suspension tower are shown in **Figure 3.1**. Features of the conventional suspension towers are relatively light construction, with cross-arms on each side of the upper tower (superstructure) and vertical insulator strings supporting the conductors. The standard foundation for suspension towers is shown in **Figure 3.1**. Special foundation types such as driven piles and screw anchors are used in poor load bearing soils or other situations where conditions are not suitable for standard foundations.

3.2.1.3 Tension (Angle) Towers

Tension towers are characterised by a 'heavier' appearance due to the larger steel section sizes and conductors 'terminated' onto the cross-arms using insulators in a near horizontal orientation. Tension towers are designed to carry the weight (vertical load) of the conductors, and transverse (horizontal) load from wind on the conductors, longitudinal conductor tension loads, earth wires and the tower structure itself. The design for a typical tension structure is shown in **Figure 3.1**. Tension towers are required where changes in direction of the transmission line of greater than 2° occurs, or where termination sites have been predetermined to facilitate line construction and operation. These towers are designed to withstand high longitudinal loading on the structure which cannot be accommodated by the lighter suspension towers.

Tension towers are used for line deviation angles exceeding the limitations of the suspension tower (2°), 'uplift' positions and at line terminations. Uplift is a term used to describe the loading condition where in the absence of sufficient vertical gravity loads would cause a suspension insulator string to swing unacceptably close to the body of the tower under certain loading conditions, thus reducing electrical clearance. This situation can occur where a tower is located at the base of a hill or on steep terrain, and is resolved by using a tension tower with its different insulation configuration even though the loading conditions would not normally require a suspension tower at this location. A suite of structures may be designed for a particular project to cover a range of angle duties. For example, an intermediate type may be designed for angles of up to 40° and a 'heavy duty' type provided for angles up to 90°, as well as termination positions, such as those that occur at each end of the transmission line.



Either tower type can be raised or lowered in increments of three metres (based on sectional lengths used in the tower design). This ensures that appropriate ground clearance is maintained. A typical foundation for the tension towers is shown in; it is larger in diameter and depth than foundations for suspension towers in order to support the higher mass and lateral loading. Similar to suspension towers, special foundation types are also used where a standard foundation design is not appropriate to the prevailing ground conditions.

3.2.1.4 Conductors

Conductors to be used on 275kV transmission lines are all aluminium alloy. For simplicity, the industry has adopted code names to differentiate between the different combinations of size and strand numbers for the conductors most frequently used. For instance, a typical conductor for this line is code named 'sulphur' and comprises 61 strands each 3.75 mm diameter with a total diameter of 33.8 mm. Each structure will support twelve individual conductors, configured in three pairs of (twin) conductors on each side of the tower.

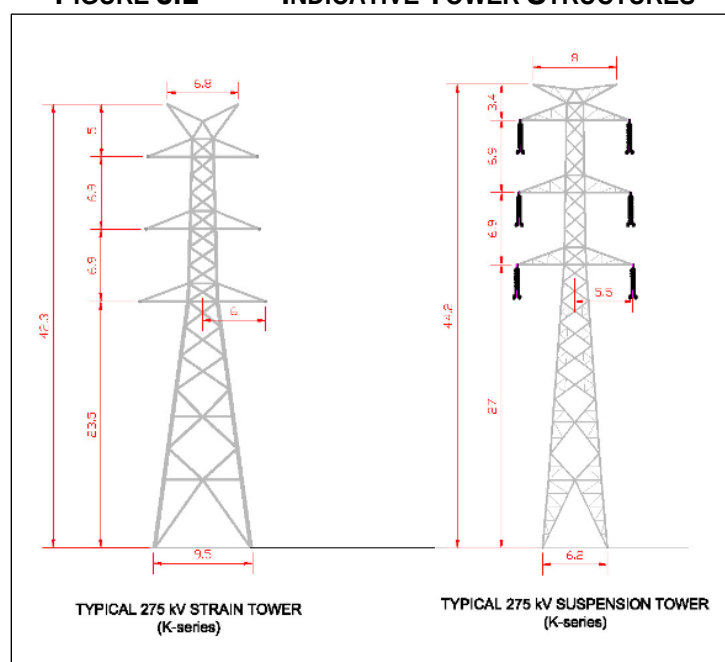
3.2.1.5 Earth Wires

Overhead earth wires provide protection to the conductors from direct lightning strikes, to safely dissipate earth fault currents and are also used as a support for optical fibre cables for communication purposes. Each optical fibre earth wire will typically be 14 mm diameter with 48 optic fibres protected within the middle of the cable.

3.2.1.6 Insulators and Fittings

Insulators are used to provide a connection between conductors and structures and to provide electrical insulation between the high voltage of the conductors and the (earthed) tower. The length of insulators in a string is determined by line voltage, clearance requirements and environmental (e.g. pollution) considerations. For this project, insulators will be the ceramic or glass type. Special galvanised steel or aluminium fittings connect both the line end of the insulator to the conductors and the tower end to the structure. A typical insulator string for 275kV lines is shown in **Figure 3.1**.

FIGURE 3.1 INDICATIVE TOWER STRUCTURES





3.2.1.7 Easements

Where tenure allows, all Powerlink transmission lines are constructed on easements. An easement is a registered interest within a parcel of land for which Powerlink pays compensation to the owner. An easement allows the transmission line to be built and operated on a part of a property while ownership of the entire property remains with the current owner. Restrictions are placed on certain activities permitted on an easement to ensure that the safety of the public is maintained and the line can operate reliably. Compensation is paid for the easement acquisition for the encumbrance that the easement represents on that land. The easement width is determined by the size, voltage and type of line and the need to maintain safe electrical clearance between the high voltage conductors and any object or structure adjacent to the line, under all conditions.

Clearing of vegetation within the easement is necessary to ensure that adequate safety clearance is maintained to energised conductors. It is Powerlink's practice to remove only that vegetation which infringes or is likely to infringe this safety clearance. In practice, this means that a significant proportion of trees and taller vegetation is cleared from the easement area. Where the new line parallels the existing Kogan – Braemar Transmission line, an easement widening of 40m is required. New 60 metre wide easements will be acquired for the balance of the connection between the WDS and the QNI.

3.2.1.8 Access Tracks

Access to the full length of the transmission line will not be required during construction, but construction and maintenance access is required to each structure site. To reduce impacts to landuse operations, Powerlink prefers, with consent of respective landowners, to use existing property access tracks. In steeper terrain or where the easement is dissected by creeks or gullies, tracks may need to detour off the easement. Where access is needed by heavy construction vehicles (including delivery trucks, cranes and concrete trucks), a higher standard of access is generally required. This may result in existing tracks being upgraded to improve access for such heavy vehicles. All track construction will be undertaken in accordance with Powerlink's Transmission Line Access Tracks Standard, which is contained in **Appendix D**.

During the service life of the proposed transmission line, access maintenance is conducted as required to ensure that tracks are passable by the range of vehicles and machinery employed to service the easement and tower sites. This maintenance addresses matters including erosion and sediment runoff, and ensures that sensitive areas such as watercourses or remnant vegetation are maintained in a healthy condition. Erosion and sediment control measures will be implemented to appropriately manage water runoff, particularly in areas of erodible soils and where heavy rainfall is expected. Any temporary diversion structures or access tracks shall be designed in accordance with the protocols outlined in the manual: Best Practice Erosion and Sediment Control (Australasian Chapter of International Erosion and Sediment Control Association, 2008).

3.2.2 Construction Process

Construction of the transmission line will involve a series of field activities, which are broadly categorised as follows:

- Site surveys;
- Vegetation clearing;
- Access tracks;



- Foundation installation;
- Structure erection;
- Conductor and earth wire stringing; and
- Site rehabilitation.

3.2.2.1 Site Surveys

Easement surveys are carried out by ground-based surveyors. Survey Plans are prepared and pegs are placed at appropriate locations to accurately define the position of the easements on each property crossed. Profile surveys involve an aerial survey of the ground profile along the final alignment. The purpose of the profile (or centre-line) survey is to obtain information necessary to aid the design of the transmission line in a precise and efficient manner. Data that is collected includes ground elevation along the centre-line (depicting topographical relief), cross-fall of the easement, location and extent of gullies and watercourses, the height range of vegetation (including in some instances, individual trees), roads, powerlines, and other information that could be pertinent or potentially influence the final transmission line layout.

Structure locations are based on the technical characteristics of the structures and conductors as well as management requirements that include environmental considerations. Upon completion of the design of the transmission line, surveyors revisit the site and place pegs at the proposed tower sites to identify the location of the foundation for the construction crews.

3.2.2.2 Vegetation Clearing

Areas of vegetation that may need to be cleared or modified will be defined once the precise location of each tower and the respective conductor height are known. The extent and type of clearing required is dependent upon terrain, vegetation type, presence of waterways and to some extent landowner and land use requirements.

Clearing methods may vary from selective vegetation removal using chainsaws and other hand tools, bulldozer and stickrake in heavier vegetation, through to megamulching to minimize soil disturbance. At tower sites, sufficient area will be cleared to allow tower assembly and erection. This area should be sufficient to cater for cranes and elevated work platform trucks. The tower footprint will also be “grubbed” for stumps. Clearing within and adjacent to waterways is discussed in **Section 7.0** of this EIS.

Approximately 40% of the preliminary alignment for the new line parallels the existing alignment between Kogan Creek Power station and the Braemar Substation. This section will require incremental widening of approximately 40 metres on the northern side of the existing clearing. In moderate terrain, where mechanical clearing is not appropriate due to soil or slope constraints, trees may be cut above ground level, felled along the contour and allowed to decompose naturally. A similar technique may be applied near watercourses to provide bank protection and/or riparian habitat; however, fallen timber will be removed from streams to prevent obstruction to stream flow. Alternative clearing methods will be considered for areas where it is likely that sodic subsoils could be exposed by traditional clearing methods.

Where practicable, timber of commercial value or that suitable for other uses such as fence posts can be recovered prior to clearing operations. In other areas of vegetation, timber will be felled with the residual material normally windrowed within the easement. Disposal of cleared material is dependent upon the clearing method



adopted and may include stacking, windrowing, burning, chipping, or being left in situ and will be in accordance with the relevant landholder's instructions. Where felled timber is left in situ adequate breaks will be left in vegetated windrows to ensure surface water flows are not concentrated. The clearing strategy and vegetation disposal techniques will be detailed in the Construction EMP and the work plans developed from the EMP. In all cases, appropriate clearing methods for various areas are to be selected with reference to Powerlink's Policies: *Vegetation Management for Transmission Corridors and Sites* and *Vegetation Control Standard*, as well as input from landowners and advisory bodies, such as the DERM. Vegetation works during construction will be supervised by Powerlink's Environmental Officer. Areas where a particular method of clearing is required are identified in the EMP and in associated Environmental Work Plans (EWPs).

Powerlink will provide at least three months notification to DERM of any proposed clearing within State Land so that the necessary assessment can be undertaken to determine the extent of commercial timber present.

3.2.2.3 Foundation Installation

Conventional tower foundations are grouped into three main types and broadly categorised as:

- Bored piles;
- Screw and driven piles; and
- Mass concrete.

Bored and mass concrete foundations are normally used whereas special foundations such as driven piles and screw anchors are only used where ground conditions do not permit installation of the normal types. The choice of foundation type is dependant on the specific nature of the soil and takes into account the following:

- Soil/concrete friction strength;
- Water levels;
- Soil bearing capacity;
- Construction constraints;
- Rock levels; and
- Soil properties.

Dimensions of foundations are determined by tower type, height and soil conditions at the site. Excavation of bored foundations is typically by truck mounted auger and by backhoe or track mounted excavator for mass concrete foundations. The excavation is bored at the same inclination, as the tower leg. In unstable ground conditions, the excavation may be stabilised by the insertion of a steel 'liner' in a bored foundation, shoring or timbering for a mass concrete foundation. Although dependent upon the geology of the surrounding soil, foundations may typically be excavated to approximately 8 metres. Some blasting may be required in areas where removal of rock is necessary for footing construction. Screw pile foundations are an installation that requires no pre-drilling, boring and limited pile cap excavation and are very suitable for acid sulphate soils where excavated spoil material may be an environmental concern. Driven foundation piles may also be adopted where swampy or malleable ground conditions are encountered, or where there is an environmental concern about the excavated spoil.

The simplest form of screw piles consists of a steel shaft with a helical plate welded to its bottom end. By the introduction of additional helical plates on each steel shaft the capacity can be enhanced accordingly. Pile



installation is achieved with a hydraulic head attached to an excavator that rotates the pile into the ground. The tops of the piles are integrated into a mass concrete pile cap that forms the connection platform for the transmission structure. The pile cap will extend slightly above ground level and it is sized according to structural design requirements. Concrete is placed in accordance with normal construction practices and formwork removed after an appropriate curing time. Stubs are cast into the pile cap and the transmission structure erected in the normal manner.

Leg stub/base setup is the process of placing an extension of the tower leg (the “stub”) in the correct position and inclination within the excavation, in preparation for concreting in place. A temporary jig or template is used to hold the stub firmly in place in the correct horizontal and vertical alignment and is removed after concrete has been poured and set. Alternatively, the lower section of the tower (the “base”) may be used for the same purpose. Backfilling of mass concrete foundations is completed using the excavated material, if suitable, or imported fill. Surplus material is spread evenly about the site or removed, depending on the quantity and suitability. Throughout this process, the site is protected from soil erosion by the implementation of measures detailed in the EMP. Where sodic soils have been identified appropriate treatment methods are to be adopted.

Reinforcing steel is included in tower foundations, with the amount and specifications varying with tower and foundation type. Temporary formwork is also used for the foundation column above ground (bored foundations) and above the base (mass concrete foundations). Concrete is placed in accordance with normal construction procedures and formwork removed after an appropriate curing time.

3.2.2.4 Tower Erection

The term ‘tower erection’ refers to a sequence of activities from delivery of the structure to the site, pre-assembly, erection, tightening and inspection of each tower structure. Steel for lattice towers is fabricated, galvanised, sorted and bundled ready for delivery at an off-site contractor’s facility. Pre-assembly of the tower is usually carried out adjacent to its final site location and involves assembly of a number of sections that will allow convenient erection at the following stage. Large or heavy towers may require the use of a small mobile crane to move members and sections around the construction site for preassembly. In most instances, a large mobile crane is used to erect the tower with a work crew installing and tightening all bolts, and checking that the structure is complete.

3.2.2.5 Conductor and Earthwire Stringing

Conductors and earthwires will be erected using the “tension stringing” method. This term is used to describe the process in which conductors and earthwires are installed under sufficient tension to be kept clear of the ground and mid-span obstacles within the easement. A draw wire pulls the conductors and earth wires through the stringing sheaves under tension. Stringing is usually carried out in sections of 5 to 10 kilometres, depending on the terrain, access and tower types. After the conductors and earthwires have been installed to the correct tensions and sags, they are “clamped in” to the insulators by removing the stringing blocks and installing permanent clamps which hold the conductor in its final position.

The stringing process requires the use of specialised equipment, which is briefly described as follows:

- A powerful winch (puller) is set up at one end of the stringing section and a braking device (tensioner) at the other;



- Specially designed pulleys (stringing sheaves) are fixed at each conductor and earth wire attachment point on each tower in the section;
- Multiple high strength, non-rotating steel winch ropes are threaded continuously through the corresponding sheave on each tower between the winch and the tensioner. This is often facilitated by threading light polypropylene ropes through the sheaves as they are installed. These ropes are used to pull the winch rope through the sheaves at each structure without the requirement for a worker to climb the tower;
- For each stringing section, eight individual winch ropes are run out –one for each phase conductor bundle on each circuit (6) and one for each earth wire (2);
- The conductors (electrical cables) are then pulled out under tension through the stringing sheaves on each tower and through to the winch. Tension of the winch ropes is continuously monitored to avoid over tensioning. Workers carry out visual checks through the stringing section to ensure that the conductor run out proceeds smoothly and wires remain clear of all obstructions (the aluminium conductor can be easily damaged if it contacts an obstruction or the ground);
- At the completion of the run out of all conductors and earth wires, they are attached to structures or temporary anchorages;
- Conductor and earth wire tensions are adjusted to give the design sag (i.e. an appropriate ground clearance);
- Conductors are clamped in final positions at the end of insulator strings at each suspension structure, and terminated on insulator strings at each tension tower;
- Earth wires are clamped or terminated as required at each structure earth wire peak; and
- Equipment is repositioned and the above process is repeated for subsequent stringing sections.

A variation of the above process employs a helicopter to undertake the stringing. It is quite similar to the process outlined above, except a small diameter, steel winch rope is run out through the stringing section by the helicopter. This winch rope is then used to pull the 'normal' heavier winch rope through the same section, and the process is continued in the same manner as conventional tension stringing. This technique is used in environmentally or visually sensitive areas to minimise vegetation clearing, and in steep and rugged terrain where direct access along the easement is limited.

3.2.2.6 Construction over road corridors

Construction of the proposed transmission line over Banana Bridge Road, the Warra Kogan Road and Wolskis Road will require road closures of short duration. These closures will allow the draw wires, conductors and earth wires to be installed across the road formation.

Appropriate consultation with the relevant agency (Western Downs Regional Council; Department of Main Roads) be undertaken and the requirements of those agencies implemented.

3.3 OPERATION AND MAINTENANCE

After the completion of construction and commissioning of the transmission line, the amount of activity on site will decrease substantially. Normal practice is for maintenance staff to carry out scheduled inspections of the line, easement and access tracks on an annual basis. These inspections are generally undertaken in a two-yearly



cycle consisting of vehicle inspections in the first year followed by helicopter inspections in the second year. Additional inspections may be required if the line unexpectedly goes out of service or in the event of vandalism.

3.3.1 Structures, Conductors and Fittings

These components are inspected on a regular basis for any signs of unusual wear, corrosion or damage. Transmission lines are designed for a 50 year service life and are very reliable under most conditions. Maintenance personnel are normally expected to climb each structure to conduct a detailed visual inspection approximately once every five years. Provision may be made for the proposed structure and conductor maintenance tasks to be carried out by helicopter. These aerial inspections are completed with the line either energized or de-energized.

3.3.2 Easement

Inspection of the easement is carried out on each scheduled line patrol, with the main aim being to record the type, density and height of vegetation regrowth as well as potential erosion issues. This information is used to schedule regrowth maintenance and treatment. Additional matters of interest include new under-crossings (e.g. distribution power lines), and other activity or construction within the easement which may affect the operation or maintenance of the line.

Powerlink's policy is for the landowner to be contacted prior to any vegetation control work on a property and the owner's agreement sought regarding the treatment method to be employed. This is particularly important if chemicals are involved. Three techniques of vegetation management are employed:

- Chemical;
- Mechanical; and
- Hand clearing.

The technique adopted for each area should take into account a number of issues such as type of regrowth, terrain and the local environment. Herbicide treatment of regrowth is a cost-effective option in many situations however, this method must be carried out within the appropriate environmental and statutory constraints, and in accordance with the manufacturers label information. Herbicide application can include foliar spray, cut stump or stem injection methods – depending on the target species to be controlled. Chemical control of weeds and vegetation will not be applied in the event that an organic farming enterprise is identified.

Mechanical clearing is usually performed by tractor driven slasher and is suitable for shrubs and smaller trees. This method is limited to relatively flat and accessible terrain and the type of vehicle or machinery used. This technique is also be used for access track maintenance, particularly where grasses or low-growing vegetation is the predominant form. Hand clearing is labour intensive but allows for target-specific vegetation clearing, which minimises disturbance to non-target species. It can be employed in areas where vehicle access is not available or where sensitive vegetation occurs (e.g. riparian or watercourse vegetation). Selective lopping of larger trees is an option that is often adopted for urban, visually sensitive or environmentally sensitive areas.



3.3.3 Weed Management

Weed infestation is largely managed under the provisions of a weed management plan, and includes vehicle and machinery washdown, and weed monitoring and control. Restricted access by the public and other parties reduces the potential for vehicle-assisted weed dispersal. Maintenance of vigorous groundcover vegetation along the corridor also reduces the capacity of weeds to colonize an area. Weed control is normally undertaken concurrently with regrowth control, or where required. Powerlink has a policy of cleaning all vehicles and plant/machinery prior to entry to new areas and on exit of suspected weed contamination areas. This assists in the control and prevention of weed dispersal. Construction and maintenance vehicles will be cleaned in accordance with approved protocols upon establishment of the transmission line and after leaving areas of suspected weed contamination. In areas known to contain declared weed infestations, Powerlink will coordinate weed control activities in accordance with local pest management plans and in consultation with landowners and managers.

3.3.4 Access Tracks

Access track maintenance is required to ensure unhindered entry to tower sites for inspections and maintenance. Techniques employed should be appropriate for the area. For example, a grader may be required in hilly terrain where some re-shaping or drainage is necessary, but a slasher would be preferred in open grasslands and on existing grassed tracks. Access track construction work should minimise disturbance to natural ground cover, thus reducing erosion potential and subsequent maintenance requirements. Planting the access with grass species in some areas with erodible soils (notably on slopes) may be required to minimise potential for gully or rill erosion. Maintenance of access tracks should include erosion and sediment control measures such as diversion drains, whoa boys and level spreaders. Any temporary diversion structures shall be designed in accordance with the manual: Best Practice Erosion and Sediment Control (Australasian Chapter of International Erosion and Sediment Control Association, 2008). Erosion prone areas are discussed in **Section 5.3**, and additional erosion control measures are outlined in the Environmental Management Plan (EMP). Access track maintenance is in accordance with Powerlink's Transmission Line Access Track Standards included in **Appendix D**.

3.4 DECOMMISSIONING DETAILS

The design lifespan of a transmission line is expected to be 50 years. The process of dismantling and removal of the transmission line is a staged process, which includes:

- Lowering the overhead conductors and earth wires to the ground and cutting them into manageable lengths to roll onto drums or reels. These are removed from the site and sold as scrap. Some minor damage to vegetation results, but other clearing is not normally required for this operation;
- Removing insulators and line hardware from structures at the site and recycling as appropriate or disposal at an approved local authority dump;
- Dismantling of towers and recycling of steel;
- Removal of foundation to 0.5m below ground level; and
- Rehabilitation of tower sites, access tracks and the easement through the promotion of natural revegetation.



4.0 RELEVANT LEGISLATION, LAWS & APPROVALS

Powerlink's request for land to be designated by the Minister for Natural Resources, Mines and Energy and Minister for Trade is based on Section 207(1) (a) and (b) of the *Sustainable Planning Act 2009* (SPA), which provides that the adequacy of the environmental assessment and public consultation about that assessment is presumed to be established if it complies with guidelines made by the Chief Executive under Section 760 of SPA (the Guidelines).

The Guidelines, at Section 1.4, require the assessment report to identify assessment requirements, at both State and Federal level, which apply to community infrastructure. Accordingly, this section of the report identifies:

- Relevant State and Federal legislation with implications for community infrastructure;
- Whether, and if so, the extent to which the legislation applies to the Powerlink Proposal; and
- The basis upon which the Minister can be satisfied that Powerlink has, or can and will meet its other statutory responsibilities.

4.1 COMMONWEALTH LEGISLATION

4.1.1 Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)

The Act

Under the assessment and approval provisions of the Commonwealth EPBC Act, actions that are likely to have a significant impact on a Matter of National Environmental Significance (MNES) are subject to a rigorous assessment and approval process. Such an action is described as a 'controlled action'. The seven MNES identified in the Act as triggers for the Commonwealth assessment and approval regime are:

- World Heritage Properties;
- National Heritage Place;
- Ramsar Wetlands of International Importance;
- Nationally listed threatened species and ecological communities;
- Nationally listed migratory species;
- Nuclear actions; and
- Commonwealth marine areas.

Application of the Act

Potential impacts of the proposed project on MNES have been considered. A summary is provided in **Table 4.1**. A detailed assessment of the significance of potential impacts on threatened and migratory species is provided in **Section 10.0**. It is considered unlikely that the Project will have a significant effect on any MNES from a local or regional perspective. In addition, mitigation measures have been recommended to minimise any potential impacts. The impact of the Project on MNES is unlikely to be significant and therefore is not considered to be a 'controlled action'.



TABLE 4.1 IMPACT OF THE PROJECT ON MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

MATTER OF NATIONAL ENVIRONMENTAL SIGNIFICANCE	IMPACT OF PROJECT
World Heritage Properties	There are no World Heritage Properties within the Study Alignment or in the immediate surroundings.
National Heritage Places	There are no National heritage places within the Study Alignment or in the immediate surroundings.
Wetlands of International Importance (Ramsar wetlands)	There are no listed Ramsar wetlands located within the Study Alignment or in the immediate surroundings.
Threatened Ecological Communities	There are no threatened ecological communities within the Study Alignment.
Listed Threatened Species	Two threatened species were recorded within the Study Alignment. Listed threatened species have also been previously recorded within the local area. Details in Section 10.0 .
Migratory Species	No listed migratory species were recorded within the Study Alignment. Listed migratory species have been recorded within the local area. Details in Section 10.0 .
Commonwealth Marine Areas	There are no Commonwealth marine areas located in the vicinity of the Study Alignment.
Commonwealth Lands and Heritage Places	There are no Commonwealth lands or heritage places located within the P Study Alignment.
Places on the Register of the National Estate (RNE)	There are no places listed on the RNE located within the Study Alignment.
State and Territory Reserves	There are no State forests on the Study Alignment.
Nuclear Action	The Project does not involve any nuclear actions.

Compliance

Two threatened species were identified along the Study Alignment. Assessment of the potential impacts on these species against the EPBC significance criteria was undertaken and is reported in **Section 10.0**. As the potential impacts on these species are not considered to be significant, this project will not be referred to the Department of Environment, Water, Heritage and the Arts (DEWHA).

4.1.2 Australian Heritage Council Act 2003

The Act

Indigenous and non-indigenous cultural heritage is regulated under multiple pieces of Commonwealth legislation.

The *Australian Heritage Council Act 2003* provides for the establishment of the Register of the National Estate, which is a list of natural, Indigenous and historic heritage places throughout Australia. However, the Register was frozen on 19 February 2007, which means that no new places can be added, or removed.

On 1 January 2004, a new national heritage system was established under the EPBC Act. The National Heritage List, which is designed to recognise and protect places of outstanding heritage to the nation, and Commonwealth Heritage List, which includes Commonwealth owned or leased places of significant heritage value, are



established under the EPBC Act. The listing of a place on the National Heritage List is an MNES under the EPBC Act.

Application of the Act

The Project is not affected by the *Australian Heritage Council Act 2003* or the EPBC Act (in relation to heritage) because there are no listed sites on the land to be designated.

4.1.3 Aboriginal & Torres Strait Islander Heritage Protection Act 1984

The Act

Indigenous cultural heritage is protected by Commonwealth legislation in the form of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* and the EPBC Act.

Indigenous and historic places that are of outstanding heritage value to the nation are included in the National Heritage List established under the EPBC Act. It is an offence under the EPBC Act for a person to take an action that has, will have or may have a significant impact on the Indigenous heritage values of a place listed in the National Heritage List.

The purpose of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* is to preserve and protect areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition. Any Aboriginal or Torres Strait Islander person or organisation may apply to the Commonwealth Minister for a temporary or permanent declaration for protection of threatened areas or objects of significance.

Application of the Act

It is theoretically possible that if an application for a declaration is made in accordance with this Act, before the Minister for Natural Resources, Mines and Energy and Minister for Trade makes a decision on Powerlink Queensland's request for designation, this Act would become relevant. Should that occur the Commonwealth Minister must liaise with the State Minister as to whether there is sufficient protection from threat of injury or desecration for the object/s or area/s under the State's law.

Compliance

Powerlink Queensland has undertaken an indigenous cultural heritage assessment of the study site to identify any potential areas of objects of significant indigenous cultural heritage and, as such, is satisfied that it is unlikely that a declaration under this Act would be made if one was sought. To minimise the risk of any such application, and to meet its duty of care during construction, Powerlink Queensland is also pursuing a Cultural Heritage Management Plan (CHMP) with the relevant Aboriginal Party for the area under the *Aboriginal Cultural Heritage Act 2003* (Qld).



4.1.4 Native Title Act 1993

The Act

The *Native Title Act 1993* has the following objectives:

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

Section 24KA of the *Native Title Act 1993* facilitates dealings with land actually or potentially subject to native title (that is, where native title rights and interests have not been extinguished). This section applies to a land dealing that is to be carried out for the provision of facilities for services to the public which includes, inter alia, an electricity transmission facility such as the proposed transmission line. Dealing under s.24KA does not equate to compulsory acquisition of native title and will result in the 'non-extinguishment principle' applying. The non-extinguishment principle means that during the 'life' of the proposed transmission line any native title rights and interests are suppressed only to the extent of their inconsistency with the use by Powerlink Queensland of that transmission line. Should the line ever be decommissioned and removed, any inconsistent native title rights and interests will resurface.

Application of the Act

No Native Title Parties exist for the proposed transmission line connection between the Western Downs Substation and the existing QNI easement. However, the route will cross several land parcels where Native Title may exist. These include a Camping and Water Reserve (used as a quarry), two Quarry and Gravel Reserves (one used, one unused), and Braemar Creek which is a boundary creek separating two properties.

Where native Title has not been extinguished due to the use of these lands, Powerlink will utilise the provisions of 24KA of the *Native Title Act* to suppress Native Title. This allows the construction, operation, use, maintenance or repair of the transmission works without extinguishing native title or affecting current claims over the study area.

4.2 STATE LEGISLATION & POLICIES

4.2.1 Aboriginal Cultural Heritage Act 2003

The Act

The protection of Aboriginal cultural heritage in Queensland is governed by the *Aboriginal Cultural Heritage Act 2003*. This Act requires any person who carries out an activity to take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage. This is called the Aboriginal Cultural Heritage Duty of Care. Compliance with the Aboriginal Cultural Heritage Duty of Care can be demonstrated by simply carrying out Cultural Heritage Register searches for minor disturbances, to carrying out detailed cultural heritage field assessments and development of a Cultural Heritage Management Plan (CHMP) where there is a high risk of impact.



Application of the Act

CHMPs are required for certain high-level impact activities (e.g. where an environmental impact statement is required under legislation). A CHMP may be initiated voluntarily e.g. to ensure that duty of care is met. This process will ensure that harm to cultural heritage is avoided or minimised to comply with the Aboriginal Cultural Heritage Act 2003.

Compliance

Powerlink will pursue development of a CHMP with the Aboriginal parties. Once this CHMP approved, Powerlink Queensland will have compliance with its Aboriginal Cultural Heritage Duty of Care. As part of the Project, detailed cultural heritage field assessment will be undertaken by the Aboriginal Parties and Powerlink along the Study Alignment.

4.2.2 Electricity Act 1994

The Act

The *Electricity Act 1994* guides the approval process for the proposed transmission line. The purpose of the Act is to set out the requirements for all electricity industry participants to follow to ensure a safe, efficient and reliable supply of electricity in an economical and environmentally sound manner. It does this by:

- Authorising Transmission Entities to establish “operating works” (the transmission grid and other property used for operating and managing transmission grid); and
- Requiring Transmission Entities to have regard to the environment when carrying out authorised activities (S31(b)).

Application of the Act

The Project constitutes “operating works” under the Act. The Act requires those responsible for operating works, which involve transmission of electricity, to be authorised as “transmission entities”.

Compliance

The Project will comply with the Act because:

- Powerlink Queensland holds a transmission authority, and hence is a transmission entity, the proposed transmission line is covered by the definition of operating works;
- Industry legal advice is that the EIS is an appropriate process to satisfy the requirements of Section 31(b);
- To the extent that the proposal involves tree clearing:
 - Section 112A of the Act states that clearing of native vegetation on freehold land is classified as “exempt development if the clearing is for operating works for a transmission entity” on land designated by the Minister for Natural Resources, Mines and Energy and Minister for Trade under SPA (previously IPA); and



- Section 17 of the *Electricity Regulation 2006* provides that an electricity entity may clear trees on non-freehold land if it is necessary to build, maintain or operate an electric line or works if an easement, license or other agreement is in place.

4.2.3 Electrical Safety Act 2002

The Act

This legislation is directed at eliminating the human cost to individuals, families and the community of death, injury and destruction that can be caused by electricity. Accordingly, the purpose of this Act is to establish a legislative framework for:

- Preventing persons from being killed or injured by electricity; and
- Preventing property from being destroyed or damaged by electricity.

Application of the Act & Compliance

As a Transmission Entity, Powerlink Queensland's responsibilities are to implement appropriate safety management systems. It does this to the required standard.

4.2.4 Environmental Protection Act 1994

The Act

The object of this Act is to protect Queensland's environment while allowing for ecologically sustainable development. The Act contains several mechanisms to aid in the protection of the natural environment and imposes a duty of care towards the environment under S 319.

Subordinate legislation to the *Environment Protection Act 1994* includes:

- *Environment Protection Regulation 2008*, Schedule 2 of which defines a number of Environmentally Relevant Activities (ERA) that require a license or approval; and
- *Environment Protection (Waste Management) Regulation 2000*, *Environmental Protection Policies for Air, Noise and Water*, which set environmental values and quality objectives for of the receiving environment.

Application of the Act

Although no approvals are currently required from the DERM under the *Environmental Protection Act 1994*, Powerlink Queensland has the following duty of care toward the environment under s.319 of this Act:

"A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm".



Compliance

The Proposal complies because:

- In Conics' view, the Project takes all reasonable and practical measures to prevent or minimise environmental harm, and so complies with the duty of care prescribed in this Act
- It is not anticipated that an ERA will be undertaken during the construction and operation of the Project.
- The requirements of the *Environmental Protection Act 1994* and its policies have been addressed in the EMP.

4.2.5 Fisheries Act 1994

The Act

The *Fisheries Act 1994* provides a framework for the regulation of fisheries, declared Fish Habitat Areas (FHA) and marine plants (including mangroves) and has been 'rolled in to' the SPA (2009). The purpose of this Act is to "...apply and balance the principles of ecologically sustainable development ..." (S.3) by managing and protecting fish habitats. Any works in a declared FHA or disturbance to marine plants (e.g. such as removal of mangroves) requires an operational works approval and referral to the Queensland Primary Industries and Fisheries (QPI&F), unless those works comply with the QPI&F's Code for Self- Assessable Development: MP04 Maintenance Works on Powerlines and Associated Infrastructure in a Declared Fish Habitat Area or Involving the Removal, Destruction or Damage of Marine Plants (to comply with the Code the works must be reasonably necessary for maintenance of existing powerlines or associated infrastructure).

Application of the Act & Compliance

Due to the inland nature of the site, the project is not located within or near a declared FHA and the project will not involve disturbance of marine plants. The Project will also not involve the creation of barriers across waterways.

4.2.6 Forestry Act 1959

The Act

The *Forestry Act 1959* provides for forest reservations, the management, silvicultural treatment and protection of State forests, and the sale and disposal of forest products and quarry material, the property of the Crown on State land including, State Forests, timber reserves, leasehold land and unallocated State land.

Application of the Act

Sections 39, 53 and 54 of the Act require that a permit be obtained prior to interference with forest products (i.e. all vegetable growth, honey, native animals (and any associated nests or shelters), relics and quarry material) on State land

Compliance

The proposed Project will not source quarry material and/or forestry products from State land. The construction and maintenance of the transmission line may interfere with forest products and therefore a permit may be required.



4.2.7 Sustainable Planning Act 2009

The Act

On the 18 December 2009, the *Sustainable Planning Act 2009* came into force and replaced the *Integrated Planning Act 1997*. The purpose of the *Sustainable Planning Act 2009* (SPA) is to seek to achieve ecological sustainability of development via three main principles:

- *Managing the process by which development takes place, including ensuring the process is accountable, effective and efficient and delivers sustainable outcomes; and*
- *Managing the effects of development on the environment, including managing the use of premises; and*
- *Continuing the coordination and integration of planning at the local, regional and State levels.*

When considering this request for designation, the Minister will be exercising “powers and functions” under SPA, and is therefore required to exercise those functions and powers “in a way that advances the Act’s purpose”.

An important component of Powerlink Queensland’s brief when considering new transmission line projects, is to ensure such projects have been considered in terms of ecological sustainability. “*Ecological sustainability*”, as defined in Section 8 of SPA:

“...is a balance that integrates:

- a) Protection of ecological processes and natural systems at local, regional, State and wider levels; and*
- b) Economic development; and*
- c) Maintenance of the cultural, economic, physical and social wellbeing of people and communities”.*

Furthermore, SPA dictates that the “precautionary principle” should be considered as part of this assessment, that is, lack of full scientific certainty should not be used as a reason for postponing measures to prevent degradation of the environment if there are threats of serious or irreversible damage.

Application of the Act

To ensure the Minister for Natural Resources, Mines and Energy and Minister for Trade is able to meet these SPA obligations when considering new transmission lines projects, Powerlink Queensland must consider each of the matters in Section 8, sub-paragraph a) to c), and apply the precautionary principle approach where appropriate.



Compliance

Ecologically Sustainable Development

Australia's National Strategy for Ecologically Sustainable Development 1992 (NSEDs) defines ecologically sustainable development (ESD) as:

"using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased".

It is necessary to address the principles in understanding the relationship of the construction and operation of the electricity network in Queensland to satisfy the requirements of the NSEDs overarching goal. These principles are used in the consideration of short, long term and cumulative impacts of the Project and include the following:

- Intergenerational Equity;
- Precautionary approach; and
- Biodiversity conservation.

Together, these approaches aim to prevent and reverse adverse impacts of economic and social activities on ecosystems while continuing to allow the sustainable, equitable development of societies.

Intergenerational Equity

Intergenerational equity is a value concept that focuses on the rights of future generations. It is a concept that is implicit in ecological sustainability. Intergenerational equity is a notion that views the human community as a partnership among all generations. Each generation has the right to inherit the same diversity in natural and cultural resources enjoyed by previous generations and equitable access to the use and benefits of these resources. At the same time, the present generation is a custodian of these resources for future generations and is obliged to conserve this legacy so that future generations may also enjoy these same rights. In this way, intergenerational equity extends the scope of social justice into the future.

The maintenance of the values of the lands through the adoption and implementation of an EMP will fulfil the requirement of consideration of intergenerational equity by ensuring that future generations may continue to enjoy the environmental values of the Project area.

Further, the proposal extends the sustainable and equitable development of the transmission line network to provide existing and future generations with low cost electricity with minimal impact on the environment.

Precautionary Approach

The precautionary approach was codified for the first time at the international level by the United Nations in 1992 under Principle 15 of the *Rio Declaration on Environment and Development*.

Principle 15 codified the precautionary approach which indicates that lack of scientific certainty was no reason to postpone action to avoid potentially serious or irreversible harm to the environment. Central to Principle 15 is the



element of anticipation, reflecting a requirement that effective environmental measures need to be based upon actions which take a long-term approach and which might anticipate changes on the basis of scientific knowledge.

Powerlink has adopted the precautionary approach in considering short, long-term and cumulative impacts in the design, construction, operation/maintenance and decommissioning phases of this Project. The consideration of potential impacts both now and in the future has been demonstrated in the adoption of an EMP for this Project which sets out future monitoring, reporting and mitigation actions to be followed for various elements including environmental, physical and social considerations. The adoption of the EMP (and other Powerlink Queensland environmental standards and strategies) allows for the element of anticipation and includes future actions to be taken on the basis of improved knowledge and data.

Biodiversity Conservation

Biodiversity conservation is a cornerstone of many legislative and planning instruments/strategies. Biodiversity conservation requires the considerations of not just immediate organisms and their habitat, but also the consideration of long term and cumulative impacts, and impacts that may be 'off-site' but caused by interactions occurring within the Project area.

There is potential for transmission lines to have impacts on biodiversity conservation. The transmission line alignment has been chosen on the basis of a number of attributes, including biodiversity values, which were considered in the original Site Selection Report and other previous internal planning documents for the Project.

The potential for off-site impacts on biodiversity includes spread of weeds, erosion and sedimentation of these areas that may arise should weed management and erosion and sediment controls as outlined in the EMP not be implemented or fail.

There are two options available under SPA for obtaining planning approval for the Project. These are via either the Integrated Development Assessment System (IDAS) as set out in Chapter 6 of SPA or through the designation of land for community infrastructure in Chapter 5 of the SPA. A comparison of these options is provided in **Section 11.0**. Section 203 of the SPA makes development under Ministerial designation exempt development to the extent it is not assessable against local government planning schemes.

The designation of land for community infrastructure is the preferred planning process for this Project as it is a more streamlined process enabling certainty of timely commencement of the required infrastructure and consistency when multiple planning schemes are involved.

4.2.8 Land Act 1994

The Act

The *Land Act 1994* provides a framework for the allocation of State land as either leasehold, freehold or other tenure. Under Chapter 4, Part 4 of the Act, a permit to occupy is required from the Chief Executive of the Department of Environment & Resource Management (DERM) (formerly Department of Natural Resources & Water) where the proposed alignment is developed on unallocated State land, a Reserve or a Road. However,



Sections 101 and 102 of the *Electricity Act 1994* provide exemptions to the *Land Act 1994* allowing electricity entities to undertake necessary actions on road reserves and publicly controlled places such as Unallocated State Land (USL).

Division 8, Section 369 of the *Electricity Act 1994* identifies that easements for public utilities on unallocated State Land or Reserves are to be registered.

Application of the Act

The proposed transmission line alignment crosses freehold land currently owned by numerous landholders. Three Council Reserves are crossed by the study alignment. Powerlink is currently negotiating acquisition packages with affected landholders.

4.2.9 Land Protection (Pest & Stock Route Management) Act 2002

The Act

One of the dual aims of the *Land Protection (Pest & Stock Route Management) Act 2002* is to provide a framework for developing pest management plans for various land types.

Application of the Act

In accordance with the Act, Powerlink Queensland must take reasonable steps to keep the easement free of Class 1 and Class 2 pests as defined under the Act during the construction and maintenance of the transmission line.

Compliance

The EMP is to adequately address management of such pests during construction and maintenance activities. All vegetation management activities will be carried out in accordance with Powerlink Queensland's policies and procedures for controlling weed spread and pest management.

4.2.10 Nature Conservation Act 1992

The Act

The objective of the *Nature Conservation Act 1992* (NCA) is to 'conserve nature' through conservation strategies such as dedicating and declaring protected areas for those parts of Queensland with outstanding biological diversity, natural features and wilderness values. The Act also provides for the protection of rare, vulnerable, endangered and least concern animals and plants and declared protected areas.

It should be noted that changes to Section 89 of the NCA in November 2007 and amendment to the *Nature Conservation (Protected Plants) Conservation Plan 2006* (NC Plan) in February 2008, have altered the clearing permit requirements for 'least concern' plants. 'Least concern' plants are now considered as all plants indigenous to Australia, except for those listed as threatened, rare or near threatened under the NCA.

However, Section 41(1) of the NC Plan provides a number of exemptions to the requirement for a clearing permit:



"A clearing permit is not needed for taking a protected plant if –

- (a) the taking happens in the course of an activity under an authority made, granted or given under another Act by –*
 - (i) the Governor in Council, or*
 - (ii) Someone else and the chief executive approves the taking in the course of the activity, or*
- (b) For a least concern plant on private land – the person taking the plant is the landholder of the land."*

Application of the Act

No protected areas are known to exist in the study area. Two listed (Rare and Vulnerable) species under NCA were detected during the Study Alignment investigation (**Section 10.0**). No clearing permits will be required under the NCA where easements are obtained by compulsory acquisition under the *Acquisition of Lands Act 1967* because clearing of native vegetation for the purposes of the works specified in the easement will be exempt under Section 41(1)(a)(i) of the NC Plan.

The Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006- 2016 (KCP)

The Act

The KCP replaced the Interim Guideline: Koalas and Development that was released under the Regional Plan. The KCP is in accordance with Section 112 of the NCA. The KCP maps areas of Koala habitat as Koala Conservation Area, Koala Sustainability Area or Urban Koala Area. Under the KCP, the state is divided into three districts (A, B and C).

Application of the Act

The Project area is included in 'District C'. The Koala is classified as 'of least concern wildlife' under the *Nature Conservation Act 1992* in area (and all areas in Queensland outside of the south-east Queensland bioregion). Policies listed under the Koala Plan that relate to translocation, sequential clearing and spotter catcher requirements still need to be considered and are addressed in the EMP.

Compliance

No requirements are imposed on Powerlink Queensland in relation to koala protection for the Project, so the Project complies with the Plan and the State Regulatory Provisions.

4.2.11 Plant Protection Act 1989

The Act

The *Plant Protection Act 1989* regulates the control, removal and movement of plant pests, diseases, infestations, infections and conditions within and external to Queensland. It is administered by Queensland Primary Industries and Fisheries within DEEDI.

Application of the Act

In accordance with the Act, Powerlink must ensure that there is no movement of infected plant, soil, appliance or other matter.



Compliance

The Restricted Area Search Engine provided by the QPI&F supplies maps of the restricted areas for Fire Ants. The Study Alignment does not fall within a restricted area for Fire Ants. Although no permits from the DEEDI will be required, consideration is to be given on the movement (particularly out of the site) of extracted or waste soil, retaining soil, sand, turf, plant material or mulch / green waste / fuel and the potential for these material to contain Fire Ants. These aspects are addressed in the EMP.

4.2.12 Queensland Heritage Act 1992

The Act

European cultural heritage derives State protection pursuant to the *Queensland Heritage Act 1992*. This legislation protects those areas that are considered to be of State significance and are placed on the 'Queensland Heritage Register', which is administered by the Queensland Heritage Council. For these areas, approval of the Heritage Council is required if any development is proposed. The Council will only approve destruction or substantial reduction of the significance of a registered place, if there is no feasible and prudent alternative to the development.

If there is a feasible and prudent alternative to the development, the Minister administering the Act can issue a 'Stop Order' (s.88) either stopping or prohibiting any work or activity that may destroy or reduce the cultural heritage significance of an area. This Act also protects 'archaeological areas and objects' and 'protected areas of cultural heritage significance'.

Application of the Act

The proposed Project will not interfere or develop any registered places of significance as listed on the Australian and Queensland Heritage Register (**Section 17.0**).

4.2.13 State Planning Policies

The Policies

A State Planning Policy (SPP) is an instrument that is made by the Minister, about matters of State interest.

Application of the Policies

The following State Planning Policies are considered to be relevant to the Project:

- SPP 1/92 "Development and the Conservation of Agricultural Land";
- SPP 1/02 "Development in the Vicinity of Certain Airports and Aviation Facilities";
- SPP 1/03 "Mitigating the Adverse Impacts of Flood, Bushfire and Landslide";
- SPP 1/07 "Housing & Residential Development"; and
- SPP 2/07 "Protection of Extractive Resources and Guidelines (and petroleum and mining leases)".

Compliance

An assessment of the relevant State Planning Policies has been undertaken in the **Section 11.0**, which states that the project does not conflict with the key principles of these State Planning Policies.



4.2.14 Transport Infrastructure Act 1994

The Act

The objective of the *Transport Infrastructure Act 1994* is to allow for effective planning and efficient management of transport infrastructure. In particular, this Act deals with the management of roads of National and State importance.

Under s.33, s.50 and s.62 of the Act, written approval is required:

- To interfere with a State-controlled road or its operation;
- To construct and / or maintain ancillary works and encroachments (e.g. overhead structures) on State-controlled roads; and
- For the location at which access between private land and a State-controlled road is permitted.

Application of the Act

The proposed Project will not interfere with any State or National roads (**Section 15.1**). National and State Roads potentially utilised for the project include the Warrego Highway and Kogan – Warra Road.

4.2.15 Vegetation Management Act 1999

The Act

The purpose of the *Vegetation Management Act 1999* (VMA) is to regulate the clearing of native vegetation in a way that, amongst other things, conserves remnant regional ecosystems, ensures the clearing does not cause land degradation and prevents loss of biodiversity.

The VMA operates in conjunction with the SPA to regulate the clearing of native vegetation. Under Schedule 4 of SPA, clearing of native vegetation is assessable development (which means a development permit for operational works for vegetation clearing) unless an exemption applies.

The VMA was amended in 2009. The amendments primarily relate to the regulation of clearing of high value regrowth vegetation and regrowth vegetation within 50m of identified watercourses. Accordingly, the VMA regulates clearing of both remnant vegetation and regulated regrowth vegetation. Schedule 24 of the *Sustainable Planning Regulations 2009* (SPR) is the relevant section in identifying that clearing of native vegetation is not assessable development for the purpose of the SPA where the activity occurs under Sections 112A of the *Electricity Act 1994* or Section 17 of the *Electricity Regulation 2006*.

Application of the Act

Vegetation clearing associated with the proposed Project will be considered a 'specified activity', if it is "an activity under:

- The *Electricity Act 1994*, section 101 or 112A; or
- The *Electricity Regulation 2006*, section 14".



Section 112A of the *Electricity Act 1994* provides that carrying out clearing of native vegetation on freehold land is exempt development if the clearing is for operating works for an electricity transmission and distribution entity on land designated for the operation works by the relevant Minister.

Section 17 of the *Electricity Regulation 2006* provides that an electricity entity may clear, lop or prune trees growing on non-freehold land if:

- It is necessary to do so to build, maintain or operate an electric line or works on the land; and
- The entity holds the benefit of an easement, license or other agreement in relation to the line or works (whether or not the easement, license or agreement authorises the clearing, lopping or pruning).

Compliance

As the preferred approval process for the development of the proposed transmission line is via Ministerial designation as community infrastructure, vegetation clearing on freehold land required for the construction would be considered exempt development on the basis that it is a 'specified activity', once the land is designated for community infrastructure.

4.2.16 Water Act 2000

The Act

The *Water Act 2000* was introduced to reform water resource management in Queensland. Under s.808 of the Act, "A person must not take, supply or interfere with water under this Act unless authorised under this Act to take, supply or interfere with water". Catchment areas are also protected under the *Water Act 2000* to regulate developments within the catchment to prevent unacceptable impacts on water quality adjacent to major storages.

Under s266 of the *Water Act 2000*, a Riverine Protection Permit is required from DERM to:

- Destroy vegetation in a watercourse;
- Excavate in a watercourse; and
- Place fill in a watercourse.

The Act provides for making of guidelines by DERM by which nominated entities can carry out activities in watercourses, lakes or springs without the need for a permit under S269 of the Act, provided the guidelines are complied with. The guideline provides that where it is proposed to destroy an area of native vegetation greater than 2ha or excavate or place fill to a volume greater than 5,000m³, the Entity should notify the local office of DERM at least 5 business days before commencement of the activity.

This guideline does not remove the requirement to obtain the consent of the owner(s) of land adjoining the watercourse, lake or spring, if necessary, or provide the right of access across other land to the watercourse, lake or spring. Nor does the guideline apply to activities in a Wild River area declared under the *Wild Rivers Act 2005*; and springs in which the water is connected to artesian water, or sub-artesian water within the area covered by the Water Resource (Great Artesian Basin) Plan 2006.



In addition to the above, where waters are to be taken from a watercourse, lake or spring or underground water, for other than an approved purpose, for example for use in dust suppression during construction works, a permit to take water would be required pursuant to S 237 of the *Water Act 2000*. No exemptions apply to the taking of water. Construction of access tracks across waterway (if required) also requires approval under the Act.

Application of the Act

Powerlink Queensland is identified as an 'Entity' under the DERM 'Guideline – Activities in a watercourse, lake or spring' (DERM, 2010) and, as such, does not require a permit under S 269 of the Act, provided it meets the guidelines.

The Study Alignment is not located in an area declared as a 'catchment area' under the *Water Regulation 2002*.

4.3 LOCAL GOVERNMENT PLANNING SCHEMES & LOCAL LAWS

Once a community infrastructure designation has been made, the local Planning Scheme provisions do not apply to assessable or self assessable development under SPA or to the reconfiguration of a lot (Section 203 of SPA). However consideration of the local Planning Scheme is required when deciding whether a designation for this purpose should be made (see Guidelines made under Section 759 of SPA).

Under SPA, a local government must make a Planning Scheme which is an instrument that identifies the desired environmental outcomes for the area and outlines the measures for achieving these outcomes (including development assessment). The applicable Local Government (Western Downs Regional Council) Planning Schemes are the Planning Schemes for the former Chinchilla Shire (prepared under IPA and came into effect on the 30 June 2006) and the former Wambo Shire (prepared under IPA and came into effect on the 22 April 2005).

A detailed review of these Planning Schemes is provided in Section 11 of this document, which includes a planning review and assessment of the Statutory and Strategic Planning provisions of each of the Planning Schemes. The planning review indicated the corridor's land use zoning (*Rural Zone*) under both Planning Schemes would mean the development would be 'code' assessable development if the project was assessed under IDAS. An evaluation of the Planning Scheme provisions was also undertaken and a summary these provisions for the proposed Project within the Study Alignment are provided below in **Table 4.2**.

The Town Planning Investigation concludes that the Project is generally consistent with the provisions of the former Chinchilla Shire and Wambo Shire Planning Schemes. Assessment against both of the Planning Scheme provisions confirm the Project presents low impacts and has minimal conflicts with the Desired Environmental Outcomes and overall planning code outcomes.



TABLE 4.2 SUMMARY OF THE PLANNING SCHEME PROVISIONS FOR THE STUDY ALIGNMENT

CHINCHILLA SHIRE PLANNING SCHEME

ZONING	USE DEFINITION	LEVEL OF ASSESSMENT	APPLICABLE OVERLAY & DEVELOPMENT CODES	COMPLIANCE ASSESSMENT
Rural	Public Utility	Code	Rural Zone Code	Not considered consistent with the Rural Zone. Generally consistent with the Desired Environmental Outcomes of the Chinchilla Shire Planning Scheme & the Rural Zone Code Purpose

WAMBO SHIRE PLANNING SCHEME

ZONING	USE DEFINITION	LEVEL OF ASSESSMENT	APPLICABLE OVERLAY & DEVELOPMENT CODES	COMPLIANCE ASSESSMENT
Rural	Public Utility	Code	Rural Zone Code	Not considered consistent with the Rural Zone. Generally consistent with the Desired Environmental Outcomes of the Chinchilla Shire Planning Scheme & the Rural Zone Code Purpose

4.3.1 Local Laws

Under the *Local Government Act 1993*, a Local Government may make local laws for the good rule and government of, its Local Government Area. Community infrastructure designation under SPA does not exempt an entity from the need to comply with Local Laws. There are no Local Laws relevant to this Project. Therefore, approval is not required from the Western Downs Regional Council under a Local Law. A detailed review of Council's Local Laws is as follows.

The Western Downs Regional Council was formed on the 15th March 2008 and consists of the former:

- Chinchilla Shire Council;
- Dalby Town Council;
- Murilla Shire Council;
- Tara Shire Council; and
- Wambo Shire Council.

All the Local Laws and policies of these former authorities continue to apply within the former local government areas until they are amended by the new Council. **Table 4.3** outlines the local laws that are applicable to the newly created Western Downs Regional Council area in which the Study Alignment is located:



TABLE 4.3 APPLICABLE LOCAL LAWS

LAW NAME	LAW TYPE	LAST AMENDED DATE
03 - Libraries	Local Law	20/10/1994
03 - Libraries	Subordinate Local Law	18/02/1999
05 - Cemeteries	Subordinate Local Law	20/05/1999
05 – Removal of Buildings	Local Law	17/01/1981
07 – Parks & Reserves	Local Law	15/04/1999
07 – Parks & Reserves	Subordinate Local Law	20/05/1999
10 – Water Meters	Local Law	18/03/1999
10 – Water Meters	Subordinate Local Law	18/03/1999
11 - Roads	Local Law	20/05/1999
11 - Roads	Subordinate Local Law	20/05/1999
13 – Gates and Grids	Local Law	15/12/1999
13 – Gates and Grids	Subordinate Local Law	15/12/1999
14 – Commercial Use of Roads	Local Law	15/04/1999
14 – Commercial Use of Roads	Subordinate Local Law	15/04/1999
16 – Temporary Homes	Local Law	16/05/1996
16 – Temporary Homes	Subordinate Local Law	19/11/1998
17 – Keeping Control of Animals	Subordinate Local Law	16/05/2002
18 – Domestic Water Carriers	Local Law	15/08/1996
18 – Domestic Water Carriers	Subordinate Local Law	17/12/1998
19 – Control of Pets	Local Law	15/08/1996
19 – Control of Pets	Subordinate Local Law	19/09/1996
20 – Control of Nuisances	Local Law	18/09/1997
21 – Riding Cycles on Footways	Local Law	17/09/1998
21 – Riding Cycles on Footways	Subordinate Local Law	17/09/1998
23 – Swimming Pools	Local Laws	20/05/1999
24 – Camping Grounds	Local Law	20/05/1999
24 – Camping Grounds	Subordinate Local Law	20/05/1999
27 – Rental Accommodation with Shared Facilities	Local Law	17/06/1999
27 – Rental Accommodation with Shared Facilities	Subordinate Local Law	17/06/1999
29 – Control of Advertising	Local Law	15/04/1999
29 – Control of Advertising	Subordinate Local Law	15/04/1999
37 – Saleyards	Local Law	20/05/1999
42 – Levee Banks	Local Law	05/06/1982



An assessment of the above policies has been undertaken against the project and found that none of the above policies are applicable.

4.4 ASSESSMENT & APPROVAL PROCESS

As discussed in the Section 11 below, although the proposal can also be assessed under the requirements of both the *Wambo Shire Planning Scheme* and *Chinchilla Planning Scheme*, infrastructure projects of this magnitude are usually assessed under the provisions for designating land as Community Infrastructure by the Minister (Chapter 5, Part 1 of the SPA) as this process provides an approval in the most efficient manner. The Ministerial Designation process is outlined in **Section 11.0** along with a designation checklist.

A list of possible licenses, permits and approvals that may be required for the Project is provided in **Table 4.4** below.



TABLE 4.4 LICENCE, PERMIT & APPROVAL THAT MAY BE REQUIRED

LEGISLATION	RESPONSIBLE AUTHORITY	ACTIVITY WHICH TRIGGERS LEGISLATION	LICENCE / PERMIT / APPROVAL REQUIREMENTS
Commonwealth Legislation			
<i>Environment Protection & Biodiversity Conservation Act 1999</i>	DEWHA	If works are likely to have a significant impact upon listed Matters of National Environmental Significance (MNES) (namely in relation to nationally listed threatened and migratory species).	The proposed Project does not need to be referred to DEWHA
<i>Native Title Act 1993</i>	Attorney-General's Department	Suppression of native title rights and interests that are inconsistent with the easement conditions. (Note that native Title has been extinguished in this instance)	Procedural requirements to be carried out on non-freehold land.
State Legislation			
<i>Electricity Act 1994</i>	QME	- Clearing exemptions; - Environmental effects of the activity (i.e. the proposed Project).	Approval required for operational works (as defined by the <i>Electricity Act 1994</i>).
<i>Sustainable Planning Act 2009</i>	DIP-LG	Designation of land for Community Infrastructure.	Approval required (<i>Sustainable Planning Act 2009</i>).
<i>Land Act 1994</i>	DERM	Creation of easements.	Registration of easements.
<i>Nature Conservation Act 1994</i>	DERM	Clearing native vegetation and works within protected areas and affecting listed species.	No protected areas known to exist in study area. Permit will not be required for clearing native vegetation in easements due to exemption under Section 41(1)(a)(i) of the NC Plan.
<i>Plant Protection Act 1989</i>	QPI&F	Movement (particularly out of the site) of extracted or waste soil, retaining soil, sand, turf, plant material or mulch / green waste / fuel.	Advice from the DPI&F is to be sought.
<i>Transport Infrastructure Act 1994</i>	DTMR	- Crossing and use of state controlled road reserves; - Possible interference with the operation of a State-controlled road; and - Development on land completely or partly in a public transport corridor.	Approval / Agreement required.
<i>Vegetation Management Act 1999</i>	DERM	Clearing of mapped remnant vegetation within transmission line easement.	Approval not required if the 'specified activity' exemption applies following designation.
<i>Water Act 2000</i>	DERM	Watercourse crossings & riparian clearing.	Approval to be obtained as necessary if guideline thresholds are exceeded.



5.0 LAND

5.1 METHODOLOGY

Assessment of land resources in the study corridor was undertaken in two stages; a literature review and a field investigation.

The following literature applicable to the site was identified and reviewed:

- Spatial data sources (GIS framework provided by Searle *et al.*, 2007; Maher, 1996) were reviewed to consider topographic, geologic and soils characteristics likely to exist on site and factors which were likely to be major issues such as sodicity and salinity;
- Digital 1:250,000 Geology Data Base, Geosciences Australia 2005 for geology and soil mapping; and
- A search of the DERM Interactive Resource and Tenure Maps for active mining or exploration leases.

A field investigation was undertaken during the 6th and 7th of January 2010 by a Soil and Hydrology Scientist. The investigation included:

- A reconnaissance of the study corridor looking for variation in soils characteristics based on surface condition and comparing with mapping for the site;
- Surface observations and soils profile descriptions at selected locations;
- Survey observations recorded in accordance with the recommendations contained in the *Australian Soil and Land Survey Field Handbook* (McDonald *et al.*, 1990) and *Australian Soil Classification* (Isbell 2002).
- An inspection of the site for any likely contaminating activities (existing and historic) i.e. old cattle dips, land fill sites, etc;
- Strategic soil sampling to test for erodibility potential and nutrient status to inform rehabilitation/revegetation; and
- Analysis of soils results to determine requirements for soil amelioration rates (e.g. gypsum to counteract sodicity and fertiliser rates for revegetation).

5.2 TOPOGRAPHY/GEOMORPHOLOGY

5.2.1 Existing Environment

The terrain of the study site can generally be described as level to gently undulating plains with a maximum slope of 3 %. The natural elevation of the proposed alignment ranges from 321m AHD to 370m AHD (refer to **Figure 5.1**).

The proposed alignment traverses three ephemeral watercourses, being Kogan, Eastern Branch and Braemer Creeks (refer to **Figure 7.1**). All watercourses are tributaries of the Condamine River.

5.2.2 Potential Impacts

The construction of the transmission line and associated infrastructure will result in minimal changes to the topography of the terrain as it is generally flat and will require minimal earthworks.



Major diversion of water is unlikely however there may be minor changes to drainage patterns to divert water flows around the tower platforms. Potential impacts on water flows and hydrology are further discussed in **Section 7.0**.

5.3 GEOLOGY AND SOILS

5.3.1 Existing Environment

5.3.1.1 Geology

The site is located entirely on Kumbarilla sandstone and alluvium geology (Digital 1:250,000 Geology Data Base, Geosciences Australia 2005) (**Figure 5.2**). The Kumbarilla sandstones are the principle geology of the study corridor, where alluvium is present within the vicinity of the watercourses which traverse the study corridor (refer to (**Figure 5.2**). The Kumbarilla sandstones which date from Mesozoic times (most likely Jurassic to Lower Cretaceous), contain mainly clayey labile to quartzose sandstone with some siltstone, mudstone and polymictic conglomerates materials (Maher, 1996). These sandstone formations were significantly eroded in the period following Tertiary times. As this site is contained within the ironbark/bull oak Land Resource Area (LRA) (Maher, 1996) the rocks were harder than other sandstones in the region and hence have been left as low hills. The alluvium geology, which dates from the Holocene period, is mainly composed of clay, silt, sand and gravel.

5.3.1.2 Soils

The proposed alignment is contained within a number of LRA's (Maher, 1996; Harris 1998) as indicated by **Figure 5.3**. The dominant LRA's which are traversed consist of Light Forests and Ironbark / Bull Oak Forests. An LRA contains a number of different soils that vary according to site within the landscape unit. The common soil types within the LRAs are shown in **Table 5.1**.

During site investigation a number of shallow soil holes (up to 0.5m) were dug to investigate soil characteristics of the site (refer to **Figure 5.1** for sampling locations). Soil descriptions undertaken along the alignment indicated the principle soil types consist of Braemar and Cutthroat. These soils are defined as Sodosols (Isbell *et al*, 1997). Sodosol soils are characterized with a clear or abrupt textural B horizon in which the major part of the upper 0.2 m of the B2 horizon (or the major part of the entire B2 horizon if it is less than 0.2m thick) is sodic and not strongly acid. Sodicity influences erosion potential through its influence on soil structure and dispersibility of clay particles. Sodic soils have poor structure which is easily broken down by raindrop impact and susceptible to entrainment. Combidiban soil type dominated the alluvial plains associated with Braemar Creek.

Samples were taken for each soil type and sent to a laboratory to be tested for their erosion and nutrient status. **Figure 5.2** summarises these results. This data has been used to inform the EMP in regards to quantities of soil ameliorants that may be required for soil stabilisation (gypsum to counteract sodicity), and revegetation (fertiliser rates).



TABLE 5.1 COMPARISON OF SOIL MAPPING AND FIELD SAMPLES

LAND RESOURCE AREA	KNOWN SOILS COMMON	DESCRIPTION OF SOIL TYPES	SOIL SAMPLE LOCATION REPRESENTATIVE OF SOIL TYPES
1a and 1c : Clay Alluvial Plains	Condamine	Fine self-mulching, black cracking clays on alluvial plains.	
	Arubial	Thin (<15cm) bleached sandy surface, over brown or black clay subsoil on alluvial plains.	
	Cecilvale	Surface sealing, grey or black cracking clays, with a coarse blocky subsoil, on alluvial plains.	
	Combidiban (Associated Soil)	Thick to very thick (30-100 cm), bleached, loose sandy surface, over mottled, brownish grey, light brown or yellowish brown sandy clay subsoil on alluvial plains.	WD01, WD02, WD05, WD13
3a: Cypress Pine Sands	Bogandilla	Thin (<15cm), bleached sandy surface, over brown or black clay subsoil on alluvial plains, poplar box or false sandalwood or bull oak.	
	Chincilla	Very deep, reddish brown sands.	
	Combidiban	Thick to very thick (30-100 cm), bleached, loose sandy surface, over mottled, brownish grey, light brown or yellowish brown sandy clay subsoil on alluvial plains.	
	Davy	Very deep, yellow or brown sands.	
7a: Ironbark / Bull Oak Forests	Braemar	Moderately thick (20 – 40 cm), bleached sandy surface, over mottled, yellowish brown to greyish brown clay subsoil derived from sandstone.	WD10, WD11, WD14, WD15
	Channing	Thin (<15cm), bleached sandy loam to loam surface, over brown or red clay subsoil overlying sandstone, narrow-leaved ironbark or bull oak or cypress pine.	WD08 WD06
	Cutthroat	thick (>30cm) bleached loose sandy surface, over mottled, yellowish brown sand clay subsoil overlying sandstone; and surface, over red brown clay overlying sandstone.	WD10, WD11, WD14, WD15
9b: Light Forests	Binkey	Shallow texture contrast soils, bleached sandy surface, over mottled, gravelly clay subsoil.	
	Minnabilla,	Very shallow (<45 cm), gravelly, red (may occasionally be black) soils, rock outcrop.	
	Flinton	Shallow to deep soils, sandy to loamy surface, with acid, red, massive subsoil.	WD16

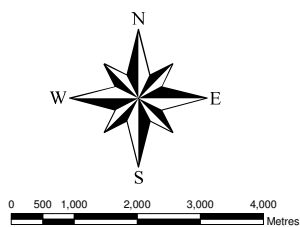
Source: Maher (1995)

The study corridor is not subject to an approved project plan for soil conservation under the *Soil Conservation Act 1986*.

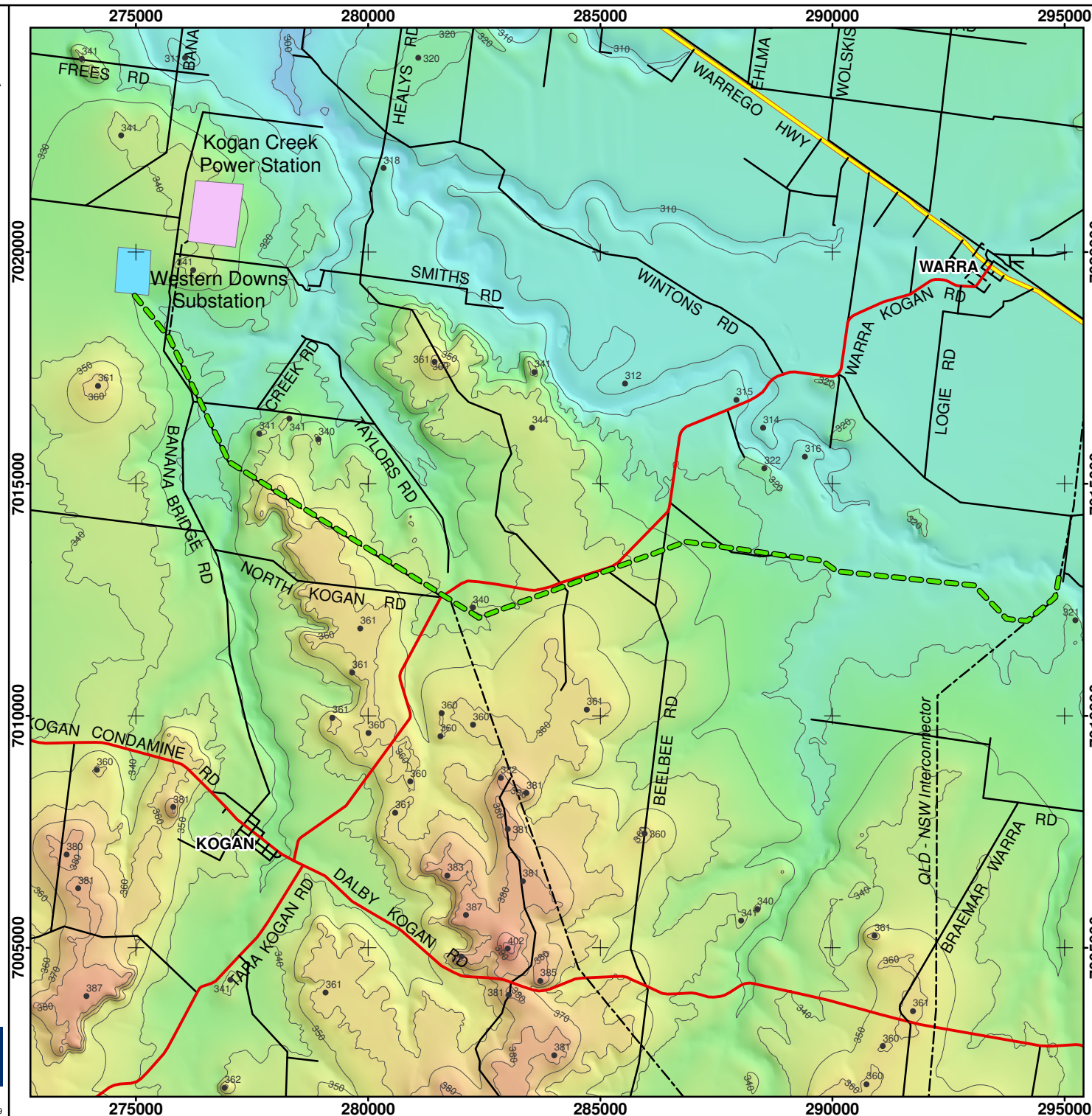
Powerlink Western Downs EIA Topography

Figure 5.1

- Spot Height
- Study Alignment
- Existing 275 kV Line
- Contour 10m interval
- Highway
- Main Road
- Local Road
- Sub-station
- Power Station



Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56

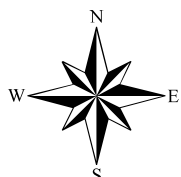


Powerlink Western Downs EIA

Geology

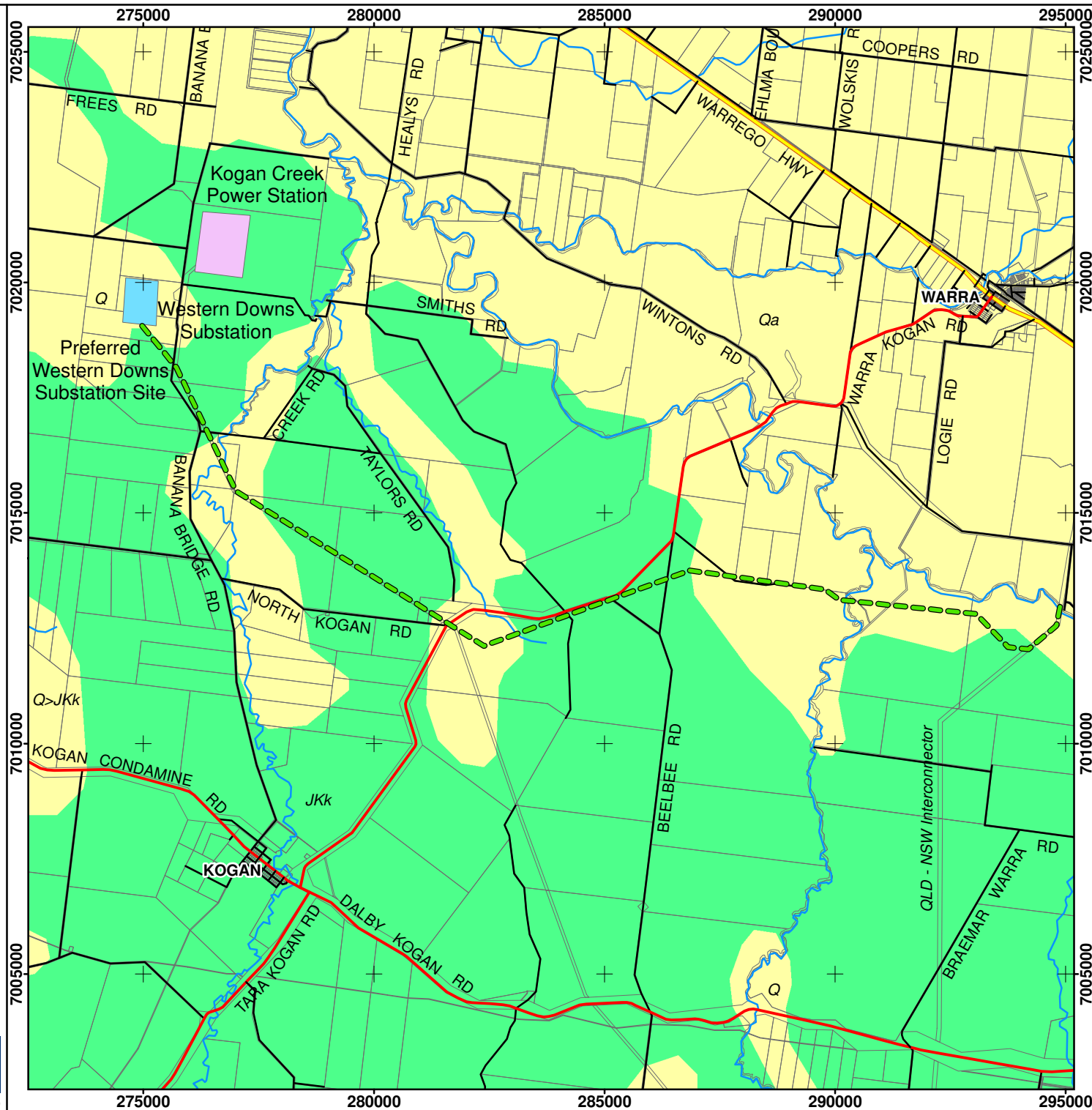
Figure 5.2

- Study Alignment
 - Highway
 - Main Road
 - Local Road
 - Watercourse
 - Cadastre
 - Power Station
 - Sub-station
- Geology**
- Kumbarilla Beds
 - Alluvium



0 500 1,000 2,000 3,000 4,000
Metres

Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56

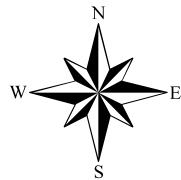


Powerlink Western Downs EIS Soil

Figure 5.3

Land Resource Area

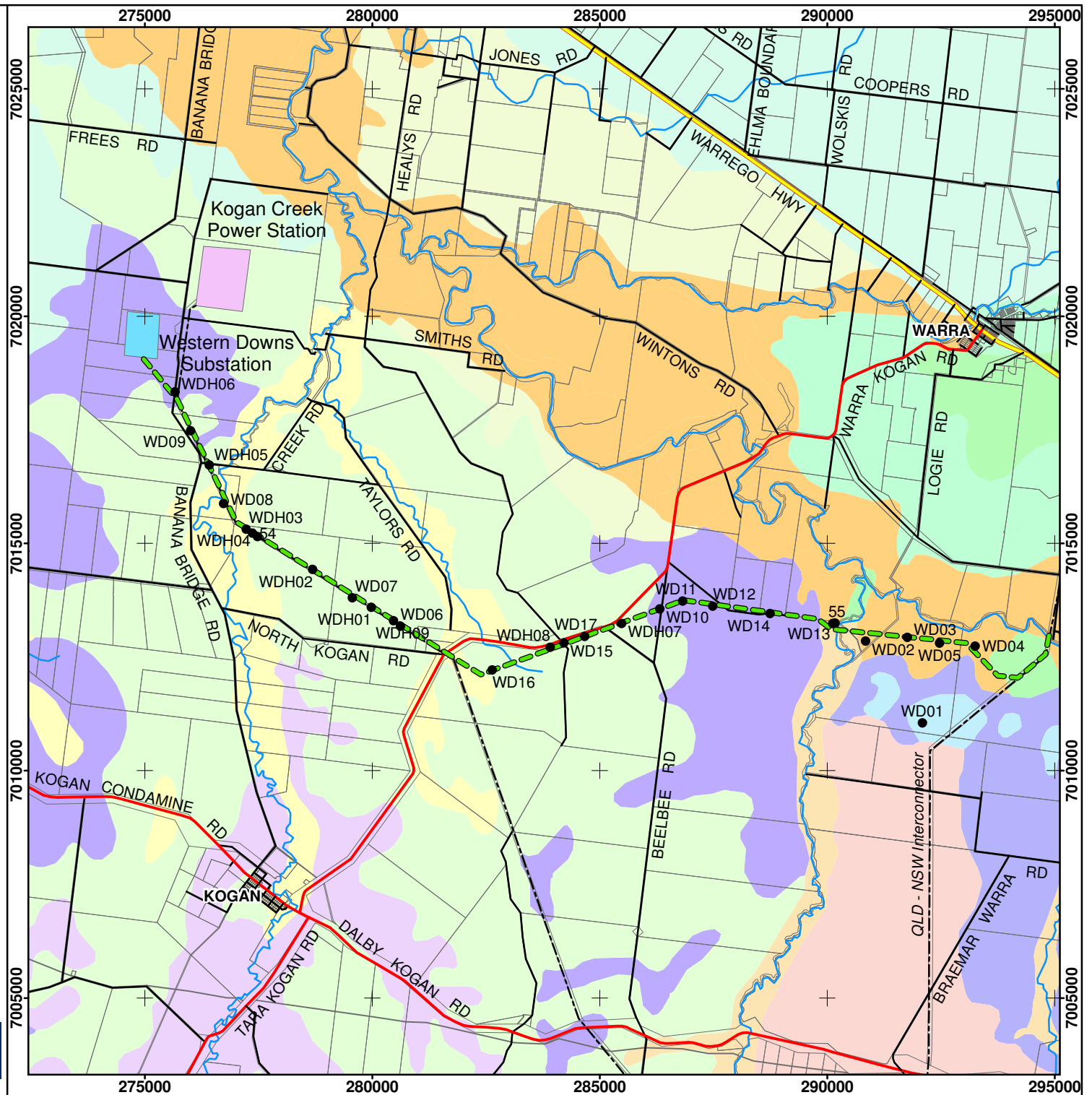
- Clay Alluvial Plains
- Poplar Box Flat Plains
- Cypress Pine Sands
- Brigalow Plains
- Ironbark / Bull Oak Forests
- Poplar Box Rises
- Light Forests
- Recent Alluvial Plains
- Older Alluvial Plains
- Alluvial Plains - Sandy Sodosols
- Brigalow Uplands
- Sandstone Forests
- Ironbark / Bull Oak Sodosols
- Survey Sites and EVR
- Study Alignment
- Existing 275 kV Line
- Highway
- Main Road
- Local Road
- Watercourse
- Cadastre
- Power Station
- Sub-station



0 500 1,000 2,000 3,000 4,000 Metres

Scale 1 : 120 000

Datum / Projection: GDA94 MGA Zone 56





5.3.1.3 Soil erosion

Erosion rate depends upon slope, slope length, aspect, elevation, prevailing weather direction, flood susceptibility and the erodibility of each particular soil type. The majority of the proposed Project will occur over flat topography (level to gently inclined) which substantially decreases the risk of erosion. The banks of the Kogan and Braemar Creeks range from moderately inclined to steep, which is the area of the proposed alignment which poses the greatest risk to erosion.

The study of the proposed alignment revealed two potential erosion hotspots. The main area of concern is located within the existing Kogan to Braemar alignment, adjacent to Kogan Creek (refer to Plate 5.1). The underlying precursor to the present erosion is likely to be the disturbance of the surface soil and the exposure of sodic subsoils and the steepness of the watercourse bank (Kogan Creek) adjacent to the erosion. It should be noted that anecdotal evidence suggests that this erosion was in place prior to the construction of the Kogan to Braemar alignment. Previous advice by the Department of Natural Resources and Water (at the time of construction of the Kogan to Braemar line) to Powerlink regarding this erosion was to leave the erosion in its current state and ensure that any activities in the area did not exacerbate the situation by altering or concentrating water flows.

The other erosion hotspot is adjacent to Braemar Creek (refer to Plate 5.2). The erosion is likely to be associated with the by wash of a large dam installed on the creek.

PLATE 5.1 SIGNIFICANT EROSION ADJACENT TO KOGAN CREEK.





PLATE 5.2 EROSION WHICH IS LIKELY TO BE ASSOCIATED WITH THE BRAEMAR CREEK DAM.



Sodicity

Soils are generally considered sodic if they have an exchangeable sodium percentage (ESP) of the total cation exchange capacity (CEC) greater than 6% (Rengasamy and Olsson 1991), soils above 16 are generally classified as highly sodic. ESP for the surface soils analysed ranged from non-sodic (2.6%) to moderately sodic (12.2%). The ESP for subsoils analysed range from non-sodic (4.8%) to highly sodic (24.8%). Sodic soil can be ameliorated by the increasing the calcium availability, the most cost effective method is through the addition of gypsum.

The Gypsy program (CRC Sugar, BSES, CSIRO 2000) was used to calculate the rates of gypsum application that would be required to counteract the sodicity levels for these soils based on the soils results from **Table 5.2**. It was determined that gypsum application at a maximum rate of 24.8 t/Ha will be required for the disturbance of any soils during the construction process, to reach a non-limiting ESP.



TABLE 5.2 SUMMARY OF SOILS SAMPLE RESULTS

SITE	EC (DS/M)	PH	CEC	NA ME/100G	K ME/100 G	CA ME/100G	MG ME/100G	AL(MG /KG)	P (MG/ KG)	EAT	ESP (%)	GYPSUM TO REACH NON- LIMITING ESP (T/HA) ¹
WD01 0-20	0.09	6.0	25.5	1.7	0.8	11.1	8.5	<0.1	10	3(2)	6.7	13.5
WD02 0-25	0.10	8.0	45.3	3.2	0.5	22.4	15.9	<0.1	19	3(2)	7.1	24.8
WD02 80- 100	0.73	7.7	45.1	6.4	0.3	19.3	17.5	<0.1	38	3(2)	14.2	
WD05 0-20	0.19	8.9	40.7	2.7	0.4	20.0	13.5	<0.1	66	4	6.6	20.5
WD06 0-25	0.07	4.5	6.9	0.5	0.2	1.4	1.0	1.4	4	3(1)	7.2	4.8
WD08 0-10	0.55	6.2	19.2	0.5	0.4	12.5	2.9	<0.1	6	5	2.6	11.5
WD08 10-35	0.14	8.9	22.0	2.7	0.3	11.2	4.1	<0.1	3	3(2)	12.3	
WD10 0-20	0.01	5.7	4.9	0.3	0.2	1.7	0.6	<0.1	4	5	6.1	23.8
WD 10 20-40	0.27	8.2	16.2	4.6	0.1	0.9	8.7	<0.1	1	2(2)	28.4	
WD 11 0-20	0.05	5.9	8.2	1.0	0.1	1.8	3.5	0.3	7	3(2)	12.2	14.4
WD 11 25-40	0.16	6.0	12.3	2.3	0.1	1.0	6.0	0.1	5	2(2)	18.6	
WD13 0-20	0.11	7.7	36.0	1.1	0.7	18.8	10.0	<0.1	14	5	3.1	6.6
WD14 0-20	<0.01	5.3	4.2	0.3	0.2	1.2	0.8	0.3	17	3(1)	7.1	18.5
WD14 20-40	0.21	7.0	14.5	3.6	0.1	1.0	7.4	0.1	2	2(2)	24.8	
WD15 0-20	0.03	5.3	4.7	0.6	0.2	1.2	0.9	0.3	4	5	12.8	5.6
WD15 20-30	0.06	5.2	6.6	0.8	0.1	1.2	2.4	0.4	1	3(2)	12.1	
WD16 0-15	0.09	4.8	8.0	0.5	0.4	1.6	1.4	2.1	7	3(1)	6.25	1.9
WD16 15-35	0.01	5.0	6.2	0.3	0.2	0.6	0.8	1.8	4	5	4.8	

Source: ¹Gpysy Calculations (CRC Sugar, BSES, CSIRO 2000)

Particle Size Analysis

As indicated by **Table 5.3** both fine and coarse textured soils were identified throughout the alignment. Particle analysis indicates that sites WD01, WD02, WD05, WD08, WD10, WD13 and WD15 are classified as fine type soils, which indicates the bulk of which are fine grained (>33% finer than 0.02mm diameter). The target particle size adopted for the site will be 0.002 mm to ensure treatment of finer soil texture (IE Aust, 1996).



TABLE 5.3 PARTICLE SIZE ANALYSIS

SITE	PARTICLE SIZE ANALYSIS (%W/W)					
	CLAY <0.002MM	SILT <0.002-0.02MM	FINE SAND 0.02-0.2MM	COURSE SAND 0.2-2MM	GRAVEL >2MM	<0.02 MM(%)
WD01 0-20	36	17	35	10	2	53
WD02 0-25	58	22	16	4	<1	80
WD02 80-100	59	20	18	3	0	79
WD05 0-20	36	10	42	12	0	46
WD06 0-25	11	9	52	15	13	20
WD08 0-10	18	24	55	3	0	42
WD08 10-35	34	24	40	2	0	58
WD10 0-20	5	6	40	48	1	11
WD 10 20-40	33	5	29	33	<1	38
WD 11 0-20	18	8	39	34	1	26
WD 11 20-40	25	5	37	33	<1	30
WD13 0-20	42	9	39	10	<1	51
WD14 0-20	6	5	50	39	0	11
WD14 20-40	25	3	42	30	0	28
WD15 0-20	12	6	32	48	2	18
WD15 20-30	34	3	22	39	2	37
WD16 0-15	8	3	26	6	57	11
WD16 15-35	8	2	22	4	5	10
	Indicates bulk of which are fine grained (>33% finer than 0.02 mm diameter)					

Emerson's Aggregate Testing

The physical Emerson's Aggregate Testing (refer to **Table 5.2**) confirms the result of analytical testing, predominantly returning dispersive classes 2, 3, 4 and 5. The EAT for the majority of soil samples indicates that soil dispersion was slight and may be prone to slake. The EAT of samples WD11 20-40 and WD14 20-40 indicated that these subsoils had high dispersion, which is likely to be associated with high ESP. Classes described in AS 1289.3.8.1 – 1997 are reproduced in **Table 5.4**.



TABLE 5.4 EMERSON AGGREGATE TEST CLASS NUMBER DEFINITIONS

EMERSON CLASS NUMBER	DEFINITION
Class 1	Air dried crumbs of soil show a strong dispersion reaction, ie, a colloidal cloud covers nearly the whole of the bottom of the beaker, usually in a very thin layer. The reaction should be evident within 10 min. In extreme cases all the water in the beaker becomes cloudy leaving only a coarse residue in a cloud of clay.
Class 2	Air-dried crumbs of soil show a moderate to slight reaction. A moderate reaction consists of an easily recognisable cloud of colloids in suspension, usually spreading ht thin steak on the bottom of the beaker. A slight reaction consists of the bare hint of cloud in water at the surface of the crumbs
Class 3	The soil remoulded at the plastic limit disperses in water
Class 4	The remoulded soil does not disperse in water. Calcium carbonate (calcite) or calcium sulfate (gypsum) is present
Class 5	The remoulded soil does not disperse in water and the 1:5 soil/water suspension remains dispersed after 5 min
Class 6	The remoulded soil does not disperse in water and the 1:5 soil/water suspension begins to flocculate within 5 min
Class 7	The air-dried crumbs of soil remain coherent in water and swells
Class 8	The air-dried crumbs of soil remain coherent in water and do not swell

Source: AS 1289.3.8.1-2006

5.3.1.4 Revegetation

An electrical conductivity (EC) of more than 0.16 dS/m may indicate a salinity issue within the soil. The EC measurement for the surface soil samples WD05 (0.19 dS/m) and WD08 (0.55 dS/m) are considered high; indicating that the growth of most plants propagated within these soils may be affected.

The pH values for the soil samples ranged from extremely acidic (4.5) to strongly alkaline (8.9), which indicates that pH in areas along the alignment are unsuitable for some plant growth. WD06 0-25 was identified as being extremely acidic with a high level of exchangeable aluminum, indicating that the growth of some plants may be affected. Other surface samples which were identified as being acidic included WD06, 0-25, WD14 0-20 and WD15 0-20.

The Cation Exchange Capacity (CEC) is a measure of the ability of the soil to hold and exchange cations with the soil solution. The cation exchange capacity of the samples tested ranged from low to very high. ESP for the surface soils analysed ranged from non-sodic (2.6%) to moderately sodic (12.2%). As well as the undesirable attribute of enhanced soil erosion the sodic soils present, they also have contribute to poor plant growth.

Surface soil sampled within the western extent of the alignment (WD01, WD02, WD05, WD13 and WD14) contained relatively high concentrations of Available P (ranging from 10 to 66 mg/kg). Analysis of surface soil samples from the eastern extent (WD06, WD08, WD10, WD11, WD15 and WD16) determined that the Available P concentrations within this section of the alignment were generally low to moderate (ranging from 4 to 7 mg/kg) where plant growth is likely to benefit from the application of phosphate fertilizer.



5.3.2 Overview

As confirmed through the laboratory analysis, the soils which characterized the proposed alignment are determined to have a high erosion potential. The moderate to high fine particle content within soil samples WD01, WD02, WD05, WD08, WD10, WD13 and WD15 highlighted the need for best practice erosion and sediment control, whereas those soils exhibiting high gravel percentage (WD06, WD10, WD11, WD14, WD15, WD16) will be more resistant to raindrop impact and entrainment, however present a rehabilitation limitation through their poor moisture holding capacity.

All sub-soil samples returned an Emerson Class indicating a dispersive soil type that may erode if disturbed (refer to **Table 5.2**).

Sodic soils are present along a large proportion of the study alignment. Sodic soils can present a severe limitation to plant growth and are generally highly erosive. If these soils are used in rehabilitation or have been disturbed during construction they will be highly erodible. Treatment with gypsum (24.8 t/Ha) may be considered to improve the exchangeable sodium levels for these samples.

Additional soil ameliorative procedures are required on certain areas of the proposed alignment to ensure that the soil is suitable for revegetation purposes. Low available phosphorus concentrations identified in samples WD06, WD08, WD10, WD11, WD15 and WD16 which lie predominantly in the eastern extent of the proposed alignment, indicated that plant growth is likely to benefit from the application of phosphate fertiliser (10-20 P kg/ha).

Samples WD06 0-25, WD06 0-25, WD14 0-20 and WD15 0-20 were identified as being acidic, whereby the growth of some plants may be affected. As such good quality agricultural lime (calcium carbonate) may be applied at a rate of 2.5 to 3 t/Ha to treat the acidity.

Soil samples within the vicinity of the sampling locations WD02 and WD08, returned high conductivity values indicating that they are likely to be non-productive. Due to the high conductivity concentrations present and the poor drainage associated with the clay sub-soils, exposure of these soils should be avoided where possible. Mulching of the soil surface should occur post-construction where exposure of these soils is unavoidable.

5.3.3 Salinity

A review of mapping developed as part of the Strategic Salinity Risk Assessment in the Condamine Catchment (Searle et al, 2007) indicates that there are no existing salinity locations within the Project site. Saline soils may be associated with the underlying sedimentary rock and unconsolidated sedimentary parent material. At a larger landscape scale, there are also virtually no existing salinity locations in all of the Kumbarilla sandstones in the Condamine Catchment. While subsoils are saline, this is mainly a function of low permeability of these subsoils and the accumulation of salts within the profile over geological time.

Searle *et al.* (2007) concludes that there is a moderate salinity risk for the subcatchment in which the project site is located, but that this is not relevant to the Kumbarilla landscape on which the proposed alignment is located.



5.3.4 Acid Sulphate Soils

Acid sulphate soils (ASS) are a characteristic feature of low lying coastal environments in Queensland, particularly where landform elevations are below 5m AHD. The geomorphic and site description criteria that are used to determine if ASS are likely to be present include:

- Land with elevation less than 5m AHD;
- Soil and sediment of recent geological age (Holocene); and
- Marine and estuarine sediments and tidal.

As the natural elevation of the alignment area is greater than 100m AHD, the occurrence of potential acid sulphate soils along the length of the alignment is considered negligible.

5.3.5 Good Quality Agricultural Land

In accordance with the Chinchilla Shire (2006) and Wambo Shire Planning Schemes (2005), **Figure 5.4** illustrates the quality of agricultural land contained within the area of the study corridor. The study alignment traverses the GQAL classifications Class A and Class B (recognised as Good Quality Agricultural Land). The four classes of agricultural land have been defined for Queensland are described in **Table 5.5**. In the context of the entire alignment, minimal areas of GQAL are traversed by the proposed alignment. In total the proposed alignment traverses approximately 2km of Class A and 5.5km of Class B GQAL. Cropping currently occurs in the eastern portion of the proposed alignment. Cropping and grazing will still be able to occur within the transmission line easement in accordance with the guidelines provided in Powerlink's *Farming Near Transmission Lines* Information Sheet.

TABLE 5.5 CLASSES OF AGRICULTURAL LAND

CLASS	DESCRIPTION
Class A	Crop land — land suitable for current and potential crops with limitations to production that range from none to moderate levels. All crop land is considered to be GQAL.
Class B	Limited crop land — land that is marginal for current and potential crops due to severe limitations; and suitable for pastures. Engineering and/or agronomic improvements may be required before the land is considered suitable for pasture cropping. Land marginal for particular crops of local significance is considered to be GQAL.
Class C	Pasture land — land suitable only for improved or native pastures due to limitations that preclude continuous cultivation for crop production; but some areas may tolerate a short period of ground disturbance for pasture establishment.
Class D	Non-agricultural land — land not suitable for agricultural uses due to extreme limitations. This may be undisturbed land with significant habitat, conservation and/or catchment values, or land that may be unsuitable because of very steep slopes, shallow soils, rock outcrops or poor drainage.

5.3.6 Mining and Petroleum

The Queensland Government Department of Mines and Energy's, Interactive Resource and Tenure Maps (IRTM), were accessed (18 January 2010) to determine any registered exploration permits, leases, licenses and permits within or immediately adjacent to the study area, and the results are shown in **Figure 5.5 a - e**.



In summary:

- Australian CBM Pty Ltd hold a Petroleum lease (Tenure no. 253) which covers a small portion of the proposed route central to the study alignment. The company also hold a Petroleum lease (Tenure no. 194) which covers approximately 10 km of the eastern extent of the alignment (Figure 5.5c);
- Aberdare Collieries Pty Ltd hold a Mineral Development License over the western extent of the proposed alignment (Figure 5.5d);
- Linc Energy Ltd holds a current exploration permit Coal (EPC) for the western part of the study alignment. Linc Energy Ltd and Peabody (Wilkie Creek) Pty Ltd both hold a current EPC over the eastern extent of the study alignment (Figure 5.5a);
- Coal resource areas have been allocated within the study area. The coal resource areas have been identified overlaying both portions of the eastern and western sections of the subject area;
- Australian CBM Pty Ltd (a subsidiary company of Arrow Energy) has been granted a Petroleum Lease Application over the eastern extent of the study area and an application from the company has been submitted for sections along the western extent (Figure 5.5c); and
- A Petroleum Exploration Permit has been granted for the entire western extent of the study alignment (**Figure 5.5b**). Exploration permits will not affect the location of the transmission line.

Subsequently, additional exploration permits for coal have been granted adjacent to the subject area:

- Clean Global Energy Operations Pty Ltd and Spinifex Rural Management Pty Ltd hold EPCs adjacent to the subject area.

5.3.7 Potentially Contaminated Land

The field survey did not identify any potential sources of contamination throughout the proposed subject area therefore DERM's Environmental Management Register (EMR) and Contaminated Land Register (CLR) were not searched for notifications of contaminated land within the study site.

The Department of Defence provides a database of areas affected by unexploded ordnance contamination (UXOs). Review of the database revealed that the study site and surrounding area are not affected by UXOs.

5.4 POTENTIAL IMPACTS

5.4.1 Soil Erosion

Due to the site having low slopes and a sandy loam soil surface, the project site is not considered to have a high risk of water erosion while the soil surface is intact. However, texture contrast soils with sodic subsoils are prone to tunnel erosion, and the problem occurs when the subsoils are exposed. Tunnels generally form under the surface and eventually cave in to form gullies. The rehabilitation of tunnel eroded areas can be difficult and expensive to repair.

Potential for erosion of susceptible saline/sodic subsoils is a key concern during the construction phase. This will only be of concern where subsoils are exposed by any new access tracks and when these soils are excavated as a result of construction works. Powerlink utilises existing tracks wherever possible; however, where new tracks are necessary, care is to be taken not to expose subsoils.



There is potential for erosion if water flows are concentrated. Impedance of flows within the vicinity of the tower locations and along access tracks should be minimised and sheet flow conditions, as would naturally occur, should be maintained as much as possible.

5.5 MITIGATION MEASURES

5.5.1 Soil Erosion

The primary issue to be dealt with in regards to soil erosion is associated with sodic soils in the study corridor. There is a the need to reduce the risk that erosion of subsoils occurs due to construction activities. This will be achieved by ensuring that earthworks are conducted in a manner which limits the exposure of sodic subsoils to water flow where practicable.

To prevent the disturbance of the soil surface, land clearing should be limited to the removal of aboveground woody material only. Wherever reasonable and practical, cleared vegetation should be mulched (eg. Via tub grinding or megamulching) for use on the site as an erosion control aid. Alternative clearing methods will be considered for areas where it is likely that sodic subsoils could be exposed by traditional clearing methods

In order to minimise flow concentration, levelling of the tower sites and tracks should be conducted in a fashion so as to maintain sheet flow of water across the site. Possible impediments to flows such as roads should either be constructed flat with ground level or constructed of coarse gravel to allow water to flow through, in accordance with Powerlink's Transmission Line Access Tracks Standard.

Where bunding and drainage channels are required to direct water away from tower pads, or where chemical or hydrocarbon storage is required during the construction of the transmission line, the bank will be pushed up from the back so not as to expose the sodic subsoils to water flows. The material used to construct the bund and drainage channels should be treated with gypsum, fertilised and seeded with grass to stabilise them as soon as possible after construction.

Where concentration of water flows does occur due to the construction of drainage channels associated with access tracks, the discharge points should be on a soil not susceptible to tunnel erosion and be well grassed. Where this is not possible, drainage channels and outlets should be fitted with level spreaders.

Best practice on managing these soils will be employed and all earthworks to level pads for towers will ensure:

- Subsoils are not exposed to water flows;
- High levels of surface cover are maintained to reduce erosion potential;
- Water flows are kept distributed and not channelized to reduce erosion potential; and
- Any banks that are required to be constructed are formed from the lower side as not to expose the subsoil in the bank channel.



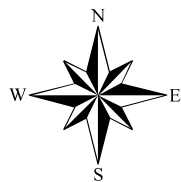
Where tunnelling and gully erosion exist (or in the event they are created due to earthworks on site) the following practices will be used to stabilise the site:

- Divert water from the top of the eroded area; it is vital to find a safe disposal area, otherwise the problem is simply being transferred. The disposal site must be well grassed and on a soil not susceptible to tunnel erosion or within a constructed sediment pond;
- If the tunnels are close to the surface and shallow (less than 60cm to the bottom of the tunnel) intensive cross ripping and the addition of gypsum may succeed. Gypsum should be applied to the surface and incorporated into the soil via ripping. The first ripping should be up and down the slope and subsequent ripping at right angles to the first;
- If the tunnels are deeper than 60cm, the tunnels can be filled with soil. This should be done when the soil moisture conditions are fairly high and it is vital the area is well compacted. The soil used as fill should be sourced from an area not susceptible to tunnel erosion. Surface capping should be applied to at least 300mm;
- The effected area should be treated with gypsum, fertilised and sown to grasses suitable for the area; and
- Ongoing regular monitoring is vital.

In addition to the above recommendations, the Best Practice Erosion and Sediment Control (IECA 2008) outlines best practice sediment and erosion control measures in Queensland. These measures must be implemented in all disturbance areas as identified in the EMP (see **Appendix F**)

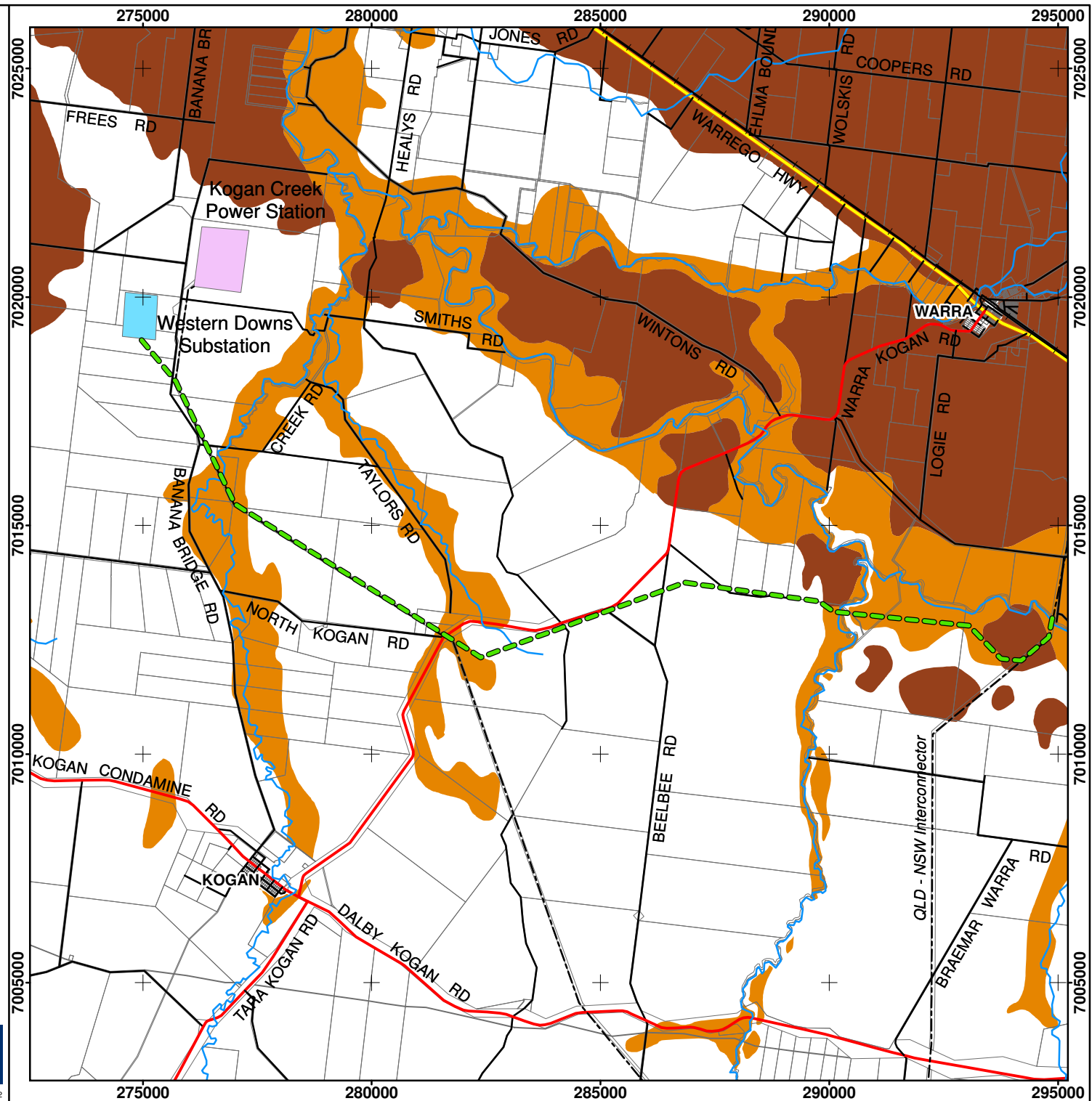
Powerlink Western Downs EIA Agricultural Land Quality Figure 5.4

- Study Alignment
 - Existing 275 kV Line
 - Watercourse
 - Highway
 - Main Road
 - Local Road
 - Cadastre
 - Power Station
 - Sub-station
- Good Quality Agricultural Land**
- Class A
 - Class B



0 500 1,000 2,000 3,000 4,000
Meters

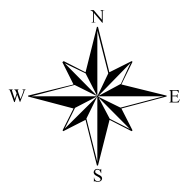
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Powerlink Western Downs EIA

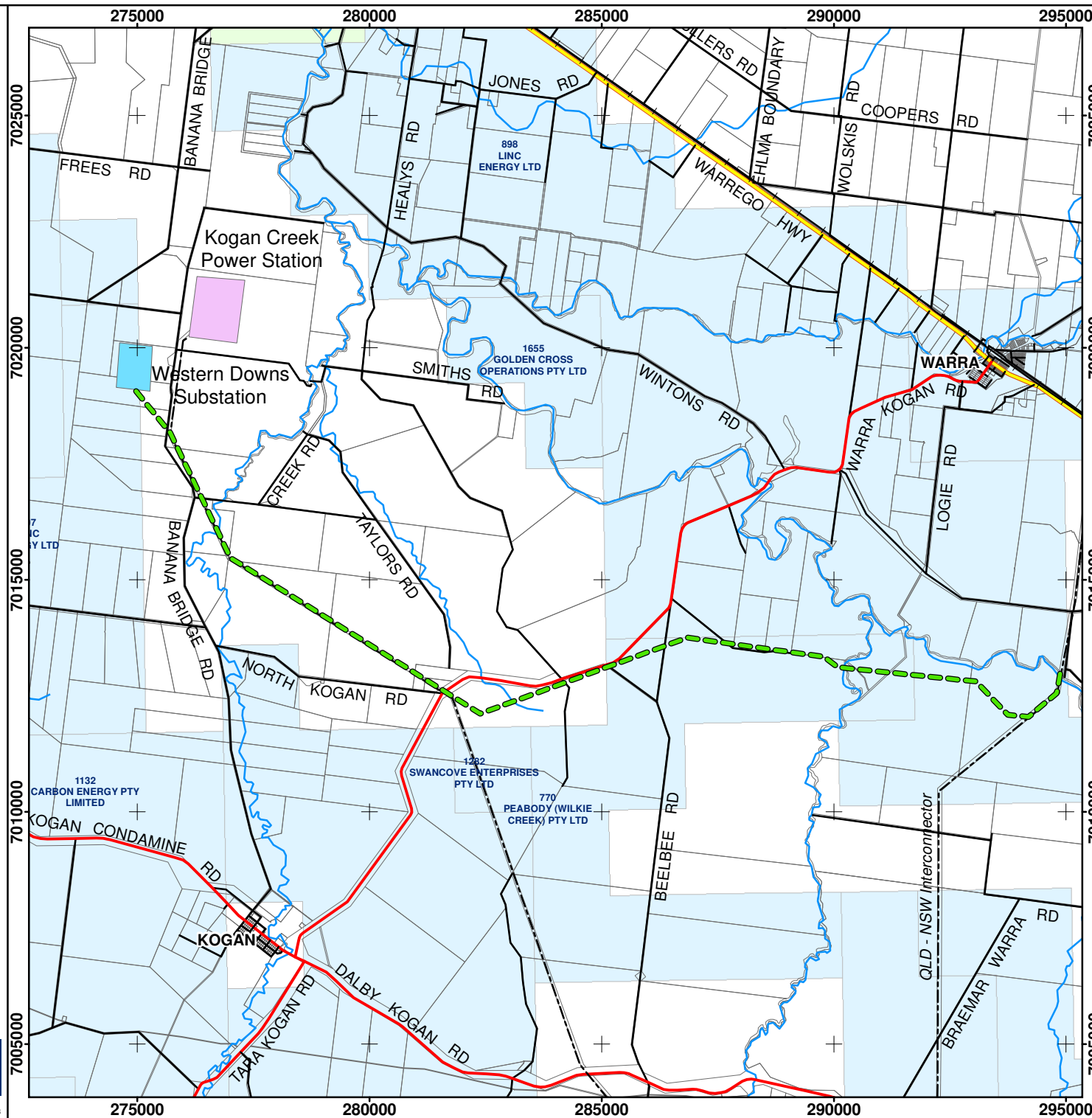
Coal Exploration Permits Figure 5.5a

- - - Study Alignment
- - - Existing 275 kV Line
- Highway
- Main Road
- Local Road
- Watercourse
- Cadastre
- Power Station
- Sub-station
- Exploration Permits (Coal)**
- APPLICATION
- GRANTED



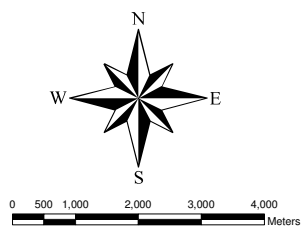
0 500 1,000 2,000 3,000 4,000
Meters

Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56

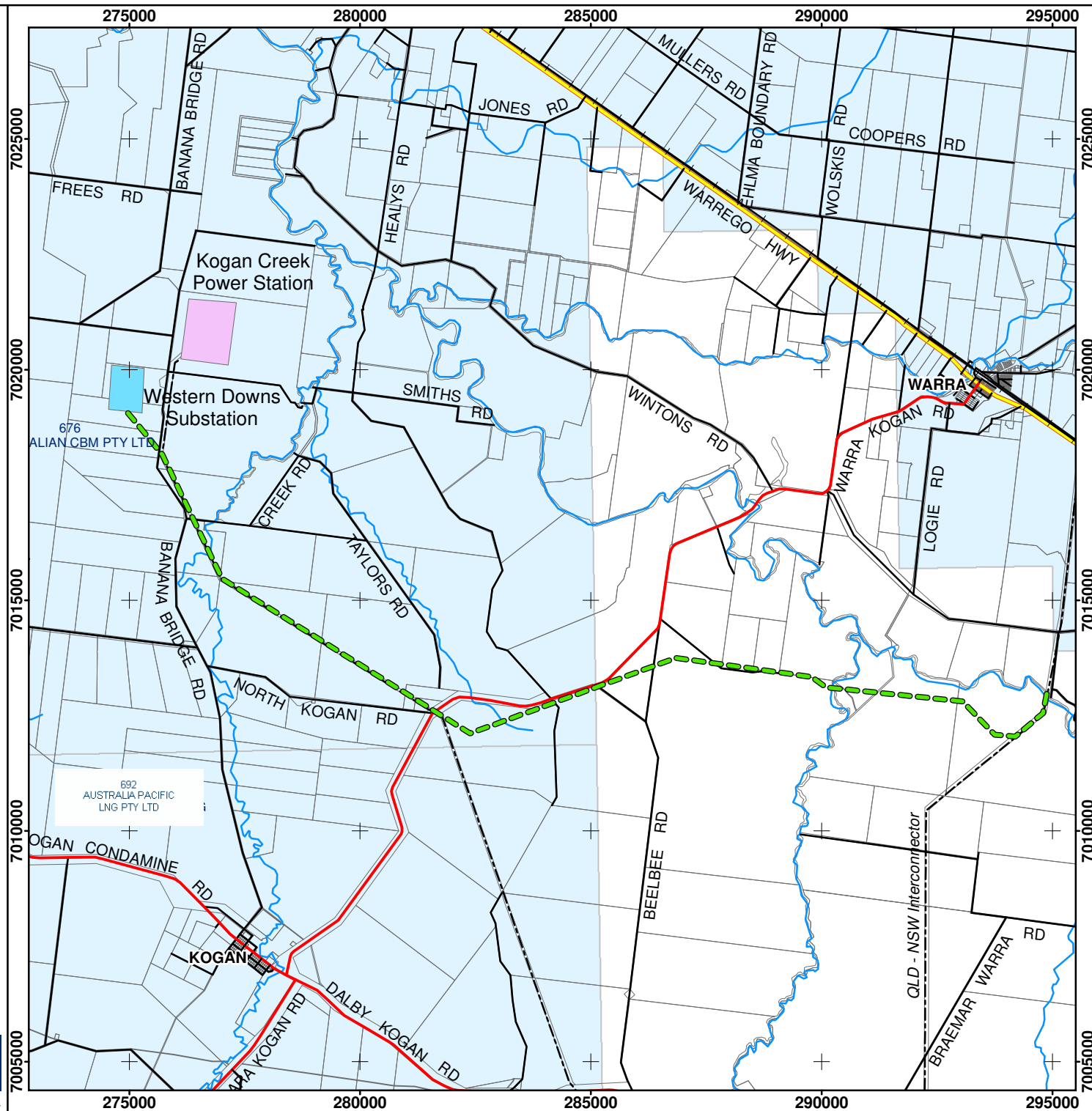


Powerlink Western Downs EIA Petroleum Exploration Permits Figure 5.5b

- - - - - Study Alignment
- - - - - Existing 275 kV Line
- Highway
- Main Road
- Local Road
- Watercourse
- Cadastre
- Power Station
- Sub-station
- Exploration Permits (Petroleum)**
- APPLICATION
- GRANTED



Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56

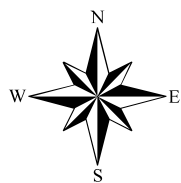


Powerlink Western Downs EIA

Petroleum Lease Applications

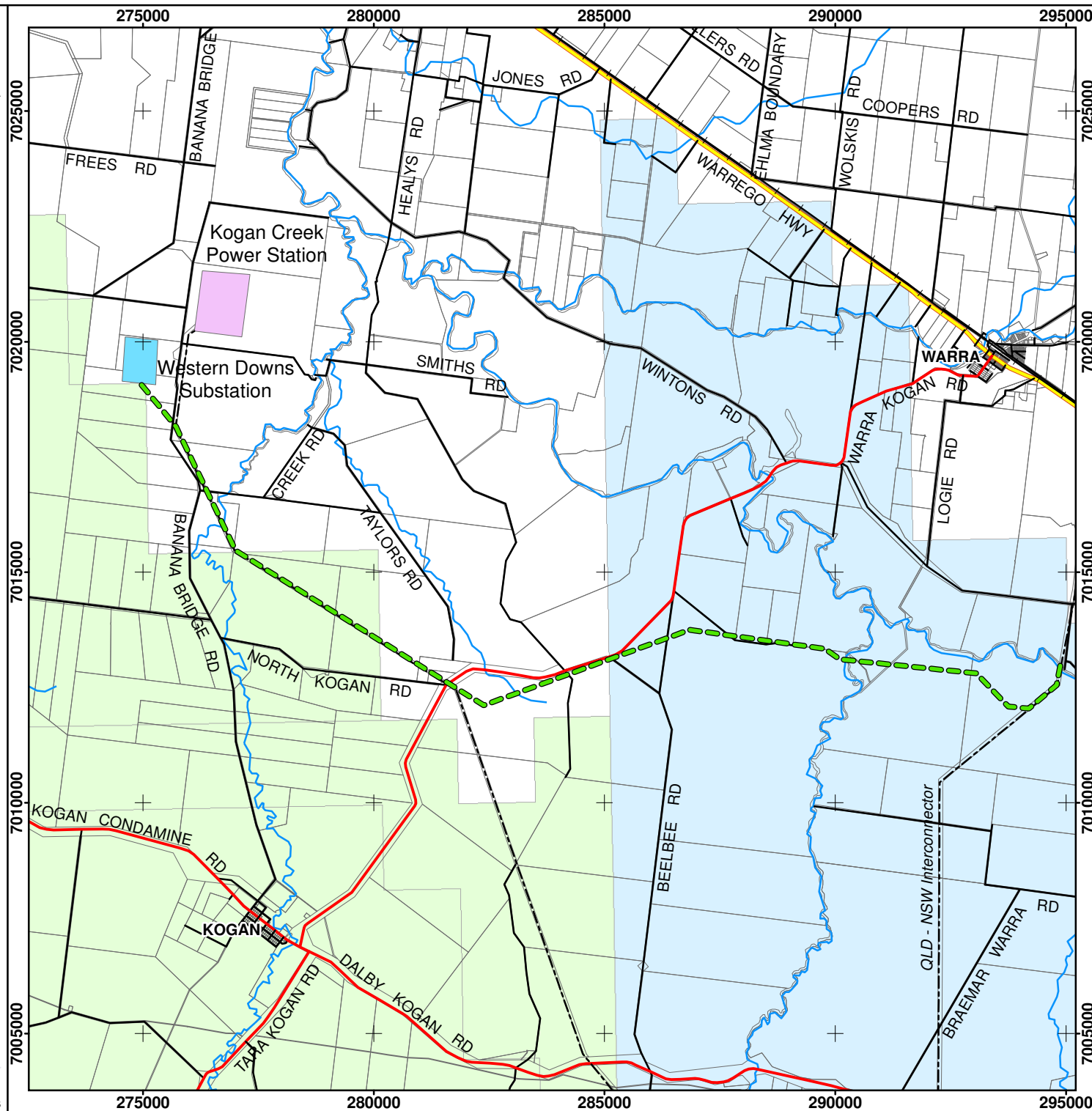
Figure 5.5c

- Study Alignment
- Existing 275 kV Line
- Power Station
- Sub-station
- Highway
- Main Road
- Local Road
- Watercourse
- Cadastre
- Petroleum Lease Application**
- APPLICATION
- GRANTED



0 500 1,000 2,000 3,000 4,000
Meters

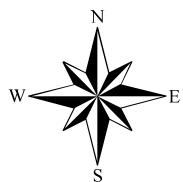
Scale 1 : 100 000
Datum / Projection: GDA94 MGA Zone 56



Powerlink Western Downs EIA Mining Tenements

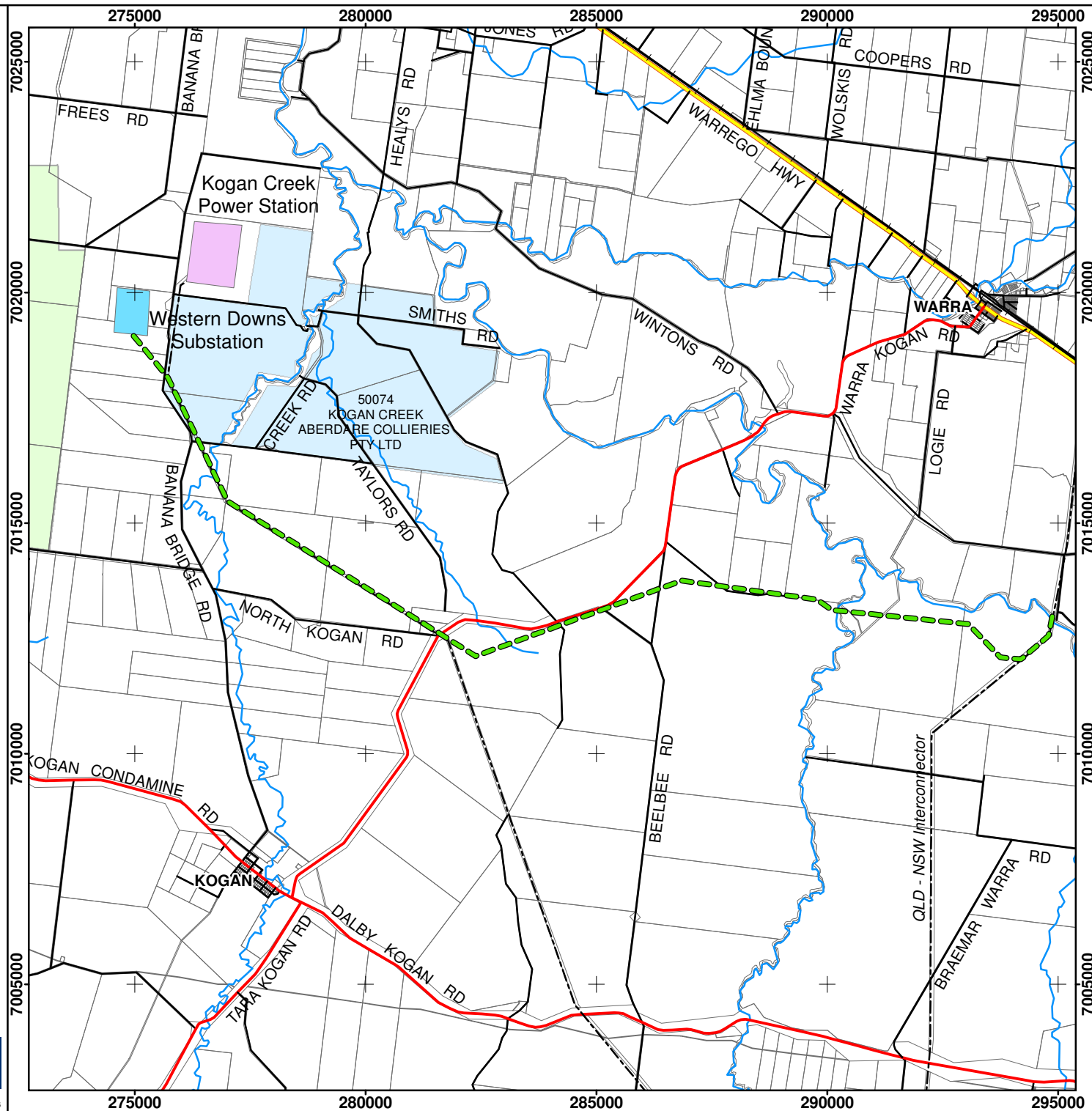
Figure 5.5d

- Study Alignment
- Existing 275 kV Line
- Highway
- Main Road
- Local Road
- Watercourse
- Cadastre
- Power Station
- Sub-station
- Mining Leases**
- APPLICATION
- GRANTED



0 500 1,000 2,000 3,000 4,000
Meters

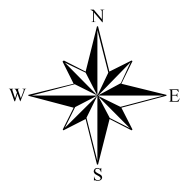
Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56



Powerlink Western Downs EIA Mineral Development Licences

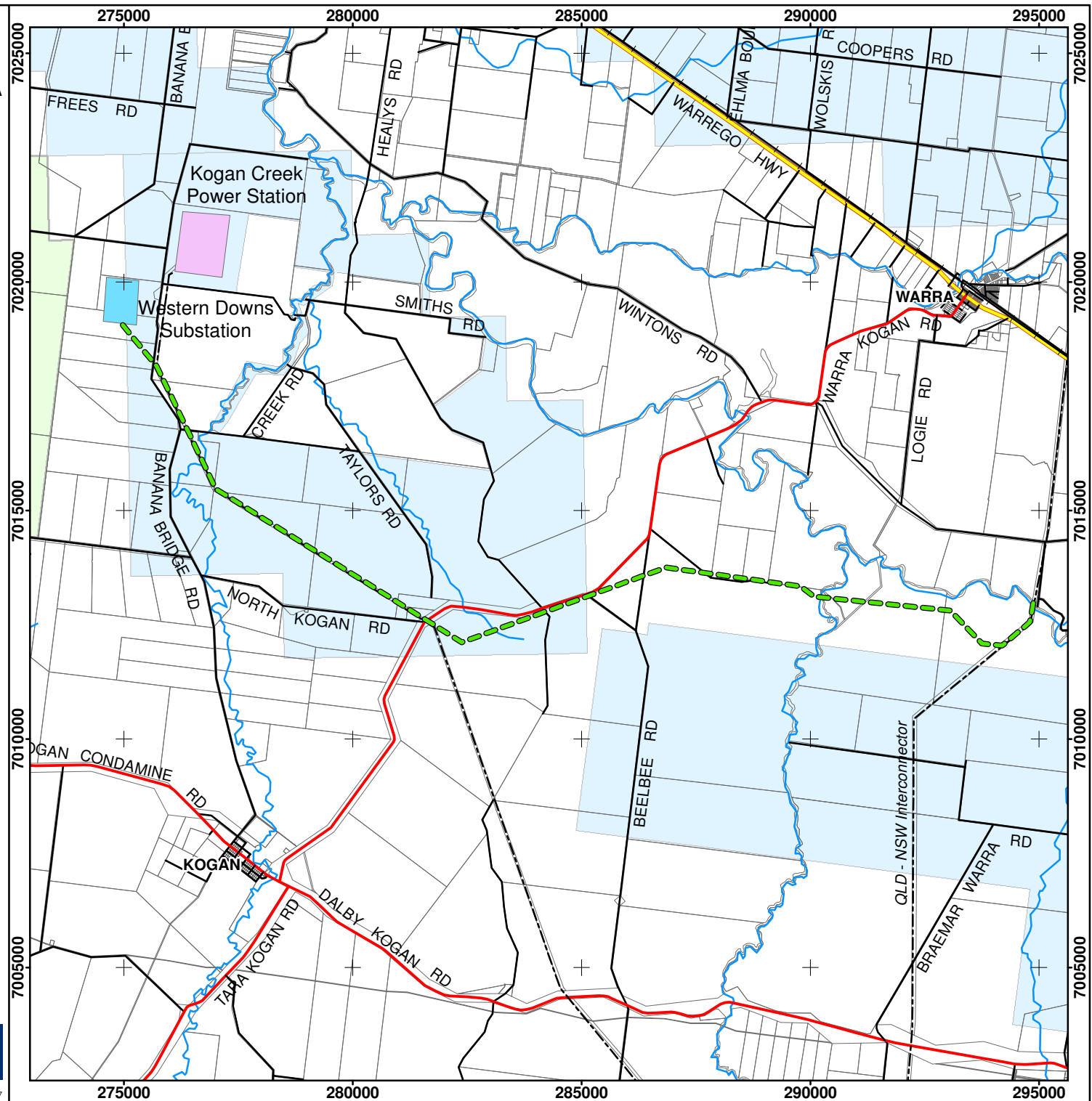
Figure 5.5e

- Study Alignment
 - Existing 275 kV Line
 - Highway
 - Main Road
 - Local Road
 - Watercourse
 - Cadastre
 - Power Station
 - Sub-station
- Mineral Development Licenses**
- GRANTED
 - APPLICATION



0 500 1,000 2,000 3,000 4,000
Meters

Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56





6.0 CLIMATE AND AIR QUALITY

This section provides a description of the climatic features and microclimate of the Study Area, including typical temperature, wind, rainfall data, and atypical meteorological conditions and their likely frequency of occurrence. Generic details of the existing air quality and the presence of pollutants are also provided.

The likelihood of air quality impacts (including potential dust and odour nuisance) on residences and ecologically sensitive areas during the construction and operation phases are discussed within this section. Commentary is also provided on the potential impacts of climate change on the proposed development. Finally, mitigation measures are provided to reduce the identified potential impacts.

6.1 EXISTING ENVIRONMENT

This section describes climate and air quality within the Kogan/Warra region, with specific mention of the impact of climate change on the proposed development.

An assessment has been conducted into the climatic conditions of the region, and the quality of air recorded adjacent to the study corridor to give some local context. The following resources were used in the preparation of this section:

- Weather data provided by the Bureau of Meteorology (BoM) and Emergency Management Australia (EMA);
- Air quality data provided by CS Energy; and
- Review of the Department of Environment and Resource Management's (DERM) Air Quality Bulletin South-East Queensland.

6.1.1 Climate

Meteorological data collected from the Dalby Airport weather station (site no. 041522; approximately 50km south-east of the Project site) between January 1992 and September 2009, indicates that the Kogan region is considered a 'Hot Dry Climate', under the BoM climate zone classification (BoM, 2009).

6.1.1.1 Rainfall & Temperature

Rainfall in Southern Queensland is considered highly variable and subject to extended periods of drought, followed by intensive rainfall. Maximum temperatures often reach 30°C in the summer months, and minimum temperatures often fall below 5°C over winter. **Table 6.1** shows the climatic averages calculated from available BoM data for records commencing in 1992 until 2009 (BoM, 2009).

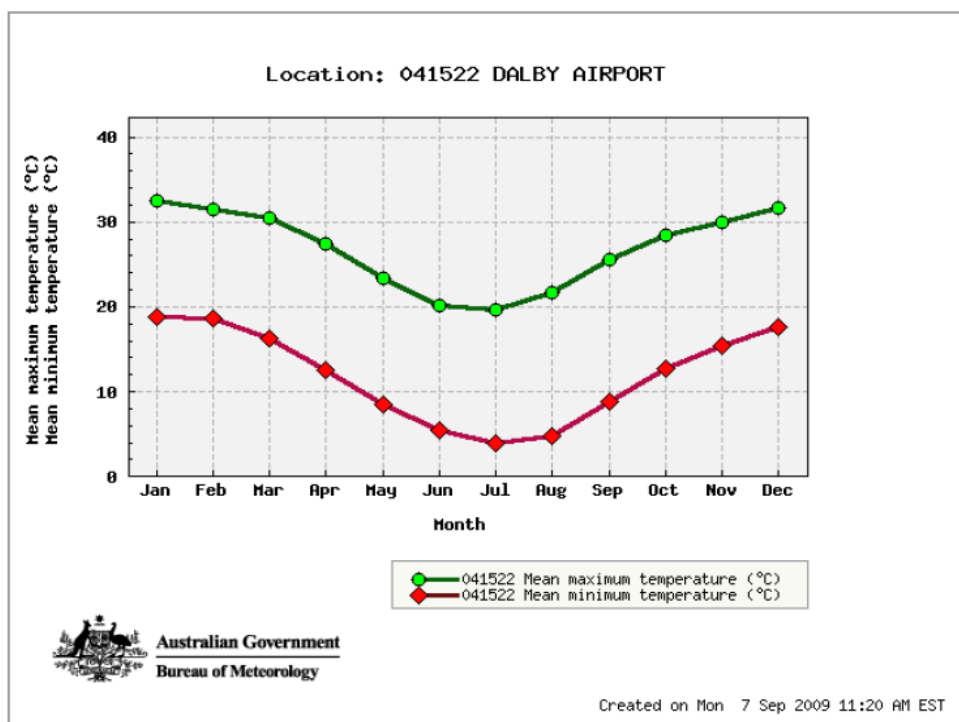


TABLE 6.1 AVERAGE CLIMATIC DATA RECORDS FOR DALBY AIRPORT

CLIMATE OBSERVATION	DALBY AIRPORT CLIMATE RECORDS
Annual Mean Daily Minimum Temperature (°C)	12.0
Annual Mean Daily Maximum Temperature (°C)	26.8
Annual Mean Rainfall (mm)	608.3
Annual Mean Number of Rain Days (days)	55

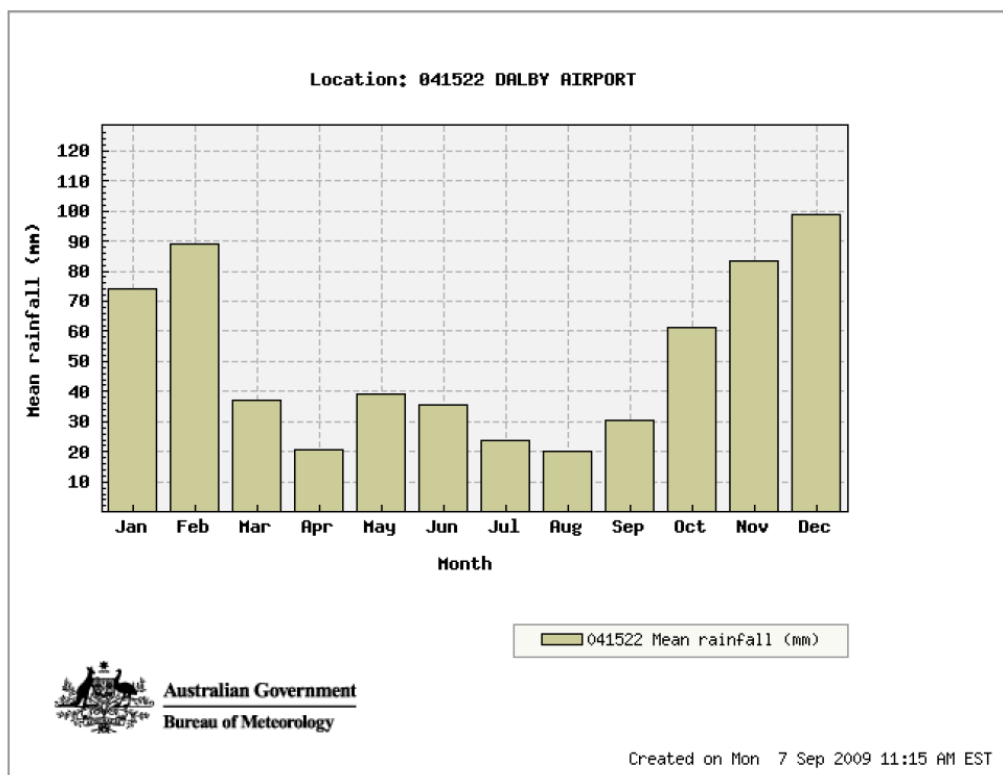
The climatic variation between months and between seasons within a period of a year is also important to note. The graphs below outline the monthly average rainfall and temperature for the wider area (as recorded at Dalby Airport).

GRAPH 6.1 MONTHLY MEAN MINIMUM & MAXIMUM TEMPERATURES (°C) FOR THE GREATER DALBY REGION





GRAPH 6.2 MONTHLY MEAN RAINFALL (MM) FOR THE GREATER DALBY REGION



6.1.1.2 Wind

Wind motion characteristics are highly variable both in speed and direction. Wind patterns are generally defined by atmospheric distribution. However, locally, wind is influenced by the time of day, height above ground level and surrounding terrain (BoM, 2009). Wind is often studied by frequency analysis rather than averages and is represented by wind roses to provide a rapid appraisal of the frequency of wind speed and direction.

Annual wind data collected by the Dalby Airport weather station indicated that the Project site is typically subjected to prevailing easterly winds for most of the year, with the average wind speed of approximately 12km per hour (BoM, 2009). Details of wind direction and velocity are shown in **Figure 6.1** and **Figure 6.2**. The data consists of 5980 (9am) and 5968 (3pm) observations from 1992 to 2008. The following should be noted when interpreting this data:

- The percentage of calm conditions is represented by the size of the circle in the centre of the wind rose;
- Each branch of the rose represents the direction from which the wind is coming (north at top of diagram);
- The thickness and colour of the branches represent the wind speed ranges in 10km/hr increments. A thicker segment represents a faster wind speed; and
- The length of each branch segment represents the percentage of wind in that wind speed range, blowing from that particular direction.



A review of the 9am and 3pm wind roses indicates that winds in the Dalby region are predominantly easterly throughout the year. The BoM wind data indicates that the conditions are calmer in the mornings (19% calm), than in the afternoon (9% calm), and the average wind speed is approximately 2km/hr stronger in the afternoon.

FIGURE 6.1 **MEAN ANNUAL 9AM WIND SPEED VS DIRECTION FOR DALBY AIRPORT (1992-2008) (BoM, 2005A)**

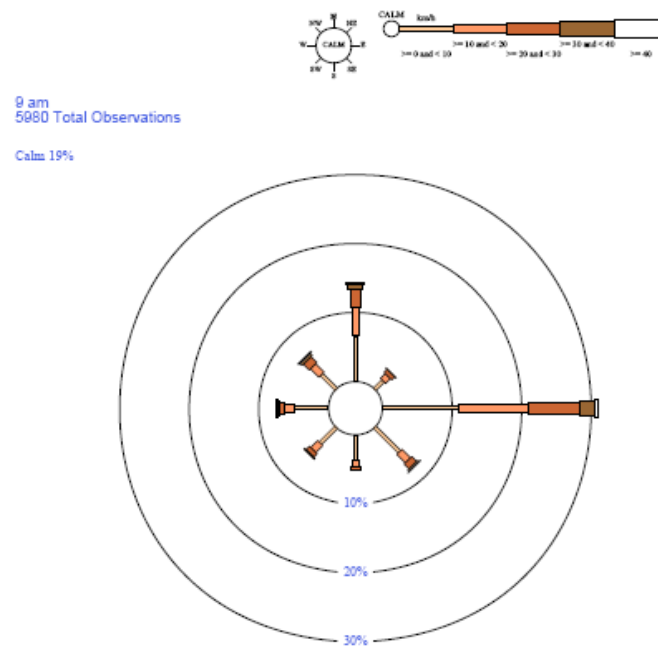
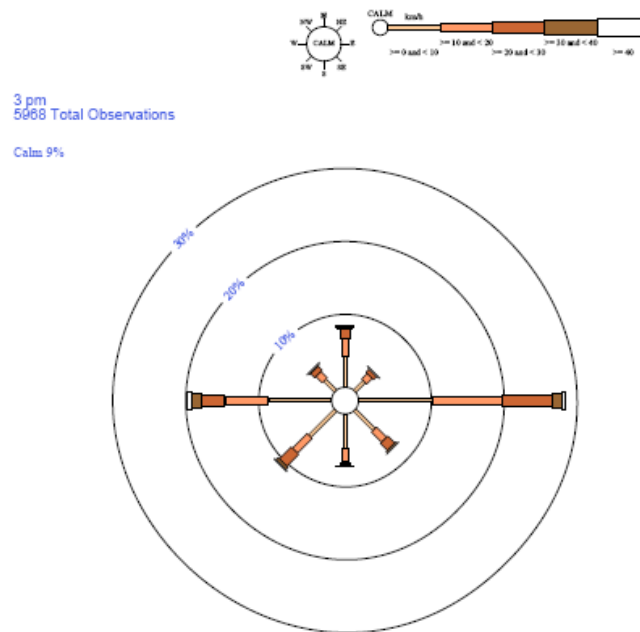




FIGURE 6.2 MEAN ANNUAL 3PM WIND SPEED VS DIRECTION FOR DALBY AIRPORT (1992-2008) (BoM, 2005A)



6.1.1.3 Extreme Weather Events

A review of atypical weather events was completed using databases from the Bureau of Meteorology (BOM) and Emergency Management Australia (EMA) and is summarised in **Table 6.2**. The later is accepted to include all Australian natural disasters from the late 1900s to present.

TABLE 6.2 SUMMARY OF PREVIOUS EXTREME WEATHER EVENTS FOR STUDY AREA

DATE	EVENT	DETAILS
01/02/1981	Flood	Dalby: Flooding and stormy conditions in the wake of an ex-tropical cyclonic depression resulted in heavy damage to approximately 2000 homes that were flooded. Crop damage and considerable erosion also resulted.
01/01/1983	Severe storm	Chinchilla: Severe Storm (incl Tornado), approx \$3.5million in damages / insurance claims.
24/11/1998	Severe storm	Dalby: Winds up to 90km/h and more than 3,300 lightning strikes were recorded in 2 hours. Roofs were ripped off houses and power cut to most of the population.
18/12/1998	Severe storm	Minor damage to trees & houses was reported at Dalby, Laidley, Esk & Toogoolawah.
26/01/2007	Severe storm	Dalby: Winds estimated at 100km/h and hail averaging 3cm in diameter.
7-12/10/2007	Severe storm	Chinchilla: Severe storms that occurred over a six day period. Storm damage sustained included roof damage, fallen trees and water damage



DATE	EVENT	DETAILS
		etc.
16-22/11/2008	Severe storms & flooding	Dalby Regional and Central Highlands Regional Council granted Natural Disaster Relief and Recovery Arrangements (NDRRA) funding. Dalby.

The data shows that severe storms (including high winds, hail and inundation with flash flooding) are the most common atypical events for the area, with an average of 10 to 25 thunder days (Figure 6.3) and 2 to 3 ground lightning strikes per square km per year (Figure 6.4)

FIGURE 6.3 AUSTRALIAN AVERAGE ANNUAL THUNDER DAYS (BOM, 2005c)

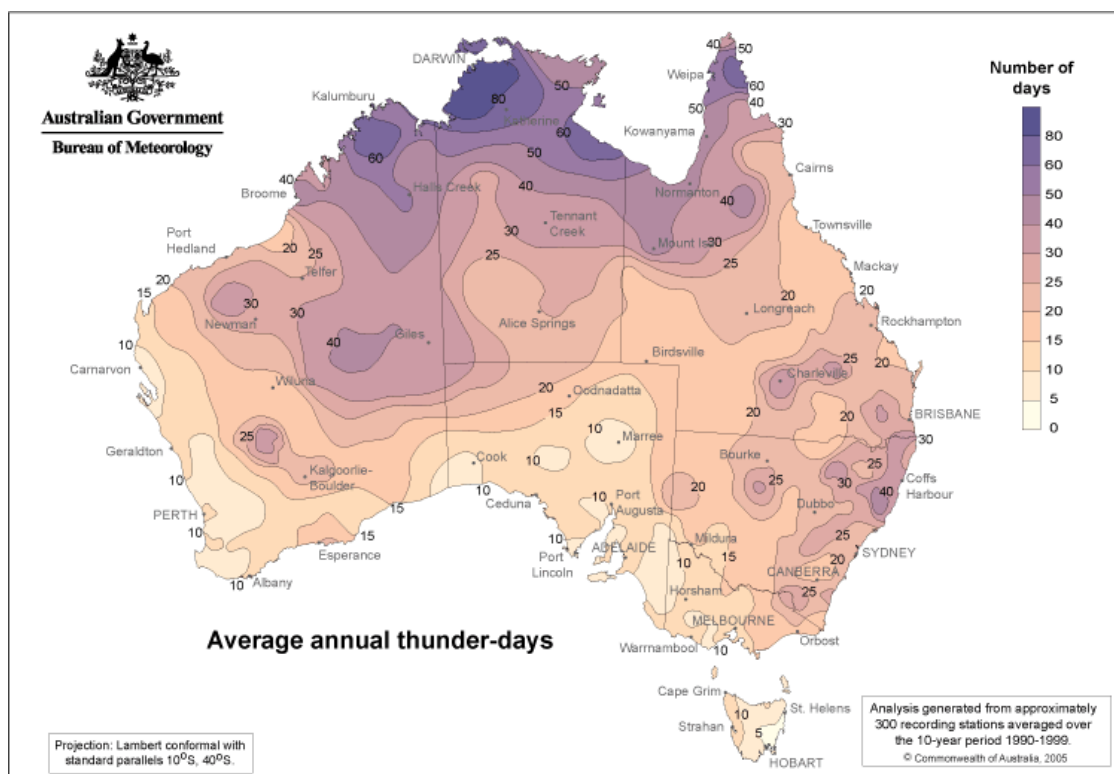




FIGURE 6.4 AUSTRALIAN AVERAGE ANNUAL LIGHTNING GROUND FLASH DENSITY (BOM, 2005B)

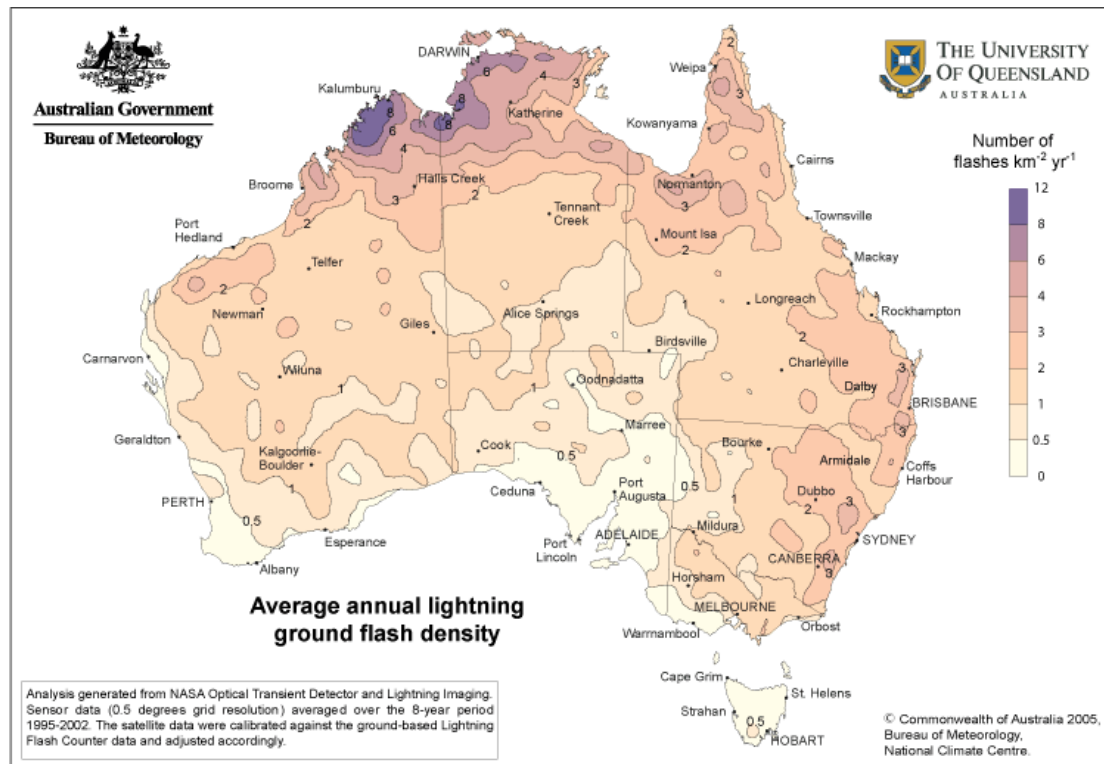
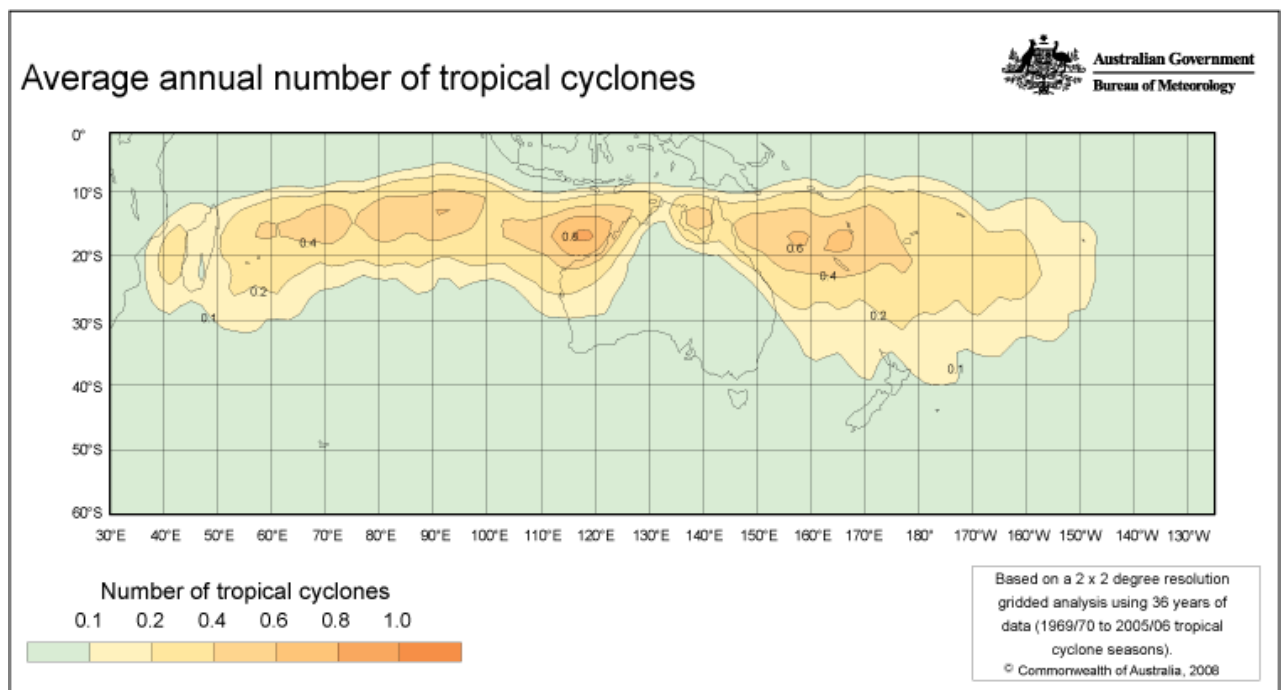


FIGURE 6.5 AUSTRALIAN AVERAGE ANNUAL TROPICAL CYCLONE INCIDENTS (BOM, 2006)





6.1.2 Air Quality

CS Energy's Kogan Creek Whyte air quality monitoring station is located immediately west of the study alignment, in the far western corner of the study area. The monthly summaries of the ambient air quality data from June 2008 to 2009 is provided below.

TABLE 6.3 CS ENERGY AIR QUALITY DATA

MONTH/ YEAR	NO PPB	NO2 PPB	NOX PPB	SO2 PPB	O3 PPB	PM25 µG/M ³	PM10 µG/M ³
Jun 2008	0	1	2	1	19	3	11
Jul 2008	0	1	1	0	20	2	9
Aug 2008	0	1	1	0	24	3	13
Sept 2008	0	1	1	0	24	7	22
Oct 2008	0	1	1	0	22	6	16
Nov 2008	0	2	2	0	22	6	17
Dec 2008	0	1	1	1	24	7	15
Jan 2009	-2	1	-2	1	19	5	15
Feb 2009	0	1	1	1	22	6	16
Mar 2009	0	1	1	1	18	4	21
Apr 2009	1	0	1	0	14	2	13
May 2009	0.1	0.6	0.7	0.5	19.9	5	14
Jun 2009	0.3	0.4	0.8	0.2	17.6	2	8
Annual	0.0	0.9	0.9	0.4	20.4	4.5	14.6

The daily average data collected from the Kogan Creek Whyte monitoring station shows no exceedances in ambient guidelines with the exception of Particulate Matter 2.5 micron (PM2.5), and Particulate Matter 10 micron (PM10) values as follows:

- 25 November 2008 – PM2.5 value of 25 equals Environment Protection Policy Air (EPP) Air Quality Objective of 25; PM10 value of 49 is just below EPP Objective of 50;
- 16 September 2008 – PM2.5 of 29 above objective of 25; PM10 value of 123 well above objective of 50; and
- 17 September 2008 – PM2.5 of 16 below objective of 25, but PM10 of 53 above objective of 50.

The Objective for PM10 allow for an exceedance on 5 days per annum for environmental values to still be protected. The 2008-2009 data provided is consistent with this objective.

High values may be a result of a combination of number of factors including regional dust storms, local ploughing of fields, unsealed roads, mining/petroleum activities and the nearby Kogan Creek Power Station.



In addition to this, DERM monitors air quality in south-east Queensland, with the closest monitoring station to the Project being located at Toowoomba (approximately 140km to the south-east). The most recent (April 2009) Air Quality Bulletin South-east Queensland reported that pollutant levels within the Toowoomba area are generally consistent with pollution levels across the South-east Queensland and reflects air quality of a metropolitan area (DERM, 2009). The bulletin also reported that pollutant levels did not exceed the relevant standards contained in the Commonwealth National Environment Protection (Ambient Air Quality) Measure (Air NEPM), the monitoring investigation levels contained in the Commonwealth National Environment Protection (Air Toxics) Measure or EPP (Air) visibility goal.

6.2 POTENTIAL IMPACTS

This section outlines a number of potential impacts relevant to the Project, including the impact of climate change on the proposed development, and the impact the proposed development may have on the ambient air quality.

6.2.1 Climate

The Australian Greenhouse Office (now Department of Climate Change) document "Climate Change: An Australian Guide to the Science and Potential Impacts" summarises the risks of climate change to include changes in rainfall pattern and intensities and bushfire patterns, increase in the average global surface temperature and sea level rise. For infrastructure, modelling suggests climate change impacts will be noticeable by 2030, with significant risks to property and plant by 2070 unless appropriate adaptation measures are undertaken.

The report also documents a need for infrastructure and the built environment to adapt to a medium to high certainty of changes to magnitude and frequency of extreme weather events. In these circumstances the risk of weather and climatic conditions exceeding design criteria (resulting in damage and increased 'wear and tear' on the structures) are considered significant.

As the useful design lifespan of the project infrastructure is expected to be 50 years, design of the structures will need to plan for changes in environmental conditions.

Quantitative assessment of the magnitude and scope of the changes to our climate have been undertaken previously by the CSIRO and the BoM. The *Climate Change in Australia — Technical Report 2007* and associated website provides climate change projections for Australia based on the Intergovernmental Panel on Climate Change (IPCC) modelling, which is based on various assumptions regarding demographic, economic and technological variables influencing future emissions profiles.

In 2009 more specific information for the Eastern Downs Region was updated and presented as part of the ClimateQ report (QLD Office of Climate Change, 2009).

Generally this data indicates 2070 peak summer temperature to be in the range of 2 to 5°C above current values (relative to 1980-1999), with a 2 to 5% reduction in summer rainfall. Some additional climatic factors from the document are described in the below table. All values are 50th percentile or median values from the various modelled scenarios under a high, fossil fuel intensive emissions profile.



**TABLE 6.4 PROJECTED CLIMATE CHANGE IN PROJECT AREA (CSIRO ET AL, 2007)
(OCC, 2009)**

	CURRENT	2030 PROJECTION	2050 PROJECTION	2070 PROJECTION
Summer Temp	18.6 - 31.8°C	+1°C (+0.6 – 1.4°C)	+1.9°C (+1.2 – 2.8°C)	+3.1°C (+2.0 – 4.6°C)
Annual Temp	12 – 26.8°C (max 41.7°C)	+1°C (+0.7 – 1.4°C)	+2°C (+1.3 – 2.8°C)	+3.2°C (+2.1 – 4.5°C)
Summer Rainfall	262 mm (42.5% of total)	-1% (-10 – +10%)	-1% (-19 – +19%)	-2% (-29 – +30%)
Annual Rainfall	694mm	-3% (-11 – +5%)	-6% (-21 – +10%)	-9% (-32 – +16%)
Annual Relative Humidity	50 – 60%	-0.5 – +0.5%	-0.5 – +0.5%	-0.5 – 1%
Annual Solar Radiation	15 – 19 MJ/m ³	-1 – +1%	-1 – +1%	-1 – +1%
Wind speed	11.1 – 12.8 km/h	-2-+2%	+2-5%	+5-10%
Evaporation	6.2 mm / day	+3% (+2 – 5%)	+7% (+4 – 10%)	+11% (+7 – 15%)

6.2.2 Regulatory Environment

International Policy

The Intergovernmental Panel on Climate Change (IPCC) is the international body responsible for review and assessment of the scientific research into climate change since 1990. The most recent (2007) review (the IPCC Fourth Assessment Report) concluded that:

- Warming of the climate system is unequivocal;
- Most of the warming in the past 50 years is 'very likely' (more than 90% probability) due to the observed increase in greenhouse gas concentrations from human activities such as the burning of fossil fuels and land use change; and
- It is 'very likely' that changes in the global climate system will continue well into the future, and that they will be larger than those seen in the recent past.

International cooperation on Greenhouse Gas (GHG) emissions is managed under an international treaty called the United Nations Framework Convention on Climate Change (UNFCCC). It is under this treaty that the first targets for reduction of GHG emissions was established in 1997, the Kyoto Protocol.

Under the Kyoto protocol an average global emission reduction of 5.2% from 1990 levels is targeted for the five year period ending 2012 (first commitment period is 2008 – 2012). Australia's target under the scheme is to impede emissions growth to 108% of 1990 levels (Department of Climate Change, 2008).

National Policy

Domestically, the Commonwealth Government have committed to emission cuts of 60% by 2050. Originally proposed for implementation in mid 2011, the Carbon Pollution Reduction Scheme (CPRS) is a market based



cap and trade system with the target to reduce Australia's emission. In April 2010 the timeline for implementation on any CPRS was extended until at least 2013. Therefore the potential impact of the proposed CPRS on the project is likely to be primarily in the increased costs of goods and services associated with the 'flow on' effect of carbon charges in the supply chain post 2013. Use of less carbon-intensive products will reduce this impact.

The National Greenhouse and Energy Reporting Scheme (NGERS) will underpin the CPRS, providing the emissions data on which obligations under the CPRS will be based. In order to satisfy any NGERS obligations (which may be either project specific or contribute to corporate level reporting), appropriate fuel and energy information needs to be collected by each sub-contractor involved with the projects construction.

The Mandatory Renewable Energy Target (MRET) requires electricity retailers and other wholesale purchases to ensure a proportion of their generation originates from non-fossil fuel sources. This target was recently increased from the original goal of a 2% increase on 1997 levels (by 2010) to the equivalent of 20% generation by 2020.

It should be noted that Powerlink has a non-discriminatory obligation to generators to provide connection to its grid. The energy source and generation type is not a consideration to Powerlink and is therefore not included in any targets of GHG calculations for Powerlink.

While MRET may not directly impact on the construction of the proposed substation and transmission line, it may impact the types and scale of renewable generation applying for interconnection into the system. As some renewable energy sources (such as wind, solar etc.) can be intermittent in nature, this can impact on the operation and security of some electrical infrastructure.

State Policy

Queensland has reiterated the Federal Government's GHG reduction target of 60% by 2050. The Queensland State Government has produced a number of policy documents regarding climate change adaptation, such as Climate Smart 2050 and the South-East Queensland Climate Change Management Plan. While not all directly applicable to the proposed transmission line and substation, the following recent policy and legislative releases (relevant to climate change) demonstrate the awareness of and rapid movement to address the management of climate change risk:

- Sustainable Planning Act 2009;
- South East Queensland Regional Plan 2009-2031;
- Draft South East Queensland Climate Change Management Plan;
- Climate Q: towards a greener Queensland (the State's Climate Change Strategy);
- The Queensland Government has set itself a target to cut Queenslanders' carbon footprint by one third by 2020;
- Premier's Council on Climate Change;
- Review of State Planning Policy 1/03 – Mitigating the adverse impact of flood, bushfire and landslide; and
- Queensland Renewable Energy Plan.



6.2.3 Air Quality

Seven sensitive receptors (dwellings) have been identified from aerial photography and regional investigations within 750m of the transmission line (refer to **Section 3.1**).

During the construction phase of the Project, traffic movements, unsealed access tracks, bulk earthworks and vegetation clearing have the potential to cause dust nuisance. During construction, fugitive dust may occur in areas where bare soil is left exposed. The impact of this dust generation through vegetation clearing is considered marginal due to the size of the development footprint.

Dust is not expected to be a significant nuisance to ecologically sensitive areas, or to the neighbouring residents, again due to the size of the development footprint. The emission of particulates and gaseous pollutants from vehicle exhausts, compressors and construction equipment is not likely to exceed health guidelines due to the low intensity of the construction activity. Nonetheless, prior to construction activities, landholders that may be potentially affected by fugitive dust will be notified. Maintenance activities are unlikely to cause a dust nuisance due to low traffic volumes and especially once ground cover/low growing vegetation has had an opportunity to establish.

The proposed development is not expected to result in significant increases in odour during construction, operation or maintenance phases. The burning of vegetation will be restricted, where possible. In the event of necessary burning, odour is not expected to be a significant issue however the neighbouring landholders will be notified prior to burning activities and appropriate approvals/permits obtained.

6.3 MITIGATION MEASURES

6.3.1 Air Quality

Dust nuisance will be minimised by avoiding construction activities in areas with soils prone to erosion (e.g. sodic soils). In areas where erosion prone soils cannot be avoided, techniques would be employed to reduce dust emissions during both the construction and operational phases, as listed below:

- Reduce the need for unsealed access tracks by utilising sealed or gravelled access roads where possible and reducing the length of the unsealed access tracks (i.e. position access tracks off existing roads which are close to the proposed alignment). Powerlink to gravel access roads when the need for gravelling is identified (dependent on ground conditions);
- Reduce unauthorised vehicle movements on access tracks (e.g. by the use of gates and signs);
- Application of mulch on exposed areas during construction; and
- In sensitive areas, use of recycled water (where available) during construction to minimise dust originating from traffic movement on access roads, bulk earthworks and other activities.

During the maintenance phase, speeds will be limited on unsealed access tracks and will be further reduced in dry, windy weather, so as to reduce fugitive dust. Dust is not expected to be a significant issue post-construction, as traffic movement will be minimised and access tracks/easement clearing will be allowed to naturally revegetate.

Further detailed measures are outlined in the EMP (see **Appendix F**).



7.0 HYDROLOGY

7.1 METHODOLOGY

Assessment of hydrology in the study corridor was undertaken in two stages; a literature review and a field investigation.

Spatial data sources (GIS framework provided with Searle *et al*, 2007; DERM wetlands mapping) were reviewed to consider topographic, drainage (including wetland and flooding) and groundwater characteristics likely to exist along the study alignment.

A field investigation was undertaken during the 6th and 7th of January 2010 by a Soil and Hydrology Scientist. This included a reconnaissance of the entire project site looking for hydrologic features that were not present in the mapping, including any drainage lines, wetlands, farm dams and groundwater bores.

7.2 EXISTING ENVIRONMENT

7.2.1 Surface Hydrology

The proposed alignment lies within the Condamine River Catchment. Watercourses which are traversed by the proposed alignment include Braemar Creek and Kogan Creek and a number of associated minor tributaries (refer to **Figure 5.1**). These creeks are ephemeral, flowing only in direct response to rainfall and as such, restricting potential impacts to times of extreme flows. Kogan Creek flows northwards into the Condamine River. At the time of site inspection Kogan Creek was flowing slowly, and the water quality was characterised by being highly turbid. Braemar Creek was identified as been highly modified. A large embankment was constructed across the watercourse diverting creek flow into a large artificial dam structure. The large artificial dam contained an abundant water supply at the time of the survey. Water is restricted from flowing in a northerly direction towards the Condamine River due to the natural flows of Braemar Creek being blocked.

Historical disturbances (grazing, clearing) which have occurred within, and adjacent to these watercourses, have resulted in the erosion of creek banks and reduction of buffering capacity for surface runoff.

7.2.2 Sub-surface Hydrology

The predominant soils along the corridor have a tendency to waterlog at the lower part of the surface profile. This is mainly due to the topsoils being sandy and having high infiltration rates, and the subsoils being very heavy clays with low infiltration capacity, thus creating a throttle on downward movement of water into the soil profile at the interface of the texture contrast. However, while water logging does occur, the very gentle slopes along the study alignment make it unlikely there are any more than minor and localised sub-surface flows in the lower surface soils.

The study corridor is located on a regional groundwater system and no local groundwater systems are recognised for the area (Searle *et al*, 2007). Groundwater data for the Condamine Catchment has been summarised by Searle *et al* (2007). This report concludes that the sub-catchment that the proposed alignment is located within has no known salinity locations in the immediate and adjacent areas. Groundwater is estimated to



be moderately deep (>10m) with an upward trend. However this groundwater rise is not relevant to the Kumbarilla landscape on which the corridor is located.

7.2.3 Wetlands

A search of the Referable Areas database provided by DERM (under Schedule 2 of the Sustainable Planning Regulation 2009) confirmed that one DERM referable wetland occurred within 100m of the study corridor (DERM, 2009). The existing Kogan to Braemar Transmission Easement traverses the referable wetland at allotment K on SP172844. At the time of the site inspection no discernible wetland features were observed within the location of the mapped wetland. The large non-riverine wetland associated with the Condamine floodplain is located in excess of 100m north of the eastern extent of the study alignment.

7.2.4 Flooding

Floodplain mapping indicates that the majority of the study corridor is subject to flooding with the exception of a portion west of Kogan Creek (refer **Figure 7.2**). Due to the nature of the project, flooding should not be an issue.

7.3 POTENTIAL IMPACTS

7.3.1 Surface Hydrology and Localised Flooding

It has been identified that floodwaters may inundate the area containing the transmission line adjacent to the Condamine River and Braemar creek. Due to the flat nature of the country, flood velocities will be minimal. The foundations requirements for affected towers will be determined in consideration of the potential for short term inundation. The impacts of any structures on the flood flows will be negligible due to the foundation columns and the anticipated low water velocity.

There is potential for erosion if water flows are concentrated. Impedance of flows across tower pads and access tracks should be minimised and sheet flow conditions (as would naturally occur) maintained as much as possible.

7.3.2 Water Quality

During the construction phase of the project there is the potential for surface water quality impacts to occur. These impacts relate primarily to erosion of the disturbed site, and sediment being transported via runoff to the local surface drainage network. In addition, potential impacts may occur from accidental spills of fuel or oil from construction equipment.

Water quality impacts may result from the following activities:

- Surface vegetation disturbance;
- Tower foundation excavations;
- Access track establishment; and
- Stormwater runoff from the construction site, including access tracks, which could be high in suspended sediment or contain contaminants.



7.3.3 Adjacent Water Use

Given the transmission towers will represent only a very minor increase in impervious area for the catchment, it is unlikely to impact on adjacent water users.

7.3.4 Groundwater

It is anticipated that groundwater is likely to occur at least 10 to 15m below ground level (Searle *et al.*, 2007).

Given that earthworks will be minor and tower foundations will extend approximately 7m below ground level the potential impacts to groundwater during construction is unlikely. Geotechnical investigations undertaken prior to final foundation design will identify shallow groundwater. The findings of these studies will allow specific footings to be designed to suit the conditions encountered. In the event that groundwater is intersected during digging for foundations, dewatering may be required.

Given that subsoils are characterised by extremely low permeability, the risk that contaminants (e.g. spillage of fuels, lubricants and chemicals used during construction) would percolate through to groundwater is highly unlikely if remediation action is conducted immediately.

7.4 MITIGATION MEASURES

7.4.1 Surface hydrology

Levelling of the tower sites will be conducted in a fashion so as to maintain sheet flow of water across the corridor with the aim of minimising flow concentration. Possible impediments to flow such as roads should either be constructed flat with ground level or constructed of coarse gravel to allow water to flow through.

Where bunding and drainage channels are required to direct water away from tower pads or where chemical or hydrocarbon storage is required during the construction of the transmission line, the bank will be pushed up from the back so not as to expose the sodic subsoils to water flows. The material used to construct the bund and drainage channels should be treated with gypsum, fertilised and seeded with grass to stabilise them as soon as possible.

Drainage control structures for the diversion of up-slope runoff around any given soil disturbance will be required; these may consist of diversion banks or catch drains. Access tracks should be constructed and maintained in accordance with Powerlink's Transmission Line Access Tracks Standard.

Where concentration of water flows does occur due to the construction of drainage channels, the discharge points should be on a soil not susceptible to tunnel erosion and be well grassed.

The towers proposed for construction (Refer Section 3.2.1.1 – 3.2.1.3) will be constructed to withstand a Q100 flood meeting the requirements of Appendix 9 and Outcome 3 of the SPP 1/03 Guideline: Mitigating the adverse impacts of flood, bushfire and landslide.

All works are to be undertaken in accordance with the EMP (see **Appendix F**).



7.4.2 Water Quality

Erosion and sediment controls will be used during construction to ensure sediment-laden runoff does not impact on water quality downstream of the project site.

However, in addition to these erosion and sediment control techniques appropriate bunding around chemicals and hydrocarbons, and maintaining equipment during the construction of the transmission line, is recommended to limit water quality impacts.

All works are undertaken in line with the DERM Guideline - Activities in a watercourse, lake or spring carried out by an entity (DERM, 2010).

All works are to be undertaken in accordance with the EMP (see **Appendix F**).

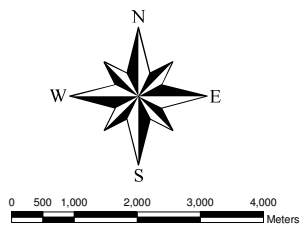
7.4.3 Groundwater

In the event that an environmental incident occurs during construction, such as a fuel or oil spill, immediate containment, management and remediation actions will be undertaken to ensure migration of the contaminants into groundwater does not occur.

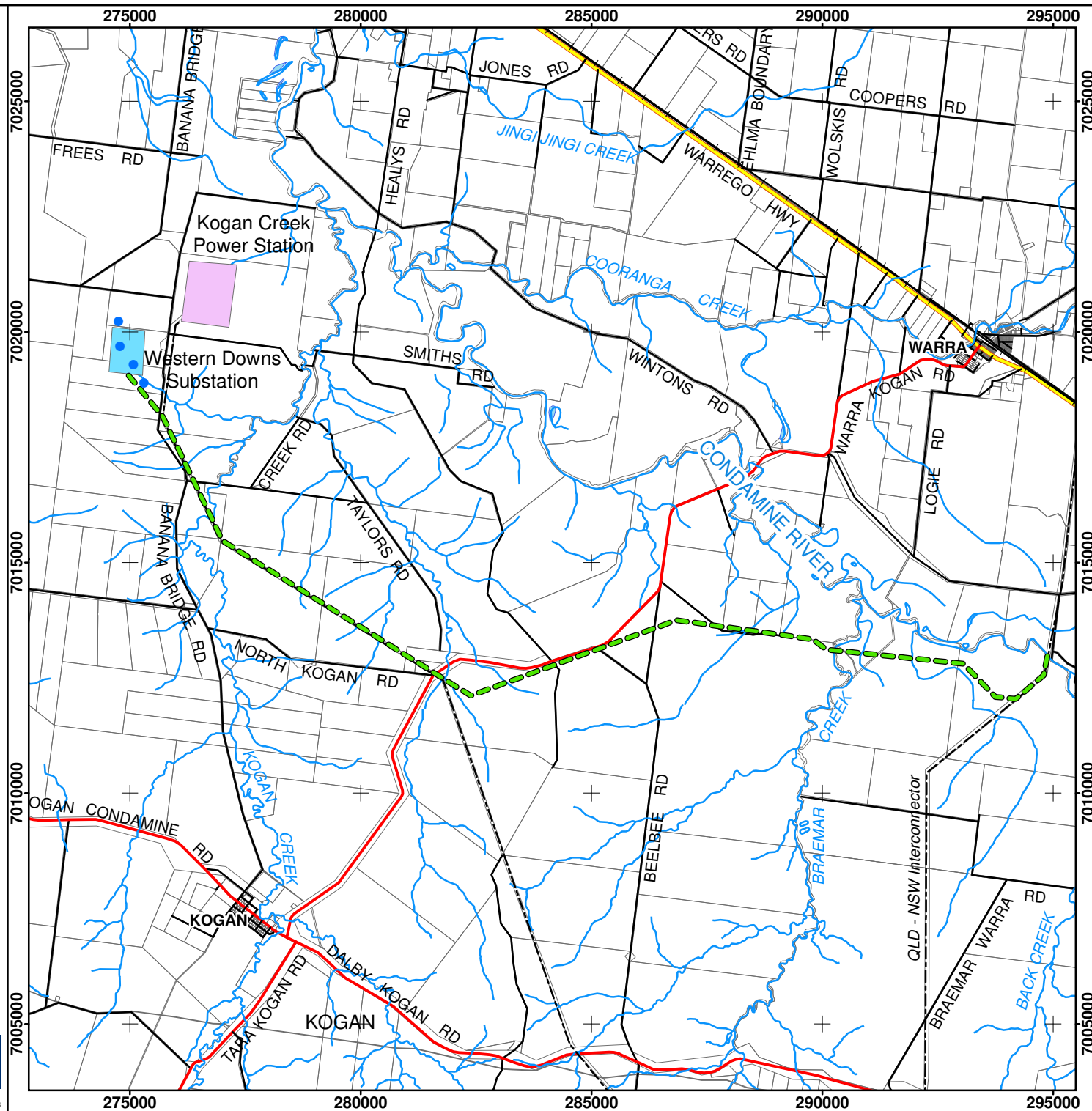
Powerlink Western Downs EIA Rivers and Creeks

Figure 7.1

- Farm Dam
- Study Alignment
- Existing 275 kV Line
- Watercourse
- Highway
- Main Road
- Local Road
- Cadastre
- Power Station
- Sub-station
- Lake / Reservoir



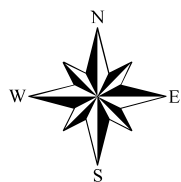
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Powerlink Western Downs EIA Floodplain Mapping

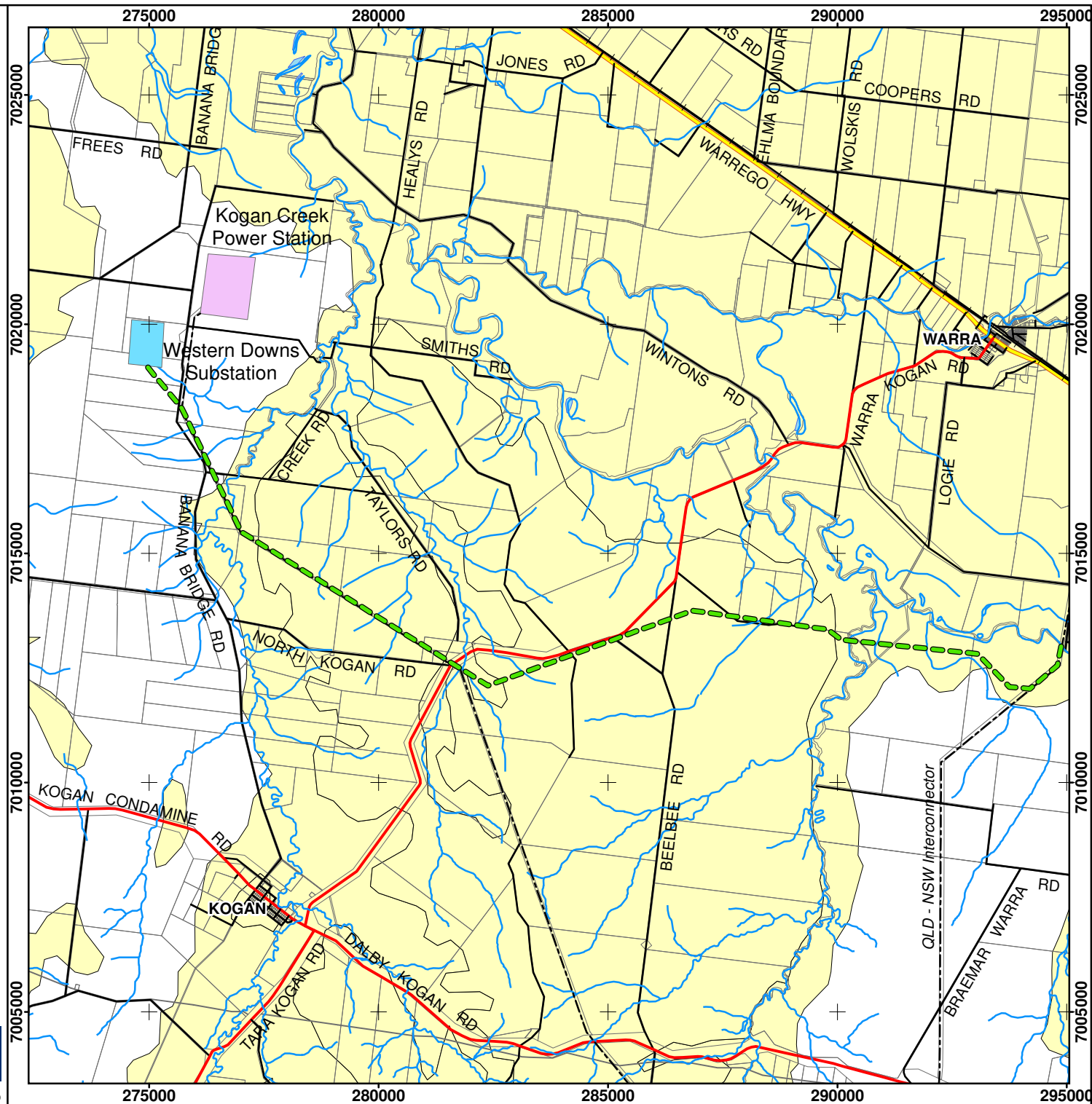
Figure 7.2

- Study Alignment
- Existing 275 kV Line
- Watercourse
- Highway
- Main Road
- Local Road
- Cadastre
- Power Station
- Sub-station
- Lake / Reservoir
- Floodplain



0 500 1,000 2,000 3,000 4,000
Meters

Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56





8.0 FIRE

This section describes aspects of the environment surrounding the Project corridor that are relevant to the generation and spread of uncontrolled fire. Reference has been made to bushfire hazard information prepared by local and State authorities.

This section discusses the likely causes of fire as a consequence of the activities associated with the construction and maintenance of the proposed development, and addresses the potential impact of bushfires on the proposed development. Mitigation measures have been provided to reduce the potential impacts of uncontrolled fires on the Project and the surrounds.

8.1 BACKGROUND & METHODOLOGY

The 'State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide' (SPP 1/03), contains a bushfire hazard assessment methodology, which uses three characteristics to determine the level of bushfire hazard within an area: vegetation, slope, and aspect. In the SPP 1/03 vegetation is used as the primary determinant of bushfire hazard and is scored out of 10. If an area has a vegetation score of 2 or less, the guidelines states that no further assessment of the bushfire hazard is required as it is not deemed to be hazardous vegetation. However, if the vegetation characteristic is scored greater than 2 then slope and aspect are also scored to provide a rating for each characteristic and these are then added to provide total scores which is used to determine the Severity of Bushfire Hazard. Slope and Aspect are scored out 5.

8.2 EXISTING ENVIRONMENT

Areas of bushfire risk, as determined by the Queensland Rural Fire Service, have been identified on Western Downs Regional Council's Chinchilla Town Planning Scheme Overlay Map 4 *Bushfire Hazard Areas*. The mapping identifies the project corridor as occurring within a Low to Medium Bushfire Hazard classified area. A field verification of the factors affecting bushfire severity were undertaken in order to identify the potential site based risk. In accordance with the prescribed methodology included in SPP 1/03, observations of the change in vegetation type, gradient and aspect along the project corridor were assessed. Accordingly, bushfire hazard severity has been assessed and included in **Table 8.1**. Based on the findings, the risk assessment reflects that the corridor based risk is generally consistent with the planning scheme mapping.



TABLE 8.1 SPP 1/03 HAZARD RATING ASSESSMENT

AREA	ELEMENT						Total Hazard Score	Bushfire Hazard Score
	Vegetation		Slope		Aspect			
	Vegetation Type	BHR	Slope (%)	BHR	Direction	BHR		
Section 1	Grassy eucalypt and acacia forest	6	0 - 5	1	North to East	0	7	Medium
Section 2	Grazed grassland	2	0 - 5	1	North to East	0	3	Low
Section 3	Grassy eucalypt and acacia forest	6	0 - 5	1	North to East	0	7	Medium

BHR – Bushfire Hazard Rating BHS – Bushfire Hazard Severity (The State Planning Policy Guideline: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide 2003)

8.3 POTENTIAL IMPACTS

The impacts of bushfires generally depend on the location, the physical characteristics of land and the type of development. Bushfires occur on a variety of vegetation and topography types where there is a flammable fuel path.

The prevailing fire regime is unlikely to be significantly altered due to the Project. Although no noticeable change in the local fire regime is expected, the intensity and occurrence of fires may actually be reduced by the presence of the transmission line, particularly due to vegetation/fuel clearing. The most probable time for a fire to occur is during construction, however the risk of such an event occurring during this phase of the development is considered low.

Fire may potentially arise from construction machinery/equipment as a result of fugitive sparks igniting dry flammable materials along the corridor. Excessive heat generated by machinery/vehicles, sparks, and/or careless disposal of cigarettes and matches pose the highest risk to the Project locale. Flammable matter providing the highest fire risk along the corridor include stockpiles of mulched/chipped vegetation, dead/dry on-site vegetation, and paper. Fuel, oil and flammable chemicals increase the risk of fire.

The line itself is unlikely to be at risk from bushfire due to resilient materials and maintenance regimes to limit vegetation regrowth and associated fuel loads.

In accordance with the SPP 1/03, the proposed development, although located within a natural hazard management area (bushfire), is designed to function effectively during and immediately following bushfire events.



8.4 MITIGATION MEASURES

The following mitigation measures will reduce the risk and impact of a fire on the proposed development and surrounding areas:

- A Bushfire Management Plan would be prepared and adhered to. This plan will be developed in conjunction with the Department of Community Safety (Queensland Fire and Rescue Service).
- Materials used for the construction of the transmission line will be fire resistant in order to reduce the chance of damage the transmission line;
- All mobile construction equipment would be fitted with spark arresters to prevent accidental spark ignition;
- Where naked flames are required (e.g. when oxy-acetylene is used) two full fire extinguishers shall be located within 10m of the work face;
- All construction sites would have fire extinguishers and first aid officer/s;
- In the unlikely event of a fire, emergency exit plans would be utilised;
- Water trucks will be present, when practicable, on construction sites that are in areas identified as a potential fire risk; and
- The relevant emergency services (e.g. Fire Rescue and Ambulance Services) would be notified of the numbers and location of construction personnel and any proposed temporary road closures.

All works are to be undertaken in accordance with the EMP (see **Appendix F**).



9.0 WASTE MANAGEMENT

This chapter provides information relating to waste produced as a result of the Project during the construction, operation and maintenance phases. A description of waste management and disposal of materials including oils and lubricants, water, solid waste, vegetative waste and regulated waste has also been provided. A description of the origin, quality and quantity of wastewater originating from the Project is also provided.

Information is also provided about on-site treatment of any regulated wastes and proposed waste avoidance, reuse, recycling, treatment and disposal have been described having regard for best practice waste management strategies and the *Environmental Protection (Waste) Policy*.

9.1 POTENTIAL WASTE GENERATION DURING CONSTRUCTION & OPERATION

The likely wastes that are to be generated during the construction and operational phases of the Project are outlined in **Table 9.1**. The majority of the wastes for the Project will be from the construction of the proposed transmission line. Waste production during the operational phase of the Project will be minimal in comparison and associated with scheduled maintenance activities of the transmission line and easements.

TABLE 9.1 POTENTIAL WASTES GENERATED DURING CONSTRUCTION & OPERATIONAL PHASES

WASTE TYPE	WASTE CLASSIFICATION*	SOURCE
Construction		
Vegetation	General	Clearing works
Existing dumped rubbish (e.g. vehicle bodies, mattresses, fridges, rusted drums)	General	Previous illegal dumping activities
Topsoil & excess spoil	General	Bulk earthworks for foundations and transmission footings
Waste gravel & concrete	General	Foundations and transmission footings.
Domestic rubbish (e.g. food scraps, packaging, paper, bottles, cans etc)	General	Construction workers & on-site work office
Waste drums & tins	Regulated	Refueling & vehicle maintenance activities
Residual construction material	General	Construction activities
Timber pallets	General	Packing material
Waste oils	Regulated	Vehicle maintenance activities
Sewage	Regulated	Construction workforce
Residual fuel	Regulated	Refueling activities
Waste water	General / Regulated	Cleaning & washing down
Operation		
Vegetation	General	Easement maintenance
Waste oils	Regulated	Equipment & plant maintenance



WASTE TYPE	WASTE CLASSIFICATION*	SOURCE
Waste water	General / Regulated	Cleaning & washing down
Scrap metal	General / Regulated	Transmission Line maintenance
Defective equipment	General	Transmission Line maintenance
Sewage	Regulated	Maintenance workforce

*Waste Classification as defined under the *Environmental Protection Act 1994*

9.2 MITIGATION MEASURES

General and regulated waste will be produced as a result of the construction and operation of the transmission line. However, waste generation and potential associated impacts are considered to be similar to other general industrial projects. The potential impacts of waste generation can be mitigated and managed by adopting appropriate waste disposal and tracking procedures, as well as adhering to waste management strategies as outlined in the EMP.

Waste management strategies are based on the principles of the waste hierarchy outlined in the *Environmental Protection (Waste Management) Policy 2000* and the Queensland Government Recycling Policy for Buildings and Civil Infrastructure 2009, which promotes the following actions in order of preference:

- Waste avoidance;
- Waste reuse;
- Waste recycling;
- Energy recovery; and
- Waste disposal.

The following sections outline the waste management strategies to be employed for each waste type potentially generated during the construction and operational phases of the Project. The waste management strategies are based on the waste hierarchy principles, and will assist in mitigating the potential impacts of the project. All works are to be undertaken in accordance with the EMP (see **Appendix F**).



9.2.1 Solid Waste Disposal

WASTE TYPE	WASTE MANAGEMENT STRATEGY
Solid	
Vegetation	- Cleared native vegetation will be sold as mill timber, reused for fencing or chipped into mulch to be used for stabilizing (erosion control), landscaping and rehabilitation works on the site. Vegetation may also be stacked on site for future disposal (any stacking must prevent surface flow concentration) - Powerlink will provide at least three months notification to DERM of any proposed surveying/clearing within State Land so that the necessary surveys can be undertaken to determine the extent of commercial timber present and allow for potential harvest.
Existing dumped rubbish (e.g. vehicle bodies, mattresses, fridges, rusted drums)	Dumped rubbish on the site will be segregated into recyclable items i.e. scrap metal. Other items will be collected as general waste by a licensed contractor for disposal at a licensed waste facility. Any old drums that appear to have contained chemical based material will be collected by a licensed contractor for treatment and disposal at a licensed waste facility.
Topsoil & excess spoil	Topsoil & excess spoil will be stockpiled on site for reuse during landscaping and rehabilitation works.
Waste gravel & concrete	Waste gravel & concrete will be reused where possible..
Domestic rubbish (e.g. food scraps, packaging, paper, bottles, cans etc)	Recycling and general waste bins will be situated on-site. Domestic rubbish is to be segregated into recyclable items and collected by a licensed contractor for disposal at a licensed general waste or recycling facility.
Waste drums & tins	Liquids within drums & tins are to be completely used. Waste drums & tins that contained hazardous material are to be kept within a bunded area until collected by a licensed contractor for treatment & disposal at a licensed facility. Waste drums & tins not containing hazardous material are to be recycled off-site.
Residual construction material	Left over construction material will be reused where possible, returned to suppliers or disposed of off-site.
Timber pallets	Timber pallets will be returned to the material supplier, collected for recycling off-site or collected as general waste by a licensed contractor for disposal at a licensed waste facility.
Scrap metal	Scrap metal to be reused (if practical) or recycled off-site.

9.2.2 Liquid Waste

WASTE TYPE	WASTE MANAGEMENT STRATEGY
Liquid	
Waste oils	Waste oils will be collected by a licensed contractor for treatment & recycling at a licensed facility. No oil or waste oils will be stored on-site.
Sewage	During construction, portable toilets will be used and serviced by a licensed contractor; or an appropriate treatment facility/septic tank will be used to process sewerage during the construction phase.
Residual fuel	Unused fuel will be reused where possible and removed from the site. No large quantities of fuel will be stored on-site.
Waste water	- Unless a suitable wash down facility has been established on site, vehicles and machinery are not to be cleaned on site. Waste water containing hazardous substances is to be contained and not released on site; and - Waste water containing hazardous substances is to be contained and not released on site.



10.0 FLORA AND FAUNA

10.1 METHODOLOGY

The terrestrial flora and fauna study was undertaken in three stages:

- A desktop review of background information;
- Assessment of potential ecological impacts of preferred alignment options; and
- Field investigations of preferred alignment.

As the waterways crossed by the preferred alignment are ephemeral and potential impacts to waterways are considered minimal, it was not considered necessary to specifically assess the aquatic biology values of these waterways. As such, this chapter is limited to identification and assessment of potential impacts on terrestrial flora and fauna species and their habitat.

10.1.1 Background Review

A range of information sources were reviewed during this ecological assessment, including:

- Wildlife Online - Department of Environment and Resource Management (DERM, 2009);
- HERBRECS - Queensland Herbarium records (DERM 2009);
- *Environment Protection & Biodiversity Conservation (EPBC) Act Protected Matters Search Tool* - Department of Environment, Water, Heritage and the Arts (DEWHA), 2009);
- Regional Ecosystem Mapping (V5.0) (DERM 2009); and
- Aerial photography and high resolution satellite imagery.

In addition to this, the conservation status of flora and fauna species occurring with the alignment have been assessed in the Commonwealth and State context with reference to the EPBC Act and *Nature Conservation Act 1992* (NC Act).

10.1.2 Field Investigations

Three field surveys were conducted as part of the ecological assessment for the proposed transmission line. A preliminary field investigation was undertaken on the 9th – 11th September 2009 to determine potential ecological considerations for various alignment options, including the preferred alignment to which this report relates.

A more detailed ecological survey was undertaken in the vicinity of the Study Alignment during two field trips on 6th - 8th and 14th - 15th January 2010. The survey tasks and sampling methods were chosen to maximise the likelihood of recording any rare or threatened species that the desktop review phase indicated may be present in the study area. They included:

- Confirmation of the Regional Ecosystems and vegetation communities present in the study area;
- Assessment of habitat potential within study area, particularly for rare or threatened species;
- Assessment of local and landscape scale ecological values of vegetation within the study area;



- Targeted searches of potentially suitable habitat within the study area for rare or threatened flora species (approx. 20 person-hours);
- Targeted active searching of potentially suitable habitat within the study area for rare or threatened reptile species (approx. 30 person-hours);
- Opportunistic bird observations during site visits for targeted flora/fauna surveys;
- Microbat echolocation call detection (Anabat) during driving transects along proposed alignment (approx. 4 hours x 1 detector) and during walking transects in selected habitats within study area (approx 3 hours x 1 detector); and
- Harp-trapping for microbats in potential habitat for rare or threatened bat species (4 sites x 1 trap-night per site).

10.2 EXISTING ENVIRONMENT

10.2.1 Flora

10.2.1.1 Vegetation Communities

Regional Ecosystems

Approximately 40% of the preferred alignment runs through mapped remnant Regional Ecosystems (RE), much of which lies along the existing Powerlink easement in the western half of the proposed alignment. The RE map for the study alignment is reproduced at **Figure 10.1** and vegetation community descriptions for each RE are provided in **Table 10.1**.

The RE mapping provides an accurate representation of the vegetation communities present along most of the study alignment, with several minor exceptions:

- For some polygons that contain multiple REs, not all REs are represented in the study area. For example, no shrubland (RE 11.7.5) was encountered in the study area through the large tract of ridge country west of the Kogan-Warra Road, nor in the ridge country between that road and “Tong Park”.
- Where the proposed alignment crosses Braemar Creek, the Endangered RE 11.4.12 polygon contains vegetation communities aligned with two other REs. The RE 11.4.12 vegetation is restricted to a narrow band on the high western bank of Braemar Creek and small patches on higher ground through the centre of the remnant. The majority of the vegetation in the alignment vicinity could be classified as RE 11.3.25 (river red gum woodland fringing drainage lines) and RE 11.3.3 (coolabah woodland on alluvial plains).

From ecological and conservation perspectives, the most significant RE includes areas of Endangered and Of Concern vegetation on alluvium and clay plains adjacent to the major watercourses that intersect the study alignment (Kogan and Braemar Creeks and fringing channels on the Condamine floodplain). The significance of the Endangered remnant on Braemar Creek (site WD14), immediately below the large dam, is enhanced by the presence of at least one Rare fauna species and abundance of arboreal mammals.



TABLE 10.1 REGIONAL ECOSYSTEM DESCRIPTIONS

RE CODE & PROPORTION OF EACH IN MULTIPLE RE POLYGONS	RE DESCRIPTION	VMA STATUS
11.5.1	<i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains/remnant surfaces	Least Concern
11.5.20	<i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> , <i>E. pilligaensis</i> with <i>E. crebra</i> woodland on Cainozoic sand plains.	Least Concern
11.4.3/11.5.20 50/50	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> shrubby open forest on Cainozoic clay plains. AND <i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> / <i>E. pilligaensis</i> ± <i>E. crebra</i> woodland on Cainozoic sand plains.	Endangered
11.4.12	<i>Eucalyptus populnea</i> woodland on Cainozoic clay plains.	Endangered
11.7.4/11.7.5 90/10	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus spp.</i> , <i>Corymbia spp.</i> , <i>Acacia spp.</i> , <i>Lysicarpus angustifolius</i> on lateritic duricrust. AND Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks.	Least Concern
11.3.2/11.3.17 80/20	<i>Eucalyptus populnea</i> woodland on alluvial plains. AND <i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains	Of Concern
11.3.2/11.3.18/11.3.4 40/35/35	<i>Eucalyptus populnea</i> woodland on alluvial plains. AND <i>Eucalyptus populnea</i> , <i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> shrubby woodland on alluvium. AND <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> tall woodland on alluvial plains.	Of Concern
11.7.7	<i>Eucalyptus fibrosa</i> subsp. <i>nubila</i> ± <i>Corymbia spp.</i> ± <i>Eucalyptus spp.</i> on lateritic duricrust	Least Concern
11.7.4/11.7.7/11.7.5 50/40/10	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus spp.</i> , <i>Corymbia spp.</i> , <i>Acacia spp.</i> , <i>Lysicarpus angustifolius</i> on lateritic duricrust. AND <i>Eucalyptus fibrosa</i> subsp. <i>nubila</i> ± <i>Corymbia spp.</i> ± <i>Eucalyptus spp.</i> on lateritic duricrust AND Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks.	Least Concern
11.3.25/11.3.4/11.3.3 80/10/10	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines AND <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> tall woodland on alluvial plains AND <i>Eucalyptus coolabah</i> woodland on alluvial plains	Of Concern Sub-Dominant

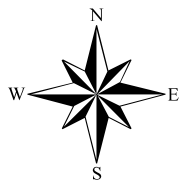
Powerlink Western Downs EIS Regional Ecosystems

Figure 10.1

- Alignment 18 Jan Ln
- Existing Substations
- Existing 275 kV Line
- Cadastre
- Highway
- Main Road
- Local Road
- Sub-station
- Power Station

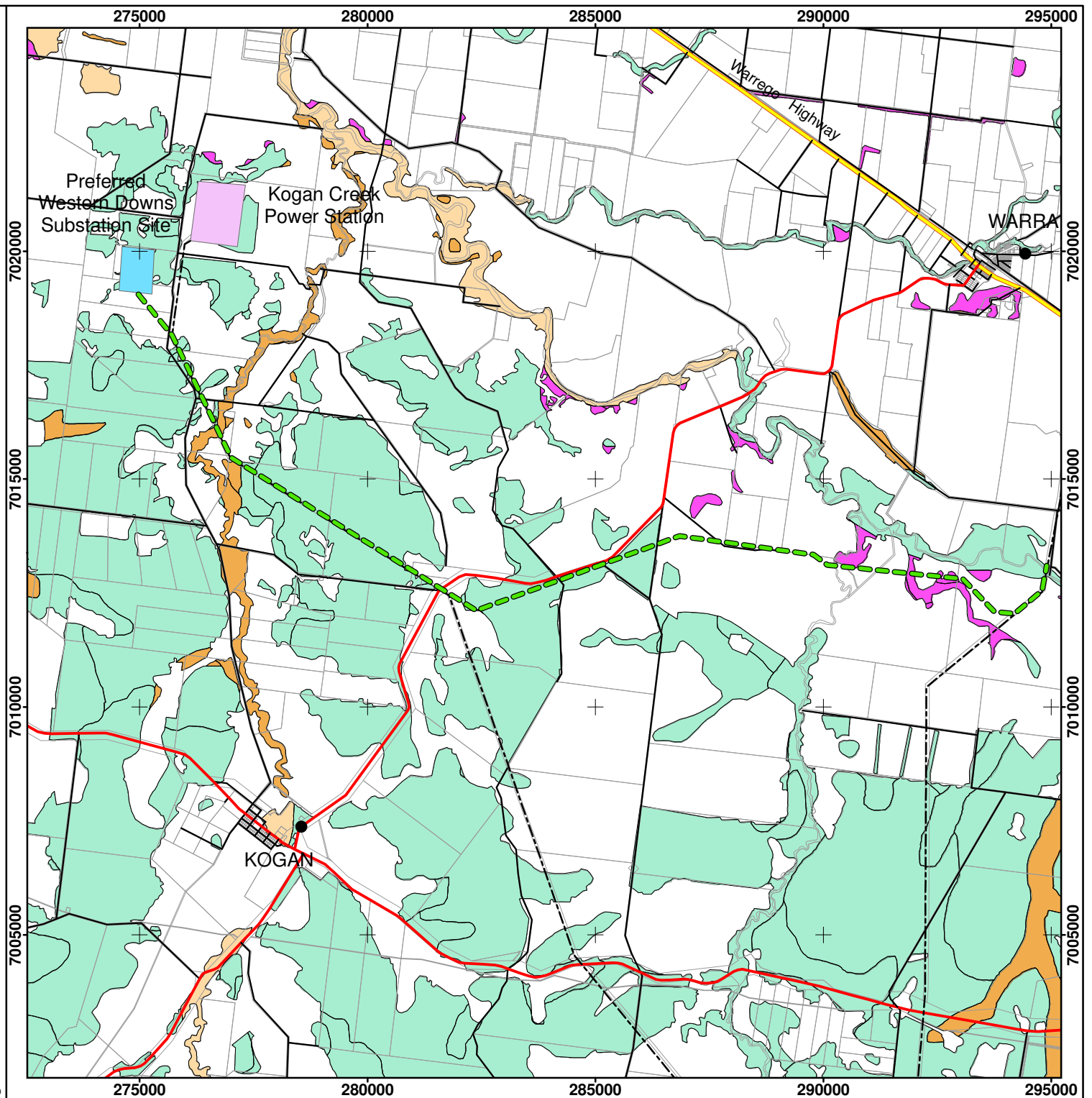
Regional Ecosystems

- Non-remnant / regrowth
- Endangered - Sub-dominant
- Endangered - Dominant
- Of Concern - Sub-dominant
- Of Concern - Dominant
- Not Of Concern
- Plantation forest



0 500 1,000 2,000 3,000 4,000
Metres

Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56





10.2.1.2 Rare and Threatened Flora Species

The potential occurrence of significant flora and fauna species listed under the NCA and EPBC Act was assessed through a review of data obtained from the Wildlife Online and EPBC Protected Matters databases. Data derived from these databases indicates that eight nationally significant and nine state significant flora species may occur in the study area. Further assessment of the potential occurrence of these species within the study area was based on an understanding of the species' preferred habitats and knowledge of types and condition of habitat present within the study area. The likelihood of rare or threatened flora species being present in the study area is discussed in **Table 10.2**.

One significant plant species - *Philotheca sporadica* – was known by Powerlink and Conics, prior to this study, to occur in the general vicinity of the study area. Indeed, this species was recorded at two locations within the study area during the field investigations undertaken by Conics.

Several other significant species may also be present but were not detected during this study. The detectability of plants and availability of plant material required for reliable species identification (e.g. flowers and fruits) varies greatly with the time of year that sampling is undertaken and prevailing climatic conditions preceding surveys. Since the present survey was undertaken over a short period in mid-summer it should not be regarded as a comprehensive flora survey and does not provide conclusive evidence that certain species do not occur in the study area.

TABLE 10.2 LIKELIHOOD OF SIGNIFICANT FLORA SPECIES OCCURRENCE

SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
<i>Eucalyptus curtisii</i>	Plunkett Mallee	R		Sandstone ridges in woodland / open forest	Possibly occurs in western portion of alignment but only marginal habitat suitability; not observed during this study.
<i>Philotheca sporadica</i>		V	V	Condamine River catchment on soils derived from low fertility laterised Cretaceous sandstones	Several known populations in study area, including two populations on and adjacent to existing Powerlink easement
<i>Solanum papaverifolium</i>		E		Grows in heavy clay soils, sometimes as a weed of crops	Possibly occurs on floodplain soils at eastern end of Study Area but not observed during this study.



SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
<i>Acacia chinchillensis</i>		NT	V	Confined to sandy or gravelly soil in the Chinchilla area.	Possibly occurs in western portion of alignment but only marginal habitat suitability; not observed during this study.
<i>Cadellia pentastylis</i>	Ooline	V	V	Occurs in vine thickets or dry rainforest, and more rarely woodlands. It is a relict rainforest species and tends to favour upper and mid slope positions, often with a northerly aspect. It commonly occurs on sandy-loam to clay soils of low to medium fertility	Unlikely due to lack of suitable habitat.
<i>Dichanthium queenslandicum</i>	King Blue-grass	V	V	Confined to black clay soils that support Bluegrass communities.	Possibly occurs on floodplain soils at eastern end of Study Area but not observed during this study.
<i>Digitaria porrecta</i>	Finger Panic Grass	R	E	Grasslands and grassy woodlands, particularly Qld bluegrass communities	Possibly occurs on floodplain soils at eastern end of Study Area but not observed during this study.
<i>Diuris sheaffiana</i>	Tricolour Diuris		V	Dry sclerophyll woodland and forest among grass; often with Callitris. Soils are often sandy or lateritic and landform ranges from flat to low lateritic hills	Possible in western two-thirds of study area; not observed during this study but poor seasonal timing for this species.
<i>Homopholis belsonii</i>	Belson's Panic	E	V	Dry woodlands including Mountain Coolibah, Wilga, Poplar Box and Belah, on basaltic and other soils.	Possibly occurs on floodplain soils at eastern end of Study Area but not observed during this study.
<i>Rhaphonticum australe</i>	Austral Cornflower	V	V	Grasslands and grassy woodlands on heavy soils	Possibly occurs on floodplain soils at eastern end of Study Area but not observed during this study.

(Source: Wildlife Online (EPA) & EPBC Database (DEWHA))

E = Endangered V = Vulnerable R= Rare NT= Near Threatened



10.2.1.3 Weeds of Management Concern

Three declared weed species, listed under the *Land Protection (Pest and Stock Route Management) Act 2002* (LPA), were identified during the ecological assessment. These were:

- *Opuntia tomentosa* (Velvety Tree Pear) - Class 2 Declared Plant;
- *Opuntia aurantiaca* (Tiger Pear) - Class 2 Declared Plant; and
- *Opuntia stricta* (Prickly Pear) – Class 2 Declared Plant.

These species occur as scattered individuals or small open clumps throughout the Study Alignment, both within native vegetation patches and along existing easements. Under the LPA, landowners must take reasonable steps to keep land free of Class 2 plants.

A number of other exotic plant species occur in the study area that are not declared under the LPA but some of which are considered as environmental weeds and particularly those under the WDRC Pest Management Plan (October 2010). These species are highlighted in the flora species list presented in **Appendix E**.

10.2.2 Fauna

10.2.2.1 Fauna habitats

Much of the study area is vegetated with remnant woodlands that provide habitat for a range of fauna species. Whilst historic land use activities (e.g. clearing, logging and grazing) have had a negative impact on the overall habitat condition in some of the remnant vegetation areas, these habitats remain structurally diverse and retain much of their original species composition. Several previously-cleared areas contain quite dense regrowth woodland that adds to the habitat diversity of the study area; and cleared pasture lands provide limited habitat potential for grassland-dependent species.

Throughout most of the study area, the ironbark-dominated woodland communities provide significant vertical habitat diversity with a tall eucalypt canopy, lower tree layer, shrubby understorey and grassy ground layer. Combined with generally high levels of fine organic litter and coarse woody debris, plus significant areas of rocky habitat, these habitats support a range of woodland-dependant birds (especially small passerines such as thornbills, whistlers and pardalotes), ground-dwelling reptiles (e.g. litter skinks) and macropods. The general lack of old hollow-bearing trees in the ironbark woodlands, however, is evidenced by the fact that no arboreal mammals and few hollow-dependent woodland birds were observed in the upland areas during this study.

In contrast to the ironbark woodlands on the hills, the river red gum, coolabah and box woodlands of the riparian and floodplain areas (especially along Braemar Creek) provide relatively less structural diversity but a high abundance of large, old hollow-bearing trees. These areas are inhabited by fewer woodland dependent small passerines but have a high abundance of arboreal mammals (e.g. brush-tail possum and sugar glider) and hollow-dependent birds (e.g. Australian owlet-nightjar and parrots).

Wetland habitats include ephemeral riverine environments, primarily in the major watercourses (Kogan and Braemar Creeks and Condamine River overflow channels), and an artificial lacustrine wetland behind the large dam on Braemar Creek. Some disturbance has occurred in the Kogan Creek riverine wetland due to clearing and resultant erosion and sedimentation; however, the fringing and in-stream habitat areas appear to be stabilising in



the disturbed area. The riverine wetland of Braemar Creek has a substantially altered hydrological regime due to the presence of the large dam and is probably only rarely connected to the Condamine River during large flood events. The lacustrine wetland on Braemar Creek provides a variety of wetland habitats, including deep and shallow open water, emergent aquatic vegetation and muddy margins. Numerous dead trees remain standing within the wetland, providing potential roosting, perching and nesting habitat for a range of waterbirds.

10.2.2.2 Fauna Diversity

Despite the diversity of habitats available, particularly from a structural viewpoint, overall fauna diversity appears to be relatively low throughout the study area. It must be remembered, however, that this survey was not intended to be comprehensive, and that it represents only a small temporal 'snapshot' of the local fauna. Further surveys encompassing a range of seasonal conditions, and including more comprehensive methods, may yield a higher species richness than that observed during this survey.

Eighty-three (83) vertebrate fauna species were observed in the study area, including: 60 birds, 13 mammals (including 8 bats), and 10 reptiles (see **Appendix E** for a full species list). Most of these species were found in the native woodland areas, with only a small number of disturbance-tolerant species (e.g. Australian Magpie, Crested Pigeon and Eastern Grey Kangaroo) observed in the developed farming and grazing areas.

The artificial lacustrine wetland on Braemar Creek supported only low numbers of a few wetland-dependant species (Pacific Black Duck, Grey Teal, Eastern Great Egret, White-faced Heron, Dusky Moorhen, Black-winged Stilt, Australian Reed Warbler and Water Dragon).

Reptile diversity and abundance was particularly low, despite an apparent abundance of suitable habitat for ground-dwelling species throughout the woodland areas. This result is likely due, at least in part, to the lack of trapping effort during this survey. The standard herpetological method of pitfall trapping was avoided due to time and logistical constraints, and may have yielded a greater diversity of cryptic species such as skinks, small snakes, pygopods and ground-active geckos. Furthermore, the seasonal timing of the survey may have reduced reptile observability (e.g. lack of moisture in litter and soil surface layers possibly reduced activity levels in cryptic and fossorial species).

10.2.2.3 Fauna of Conservation Significance

A desktop review of the potential for rare and threatened species to occur in the study area was based on Wildlife Online and EPBC Protected Matters database search results and local knowledge of species distributions and habitat availability. This review indicated that as many as 24 federally significant and 26 state significant fauna species may occur in the study area. The likelihood of presence of each of these species is discussed in **Table 10.3**.

One Rare species, listed under the NCA, was recorded within the study area during this survey. A single Little Pied Bat (*Chalinolobus picatus*) was captured in a harp trap in the riparian woodland on Braemar Creek, below the dam. One further potential record of the species was obtained from the Anabat echolocation call surveys of the ironbark woodland west of the Kogan-Warra Road, along the existing Powerlink easement. This record, however, was not substantiated as the call data was not sufficient to obtain a definitive identification of the bat.



responsible (the call was most likely from *C. picatus* but it may have also been from the little broad-nosed bat *Scotorepens greyii*).

The little pied bat is primarily a hollow-roosting bat that depends upon the abundant presence of live and dead hollow-bearing trees to provide a range of suitable roosting and breeding sites for use throughout the year (Churchill 2008¹). It forages for insect prey around and beneath the woodland canopy and has been known to fly a round trip of some 30km between its roost and foraging area in a single night (Ford *et al.* 2008²). The capture locality for this species on Braemar Creek provides ideal habitat with abundant hollow trees and foraging habitat as well as a continuous habitat connection to the Condamine River riparian zone, which provides similar habitat.

No other significant fauna species listed under the EPBC Act or NCA were recorded during the field investigations.

¹ Churchill, S. (2008). *Australian Bats*. Allen & Unwin, Sydney.

² Ford, G.I., Pennay, M., Young, R.A. & Richards, G.C. (2008). Little Pied Bat *Chalinolobus picatus* pp.539-540 in *The Mammals of Australia* Third Edition (S. van Dyck & R. Strahan, ed.), New Holland Publishers, Sydney.



TABLE 10.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES

SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
Reptiles					
<i>Acanthophis antarcticus</i>	Common Death Adder	R	-	Favours undisturbed habitat in open woodland, scrub and heathland areas.	Suitable habitat available in study area; possibly present, particularly in ironbark woodlands.
<i>Furina dunmali</i>	Dunmall's Snake	V	V	Prefers Brigalow (<i>Acacia harpophylla</i>) forest and woodland growing on cracking black clay and clay loam soils on the Darling Downs.	May be present - potential habitat occurs on floodplain areas in eastern portion of study area.
<i>Hemiaspis damelii</i>	Grey Snake	E	-	Favours cracking flood-prone soils in the Brigalow Belt. Shelters in soil cavities.	May be present - potential habitat occurs on floodplain areas in eastern portion of study area.
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	E	V	Natural grasslands on deep cracking clays.	Low probability of occurrence, although marginal habitat present on heavier soils in eastern portion of study area.
<i>Egernia rugosa</i>	Yakka Skink	V	V	Usually found in open dry sclerophyll forest or woodland. The core habitat of this species is within the Mulga Lands and Brigalow Belt South Bioregions. Yakka Skinks occur in a wide variety of vegetation types including Poplar Box (<i>Eucalyptus populnea</i>), Ironbark (<i>Eucalyptus</i> spp.), Brigalow (<i>Acacia harpophylla</i>) and White Cypress Pine (<i>Callitris</i> spp.).	Potentially suitable habitat occurs within study area; possibly present.
<i>Delma torquata</i>	Collared Delma	V	V	Currently known from only four sites: Mount Crosby, Lake Manchester, Karana Downs and the Bunya Mts. In general, the species occurs on rocky hillsides on basalt and lateritic soils supporting open eucalypt and Acacia woodland with a sparse understorey of shrubs and tussocks or semi-evergreen vine thicket.	Potentially suitable habitat occurs within study area; possibly present.
<i>Paradelma orientalis</i>	Brigalow Scalyfoot	V	V	Woodland and open forest including ironbark, box, cypress, bullock and brigalow on variety of substrates from cracking clays to loamy, sandy and rocky areas.	Potential habitat occurs throughout study area, particularly in hilly ironbark woodlands.
<i>Tympanocryptis pinguicollis</i>	Grassland Earless Dragon	E	V	All specimens are known from highly modified agricultural land. Large areas of native and introduced grasses existing as headlands, and along drainage lines are a feature of the farmlands where the dragon exists. Soils are essentially black, cracking clays of the Condamine River flood plain.	May be present - potential habitat occurs on floodplain areas in eastern portion of study area.



SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
Frogs					
<i>Cyclorana verrucosa</i>		R	-	Heavy cracking soils in Brigalow Belt	Potentially suitable habitat present; very likely to occur in study area.
Birds					
<i>Anthochaera phrygia</i>	Regent Honeyeater	E	E	Eucalypt woodlands typified by box and ironbark species, particularly on the western slopes of the Great Dividing Range	Marginal habitat present and may occur sporadically when ironbark woodlands are in flower
<i>Apus pacificus</i>	Fork-tailed Swift	-	M	Low to very high airspace over varied habitat, rainforest to semi-desert.	Possible fly-over
<i>Ardea alba</i>	Great Egret	-	M	Wetlands, flooded pastures, dams, estuarine mudflats, mangroves and reefs.	Probable intermittent occurrence on dams watercourses; observed during survey at "Tong Park" lake.
<i>Ardea ibis</i>	Cattle Egret	-	M	Wide range of open habitats from grazing paddocks to wetlands and tidal mudflats.	Probable intermittent occurrence at dams and on floodplains
<i>Lophoictinia isura</i>	Square-tailed Kite	R	-	Eucalyptus woodland, open forest and heath-woodland.	Possible occurrence.
<i>Erythroriorchis radiatus</i>	Red Goshawk	E	V	Open forests, woodlands especially near rivers, wetlands, rainforest fringes	Remote possibility
<i>Gallinago hardwickii</i>	Latham's snipe	-	M	Soft wet ground or shallow tussocks and other green or dead growth.	Possible intermittent occurrence, particularly at the lacustrine wetland on "Tong Park"
<i>Geophaps scripta scripta</i>	Squatter Pigeon	V	V	Grassy understorey of eucalypt woodland, usually with ready access to water	Potentially suitable habitat but unlikely to be present
<i>Grantiella picta</i>	Painted Honeyeater	R	-	Species is found in dry open forests and woodlands, and is strongly associated with mistletoe. It may also be found along rivers, on plains with scattered trees and on farmland with remnant vegetation.	Probably moves through the study area when suitable habitat/seasonal conditions prevail.
<i>Melithreptus gularis</i>	Black-Chinned Honeyeater	R	-	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts. It is often found along waterways, especially in arid and semi-arid areas and in northern Australia.	Possible intermittent occurrence along major watercourses.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	-	M	Usually coastal, over islands, reefs, headlands, beaches, bays, estuaries, mangroves, seasonally flooded inland swamps, lagoons and floodplains.	Probable intermittent occurrence, particularly at the lacustrine wetland on "Tong Park" and along the Condamine River



SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	M	High open spaces above almost any habitat.	Probably fly-over
<i>Lathamus discolor</i>	Swift Parrot	E	E	Eucalypt forests and woodlands, plantations and banksias	Possible sporadic occurrence when ironbark in flower
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V	-	Forests and woodlands with abundant Casuarina trees.	Possible occurrence in ironbark country but habitat marginal
<i>Lophochroa leadbeteri</i>	Major Mitchell's Cockatoo	V	-	Open, sparsely timbered grasslands, drier farmlands with well-treed paddocks, Callitris and Casuarina country.	Highly improbable
<i>Neophema pulchella</i>	Turquoise Parrot	R	-	Woodland and open grassland, natural or partially cleared.	Highly improbable
<i>Merops ornatus</i>	Rainbow Bee-eater	-	M	Open country of woodlands, open forest, semi-arid scrub, grasslands, clearings in heavier forests and farmlands.	Probably move through on annual migration; observed during survey
<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose	R	M	Deeper freshwater swamps, lagoons, dams.	Possible intermittent occurrence at lacustrine wetland on "Tong Park"
<i>Neochima ruficauda</i>	Star Finch	E	E	Swamp vegetation, open grassland with sparse vegetation, cultivated land.	Unlikely due to lack of suitable habitat. Probably locally extinct
<i>Rostratula australis</i>	Australian Painted Snipe	-	V	Well vegetated shallows and margins of wetlands and other water courses.	Possible intermittent occurrence at lacustrine wetland on "Tong Park"
Mammals					
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	R	V	Caves and mines in dry sclerophyll forests and woodlands as well as higher altitude moist eucalypt forest and edges of rainforest.	Unlikely - lack of suitable habitat.
<i>Chalinolobus picatus</i>	Little Pied Bat	R	-	Dry eucalypt woodlands and forests, brigalow, cypress, bullock, mulga woodlands	Suitable habitat present; recorded in study area during this survey.
<i>Dasyurus hallucatus</i>	Northern Quoll	-	E	Variety of vegetation types, but particularly in rocky eucalypt woodlands and near creeks.	Unlikely – study area is well south of known range
<i>Nyctophilus corbeni</i> Formerly <i>N. timoriensis</i> (South-eastern form)	Eastern Long-eared Bat	V	V	A range of dry woodland and shrubland communities, roosts mainly in tree hollows, forages low amongst the canopy and shrub layers.	Possibly present in extensive woodland areas but habitat only marginal suitability
Ray-finned fishes					
<i>Maccullochella peelii</i>	Murray Cod	-	V	Prefers deep holes with abundant snags in slow-moving rivers	Probably in Condamine River but unlikely to occur in other watercourses that intersect study alignment



SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
Insects					
<i>Hypochrysops piceata</i>	Bulloak Jewel Butterfly	E	-	Bulloak forest and woodland	Potentially suitable habitat available and may be present in study area.
<i>Jalmenus eubulosa</i>	Pale Imperial Hairstreak	V	-	Brigalow and yarran forests and woodlands	Small areas of potentially suitable habitat available; remote possibility of presence in study area.



10.2.2.4 Introduced Fauna

Five introduced fauna species - Fox (*Vulpes vulpes*), Indian Mynah (*Sturnus tristis*), Cat (*Felis catus*), Rabbit (*Oryctolagus cuniculus*) and Brown Hare (*Lepus europaeus*) - were identified in the study area during the field surveys. It is highly likely that Pig (*Sus scrofa*) and Cane Toad (*Rhinella marina*) also inhabit parts of the study area. All of these feral species may impact upon local native fauna through predation and competition for resources. The Western Downs Regional Council has recently revised its Pest Management Plan (October 2010), which identifies vertebrate pests of local significance.

10.3 POTENTIAL IMPACTS AND MITIGATION

The impacts to flora and fauna from the construction and operation of this transmission line are largely associated with the clearing of native vegetation. Where the new transmission line is proposed to follow the existing Powerlink line, it is anticipated that the easement will be widened by up to 40m, necessitating the removal of about 30ha of remnant vegetation. New easement clearing, to a width of c. 60m, will be required through several remnant vegetation areas that are relatively undisturbed at present, resulting in the loss of a further c. 25ha.

10.3.1 Flora Impacts and Mitigation

10.3.1.1 Construction Phase Impacts - Flora

The construction of the new transmission line may result in negative impacts to the Regional Ecosystems and threatened flora that occur within the proposed alignment area. The key anticipated impacts of construction include:

- Reduced area of “Of Concern” and “Endangered” RE;
- Reduced habitat for threatened plant species;
- Direct impacts on threatened plant species (e.g. damage, death, reduced populations).

Most of the vegetation to be cleared is “Not of Concern” RE and represents a very small proportion of the large tracts of similar vegetation adjacent to the alignment. There is, however, a small area (c. 1ha) of “Of Concern” RE 11.3.2 woodland that is likely to be cleared at the Kogan Creek crossing. Relocation of the proposed alignment has occurred to minimise disturbance of patches of Endangered RE 11.3.1 and 11.4.3 and habitat at Braemar Creek at the eastern end of the alignment.

Direct loss of individual plants or populations is a significant issue for the construction phase, particularly with regard to rare and threatened species known to be present in the study area. The primary concern in this regard will be the two populations of *Philotheca sporadica* on and adjacent to the existing easement at Sites WDH04 and WD07 (see **Figure 10.2**). Construction activities such as indiscriminate clearing, vehicle movement, mulching and tower installation may kill, remove or damage individual *P. sporadica* plants and/or reduce the size of these populations.

The loss of native vegetation cover and disturbances to soil also increases the opportunities for weed species to invade the site and encroach into surrounding bushland. Machinery and vehicles may also import weed species



on to the site during site construction activities. Environmental weeds may compromise the condition and integrity of surrounding bushland if not managed appropriately.

10.3.1.2 Operational Phase Impacts - Flora

The impacts of transmission line operation are largely associated with vehicle traffic and vegetation management along the easement, plus potential bushfire hazard.

Vehicle activity may damage individual threatened plants (*P. sporadica*), but the anticipated low vehicle activity during the operational phase is unlikely to be a significant concern.

Vegetation management activities (e.g. cutting, poisoning and mulching of regrowth) have the potential to damage individual threatened plants and/or reduce threatened plant populations.

The transmission line may provide a potential fire source, thereby posing a potential bushfire risk to surrounding vegetation. The onset of a bushfire could result in threatened plant mortalities as well as loss and degradation of habitats and/or threatened plant populations.

10.3.1.3 Flora Impact Mitigation

An Environmental Work Plan (EWP) will be prepared for the transmission line to address the clearing of vegetation and protection of threatened flora species on the proposed easement.

Threatened plants (*P. sporadica*) need careful management during clearing and construction operations. Towers will be positioned to span across this area therefore no direct impacts are required on this population. All individuals likely to fall within the construction zone should be identified and clearly marked. Clearing operations in the vicinity of the populations should be done by hand in a way that reduces the likelihood of damaging or removing *P. sporadica* plants. Contractors, staff and visitors likely to be working in the area containing threatened plant populations should be advised during the induction process of the location identification and management requirements of the species. Ongoing vegetation management during the operational phase should adopt similar practices to avoid damage or loss of *P. sporadica* plants.

Where possible, any clearing as a result of the construction of the transmission line will be undertaken in a manner that will minimise any impacts to the small patches of “Endangered” RE at the eastern end of the alignment. Any clearing which must occur, should be undertaken carefully to minimise the overall area of clearing necessary. This is possible by siting towers close to these areas in order to allow lower growing species to be retained under the line, increasing tower height to clear sensitive vegetation, selective lopping and a minimal clearing width.

All vehicles should be free of weeds prior to entering and exiting the site to prevent the spread of weed species. Washdown facilities should be provided and frequent inspections should be undertaken by suitably qualified staff.



Where revegetation is required to stabilise cleared areas it is recommended to encourage natural regeneration. Where natural regeneration is inadequate to stabilise cleared areas, planting of grasses should be completed and should include a mix of fast growing sterile cover crop species and native grasses. Planting of tree and/or shrub species is not proposed for this Project.

All works are to be undertaken in accordance with the EMP (see **Appendix F**).

10.3.2 Fauna Impacts and Mitigation

10.3.2.1 Construction Phase Impacts - Fauna

The construction of the new transmission line may result in negative impacts to the ecosystems, habitats and species that occur within the proposed alignment area. The key anticipated impacts of construction include:

- Habitat loss;
- Habitat fragmentation; and
- Direct impacts on rare or threatened species (e.g. injury, death, reduced populations).

These impacts are largely associated with the clearing of native vegetation. Where the new transmission line is proposed to follow the existing Powerlink line, it is anticipated that the easement will be widened by up to 40m, necessitating the removal of about 30ha of remnant vegetation. New easement clearing, to a width of c. 60m, will be required through several remnant vegetation areas that are relatively undisturbed at present, resulting in the loss of a further c. 25ha.

The required vegetation clearing will reduce habitat availability for wildlife in the study area; however, given the extent of adjoining remnant vegetation along most of the alignment, this loss of habitat will be relatively minor. Habitat loss due to clearing will be most significant in relation to the riparian areas that support a relatively high abundance of mature hollow-bearing trees. Of greatest concern in this regard would be any clearing in the river red gum/coolabah/poplar box community on Braemar Creek (Site WD14; see **Figure 10.2**), where the rare Little Pied Bat was recorded. Through this area, the alignment has been relocated to the south to avoid this community.

The fragmentation effect caused by enlarging the existing easement by a further 40m is also a significant concern from a wildlife perspective. The resultant gap in vegetation canopy (approximately 90m) will further impact on the ability of less mobile species (e.g. small mammals and reptiles) to disperse between the woodlands on either side of the easement. The overall impact of this fragmentation will, however, be lessened by the provision and maintenance of ground cover through mulching, as has been done on the existing easement. The wide canopy gap may also impact negatively on the ability of gliders (e.g. sugar glider) to move between remnant vegetation areas; however, no gliders were observed along the existing easement during the Conics surveys. If gliders are present in the area subject to easement widening, it is expected their densities are very low and the resultant fragmentation impacts, are likely to be minor.

Direct loss of individual animals is a significant issue for the construction phase, particularly with regard to rare and threatened species known or likely to be present in the study area. Clearing of hollow-bearing trees has the



potential to harm roosting bats, such as the rare Little Pied Bat, and other hollow-dwelling species (e.g. birds, gliders and reptiles).

Impact on aquatic fauna and their habitat will be minimal due to the:

- Ephemeral nature of the waterways;
- Relatively poor condition of the riparian zone; and
- Limited impacts on waterways during the construction, operation and maintenance phases.

Construction traffic may also injure fauna during site construction activities. In particular, less mobile and nocturnal species are highly susceptible during construction as they may lack the opportunity to migrate to safe habitats.

10.3.2.2 Operational Phase Impacts - Fauna

The impacts of transmission line operation are largely associated with vehicle traffic and vegetation management along the easement, plus potential bushfire hazard.

Vehicles provide a potential source of fauna injury or death due to collision and crushing; however, the frequency and intensity of vehicle traffic along the easement is likely to be very low and poses only a minor threat in this regard.

Vegetation management activities (e.g. cutting, poisoning and mulching of regrowth) will maintain a large gap between remnant vegetation areas, therefore continually restricting fauna movement capabilities. Vegetation management operations also have the potential to damage or kill individual threatened animals (e.g. ground-dwelling reptiles) through crushing by machinery.

Whilst unlikely, there is potential for the transmission lines to provide a barrier to fauna movement and injury is sustained from flying into the transmission lines. As migratory bird species have been recorded in the surrounding area it is proposed to place aerial markers on the earth wire along the transmission line at Braemar creek in the span where the transmission line crosses the dam in the creek.

10.3.2.3 Fauna Impact Mitigation

Vegetation clearing should be undertaken in a manner that reduces potential injuries and mortalities to fauna. It is recommended that areas to be cleared should be surveyed by the project environmental officer, a spotter catcher or ecologist within 24 hours prior to clearing to identify habitat trees that could be occupied by fauna. These trees should be clearly marked and retained during the clearing phase until fauna has had the opportunity to move into nearby habitat on their own accord. Habitat trees could be gently disturbed (e.g. by bumping with machinery or knocking with a hammer) to warn residents of impending clearing and encourage them to move to alternative habitat. Clearing should also be undertaken in the presence of a fauna spotter/catcher to ensure disturbed and/or injured animals are appropriately managed.

Where possible, vegetation management during construction and operation of the transmission line should aim to retain and/or enhance ground-level habitat within the easement. This could be achieved through mulching



cleared vegetation and leaving areas of coarse debris and low-growing understorey plants to provide dispersal and shelter opportunities for fauna.

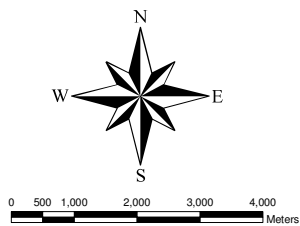
Appropriate traffic management should be implemented during construction and operation. All vehicles, except in the event of an emergency, should be restricted to designated access tracks with a maximum speed limit of 40km/hr. Signs should be erected to notify of speed limits and the potential presence of wildlife.

All works are to be undertaken in accordance with the EMP (see **Appendix F**).

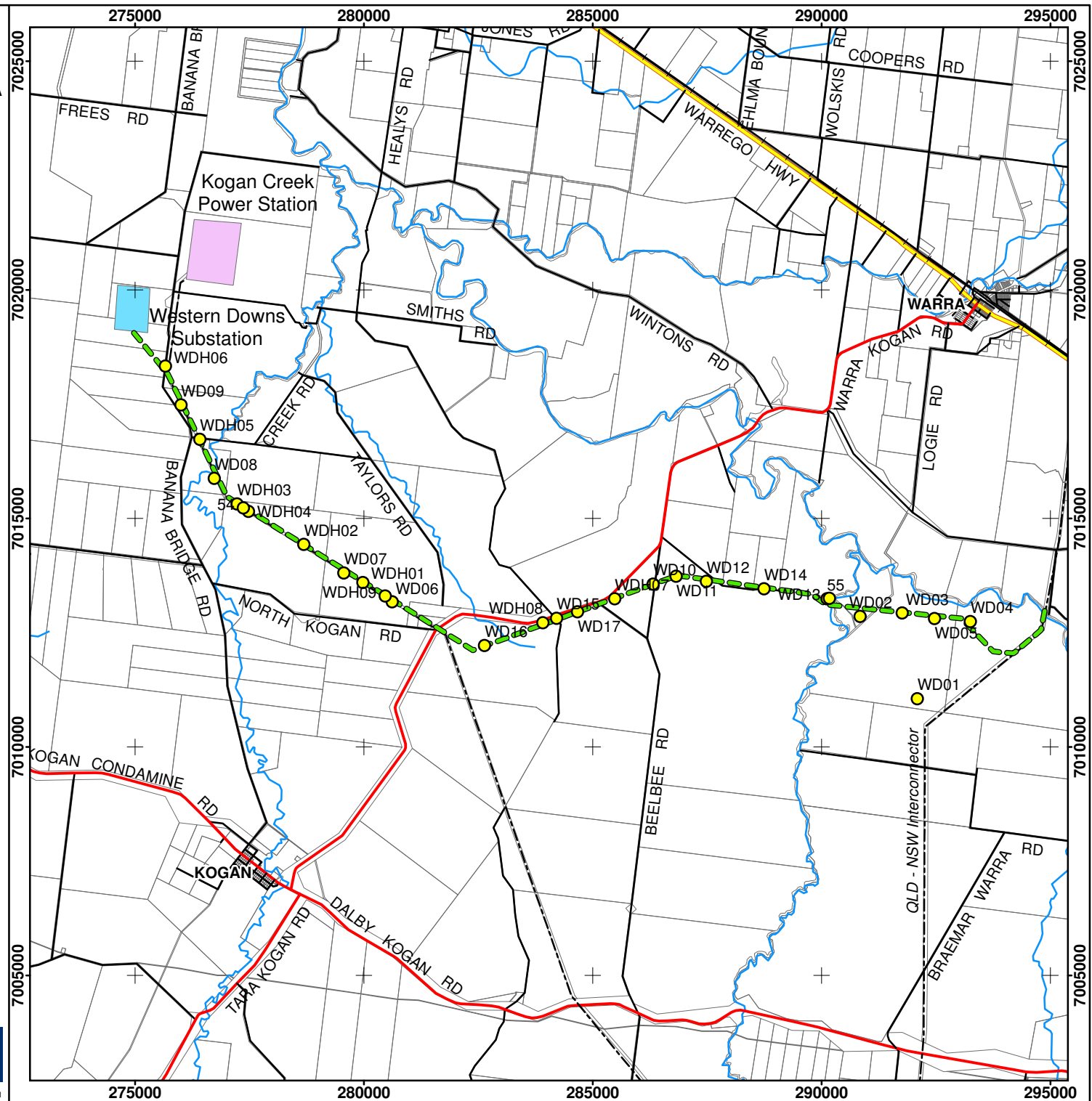
Powerlink Western Downs EIA Survey Sites and EVR

Figure 10.2

- Survey Sites and EVR
- Study Alignment
- Existing 275 kV Line
- Highway
- Main Road
- Local Road
- Watercourse
- Cadastre
- Power Station
- Sub-station



Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56





11.0 LAND USE & PLANNING

11.1 SUSTAINABLE PLANNING ACT 2009

The *Sustainable Planning Act 2009* (SPA) allows for two planning processes to be used to facilitate the proposed development. The following section provides an overview of each planning process, being:

- Integrated Development Assessment System (IDAS); and
- Ministerial Designation Process.

11.1.1 IDAS

The Integrated Development Assessment System (IDAS) outlined in Chapter 6 of the *Sustainable Planning Act 2009* provides a clear description of the Development Application Process to be used by Local Government in the assessment of Development Applications. If the project were to proceed under IDAS, it would trigger Code Assessment. Therefore the Local Authority under *Section 313 of the Sustainable Planning Act 2009* would undertake the assessment, having regard to the following:

- a. *the State planning regulatory provisions;*
- b. *the regional plan for a designated region to the extent it is not identified in the Planning Scheme;*
- c. *any applicable codes, other than concurrence agency codes the assessment manager does not apply, that are identified as a code for IDAS under this or another Act;*
- d. *State planning policies, to the extent the policies are not identified in-*
 - (i) any relevant regional plan as being appropriately reflected in the regional plan; or*
 - (ii) the planning scheme as being appropriately reflected in the planning scheme;*
- (e) *any applicable codes in the following instruments –*
 - (i) a structure plan;*
 - (ii) a master plan;*
 - (iii) a temporary local planning instrument;*
 - (iv) a preliminary approval to which section 242 applies;*
 - (v) a planning scheme;*
- (f) *if the assessment manager is an infrastructure provider – the priority infrastructure plan.*

The Integrated Development Assessment System provides a five (5) stage process. Accordingly as all Development Application have different requirements and levels of complexity, not all stages of the Integrated Development Assessment System or steps within each stage are applicable to all applications.

- Stage 1 – Application Stage;
- Stage 2 – Information and Referral;
- Stage 3 – Notification; and



- Stage 4 – Decision
- Stage 5 – Compliance Stage.

As the project would be Code Assessable under IDAS, any submitters who make a properly made submission during the Notification Stage obtain appeal rights and have the ability to appeal the decision in the Planning and Environment Court.

Type of Proposed Development

The project is defined as a Material Change of Use under Section 10 of the *Sustainable Planning Act 2009*, which is defined as:

- a. *generally –*
- (i) *the start of a new use of the premises; or*
 - (ii) *the re – establishment on the premises of a use that has been abandoned; or*
 - (iii) *a material increase in the intensity or scale of the use of the premises; or*
- b. *for administering IDAS in relation to an environmentally relevant activity, other than for a mining activity, a chapter 5A activity or a mobile and temporary environmentally relevant activity –*
- (i) *the start of a new environmentally relevant activity on the premises; or*
 - (ii) *an increase in the threshold of an environmentally relevant activity on the premises; or*
 - (iii) *the re – establishment on the premises of an environmentally relevant activity that has been abandoned; or*
 - (iv) *a material change in the intensity or scale of an environmentally relevant activity on the premises.*

11.1.2 Ministerial Designation

Chapter 5 of the *Sustainable Planning Act 2009* provides a clear description of the process required for a Ministerial Designation. The purpose of this EIS is to identify and outlined matters to be considered by the Minister for Natural Resources, Mines and Energy and Minister for Trade.

Powerlink proposes to seek ministerial designation following the process detailed in the “*Guidelines about Environmental Assessment and Public Consultation Procedures for designating land for Community Infrastructure*” (‘the Guideline’). These were prepared in accordance with Section 5.9.96 of the *Integrated Planning Act 1997* and have continued effect under Section 846 of the *Sustainable Planning Act 2009*.



Matters to be considered

Section 207 (1) and Section 207(2) of the SPA outline the matters which should be considered, as follows:

207(1)	<i>Before designating land, the Minister must be satisfied that, for the development, the subject of the proposed designation –</i>
a.	<i>adequate environmental assessment has been carried out; and</i>
b.	<i>in carrying out environmental assessment under paragraph (a), there was adequate public consultation; and</i>
c.	<i>adequate account has been taken of issues raised during the public consultation; and</i>
d.	<i>for land to which section 204 applies – adequate account has been taken of the approved development scheme mentioned in that section.</i>
2.6.7(2)	<i>The Minister must also consider –</i>
a.	<i>every properly made submission under subsection (4); and</i>
b.	<i>for land in a relevant area for a State planning regulatory provision – the provision; and</i>
c.	<i>for land in a designated region – the region's regional plan; and</i>
d.	<i>each relevant State planning policy; and</i>
e.	<i>for land in a declared master planned area – and master plans for the area;</i>
f.	<i>and each relevant Planning Scheme.</i>

An assessment of the proposed development against Section 207(1) of the SPA has been provided within the EIS. An assessment of the proposed development against Section 207(2) of the SPA has been provided within this document and is summarised below:

Properly made submissions under Section 207(4)

The project has not reached this stage in the process. The Second stage of the Guideline specifies the consultation process required as part of the designation process and involves the public advertising of the intent to seek ministerial designation. Submissions received from the relevant stakeholders and the matters raised will be addressed (refer **Section 19.0**). The Minister must consider these submissions in determining the designation.

State Planning Regulatory Provision

The site is not located within a State Development Area and as such is not subject to a State Planning Regulatory Provision.

Regional Plan

There is no Regional Plan in place that includes land contained within the Western Downs Regional Council.



State Planning Policies

An assessment of all relevant SPP are provided in **Section 11.8** of this report.

Master Plans

The site is not within a declared master planned area.

Planning Scheme Provisions

An assessment of all relevant Planning Scheme Provisions is provided in **Section 11.2** below.

Type of Proposed Community Infrastructure

The use of the subject corridor for a transmission line is defined as Community Infrastructure under Schedule 2 of the *Sustainable Planning Regulation 2009*, and as operation works under the *Electricity Act 1994*, which are defined as:

- a. *for a generation entity – the generating plant, fuel stocks, electrical and other property used for generating electricity or connecting supply to a transmission grid or supply networks; or*
- b. *for a transmission entity – the transmission grid and other property used for operating or managing the transmission grid; or*
- c. *for a distribution entity – the supply network and other property used for operating and managing the supply network.*

Powerlink Queensland is considered to be transmission entity. According the provision of a transmission corridor for a 275kV transmission line and associated works are considered to be Operation Works, and is Community Infrastructure under Schedule 2 of the *Sustainable Planning Regulation 2009*.

11.1.3 Reasons for Proposed Designation

The provision of a 275kV transmission line is considered to satisfy the designation provision described in Section 201 of the *Sustainable Planning Regulation 2009*, where land may be designated for Community Infrastructure only if the designator is satisfied the Community Infrastructure will satisfy at least one of following:

- a. *facilitate the implementation of legislation and policies about environmental protection or ecological sustainability; or*
- b. *facilitate the efficient allocation of resources; or*
- c. *satisfy statutory requirements or budgetary commitments of the State or local government for the supply of community infrastructure; or*
- d. *satisfy the community's expectation for the efficient and timely supply of the infrastructure.*

The proposed transmission line and associated corridor is considered Community Infrastructure that would satisfy item (d) above, as Powerlink Queensland have identified the need to construct a new transmission to provide a more reliable electricity supply throughout Southern Queensland.



The test for qualification under Section 201 of the *Sustainable Planning Act 2009* is to ensure that designated Community Infrastructure is planned and justified in terms of being beneficial to the public. For the benefit of public accountability, the consideration of the matters under Section 201 of the *Sustainable Planning Act 2009* should be a deliberative and recorded action. **Table 11.1** at the end of this section provides a summary of Town Planning requirements.

11.1.4 Comparison of Planning Processes

The primary area of difference between the Ministerial Designation Process and the Integrated Development Assessment System Process (IDAS) is that the proposed transmission line is not subject to the provisions of the Planning Scheme for the former Chinchilla Shire or former Wambo Shire, as a result of the Ministerial Designation.

The Ministerial Designation Process allows for the assessment of the development without the requirements associated with the preparation, lodgement and management of a Development Application under the IDAS process.

The Ministerial Designation Process is preferred as it would streamline the planning process enabling the timely commencement of infrastructure that will meet the growing demand and demonstrated need within the Western Downs Region.

Furthermore, as a function performed under the *Sustainable Planning Act 2009*, the proposed designation is still required to complete a thorough assessment against the Planning Scheme provisions, including public notification prior to designated by the Minister, as well as manage the effect of the development on the environment during the process.

11.2 EXISTING ENVIRONMENT

11.2.1 Current Land Use

Historically, the locality has been used for primary production and agricultural activities, such as beef and pork production, wool growing, horticulture and timber resources. More recently, extractive resources (i.e. coal and coal seam gas) have also been identified and developed in the area. The study area itself has historically been used for a variety of purposes, with grazing being the primary activity. The Tong Park Piggery is located in the locality to the south of the Township of Warra and is crossed by the alignment.

The Kogan Power Station was commissioned in 2007 and forms the western extent of the study area, with the QNI as the eastern extent of the study area. An existing 275kV transmission line extends between the power station and Braemer substation to the south. Residential housing is limited in the study area and mainly occurs in proximity to the Warra Township. Dalby State Forest is to the south of the proposed transmission line approximately 11km south of Warra.



11.2.2 Planning Scheme

The study area is located within the municipal boundaries of Western Downs Regional Council. On 15th March 2008, Western Downs Regional Council was formed with the amalgamation of Wambo, Dalby Town, Chinchilla, Murilla, Tara and Taroom Shires.

Prior to the amalgamation the study area was situated within Chinchilla Shire and Wambo Shire. The study area is subject to the provision of both the *Chinchilla Shire Planning Scheme* and the *Wambo Shire Planning Scheme*. Both the *Chinchilla Shire Planning Scheme* and *Wambo Shire Planning Scheme* are IPA compliant Planning Schemes.

11.2.2.1 Chinchilla Shire Planning Scheme

Overview / Structure

The *Chinchilla Shire Planning Scheme* is similar in structure to the majority of Planning Schemes prepared under the IPA. The *Chinchilla Shire Planning Scheme* is structured in the following manner:

1. Strategic Designation;
2. Zones;
3. Zone Codes; and
4. Planning Scheme Policies.

This section of the report outlines the processes of the *Chinchilla Shire Planning Scheme* and other mechanisms that are useful in Planning Scheme interpretation.

Use Definition

The *Chinchilla Shire Planning Scheme* provides a number of definitions to provide an explanation of the meaning of terms used in the scheme and for use to assist the community in understanding development proposals. The definitions are contained in Part 2 the Planning Scheme.

The proposed transmission line would be defined as a “*Public Utility*”, which is:

Public utility - means “premises” used for a waste landfill site, the supply of water, hydraulic power, electricity or gas, or provision of telephone, sewerage, postal or drainage services or the provision or maintenance of roads or traffic controls or railways or railway corridors.

Level of Assessment

Section 4.1.2 of the *Chinchilla Shire Planning Scheme* nominates the level of assessment for uses established in the Rural Zone. In accordance with Section 4.1.2 of the Planning Scheme, a “Public Utility” is “Code Assessable” development.



Strategic Designation

Part 3 of the Planning Scheme outlines the Strategic Direction for the former Chinchilla Shire Council area and is summarised into 3 Desired Environmental Outcomes (DEO), being:

1. The Natural Environment;
2. Economic Development; and
3. Community and Services.

Natural Environment

In Chinchilla Shire, ecological systems (including the Condamine River, its tributaries and floodplain) and the natural environment, items and places of cultural heritage significance are protected and enhanced by development:

- *Development is managed to minimise the adverse impacts on air and water quality, to prevent land degradation, loss of habitat and biodiversity and to protect riparian areas.*
- *Significant areas (including the Condamine River) and areas and items of cultural significance (including areas along water courses) are identified to ensure their environmental and landscape values and historic significance are protected and enhanced through compatible development.*

As demonstrated throughout this report, consideration has been given to the proposal and the potential for impacts upon the study area. It is acknowledged the study area has previously been used for grazing purposes and has been disturbed as a result of this and other agricultural activities.

Given the project will establish a transmission line, it is anticipated the project is unlikely to have a significant impact upon air and water quality (see **Sections 5.1 and 7.0**). From a vegetation perspective, it is proposed to retain as much of the existing vegetation as possible (see **Section 10.0**).

Consideration has also been given to the potential cultural heritage values of the study area. As outlined in **Sections 17.0** of this report, no non-indigenous cultural heritage values have been identified for the site.

Based on the above, the project will not compromise the associated Natural Environment DEO through the endeavours to minimise the potential impacts of the proposal on the natural environment of the study area.



Economic Development

The economy of Chinchilla Shire is enhanced and diversified through sustainable use of natural resources (including soil, extractive and mineral resources) and through a diverse range of other economic activities that respect the hierarchy of the urban centre and the small towns:

- *The planning scheme reinforces and consolidates the role of Chinchilla as the principal place for business, industry and commerce within the shire.*
- *The local service roles of the towns of Brigalow and Kogan are protected and enhanced.*
- *Productive rural land (such as the Condamine floodplain), rural industries and natural features (including mineral and extractive resources) are protected to reflect and enhance their continued economic potential and viability.*
- *The industrial areas in chinchilla are consolidated and protected to ensure their role as the key areas for industrial activity is reinforced.*

The emphasis of this DEO is to promote economic diversity, particularly through the sustainable use of the natural resources of the former Chinchilla Shire. In promoting economic diversification, the existing townships are not to be adversely affected.

The project is considered to satisfy this DEO on the basis the development:

- Is for a new 275kV transmission line and will not affect the role of Chinchilla as a principal place of business;
- The proposal will not affect the role of Brigalow and Kogan as townships; and
- The transmission line and associated easement will occupy land previously used for agricultural purposes, but is required to meet the on-going and increasing demand for electricity in the network. The easement will not preclude the continued use of the land within the transmission line easement from ongoing grazing or farming purposes and therefore the project is unlikely to effect the continuation of agricultural activities on adjoining land.



Community and Services

Development in Chinchilla Shire reflects community expectations and needs, and contributes to community well-being through enhancement of core community elements (including the built environment, services, facilities and infrastructure):

- *The settlement pattern is logical and sequenced and the built environment contributes to the overall rural amenity and character of Chinchilla Shire.*
- *People are connected to public spaces (including recreational areas) and community services through an appropriate land use structure and the provision of infrastructure, particularly within the urban centre and small towns of the shire.*
- *Development contributes to the health and safety of people and provides a diverse range of housing types, services and facilities.*
- *Infrastructure (including water, sewerage and roads) reflects community expectations and needs, achieves engineering and environmental standards and is provided in an orderly and logical sequence to ensure cost effectiveness.*

The proposal satisfies the DEO with respect to the provision of infrastructure to meet the needs and the expectation of the community for an ongoing and uninterrupted supply of electricity. As discussed within this report, the provision of this new transmission line and easement corridor will be designed so as to meet engineering standards and minimise the potential for environmental impact. The balance of the matters raised in the DEO is not applicable to this project.

Zoning – Rural Zone

Under the *Chinchilla Shire Planning Scheme*, land is allocated a specific zone in order to identify the predominant, preferred or existing land uses for that area. Each respective zone has a Planning Scheme Code associated with it to govern and influence development. The proposed study area is located within the *Rural Zone* of the *Chinchilla Shire Planning Scheme* and any proposed development within this zone is to comply with the provisions of the *Rural Zone Code*.



In accordance with Section 4.1.3.3 of the Planning Scheme the purpose of the *Rural Zone* is as follows:

within the Rural Zone, “development”:

- (a) *Maintains the environment, including soil, air and water, compatible with healthy natural systems and ensures public health and safety;*
- (b) *Protects good quality agricultural land (GQAL) from fragmentation, alienation or encroachment of incompatible land “uses” in accordance with state planning policy 1/92 – development and conservation of agricultural land;*
- (c) *Is located, designed and operated in a manner that protects and enhances the predominant rural scale, intensity, form and character;*
- (d) *Maintains the rural amenity;*
- (e) *Does not prejudice or impact adversely on other “uses” including those within other “zones”;*
- (f) *Does not prejudice extractive or mining resources;*
- (g) *Has an appropriately designed access to the road network, and traffic generated by the development does not impact adversely on the local road network;*
- (h) *Protects areas and sites of conservation importance, including cultural and high landscape values;*
- (i) *Is undertaken in an orderly and logical sequence to achieve an efficient provision of infrastructure;*
- (j) *Maintains the integrity of the Condamine flood plain;*
- (k) *Is located and designed in ways that minimise the need for flood, bushfire and landslide mitigation, and to protect people and premises from such natural events;*
- (l) *Has water supply, stormwater disposal, sustainable effluent and waste disposal and power, to appropriate standards, adequate for the “use”; and*
- (m) *Does not impact adversely on infrastructure.*

The purpose for development within the *Rural Zone* does not directly contemplate the establishment of transmission lines or public utilities in this zone. Ultimately, development that occurs within the *Rural Zone* is to ensure the continued maintenance of a high level of amenity through the protection of environmental processes. It is important to note that:

- The project has been located and designed to minimise the environmental impact.. In particular, the western portion of the proposed transmission line will be located adjacent to an existing transmission line easement (Kogan Power Station to Breamer Substation);
- The majority of the transmission line located within the former Chinchilla Shire area is not mapped as GQAL. A small section of the transmission line (approximately 2.5km) is mapped as Class B Good Quality Agricultural Plans for the purposes of the Planning Scheme (see **Section 5.3.5** and **Figure 5.4**). Given the small length of the transmission line traversing Class B GQAL and the opportunity to continue current framing activities across the transmission line corridor, the project is not considered to affect Good Quality Agricultural land;
- The project will be limited to the corridor identified and is not anticipated to alienate agricultural uses from the adjoining allotments; and
- The project will minimise the potential for impacts upon the ecological values of the site and immediately surrounding area.



The proposal represents a sequential expansion of the existing electricity network in order to meet the future electricity demands for the region and South East Queensland. In this regard, the proposal is considered to satisfy the provision that development in the *Rural Zone* will not adversely impact upon the provision of necessary infrastructure or limit the potential to expand electricity infrastructure required to service the needs of the broader community..

Development Provisions – Rural Zone Code

The *Rural Zone Code* is used to assess all development that occurs within the *Rural Zone* (**Figure 11.1**). In this instance, the Project would be subject to assessment against the provisions of this code. The *Rural Zone Code* is structured with Performance Criteria and Acceptable Solutions in which to assess development.

The Acceptable Solutions within the Planning Scheme identify one solution to the relevant Performance Criteria. Where a proposal does not accord with the Acceptable Solution, the proposal will need to demonstrate it satisfies the Performance Criteria.

Within the *Rural Zone*, the Code allows for:

- | | |
|-----|--|
| (a) | <i>Tourist related “uses” (“bed and breakfast premises” and “visitor accommodation”) and “home businesses” where they are of a small scale and are compatible with surrounding “uses”;</i> |
| (b) | <i>The protection of existing “intensive animal industries” and “extractive industries” from incompatible “uses”;</i> |
| (c) | <i>“Intensive animal industries” and “extractive industries”, where located and operated so as to ensure no detrimental impact on surrounding “uses” or on the environment; and</i> |
| (d) | <i>Limited industrial “uses”, where it can be demonstrated those “uses” are associated with rural production and can not reasonably be established in the industrial “zone”.</i> |

The *Rural Zone Code* remains relatively silent on establishing a *Public Utility* within the *Rural Zone*. However, it does not preclude the operation of such infrastructure. It is noted the code provides specific criteria for uses that are considered to be “non-rural activities”, being activities that do not involve agriculture, grazing, intensive agriculture and intensive animal husbandry.

In this instance, the proposal is inconsistent with these two provisions of the code, being:

PC2 Non-“Rural activities” - scale Non-“rural activities” are of an appropriate scale to protect the amenity of the rural “zone” and do not prejudice the operation and viability of other “uses” or activities in the rural “zone” or other “zones”.	AS2 The “total use area” is less than 150m ² on a lot.
PC3 Non-“rural activities” - operating hours Non-“rural activities” are operated so as to ensure the activities and the operation of equipment occur at appropriate times to protect the amenity of the rural “zone”.	AS3 non-“rural activities” are operated only between the hours of 7:00am and 6:00pm.



In both instances, it would be unreasonable for the proposal to comply with these requirements as the size of the area occupied by the project is dictated by the extent to which the network needs to satisfy energy demands. In addition, it cannot be expected that the transmission line would operate on a 7am to 6pm timeframe.

Regard is therefore given to the relevant Performance Criteria. In the first instance, the proposed transmission line will be contained within the land set aside for the incremental development of electricity infrastructure adjacent to the existing transmission line and Kogan Creek Power Station. The transmission line will be located to ensure it is suitably setback from the property boundaries and the opportunity remains for the provision of grazing across the easement corridor. Secondly, the transmission lines are considered to generate little in the way of noise. Therefore the project is capable of satisfying the Performance Criteria above. Through appropriate mitigation measures the proposed transmission line can be implemented in a manner that has minimal impact on the amenity of the existing locality whilst not jeopardizing surrounding land activities.

In addition to the above, the *Rural Zone Code* also includes a number of Performance Criteria and Acceptable Solutions for electricity transmission line easements. The provisions of the Code (and references to diagrams in the Planning Scheme) include:

PC21 "Electricity Transmission line easement" - vegetation Transmission lines within an "Electricity transmission line easement" are protected from vegetation.	AS21.1 Planted vegetation within an "Electricity transmission line easement" shall have a mature height not exceeding 2.5m as shown in schedule 2, division 3: Powerline / Electricity easements, section 3.2 diagram 3. AS21.2 No part of planted vegetation, at its mature size, is located closer than 2.5m to an electricity transmission line as shown in schedule 2, division 3: Powerline / Electricity Easements, section 3.2 diagram 3.
PC22 "Electricity transmission line easement" – Vegetated Buffers Vegetated buffers adjoining an " <i>Electricity transmission line easement</i> " are maintained to provide: (a) a visual buffer to the easement; and (b) a separation distance.	AS22 Existing vegetation, comprising trees and/or shrubs, shall be retained within 20m of an " <i>Electricity transmission line easement</i> " as shown in Schedule 2, Division 3: Powerline / Electricity Easements, Section 3.2 Diagram 4.
PC23 "Electricity transmission line easement" – Separation Distances " <i>Habitable buildings</i> " and " <i>Child oriented uses</i> " are located to ensure community safety.	AS23 " <i>Habitable buildings</i> " and " <i>Child oriented uses</i> " maintain a minimum separation distance from the most proximate boundary of an " <i>Electricity transmission line easement</i> " in accordance with Schedule 2, Division 3: Powerline / Electricity Easements, Section 3.1 (1) and Section 3.1 Diagram 1.



With regard to how Performance Criteria 21 and 22, Powerlink has a '*Vegetation Control Standard*' (Powerlink, 2005) that outlines all initial line route clearing and subsequent maintenance is to be performed. In summary, the standard states that no vegetation is to be located within a 20m radius of the footings of the transmission towers. From a safety perspective, there is a desire for all vegetation to be removed from the easement area. However, there is recognition and intent to limit the unreasonable loss of vegetation. Therefore, vegetation may be permitted to encroach within the fringe of easement where it poses no danger to the integrity of the transmission line.

We are therefore of the view that no vegetation located within the easement would exceed 2.5m in height or would be located within 2.5m of the transmission tower or transmission line and would satisfy AS21.1 and AS21.2 of the *Rural Zone Code*.

Powerlink also has no intention of clearing vegetation beyond the boundary of the transmission line easement (unless required for safety or access) and is therefore considered to satisfy AS 22 of the *Rural Zone Code*.

In relation to Performance Criteria 23, Division 2, Section 3.1(1) states that a 30m separation distance is required between the transmission line easement and any houses and 'child orientated' land uses for transmission lines of 133kV – 275kV.

Based upon the desktop investigations of aerial photography, there are no houses or 'child oriented' land uses known to be located within 30m of the proposed transmission line. Therefore, the proposal would comply with AS23 of the *Rural Zone Code*.

11.2.3 Planning Scheme - Local Plan

The Planning Scheme does not contain any Local Plan. This matter is not relevant to the assessment.

11.2.4 Good Quality Agricultural Land

Good Quality Agricultural Land (GQAL) has been mapped by the former Chinchilla Shire Council and is illustrated on Planning Scheme Sheet 3 of 7 (see **Figure 5.4**). The mapping identifies Class A and Class B Good Quality Agricultural Land. This is further discussed in **Section 5.3.5**.

The study area is mapped as traversing small areas of Class B GQAL. Performance Criteria 33 of the *Rural Zone Code* and seeks to conserve and manage GQAL. No Acceptable Solution is provided by Council.

11.2.5 Future land use

As outlined above, the study area is included in the *Rural Zone* and as such is intended to accommodate rural activities such as agriculture, horticulture and grazing. The site is likely to be capable of accommodating limited agricultural uses, such as grazing across the transmission line corridor.

The desktop assessment of mapped and known site constraints is also provided to understand the potential future land uses for land contained within the proposed transmission line corridor. The assessment of the site is based on the following site constraints:



- Regional Ecosystem & Essential Habitat Map (DERM);
- Chinchilla Shire Council's Good Quality Agricultural Land mapping (**Figure 5.4**);
- Chinchilla Shire Council's Land Characteristics Map _ Features Map 1 (**Figure 11.2**); and
- Chinchilla Shire Council's Land Characteristics Map – Features Map 2 (**Figure 11.3**).

Based on the constraints assessed, an assessment of Planning Scheme intents and requirements, and the current services on the site, potential site specific and cumulative impacts of the project (from a Planning Scheme perspective) on existing and potential land uses on the site, have been considered. A summary of these findings is provided below:

Extractive Industry (Impact – Medium)

- The study corridor is mapped as a Mineral Development Licence area;
- The study corridor is not identified as being a Key Resource Area; and
- While a Mineral Development License area is identified for the site, the Planning Scheme is silent on the resource and merely provides a separation distance from the site to any building, structure and outdoor activity.

The intention to develop the study corridor for a public utility is not clearly contemplated by the Planning Scheme. However, the proposal represents a sequential and logical expansion of the existing Kogan Power Station and will also assist with meeting the future energy demands for the network. On this basis, the proposal is considered to not unreasonably prejudice the Strategic Directions provided in the *Chinchilla Shire Planning Scheme* or the purposes of the *Rural Zone*.

11.3 POTENTIAL IMPACTS

11.3.1 Conflicts with Chinchilla Shire Planning Scheme

Provisions of the Rural Zone Code

As outlined above, there are limited provisions that relate to the establishment of a transmission easement. The proposal is unlikely to conflict with the Strategic Directions of the Planning Scheme. Furthermore, the proposal is not considered to compromise the purpose of the *Rural Zone Code*.

This being said, it is acknowledged that the *Rural Zone Code* does identify Performance Criteria and Acceptable Solutions for land uses that are not Rural Activities – such as the proposed transmission line.

These provisions state:

PC2 Non-“Rural activities” - scale Non-“rural activities” are of an appropriate scale to protect the amenity of the rural “zone” and do not prejudice the operation and viability of other “uses” or activities in the rural “zone” or other “zones”.	AS2 The “total use area” is less than 150m ² on a lot.
PC3 Non-“rural activities” - operating hours Non-“rural activities” are operated so as to ensure that the activities and the operation of equipment occur at appropriate times to protect the amenity of the rural “zone”.	AS3 non-“rural activities” are operated only between the hours of 7:00am and 6:00pm.



The proposal is capable of satisfying the Performance Criterion PC2 given the information available suggests the proposed transmission line is unlikely to prejudice the ongoing use of the surrounding land for agricultural, grazing or horticultural purposes.

Similarly for Performance Criterion PC3, the key issue is to ensure the transmission line corridor maintains the amenity of the locality. Given the western portion of the project will be located adjacent to the existing Kogan Power Station and an existing transmission line corridor, it is reasonable to form the view the proposal will not result in a significant change to the amenity of the existing locality from the operation of the transmission line.

Mining/Extractive Resource

The Project corridor is identified as being within a Mineral Development Lease area on the *Chinchilla Planning Scheme* Features Map 1 (**Figure 11.2**). It is acknowledged that the Planning Scheme, through its Strategic Directions and purpose for the *Rural Zone* seeks to discourage development that may prejudice mining or extractive resource opportunities. In saying this, Schedule 2 of the Planning Scheme provides a clear separation distance for structures from power transmission line easement. In this instance, a separation distance of 1,000m is imposed by the Planning Scheme.

Given the existence of the existing Kogan Creek Power Station and existing transmission line along the western portion of the study area, it could be argued that land within 1,000m of the power station has been effectively sterilised from mining or extractive resource operations. This separation distance extends onto the study corridor. Therefore, based upon the desktop assessment undertaken, the proposal will not further sterilise land included in a Mineral Development Lease area. Consequently, the proposal does not unreasonably compromise the Planning Scheme.

Ground Water

The study area includes land mapped by the *Chinchilla Planning Scheme* as being land subject to Groundwater Vulnerability. Consideration of Performance Criteria 36 (PC36) of the *Rural Zone Code* identifies that the purpose of the mapping is to identify land where groundwater contamination is a concern. As such, PC36 states that development is to ensure that “...water quality is maintained...” and “...the natural characteristics of the setting are protected from pollutants and contaminants”.

As outlined above, operational requirements will mean that mitigation measures will be put in place to manage the quality of water that leaves the site and to manage any contaminants that might be spilled on the site. On this basis, these mitigation measures are implemented and the project is considered to satisfy the Planning Scheme in this regard.

11.3.2 Changes in Property Value

The land traversed by and located in close proximity to the proposed transmission line area is located in the *Rural Zone* and is therefore considered to have a similar baseline value, subject to the arable nature of the land. A large portion of the proposed transmission line (approximately 54% in the former Chinchilla Shire) will traverse land that is either located in close proximity to the existing Kogan Power Station or is traversed by an existing 275 kV transmission line. The balance of the transmission line located in the former Chinchilla Shire area is vegetated and not mapped by Council as Good Quality Agricultural Land.



Therefore, it is reasonable to conclude that with limited mapped agricultural potential over the majority of the land traversed by the proposed transmission line and the proximity of affected land to existing electricity infrastructure, the value of land traversed by the proposed transmission line is unlikely to be significantly affected.

11.3.3 Disruptions to Neighbouring Areas and Existing Environments

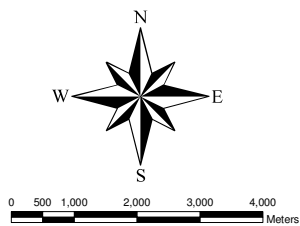
The corridor consists of land comprising both sparsely vegetated land and well vegetated land that has accommodated agricultural (i.e. grazing) activities in the past. There are seven houses located within 750m of the proposed alignment. One house is located within 250m of the proposed alignment however it is currently uninhabited. The surrounding land is also included in the *Rural Zone* and is attributed the same land uses rights and therefore it is anticipated that the proposed transmission line will not generate any significant or cumulative disruptions. The house located near the western most end of the alignment is located within approximately 1.6km of the Kogan Power Station and 400m from the Western Down Substation is therefore not expected to be further affected by the establishment of an additional transmission line.

11.4 MITIGATION MEASURES

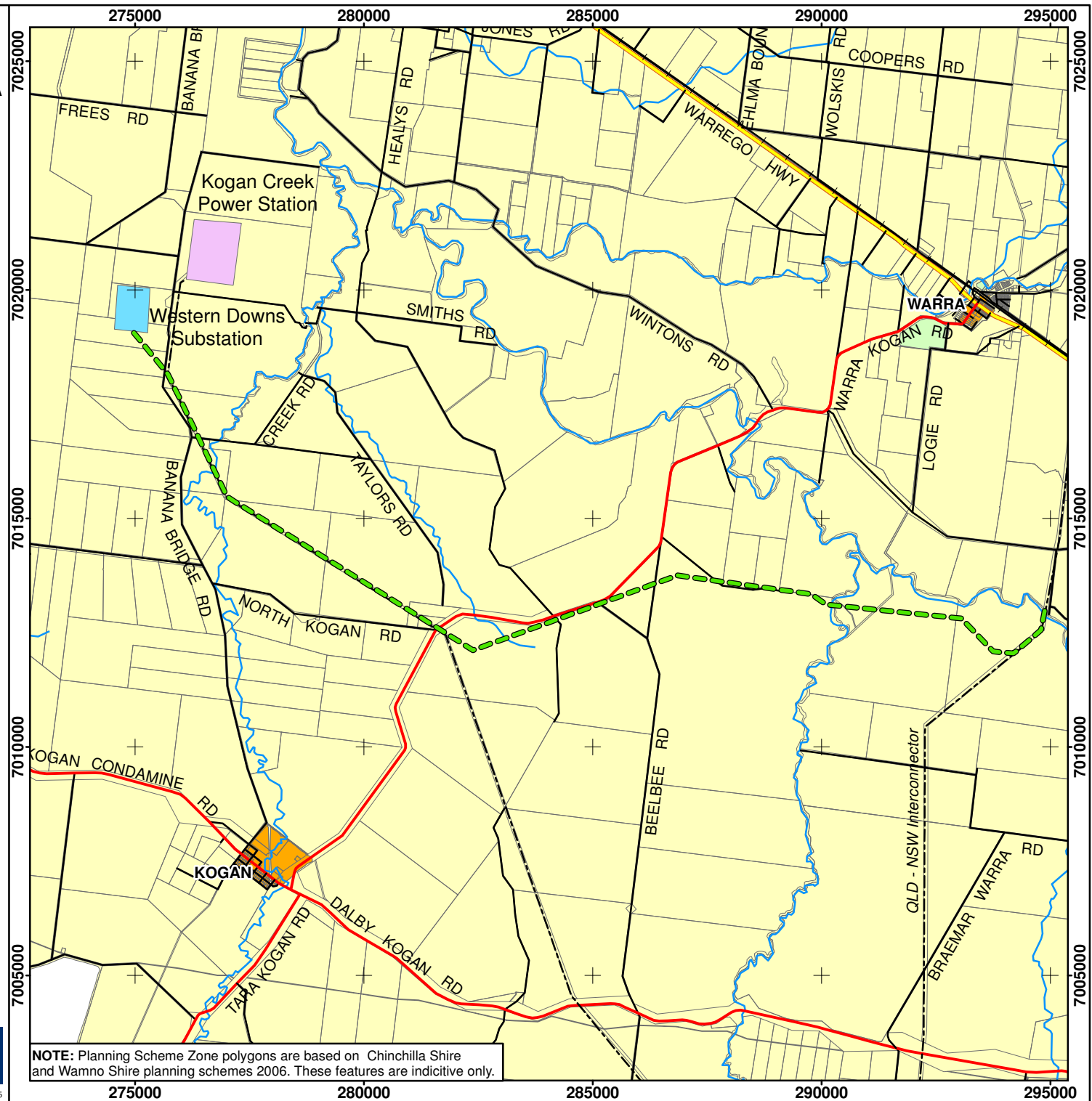
No mitigation measures are considered to be relevant in this instance.

Powerlink Western Downs EIA Planning Scheme Zone Map Figure 11.1

- Study Alignment
 - Existing 275 kV Line
 - Highway
 - Main Road
 - Local Road
 - Watercourse
 - Power Station
 - Sub-station
 - Cadastre
- Planning Scheme Zones**
- Mixed Use (MU)
 - Open Space (OSR)
 - Rural (Ru)
 - Rural Residential (RR)
 - Small Town (ST)



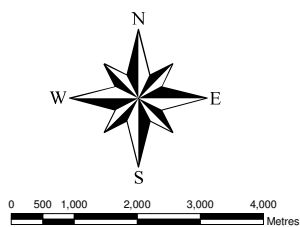
Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56



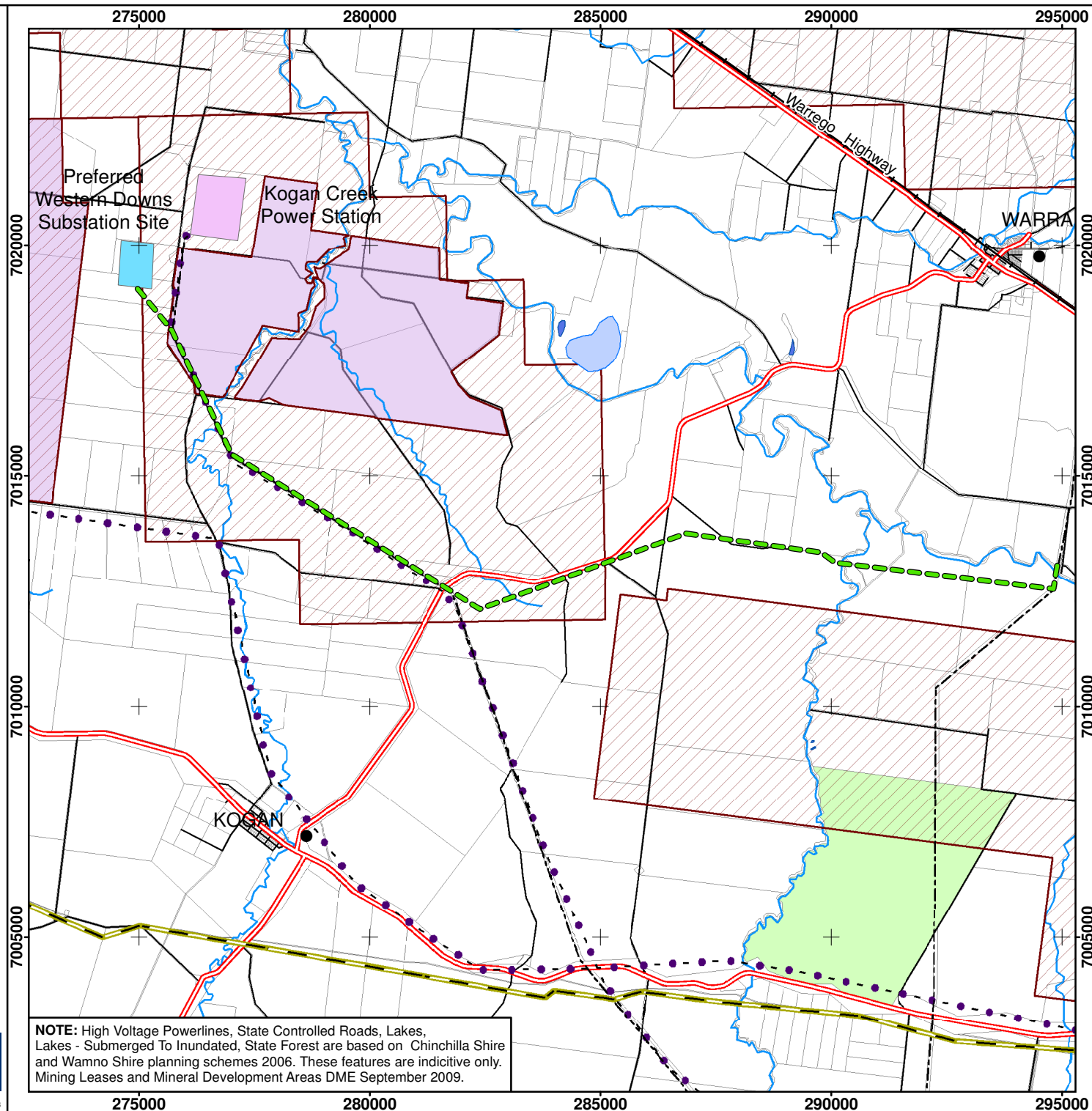
Powerlink Western Downs EIS Planning Scheme

Features
Figure 11.2

-  Study Alignment
-  Railway
-  Petroleum and Gas Pipeline
-  Existing 275 kV Line
-  Planning Scheme HV Powerline
-  State Controlled Roads
-  Highway
-  Main Road
-  Local Road
-  Watercourse
-  Mineral Development License
-  Power Station
-  Sub-station
-  Lake
-  Lake - Submerged to Inundated
-  Mining Lease
-  Cadastre
-  State Forest



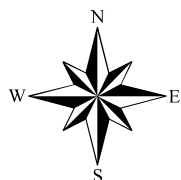
Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56



Powerlink Western Downs EIA Planning Scheme

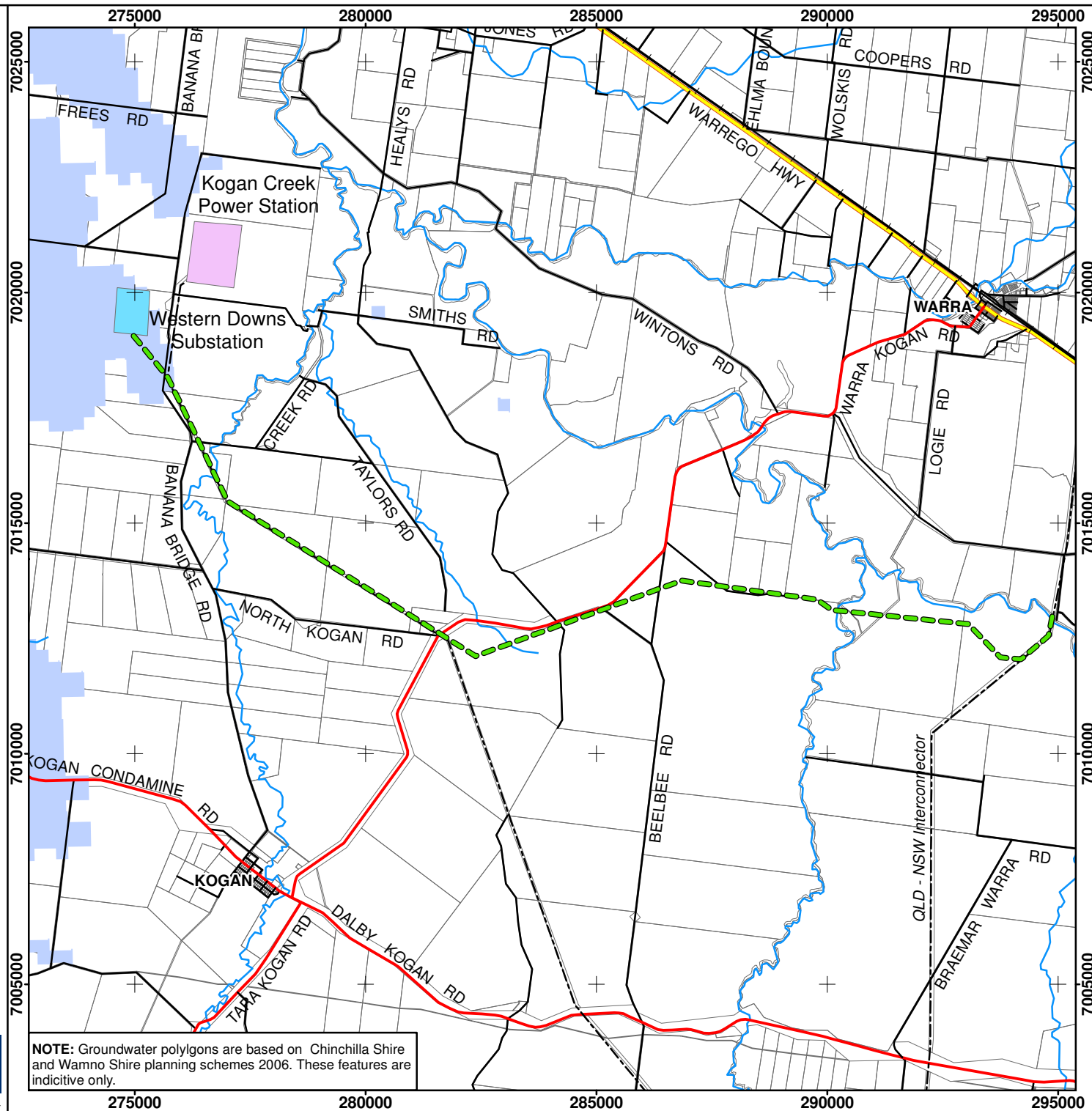
Ground Water
Figure 11.3

- - - Study Alignment
- - - Existing 275 kV Line
- Power Station
- Sub-station
- Highway
- Main Road
- Local Road
- Watercourse
- Groundwater
- Cadastre



0 500 1,000 2,000 3,000 4,000
Meters

Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56





11.4.1.1 Wambo Shire Planning Scheme

Overview / Structure

The *Wambo Shire Planning Scheme* is similar in structure to the majority of Planning Schemes prepared under the IPA. The *Wambo Shire Planning Scheme* is structured in the following manner:

1. Strategic Designation;
2. Zones;
3. Zone Codes; and
4. Planning Scheme Policies.

This section of the report outlines the processes of the *Wambo Shire Planning Scheme* and other mechanisms that are useful in Planning Scheme interpretation.

Use Definition

The *Wambo Shire Planning Scheme* provides a number of definitions to provide an explanation of the meaning of terms used in the scheme and for use to assist the community in understanding development proposals. The definitions are contained in Part 2 the Planning Scheme.

The proposed transmission line would be defined as a “*Public Utility*”, which is:

Public utility - means “premises” used for a waste landfill site, the supply of water, hydraulic power, electricity or gas, or provision of telephone, sewerage, postal or drainage services or the provision or maintenance of roads or traffic controls or railways or railway corridors.

Level of Assessment

Section 4.1.2 of the *Wambo Shire Planning Scheme* nominates the level of assessment for uses established in the *Rural Zone*. In accordance with Section 4.1.2 of the Planning Scheme, a “Public Utility” is “Code Assessable” development.

Strategic Designation

Part 3 of the Planning Scheme outlines the Strategic Direction for the former Wambo Shire Council area and is summarised into 3 Desired Environmental Outcomes (DEO), being:

1. The Natural Environment;
2. Economic Development; and
3. Community and Services.

Natural Environment

In Wambo Shire, ecological systems (including the Condamine River, its tributaries and floodplain) and the unique natural features (such as Bunya Mountains and Lake Broadwater) are protected and enhanced by development:

- *Development is managed to minimise the adverse impacts on air and water quality, to prevent land degradation, loss of habitat and biodiversity and to protect riparian areas.*
- *Protected areas (including Bunya Mountains and Lake Broadwater) and areas and items of cultural significance (including areas along water courses) are identified to ensure their environmental and landscape values and historic significance are protected and enhanced through compatible development.*



As demonstrated throughout this report, consideration has been given to the proposal and the potential for impacts upon the study area. It is acknowledged the study area has previously been used for grazing purposes and has been disturbed as a result of this and other agricultural activities.

Given the project will establish a transmission line and associated easement, it is anticipated the project is unlikely to have a significant impact upon air and water quality (see **Sections 5.1 and 7.0**). From a vegetation perspective, it is proposed to retain as much of the existing vegetation as possible (see **Section 10.0**).

Consideration has also been given to the potential cultural heritage values of the study area. As outlined in **Sections 17.0 and 17.2** of this report, no non-indigenous cultural heritage values have been identified for the site.

Based on the above, the project will not compromise the associated Natural Environment DEO through the endeavours to minimise the potential impacts of the proposal on the natural environment of the study area.

Economic Development

The economy of Wambo Shire is enhanced through sustainable use of natural resources and through a diverse range of other economic activities that respect the hierarchy of the urban centres.

- *The planning scheme reinforces and consolidates the role of Jandowee as the principal place for business and commerce within the Shire.*
- *The local service roles of the towns of Macalister, Warra, Jimbour, Bell and Kaimkillenbun are protected and enhanced.*
- *Productive rural land (such as the Jimbour floodplain), rural industries (such as intensive animal industries, cotton and grain processing) and natural features (including mineral and extractive resources and tourist resources such as the Bunya Mountains and Lake Broadwater) are protected to reflect and enhance their continued economic potential and viability.*
- *The industrial area in Jandowae is consolidated and protected and its role as the key area for industrial activity is reinforced.*

The emphasis of this DEO is to promote economic diversity, particularly through the sustainable use of the natural resources of the former Wambo Shire. In promoting economic diversification, the existing townships are not to be adversely affected.

The project is considered to satisfy this DEO on the basis the development:

- Is for a new 275kV transmission line and will not affect the role of Jandowae as a principal place of business;
- The proposal will not affect the role of *Macalister, Warra, Jimbour, Bell and Kaimkillenbun* as Townships.; and
- The transmission line and associated easement will occupy land previously used for agricultural purposes, but is required to meet the on-going and increasing demand for electricity in the network. The easement will not preclude the continued use of the land within the transmission line easement from ongoing grazing or farming purposes and therefore the project is unlikely to effect the continuation of agricultural activities on adjoining land.



Community and Services

Development in Wambo Shire reflects community well-being and preservation of the quality of lifestyle through management and enhancement of core community elements.:

- *The built environment reflects community expectations and contributes to the amenity and rural character of Wambo Shire.*
- *People are connected to public spaces and community services through an appropriate land use structure and the provision of infrastructure, particularly within the urban centres of the Shire.*
- *Development contributes to the health and safety of people and provides a diverse range of housing types, services and facilities.*
- *Infrastructure (including water and sewerage and roads) reflects community expectations and engineering standards and is provided in an orderly and logical sequence to ensure cost effectiveness.*

The proposal satisfies the DEO with respect to the provision of infrastructure to meet the needs and the expectation of the community for an ongoing and uninterrupted supply of electricity. As discussed within this report, the provision of this new transmission line and easement corridor will be designed so as to meet engineering standards and minimise the potential for environmental impact. The balance of matters raised in the DEO is not applicable to this project.

Zoning – Rural Zone

Under the *Wambo Shire Planning Scheme*, land is allocated a specific zone in order to identify the predominant, preferred or existing land uses for that area. Each respective zone has a Planning Scheme Code associated with it to govern and influence development. The proposed study area is located within the *Rural Zone* of the *Wambo Shire Planning Scheme* and any proposed development within this zone will comply with the provisions of the *Rural Zone Code*.



In accordance with Section 4.1.3.3 of the Planning Scheme the purpose of the *Rural Zone* and Code is as follows:

Within the Rural Zone, “development”:

- (a) *maintains the environment, including soil, air and water, compatible with healthy natural systems and ensures public health and safety;*
- (b) *protects Good Quality Agricultural Land (GQAL) from fragmentation, alienation or encroachment of incompatible land “uses” in accordance with State Planning Policy 1/92 – Development and Conservation of Agricultural Land;*
- (c) *is located, designed and operated in a manner that protects and enhances the predominant rural scale, intensity, form and character;*
- (d) *maintains the rural amenity;*
- (e) *does not prejudice or impact adversely on other “uses” including those within other “zones”;*
- (f) *does not prejudice extractive or mining resources;*
- (g) *has an appropriately designed access to the road network, and traffic generated by the development does not impact adversely on the local road network;*
- (h) *protects areas and sites of conservation importance, including cultural and high landscape values;*
- (i) *is undertaken in an orderly and logical sequence to achieve an efficient provision of infrastructure;*
- (j) *maintains the integrity of the Jimbour flood plain;*
- (k) *is located and designed in ways that minimise the need for flood, bushfire and landslide mitigation, and to protect people and premises from such natural events;*
- (l) *has water supply, stormwater disposal, sustainable effluent and waste disposal and power, to appropriate standards, adequate for the “use”; and*
- (m) *does not impact adversely on infrastructure.*

The purpose for development within the *Rural Zone* does not directly contemplate the establishment of substations or public utilities in this zone. Ultimately, development that occurs within the *Rural Zone* is to ensure the continued maintenance of a high level of amenity through the protection of environmental processes. It is important to note that:

- The project has been located and designed to minimise the environmental impact.. In particular, the portion of the proposed transmission line within the former Wambo Shire will connect to an existing transmission line easement (QNI Line);
- The majority of the transmission line located within the former Wambo Shire is mapped as either Class A GQAL (approximately 1.5 km) or Class B GQAL (approximately 2.1km) for the purposes of the Planning Scheme (see **Section 5.3.5** and **Figure 5.4**). Given there is current grazing occurring within the proposed transmission line corridor, there is negligible impact the future agricultural use of this portion of the transmission line. Similarly, cropping occurs in that portion of the study area mapped as Class A GQAL and will still be able to occur within the transmission line easement in accordance with the guidelines provided in Powerlink's *Farming Near Transmission Lines* Information Sheet. As only a small area of Class A GQAL is affected (and is already affected by the existing QNI transmission line and there is the



opportunity to continue the current agricultural activities across the transmission line corridor, the project is not considered to affect Good Quality Agricultural land; and

- The project will be limited to the corridor identified and is not anticipated to alienate agricultural uses from the adjoining allotments.

The proposal represents a sequential expansion of the existing electricity network to in order to meet the future electricity demands for the region and South East Queensland. In this regard, the proposal is considered to satisfy the provision that development in the *Rural Zone* will not adversely impact upon infrastructure and thus limit the potential for the expansion of existing electricity infrastructure.

Development Provisions – Rural Zone Code

The *Rural Zone Code* is used to assess all development that occurs within the *Rural Zone* (**Figure 11.1**). In this instance, the project would be subject to assessment against the provisions of this code. The *Rural Zone Code* is structured with Performance Criteria and Acceptable Solutions in which to assess development.

The Acceptable Solutions within the Planning Scheme identify one solution to the relevant Performance Criteria. Where a proposal does not accord with the Acceptable Solution, the proposal will need to demonstrate it satisfies the Performance Criteria.

Within the *Rural Zone*, the Code allows for:

- (a) Tourist related “uses” (“bed and breakfast premises” and “visitor accommodation”) and “home businesses” where they are of a small scale and are compatible with surrounding “uses”;
- (b) The protection of existing “intensive animal industries” and “extractive industries” from incompatible “uses”;
- (c) “Intensive animal industries” and “extractive industries”, where located and operated so as to ensure no detrimental impact on surrounding “uses” or on the environment; and
- (d) Limited industrial “uses”, where it can be demonstrated those “uses” are associated with rural production and can not reasonably be established in the industrial “zone”.

The *Rural Zone Code* remains relatively silent on establishing a *Public Utility* within the *Rural Zone*. However, it does not preclude the operation of such infrastructure. It is noted the code provides specific criteria for uses that are considered to be “non-rural activities”, being activities that do not involve agriculture, grazing, intensive agriculture and intensive animal husbandry.

In this instance, the proposal is inconsistent with these two provisions of the code, being:

PC2 Non-“Rural activities” - scale Non-“rural activities” are of an appropriate scale to protect the amenity of the rural “zone” and do not prejudice the operation and viability of other “uses” or activities in the rural “zone” or other “zones”.	AS2 The “total use area” is less than 150m ² on a lot.
PC3 Non-“rural activities” - operating hours Non-“rural activities” are operated so as to ensure that the activities and the operation of equipment occur at appropriate times to protect the amenity of the rural “zone”.	AS3 non-“rural activities” are operated only between the hours of 7:00am and 6:00pm.



In both instances, it would be unreasonable for the proposal to comply with these requirements as the size of the area occupied by the project is dictated by the extent to which the network needs to satisfy energy demands. In addition, it cannot be expected that the transmission line would operate on a 7am to 6pm timeframe.

Regard is therefore given to the relevant Performance Criteria. In the first instance, the proposed transmission line will be contained within the land set aside for the incremental development of electricity infrastructure adjacent to the existing transmission line and Kogan Creek Power Station. The transmission line will be located to ensure it is suitably setback from the property boundaries and the opportunity remains for the provision of grazing across the easement corridor. Secondly, the transmission lines are considered to generate little in the way of noise. Therefore the project is capable of satisfying the Performance Criteria above. Through appropriate mitigation measures the proposed transmission line can be implemented in a manner that has minimal impact on the amenity of the existing locality whilst not jeopardizing surrounding land activities.

In addition to the above, the *Rural Zone Code* also includes a number of Performance Criteria and Acceptable Solutions for electricity transmission line easements. The provisions of the code (and references to diagrams in the Planning Scheme) include:

PC21 “Electricity Transmission Line Easement” - vegetation <i>Transmission lines within an “electricity transmission line easement” are protected from vegetation.</i>	AS21.1 <i>Planted vegetation within an “electricity transmission line easement” shall have a mature height not exceeding 2.5m as shown in schedule 2, division 3: Powerline / Electricity Easements, section 3.2 diagram 3.</i> AS21.2 <i>No part of planted vegetation, at its mature size, is located closer than 2.5m to an electricity transmission line as shown in schedule 2, division 3: Powerline / Electricity Easements, section 3.2 diagram 3.</i>
PC22 “Electricity transmission line easement” – Vegetated Buffers <i>Vegetated buffers adjoining an “Electricity transmission line easement” are maintained to provide:</i> (a) a visual buffer to the easement; and (b) a separation distance.	AS22 <i>Existing vegetation, comprising trees and/or shrubs, shall be retained within 20m of an “Electricity transmission line easement” as shown in Schedule 2, Division 3: Powerline / Electricity Easements, Section 3.2 Diagram 4.</i>
PC23 “Electricity transmission line easement” – separation distances <i>“habitable buildings” and “child oriented uses” are located to ensure community safety.</i>	AS23 <i>“Habitable buildings” and “child oriented uses” maintain a minimum separation distance from the most proximate boundary of an “electricity transmission line easement” in accordance with schedule 2, division 3: Powerline / Electricity Easements, section 3.1 (1) and section 3.1 diagram 1.</i>



With regard to how Performance Criteria 21 and 22, Powerlink has a 'Vegetation Control Standard' (Powerlink, 2005) that outlines all initial line route clearing and subsequent maintenance is to be performed. In summary, the standard states that no vegetation is to be located within a 20m radius of the footings of the transmission towers. From a safety perspective, there is a desire for all vegetation to be removed from the easement area. However, there is recognition and intent to limit the unreasonable loss of vegetation. Therefore, vegetation may be permitted to encroach within the fringe of easement where it poses no danger to the integrity of the transmission line.

We are therefore of the view that no vegetation located within the easement would exceed 2.5m in height or would be located within 2.5m of the transmission tower or transmission line and would satisfy AS21.1 and AS21.2 of the *Rural Zone Code*.

Powerlink also has no intention of clearing vegetation beyond the boundary of the transmission line easement (unless required for safety or access) and is therefore considered to satisfy AS 22 of the *Rural Zone Code*.

In relation to Performance Criteria 23, Division 2, Section 3.1(1) states that a 30m separation distance is required between the transmission line easement and any houses and 'child orientated' land uses for transmission lines of 133kV – 275kV.

Based upon the desktop investigations of aerial photography, there are no houses or 'child oriented' land uses known to be located within 30m of the proposed transmission line. Therefore, the proposal would comply with AS23 of the *Rural Zone Code*.

11.4.2 Planning Scheme - Local Plan

The Planning Scheme does not contain any Local Plan. This matter is not relevant to the assessment.

11.4.3 Good Quality Agricultural Land

Good Quality Agricultural Land (GQAL) has been mapped by the former Wambo Shire Council and is illustrated on Planning Scheme Sheet 5 of 9 (see **Figure 5.4**). The mapping identifies Class A and Class B Good Quality Agricultural Land.

The study area is mapped as traversing small areas of containing both Class A and Class B GQAL. Performance Criteria 33 of the *Rural Zone Code* and seeks to conserve and manage GQAL. No Acceptable Solution is provided by Council.

While this will be discussed in Section 11.7 in relation to State Planning Scheme Policy 1/92, for the purpose of the Planning Scheme, it is submitted the project will have limited impact upon the loss of GQAL. It is estimated the alignment will traverse approximately 1.5km of Class A GQAL and approximately 2.9km of Class B GQAL. The State Planning Scheme Policy suggests that Class A land is suitable for both cropping and grazing. Class B land is predominantly suitable for grazing purpose as it has limited cropping potential.

As Powerlink will allow grazing to occur across the transmission easement, we are of the view the project will satisfy Performance Criteria 33. Furthermore, the portion of the transmission line likely to traverse Class A GQAL



is already traversed by an existing transmission line. Therefore, it is anticipated there will be little additional impact on the Class A GQAL.

11.4.4 Future land use

As outlined above, the study area is included in the *Rural Zone* and as such is intended to accommodate rural activities such as agriculture, horticulture and grazing. The site is likely to be capable of accommodating limited agricultural uses, such as grazing across the transmission line corridor.

The desktop assessment of mapped and known site constraints is provided. The assessment of the site is based on the following site constraints:

- Regional Ecosystem & Essential Habitat Map (DERM) (**Figure 10.1**);
- Wambo Shire Council's Good Quality Agricultural Land mapping (**Figure 5.4**);

Based on the constraints assessment, an assessment of Planning Scheme intents and requirements and the current services on the site, potential site specific and cumulative impacts of the project (from a Planning Scheme perspective) on existing and potential land uses on the site have been considered. A summary of these findings is provided below:

Extractive Industry (Impact – Medium)

- The corridor is mapped as a Mineral Development Licence area;
- The corridor is not identified as being a Key Resource Area; and
- While a Mineral Development License area is identified for the site, the Planning Scheme is silent on the resource and merely provides a separation distance from the site to any building, structure and outdoor activity.

The intention to develop the corridor for a public utility is not clearly contemplated by the Planning Scheme. However, the proposal represents a sequential and logical expansion of the existing Kogan Power Station and will also assist with meeting the future energy demands for the network. On this basis, the proposal is considered to not unreasonably prejudice the Strategic Directions provided in the *Wambo Shire Planning Scheme* or the purposes of the *Rural Zone*.

11.5 POTENTIAL IMPACTS

11.5.1 Conflicts with Wambo Shire Planning Scheme

Provisions of the Rural Zone Code

As outlined above, there are limited provisions that relate to the establishment of a transmission easement. The proposal is unlikely to conflict with the Strategic Directions of the Planning Scheme. Furthermore, the proposal is not considered to compromise the purpose of the *Rural Zone Code*.

This being said, it is acknowledged that the *Rural Zone Code* does identify Performance Criteria and Acceptable Solutions for land uses that are not Rural Activities – such as the proposed transmission line.



These provisions state:

PC2 Non-“Rural activities” - scale Non-“rural activities” are of an appropriate scale to protect the amenity of the rural “zone” and do not prejudice the operation and viability of other “uses” or activities in the rural “zone” or other “zones”.	AS2 The “total use area” is less than 150m ² on a lot.
PC3 Non-“rural activities” - operating hours Non-“rural activities” are operated so as to ensure that the activities and the operation of equipment occur at appropriate times to protect the amenity of the rural “zone”.	AS3 non-“rural activities” are operated only between the hours of 7:00am and 6:00pm.

The proposal is capable of satisfying the Performance Criterion PC2 given the information available suggests the proposed transmission line is unlikely to prejudice the ongoing use of the surrounding land for agricultural, grazing or horticultural purposes.

Similarly for Performance Criterion PC3, the key issue is to ensure the transmission line corridor maintains the amenity of the locality. Given the eastern portion of the project will connect with an existing transmission line corridor, it is reasonable to form the view the proposal will not result in a significant change to the amenity of the existing locality from the operation of the transmission line.

Mining/Extractive Resource

Part of the project corridor is identified as being within a Mineral Development Lease area on the *Wambo Shire Planning Scheme* Features Map 1 (**Figure 11.2**). It is acknowledged that the Planning Scheme, through its Strategic Directions and purpose for the *Rural Zone* seeks to discourage development that may prejudice mining or extractive resource opportunities. In saying this, Schedule 2 of the Planning Scheme provides a clear separation distance for structures from power transmission line easement. In this instance, a separation distance of 1,000 metres is imposed by the Planning Scheme.

Given the existence of the existing Queensland- New South Wales Interconnector to the national electricity grid, it could be argued that land within 1,000m of the existing transmission line has been effectively sterilised from mining or extractive resource operations. This separation distance extends onto the study area. It is therefore reasonable to form the view, based upon the desktop assessment undertaken, that the proposal will not further sterilise land included in a Mineral Development Lease area. Consequently, the proposal does not unreasonably compromise the Planning Scheme.

Ground Water

The *Wambo Shire Planning Scheme* includes mapping that identifies areas of groundwater vulnerability. The study area is not mapped as being a ‘groundwater vulnerability area. Therefore, this aspect of the Planning Scheme will not affect the project.



11.5.2 Changes in Property Value

The eastern portion of the proposal will traverse three (3) separate lots within the former Wambo Shire Council area once it deviates from the existing transmission easement that extends south-east from the Kogan Power Station.

These three parcels are included in the *Rural Zone* and are largely mapped as not Good Quality Agricultural land. There is an area of land at the eastern most extent of the transmission line that is used for agricultural purposes. The impact upon the value of this land will be subject the extent that the transmission line affects the operation and agricultural yield the land. Given the proposed transmission lines will traverse a small area of land use for agricultural purposes, it is anticipated that the corridor will have limited impact on the value of the land.

11.5.3 Disruptions to Neighbouring Areas and Existing Environments

The corridor consists of land that accommodates both sparsely vegetated land and well vegetated land that has accommodated agricultural (i.e. grazing) activities in the past. There are seven houses located within 750m of the study alignment (see **Section 13.1**). The surrounding land is also included in the *Rural Zone* and is attributed the same land uses rights and is therefore expected to be used for agricultural activities.

Due to the separation distances between the proposed transmission line and the seven houses, and the vegetation of the study area, minimal impacts are expected on neighbouring areas and existing environments.

11.6 MITIGATION MEASURES

No mitigation measures are considered to be relevant in this instance.

11.7 REGIONAL PLANNING INSTRUMENT

In accordance with Section 207(2)(c) of the *Sustainable Planning Act 2009*, in assessing a request for a ministerial designation for community infrastructure consideration must be given to any Regional Plan that has affect over the subject site.

In this instance, there is no Regional Plan that is applicable to the study site.

11.8 STATE PLANNING SCHEME POLICIES

The following section contains a detailed assessment of the development project against the relevant State Planning Policies for the site as per Section 207(2)(d) of the *Sustainable Planning Act 2009*. Currently eight (8) State Planning Policies (SPP) are operational within Queensland under the provisions of the *Sustainable Planning Act 2009*, being:

- SPP 1/92 Development and the Conservation of Agricultural Land 1.0;
- SPP 1/02 Development in the Vicinity of Certain Airports and Aviation Facilities 1.0;
- SPP 2/02: Planning and Managing Development Involving Acid Sulfate Soils 1.0;
- SPP 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide 1.0;



- SPP 1/07 Housing and Residential Development including Guideline 1.0;
- SPP 1/10 Protecting wetlands of high ecological significance in Great Barrier Reef catchments (temporary SPP),
- SPP 2/07 Protection of Extractive Resources and Guideline; and
- State and Regional Coastal Management Plans.

It is noted that pursuant to Schedule 1, Part 2, Section 18, Subsection (5A) of the repealed *Integrated Planning Act 1997*, the Minister had identified the following SPP as having been appropriately reflected in both the Chinchilla Shire and Wambo Shire Planning Schemes:

- State Planning Policy 1/92: Development and Conservation of Agricultural Land;
- State Planning Policy 1/02: Development in the Vicinity of Certain Airports and Aviation Facilities; and
- State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide - Bushfire and Landslide Component.

Approval to adopt the Planning Scheme is conditional upon the continued operation and effect of the Integrated Development Assessment System triggers for Department of Main Roads matters.

As the above SPP as having been appropriately reflected in the Planning Scheme and Section 778 of the SPA states that Planning Schemes made under the repealed IPA will continue to have effect under SPA, compliance with the Planning Scheme ensures compliance with the SPP. A copy of all State Planning Policies can be found online at <http://www.dip.qld.gov.au/policies/state-planning-policies.html>.

State Planning Policies not considered applicable to the development of the site are as follows:

SPP 2/02: Planning and Managing Development Involving Acid Sulfate Soil and Guideline

The SPP identifies those Local Government Areas that may contain land considered to be 'Acid Sulfate Soils'. In particular, this policy seeks to manage both 'actual' and 'potential' acid sulphate soils that could be affected as a result of excavation or filling works.

SPP 2/02 only applies to local government areas listed in the SPP. The former Chinchilla Shire and Wambo Shire areas are not listed and therefore the SPP is not applicable to the study area.

SPP 1/07 Housing and Residential Development including Guideline 1.0

This SPP is not considered applicable as it seeks to ensure that large, higher growth local governments identify their community's housing needs and analyse, and modify if necessary, their planning schemes to remove barriers and provide opportunities for housing options that respond to identified needs.

SPP 2/07 Protection of Extractive Resources and Guideline

This SPP identifies those extractive resources of state or regional significance where extractive industry development is appropriate in principle, and aims to protect those resources from developments that might prevent or severely constrain current or future extraction when the need for utilisation of the



resource arises. This SPP is not considered applicable as the study area does not contain any identified Key Resource Areas.

In addition, there is no State or Regional Coastal Management Plan relevant to the study area.

TABLE 11.1 TOWN PLANNING SUMMARY TABLE – FORMER CHINCHILLA SHIRE AND WAMBO SHIRE

PLANNING INSTRUMENT	CONCLUSION	SECTION REFERENCE
Properly Made Submissions		
The project has not reached this stage in the process. Upon submission of the request for community designation, a written notice of the project will be provided to both the Department of Environment and Resource Management (DERM) and the Western Downs Regional Council.		
Relevant State Planning Policies		
SPP 1/92 Development and the Conservation of Agricultural Land 1.0	The Minister has identified the SPP as having been appropriately reflected in the Planning Scheme. As the majority of the land proposed to be traversed by the transmission line is not identified within planning scheme as containing good quality agricultural land, the development is considered to comply with the SPP. It is noted that the eastern portion of the proposed transmission corridor traverses land mapped as Class A & B GQAL. The extent of the impact will depend upon the extent to which the transmission line prevents the continued use of the existing agricultural activity. It is anticipated that as the transmission line may sterilise a small patch of GQAL, there will be an impact, but it will be minor.	Section 11.6
SPP 1/02 Development in the Vicinity of Certain Airports and Aviation Facilities 1.0	The Minister has identified the SPP as having been appropriately reflected in Planning Scheme. The development is considered to be consistent with the requirements of the Airport Overlay Code in the planning scheme and is therefore considered to comply with the SPP.	Section 11.6
SPP 2/02: Planning and Managing Development Involving Acid Sulfate Soils 1.0	Annex 1 of the State Planning Policy lists the former Local Government Area that contains land that may require assessment against this policy. The policy is not applicable as both the former Chinchilla Shire and Wambo Shire are not one of the Local Government Authorities listed in Annex 1. Therefore, the policy does not apply.	Section 11.6
SPP 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide 1.0 – Bushfire and Landslide components	The Minister has identified the SPP as having been appropriately reflected in Planning Scheme. The development is considered to be consistent with these components of the SPP. The development is also considered to comply with the flood	Sections 5.1.3.6, 7.2.4 and 11.2.4



PLANNING INSTRUMENT	CONCLUSION	SECTION REFERENCE
	requirement of the SPP.	
SPP 1/07 Housing and Residential Development including Guideline 1.0	The SPP is not considered applicable. It seeks to ensure that large, higher growth local governments identify their community's housing needs and provide opportunities for housing options that respond to identified needs.	Section 11.6
SPP 2/07 Protection of Extractive Resources and Guideline	This SPP is not considered to be applicable as the site is not identified as containing a Key Resource Area.	Section 11.6
Regional Planning Instruments		
The site is not located in an area that is subject to a Regional Planning Instrument.		
State Planning Regulatory Provision		
The site is not located within a State Development Area and as such is not subject to a State Planning Regulatory Provision		
Planning Scheme Requirements – Chinchilla Shire Planning Scheme		
Strategic Framework		
Desired Environmental Outcome - The Natural Environment	The project is considered to achieve the Desired Environmental Outcome in both the Chinchilla Shire and Wambo Shire Planning Schemes as the development is located on land that is considered to contain limited ecological values or known cultural significance.	Section 11.2.2
Desired Environmental Outcome - Economic Development	The development is consistent with the DEO as the proposal will not affect the economic hierarchy of the study area. Moreover, the additional employment that will be generated through the construction of the development will enhance the role of both the Kogan and Warra townships as a local service centres. In summary, the elements of the former Chinchilla Shire and former Wambo Shire that contribute to its ongoing economic development will not be compromised by the development.	Section 11.2.2
Desired Environmental Outcome - Community and Services	The development will satisfy the community's expectation for the provision of a reliable electricity supply. Furthermore, the development will not compromise the well being of the community, the pattern of settlement or ongoing provision of public spaces.	Section 11.2.2
Rural Zone	The proposed development is inconsistent with the intent of the zone. It is noted however, that the proposed development is considered to have minimal impact on the Rural Area. The project is not expected to unreasonably compromise the environmental values of the site or the strategy for land in the rural designation.	Section 11.2.2
Development Codes		



PLANNING INSTRUMENT	CONCLUSION	SECTION REFERENCE
Rural Code	Although the proposed transmission corridor is located within the Rural Zone, the area is directly adjacent to areas zoned and use for power generation (Kogan Power Station) and the western portion of the proposed transmission line will be collocated with an existing transmission line. The proposed development is therefore considered to have minimal impact on the Rural Zone and will complement the existing energy infrastructure on the study site. The opportunity for continued grazing across the proposed transmission corridor, the project is not expected to impact negatively on surrounding rural activities. Given the limited potential for wider impacts on the Rural Zone the development of the proposed 275kV transmission line corridor is considered an appropriate use for this location.	Section 11.2.2



12.0 SOCIO-ECONOMIC ENVIRONMENT

12.1 EXISTING ENVIRONMENT

12.1.1 Study Area Overview

Agriculture is the economic base of both the Chinchilla and Warra Districts. Chinchilla has particular economic strengths in beef and pork production, wool growing, and horticulture being traditional industries in the local economy, whereas Warra is heavily reliant on cotton and grain production. Energy and resources (e.g. coal mining, coal seam gas development and power generation) are currently developing rapidly within this area.

The study alignment extends southeast from Banana Bridge Road, Hopeland, along Warra Kogan Road to Youngs Road, Warra to the east. The transmission line corridor will extend 30m on each side of the transmission line, and will therefore impact on a maximum of 34 allotments in the Kogan, Brigalow and Warra Districts. Of these allotments the majority (30 allotments) have a rural zoning and are utilised for cattle breeding and fattening purposes. The development of the transmission line will require 60m of land to be cleared (or partially cleared) directly under the transmission line however existing uses will be allowed to continue with minimal alteration to existing property lines and existing fencing.

The proposed Western Downs Substation will feed the Western Downs Transmission Line. The substation is to be located south of the existing Kogan Creek Power Station, owned by CS Energy, which is a 750 megawatt, coal-fired power station that provides electricity into the Queensland transmission line via Braemar Substation. The Kogan Creek Power Station currently generates enough electricity to power almost 1 million homes and has a permanent workforce of 41. The power station is neighboured and fuelled by the Kogan Creek Coal Mine, which has an additional permanent workforce of 50 employees.

As discussed in Section 11, the majority of the lots within the study alignment are zoned 'Rural' under the Chinchilla and Warra Planning Schemes. The transmission line alignment extends across L20 DY1072 on North Kogan Road, which is zoned 'Reserved for Gravel and Quarry' and is identified as being utilised for Extractive uses. The transmission line study alignment extends across areas which are identified as Class A and Class B Good Quality Agricultural Land under the Chinchilla and Warra Planning Schemes. The transmission line also extends across three allotments (L34 DY604, L27 DY374, and L7 RP176345) which have a Mining Lease of Mining Development Licence, which is related to the Kogan Creek Power Station and Coal Mine.

The most proximate residential communities are located at Warra, Brigalow and Kogan.

12.1.2 Key Demographic Characteristics

Some of the key demographic characteristics of the Western Downs Regional Council include:

- The 2006 ABS Census states that the Western Downs Regional Council had a total resident population of approximately 28,100 people in 2006.
- The Department of Infrastructure and Planning (DIP) estimates that the population reached approximately 30,870 people by 2008.
- The proportion of the population aged between 0 and 19 years old is 29.6% which is marginally higher than the proportion in Queensland (27.6%).



- Western Downs has a lower proportion of residents aged 20 to 34 years old, with 16.7%, when compared to Queensland (20.3%).
- The proportion of residents aged between 35 and 54 years old in the Western Downs, 27.9%, is in line with Queensland (28.6%).
- The proportion of people aged 55 and older in the Western Downs, of 25.7%, is marginally higher than the Queensland average (23.6%).
- 90.5% of occupied dwellings in the Western Downs are separate house dwellings, which is significantly higher than the state average of 79.5%.
- Based on the 2006 ABS Census, the total workforce of the Western Downs Region was approximately 13,500 of which 65.1% are employed full time. Approximately 67.6% of the Western Downs workforce is employed in upper and lower blue collar occupations, which is higher than the state average of 63.7%.
- The average annual household income in the Western Downs is substantially less than Queensland with \$58,293 compared with \$69,001 (September 2009 dollars).

The demographic profile of the Western Downs Region is indicative of a traditional rural community, given the dispersed age demographic and the high proportion of separate house dwellings in the region. Whereas some traditional agricultural based communities experience a proportion of the young population of working age (between 20 and 35 years old) leaving their communities for diversified employment and education opportunities in urban centres, this is not occurring within the Western Downs. The strong agricultural base, in correlation with the emergence of mining and energy opportunities occurring within the Surat Basin, is currently able to retain this population within the community.

The study alignment extends between two ABS Collection Districts (3081008 and 3081603), which extend northwest to the Warrego Highway, southwest to Kogan, bounded by Moonie Highway to the southwest, and includes Daandine and Kumbarilla to the east. Some of the key demographic characteristics of the area surrounding the study alignment include:

- The 2006 ABS Census states that the surrounding area had a total resident population of approximately 559 people in 2006.
- The proportion of the population aged between 0 and 19 years old in the surrounding area is 32.7% which is higher than the proportion in the Western Downs Region (29.6%).
- The area surrounding the subject site has a proportion of residents aged 20 to 34 years old of 14.8% which is only marginally lower than that of the Western Downs (16.7%).
- The proportion of residents aged between 35 and 54 years old in the surrounding area, 32.4%, is higher than the proportion in the Western Downs (27.9%).
- The proportion of people aged 55 and older in the surrounding area, of 19.9%, is significantly lower than the Western Downs average (25.7%).
- 93.4% of occupied dwellings in the surrounding area are separate house dwellings, which is higher than the proportion of separate houses in the Western Downs (90.5%).
- Based on the 2006 ABS Census, the total workforce of the surrounding area was approximately 227 of which 61.8% are employed full time. The area has a much higher unemployment rate (9.3%) than the Western Downs average in 2006 (4.3%). Approximately 59.6% of the residents in the area surrounding the subject site have upper or lower white collar jobs, which is lower than the 61% of Western Downs residents.



- The average annual household income in the surrounding area is substantially less than the Western Downs with \$49,734 compared with \$58,293 (September 2009 dollars).

The demographic profile of the area surrounding the study alignment is in line with that of the Western Downs Region as a whole. The area does, however, have a higher proportion of residents aged between 35 and 54 years old which is representative of its rural character, with families establishing themselves in an area which offers low density residential living away from the centralised townships elsewhere in the region. The average household income in the area is also indicative of the rural nature of the surrounding area, with a limited provision of employment opportunities that provide higher incomes, which is in line with the lower proportion of white-collar employees in the area.

12.1.3 Landholders and Land Use

The subject site consists of 34 allotments extending from Banana Bridge in Hopeland to Youngs Road in Warra. Based on data collected from the RP Data ownership database, with the exception of the lots associated with the Kogan Creek Power Station and Coal Mine, and the two lots proposed for the Western Downs Powerlink Substation, the majority of lots along the transmission line study alignment are under the ownership of single and groups of individuals, and propriety companies who are utilising the land for agricultural purposes (with cattle breeding and grazing in particular).

12.2 POTENTIAL IMPACT

Social Impacts

Given the predominantly rural and industrial land use along the study alignment, there are few impacts expected on residential land uses. There are few social values associated with the study alignment, therefore the development of an electrical transmission line will have minimal social impact on how existing uses in the area function. In addition, the community profile of the surrounding area, as detailed above, is not anticipated to be impacted by the development of a transmission line. The existing residential dwelling, located adjacent to the proposed substation and at the western end of the transmission line, will be minimally impacted by the transmission line as towers will not be developed on the allotment. Therefore the development of the transmission line is not anticipated to negatively impact any residential or agricultural landowners.

It is recognised that Powerlink has further network developments planned that affect the Western Downs Region, and that water supply, sewerage, waste management matters and the burden on time and resources require attention across all projects.

Issues associated with impacts and associated mitigation have been addressed in the following sections:

- Dust (**Section 6.0**);
- Noise (**Section 13.0**);
- Electric and Magnetic Fields (**Section 14.0**); and
- Visual Amenity (**Section 15.0**).



Economic Impacts

The economic value of the land along the transmission line is largely based on the existing agricultural uses, which include cattle breeding and fattening and milk production. It is our understanding that the alignment and development of the transmission line will have minimal impact on existing ground uses as it is Powerlink's intention, wherever possible, for the transmission towers to be placed in a way that will ensure that they have minimal impact on existing uses. This will take into consideration property lines and existing fencing utilised for agricultural purposes.

The development of a transmission line will have positive economic impacts on the surrounding area. These include:

- The construction and installation of the transmission line and towers will generate short-term employment opportunities during the construction phase. Materials for construction should be procured from local sources as far as practicable;
- The development of the transmission line, in association with the substation on Banana Bridge Road, will enhance the surrounding area as an 'energy precinct' by increasing the existing industries in the immediate area; and
- The transmission line and substation may enhance the function of the Kogan Creek Power Station.

This increase in economic activity will benefit the surrounding community by generating additional employment opportunities and enhancing the overall economic capacity of the Western Downs region. This has the potential to generate indirect community benefits through the additional economic contribution to the region.

12.3 MITIGATION MEASURES

The development of an electrical transmission line is anticipated to have minimal negative social or economic impacts on the surrounding community. The transmission line will extend through an area utilised for agricultural purposes, and where possible the location of transmission towers will be placed in areas that have minimal adverse effect on the function of cattle grazing and milk production operations.

As the development of the transmission line will have minimal negative social implications on the surrounding community, there are no mitigation measures required.

Powerlink and Western Downs Regional Council representatives are consulting on matters such as water supply, sewerage, waste management and the burden on time and resources to ensure a coordinated approach aimed at minimising these impacts.



13.0 NOISE AND VIBRATION

This chapter provides details of existing ambient noise levels within the vicinity of the Study Alignment. Noise sensitive receivers and locations have been identified along with details regarding their respective distances from the Study Alignment.

Based on the vicinity of residences/human habitation to the Study Alignment, an assessment of potential background and incidental noise levels at noise-sensitive locations, particularly during construction and operational phases has been undertaken. Mitigation measures to reduce the potential impacts have also been identified within this section.

13.1 EXISTING ENVIRONMENT

The Study Alignment predominantly passes through rural areas with generally acceptable background noise levels. An exception to this is where the Study Alignment traverses close to the existing Kogan Creek Power Station. The acoustic environment of this section of the Study Alignment is dominated by the noise of the existing Kogan Creek Power Station. During field investigations, the power station was clearly audible along this section of the Study Alignment. Due to the magnitude of the power station, its associated noise is expected to be significant in comparison to the expected noise emanating from the proposed transmission line.

Noise sensitive places as defined by the *Environmental Protection (Noise) Policy 1997* (EPP (Noise)) include:

- Dwellings;
- Library, childcare centre, kindergarten, school, college, university or other educational institution;
- Hospital, surgery or other medical institution;
- Protected areas, or an area identified under a conservation plan as a critical habitat or an area of major interest, under the *Nature Conservation Act 1992*; and
- Parks or gardens open to the public for use other than for sport or organized entertainment.

Seven noise sensitive receptors have been identified from aerial photography and regional investigations within 750m of the proposed transmission line.

DISTANCE FROM STUDY ALIGNMENT	NUMBER OF HOUSES
< 250m	1
>250m <500m	3
>500m <750m	3

It should be noted that the house which is within 250m of the Study Alignment, is currently unoccupied.



13.2 POTENTIAL IMPACTS

Background and incidental noise and vibration levels are expected to be elevated during the construction phase within and surrounding the proposed alignment. Sources of noise and vibration will include earthworks, machinery, traffic (both heavy and light vehicle movements), cranes, foundation excavation and boring, structure installations, vegetation clearing, mulching and chipping, access and building construction. The expected noise and vibration levels and exposure periods will be comparable to that of an ordinary construction site.

During the construction phase elevated noise levels can be expected at locations close to the works areas, and may cause some noise nuisance or annoyance to surrounding sensitive receivers. However, due to the sequential and linear nature of construction associated with the transmission line, any elevation in background and incidental noise will be localized and of short duration. Due to the large separation distance, and proposed construction works being carried out during less noise sensitive hours, there is a low potential for noise impacts to occur during the construction phase. Furthermore, considering the proposed alignment is located in a rural setting, with some sections adjacent to a pre-existing power station, construction noise is not anticipated to be unreasonable or cause nuisance within the immediate area.

During the operational phase, transmission lines can produce corona noise, which is a crackling sound that is caused by the ionisation of air near the conductors. Corona noise is likely to be greatest immediately following rainfall or fog. Transmission lines generate noise, as a result of wind passing across conductors and poles. Wind noise is generally masked by other wind-generated noise such as rustling vegetation. Generally, the transmission line's distance from sensitive receptors provides an adequate noise buffer under normal operating conditions and therefore would not significantly contribute to an increase in background noise levels. Furthermore, vibration is not expected to cause an impact during the operational phase.

During maintenance, aerial (via helicopter) and/or vehicular inspections of the proposed transmission lines will be conducted. Aerial inspection is the most cost-effective method of conducting maintenance inspections and is expected to occur approximately once every 12 months. Potential noise and vibration sources include those related to vehicle operation, and noise associated with repairs. However, the noise generated from these activities are not expected to be significant.

13.3 MITIGATION MEASURES

The proposed transmission line study alignment has been chosen to ensure the distance between the alignment and any adjacent dwellings is maximised.

A number of mitigation measures have been recommended to minimise the potential noise and vibration impacts of the proposed development during the construction phase, including:

- Trucks and machinery to be fitted with effective mufflers and regularly maintained to prevent noise sources (i.e. loose bearings, vibrating panels etc);
- Machinery and vehicles are to be maintained in accordance with the manufacturer's recommendations;
- Equipment not being utilised as part of the work should not be left standing with engines idling for an extended period;



- Ensure construction time is kept to a minimum;
- Restricting construction works to those hours permitted by the DERM (normally 6:30am to 6:30pm Monday to Saturday) except where required for operational reasons or where noise outside these times will not create a nuisance; and
- Publicly communicate construction schedules.

Should works be required outside of those hours stipulated above, potentially affected landholders will be notified and appropriate DERM approvals acquired.

During maintenance, the potential for noise nuisance would also be minimised by keeping the public informed of maintenance schedules and restricting maintenance works, where possible, to the hours outlined above. There may be infrequent instances where emergency works may be required outside these hours.

The additional proposed mitigation measures for Noise Management are outlined further in the EMP (see **Appendix F**).



14.0 ELECTRIC AND MAGNETIC FIELDS

14.1 EXISTING ENVIRONMENT

14.1.1 Explanation & Sources of EMF

Electrical and Magnetic Fields (EMF) is the term used for electric fields and magnetic fields produced due to current movements with electrical conductors. Electric and magnetic fields occur in nature (e.g. static electricity, magnetic poles near north and south poles), in all living things (e.g. neuromuscular activity, functioning of cell membranes) and as a consequence of anthropogenic sources (e.g. generation, transmission, distribution and use of electrical equipment).

Electrical fields are caused by voltages (volts) and can be found near any electrical appliance that is switched on at the power outlet, even if it is not operating. High electrical fields are created by high voltages and are strongest close to their source; however, they reduce quickly with increasing distance from the source. Electric fields are measured in volts per meter (V/m).

Magnetic fields are caused by the flow of electricity (current) through a conductor (e.g. wire). Electrical appliances must be switched on and operating to create a magnetic field. Like electrical fields, magnetic fields are greatest close to the source and increase as the current increases. Magnetic field strength, which is measured in milligauss (mG), reduces quickly with increasing distance from the source.

Whereas electrical fields are easily shielded (weakened) by conducting objects such as trees and buildings, magnetic fields are not easily shielded by most materials. Magnetic fields can only be shielded by structures containing large amounts of ferrous metals of similar material. Typical magnetic fields generated from common household appliances and transmission lines are included in **Table 14.1**

TABLE 14.1 TYPICAL MAGNETIC FIELDS FROM COMMON ELECTRICAL APPLIANCES

EMF SOURCE	TYPICAL LEVEL (MG)	TYPICAL RANGE (MG)
Electric Stove	6	2-30
Computer	5	2-20
Television	1	0.2-2
Electric Blanket	20	5-30
Hairdryer	25	10-70
Fridge	2	2-5
Toaster	3	2-20
Electric Kettle	3	2-10
Electric Fan	1	0.2-2
Suburban Powerline	10	2-20
High Voltage Transmission Line	20	5-100

Source: *Electricity Supply Association of Australia 2001*



14.1.2 EMF & Health

The issue of possible adverse effects on human health from EMF has been investigated and studied for more than 40 years. Research to date has been extensively reviewed by bodies such as the World Health Organisation, the International Radiation Protection Association, and the National Radiological Protection Board (United Kingdom). Currently, no causal relationship has been established, however worldwide research is continuing.

Powerlink recognises there is community interest and concern regarding EMF from its facilities, and continues to monitor developments on this important issue. Powerlink endorses the approach taken by the electricity industry, basing its policy and actions on expert advice on this matter from competent health authorities in Australia and from around the world.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is the Federal Government agency charged with responsibility for this issue and its Fact Sheet 'Electromagnetic Fields and Possible Adverse Health Effects' concluded:

"On balance, the scientific evidence does not indicate that exposure to 50Hz EMFs found around the home, the office or near power lines is a hazard to human health" (ARPANSA 2007a).

The full text of this document can be obtained on the ARPANSA website:

http://www.arpansa.gov.au/radiationprotection/FactSheets/is_emf.cfm

ARPANSA also advise that where people are concerned about the risk of electric and magnetic fields, certain behavioural modifications with respect to use of household appliances could be undertaken to reduce exposure (ARPANSA, 2007b). That is, because the intensity of EMF drops off significantly with distance from the source, appliances could be moved away from close human contact (ARPANSA, 2007b).

Because of the existence of EMF in almost every part of our living environments and the lack of conclusive causal relationship data, the setting of recommended ambient 'acceptable' EMF levels has been difficult. The National Health and Medical Research Council (NHMRC) in 1989 issued interim guidelines for limitations of exposure to EMF. The NHMRC has rescinded this publication in accordance with its policy of reviewing documents published more than 10 years ago, but for completeness, references are included in this EIS where relevant. ARPANSA has since reviewed the NHMRC guidelines and in December 2006 released the 'Draft Radiation Protection Standard: Exposure Limits for Electric & Magnetic Fields – 0 Hz to 3 kHz' report (ARPANSA, 2006) for review. It is expected that the ARPANSA review, when finalised, will replace the NHMRC publication (i.e. the "Radiation Health Series No. 30, Interim guidelines of exposure to 50/60 Hz electric and magnetic fields").

The ARPANSA review (i.e. Draft Radiation Protection Standard) proposes a set of instantaneous reference levels for EMF exposure at 50Hz and these are outlined in **Table 14.2** below whilst the NHMRC interim guideline for continuous public exposure is included in **Table 14.3** below.



TABLE 14.2 ARPANSA DRAFT EMF STANDARD FOR LIMITS OF EXPOSURE – GENERAL PUBLIC

EXPOSURE CHARACTERISTICS	ELECTRICAL FIELD STRENGTH (V/M)	MAGNETIC FIELD STRENGTH (MG)
General Public	5,000	1,000
General Public 'Controlled Activity'*	10,000	3,000

* = an activity in which exposure to EMF may reasonably be expected to exceed public exposure reference levels. See ARPANSA for further details.

TABLE 14.3 NHMRC LIMITS OF EXPOSURE – GENERAL PUBLIC

EXPOSURE CHARACTERISTICS	ELECTRICAL FIELD STRENGTH (V/M)	MAGNETIC FIELD STRENGTH (MG)
Up to 24hrs/d	5,000	1,000
Few hrs/d	10,000	10,000

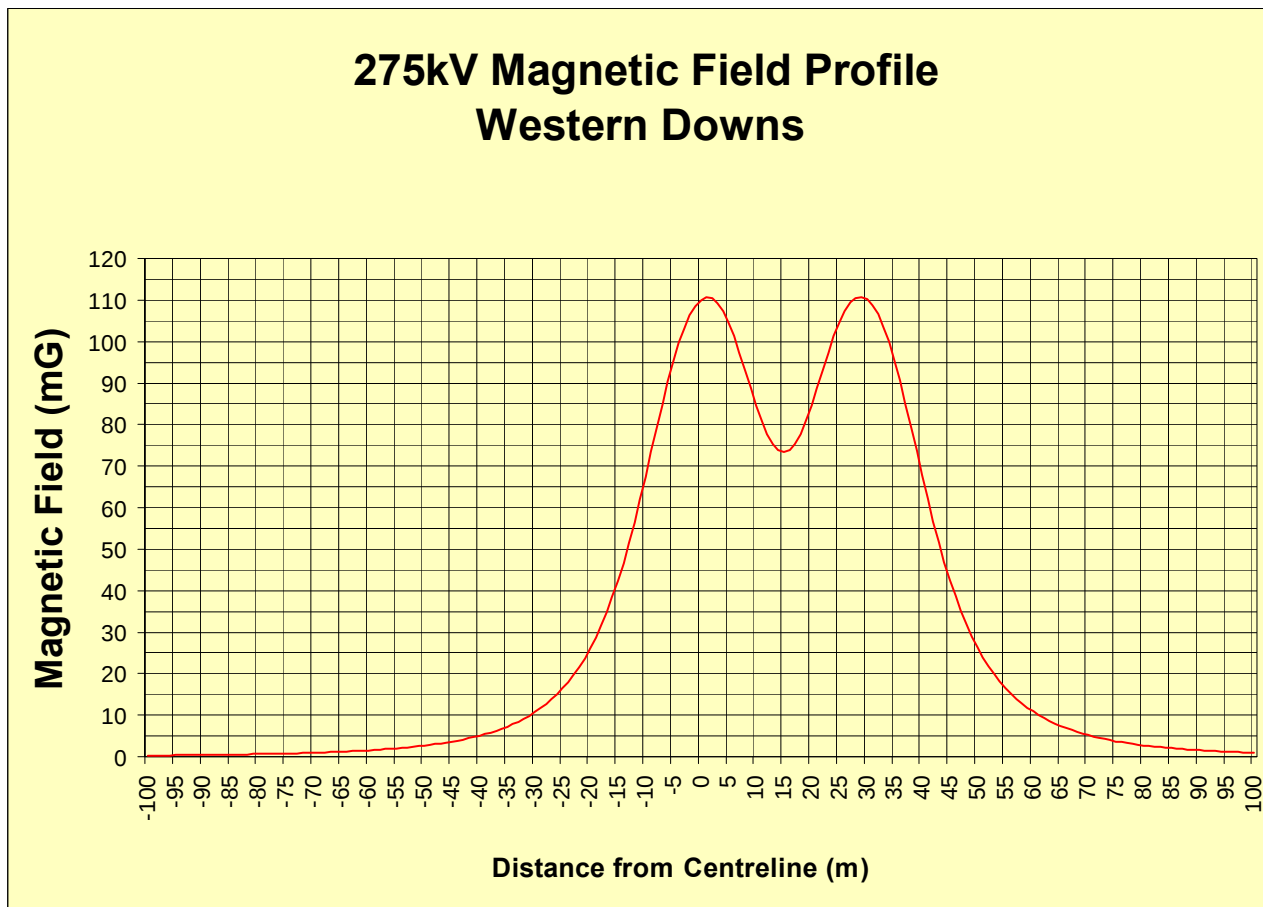
14.1.3 Existing & Proposed EMF Levels

Currently, there are a number of high voltage transmission lines and distribution power lines traversing the area surrounding the project site which, together with domestic sources, contribute to the background levels of EMF. Current levels of EMF are well below the ARPANSA Draft Standard as well as the NHMRC limits of exposure and modeling indicates that even with the installation of the proposed transmission line, increases in field levels would be limited to areas immediately adjacent to the transmission line. Taking account of the impact of the proposed transmission line, field levels would remain well below the ARPANSA Draft Standard and the NHMRC limits of exposure, with field levels outside the proposed alignment corridor (to 30m either side of the centerline) would experience only minor increases above current background levels.

The EMF calculations for the proposed transmission line, as shown in the graph (**Graph 14.1**), are calculated by Powerlink from expected parameters for line loading, conductor configuration and height. The EMF profile and graph is representative of the section of dual line easement west of the Kogan Warra Road. For a single line easement, the EMF profile between the line and the easement boundary, and outside the boundary would be consistent with that situation for the dual line layout i.e. the EMF readings at a given distance “outside” the single and dual lines would be for all intents and purposes, the same level.



GRAPH 14.1 MAGNETIC FIELD PROFILE WESTERN DOWNS TRANSMISSION LINE



14.2 POTENTIAL IMPACTS

14.2.1 Health Concerns

The transmission of electricity via the proposed Project has the potential to generate electrical and magnetic fields which in turn raises public health concerns. Recommended (by ARPANSA and NHMRC) exposure levels have been outlined above along with the predicted EMF levels for the area immediately surrounding the proposed transmission line once constructed. The expected EMF levels from the proposed transmission line are well within the ARPANSA Draft Standard and the NHMRC limits of exposure.

It can also be seen that both EMF strength relationships are significantly reduced at the edge of the easement (i.e. approximately 30m either side of the centreline). **Graph 14.1** shows even at the centreline of the proposed Project the EMF levels are consistent with the published typical ranges shown in **Table 14.1** and **Table 14.3**.

14.2.2 Other Possible Impacts

The proposed Project has the potential to induce voltages on adjacent conducting objects. For example electric fields can induce charges on metal objects which may generate a slight spark and shock if touched. These slight sparks and shocks are harmless but can be perceived as a problem and to reduce the potential for such



occurrences, Powerlink Queensland's practice is to earth metal objects (such as fences), as required. Additional impacts that could be caused by EMF include:

- Corona effects - Energised surfaces, such as conductors, are surrounded by regions of high field strength that cause ionisation of the air. The corona effect is a minor electrical discharge as a consequence of ionised air and is strongest during wet weather. Other effects of corona may include gas emissions, audible noise and television and radio interference, as discussed below;
- Gas emissions – Extremely low concentrations of ozone, nitric oxide and nitrogen dioxide gases are generated by corona discharges. The concentrations produced are environmentally insignificant compared to the quantity produced by thunderstorms, solar radiation and wind;
- Audible noise - Corona noise is characterised by the 'crackling' sound that is normally heard during light rainfall. Noise generated by the conductor in normal dry weather is not noticeable; however, it rises during wet weather as a consequence of water droplets on the conductor itself. During such conditions, the noise from rainfall normally overrides the noise from the conductor. Therefore, audible noise from corona is dependent on weather and distance from the conductor; and
- Television and radio reception - Television and radio reception can potentially be affected by corona, however, this is considered unlikely, as corona effects are significantly reduced outside of the transmission line easement. Impacts on television and radio reception are unlikely to be experienced.

14.3 MITIGATION MEASURES

Powerlink follows the Electricity Networks Association's (ENA) EMF policy, which includes practising prudent avoidance when designing new electricity infrastructure. This involves actions including, where practicable, locating electricity assets away from houses, and configuring powerline conductors in a way which reduces EMFs. These strategies are based on the fact that the strengths of EMFs decrease rapidly with increasing distance from a powerline. For example, the EMFs become negligible at a distance of less than 100m from the type of line proposed for this Project.

Mitigation measures that may assist with EMF and associated impacts include:

- Appropriate design of conductors and line fittings can reduce corona discharge;
- Powerlink Queensland can install mitigation measures such as isolating fences into shorter sections, to reduce potential for induced voltage; and
- With regard to impact on essential services, Powerlink Queensland liaises regularly with the appropriate authorities (e.g. Telstra etc) to determine whether any mitigation measures will be required.

If a causal impact on television reception is observed due to the Transmission line operation, Powerlink Queensland will undertake necessary investigations and remedial measures (see **Appendix F**).



15.0 LANDSCAPE CHARACTER AND VISUAL AMENITY

15.1 LANDSCAPE

15.1.1 Background and Methodology

In order to recognize the value of the study area, a broad landscape character assessment has been undertaken. This assessment includes consideration of landscape elements and how they combine to create the character of the subject area. This assessment addresses the way different components of the environment, both natural (vegetation, geology, topography, etc.) and cultural (land use, built environment, enclosure, etc.), interact with each other to be seen by residents or visitors to the area as creating a distinct combination of features. By defining the existing character of the area, any changes as a result of development can be easily identified and characterised as either contributing to the local character or detracting from the existing character of the area.

15.1.2 Existing Environment

The landscape character of the Western Downs area generally comprises three distinct land use types – rural crop land, grazing land with scattered native trees and areas of native woodland. Beyond the flat agricultural plains, the land is gently undulating between 300 to 360m above sea level and is largely covered with a combination of grazing land and dry eucalypt woodland.

The landscape of the region is characterised by the following distinctive elements:

- Very low density and generally small scale of development;
- Long straight rural roads with open or filtered views of the rural landscape;
- The meandering Condamine River, associated floodplains and riparian vegetation;
- Open flat or undulating rural plains with a patchwork of agricultural uses;
- Rolling grazing land and vegetated foothills; and
- Dry eucalypt woodland

The landscape of the eastern 7km of study alignment is characterised by the low lying open agricultural land and riparian vegetation of the Condamine flood plain. The landscape surrounding the remainder of the route is characterised by dry eucalypt woodland on the foothills, with the highest ground level along the route being approximately 40m above the flood plain level.

15.1.3 Potential Impacts

Where the study alignment follows an existing transmission line corridor, only an incremental amount of vegetation will have to be cleared. No significant changes to the existing topography are required. Existing screening vegetation will be retained where possible, particularly where the route crosses existing roads. The development of the proposed transmission line route will not change the overall landscape character of the study area.

Once construction of the transmission line is complete and vegetation regenerates, the development will have a minimal impact on the local landscape character.



15.1.4 Mitigation Measures

On-going maintenance to allow native vegetation to regenerate will help to integrate the proposed development within the local landscape character.

15.2 VISUAL AMENITY

15.2.1 Background and Methodology

There are no formal viewing points in or around the study area so the most significant viewing locations to be considered will be from state and local roads and from seven houses within 750m (see Section 13.1) of the study alignment. Assuming a nominal transmission tower height of 42m above the existing ground level and an average woodland vegetation height of 12m and a riparian vegetation height of 18m, the screening effect of the existing vegetation will result in limited visibility of the development from the most significant travel routes and will screen the majority of the route from the houses identified.

15.2.2 Existing Environment

The Warrego Highway is the most highly trafficked route in the vicinity of the study area. Secondary roads in the area include the Warra Kogan Road and the Kogan Condamine Road; tertiary roads include Banana Bridge Road, North Kogan Road and Beelbee Road and access roads within the study area that will be effected by the proposed route include Muhlings Road, Healys Croassing Road and Wolskis Road.

Long views of the study area are generally screened by the existing woodland and riparian vegetation and the undulating terrain.

15.2.3 Potential Impacts

The closest point the proposed study alignment comes to the Warrego Highway is 5km away at the eastern most point where it meets the existing transmission line corridor. This section of the study alignment will be screened from the Warrego Highway by riparian vegetation along the Condamine River and the distance from the viewing location.

The closest point the proposed transmission line route comes to the Kogan Condamine Road is 6.5km away at a point approximately half way along the corridor length. This section of the proposed route is screened from the Kogan Condamine Road by existing dense vegetation and the intervening topography.

Views of the remainder of the proposed transmission lines will be predominantly screened from local trafficked roads by existing vegetation other than at road crossings and sections of road where the corridor travels parallel with the road.

The roads that will be impacted are generally less trafficked routes so will have very low visual exposure. However, the transmission lines along a short section of the Warra Kogan Road (approximately 2km) will have a moderate level of visual exposure and therefore drivers will experience a moderate visual impact, particularly during the construction phase. The Transmission Line will be visible at the eastern end of Wolski's Road and where it crosses a property access from this road.



Seven houses have been identified from aerial photography and regional investigations within 750m of the proposed transmission line route. One house is within 250m, 3 are between 250 to 500m and 3 are between 500 to 750m. The house within 250m is currently unoccupied. Section 13.1 discusses this in more detail.

15.2.4 Mitigation Measures

One third of the study alignment follows an existing transmission line corridor through sections of landscape characterised by dense vegetation, no mitigation is necessary along these sections of the route.

In locations where the study alignment crosses roads, existing vegetation should be retained (where possible) to minimise the visual impact of these crossing points on passing traffic. Regeneration associated with existing vegetation south of the Warra Kogan Road will increase the screening effect to the transmission towers and lines along this section of the alignment.

Development of the study alignment should include the following requirements:

- Minimise the removal of existing woodland vegetation outside of the immediate construction site area; and
- Review individual circumstances for properties within 750m of the transmission line routes and where the property is visually impacted, provide advice on screen planting that can be installed within their property to help screen views of the transmission towers from their home.

With the retention (where possible) and regeneration of woodland buffers at road crossing points and along a 2km section of the Warra Kogan Road, the permanent transmission towers and lines will have no long-term visual impacts regionally and will have no significant long-term visual impacts locally.



16.0 TRANSPORT INFRASTRUCTURE AND TRAFFIC

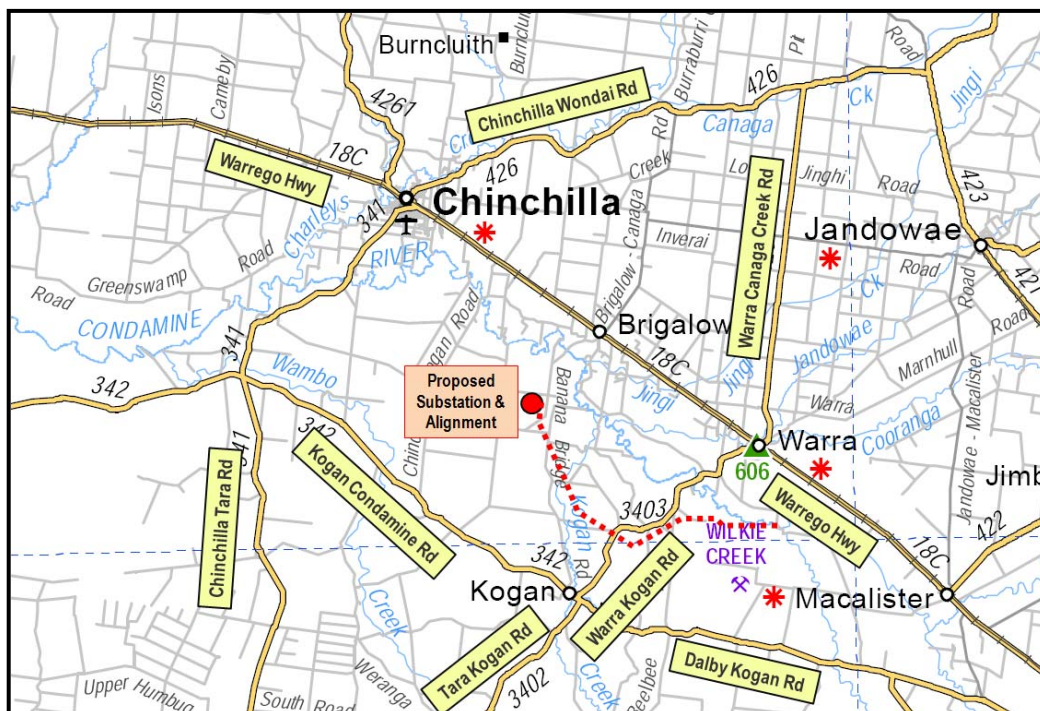
16.1 EXISTING ENVIRONMENT

16.1.1 Road Network

The area adjacent to the study alignment comprises a number of State controlled roads under the management of the Department of Transport and Main Roads (DTMR) and local authority roads under the management of the Western Downs Regional Council. **Figure 16.1** shows the State controlled roads in yellow and the local roads in grey. The most relevant State controlled roads are:

- Warrego Highway (included in the Auslink national road network);
- Tara Kogan Road;
- Kogan Condamine Road;
- Chinchilla Tara Road;
- Warra Canaga Creek Road;
- Chinchilla Wondai Road;
- Warra Kogan Road; and
- Dalby Kogan Road.

FIGURE 16.1 STATE CONTROLLED AND LOCAL ROADS NEAR THE STUDY AREA



Detailed information about the surface type, daily traffic volumes and approximate width of the above mentioned roads is provided on Table 16.1, where it is shown how the Warrego Highway is the corridor that carries the majority of traffic near the study area (AADT = 2111). It is also shown that the percentage of heavy vehicles travelling in the area is relatively high, particularly along the Warrego Highway (28%).



TABLE 16.1 ROAD INFORMATION

	AADT	%HV	Surface Type	Approx. Width (m)
Warrego Highway	2111	28	Sealed	10
Tara Kogan Road	151	12	Sealed	7
Kogan Condamine Road	192	24	Sealed	9
Chinchilla Tara Road	976	12	Sealed	8
Warra Canaga Creek Road	unknown	unknown	unknown	unknown
Chinchilla Wondai Road	272	17	Sealed	9
Warra Kogan Road	47	10	Sealed for most of its length with some unsealed sections	9
Dalby Kogan Road	378	20	Sealed	8

The proposed transmission line alignment extends for approximately 23km before connecting with the existing Queensland-NSW Interconnector. It crosses four local roads and one State controlled road, as shown in **Figure 16.2**.

FIGURE 16.2 ROADS CROSSED BY THE TRANSMISSION LINE ALIGNMENT

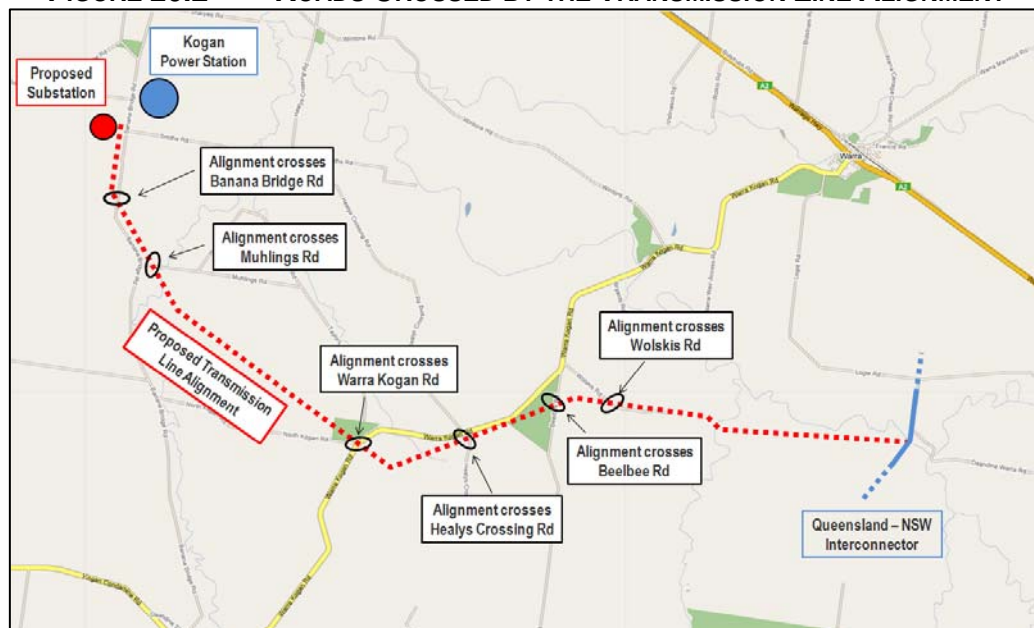
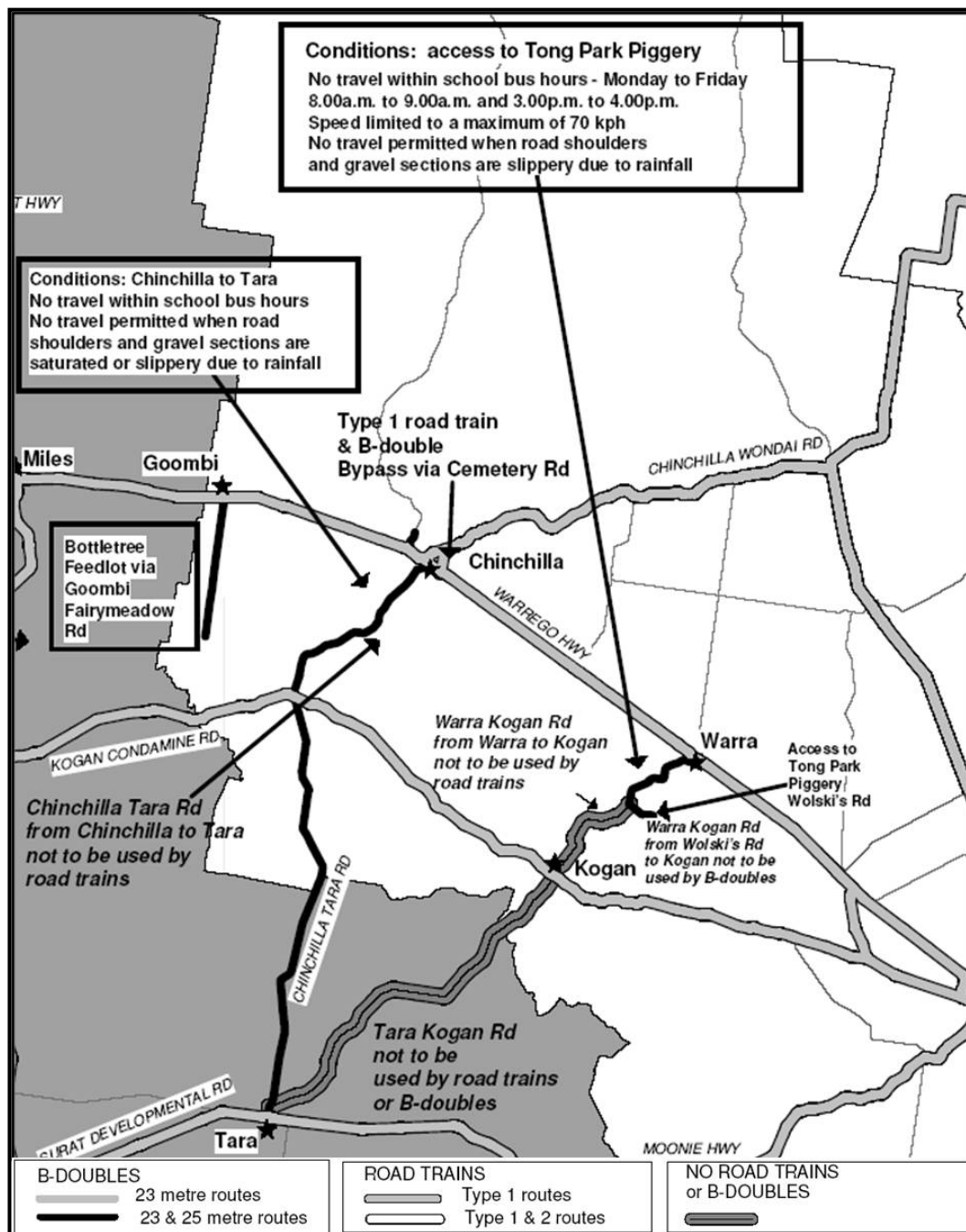




FIGURE 16.3 HEAVY VEHICLE RESTRICTIONS NEAR THE SITE



In terms of the heavy vehicle size restrictions in the area, **Figure 16.3** provides an indication of the current situation as specified by DTMR. It is important to note that operational restrictions for road train are currently in place along Wara Kogan Road and Tara Kogan Road during school set-down and pick-up periods and during period of wet weather.



16.1.2 Planned Road Upgrades

The DTMR Roads Implementation Program for the Darling Downs region indicates that some improvements are planned to be implemented on a number of roads in the study area, such as Dalby Kogan Road, Chinchilla Tara Road and Kogan Condamine Road. The majority of these improvements, however, are considered to be irrelevant due to the distance to the transmission line and/or the nature of the upgrades. However, it is important to highlight the proposed upgrade of the southern end of both Banana Bridge Road and Warra Kogan Road to 2-lane sealed standard.

16.1.3 Rail Network

A rail line passes near the study area (parallel to the Warrego Highway) but is not crossed by the study alignment. Passenger services currently operate twice a week along this route, designated as “The Westlander”, which connects Brisbane to Charleville, passing through Toowoomba. Sections of this line are proposed to be upgraded from Columboola to Brisbane to cater for increased coal rail traffic.

FIGURE 16.4 THE WESTLANDER RAIL ROUTE

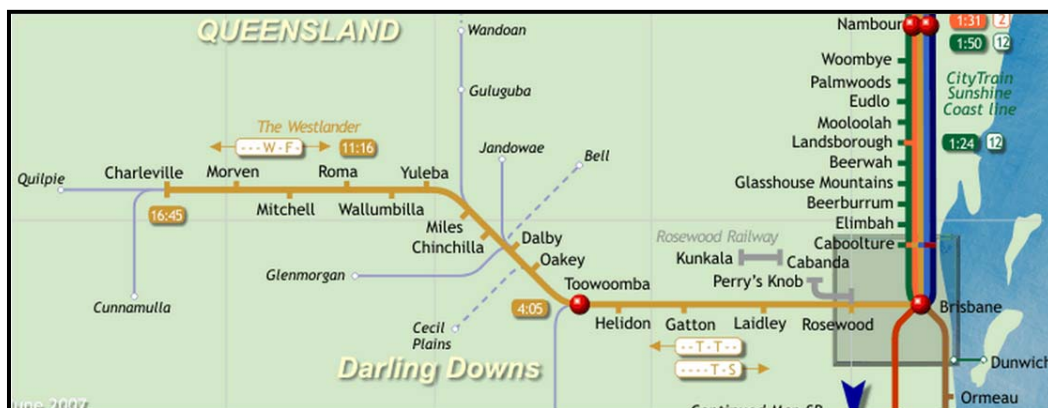


FIGURE 16.5 RAIL LINE NEAR THE STUDY AREA



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16.1.4 Flight Paths and Facilities

The closest airfield is the “Chinchilla Airport”, located approximately 15km to the north-west of the existing Kogan Power Station. The number of flights currently using this airfield and respective frequency is undetermined.

16.2 POTENTIAL IMPACTS

16.2.1 Construction Period

During the construction phase, a light increase of traffic volumes on the roads adjacent to the alignment is expected to occur given the necessary transport of materials, equipment and personnel. Previous projects of this nature generated approximately 20–30 vehicle movements per day. These volumes are considered unlikely to affect traffic flows in the area. Inconveniences caused by the project are more likely to be related to factors such as vehicle noise and dust. Localised road improvements might be necessary to ensure that construction vehicles can pass traffic travelling in the opposite direction and that adequate access is available to the full extent of the alignment.

All equipment and materials will be transported and delivered using semi trailers and therefore the size limitations currently in place on some state controlled roads around the area will not be exceeded.

It is anticipated that the majority of traffic movements to and from the site will occur via the Warrego Highway / Warra Kogan Road and the local roads that run parallel or cross the alignment such as Banana Bridge Road, Wolski’s Road, and Warra Kogan Road. Where possible, direct access to the transmission line will be provided via the existing easements.

Powerlink, in conjunction with the construction contractor, will consult with the Western Downs Regional Council about the use and maintenance of local road infrastructure. Joint asset condition assessments will be held to determine the state of the road infrastructure prior to commencing the Project and agreement reached on the upkeep and rehabilitation required for the affected road infrastructure during the course of the Project.

16.2.2 Operation and Maintenance Period

Vehicle movements related to the maintenance and inspections of the transmission line are expected to be very low, particularly when compared to those that will potentially occur during the construction phase.

While the actual frequency of these trips is undetermined, there should be no relevant impacts on the transport infrastructure and traffic operation in the area.

16.3 MITIGATION MEASURES

16.3.1 Construction Phase

The impacts caused by construction generated traffic are not likely to be significant. The Warrego Highway and Warra Kogan Road are likely to carry a great part of this traffic, which will also use some local roads to gain access to the transmission line alignment. In the event of over-dimensioned equipment needing to be transported, the appropriate approval must be sought from Main Roads.



Some minor traffic delays may occur during the construction phase, as a result of line stringing. This process normally takes an average of 15 minutes per draw wire, after which traffic flow resumes. In order to minimize the impacts of temporary road closures and interruption of traffic flows, a detailed Traffic Management Plan will be prepared by the construction contractor prior to the commencement of the works. Consideration will also be given to undertaking the works which are likely to cause traffic delays at times of low volumes. As part of the Traffic Management Plan, the construction team will notify the local Department of Community Safety (Emergency Management Queensland and Queensland Ambulance Service) and the Western Downs Regional Council to ensure these groups are kept informed of the construction methods, traffic movements and proposed time frames for the duration of the project. GPS coordinates of each tower location will be supplied to each entity to accelerate access in an emergency.

16.3.2 Access Tracks and Construction Traffic Property Access

Where practical, all access tracks will be placed within existing or new easements. During the construction phase, some equipment, machinery and various types of vehicles will require access to properties. This will cause some short-term community amenity impacts such as noise or dust emission nuisance caused to adjacent or nearby residences.

It is recommended to contact and formally advise landowners of the need for property access prior to the commencement of construction activities.

16.3.3 Maintenance Activities

Post construction vehicle movements related to maintenance and inspection of the transmission line are expected to only be minimal and therefore all impacts related to these activities are considered to be negligible and do not require any substantial mitigation measures.

16.3.4 Flight Paths and Facilities

It is recommended that Powerlink contacts landowners in the area to investigate whether aerial spraying is frequently carried out in the vicinity of the study alignment. Powerlink should advise spraying contractors known to work in the area of the location of the lines.



17.0 CULTURAL HERITAGE

17.1 NON-INDIGENOUS CULTURAL HERITAGE

17.1.1 Background and Methodology

The identification and assessment of the region's cultural heritage areas, objects and values (both potential and realised) are fundamental to the successful planning of the proposed development. This section describes the non-indigenous cultural heritage values and history associated with the area study area. Historical descriptions of Project locale have been provided. Community cultural heritage values as well as sites/places listed on State and Federal heritage lists are discussed. Finally, potential impacts which may occur as a result of the Project are discussed and mitigation measures and recommendations provided.

An assessment has been conducted into the non-indigenous cultural heritage values of the study area. The following resources were used in the preparation of this section:

- Searches of the following heritages agencies' databases:
 - The National Trust;
 - The State Heritage Register; and
 - The Register of National Estate.
- Consultation with local Warra resident, and Secretary of the Warra Progress & Heritage Society, Lyn Taylor; and
- Consultation with former long-time Kogan resident and previous owner of the Kogan Hotel, Berryl Dwyer.

The aforementioned methodology was utilised in order to gather information on a wide array of cultural heritage values for the region ranging from those places and sites listed on State and National heritage registers, to places/sites which hold particular significance to specific community members.

17.1.2 Existing Environment

Discussions with Lyn Taylor (Secretary of the Warra Progress & Heritage Society) and Berryl Dwyer (previous owner of the Kogan Hotel), has resulted in the following account of historical events within the region:

On October 1st, 1844, German explorer Ludwig Leichhardt led his first expedition from Jimbour (approximately 15km north-west of Warra) to Port Essington in the Northern Territory. By following the Condamine River, Leichhardt and his expedition team arrived in Warra on the fourth day of the journey, and set up camp along the river bank. A memorial entitled "Leichhardt's Legacy" has been erected at the apparent campsite, and exhibits his journal entry for the event.

The Warra region was settled in the 1840s by Henry Dennis. In 1877, the western railway line was extended from Dalby to Warra, and was used to transport passengers and produce between Brisbane and Charleville. The restored Warra Railway Station is now located within the Richard Best Memorial Park, which accommodates the



Progress & Heritage Society Museum. According to Lyn Taylor, the Progress & Heritage Society Museum frequently exhibits historical photographs taken within the Warra region, entitled “Warra Remembers”.

Between 1914 and 1919 the town subsequently flourished with the establishment of coal mining operations. After five years of operation, the Warra coal mining industry ceased, and the population declined as result of the migration of miners to alternative locations. Mining has since been replaced by grain and cotton growing, which has resulted in the successful establishment of a rich agricultural heritage.

17.1.2.1 Significant Sites/Places

As a result of this investigatory study into the non-indigenous cultural heritage values associated with the study area, it has been identified that whilst the region surrounding Warra has numerous sites and places of cultural heritage significance, there is an absence of significant sites in the vicinity of the study alignment. For the purposes of this Section, the term “culturally significant” describes those areas which are deemed culturally significant either by State and Federal heritage agencies, by industry professionals and by interested community members. Distinctions are made between site/places of these varying significance levels.

For the purposes of this section, only those sites and places located in the direct vicinity of the study corridor will be examined in detail. It is acknowledged that there are numerous other significant cultural heritage sites located within reasonable proximity to the study corridor, however the Project is not expected to impact on these areas.

17.1.2.2 Cultural Heritage Listings

Review of the Queensland Heritage Register (European) indicates an absence of non-indigenous cultural heritage sites within the immediate vicinity of the Project corridor (DERM, 2009). Australian Heritage Database searches for the suburbs of Warra, Kogan, Dalby and Chinchilla, have identified the Boonarga Cactoblastis Memorial Hall (for its association with the defeat of the prickly pear plague; a major event in Australia’s agricultural history) is located within 17km of the project site. Similarly, the Chinchilla Sands Local Fossil Fauna Site (a highly significant Pliocene fossil site), is located within 21km of the project site (DEWHA, 2009). No Commonwealth or State significant non-indigenous cultural heritage sites exist within Project corridor locale.

17.1.2.3 Other Sites of Cultural Significance

Consultation with the Warra Progress & Heritage Society secretary (Lyn Taylor) and former owner of the Kogan Hotel (Berryl Dwyer), has resulted in identification of areas/objects within the region that are considered socially important by local and regional stakeholders. Areas/objects of social significance, important in maintaining the community's integrity, include:

- Warra Memorial Hall;
- Richard Best Memorial Park (Warra);
- Campsite of Ludwig Leichhardt (Warra);
- Warra Cemetery;
- Police Station (est. 1908) (Warra);
- Post Office (est. 1908) (Warra);
- Warra Pub (est. 1908);



- Church (est. 1907) (Warra);
- Railway (est. 1877) (Warra);
- Memorial site for first Government owned coal mine in Queensland (Silhouettes and skip replica made of original railway platform board) (Warra); and
- Historical subway (Warra).

None of the above mentioned significant places/objects are within the vicinity of the study corridor.

17.1.3 Potential Impacts

The Project will not directly impact upon areas or objects of social importance or cultural significance. In consideration of the broader context of the area surrounding the Project corridor, the proposed development is not expected to have a negative impact on the lifestyle of local residents, or on the appeal of places frequently visited within the region. Despite this, the likely presence of remnants of cultural heritage has not been dismissed and should be considered during construction and operational activities.

17.1.4 Mitigation Measures

The impact of the proposed development on matters of cultural significance is expected to be negligible. However, if during construction, historic relics are discovered, the site/location should be avoided until an appropriately qualified heritage assessor has been afforded the opportunity to assess any objects of possible heritage value, *in situ* in accordance with the EMP (see **Appendix F**).

17.2 ABORIGINAL CULTURAL HERITAGE

The Aboriginal parties for this project are the Barunggam People. A previous cultural heritage survey of the Kogan to Braemar transmission line in about 2005 identified significant cultural heritage adjacent to the proposed alignment of the Western Downs to QNI. The cultural heritage survey for the Western Downs to QNI easement will ensure these areas are identified and agreed steps taken to manage these areas during the development of this project. The cultural heritage survey with the Barunggam people will be conducted in the second half of 2010.



18.0 GREENHOUSE GAS EMISSIONS

18.1 BACKGROUND AND METHODOLOGY

Greenhouse gases (GHG) are atmospheric gases which reduce the loss of heat from the earth into space through capturing of radiant heat. While these gases are naturally present in the atmosphere, significant additional amounts are released when fossil fuel based products (like coal, natural gas, and petrol) are burned. Because of the gases ability to capture energy, increased levels of the gases means more heat is captured, resulting in an increase in global surface temperatures (through the 'enhanced' greenhouse effect). The impacts of this temperature increase are expected to include a rise in sea levels, increase in frequency and intensity of severe weather events (flood, drought, etc) and changes in rainfall patterns.

The construction and operation of transmission infrastructure can contribute to these emissions when trees are cleared for access (removal of carbon sink) and where liquid fossil fuels are used to transport materials and equipment for construction and operation. Energy (as both fuel and electricity generated from fossil fuels) is also consumed in the manufacture and production of the materials used in the line construction (steel, aluminium etc), and can be considered to be 'embedded' in the final product.

By recognising these links and considering them in the development phase; some of these contributions can be reduced or eliminated through better planning and design decisions.

In addition to the direct net impact of the development on, and contribution to greenhouse emissions, there are also potential impacts of climate change on the development such as the need to plan for more extremes in weather events . Adaptation and mitigation measures can be selected to manage the changes in environment and stakeholder expectations to determine the success of the development in the medium to long term.

The greenhouse gas footprint of the transmission line was assessed based on vehicle movement data provided by Powerlink and estimates of the value of embedded materials based on similar projects.

18.2 ADAPTATION PLANNING

With regard to the changing physical and political environment (see in **Sections 6.2.1** and **6.2.2**) there are a number of considerations in the planning of the Project which can help to minimise the risks of adverse impacts. A brief summary of these issues is provided in the below table.

As with any risk management strategies, hazards don't necessarily need to be eliminated, but controlled to within acceptable risk tolerances.



TABLE 18.1 CLIMATE CHANGE RISK AND ADAPTATION SUMMARY

RISK	IMPACT	DESIGN RESPONSE
Flash Flooding	Inundation and high velocity water movements, erosion, access restrictions and material damage.	Any grading of land, drainage system and bunding to take risk into account. Footings to allow for erosion. Rate and nature of degradation of materials. Material selection and maintenance schedule to consider. Access to repairs/ maintenance may be impeded due to weather events. Appropriate response/contingency plans should be developed. Insurance premiums / excess may increase with more frequent severe weather events. Risk management documentation and procedures should be followed to counteract.
Severe Storms & Tropical Cyclones	High wind loading, lightning strike and flash flooding. Cyclones and more particularly storms, may become more intense and move further South more often, impacting the study area.	Design to account for wind loading as necessary (AS/NZS 1170.2:2002 – Structural design actions – Wind actions). Proper grounding of structures. Drainage design to account for severe short term events (as per above).
Temperature Rise	Cyclones and more particularly storms, may become more intense and move further South more often, impacting the study area.	Specifications for materials should account for these issues. Rate and nature of degradation of materials and potential increase in maintenance schedule to be considered.
	Increased bushfire risk and season, destruction of plant as well as overheating of lines, transformers etc.	Firebreaks to be maintained and appropriately sized for conditions and level of acceptable risk.
	Network congestion from increased peak loads associated with air-conditioning use etc. Decreased efficiency transmission and generation facilities.	Design and capacity of infrastructure to include sufficient redundant capacity to account for potential future inefficiencies.
Changing Rainfall Patterns	Changes to ground conditions (wetting and drying cycles) leading to impacts on footings and foundation materials.	Material specifications should account for such potential stresses. Maintenance and testing systems and frequency should be developed with regard to acceptable level of risk.
Legislative response to Climate Change	Distribution patterns for electricity are likely to be effected by both Carbon Pollution Reduction Schemes and Mandatory Renewable Energy Target, favouring renewable and lower intensity capacity.	Transmission network capacity should account for potential future renewable generation sources, such as biogas. Future network planning is to consider the impacts of future renewable generation sources however Powerlink Queensland has no control over the location or type of generation required to supply non-discriminatory access to generators.



18.3 GREENHOUSE GAS FOOTPRINT

Typically Greenhouse Gas (GHG) emissions reporting involves categorisation of the emissions into three 'Scopes' or types of emissions. This helps to delineate emissions with regard to the source and level of control.

These 'Scopes' may be defined as follows:

- Scope 1 emissions are direct, controllable emissions that come from sources owned and controlled by the company (such as fuel-use by vehicles or natural gas consumed on site);
- Scope 2 emissions are indirect emissions that come from the generation of purchased electricity; and
- Scope 3 emissions are a consequence of the activities which are not in the direct ownership or control of the company, but are a result of their use of third party goods and services. Items such as domestic flights, taxis or emissions from the production of consumables such as paper all fit under this category.

Scope 3 emissions are generally reported voluntarily and separately from a company's other emissions, as they will form part of the 'primary' (scope 1 and 2) emissions of another entity.

A preliminary desktop audit has summarised the major project elements as follows:

TABLE 18.2 GREENHOUSE GAS (GHG) SOURCES BY SCOPE

SCOPE 1	SCOPE 2	SCOPE 3
Tree clearing for site preparation. Fuel used in company owned heavy vehicles for site works. Fuel used in company owned light vehicles (for staff transport, delivery of materials etc). Any fuel used for on site generation (industrial lighting etc).	Grid Electricity used in temporary site office.	Domestic flights for staff and management to and from site. Other project consumables (steel, concrete, aluminium etc). Wastes generated as a result of the project. Energy / Emissions embedded in construction materials. Third party site works and vehicle movements.

18.4 VEGETATION CLEARING

The study alignment includes some vegetative cover which will be cleared for construction and there is expected to be a net loss of vegetative-carbon sink due to the transmission line construction.

No comprehensive modelling is currently available for detailed estimation of the scale of the lost carbon sink however broad assessment has been completed.

In terms of clearing along the alignment:

- Approximately 8.5km will be cleared to 40m wide; and
- Approximately 4.5km will be cleared to 60m wide.



The total area to be cleared therefore is 61ha. This assessment does not make allowance for selective clearing or areas where the total easement will not require clearing and should be viewed as a “worst case” scenario.

According to vegetation mapping (refer Figure 10.1), this land is a mixture of Non-remnant / regrowth, Endangered – Dominant and Not of Concern ecosystem. Cleared area has not been specified by ecosystem as it is not material to the GHG calculations at this level of detail. The Flora and Fauna assessment of the site (refer Section 10) found that the vegetation impacted by the clearing was dominated by various eucalyptus species. The area has therefore been assumed to be dry sclerophyll forest for the purposes of this GHG assessment.

The National Carbon Accounting System (NCAS) calculates dry sclerophyll forest to have a carbon sequestration potential of 546 tonnes of CO₂ equivalent per ha. At this rate approximately 33 300 tonnes of lost CO₂ sequestration potential is generated from the project.

18.5 HEAVY VEHICLE FUEL USE

Heavy vehicles (trucks/semi trailers, pilling rig, excavators and cranes etc) will be used to transport materials to and from the site.

It has been estimated that in the region of 71 round trips will be made to and from the site to deliver materials and equipment, and to remove site wastes:

Transmission Line

- 5 Semi trailer deliveries for site clearing machinery (Excavators and Bobcats etc) and 5 trips for collection;
- 40 Concrete Truck deliveries;
- 2 Semi trailer deliveries for reinforcement steel;
- Single Semi trailer delivery for boring machine (plus trip for collection);
- 2 Semi trailer deliveries for cranes (plus 2 trips for collection); and
- 13 Semi trailer deliveries for pre-fabricated structures, plant and equipment for completion.

It has been assumed that all suppliers and materials will be provided from the Toowoomba area (approx 120 km away) with an average travel distance (return trip) of 240 km.

This results in a total heavy vehicle travel distance of 17,040 km for the transmission line development.

The Australian Bureau of Statistics (ABS, 2008) estimate Articulated trucks to consume in the region of 54.6 L of diesel per 100km travelled, and 28.6 L / 100 km for rigid trucks. In total around 5.9 kL of diesel has been calculated for this use.

In addition to the above, some equipment will be used at the site for civil and construction works:



Transmission Line

- Dozer, excavator, roller, bobcat, grader and water truck for 4 weeks for construction of access tracks;
- 2 mulcher tractors, groomer, excavator and dozer for 8 weeks for clearing;
- Boring machine, bobcat, flat tray truck, crane and water truck for 75 days for boring foundations;
- flat tray truck, concrete truck and pump for 25 days for foundation concrete pour;
- 2 cranes for 100 days for tower erection;
- 2 break / winch machines, 4 drum carriers, 2 flat tray trucks, single crane and elevated work platform for 5 weeks for stringing preparation;
- helicopter for stringing prep 5 weeks; and
- helicopter for stringing 2 weeks.

Assuming the site operates for 8 hours per day 5 days per week, 10,040 machine hours are accrued.

According to "Spon's Civil Engineering and Highway Works Price Book" (2005) heavy machinery for site works use in the region of 38 L diesel per hour with 80% capacity usage (leaving around 30L/hour being used). Helicopters were assumed to use 140L/hour of fuel.

In total 297 kL of diesel and 39 kL of aviation fuel where calculated.

The National Greenhouse Accounts (NGA) Factors (June 2009) indicate 2.7 tonnes of CO₂-eq per kL of diesel fuel and 2.2 tonnes of CO₂-eq per kL of aviation gasoline (direct emissions).

Based on these values, the transmission line would contribute 887 tonnes of GHG.

18.6 LIGHT VEHICLE FUEL USE

Private vehicle usage is estimated to vary over the Project schedule. Site staff will be going to and from the site daily from the Dalby area (approximately 75 km away).

Transmission Line

- 1 to 2 4wd's for 4 weeks for construction of access tracks;
- 2 4wd's for 8 weeks for clearing;
- 3 4wd's for 75 days for boring foundations;
- 1 4wd for 25 days for foundation set up;
- 3 4wd's for 25 days for foundation concrete pour;
- 4 4wd's for 100 days for tower erection;
- 5 4wd's for 5 weeks for stringing preparation; and
- 2 4wd's for 2 weeks during stringing.

Using an average return trip distance of 150km, a total of 980 return trips and a total distance of 147 000 km was estimated to be travelled.

ABS (2008) estimate passenger vehicles use 11.1L of petrol per 100km travelled. The testing vehicles where assumed to be light commercial vehicles at 12.5L diesel per 100 km's. In total around 18.4 kL of fuel is expected



to be consumed based on the above assumptions. Approximately 50 tonnes of greenhouse gas are contributed to the footprint from this source.

It should be noted that this number is highly dependent on driver behaviour, location and site conditions, and would need to be closely monitored (through the use of fuel cards, etc) to ensure the appropriate reporting thresholds are observed.

18.7 ELECTRICITY FOR TEMPORARY SITE AMENITIES

No temporary site amenities have been indicated. It is assumed all staff will be Dalby based.

18.8 EMISSIONS SUMMARY

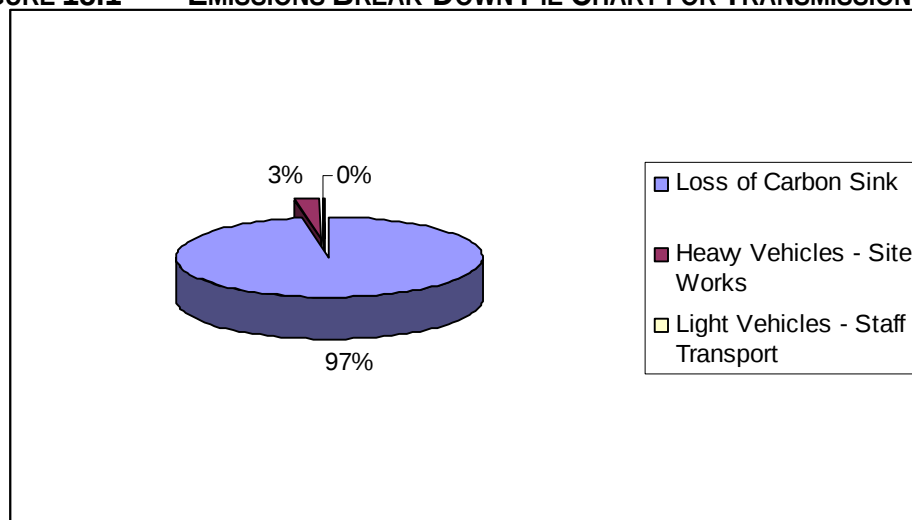
The following table summarises the calculated GHG emissions according to the Scopes that categorises them. Scope 1, or direct emissions is the largest emissions group by an overwhelming margin as Scope 3 emissions are reported by others.

TABLE 18.3 EMISSIONS SUMMARY

	SCOPE 1 (T CO ₂ -E)	SCOPE 2 (T CO ₂ -E)
Loss of Carbon Sink	Transmission Line: 33 300	NA
Heavy Vehicles – Deliveries	NA	NA
Heavy Vehicles – Site Works	Transmission Line: 887	NA
Light Vehicles – Staff Transport	Transmission Line: 50	NA
Totals	34 237 t CO₂-e	0 t CO₂-e

This is reinforced by the below chart (Figure 18.1), which illustrate the dominance of the loss of carbon sink to the overall profile.

FIGURE 18.1 EMISSIONS BREAK-DOWN PIE CHART FOR TRANSMISSION LINE



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18.9 POTENTIAL IMPACTS

Queensland's 2008 Greenhouse Gas Inventory (available from <http://ageis.climatechange.gov.au/>) reports total emissions, including those from land use change, to be in the region of 160,264,670 tonnes of CO₂ equivalent, excluding 'embedded' energy in materials consumed. The equivalent emissions for this project would increase this total by around 0.02%.

18.10 MITIGATION MEASURES

18.10.1 Direct GHG Abatement Measures undertaken for the Project

In line with National and State policies, Powerlink has committed to adopting several measures to reduce the project's carbon footprint. The following direct GHG abatement actions will be undertaken:

- Minimising land clearing to areas where it is necessary for operational safety;
- Specifying in procurement contracts for construction and maintenance services:
 - Use of equipment and vehicles with GHG emissions ratings of 5.5 for passenger vehicles and 3.5 for light commercial vehicles, as described in the Australian Design Rules (Motor Vehicle Standards Act 1989) for heavy commercial vehicles;
 - Use of biofuels (e.g. biodiesel, ethanol, or blends) to reduce GHG emissions;
 - Implementation of energy-efficient guidelines for construction work, such as minimal idling time for machinery;
 - Use of local material and staff to minimise transport-related emissions; and
 - Use of recycled materials, such as replacement of cement with fly ash, recycled aggregate, and recycled content in steel.

18.10.2 Other Mitigation Measures

As discussed in Section 22.3, Powerlink was, up until 1 July 2009 when the program ceased to operate, a member of the Greenhouse Challenge Plus and has committed to the following actions as part of the program outlined above:

- Using hybrid vehicles in Powerlink's vehicle fleet ;
- Facilitating car pooling for employees;
- Regularly maintaining vehicles to ensure efficient operation;
- Regularly recycling paper, green waste, metals and oils to reduce the amount of energy required to make new products;
- Independent verification of Powerlink's greenhouse reporting processes to ensure reporting requirements/standards set by the Australian Greenhouse Office are met;
- Including transmission line system losses in Capital Project Assessments; and
- Undertaking SF₆ gas management strategies and participating in a national review of SF₆ monitoring.

As more cost-effective and viable alternatives become available to reduce GHG emissions and enhance energy efficiency, Powerlink will seek to explore these to find the most efficient and effective method for reducing the Project's carbon footprint.



19.0 CONSULTATION

19.1 GOALS AND OBJECTIVES

The goal of engagement and consultation activities was to inform stakeholders of the Project EIS process and ensure members of the public and stakeholders are appropriately informed about the project in general and have opportunities to provide feedback to the project team and Coordinator General.

This will be achieved through a comprehensive process which focused on effective and timely information dissemination and engagement with interested and affected stakeholders.

The objectives of the consultation program are to:

- to develop communication strategies and clear and effective messages for stakeholders that will:
 - o meet the communication needs of landowners, stakeholders and members of the public which will assist in developing an understanding of the proposed project and the need for the project.
 - o meet the overall needs of Powerlink.
 - o position Powerlink as a responsible, fair, open, effective and honest organisation with key stakeholders and positively strengthen Powerlink's reputation with stakeholders.
- to work with internal Powerlink teams and with Powerlink representatives to coordinate consistent delivery of message to stakeholders and facilitate effective stakeholder feedback to Powerlink;
- to achieve balanced media coverage of the project; and
- to proactively manage potential communication risk areas to reduce the potential for communication based issues that could result in adverse stakeholder reaction to Powerlink's proposed activities in the area.

19.2 ENGAGEMENT STRATEGY

The overall commitment to the goals and objectives in undertaking community engagement activities will provide a solid framework for building long-term relationships with key stakeholders.

In November 2008 a Stakeholder Communication Strategy was developed to guide consultation activities throughout the development of the EIS. The strategy outlines the stakeholders, objectives and the consultation methodology to be adopted.

Throughout the EIS process, engagement activities were, and continue to be, undertaken and a central database is regularly updated to reflect information sent and received to and from stakeholders. The database is also regularly updated to include new stakeholders as needed.

19.3 METHODOLOGY

The methodology adopted for the project was a staged approach based on project progress. Major activities within these consultation stages included newsletter distribution and two website (Conics project consultation website and Powerlink's website) where all newsletters and guides could be access by any interested persons.



The staged approach allowed the project team to meet regularly with stakeholders and the community throughout the EIS process and ensure information was relayed in a timely and ordered manner.

19.4 STAKEHOLDERS

19.4.1 Stakeholder Identification

The following definitions of interested and affected persons are as defined by the Queensland *Environmental Protection Act 1994*, Section 38 and Section 41 (3)(b) and were used to define the stakeholder groups throughout the consultation process.

An **interested person** means an unincorporated community or environmental body with a financial or non-financial interest in the region in which the Project is proposed.

An **affected person** means a person or party who is for the purposes of operational land or adjoining land is:

- a registered proprietor;
- a person recorded in the Land Act 1994 register (as the registered hold of that interest);
- for land subject to a mining claim, mineral development licence or mining lease, the holder of, or an applicant for, the tenement;
- for land subject to a relevant resource authority, the holder of the resource authority;
- an Aboriginal or Torres Strait Islander trustee of land;
- an Aboriginal or Torres Strait Islander grantee of the land;
- Local government for land held under lease; or
- State government for unallocated state land, reserve land for which there is no trustee, national park, forest reserve, conservation part for which there is no trustee, State forest, timber reserve, State controlled road or fish habitat area.

TABLE 19.1 PROJECT STAKEHOLDERS

AFFECTED PERSON/S	INTERESTED PERSON/S	SECONDARY STAKEHOLDERS
Landowners within the identified study corridor. Mining & exploration companies with tenements over portions of the transmission line alignment. (Figures 5.5a, b, c, d & e).	Brigalow Jimbour Floodplains Group	Department of Environment and Resource Management (DERM)
Western Downs Regional Council	Chinchilla Landcare Group	Department of Transport and Main Roads (DTMR)
Department of Environment and Resource Management (DERM)	Condamine Alliance	Department of Employment, Economic Development and Innovation – Primary Industries and Fisheries (DEEDI)
Barunggam People		



19.4.2 Landowners

The majority of tenancy surrounding current Powerlink infrastructure in the region, including the Braemar to Tarong transmission line, is long-standing, family owned farms involving general or broad acre farming, range grazing and improved pastures. Community spirit is generally strong, reflecting the longevity of family farming operations.

Landholders potentially affected by the new easement between Western Downs and the QNI include the owners of approximately 20 parcels of land in the study area. Powerlink has existing relationships with the majority of these landowners.

19.4.3 Federal, State and Local Government Consultation

A number of engagement methods were used to inform Federal, State and Local government authorities throughout the consultation period. Methods included briefings (available on request), meetings, phone conversations and regular newsletter mail-outs.

Federal, State and Local government included in this consultation process included the following:

Local Government

- Western Downs Regional Council.

State Government

- Department of Communities – Queensland Fire and Rescue Service;
- Department of Employment, Economic Development and Innovation – Primary Industries and Fisheries (DEEDI);
- Department of Environment and Resource Management (DERM);
- Department of Infrastructure and Planning (DIP); and
- Department of Transport and Main Roads (DTMR).

Federal Government

- Department of Environment, Water and Heritage.

19.5 ENGAGEMENT AND CONSULTATION ACTIVITIES AND MESSAGES

19.5.1 Key Messages

Key project messages aimed to support the delivery of consistent messaging were disseminated using common terminology expressions and presented all facts in an easy to understand format. Responses to stakeholder requests, messages and information about the project were tailored to each community to provide localised responses.

The key messages for the project were:

- In order to strengthen the high voltage transmission network in South West Queensland, and to reinforce supply into South East Queensland, Powerlink proposes to construct two new substations, one near Kogan (to be called Western Downs Substation), the other at Halys (near Kingaroy) and a new 275kV transmission line to connect these.



- It is proposed that 80 per cent of the new 275kV powerline be located on existing double-width easements located between Powerlink's Braemar and Tarong Substations (alongside an existing transmission line). Locating the new line on these existing double-width easements will help minimise potential impacts on landholders, the environment and the wider local community.
- The double-width easements were acquired in the late 1990's to ensure the State's future electricity infrastructure needs could be met. Acquiring these easements in advance has also helped provide certainty to the local community about future land use planning.
- Powerlink has commenced a project to identify and acquire new easements (approximately 25km in length) for southern section of the new 275kV transmission line between the new Western Downs substation site and a connection point on the existing Braemar to Tarong double-width easements.
- Powerlink is undertaking a comprehensive Environmental Impact Assessment (EIA), including community consultation for both the proposed substation and 275kV transmission line. The EIA will include the production of separate Environmental Impact Statements (EIS) for both the substation and transmission line components of the project. The EIS will identify any potential economic, social and environmental impacts of the proposed project, and recommend strategies to manage/ mitigate any potential impacts.
- Specialist independent environmental consultants will be engaged to undertake the EIA. The draft EIS for the substation is expected to be released for public comment in late 2009. The draft EIS for the transmission line is expected to be released for public comment in early 2010.
- Powerlink will consult with affected landowners and local stakeholders through the EIA process to seek their feedback on the project and proposed location of the 275kV transmission line and substation/
- A potential site for the proposed new substation has been identified near Kogan Creek Power Station. The suitability of this site will be examined as part of the EIA process.
- Based on current demand forecasts, the new 275kV transmission line and substation are expected to be required by summer 2012.
- No final decision regarding the project will be made until a comprehensive EIA process and associated consultation have been completed.

19.5.2 Engagement and Consultation Activities

Consultation activities focused on informing the community and stakeholders about the project and collecting feedback. An overview of the activities is provided below.

19.5.2.1 Draft Terms of Reference Stakeholder Workshop

A workshop was held in Toowoomba with stakeholders on 25 September 2009 regarding the Draft Terms of Reference (TOR). Specifically, the purpose of the workshop was to provide an overview of the project and the Draft TOR and obtain feedback regarding the draft TOR.

Organisations that were invited to attend the workshop were:

- Western Downs Regional Council
- Department of Environment and Resource Management (DERM);
- Department of Transport and Main Roads (DTMR);
- Department of Employment, Economic Development and Innovation – Primary Industries and Fisheries (DEEDI);
- Bragalow Jimbour Floodplains Group;



- Chinchilla Landcare Group; and
- Condamine Alliance.

The organisations that attended the workshop were Western Downs Regional Council, DERM and DTMR. Workshop attendees were invited to provide written feedback regarding the Draft TOR.

19.5.2.2 Initial Landowner Contact & Face to Face Meetings

In November 2009 and April 2010, affected land owners were contacted regarding the project and to arrange a meeting with the landowners to discuss the project, the EIA process and compensation process.

19.5.2.3 Public Notices

Advertisements were placed in local newspapers which are circulated within the project catchment, to inform the public about the project. Future public information sessions on the project will be advertised through the local media.

19.5.2.4 Community Contact Points

A freecall number (1800 211 744) and project email (westerndowns@conics.com.au) have established from the outset of the consultation process to provide a free service via which stakeholders can contact the consultation team to provide feedback, make a complaint, ask a question or to request information.

Powerlink also have a freecall number (1800 635 369) and email (website.enquiries@powerlink.com.au) which were provided as a secondary community contact point.

To date, these contact points have not been utilised by stakeholders in relation to this phase of the project.

19.5.2.5 Website

Information about the draft EIS will be made available on both Conics' project consultation website – www.westerndowns.yolasite.com – and Powerlink's website under "Projects in My Area > Southern". Site visitors were able to access:

- the draft EIS;
- project newsletter/s;
- the guide for landowners;
- the guide on how to make a submission;
- the project terms of reference; and
- contact details for the project.



19.5.2.6 Project Newsletters

An integral part of the stakeholder engagement strategy was the distribution of the project newsletters. A project newsletter was distributed in November 2009, coinciding with Phase 1 of this Project, being the Western Downs Substation project. The newsletter provided information to residences and the community about the Project, specifically:

- information about the project
- a map of the study corridor, illustrating affected properties
- information about the consultation program
- information about the EIA, the study corridor and project timeframes
- frequently asked questions
- Powerlink contact details

Concurrent to the project newsletter, a guide for landowners was also provided in November 2009. The guide aimed to assist landowners in understanding the processes that will be involved in identifying and acquiring the new easement, specifically:

- the status of the project;
- the EIA process;
- compensation for landowners; and
- Conics' contact details.

19.5.2.7 Draft EIS Consultation

The draft EIS was available for comment by stakeholders with submissions closing on 16th August 2010. 8 submissions were received: 7 from State Government and 1 from the Western Downs Regional Council. Letters summarising comments and how they have been addressed will be sent to submitters.

These submissions have been collated and addressed in this revised EIS and EMP. A tabulation of these submissions and how each comment was addressed can be found in **Appendix G**.

19.6 OUTCOMES FROM ENGAGEMENT AND CONSULTATION ACTIVITIES

The following is an overview of the outcomes from engagement and consultation activities undertaken as part of the consultation program. In summary, the data which is described in this Section of the report is based on the following engagement and consultation activities undertaken to date:

- draft TOR stakeholder workshop;
- initial phone conversations with affected landowners; and
- face to face affected landowner meetings.

19.6.1 Draft TOR Stakeholder Workshop

A workshop was held in Toowoomba with stakeholders on 25 September 2009 regarding the draft Terms of Reference (TOR). Formal submissions on the Draft TOR were made following this meeting and comments received have been included, where applicable, in the final TOR.



19.6.2 Initial Landowner Contact & Face to Face Meetings

In November 2009 and April 2010, affected land owners were contacted regarding the project and to arrange a meeting with landowners to discuss the project, the EIA process and compensation process as well as access to their property in order to undertake field studies. Landowners included parties which reside on their properties as well as absentee landowners.

Initial feedback from affected land owners varied considerably and key issues and concerns that were raised included:

- appreciation of the phone call to landowners;
- anxiousness regarding the project (e.g. eager to receive more information regarding the project);
- concern regarding the devaluation of their properties;
- preliminary feedback regarding the location of the transmission line in regards to existing agricultural operations or infrastructure;
- believe that landowners will have no say in the location of the transmission line;
- concern regarding the width of the study corridor (3km); and
- concern regarding negative implications to landowners' health (e.g. believe that the transmission line may bring on cancer in landowners)

In addition to above, a number of land owners indicated that based on the information provided to date, they were not concerned about the project.

19.7 CONCLUSIONS

Powerlink and Conics have undertaken consultation with stakeholders and landowners to ensure that potentially affected members of the community are fully aware of the project and can provide input to the process. Route selection of the study alignment has been undertaken in consultation with the owners to determine the route that when environmental, social and costs are considered, gives the most balanced outcome.



20.0 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan (EMP) for the project has been completed using the Powerlink Environmental Management Plan template. The EMP can be found in **Appendix F**.



21.0 ENVIRONMENTAL COST-BENEFIT SUMMARY

21.1 BACKGROUND AND METHODOLOGY

The environmental cost benefit assessment has reviewed the existing environmental costs associated with the proposed transmission line alignment and provided a comparative analysis with the anticipated benefits associated with the construction and ongoing operation of the transmission line. Where environmental and economic costs/benefits can not be quantified, they have been described to be consistent with the terms of reference for Environmental Cost Benefit Analysis as defined by the Queensland Treasury.

21.2 SHORT TERM COSTS AND BENEFITS

The development of a transmission line in the study area is considered to have minimal short term environmental impacts both on the properties which will be directly affected by the transmission line and the surrounding area as a whole.

The majority of allotments located along the transmission line corridor are zoned 'Rural' under the respective Wambo and Chinchilla Planning Schemes, and are utilised for agricultural purposes. The development of a transmission line and towers along the study alignment may influence the current agricultural during the construction phase of the Project, however this impact is not expected to reduce the agricultural production capacity of the area. Whilst the transmission line will pass over areas identified as Good Quality Agricultural Land (GQAL), it is intended that through consultation with the landowners, the placement of the transmission towers will have negligible impact on existing agricultural uses, as tower positioning will factor in any potential negative impact.

The Chinchilla and Wambo Planning Schemes identify the Biodiversity Planning Assessment areas within the District. These areas have, or potentially have, high conservation values. The study alignment extends over a few areas which have been identified as a Biodiversity Planning Assessment Area under the Planning Scheme. However, it is Powerlink's intention to ensure that the transmission towers are placed in locations which have minimal impact on existing uses and minimal social and economic implications. In addition, the identified Biodiversity Planning Assessment Areas within the study alignment are small in scale and it is therefore anticipated that they will be avoided by transmission towers. Therefore the transmission line development will have negligible costs on the provision of area of high conservation values within the surrounding area.

As discussed in **Section 18.0**, the short term cost generated by an increase in greenhouse emissions is related to the construction activities involved in establishing the proposed transmission line. These greenhouse gas emissions have been calculated based on the various construction components and activities. The calculated greenhouse gas emissions are as follows:

- Loss of Carbon Sink – 33,300 tCO₂-e
- Heavy Vehicles – Site Works – 887 tCO₂-e
- Light Vehicles for Staff Transport – 50 tCO₂-e



From an employment perspective, the development of a transmission line will generate short term employment opportunities. The construction of the transmission line is expected to employ approximately 120+ employees. It is estimated that approximately 10% to 15% of the workforce are expected to be sourced from the local Dalby/Chinchilla area with an additional 15% expected to be sourced from the Toowoomba region.

21.3 LONG TERM COSTS AND BENEFITS

The development of a transmission line in study area is considered to have minimal long term environment impacts both on the properties which will be directly affected by the transmission towers and the surrounding area as a whole.

The majority of allotments located along the transmission line corridor are zoned 'Rural' under the respective Wambo and Chinchilla Planning Schemes, and are utilised for agricultural purposes. The development of a transmission line and towers along the corridor may influence the current agricultural during the construction phase of the project, however this impact is not expected to reduce the agricultural production capacity of the area. Whilst the transmission line will pass over areas identified as GQAL, it is intended that through consultation with the landowners, the placement of the transmission towers will have negligible impact on existing agricultural uses, as tower positioning will factor in any potential negative impact.

The transmission towers will have a relatively small base coverage area, which is anticipated to be approximately 100 to 150 Sq m each. Transmission towers will be located approximately 400m apart depending on span constraints/opportunities. The development of the transmission line will therefore have minimal impact on the agricultural production capacity of the local area. Primary industry is the economic base of the Western Downs economy and any reduction in the provision of GQAL will adversely affect the economy.

The Chinchilla and Wambo Planning Schemes identify the Biodiversity Planning Assessment areas within the District. These areas have, or potentially have, high conservation values. The Transmission Line extends over a few areas which have been identified as a Biodiversity Planning Assessment Area under the Planning Scheme. However, it is Powerlink's intention to ensure that the transmission towers are placed in locations which have minimal impact on existing uses and minimal social and economic implications. In addition, the identified Biodiversity Planning Assessment Areas within the transmission line corridor are small in scale and it is therefore anticipated that they will be easily avoided by transmission towers. Therefore the transmission line development will have negligible costs on the provision of area of high conservation values within the surrounding area.

The long term greenhouse gas emissions from maintaining the transmission line are expected to be minimal, with the potential that operations may be integrated into existing maintenance regimes for the local plant/substations so not to increase overall travel requirements. Furthermore, it is anticipated that any emissions from this maintenance phase would be potentially offset by the increased efficiency of electricity supply and lower distribution losses.

As previously mentioned, the development of a power transmission line may generate a few long term, permanent employment opportunities for the operation of the transmission line. The development of additional energy infrastructure within the region will increase the economic capacity of the region as a whole. The Western Downs Substation development together with the supporting transmission line to the existing network, in



correlation with the existing Kogan Creek Power Station and Coal Mine on Banana Bridge Road, will increase an already existing energy industry precinct in the surrounding area.

The actual economic contribution that the proposed transmission line will make to the local and regional economy needs to be quantified and will be included in the final report, following consultation and discussion with Powerlink regarding the function of the proposed facilities.

21.4 POTENTIAL IMPACTS

The development of the transmission line is considered to have minimal short term and long term environmental impacts both on the affected properties and on the surrounding area.

Whilst small areas of the transmission line corridor are identified as GQAL, the development of transmission towers within the corridor will have minimal impact on existing land uses, as the towers only require a minimal footprint and existing land uses can continue. It is our understanding that wherever possible, towers will be placed in strategic locations to ensure minimal negative impact. The anticipated environmental impacts associated with the proposed transmission line development are predominantly short term and are related to the anticipated increase in greenhouse gas emissions, loss of vegetation and potential for soil erosion, which equate to an estimated 6,260 tCO₂-e as a result of the required construction activity.

The economic benefits related to the construction of the proposed transmission line will be the employment generated throughout the construction period (estimated to be approximately 150 jobs) and potentially additional long term employment opportunities. The completed substation and supporting transmission line will add to the existing energy related infrastructure in the region and increase the region's overall economic value.



22.0 POWERLINK ENVIRONMENTAL PERFORMANCE

Powerlink is committed to responsible environmental management as an integral part of our business activities. This commitment includes the maintenance and implementation of an Environmental Management System that takes a structured approach to managing the environmental aspects of the business, including but not limited to areas such as construction, maintenance, land management and substations.

Powerlink strongly encourages ownership of environmental care among our workforce by providing training and support, including involvement and encouragement, for operational excellence in environment from the executive levels of the business. Innovation and excellence in environmental care by our people is recognised and rewarded.

Powerlink has a strong history of environmental performance across the business and is committed to continuous improvement in our environmental care to ensure that we continue to address the changing expectations of our own people, our stakeholders, the general community and changing legislative requirements.

22.1 POWERLINK ENVIRONMENTAL POLICY

Powerlink is responsible for the operation, maintenance and development of the high voltage transmission network in Queensland. We are committed to responsible environmental management as an integral part of our business activities. We demonstrate that commitment by:

- Consulting openly, honestly and proactively with the community and statutory authorities on the potential environmental impacts of our plans and activities. We are responsive to constructive suggestions to eliminate or minimise potentially adverse impacts;
- Recognising that environmental factors such as land use, public health and safety, noise and visual impact, protection of flora and fauna, environmentally hazardous materials management and waste management are all environmental aspects of our business;
- Maintaining a structured approach to managing our environmental aspects by implementing an Environmental Management System;
- Seeking continual improvement in the environmental performance of our operations;
- Complying with relevant environmental legislation; and
- Building and encouraging ownership of environmental care among our people by providing training and support.

22.2 RECENT PROJECT PERFORMANCE

Powerlink has demonstrated commitment to environmental management during the asset development phase, through undertaking route selection studies, Environmental Impact Assessments and the integration and monitoring of environmental requirements and performance during the construction of Powerlink assets. Recent construction project environmental management includes:



- **Millmerran to Middle Ridge 275kV Transmission Line.** This project demonstrated a high level of environmental management performance during construction, including compliance with legislative requirements, integrated stakeholder liaison, and management of interaction with species of national significance subject to referral under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC).
- **Tully to Innisfail 275/132kV Transmission Line.** This Project has been planned and designed to minimise environmental impacts in tropical north Queensland. Due to potential interactions with nationally significant species, this project was also subject to a referral under the EPBC Act. This project was selected randomly by the Department of Environment and Water Resources to be audited against referral conditions. Generally a high level of compliance was noted throughout the project.
- **Middle Ridge to Greenbank 275kV Transmission Line.** This project has demonstrated a sound to high level of environmental management performance during construction. Powerlink has in place financial incentive processes for construction contractor environmental performance against the Environmental Management Plan. Environmental performance of the construction activities is monitored by the construction contractor and Powerlink, and actions taken to address identified areas of potential or actual non-conformance with the Environmental Management Plan or legislative requirements.
- **Belmont to Murarrie 275kV Transmission Line.** This project has demonstrated a high level of environmental management performance during construction, including compliance with legislative requirements, integrated stakeholder liaison, and working with community groups to improve biological diversity and habitat for native fauna. An example of the habitat enhancement works, Powerlink installed around 80 habitat boxes in trees within Minniipi parklands as homes for the Squirrel Gliders and other animals prevalent in the area, including lorikeets, kookaburras, kingfishers, owls, possums and bats. Monitoring of the habitat boxes following the construction of the Belmont to Murarrie 275kV Transmission Line showed just how successful this simple yet effective environmental initiative was, with a 90% usage rate within just a few months.

22.3 GREENHOUSE CHALLENGE PLUS

Powerlink has been a signatory to the Greenhouse Challenge Plus (formally the Greenhouse Challenge) since 1999 until the program ceased to operate on 1 July 2009 and successfully continues to report on a variety of emission generating sources. Powerlink's inventory consists of industrial processes (fugitive emissions), stationary energy, transport energy and wastes. Continued efforts are undertaken to decrease greenhouse emissions from Powerlink's transmission and company assets including the adoption of energy efficient technologies, regular recycling, reducing input resources and exploring emission offsets. Additionally, ongoing innovation and technical design knowledge is promoted and applied throughout the organisation.

22.4 ENVIRONMENTAL RESEARCH

Powerlink demonstrates commitment to environmental management of activities through the whole of the life cycle of Powerlink's assets through commissioning and undertaking research that both directly and indirectly relates to Powerlink activities. Research presently funded by Powerlink includes:

- Investigations into arboreal species movement across easements;
- Investigations into nest box adoption by arboreal species;



- Direct seeding trials in Southern, Central and Northern Queensland;
- Weed seed destruction and mobile cleandown investigations;
- Selection of native ground cover species for revegetation under high voltage power lines;
- Edge effects on natural systems within Queensland's protected area estate; and
- Investigations into the potential impacts from transmission lines on endangered frog species in the Tully-Innisfail area, with particular interest in the potentially fatal fungus Chytridiomycosis.

Powerlink has previously funded research in areas such as:

- Internal fragmentation in the rainforest: edge effects of highways, powerlines and watercourses on tropical rainforest understorey microclimate, vegetation structure and composition, physical disturbance and seedling regeneration. C.L.Pohlman 2006 (PhD thesis – James Cook University); and
- Impact of roads and powerline clearings on rainforest vertebrates with emphasis on ground-dwelling small mammals. M.W.Goosem 2000 (PhD thesis – James Cook University).



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APPENDIX A FINAL TERMS OF REFERENCE

**TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF A
PROPOSED TRANSMISSION INFRASTRUCTURE DEVELOPMENT (Transmission
Line)**

It is intended that the proponent will seek Ministerial Designation of the development as Community Infrastructure, under the *Integrated Planning Act 1997*.

These Terms of Reference are adapted from the DLGP “Generic Terms of Reference for an Environmental Impact Statement” published in March 2007.

Contents

It is suggested that as far as practical the EIS should follow the same format as the suggested TOR.

PREFACE

1. GENERAL
 - 1.1 Project Proponent
 - 1.2 Project Description
 - 1.3 Objectives and Key Issues of the EIS
 - 1.3.1 Objectives of the EIS
 - 1.3.2 EIS Key Issues
 - 1.4 Cross-reference with the EIS
2. PROJECT IDENTIFICATION AND FEASIBLE ALTERNATIVES
 - 2.1 Project Justification
 - 2.2 Feasible Alternatives
3. PROJECT DESCRIPTION
 - 3.1 Location Details
 - 3.2 Physical Details of Structures
 - 3.3 Construction, Maintenance AND Decommissioning Activities
 - 3.4 Infrastructure Requirements
4. ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS
 - 4.1 Physical Environment
 - 4.1.1 Land
 - 4.1.1.1 Topography / Geomorphology
 - 4.1.1.2 Soils and Geology
 - 4.1.2 Climate and Air Quality
 - 4.1.3 Hydrology
 - 4.1.4 Fire
 - 4.1.5 Waste Management
 - 4.2 Biological Environment
 - 4.2.1 Sensitive Environmental Areas
 - 4.2.2 Flora and Fauna
 - 4.2.2.1 Flora – Description of Existing Environmental Values
 - 4.2.2.2 Fauna – Description of Existing Environmental Values
 - 4.2.2.3 Flora and Fauna Potential Impacts and Mitigation
 - 4.2.2.4 Flora Potential Impacts
 - 4.2.2.5 Flora Mitigation Measures
 - 4.2.2.6 Fauna Potential Impacts
 - 4.2.2.7 Fauna Mitigation Measures
 - 4.3 Socio-Economic Environment
 - 4.3.1 Land Use
 - 4.3.2 Socio-Economic Issues
 - 4.3.3 Noise and Vibration
 - 4.3.4 Electric and Magnetic Fields
 - 4.3.5 Landscape Character
 - 4.3.5.1 Landscape
 - 4.3.5.2 Visual Amenity
 - 4.3.6 Transport Infrastructure, Traffic and Amenity
 - 4.3.7 Non-Indigenous Cultural Heritage
 - 4.3.8 Aboriginal Cultural Heritage
5. TOWN PLANNING AND LEGISLATIVE REQUIREMENTS
 - 5.1 Description of Each Relevant Planning Scheme
 - 5.2 Outcomes Summary
 - 5.3 Description of each State Planning Policy (SPP)
 - 5.4 Effect on Regional Plan or Master Plan, if any

- 5.5 Description of Nature, Scale and Intensity
- 6. OTHER APPROVALS AND CONDITIONS
 - 6.1 Federal Legislation
 - 6.2 State Legislation and Permit Requirements
 - 6.3 Local Government Planning, Ordinances and By-Laws
- 7. ENVIRONMENTAL COST-BENEFIT SUMMARY
- 8. POWERLINK'S ENVIRONMENTAL RECORD
- 9. ENVIRONMENTAL MANAGEMENT PLANS
- 10. REFERENCES

Attachment 1 – Schedule 2 of the DLGP Guidelines

Attachment 2 – Final TOR

Attachment 3 – Corridor or Substation Site or Communication Site Selection Report/s, if applicable.

Attachment 4 – Development Approvals

Attachment 5 – Study Team

Attachment 6 – Consultation Report

Attachment 7 - Final EIS attachments

PREFACE

The first step in the impact assessment process is the development of Terms of Reference (TOR) for the preparation of an EIS. The process involves the formulation of draft TOR which will be made available to appropriate stakeholders and agencies through targeted consultation. The Consultant will finalise the TOR which will be presented to Powerlink.

The Consultant will prepare a Draft EIS that addresses the TOR. Once the EIS has been prepared to the satisfaction of Powerlink, the Consultant will advertise that the Draft EIS is now available for public comment. At the conclusion of the submission period, the Consultant will hand to Powerlink the Final EIS and recommend a Final Alignment for the Transmission Line corridor.

Upon finalisation of the EIS and Powerlink's approval of the Final Alignment, Powerlink will follow the Department of Local Government, Planning, Sport and Recreation "Guidelines about Environmental Assessment and Public Consultation Procedures for Designating Land for Community Infrastructure, Powerlink Manual" starting at Step 4 and commence the designation process. After publicly advertising Powerlink's intention to designate the project and calling for submissions, Powerlink will prepare an Assessment Report evaluating the EIS and other related material, including any properly made submissions received. The Final Assessment Report will include an evaluation of the environmental effects of the proposed development and any related matters and will be forwarded to the Minister for Energy for his / her decision.

Not all sections within the Terms of Reference will be relevant for each project and only the relevant sections should be expanded upon within the EIS. If a section is not relevant, the Terms of Reference will be marked as "not relevant to this project" and the section in the EIS will also state that "this section is not relevant for this project". For further inquiries about the EIS Process in general or for a specific project, please contact:

CONICS

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PO Box 1185 Toowoomba QLD 4350

Unless specified otherwise, the term environment in these TOR refers to:

- (a) ecosystems and their constituent parts, including people and communities;
- (b) all natural and physical resources;
- (c) those qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community;
- (d) the social, economic, aesthetic and cultural conditions affecting the matters mentioned in paragraphs (a), (b) and (c) or affected by those matters.

1. GENERAL

1.1 Project Proponent

The Project Proponent is:

Powerlink Queensland
33 Harold Street, Virginia,
PO Box 1193, Virginia, Queensland 4014, Australia
Telephone: (07) 3860 2111, Facsimile: (07) 3860 2100
Website: www.powerlink.com.au

Powerlink Queensland is the registered business name of the Queensland Electricity Transmission Corporation Limited, ABN 82 078 849 233.

1.2 Project Description

Provide a brief description of the project and its location.

1.3 Objectives and Key Issues of the EIS

1.3.1 Objectives of the EIS

The objectives of the EIS are as follows:

- a description of the relevant aspects of the existing social, economic, natural and built environment;
- to provide information on the proposal and development process to the community and decision makers;
- to comprehensively identify and evaluate all relevant issues associated with the proposal;
- to identify all potential environmental impacts (across the short, medium and longer term) of the development;
- to recommend construction, operational, maintenance and decommissioning measures required to minimise or compensate for adverse impacts and enhanced benefits;
- to consult with the community and relevant stakeholders in the process of identifying, assessing and responding to the impacts of the proposal;
- to identify all necessary licences, planning and environmental approvals including approval requirements pursuant to the *Environment Protection and Biodiversity Conservation Act 1999*, *Integrated Planning Act 1997*, *Environmental Protection Act 1994*, *Vegetation Management Act 1999* and other legislation;
- to provide recommendations on the need for and contents of any environmental management plans and / or operational plans to mitigate adverse effects; and
- to provide an input to the decision-making process, assisting with the determination of whether to accept or modify the proposal, approve it with conditions or carry out further studies.

1.3.2 EIS Key Issues

The level of analysis and detail in the EIS shall reflect the level of significance of the impacts. Any and all unknown variables or assumptions made in the assessment must be clearly stated and discussed. The extent to which the limitations, if any, of available Information may influence the conclusions of the environmental assessment should be discussed. The emphasis shall be on quality and not quantity. Repetition should be avoided wherever possible.

Additional consultation shall be undertaken with other stakeholders, such as property owners and special interest groups, identified through the EIS development process. The EIS is the principal means of ensuring that ecologically sustainable principles are applied in the decision-making process, therefore the EIS shall detail the proposed mitigation measures required to minimise any adverse impact of the proposal along the Study Alignment and recommend a Final Alignment that provides the lowest overall environmental, social and economic impact.

When some impacts are not quantifiable, they should be fully described. Safeguards and mitigation measures to ameliorate the impacts, where applicable, should be proposed together with an objective assessment of their effectiveness. Proposals for monitoring of impacts should also be included where appropriate.

A concluding statement at the end of each section of the EIS shall advise if, in the opinion of the consultant, there are any identified reasons why the project should or should not proceed on the chosen Study Alignment.

The issues to be addressed as part of the EIS can be divided into the following categories:

- project justification and feasible alternatives;
- detailed project description;
- description of environmental values and management of impacts including mitigation measures, if any.

The EIS will be required to consider in detail relevant issues under each category. In addition, it is essential that the main text of the EIS should address all relevant matters concerning environmental values, impacts on those values and proposed mitigation measures. No relevant matter should be raised for the first time in an appendix or the draft EMP. Other matters that may have to be addressed include those matters covered by the Federal EPBC Act.

If there is a necessity to make use of material that is considered to be of a confidential nature, the Consultant may request that such information remain confidential and not be included in any publicly available document.

The reader should be able to distinguish the EIS as the key environmental document providing advice to decision makers considering approvals for the project.

While the TOR provides guidance on the scope of the EIS studies, it should not be seen as exhaustive or limiting. It is important for Powerlink and its consultants to recognise that there cannot be perfect knowledge in advance of undertaking an EIS or what the EIS studies may find.

If it transpires during the preparation of the EIS that previously unforeseen matters not addressed in the TOR are found to be relevant to the assessment of impacts of the proposal, those matters should be included in the EIS.

When considering whether an impact is or is not significant, the Consultant should take account of both the intensity of the impact and the context in which it would occur.

The EIS is a public document. Its purpose is not only to provide information to regulatory agencies, but also to inform the public of the scope, impacts and mitigation measures of the proposal. Additional technical detail may be provided in appendices. The main text should not assume that a reader would have a prior knowledge of the project. It should not be necessary for the reader to have visited the area to understand the issues involved in the proposal.

In brief, the EIS objectives should be to provide public information on the need for and likely effects of the project, to set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values, and demonstrate how environmental impacts can be managed through the protection and enhancement of the environmental values. Discussion of options and alternatives and their likely relative environmental management outcomes is a key aspect of the EIS.

The role of the EIS in providing the project's draft EMP should also be discussed, with particular reference to the EMP's role in providing management measures that can be carried over into conditions that would attach to any approval(s), environmental authorities and permits for the project.

1.4 Cross-reference with the EIS

The EIS and the final TOR are to be cross-referenced to ensure that all the relevant issues have been addressed. A summary cross-referencing specific items of the final TOR to the relevant section of the EIS is to be provided. For this reason, it is suggested that as far as practical the EIS should follow the same format as the TOR.

2 PROJECT JUSTIFICATION AND FEASIBLE ALTERNATIVES

2.1 Project Justification

The justification for the project should be described, with particular reference made to the economic and social benefits. The status of the project should be discussed in a regional, State and National context. *

* Powerlink to provide details when issuing a specific project brief

2.2 Feasible Alternatives

This section should describe feasible alternatives, including conceptual, technological and locality alternatives to the project, and discussion of the consequences of not proceeding with the project. Alternatives should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others. Comparative environmental impacts of each alternative should be summarized.

Reasons for selecting the preferred options should include technical, commercial, social and natural environment aspects. In particular, the principals of ecological sustainable development (ESD) and sustainable development should be included. This information is required to assess why the scope of the proposal is as it is and to ensure that the ESD principles and sustainable development aspects have been considered and incorporated during the scoping and planning of the proposal.

3. PROJECT DESCRIPTION

The objective of this section is to describe the project through its lifetime of design, construction, operation and decommissioning. This information is required to allow assessment of all aspects of a proposal including all phases of the proposal. It also allows further assessment of which approvals may be required and how they may be managed through the life of the proposal.

Describe:

- any existing easements, new easement requirements or land that may need to be purchased;
- the location and type of buildings or structures that may be impacted by the proposal;
- construction and maintenance access requirements, including wet weather access.

The various elements of the project should be described in the text and illustrated with maps and diagrams, as required.

3.1 Location Details

Provide an overall locality plan of the Study Alignment within a State or regional context together with a general description of land uses and the nature of the land affected by the proposed development.

3.2 Physical Details of Structures

Describe the typical form, physical dimensions and construction materials of the structures, insulators, conductors, buildings, transformer bays, busbars, SVCs etc., as appropriate, proposed for the project. Include:

- The approximate location and details of any transposition or transition structures proposed for the development;
- structure details and proposed layouts of any infrastructure likely to be associated with access tracks.

3.3 Construction, Maintenance and Decommissioning Activities

Describe:

- construction stages and equipment used, including anticipated workforce levels;
- activities relating to the inspection, operation and maintenance of the development including how frequently the operational and maintenance activities would be required, including the provision for regrowth and weed control;
- proposals for the decommissioning of any power lines which may be, or could be, replaced by alternative proposals. As the full rehabilitation / revegetation of any swathe clearings and any roads or tracks may take place in the far distant future, a statement needs to be made that a separate EMP will be produced for this component of the work when decommissioning occurs;
- the surrender, if any, of the underlying easements.

3.4 Infrastructure Requirements

This section should provide descriptions of any infrastructure that is likely to be impacted by the construction, operation, maintenance and decommissioning of the project. The matters to be considered include such infrastructure as roads, rail, dams and weirs, other power lines and other cables and pipelines for any services (whether underground or above) and telecommunications.

4. ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS

The functions of this section are to describe the existing environmental values of the area which may be affected by the proposal, to assess the potential impact of the proposed development on those environmental values, and to develop mitigation measures to minimize those impacts.

When addressing the existing environment describe the physical features of the existing project environment and surrounding areas in sufficient detail to allow the environmental impacts of the proposal to be adequately assessed and to provide a baseline against which predicted and future changes can be measured.

When addressing the potential environmental impacts and mitigation measures, regard should be given to the meaning of “environment” as set out in the Preface. The assessment should include:

- (a) the matters listed in Schedule 2 of the Guidelines (refer Attachment 1);
- (b) short, long-term and cumulative effects;
- (c) effects from use and works, during the construction phase, the operational phase and the decommissioning phase of the proposed community infrastructure; and
- (d) on-site and off-site effects. Consideration should be given to the level and type of existing disturbance along the Study Alignment. If during investigations it becomes apparent that a variation to the Study Alignment may result in a significant reduction in negative effects, then recommendations should be made to the project proponent to adopt a new Study Alignment.

For community infrastructure proposed to be designated well in advance of construction and use, identification and assessment of environmental effects should consider, amongst any other relevant matters, likely changes of use on adjoining and nearby land, and broad parameters of scale, intensity, access and the like.

Paragraphs (a) to (d) are to be specifically addressed in the EIS but only to the extent relevant, including to state that a matter is not relevant. Attachment 1 lists the elements from Schedule 2 of the Guidelines and the specific questions that require answers. The EIS is to address all of these matters and Attachment 1 is to be completed by stating next to the question, either a specific reference where the matter has been discussed within the EIS or state that the matter is not relevant.

Environmental and social factors that need to be considered in the EIS may be grouped for convenience under three headings:

- Physical environment;
- Biological environment;
- Socio-economic environment.

In parallel with or in addition to each of the matters listed in Schedule 2 of the Guidelines, the EIS shall give consideration to each of the matters listed below. In each case, where appropriate, the consideration shall include the environmental value of the matter, the potential impact of the proposed development on that matter and ways in which any adverse effects can be avoided or mitigated. Where appropriate, discussions of each of the matters shall be supported by suitably scaled current mapping illustrating the features and occurrence of the matters under discussion.

4.1 Physical Environment

4.1.1. Land

This section describes the existing environment values of the land area that may be affected by the proposal.

4.1.1.1 Topography / Geomorphology

The topography of the proposal should be detailed with contours at suitable increments, shown with respect to AHD. Significant features of the locality should be included on the maps. Such features would include any locations subsequently referred to in the EIS (e.g. the nearest noise sensitive locations, national or marine parks, sensitive marine ecosystems) that are not included on other maps. Commentary on the maps should be provided highlighting the significant topographical features.

4.1.1.2 Soils and Geology

Provide a description of the geology and geomorphology of the Study Alignment in sufficient detail to describe the geology of the site in terms of dominant rock types in a regional context. Describe the landforms of the Study Alignment and surrounding areas including slope and terrain components and an analysis of subsurface and slope stability. Any interesting geomorphological or geological unique features and any associated biological importance shall be described. Describe soil analysis including stability, erodability, contaminants, acid sulphate soils, sodic soils or saline soils and revegetation potential. Describe any likely impacts on soil erosion, siltation, major earth slippage / movement, soil contamination risk and sulfate and saline soils risk.

Describe any known mineral deposits, mines or quarries of commercial significance, including any registered exploration permits within or immediately adjacent to the Study Alignment. Describe the extent, if any, of any mining tenements with suitable mapping along or adjacent to the Study Alignment.

4.1.2 Climate and Air Quality

Provide generic details of the existing air quality and the presence of pollutants. Identify atypical meteorological conditions and their likely frequency of occurrence. Provide a description of the climatic features and microclimate of the Study Alignment (temperature, wind, frost, rainfall, etc.).

In addition, climate change is emerging as an issue of international significance. In Queensland, climate change is expected to have a number of impacts including warmer temperatures, rising sea levels, changes in rainfall patterns, and increased storm and cyclone intensity. Describe in general detail how these effects may impact on the development.

Include any likely impacts on air quality during the construction and operation phases including dust, odours or potential greenhouse gas emissions and how these may affect the surrounding environment including, but not necessarily limited to, residences and ecologically sensitive areas, where applicable.

4.1.3 Hydrology

Describe the hydrology traversed by the Study Alignment and surrounding areas including surface hydrology and locally important subsurface hydrology including water quality, wetlands, and the frequency and extent of flooding. Include an overview of any existing water use adjacent to the proposed development that may be impacted by the proposal. Where the project impacts a tidally influenced waterway, advise the level of highest astronomical tide (HAT).

Describe any likely impacts on groundwater and surface water quality and flow, water contamination risk, flooding potential, surge potential and hydrology, alterations to drainage patterns and crossing of waterways including mitigation measures and their effectiveness. Review Powerlink's authorisation under the *Water Act 2000* (Authority) for works in waterways and advise of any likely impacts. Quantify such impacts in accordance with the provisions of the Authority and prepare a separate record of all necessary calculations and reports for use by the construction team. Where feasible, describe the potential issue of groundwater interception during the drilling of foundations and the potential need to dewater foundations or any other water pending structures. When addressing the issue of dewatering foundations, include appropriate management controls which address discharge waters and their potential to contain sediment, concrete, slurry or fines, inappropriate pH value (acidic or alkaline) or other environmental pollutants.

4.1.4 Fire

Discuss any likely causes due to construction and maintenance activities of the proposed development. Also indicate any likely impacts on burning for pasture management and / or weed control. Discuss the potential impact of bushfires on the proposed development.

4.1.5 Waste Management

Describe waste management and disposal of materials including oils and lubricants, water, solid waste, vegetative waste and regulated waste.

4.2 Biological Environment

4.2.1 Sensitive Environmental Areas

Provide a description of the conservation significance, including wildlife and habitat, of any specific portions of the Study Alignment affecting sensitive environmental areas. Include reference to World Heritage Areas, RAMSAR wetlands, National Parks, State Forests, Stock Routes and proposed conservation areas as relevant to the proposal and their conservation value.

For sensitive environmental areas, describe the extent, integrity and relative importance of the biological communities of the Study Alignment and surrounding area. Discuss the relationship of the vegetation to water quality and soil stability. Discuss the conservation significance of the associations and communities of the site and surrounding area, in respect to local, regional and national and international importance. Describe the ecological values of the site, including any refuge habitats, breeding habitats, food chains, and presence of barriers to, and corridors for, wildlife movement.

4.2.3 Flora and Fauna

4.2.3.1 Flora – Description of Existing Environmental Values

Provide details of the vegetation along the Study Alignment including the surrounding area. Describe the methodology used for any flora surveys undertaken. Identify and describe threatened species and communities protected under State or Commonwealth legislation, including Regional Ecosystem (RE) categories where applicable, and the significance of vegetation types or locations to identified native fauna. Include a comparison of site mapping and mapping produced by the Queensland Herbarium under the *Vegetation Management Act 1999* when any differences are identified. Comment on the ecological value of the areas along the Study Alignment. Any areas where vegetation is considered of high ecological importance should be noted. Investigations should comply with all elements of the assessment code in the State policy for vegetation management where appropriate. Note any species that are identified as under threat on a

local or regional scale that may not be recognised under Commonwealth or State Legislation.

Discuss:

- the presence of any presumed extinct, endangered, vulnerable or rare species or endangered or of concern ecosystems, their habitat requirements and sensitivity to changes / disturbances associated with the normal construction and operation of power line infrastructure;
- the presence of biogeographically significant, unusual or evolutionary significant species, communities or populations;
- the extent and incidence of exotic species, weeds and diseases. Species of note should include, but not necessarily be limited to, those species recognised under Federal and State legislation (declared and not declared) and recognised by the local Shire Councils. The status and category of any weeds should be noted; and
- the extent of any marine plants along the Study Alignment.

Detail existing occurrence of pest species including weed species identification, prevalence and infestation of pests.

Provide a vegetation map of the alignment and key flora indicators should be identified for future ongoing monitoring.

4.2.3.2 Fauna - Description of Existing Environmental Values

Describe the methodology and findings of fauna surveys and desktop studies, including the aerial, terrestrial and aquatic fauna present or likely to be present in the area or in areas that may be affected by the project, including the existence of endangered, vulnerable or rare species under both Commonwealth and State legislation and the impact of the project on these aspects including:

- any presumed extinct, endangered, vulnerable or rare species, their habitat requirements and sensitivity to change including any ongoing activities associated with the project;
- location and importance of wildlife corridors;
- occurrence or likely seasonal occurrence of migratory species, and presence of suitable habitat for these species;
- the presence of biogeographically significant, unusual or evolutionary significant species or populations;
- presence of feral animals, their distribution and present level of ecological impact;
- presence of any significant / notable nests, burrows, hollows etc;
- the presence of any wetlands, wildlife breeding or roosting areas;
- any significant habitat or relevant bird flight paths for migratory species;
- bat roosting and breeding caves including existing structures such as adits and shafts; and
- the habitat of threatened animals and communities. Note any species that are identified as under threat on a local or regional scale that may not be recognised under Commonwealth or State Legislation.

The survey intensity and period should be consistent with the difficulty of locating any species listed as rare, vulnerable or endangered under the Nature Conservation (Wildlife) Regulation 1994 or the EPBC Act that potentially occur in the area. Key fauna indicators should be identified for future ongoing monitoring.

4.2.3.3 Flora and Fauna - Potential Impacts and Mitigation

Potential Impacts and Mitigation Measures associated with Flora and Fauna should be described under the headings of:

- Pre-construction work including surveys, access, etc.;
- Construction;
- Maintenance; and
- Decommissioning.

and include the matters, where applicable, set out below.

4.2.3.4 Flora Potential Impacts

Include any likely direct and indirect impacts on terrestrial and aquatic flora. Attention should be given to any rare, threatened or endangered species, or species of local, regional, State or National Environmental Significance (NES) identified in the surveys and / or desktop study and advise on any Matters of NES that need to be referred to the Commonwealth Department of Environment and Water Resources (DEWR) for a determination as to whether or not it is a Controlled Action under s67 of the EPBC Act.

Discuss the ability of identified vegetation to withstand any increased pressure resulting from the project and the likely impact of the project on the abundance and distribution of exotic species, weeds and diseases.

Discuss clearing requirements including the amount and type of vegetation affected, including marine plants. The proposed methods of disposal of cleared vegetation should be described. The potential use of cleared vegetation for rehabilitation / compensatory habitat, provision of ground level habitat or erosion control (mulch) should be considered. Tabulated data on the Regional Ecosystem (RE), areas likely to be cleared and the clearing methodology applicable to each RE shall be detailed. Include details on whether vegetation is native and its maturity. Reference to the ecological value (as established in the flora investigation) of material to be cleared should be made.

The Queensland Vegetation Management Act 1999 and the findings of any regional vegetation management plan should also be referenced.

4.2.3.5 Flora Mitigation Measures

Measures to mitigate impacts and their adequacy and effectiveness shall be proposed. Measures for ongoing management of the natural environment and prevention of the introduction and spread of pests and weeds using washdown facilities shall also be included. The barrier, fragmentation and edge effects of the Study Alignment need to be analysed.

Mitigation measures should consider the use of higher line support structures and localised clearing constraints such as pruning and allowing for regrowth to restore habitat value and limit erosion, where possible. Other mitigation measures such as compensatory vegetation and tree planting should also be considered where relevant. Long term ecological consequences of compensatory vegetation and the management of that vegetation should also be discussed. Any barrier effect of a cleared corridor on the movement of fauna should also be considered. Elements of the State Policy Assessment Code for tree clearing should be addressed, where applicable. Indicate if any millable timber can be salvaged during the clearing operation.

4.2.3.6 Fauna Potential Impacts

Include any likely direct and indirect impacts on aerial, terrestrial, feral and aquatic fauna including migratory species, and any relevant bird flight paths. Attention should be given

to any rare, threatened or endangered species, or species and habitats of local, regional, State or NES identified in the surveys and / or desktop study and advise on any Matters of NES that need to be referred to the DEWR for a determination as to whether or not it is a Controlled Action under s67 of the EPBC Act.

Discuss the ability of identified fauna to withstand any increased pressure resulting from the project, including potential barrier, fragmentation and edge effects of the proposed transmission corridor on terrestrial and aquatic habitats. Consideration should be given to the extent and type of disturbance created by other corridors (e.g, roads, rail, access tracks) existing in the area. Include any potential impacts on any apiary industry.

4.2.3.7 Fauna Mitigation Measures

Measures to mitigate impacts, including wildlife corridors and compensatory habitat areas and their adequacy and effectiveness shall be proposed. Measures for ongoing management of the natural environment shall also be included.

4.3 Socio-Economic Environment

4.3.1 Land Use

Describe each existing use on the Study Alignment and uses adjoining the Study Alignment. Discuss potential site specific and cumulative impacts of the project on existing and potential land use and developments including farming activities, forestry, tourism and airfield operation. In particular on the operation, management, productivity of developments, likely sterilisation of mineral and significant extractive industry resources and loss of good quality agricultural land. Note how much land of each type / use will be altered, relating this to the amount of land of each type / use currently existing in the area.

4.3.2 Socio-Economic Issues

Include a description of the socio-economic characteristics of the community surrounding the proposed development. Provide an assessment of the potential impacts (real or perceived) of the development along the Study Alignment.

Detail the matters to be of concern to other parties affected or likely to be affected by the project. Include in the EIS any consultation about the action, including:

- a) any consultation that has already taken place;
- b) proposed consultation about relevant impacts of the action;
- c) if there has been consultation about the proposed action, any documented response to, or result of, the consultation; and
- d) identification of affected parties. Comments from relevant local, State and Commonwealth agencies, service and utility providers, community groups, affected landowners and individuals shall be identified and addressed in the EIS. Include discussion on any feature or areas of local, regional or community concern such as those of recreation, amenity, cultural heritage or conservation value. All consultation shall be documented including any issues raised and how they were considered in finalising the EIS. Provide copies of any documented response to, or submission from the consultation. In conjunction with Powerlink, prepare a draft response to any submission received. Results of consultation shall be included in an Appendix to the EIS. The DLGP Guidelines include a list of the minimum parties to be consulted.

4.3.3 Noise and Vibration

Provide details of any noise sensitive receivers or locations within or near the proposed development and detail their respective distance from the proposed development and, if any, provide details of existing ambient noise levels.

Identify:

- sources of vibration from the environment that may impact upon the development and comment upon their effect, eg. blasting, movement of heavy traffic on roads or railways, audio and sonic shock from aircraft;
- parts of the receiving environment that is sensitive to vibration emanating from the development. This vibration typically arises from the use of explosives, movement of heavy vehicles and fly over of aircraft, eg. helicopters;
- Audible noise emanating from equipment forming parts of the development and wind noise associated with the conductors and towers and corona noise on the proposed development.

Based on the vicinity of residences / human habitation, assess any increase in background and incidental noise levels at noise-sensitive locations, particularly during construction and operational phases.

4.3.4 Electric and Magnetic Fields

Measure existing magnetic fields at key locations e.g. close to dwellings, places of assembly, etc. along and adjacent to the Study Alignment and report the findings.

Assess potential impacts of electric and magnetic fields on fauna, agriculture, TV reception, radio, on the quality of telephone and mobile communications, as well as navigational instruments and adjacent conductive materials. Also, based on the vicinity of residences / human habitation, assess the potential risk of electric and magnetic fields from the proposed line on adult and child health, including identification of the potential hazards, transient and prolonged exposure, epidemiological studies, etc.

4.3.5 Landscape Character

4.3.5.1 Landscape

Describe in general terms the existing character of the landscape that will be affected by the proposal. It should comment on any changes that have already been made to the natural landscape since European settlement. It should 'set the scene' for the description of particular scenic values in the following section on visual amenity. The difference between the two sections is that this section describes the general impression of the landscape that would be obtained while travelling through and around it, while the visual amenity section addresses particular panoramas and views (e.g. from constructed lookouts, designated scenic routes, etc.) that have amenity value.

4.3.5.2 Visual Amenity

Describe existing landscape features, panoramas and views that have, or could be expected to have, value to the community whether of local or regional significance.

Evaluate local and regional visual impacts of the major transmission structures, access tracks and easement clearance. Include potential impacts on the users of State-controlled roads.

Describe the aesthetic and landscape values of the area traversed by the Study Alignment and other features contributing to the amenity including landforms, visual character, viewsheds traversed by the Study Alignment, resident populations within the viewshed, buildings, structures or other facilities of particular cultural, historic, religious or social importance.

Sketches, diagrams, computer imaging and photos may be used where possible to portray the near views and far views of the completed development and their surroundings from visually sensitive locations.

4.3.6 Transport Infrastructure, Traffic and Amenity

Describe:

- the existing transport infrastructure including a description of the existing aerodromes, road networks including highways and State controlled roads expected to be used to transport freight to the project, road surface types and estimated traffic flows making reference to the Regional Transport Plans, as appropriate;
- the rail network (including the volume of traffic on any rail line) and a description of where, if any, the Study Alignment will cross the rail corridor.
- arrangements for the transport of plant, equipment, products, wastes and personnel during both the construction phase and operational phase of the project. The description should address the use of existing facilities and all requirements for the construction, upgrading or relocation of any transport related infrastructure.

Information should be provided on road transportation requirements on public roads for both construction and operations phases, including:

- proposed road access to the project, including wet weather access if different from normal access;
- the estimated volume, composition (types and quantities) of, origin and destination of goods to be moved including construction materials, plant, raw materials, wastes, hazardous materials;
- the volume of traffic generated by workforce personnel, visitors and service vehicles and materials to be delivered to the project;
- anticipated times at which movements may occur.

Assess:

- any impact on local aircraft flight paths including commercial flights, agricultural flights such as crop-dusting, tourist flights such as parachuting and balloon flights as well as emergency flights;
- potential impacts on road and rail, if any, traffic and community amenity especially during the construction phase of the proposal. Include an assessment of the impacts where vehicles will access State-controlled roads and how road safety and traffic efficiency will be maintained;
- the ongoing impact on existing and new road and access track infrastructure associated with improved access to various recreational vehicles including any necessary management requirements.

4.3.7 Non-Indigenous Cultural Heritage

The impact of the proposed development on non-indigenous cultural heritage shall be determined in the assessment.

Local and regional historical societies should be contacted to determine sites of significant heritage value. Advise if any place along the Study Alignment or adjacent to the alignment is entered in the heritage register under the *Queensland Heritage Act 1992*.

Activities should include:

- review of literature to identify relevant archaeological, anthropological, natural, historical and other non-indigenous cultural heritage data pertaining to the area impacted by the proposed development;
- consultation of relevant non-indigenous cultural heritage site registers and databases including the Register of National Estates and the Queensland Heritage Register to compile a list of significant non-indigenous sites and places previously recorded in the area impacted by the proposed development;
- consult locally for information on any areas / items considered of cultural heritage significance by local and regional stakeholders.

Determine the potential impact of the Study Alignment with consideration of issues including lifestyle, heritage places, and other places frequently visited or used.

4.3.8 Aboriginal Cultural Heritage

Powerlink will consider the impact of the proposed activities on Aboriginal Cultural heritage and where appropriate will enter into an agreement with the relevant Aboriginal parties to protect or minimise the harm to Aboriginal Cultural Heritage affected by the project. Powerlink will provide the Consultant with confirmation of the steps taken to manage Aboriginal Cultural Heritage for inclusion in the EIS.

5. TOWN PLANNING AND LEGISLATIVE REQUIREMENTS

This section addresses the requirements of the IPA in relation to development approval for a preferred transmission corridor development. The description of the proposed Study Alignment should be sufficient to identify the land involved, and the description of the infrastructure should be general in nature and should not include the technical details of individual structures. The following items should be addressed under the proposed headings:

5.1 Description of Each Relevant Planning Scheme

Describe any special attributes affecting the Study Alignment that are identified on each relevant Planning Scheme, together with any consistencies or otherwise with the Scheme(s). A conclusion is required at the end of each comparison stating how the Study Alignment / Final Alignment will affect a Planning Scheme or how the proposed development complies with the intent of the Planning Scheme.

5.2 Outcomes Summary

Include a summary of the intentions or outcomes sought for uses and works on the Study Alignment and in the surrounding area in each relevant Planning Scheme.

5.3 Description of Each State Planning Policy (SPP)

A description of any special attributes affecting the Study Alignment that are identified in a State Planning Policy and include a statement about the consistency with any relevant SPP.

A conclusion is required at the end of each SPP stating whether the Study Alignment / Final Alignment will affect a SPP or how the proposed development complies with the intent of the SPP.

5.4 Effect on Regional Plan or Master Plan, If Any

A description of any special attributes affecting the proposed development that are identified in any regional plan, where not identified as adequately reflected in the relevant Planning Scheme. Include a statement about the consistency with any regional plan where not identified as adequately reflected in the relevant Planning Scheme.

Describe any special attributes affecting the declared urban development master plan for the area, and comment on whether, or not, the proposed development will impact on the declared or a proposed master plan.

5.5 Description of Nature, Scale and Intensity

A description of the nature, scale and intensity of each use proposed as part of the community infrastructure.

6. ENVIRONMENTAL MANAGEMENT PLAN

The Draft EIS will contain a draft Environmental Management Plan (EMP) covering the life cycle of the proposed development. The plan should contain all relevant details available at the time when the EIS is prepared. When information is not available, they should be described with an indication of how and when the information will be incorporated into the final detailed EMP. When developing the EMP, any relevant impacts identified during the EIS process should be considered and a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action.

The plan should address, but not be limited to, the following matters:

- Key Performance Objectives;
- Management Strategy; and
- Performance Indicators

on the following criteria, if applicable:

Section Number	Heading	Includes
4.1	PHYSICAL ENVIRONMENT	
4.1.1	Land	Topography, minerals, Contamination and erosion
4.1.2	Climate and Air Quality	
4.1.3	Hydrology	
4.1.4	Fire	
4.1.5	Waste Management	
4.2	BIOLOGICAL ENVIRONMENT	
4.2.1	Sensitive Environmental Areas	National parks and protected areas
4.2.2	Coastal Environment	
4.2.3	Flora and Fauna	
4.3	SOCIO-ECONOMIC ENVIRONMENT	
4.3.1	Land Use	Flora and fauna and pest and weed control, fire ant area, Wet Tropics Management Area
4.3.2	Socio-Economic Issues	

4.3.3	Noise and Vibration	
4.3.4	Health and Safety	Safety and EMF (Induction effects and health concerns)
4.3.5	Landscape Character	Landscape and Visual Amenity
4.3.6	Transport Infrastructure, Traffic and Amenity	Access, hazardous materials / substances
4.3.7	Non-Indigenous Cultural Heritage	
4.3.8	Aboriginal Cultural Heritage	Reference to CHMP

7. OTHER APPROVALS AND CONDITIONS

The Final EIS will be used by Powerlink to support an application for Community infrastructure Ministerial designation under the IPA.

The information is required to assess how the legislation applies to the project and which agencies have jurisdiction. This section should explain the legislation and policies controlling the approvals process. Any requirements of the EPBC Act should also be included.

The EIS should also include a statement identifying what assessment requirements apply to the proposed community infrastructure under State legislation. Reference should be made to the IPA (for both assessment under the IPA integrated development assessment system (IDAS) and outside that system) any other relevant Queensland legislation and approval processes. Local Government planning controls, local laws and policies applying to the development should be described.

Therefore the following headings can be used:

7.1 Federal Legislation

Detail the requirements of relevant Federal legislation including the roles of Government Agencies. Describe any approval that has been obtained from a Commonwealth agency or authority, including any conditions that apply to the action. Include any other requirements for approvals or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action.

Describe the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

7.2 State Legislation and Permit Requirements

The IPA, schedule 8 and the Integrated Planning Regulation 1998, in particular Schedule 10 (State Resources), identify State assessment requirements under the IPA and the report should include any permits required to be obtained by Powerlink and associated requirements, such as resource entitlement / allocation, based on the Study Alignment. Attachment 1 includes a column requesting information on permit requirements. If any other permits are required other than the information requested in Attachment 1, then include those permit requirements under this section.

Describe any approval or exemption that has been obtained from a State agency or authority, including any conditions that apply to the action. Reference should be made to any other requirements for approvals or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action.

Describe the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

7.3 Local Government Planning, Ordinances and By-Laws

Detail the relevant local government planning and land use requirements of the relevant City or Shire Councils including local ordinances and by-laws such as local vegetation laws. A list should be provided of the approvals required for the project and the expected program for approval of applications.

Include also any potential conflict with Planning Scheme measures including strategic plans, any development control plans and the intent of the zones within which the proposed development is located.

8. ENVIRONMENTAL COST-BENEFIT SUMMARY

The summary shall include both the short and long term environmental costs and benefits to be borne by the community and the environment, such as reduced productivity on land impacted by the development, quantity of good agricultural land affected, areas of high conservation values affected, and reduction in greenhouse gas emissions. It should include an analysis of options for traversing State-controlled road reserves based on ultimate concept plans. Where costs / benefits are not quantifiable, they should be described.

9. POWERLINK'S ENVIRONMENTAL RECORD

The EIS shall detail: *

- any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against Powerlink.
- Powerlink's environmental record including reference to its environmental policy and planning framework. Specific reference should be made to the environmental performance of the past three projects of similar nature and structure to that proposed.

*Powerlink will supply this information with the specific project brief.

10 REFERENCES

All references consulted should be presented in the EIS in a recognised format.

Recommended appendices

A1 – Schedule 2 of the DLGP Guidelines

A2. Final Terms of Reference for this EIS

A copy of the final TOR should be included in the EIS. Where it is intended to bind appendices in a separate volume from the main body of the EIS, the TOR at least should be bound with the main body of the EIS for ease of cross-referencing. A summary, cross-referencing specific items of the TOR to the relevant section of the EIS, should also be provided in Section 1.4 of the EIS. For this purpose the TOR should be line numbered.

A3. Corridor Selection Report

If applicable, a copy of the Corridor Selection Report and / or Substation Site Selection Report should be included.

A4. Development Approvals

A list of the development approvals required by the project should be presented (in the expected sequencing of applications) along with their corresponding regulating legislation and the approving authority. – refer A1

A5. Study Team

The qualifications and experience of the study team and specialist sub-consultants and expert reviewers should be provided.

A6. Consultation Report

The summary Consultation Report appendix for an EIS should commence by including the details of affected and interested persons by type or organisation, and the statement of planned consultation with those persons, originally provided with the draft Terms of Reference. It should describe how 'interested' and 'affected persons,' and any 'affected parties' as defined by the EPBC Act were identified and include the matters likely to be of concern to other parties affected or likely to be affected by the development for the proposed community infrastructure.

A7. The Final EIS should include the following:

- (a) a list of the parties consulted (subject to their permission);
- (b) a copy of newspaper tear-sheet of Draft EIS advertisements;
- (c) a summary of all submissions and the account taken of the issues raised;
- (d) any further assessment of environmental effects of the project;
- (e) any additional strategies for managing the environmental effects;
- (f) a statement of any matters proposed to be included in the designation under the IPA, s2.6.4; and
- (g) any recommended changes to the study Alignment which produces the Final Alignment.

ATTACHMENT 1 – to be submitted with draft EIS

Adapted from SCHEDULE 2 OF DLGP Guidelines

**If a matter is not relevant, state that the matter is not relevant. If the item is also covered by a SPP, refer to the paragraph number that covers that particular SPP. Reference should be made to the actual Schedule 2 of the DLGP Guidelines which lists relevant public sector entities and local governments as sources of advice and information on the range of listed matters.

1. Soils and geology	Reference Number within EIS that addresses the matter.**	Is a Permit Required?
1.1 Is the proposed community infrastructure compatible with the geology and topography of the Study Alignment?		
1.2 Does the Study Alignment have acid sulfate soils or potential acid sulfate soils?		
1.3 Does any part of the Study Alignment have erosion potential or does the Study Alignment have potential hillslope stability problems?		
1.4 Is the Study Alignment subject to salinity or soil degradation? Is any part of the Study Alignment subject to an approved project plan for soil conservation under the <i>Soil Conservation Act 1986</i> ?		
2. Natural resources		
2.1 Does the Study Alignment include land identified as good quality agricultural land, or is the Study Alignment adjacent to agricultural areas? If so, will the proposal be compatible with agricultural activities?		
2.2 Are there fisheries habitats or fish habitat areas located on or adjacent to the Study Alignment? (IPA, schedule 8 applies)		
2.3 Will the proposal require the removal, destruction or damage of marine plants? (IPA, schedule 8 applies)		
2.4 Will the proposed community infrastructure involve the construction of waterway barrier works in waterways, or require the construction of a fish way? (IPA, schedule 8 applies)		
2.5 Will the proposed community infrastructure involve taking, using or interfering with the flow of water on, under or adjoining any part of the Study Alignment? (IPA, schedule 8 applies)		

2. Natural resources (Cont)	Reference Number within EIS that addresses matter.**	Is a Permit Required?
2.6 Is the Study Alignment located in or adjacent to a State forest or timber reserve under the Forestry Act 1959?		
2.7 Does the proposed community infrastructure include vegetation clearing not covered by 2.8 below? (IPA, schedule 8 applies)		
2.8 Does the proposal include clearing native vegetation in: (a) a forest reserve or protected area under the <i>Nature Conservation Act 1992</i> ; or (b) a State forest or timber reserve under the <i>Forestry Act 1959</i> ? (IPA, schedule 8 applies)		
2.9 Does the Study Alignment include or is it adjacent to any identified mineral, oil, gas or extractive resources, pipelines or haul routes servicing these resources?		
2.10 Does any part of the Study Alignment include land that is part of the State Stock Route network?		
2.11 Does the Study Alignment include any part of land leased, reserved, or granted in trust under the <i>Land Act 1994</i> ?		
2.12 Is any part of the Study Alignment within a port or on strategic port land?		
3. Natural hazards		
3.1 Is the Study Alignment or its access at risk from natural hazards such as flooding or drainage, bushfire and land slip?		
3.2 Is the Study Alignment or its access at risk from storm surge?		
3.3 Are there any declared pests in the area or is any part of the Study Alignment subject to a local government pest management plan?		

4. Water quality	Reference Number within EIS that addresses the matter.**	Is a Permit Required?
4.1 Will the proposal have impacts on surface or groundwater quality?		
4.2 Is the Study Alignment in close proximity to a watercourse?		
4.3 Is any part of the Study Alignment within a wild river area declared under the <i>Wild Rivers Act 2005</i> ? (IPA, schedule 8 applies)		
4.4 Does any part of the proposal involve development below high water mark (tidal), or within the beds and banks of a watercourse, lake or spring (non-tidal)? (IPA, schedule 8 applies)		
4.5 Will waste water disposal or stormwater from the proposal affect water quality either by sedimentation or contamination from effluent?		
4.6 Will the proposal have impact on hydrology, including— (a) change to existing drainage patterns; (b) groundwater flow?		
5. Conservation values		
5.1 Is the Study Alignment identified in the SEQ regional plan and/or the Koala Conservation Plan and Management Program 2006 as any of the following? (a) Koala conservation area (b) Koala sustainability area (c) Urban koala area.		
5.2 Is the Study Alignment in or adjacent to an area protected under the <i>Nature Conservation Act 1992</i> ?		
5.3 Is the Study Alignment in an area or adjacent to an area likely to have rare, endangered or threatened flora or fauna?		

5. Conservation values (Cont)	Reference Number within EIS that addresses matter.**	Is a Permit Required?
5.4 Does the proposal involve building work on land that is partly or completely seaward of a coastal building line under the <i>Coastal Protection and Management Act 1995</i> ? (IPA, schedule 8 applies)		
5.5 Does the proposal involve work within a coastal management district under the <i>Coastal Protection and Management Act 1995</i> ? (IPA, schedule 8 applies)		
5.6 Is the Study Alignment included in an area over which a State or regional coastal management plan applies?		
5.7 Is the Study Alignment in or adjacent to an area protected under the <i>Marine Parks Act 1982</i> ?		
5.8 Will the proposal affect the biodiversity and conservation values of the Study Alignment?		
6. Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EP&BC Act)		
6.1 Does part or all of the proposal significantly impact upon a matter on national environmental significance? If so, the proposal needs to be referred to the Department of the Environment and Water Resources for a determination as to whether or not it is a Controlled Action under the EP&BC Act, section 67.		
7. Cultural heritage		
7.1 Does the Study Alignment involve, or is the Study Alignment adjacent to, any place entered in the heritage register under the Queensland Heritage Act 1992, or identified as having cultural heritage significance in the relevant Planning Scheme. (IPA, schedule 8 applies).		
7.2 Does the Study Alignment contain any items on the register of the Queensland Estate, Aboriginal and Torres Strait Islander Cultural Heritage Register or Cultural Heritage Database?		
7.3 Is it possible the Study Alignment may contain areas or objects of archaeological or historic significance for Aboriginal or Torres Strait Islander cultural heritage values?		

7. Cultural heritage (Cont)	Reference Number within EIS that addresses the matter.**	Is a Permit Required?
7.4 Does any part of the Study Alignment include Aboriginal or Torres Strait land, or land subject to a native title claim or Indigenous Land Use Agreement?		
8. Health, safety, amenity and social impacts		
8.1 Is the proposal an environmentally relevant activity as listed in schedule 1 of the <i>Environmental Protection Regulation 1998</i> ? (IPA, schedule 8 applies).		
8.2 Does the Study Alignment include lands recorded in the environmental management register or contaminated land register under the <i>Environmental Protection Act 1994</i> , or a notifiable activity under schedule 2 of that Act?		
8.3 Does the proposal have the potential to release contaminants, or include a notifiable activity under the <i>Environmental Protection Act 1994</i> , schedule 2? (IPA, schedule 8 applies)		
8.4 Is the proposal sensitive to air quality?		
8.5 Are there known or potential air quality problems in the area that may affect the proposal?		
8.6 Does the proposal have the potential to create air quality problems for the area or odour emissions? If so, will the proposal affect the amenity of adjoining or nearby uses due to the times, nature, intensity and proximity of the air quality problems or odour?		
8.7 Will the proposed community infrastructure generate significant greenhouse gas emissions?		
8.8 Is the proposal a noise sensitive land use? If so, are surrounding uses compatible?		
8.9 Does the proposal have the potential to create noise nuisance for the surrounding area? If so, will the proposal affect the amenity of adjoining or nearby uses due to the times, nature, intensity and proximity of the noise?		
8.10 Will the proposal include external lighting? If so, will the proposal affect the amenity of adjoining or nearby uses due to the times, nature, intensity and proximity of external lighting?		

8. Health, safety, amenity and social impacts (Cont)	Reference Number within EIS that addresses the matter.**	Is a Permit Required?
8.11 Will the appearance of the proposal, including the physical compatibility of the proposal (e.g. scale, height, materials, colours, Study Alignment coverage) affect the amenity of adjoining or nearby uses?		
8.12 Will the proposal impact on scenic values including landscape character and visual amenity?		
8.13 Will the proposal generate significant amounts of traffic? If so, will the proposal affect the amenity of adjoining or nearby uses due to the times and nature of traffic generation, the location of access points, and the adequacy of on-site parking and public transport?		
8.14 Will the proposal generate significant amounts, or sensitive types, of waste? If so, will the waste affect the health, safety or amenity of adjoining or nearby uses?		
8.15 Will the proposal create a need for personal safety and building security measures? If so, is there a need for crime prevention measures for users of the Study Alignment and for access to the Study Alignment? Would such measures affect the safety and amenity of adjoining or nearby uses?		
8.16 Is the proposal likely to have any impacts on the economic activities of the area, including— (a) labour and markets; (b) service delivery; (c) local industries?		
8.17 Is the proposal controversial or could it lead to conflict or concern in the community?		
8.18 Is the proposal a childcare centre? If so, building requirements under the <i>Queensland Development Code</i> , part 22 may apply.		
8.19 Is the proposal a nursing home or hostel? If so, requirements under the <i>Health Regulation 1996</i> may apply.		
8.20 Is the proposal a private health facility? If so, requirements under the <i>Queensland Development Code</i> , part 7, may apply.		

8. Health, safety, amenity and social impacts (Cont)	Reference Number within EIS that addresses the matter.**	Is a Permit Required?
8.21 Does the proposal involve a major hazard facility or is the Study Alignment within or adjacent to a major hazard facility under the <i>Dangerous Goods Safety Management Act 2001</i> ?		
9. Infrastructure		
9.1 Does the proposal create additional demand for infrastructure, including augmentation of existing networks, for— (a) water; (b) sewerage; (c) roads; (d) wastewater management; (e) solid waste management; (f) energy; (g) telecommunications?		
9.2 Is the Study Alignment in the vicinity of an airport or aviation facilities, or both?		
9.3 Is any part of the Study Alignment situated in an electricity easement or within 100m of a substation site?		
10. Traffic and transport		
10.1 Will the proposal generate additional vehicle, pedestrian or cycle traffic, or increase demand for public transport? If so, is there a need to change one or more of the following in the locality to meet the needs of those using the community infrastructure— (a) traffic management arrangements; (b) public transport networks and services; (c) pedestrian and cycling networks?		
10.2 Does the location and design of the proposed community infrastructure enable connections to public transport, cycling and pedestrian networks?		
10.3 Is the proposal consistent with the land use and transport planning principles detailed in relevant integrated regional transport plans?		
10.4 Are changes proposed to the traffic ingress and egress for the Study Alignment?		

10. Traffic and transport (Cont)	Reference Number within EIS that addresses the matter.**	Is a Permit Required?
10.5 Does the Study Alignment adjoin or gain access from a State-controlled road? Will the proposal impact on a State-controlled road?		
10.6 Will the proposal impact on the provision of existing or future public passenger transport services or facilities?		
10.7 Will the proposal impact on existing or future railway land or facilities?		
10.8 Does the proposal involve tidal works or prescribed tidal works? (IPA, schedule 8 applies)		



APPENDIX B DESIGNATION CHECKLIST



ATTACHMENT 1 – to be submitted with draft EIS
Adapted from SCHEDULE 2 OF DLGP Guidelines

**If a matter is not relevant, state that the matter is not relevant. If the item is also covered by a SPP, refer to the paragraph number that covers that particular SPP. Reference should be made to the actual Schedule 2 of the DLGP Guidelines which lists relevant public sector entities and local governments as sources of advice and information on the range of listed matters.

MATTER		YES/NO	SECTION
1. Soils and geology			
1.1	Is the proposed community infrastructure compatible with the geology and topography of the Study Area?	Yes	5.2 & 5.3
1.2	Does the Study Area have acid sulfate soils or potential acid sulfate soils?	No	5.3.4
1.3	Does any part of the Study Area have erosion potential or does the Study Area have potential hillslope stability problems?	Yes	5.3.1.3
1.4	Is the Study Area subject to salinity or soil degradation?	No	5.3.3
	Is any part of the Study Area subject to an approved project plan for soil conservation under the <i>Soil Conservation Act 1986</i> ?	No	5.3.1.2
2. Natural resources			
2.1	Does the Study Area include land identified as good quality agricultural land, or is the Study Area adjacent to agricultural areas? If so, will the proposal be compatible with agricultural activities?	Yes Yes	5.3.5
2.2	Are there fisheries habitats or fish habitat areas located on or adjacent to the Study Area? (SPR, schedule 3 applies)	Yes	10.2.2.1
2.3	Will the proposal require the removal, destruction or damage of marine plants? (SPR, schedule 3 applies)	N/A	
2.4	Will the proposed community infrastructure involve the construction of waterway barrier works in waterways, or require the construction of a fish way? (SPR, schedule 3 applies)	No	
2.5	Will the proposed community infrastructure involve taking, using or interfering with the flow of water on, under or adjoining any part of the Study Area? (SPR, schedule 3 applies)	No	
2.6	Is the Study Area located in or adjacent to a State forest or timber reserve under the Forestry Act 1959?	Yes	11.2.1
2.7	Does the proposed community infrastructure include vegetation clearing not covered by 2.8 below? (SPR, schedule 3 applies)	Yes	10.3.1
2.8	Does the proposal include clearing native vegetation in:	No	4.2.8



MATTER		YES/NO	SECTION
(a)	a forest reserve or protected area under the <i>Nature Conservation Act 1992</i> ; or	No	
(b)	a State forest or timber reserve under the <i>Forestry Act 1959</i> ? (SPR, schedule 3 applies)		
2.9	Does the Study Area include or is it adjacent to any identified mineral, oil, gas or extractive resources, pipelines or haul routes servicing these resources?	Yes	11.2 & 11.3 & 16.0
2.10	Does any part of the Study Area include land that is part of the State Stock Route network?	No	
2.11	Does the Study Area include any part of land leased, reserved, or granted in trust under the <i>Land Act 1994</i> ?	No	
2.12	Is any part of the Study Area within a port or on strategic port land?	N/A	
3. Natural hazard			
3.1	Is the Study Area or its access at risk from natural hazards such as flooding or drainage, bushfire and land slip?	Yes	8.0, 7.2.4, 5.2
3.2	Is the Study Area or its access at risk from storm surge?	NA	
3.3	Are there any declared pests in the area or is any part of the Study Area subject to a local government pest management plan?	Yes	10.2.1.3
4. Water quality			
4.1	Will the proposal have impacts on surface or groundwater quality?	Yes	7.3.2 & 7.3.4
4.2	Is the Study Area in close proximity to a watercourse?	Yes	7.2.1
4.3	Is any part of the Study Area within a wild river area declared under the <i>Wild Rivers Act 2005</i> ? (SPR, schedule 3 applies)	No	
4.4	Does any part of the proposal involve development below high water mark (tidal), or within the beds and banks of a watercourse, lake or spring (non-tidal)? (SPR, schedule 3 applies)	No	
4.5	Will waste water disposal or stormwater from the proposal affect water quality either by sedimentation or contamination from effluent?	No	7.3.2, 9.2.2
4.6	Will the proposal have impact on hydrology, including— (a) change to existing drainage patterns; (b) groundwater flow?	No	7.3.1, 7.3.4
5. Conservation values			
5.1	Is the Study Area identified in the SEQ regional plan and/or the Koala Conservation Plan and Management Program 2006 as any of the following? Koala conservation area Koala sustainability area Urban koala area.	No	4.2.8
5.2	Is the Study Area in or adjacent to an area protected under the <i>Nature Conservation Act 1992</i> ?	No	4.2.8



MATTER		YES/NO	SECTION
5.3	Is the Study Area in an area or adjacent to an area likely to have rare, endangered or threatened flora or fauna?	Yes	10.2.1.2, 10.2.2.3
5.4	Does the proposal involve building work on land that is partly or completely seaward of a coastal building line under the <i>Coastal Protection and Management Act 1995</i> ? (SPR, schedule 3 applies)	N/A	
5.5	Does the proposal involve work within a coastal management district under the <i>Coastal Protection and Management Act 1995</i> ? (SPR, schedule 3 applies)	N/A	
5.6	Is the Study Area included in an area over which a State or regional coastal management plan applies?	N/A	
5.7	Is the Study Area in or adjacent to an area protected under the <i>Marine Parks Act 1982</i> ?	N/A	
5.8	Will the proposal affect the biodiversity and conservation values of the Study Area?	No	10.3.1 10.3.2
6. Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EP&BC Act)			
6.1	Does part or all of the proposal significantly impact upon a matter on national environmental significance? If so, the proposal needs to be referred to the Department of the Environment and Water Resources for a determination as to whether or not it is a Controlled Action under the EP&BC Act, section 67.	No	4.1.1
7. Cultural heritage			
7.1	Does the Study Area involve, or is the Study Area adjacent to, any place entered in the heritage register under the Queensland Heritage Act 1992, or identified as having cultural heritage significance in the relevant Planning Scheme. (SPR, schedule 3 applies).	No	17.1.2.2
7.2	Does the Study Area contain any items on the register of the Queensland Estate, Aboriginal and Torres Strait Islander Cultural Heritage Register or Cultural Heritage Database?	No	17.1.2.2, 17.2
7.3	Is it possible the Study Area may contain areas or objects of archaeological or historic significance for Aboriginal or Torres Strait Islander cultural heritage values?		
7.4	Does any part of the Study Area include Aboriginal or Torres Strait land, or land subject to a native title claim or Indigenous Land Use Agreement?		
8. Health, safety, amenity and social impacts			
8.1	Is the proposal an environmentally relevant activity as listed in schedule 1 of the <i>Environmental Protection Regulation 1998</i> ? (SPR, schedule 3 applies).	No	4.2.4
8.2	Does the Study Area include lands recorded in the environmental management register or contaminated land register under the <i>Environmental Protection Act 1994</i> , or a notifiable activity under schedule 2 of that Act?	No	5.3.7
8.3	Does the proposal have the potential to release contaminants, or include a notifiable activity under the <i>Environmental Protection Act 1994</i> , schedule 2? (SPR, schedule 3 applies)	Yes	9.0



MATTER	YES/NO	SECTION
8.4 Is the proposal sensitive to air quality?	No	6.1.2, 6.3.1
8.5 Are there known or potential air quality problems in the area that may affect the proposal?	No	6.1.2, 6.3.1
8.6 Does the proposal have the potential to create air quality problems for the area or odour emissions? If so, will the proposal affect the amenity of adjoining or nearby uses due to the times, nature, intensity and proximity of the air quality problems or odour?	No	6.3.1
8.7 Will the proposed community infrastructure generate significant greenhouse gas emissions?	No	18.8
8.8 Is the proposal a noise sensitive land use? If so, are surrounding uses compatible?	No	13.0
8.9 Does the proposal have the potential to create noise nuisance for the surrounding area? If so, will the proposal affect the amenity of adjoining or nearby uses due to the times, nature, intensity and proximity of the noise?	No	13.0
8.10 Will the proposal include external lighting? If so, will the proposal affect the amenity of adjoining or nearby uses due to the times, nature, intensity and proximity of external lighting?	No	15.2
8.11 Will the appearance of the proposal, including the physical compatibility of the proposal (e.g. scale, height, materials, colours, Study Area coverage) affect the amenity of adjoining or nearby uses?	No	15.2
8.12 Will the proposal impact on scenic values including landscape character and visual amenity?	Yes	15.1, 15.2
8.13 Will the proposal generate significant amounts of traffic? If so, will the proposal affect the amenity of adjoining or nearby uses due to the times and nature of traffic generation, the location of access points, and the adequacy of on-site parking and public transport?	Yes	16.2
8.14 Will the proposal generate significant amounts, or sensitive types, of waste? If so, will the waste affect the health, safety or amenity of adjoining or nearby uses?	No	9.0
8.15 Will the proposal create a need for personal safety and building security measures? If so, is there a need for crime prevention measures for users of the Study Area and for access to the Study Area? Would such measures affect the safety and amenity of adjoining or nearby uses?	No	
8.16 Is the proposal likely to have any impacts on the economic activities of the area, including— (a) labour and markets; (b) service delivery; (c) local industries?	Limited	12.2
8.17 Is the proposal controversial or could it lead to conflict or concern in the community?	No.	
8.18 Is the proposal a childcare centre? If so, building requirements under the <i>Queensland Development Code</i> , part 22 may apply.	No	
8.19 Is the proposal a nursing home or hostel? If so, requirements under the <i>Health Regulation 1996</i> may apply.	No	
8.20 Is the proposal a private health facility? If so, requirements under the <i>Queensland Development Code</i> , part 7, may apply.	No	



MATTER	YES/NO	SECTION
8.21 Does the proposal involve a major hazard facility or is the Study Area within or adjacent to a major hazard facility under the <i>Dangerous Goods Safety Management Act 2001</i> ?	No	
9. Infrastructure		
9.1 Does the proposal create additional demand for infrastructure, including augmentation of existing networks, for— (a) water; (b) sewerage; (c) roads; (d) wastewater management; (e) solid waste management; (f) energy; (g) telecommunications?	No	
9.2 Is the Study Area in the vicinity of an airport or aviation facilities, or both?	No	16.1.4
9.3 Is any part of the Study Area situated in an electricity easement or within 100m of a substation site?	Yes	3.1, 3.2
10. Traffic and transport		
10.1 Will the proposal generate additional vehicle, pedestrian or cycle traffic, or increase demand for public transport? If so, is there a need to change one or more of the following in the locality to meet the needs of those using the community infrastructure— (a) traffic management arrangements; (b) public transport networks and services; (c) pedestrian and cycling networks?	Yes No No No	16.0
10.2 Does the location and design of the proposed community infrastructure enable connections to public transport, cycling and pedestrian networks?	No	
10.3 Is the proposal consistent with the land use and transport planning principles detailed in relevant integrated regional transport plans?	N/A	
10.4 Are changes proposed to the traffic ingress and egress for the Study Area?	No	16.2.1, 16.2.2
10.5 Does the Study Area adjoin or gain access from a State-controlled road? Will the proposal impact on a State-controlled road?	Yes	16.1.1
10.6 Will the proposal impact on the provision of existing or future public passenger transport services or facilities?	No.	16.0
10.7 Will the proposal impact on existing or future railway land or facilities?	No	16.0
10.8 Does the proposal involve tidal works or prescribed tidal works? (SPR, schedule 3 applies)	N/A	



TOR Cross Reference

TERMS OF REFERENCE	EIS SECTION
1. INTRODUCTION	
1.1 Project Proponent	1.2
1.2 Project Description - brief description of the project and its location	3.0
1.3 Objectives and Key Issues of the EIS	1.3
1.3.1 Objectives of the EIS	1.3.1
1.3.2 EIS Key Issues	ES
1.4 Cross-reference with the EIS – the EIS and the final TOR are to be cross-referenced to ensure that all the relevant issues have been addressed	Appendix B
2. PROJECT JUSTIFICATION AND FEASIBLE ALTERNATIVES	
2.1 Project Justification – description of the justification for the project, with particular reference made to the economic and social benefits. The status of the project should be discussed in a regional, State and National context.	2.1
2.2 Feasible Alternatives - description of feasible alternatives, including conceptual, technological and locality alternatives to the project, and discussion of the consequences of not proceeding with the project.	2.2
3. PROJECT DESCRIPTION	
3.1 Location Details - overall locality plan of the Study Area within a State or regional context together with a general description of land uses and the nature of the land affected by the proposed development.	3.1
3.2 Physical Details of Structures - typical form, physical dimensions and construction materials of the structures, insulators, conductors, buildings, transformer bays, busbars, SVCs etc., as appropriate, proposed for the project.	3.2.1
3.3 Construction, Maintenance and Decommissioning Activities - description of construction stages and equipment used, activities relating to the inspection, operation, maintenance and decommissioning of the development, and the surrender, if any, of the underlying easements.	3.3, 3.4
3.4 Infrastructure Requirements	
3.4.1 Energy - describe electricity requirements, for the construction and operation phases of the project.	3.0
3.4.2 Water Supply and Storage - information on water usage by the project, including the quality and quantity of all water to be supplied to and discharged from the site from the various sources and the reliability of those sources.	N/A
3.4.3 Stormwater Drainage - proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. A Stormwater Management Plan should be prepared for the site.	N/A
3.4.4 Sewerage – a description, in general terms, the sewerage infrastructure required by the project. Information is required on any on site treatment.	N/A



TERMS OF REFERENCE	EIS SECTION
3.4.5 Telecommunications – a description of the telecommunications requirement of the project where telecommunications sites will be developed and the proposed tenure; and description of any impacts on existing telecommunications infrastructure and identification of the owners of that infrastructure.	N/A
4. ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS	
4.1 Physical Environment	
4.1.1 Land	
4.1.1.1 Topography / Geomorphology - topography of the proposal with contours at suitable increments, shown with respect to AHD. Significant features of the locality should be included on the maps and commentary on the maps should be provided highlighting the significant topographical features.	5.2
4.1.1.2 Soils and Geology - description of the geology and geomorphology of the Study Area in sufficient detail to describe the geology of the site in terms of dominant rock types in a regional context.	5.3
4.1.1.3 Land Contamination – outline of the possible contamination of land from aspects of the project; measures of prevention, recording, containing and/or remediating of contaminated land.	5.3.7
4.1.2 Climate and Air Quality - generic details of the existing air quality and the presence of pollutants; identified atypical meteorological conditions and their likely frequency of occurrence; description of the climatic features and microclimate of the Study Area; and general description of how climate change may affect the development.	6.0
4.1.3 Hydrology – outline of the hydrology traversed by the Study Area and surrounding areas; any likely impacts on groundwater and surface water quality and flow, water contamination risk, flooding potential, surge potential and hydrology, alterations to drainage patterns and crossing of waterways including mitigation measures and their effectiveness.	7.0
4.1.4 Fire – discussion of any likely causes due to construction and maintenance activities of the proposed development; likely impacts on burning for pasture management and / or weed control; and potential impact of bushfires on the proposed development.	8.0
4.1.5 Waste Management	
4.1.5.1 Character and quantities of waste materials - an inventory of all wastes to be generated by the project during the construction and operational phases of the project.	9.1
4.1.5.2 Solid waste disposal - the proposed location, site suitability, dimensions and volume of any landfill requirements for solid wastes generated by the project.	9.2.1
4.1.5.3 Liquid waste - description of the origin, quality and quantity of wastewater originating from the project.	9.2.2
4.2 Biological Environment	
4.2.1 Sensitive Environmental Areas - description of the conservation significance, including wildlife and habitat, of any specific portions of the Study Area affecting sensitive environmental areas. For sensitive environmental areas, describe the extent, integrity and relative importance of the biological communities of the Study Area and surrounding area.	10.2



TERMS OF REFERENCE	EIS SECTION
4.2.2 Flora and Fauna	
4.2.2.1 Flora – Description of Existing Environmental Values - details of the vegetation across the Study Area including the surrounding area; identified threatened species and communities; and existing occurrence of pest species.	10.2.1
4.2.2.2 Fauna - Description of Existing Environmental Values – details of the aerial, terrestrial and aquatic fauna present or likely to be present in the area or in areas that may be affected by the project, including the existence of endangered, vulnerable or rare species under both Commonwealth and State legislation. Description of available fauna habitat.	10.2.2
4.2.2.3 Flora and Fauna - Potential Impacts and Mitigation	
4.2.2.4 Flora Potential Impacts – description of any likely direct and indirect impacts on terrestrial and aquatic flora. Discussion of the ability of identified vegetation to withstand any increased pressure resulting from the project and the likely impact of the project on the abundance and distribution of exotic species, weeds and diseases.	10.3.1
4.2.2.5 Flora Mitigation Measures - measures to mitigate impacts and their adequacy and effectiveness. This includes measures for ongoing management as well as the barrier, fragmentation and edge effects of the Study Area.	10.3.1.3
4.2.2.6 Fauna Potential Impacts - any likely direct and indirect impacts on aerial, terrestrial, feral and aquatic fauna including migratory species, and any relevant bird flight paths. Attention should be given to any rare, threatened or endangered species, or species and habitats of local, regional, State or National environmental significance identified in surveys or desktop studies. Detail the ability of identified fauna to withstand any increased pressure resulting from the project.	10.3.2
4.2.2.7 Fauna Mitigation Measures - measures to mitigate impacts, including wildlife corridors and compensatory habitat areas and their adequacy and effectiveness. Also outline ongoing monitoring measures.	10.3.2.3
4.3 Socio-Economic Environment	
4.3.1 Land Use – description of each existing use on the Study Area and uses adjoining the Study Area. Discuss potential site specific and cumulative impacts of the project on existing and potential land use and developments.	11.2.1
4.3.2 Socio-Economic Issues - description of the socio-economic characteristics of the community surrounding the proposed development and an assessment of the potential impacts (real or perceived) of the development of the Study Area.	12.0
4.3.3 Noise and Vibration - details of any noise sensitive receivers or locations within or near the proposed development; their respective distance from the proposed development; and, if any, existing ambient noise levels.	13.0
4.3.4 Electric and Magnetic Fields - potential impacts of electric and magnetic fields on fauna, agriculture, TV reception, radio, on the quality of telephone and mobile communications, as well as navigational instruments and adjacent conductive materials. Also includes details of potential risk of electric and magnetic fields from the proposed transmission line on adult and child health.	14.0
4.3.5 Landscape Character	
4.3.5.1 Landscape – description, in general terms, of the existing character of the landscape that will be affected by the proposal. Describe the potential impacts of the project landscape character of the site and the surrounding area.	15.1
4.3.5.2 Visual Amenity - existing landscape features, panoramas and views that have, or could be expected to have, value to the community whether of local or regional	15.2



TERMS OF REFERENCE	EIS SECTION
significance. Evaluation of local and regional visual impacts of the major structures, access tracks and easement clearance.	
4.3.6 Transport Infrastructure, Traffic and Amenity – description of the existing transport infrastructure, traffic and amenity. Discussion of arrangements and requirements of transportation and an assessment of potential impacts on infrastructure, traffic and amenity.	16.0
4.3.7 Non-Indigenous Cultural Heritage - impact of the proposed development on non-indigenous cultural heritage.	17.1
4.3.8 Aboriginal Cultural Heritage – potential impact of the proposed activities on Aboriginal Cultural heritage.	17.2
5. TOWN PLANNING AND LEGISLATIVE REQUIREMENTS	
5.1 Description of Each Relevant Planning Scheme - special attributes affecting the Study Area that are identified on each relevant Planning Scheme, together with any consistencies or otherwise with the Scheme(s).	11.2
5.2 Outcomes Summary - summary of the intentions or outcomes sought for uses and works on the Study Area and in the surrounding area in each relevant Planning Scheme.	11.2
5.3 Description of Each State Planning Policy (SPP) - description of any special attributes affecting the Study Area that are identified in a State Planning Policy including a statement about the consistency with any relevant SPP.	11.8
5.4 Effect on Regional Plan or Master Plan, If Any - description of any special attributes affecting the proposed development that are identified in any regional plan, where not identified as adequately reflected in the relevant Planning Scheme.	11.7
5.5 Description of Nature, Scale and Intensity - description of the nature, scale and intensity of each use proposed as part of the community infrastructure.	3.0
6. ENVIRONMENTAL MANAGEMENT PLAN - (EMP) covering the life cycle of the proposed development. The EMP will include any relevant impacts identified during the EIS process should be considered and a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action. The plan should address, but not be limited to, the following matters: ▪ Key Performance Objectives; ▪ Management Strategy; and ▪ Performance Indicators	20.0
7. OTHER APPROVALS AND CONDITIONS	
7.1 Federal Legislation - requirements of relevant Federal legislation including the roles of Government Agencies, including any approvals required.	4.1
7.2 State Legislation and Permit Requirements - requirements of relevant State legislation including the roles of Government Agencies, including any approvals required.	4.2
7.3 Local Government Planning, Ordinances and By-Laws - relevant local government planning and land use requirements of the relevant City or Shire Councils including local ordinances and by-laws such as local vegetation laws. Should also include a list of the approvals required for the project and the expected program for approval of applications.	4.3
8. ENVIRONMENTAL COST-BENEFIT SUMMARY – summary of both the short and long term environmental costs and benefits to be borne by the community and the environment, such as reduced productivity on land impacted by the development, quantity of good agricultural land affected, areas of high conservation values	21.0



TERMS OF REFERENCE	EIS SECTION
affected, and reduction in greenhouse gas emissions.	
9. POWERLINK'S ENVIRONMENTAL RECORD – environmental record including reference to its environmental policy and planning framework and any proceedings under a Commonwealth, State or Territory law against Powerlink.	22.0
10 REFERENCES - references consulted should be presented in the EIS in a recognised format.	23.0
RECOMMENDED APPENDICES	
A1 – Schedule 2 of the DLGP Guidelines	
A2. Final Terms of Reference for this EIS	Appendix A
A3. Corridor Selection Report - If applicable, a copy of the Corridor Selection Report and / or Substation Site Selection Report should be included.	Appendix C
A4. Development Approvals - list of the development approvals required by the project should be presented (in the expected sequencing of applications) along with their corresponding regulating legislation and the approving authority.	
A5. Study Team - qualifications and experience of the study team and specialist sub-consultants and expert reviewers should be provided.	
A6. Consultation Report - including the details of affected and interested persons by type or organisation, and the statement of planned consultation with those persons, originally provided with the draft Terms of Reference. It should describe how 'interested' and 'affected persons,' and any 'affected parties' as defined by the EPBC Act were identified and include the matters likely to be of concern to other parties affected or likely to be affected by the development for the proposed community infrastructure.	19.0
A7. The Final EIS should include the following: a) a list of the parties consulted (subject to their permission); b) a copy of newspaper tear-sheet of Draft EIS advertisements; c) a summary of all submissions and the account taken of the issues raised; d) any further assessment of environmental effects of the project; e) any additional strategies for managing the environmental effects; f) a statement of any matters proposed to be included in the designation under the SPA, s202; and g) any recommended changes to the Transmission Line which produces the Final Layout.	



APPENDIX C CORRIDOR SELECTION REPORT

**Powerlink Queensland
Corridor Selection and
Preliminary Alignment Report**

**Transmission Line Route:-
Western Downs Substation to the existing
Queensland N.S.W Interconnector**

Date: October 2009
Job Reference: PR24395



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Quality Assurance Statement				
Revision No.	Author	Reviewer	Approved for Issue	
			Signature	Date
1	Shelley Ford, Sarah Stone, Simon Pollock, Mike O'Brien	David Carberry		12 th Oct 09
2	Shelley Ford	David Carberry		6 th Nov 09



TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	BACKGROUND.....	1
1.2	JUSTIFICATION FOR PROJECT	1
1.3	SCOPE OF THE PRELIMINARY ASSESSMENT REPORT	1
1.4	ASSESSMENT METHODOLOGY	2
2.0	DESCRIPTION OF STUDY AREA.....	4
2.1	INTRODUCTION.....	4
2.2	LOCAL GOVERNMENT AREAS	4
2.3	POPULATION CENTRES.....	4
2.4	ROADS	4
2.5	LAND USES.....	4
2.6	NATURAL ENVIRONMENT	5
3.0	DETERMINATION OF PRELIMINARY ALIGNMENT OPTIONS.....	6
3.1	PRELIMINARY ALIGNMENT CONSTRAINT CATEGORIES	6
3.2	INFORMATION SOURCES.....	6
3.3	MAJOR ALIGNMENT DEVELOPMENT CONSTRAINTS.....	7
4.0	STUDY AREA & CORRIDOR CONSIDERATIONS.....	8
4.1	BRIEF OVERVIEW OF CORRIDOR OPTIONS	8
4.1.1	Northern Route	8
4.1.2	Central Route	8
4.1.3	Southern Route	8
4.2	ENVIRONMENTAL ASSESSMENT CONSIDERATIONS	8
4.2.1	Topography	9
4.2.2	Geology and Soils	9
4.2.3	Hydrology	9
4.2.4	Flora and Fauna	9
4.2.5	Forest and Conservation Areas	14
4.2.6	Cultural Heritage.....	15
4.2.7	Contaminated Land	16
4.2.8	Noise	16
4.2.9	Air Quality	16
4.2.10	Electro Magnetic Fields (EMF)	16
4.2.11	Flood, Bushfire and Landslide	16
4.2.12	Traffic and Infrastructure	17
4.3	PLANNING ASSESSMENT CONSIDERATIONS	17
4.3.1	Visual Amenities.....	17



4.3.2	Planning Scheme Requirements	17
4.3.3	Bushfire Hazard	19
4.3.4	Mineral Development Licence Area	20
4.3.5	Biodiversity Planning	20
4.3.6	Groundwater Vulnerability	20
4.3.7	Transmission Line Separation	21
4.3.8	Construction and Maintenance	22
4.4	SUMMARY	22
5.0	COMPARATIVE ASSESSMENT OF OPTIONS	30
5.1	QUANTITATIVE AND QUALITATIVE ANALYSIS OF OPTIONS	30
5.2	SUMMARY OF ANALYSIS	35
6.0	CONCLUSION	36

TABLES

Table 4.1	Regional Ecosystems in the Study Area which Alignments Traverse	11
Table 4.2	Remnant Vegetation to be Traversed for Each Corridor Option	13
Table 4.3	GQAL in the Study Area which Alignments Traverse	18
Table 4.4	Length of GQAL Traversed	19
Table 4.5	Bushfire Hazard Risk	20
Table 4.6	Summary of Key Issues for Comparative Assessment	22
Table 5.1	Criteria rationalisation and Performance Measures	30
Table 5.2	Quantitative Assessment of Proposed Alignment Options	31
Table 5.3	Qualitative Comparative Assessment of Alignment Options	32

FIGURES

Figure 1.1	Study Area & Alignment Options	3
Figure 4.1	Topography	24
Figure 4.2	Soil	25
Figure 4.3	Rivers & Creeks	26
Figure 4.4	Regional Ecosystems	27
Figure 4.5	Good Quality Agricultural Land	28
Figure 4.6	Landuse/Planning	29

APPENDICES

Appendix A	Species of Conservation Significance	A
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1.0 INTRODUCTION

1.1 BACKGROUND

Conics was commissioned by Powerlink Queensland to prepare a Preliminary Alignment Report (PAR) for a proposed 275,000 volt (275kV) transmission line between the proposed Western Downs Substation to the South West Queensland Area (Halys in the vicinity of Tarong) (**Figure 1-1**). This line is proposed to be built on partially vacant easements from the Warra to Halys area. Powerlink Queensland have previously undertaken a preliminary corridor selection process to identify the potential corridor alignment options available within the study area. The alignment options identified by this investigation have been considered in further detail within this report. The potential for necessary deviations of the corridor options proposed in the Powerlink Queensland investigation are also considered within this report.

Of the alignment options considered, one route has been proposed as the preferred alignment option. The aim of this report is to investigate all three options and make a final recommendation as to a preferred alignment option. Construction is proposed to commence in 2010.

1.2 JUSTIFICATION FOR PROJECT

As a Transmission Network Service Provider in the National Electricity Market, and a holder of a transmission licence in Queensland, Powerlink Queensland is required to develop its network to meet the security and reliability standards of the National Electricity Rules, the Queensland Electricity Act 1994 and the terms of its transmission licence.

Electricity use in Southern Queensland has exhibited very strong growth during the past ten years and growth is expected to continue over the next ten years, due to inter alia population growth and the on going uptake of domestic air-conditioning. The existing transfer capability of Powerlink's network between Central Queensland and Southern Queensland, as well as between Bulli, South West, and South East Queensland, is described by limit equations which dynamically maximise the transmission capability available to electricity market participants at any time. It has been identified that the focus of generation adjacent to the Braemar Substation, in the south-west, may soon impose limits on the capability of that facility to meet system and security limits.

The network needs to be developed in an efficient manner so that future generation capacity that needs to be transferred can also be connected without exceeding fault ratings in the 275kV network.

1.3 SCOPE OF THE PRELIMINARY ASSESSMENT REPORT

The scope of the PAR is to assess and compare corridor options for the proposed 275kV transmission line, in terms of relevant environmental, planning (including social) and construction cost criteria and recommend a preferred corridor for further detailed assessment (i.e. an Environmental Impact Statement).

Initial studies undertaken by Powerlink Queensland and Conics for this PAR have been carried out in accordance with Powerlink Queensland's Internal Guidelines for Route Alignment (Powerlink Queensland 2004), which states that Powerlink Queensland will, "...*wherever practical and economically feasible*:"



- *Position the transmission line as far as is reasonable from residences, or places of assembly in which children remain for extended periods of times such as schools, childcare centres, etc;*
- *Limit the number of property titles affected by the proposed easement;*
- *Align the easement as close to property boundaries as possible; and*
- *Position the transmission towers and wires so as to cause minimal interference with farming operations."*

1.4 ASSESSMENT METHODOLOGY

Identification and assessment of the three potential corridors for the proposed transmission line included the following:

- Desktop assessment of existing information, mapping and reports;
- Field assessment by 2 ecologists and a soil scientist\hydrologist; and
- Consultation with Powerlink Queensland.

Desktop investigations of the Study Area were conducted using a number of information sources: maps, aerial photography, flora and fauna databases (Department of Environment and Resource Management (DERM) and Queensland Museum), Department of Mines and Energy (DME) mining mapping, remnant vegetation (RE) mapping, the Chinchilla and Dalby Shire Planning Schemes, state and federal cultural heritage databases and other existing literature on the area.

The short-list of possible alignment options was developed by Powerlink Queensland by identifying routes that considered the proximity to or potential impacts on environmental and social (including planning) values of the Study Area and general locality. As a result of these initial investigations, Powerlink proposed three potential corridor alignments for further consideration in the PAR. An overview of these corridor options is provided in **Section 4.1**.

Preliminary field assessments of the three potential corridor alignments and surrounding environments were undertaken during the week of 7th of September 2009. During the field assessments, a number of environmental and land use considerations were investigated, namely ecology, hydrology, soil, geology and land use. These preliminary investigations were limited due to private property restrictions and hence, the scope of these investigations was limited to observations made possible mostly from roadside corridors.

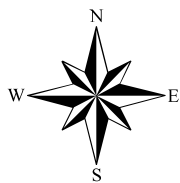
The comparison and analysis of corridor options is explained in **Sections 4.2** and **4.3**. From this analysis, one option provided the least constraint in relation to the environmental, planning/social and constructions considerations (see **Sections 4.2** and **4.3**). This option is recommended to form the preferred corridor for further detailed analysis (i.e. an Environmental Impact Statement).

Powerlink Western Downs PAR Alignment Options

Figure 1.1

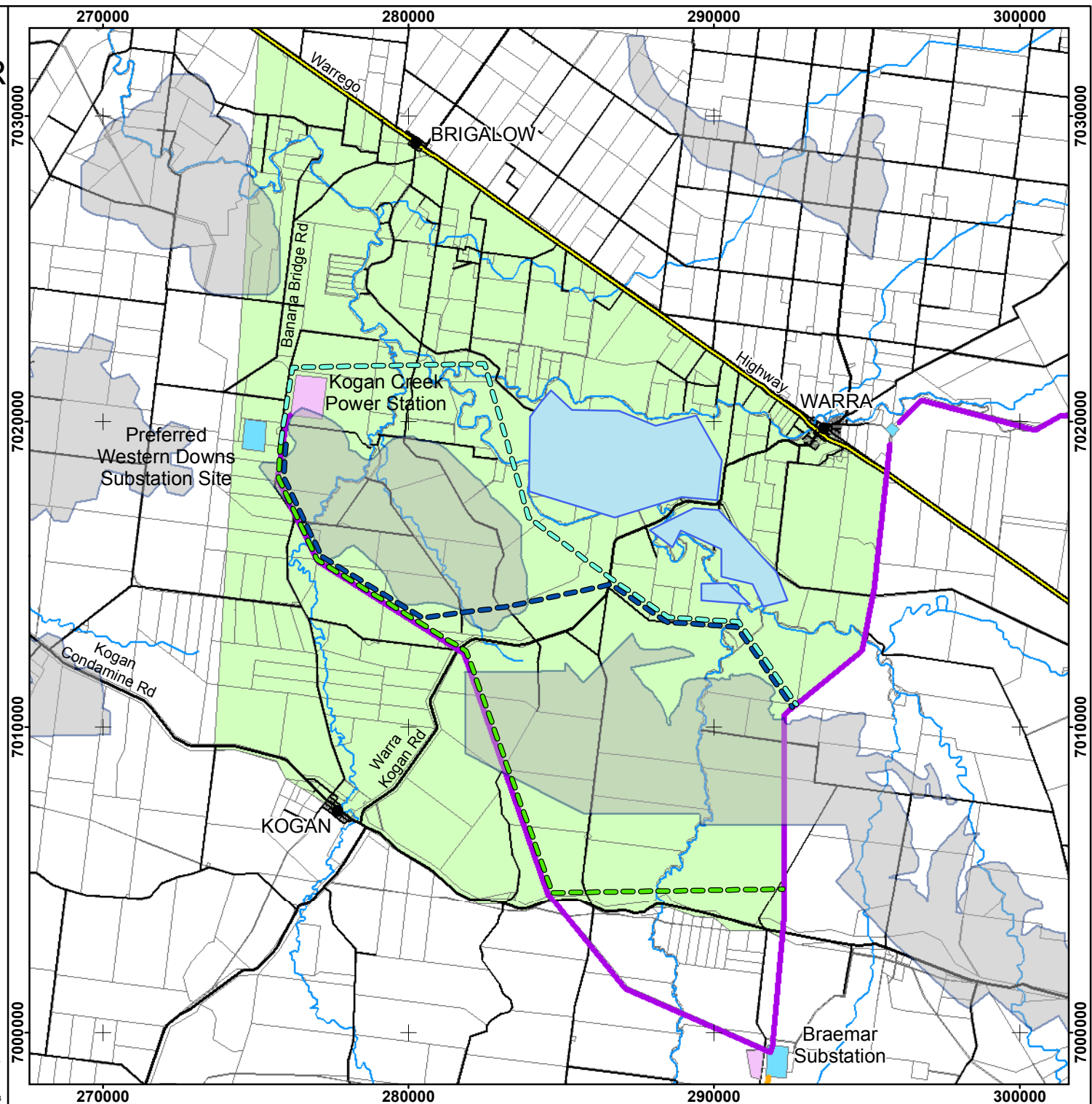
Alignment Options

- Northern Route
- Central Route
- Southern Route
- 275 kV
- 330 kV
- Highway
- Main Road
- Local Road
- Watercourse
- Power Station
- Sub-station
- Irrigation
- Coal Resource Area
- Cadastre
- Study Area



0 1,000 2,000 4,000 6,000 8,000 Metres

Scale 1 : 180 000
Datum / Projection: GDA94 MGA Zone 56





2.0 DESCRIPTION OF STUDY AREA

2.1 INTRODUCTION

The Study Area is defined as the area between the proposed Western Downs substation site in the west, the existing Queensland NSW Interconnector line (QNI) to the east, the vicinity of the Warrego Highway between Warra and Brigalow to the north and the Kogan Condamine Road in the south (**Figure 1-1**). Three corridor options were evaluated within this study area.

2.2 LOCAL GOVERNMENT AREAS

The study area is contained within the Western Downs Regional Council area (previously the Wambo and Chinchilla Shire Councils).

2.3 POPULATION CENTRES

The nearest population centres are Dalby (50km) and Chinchilla (30km). The smaller centres of Warra, Brigalow and Kogan are within the Study Area. The locations of these townships within the Study Area are shown on **Figure 1-1**.

2.4 ROADS

The principle road within the Study Area is the Warrego Highway which traverses the northern portion of the study area in an east-west direction and is the main road transport corridor between Toowoomba and Western Queensland. It links key rural service centres in the region including Dalby (to the east of the Study Area) and Chinchilla (to the west of the Study Area), as well as numerous other small towns. Other local roads within the study area include:

- Warra – Kogan Road;
- Kogan – Condamine Road; and
- Banana Bridge Road.

A network of minor roads and access tracks are located throughout the Study Area.

2.5 LAND USES

The economic base of the Western Downs Regional Council area traversed by the Study Area is generally primary production that includes:

- Beef;
- Grain (wheat, sorghum);
- Feedlots; and
- Forestry.



Irrigated cultivated lands are evident along the alluvial plains of the Condamine River and tributaries. Dry land cultivation occurs on the better soils elsewhere.

The Kogan Creek Power Station and associated coal mine are also located in the study area and provide a number of jobs for the local area and beyond.

The Tong Park Piggery and several smaller piggeries occur within and adjacent to the Study Area.

2.6 NATURAL ENVIRONMENT

The natural environment of the Study Area is dominated by flat to undulating plains with emergent residual low hills. The Study Area falls within the Condamine - Balonne River Catchment and the Condamine River flows through the Study Area. Also within the area are numerous creeks (including Braemar Creek, Branch Creek, Kogan Creek and Cooranga Creek) and drainage lines. There are numerous Lacustrine, Palustrine and Riverine wetlands mapped across the Study Area (EPA 2005).

There are no National Parks within the Study Area. The Dalby State Forest is located in the south-east of the Study Area and the Braemar State Forest is located south of the Study Area.

The majority of the landscape of the study area is currently used for agricultural and grazing purposes. Clearing and general disturbance of the existing natural environment has occurred as a result of this land use and others found within the study area such as industry and residential. The Study Area does however contain patches of mapped remnant vegetation including a large area of mapped not of concern RE which stretches some way across the centre of the Study Area.



3.0 DETERMINATION OF PRELIMINARY ALIGNMENT OPTIONS

3.1 PRELIMINARY ALIGNMENT CONSTRAINT CATEGORIES

Corridor options were developed by Powerlink Queensland by identifying routes that considered the proximity to, or potential impacts on environmental and social (including planning) values of the Study Area and general locality. These included:

- Population centres and other residential areas;
- Watercourses;
- Sensitive land uses, such as houses, schools, hospitals, churches and cemeteries;
- Airstrips;
- Topography;
- Mineral resources, including registered active, and non-active leases;
- Significant vegetation communities and fauna habitats, particularly for species of conservation significance;
- Areas of State Forests;
- Areas of potential cultural heritage significance, both indigenous and non-indigenous;
- Tourism and recreation areas; and
- Areas of visual or scenic amenity.

Construction costs and engineering issues were also considered during the evaluation process.

3.2 INFORMATION SOURCES

Information sources used to research the constraints for each of the proposed corridor options included:

- Department of Infrastructure and Planning (DIP) – planning schemes of Wambo and Chinchilla Shire Councils;
- Department of Mines and Energy (DME) – Interactive Resource and Tenure Maps (mining leases, geological landform) (2009).
- Department of Environment and Resource Management (DERM) – cultural heritage records on the Queensland Heritage Register (2009), Wildlife Online database (2009);
- CSIRO – soil landscape maps (1985);
- Queensland Herbarium – regional ecosystem mapping version 5.0 (2005a), HERBRECS database of individual threatened flora species (2009);
- Queensland Museum – fauna species database (2009);
- Department of Environment, Water, Heritage and Arts (DEWHA) – Online Database for Matters of Environmental Significance (2009), cultural heritage records on the Register of National Estate (2009);
- Aerial photography (Powerlink Queensland 2009); and
- Local landholders and Western Downs Regional Council staff.



3.3 MAJOR ALIGNMENT DEVELOPMENT CONSTRAINTS

Major constraints within the Study Area were also considered when formulating corridor alignment options. These constraints (which will be given further attention in **Section 4**), include:

- Coal reserves (Kogan Creek, Glen Wilga, Wilkie Creek) within the area;
- Kogan Creek Power Station and associated infrastructure, conveyors, ash dam etc;
- Tong Park Piggery, the largest piggery in Australia (73,000 pigs);
- Irrigated farmlands and associated infrastructure adjacent to the Condamine River and on the floodplains of the major creeks in the area;
- Broadacre farming on the Brigalow – Jimbour Floodplains;
- Rural residential subdivisions to the north of the town of Kogan on Banana Bridge Road and the Kogan-Warra Road;
- Remnant vegetation including some areas classified as “endangered”;
- The Dalby State Forest;
- Isolated farmhouses;
- Scarp country comprising elevated rocky terrain above the surrounding plains; and
- A disused airstrip on the Tong Park property.

After consideration of the aforementioned values and Study Area constraints, four corridor alignment options were developed by Powerlink Queensland. Further investigation revealed that the fourth option, which was going to depart the existing easement in the Warra area to the north of the Condamine River would encounter intensive cultivation and land use including irrigated cultivation in the Warra Creek, Cooranga Creek and Condamine River areas. This option would also pass immediately to the west and north of Warra and consequently this option was rejected on the basis of land use and social impacts. Consequently, consideration is now only given to the remaining three routes which depart from the existing QNI easement, south of the Condamine River (see **Figure 1.1**).

The existing Tarong to Braemar transmission line easement has sufficient width to accommodate one additional line on the western/northern side of the existing line. This easement width was acquired at the time of the original easement acquisition in anticipation of future transmission line development from the Braemar/SWQ area into the Tarong Area. It is proposed to utilise this space from Tarong through to the Warra/Condamine River area and then acquire a new easement through to the proposed Western Downs substation. The three alignment options which are considered in this report have previously been assessed by Powerlink Queensland with regard to the location of residences, terrain, vegetation, coal resources, irrigation and other rural land use restrictions. Details of the proposed alignment routes of these corridors are detailed in **Section 4.1**.



4.0 STUDY AREA & CORRIDOR CONSIDERATIONS

4.1 BRIEF OVERVIEW OF CORRIDOR OPTIONS

Three corridor options have been considered for the proposed transmission line (see **Figure 1.1**). Specific descriptions and location details relating to each of these options are discussed below.

4.1.1 Northern Route

This route is approximately 24.5km long and departs the QNI approximately 3.5 km south of the Condamine River, angles north west (3.6km) to pass between irrigated farming country adjacent to the river and Tong Park piggery. The northern boundary of the piggery (Wolskis Road) is followed through to the Kogan Warra Road (8.2km) and then the line continues north west (11.9 km) to the Kogan Creek Coal Resource. The line then angles north to cross the Condamine River (13.6 km), enters irrigated farming country before heading west (16.1 km) to again cross the Condamine River (18.9 km). The line continues west to pass to the north of the Kogan creek Power station. Two crossings of the Condamine River, one of Braemar Creek, Cooranga Creek (possibly), and one of Kogan Creek are required. Cultural heritage may be an issue at these crossings and the scarp country adjacent to the river.

4.1.2 Central Route

This route is approximately 24.6km long and follows the same course as the Northern Route through to the Kogan Warra Road (8.2 km). At the road crossing, the alignment angles to the south west, and then west, generally parallel with the road and skirting the southern edge of the Kogan Creek Coal resource. At approximately 15.4km, the route joins the existing Kogan Creek to Braemar 275kV transmission line which is then followed through to the Power Station (24.6km). Crossings of Braemar Creek, Branch Creek and Kogan Creek are required. There are no crossings of the Condamine River. Cultural heritage issues are considered of medium risk. There is one house in close proximity (<200m), and one more distant (500m) of a possible alignment. Purchase of the property containing the house may be a consideration.

4.1.3 Southern Route

This route is approximately 35.5km long and skirts the Tong Park piggery to the east, south and west by continuing south along the QNI towards Braemar before heading west (7.1km) along the existing Ergon 110 kV line. The route intersects the Kogan Braemar 275kV line (15.7km) where it then parallels the existing line to the north north-west (24.4km), and then west north west (33.5km) before entering the Kogan Creek Power Station (35.5km). Crossings of Braemar Creek, Branch Creek and Kogan Creek are required. There are no crossings of the Condamine River. Cultural heritage issues are considered of medium risk. There are two houses approximately <500m to the south of the existing Kogan Braemar easement where the lines would be parallel. Incremental impact on these houses would be low.

4.2 ENVIRONMENTAL ASSESSMENT CONSIDERATIONS

The following environmental assessment criteria have been examined in light of the Study Area. Major constraints/factors for consideration are raised in the following sections.



4.2.1 Topography

The Northern alignment is predominantly flat and traverses the Condamine River floodplain and river terraces. The Central and Southern routes rise from the floodplain towards the Kogan Creek Power Station with elevated plains, jump-ups and dissected scarp country 20m – 30m above the surrounding landscape. **Figure 4.1** illustrates the topography of the study area.

4.2.2 Geology and Soils

The primary geological units of the area the alignments traverse are the Kumbariila beds. Secondary units are alluvial in the major drainage lines. The Northern and Central alignments terminate on Walloon Coal Measures.

Soils are dominated by duplex soils (Light forest, Ironbark/Bull oak forest and Cypress Pine Sand Land Resource Areas), with areas of clay alluvial plains in the North. There is considerable soil variability, however as a general description soils are thin sandy loam surfaced over sodic subsoils on the lowlands, with skeletal soils overlaying shallow rock on the elevated scarps. The alluvial plains to the north have been strongly influenced by the sandstone geology and exhibit sodicity in the surface soils. **Figure 4.2** illustrates the soils of the study area.

4.2.3 Hydrology

The Condamine River and Cooranga Creek border the northern edge of the investigation area. The northern alignment crosses both the River and Creek twice near their confluence. Braemar Creek borders the eastern edge and Kogan Creek is towards the west of the investigation area. Several other small creeks and water courses will be crossed. All streams are ephemeral and only flow following local rain or rain in the catchment. There is a lacustrine wetland on Braemar Creek upstream of the Central route crossing of Braemar Creek.

The northern alignment has 6 waterway crossings. It traverses both the Condamine River and Cooranga Creek twice and both Kogan and Braemar Creek once. The central alignment has 3 waterway crossings. It traverses Kogan, Eastern Branch and Braemar Creeks. The southern alignment has 2 waterway crossings and traverses both Kogan and Braemar Creeks. **Figure 4.3** illustrates the watercourses in the study area.

Groundwaters are moderately deep (5-15m) and are estimated to be static in the eastern part of the investigation area and trending upwards in the west. There is potential for watertables reaching the surface (in lower parts of the landscape) within 100 years (Searle et al 2008). Modelling predictions of landuse indicate increased rates of recharge. Current monitoring show a rising groundwater trend (Searle et al 2008).

4.2.4 Flora and Fauna

Potential impacts on flora and fauna will vary across the Study Area and may influence corridor selection. Issues that should be considered include the extent of tree clearing, impacts on regional ecosystems (REs) and effects on significant flora and fauna species.



4.2.4.1 Vegetation Cover and Clearing

Regional Ecosystem data and aerial photography for the area was interpreted and used as the basis for broader assessment and opportunistic site evaluations undertaken from roads where access permitted. Whilst numerous quaternary vegetation site investigations were undertaken along each corridor option, for the purposes of this study, the extent of vegetation likely to be affected by each of the transmission line corridor options has been determined through the analysis of the presence and area of REs affected (e.g. the average length of the disturbance corridor) and analysis of aerial photography.

Vegetation clearing is an environmental consequence of the construction of transmission line projects. Depending on the condition (i.e. vegetated or disturbed) of the land adjacent to the corridor, additional vegetation clearing can have significant impact on both environmental and visual amenity levels. Removal of vegetation or the potential retention of vegetation within a corridor option may increase costs and could have a number of operational and maintenance implications.

The *Vegetation Management Act 1999* regulates clearing of remnant vegetation on both freehold and leasehold land. Remnant vegetation is categorised into REs, which describe the unique combination of vegetation species, geology and landform, across Queensland's bioregions (Sattler and Williams, 1999). Conservation status categories are assigned to all REs. The three conservation categories are 'endangered', 'of concern' and 'not of concern'. The construction of the proposed transmission line may require some clearing of remnant vegetation listed under the *Vegetation Management Act 1999*.

Powerlink Queensland have some exemptions in relation to the clearing of native vegetation on freehold lands under s112A of the Electricity Act 1994, where the works are for a "...transmission entity on land designated for the operating works by a Minister under the Integrated Planning Act 1997".

To enable a thorough assessment of the preferred corridor options in relation to REs and native vegetation:

- A preliminary assessment of vegetation along the three alignment options was undertaken with quaternary vegetation site assessments undertaken along each alignment where possible (restricted to public access areas). Further detailed vegetation assessments were not undertaken at this stage; and
- All categories of REs (i.e. 'endangered', 'of concern' and 'not of concern') were considered in the assessment of corridor options.

A number of mapped REs (DERM 2005) occur within the Study Area. These are illustrated in **Figure 4.4** and descriptions of each of the REs to be traversed are outlined in **Table 4.1**. This table also expresses the likelihood of the REs to be present within the Study Area based on preliminary field observations.

TABLE 4.1 REGIONAL ECOSYSTEMS IN THE STUDY AREA WHICH ALIGNMENTS TRAVERSE

RE CODE	RE DESCRIPTION	VMA STATUS	ALIGNMENTS TO TRAVERSE	LIKELIHOOD OF OCCURANCE
11.5.1	<i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains/remnant surfaces	Not of Concern	Central Option Southern Option	Likely
11.5.20	<i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> , <i>E. pilligaensis</i> with <i>E. crebra</i> woodland on Cainozoic sand plains.	Not of Concern	Central Option Southern Option	Likely
11.4.3/11.5.20 50/50	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> shrubby open forest on Cainozoic clay plains. AND <i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> / <i>E. pilligaensis</i> ± <i>E. crebra</i> woodland on Cainozoic sand plains	Endangered	Northern Option Central Option	Mixed polygon. Mapped 11.4.3 unlikely to present based on field observations. 11.5.20 most likely present.
11.4.12	<i>Eucalyptus populnea</i> woodland on Cainozoic clay plains.	Endangered	Northern Option Central Option	Likely
11.7.4/11.7.5	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> on lateritic duricrust. AND Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks.	Not of Concern	Northern Option Central Option Southern Option	Likely
11.3.2/11.3.17 80/20	<i>Eucalyptus populnea</i> woodland on alluvial plains. AND <i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains	Of Concern	Central Option Southern Option	Likely
11.3.2/11.3.18/11.3.4 40/35/35	<i>Eucalyptus populnea</i> woodland on alluvial plains. AND <i>Eucalyptus populnea</i> , <i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> shrubby woodland on alluvium. AND <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. tall woodland on alluvial plains.	Of Concern	Northern Option Central Option Southern Option	Likely

RE CODE	RE DESCRIPTION	VMA STATUS	ALIGNMENTS TO TRAVERSE	LIKELIHOOD OF OCCURANCE
11.7.7	<i>Eucalyptus fibrosa</i> subsp. <i>nubila</i> ± <i>Corymbia</i> spp. ± <i>Eucalyptus</i> spp. on lateritic duricrust	Not of Concern	Central Option Southern Option	Likely
11.7.4/11.7.7/11.7.5 50/40/10	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> on lateritic duricrust. AND <i>Eucalyptus fibrosa</i> subsp. <i>nubila</i> ± <i>Corymbia</i> spp. ± <i>Eucalyptus</i> spp. on lateritic duricrust AND Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks.	Not of Concern	Central Option Southern Option	Likely
11.3.25/11.3.4/11.3.3 80/10/10	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines AND <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. tall woodland on alluvial plains AND <i>Eucalyptus coolabah</i> woodland on alluvial plains	Of Concern Sub-Dominant	Northern Option	Likely



Table 4.2 describes the total length of 'endangered', 'of concern' and 'not of concern' mapped remnant vegetation to be traversed by each corridor option.

TABLE 4.2 REMNANT VEGETATION TO BE TRAVERSED FOR EACH CORRIDOR OPTION

CORRIDOR OPTION	KM OF 'ENDANGERED'* RE TO TRAVERSE	KM OF 'OF CONCERN'* RE TO TRAVERSE	KM OF 'NOT OF CONCERN'* RE TO TRAVERSE	TOTAL KM OF RE TO TRAVERSE
Northern	0.8	1.3	2.2	4.3
Central	0.3	0.9	7.1	8.3
Southern	0.0	0.3	13.3	13.6

* 'Endangered', 'Of Concern' and 'Not of Concern' as listed under the *Vegetation Management Act 1999*.

4.2.4.2 Commonwealth Threatened Ecological Communities

Vegetation communities may also be protected as 'threatened ecological communities' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Projects which have the potential to significantly impact a 'threatened ecological community' may require 'referral' to the Federal Department of Environment, Water Heritage and Arts (DEWHA) for assessment under the EPBC Act.

The DEWHA database search identified four threatened ecological communities known or potentially occurring in the vicinity of the Study Area. The field assessment did not reveal the presence of any threatened ecological communities however RE mapping indicates that Brigalow (*Acacia harpophylla*) dominant and sub-dominate communities (listed as Endangered) may be present within the Study Area. In addition to this, the landscape evident along the northern portion of the Study Area may also provide suitable habitat for 'Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland' (listed as Critically Endangered). Whilst it is considered unlikely that the 'White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland' would occur within the Study Area (due to a lack of corresponding REs), it is possible that Weeping Myall Woodlands may occur within the Study Area.

Detailed field investigations are required to confirm the presence or absence of these communities. In the event that field investigations confirmed the presence of any threatened ecological community, referral of the project would need to be considered as part of the EIS phase of the project, once a final alignment has been determined and the extent of impact to this community established. The decision to refer the project would depend upon the significance of the predicted impacts on the relevant matter of national significance.

4.2.4.3 Flora and Fauna of Conservation Significance

Conservation significant flora and fauna species listed under provisions of Commonwealth and State legislation have the potential to influence the planning, design and construction of the transmission line and maintenance of any associated easements. If any flora or fauna of conservation significance exist within or adjacent to the final corridor option, management strategies to avoid or minimise impact to the species population and associated habitat may be required. This may include obtaining approvals from DERM to remove/relocate these threatened species from within the proposed corridor area. This may impact project delivery and cost.,



In order to determine the potential occurrence of flora and fauna of conservation significance in or adjacent to each of the corridor options, a number of database searches were undertaken (see **Section 3.2**). Species of conservation significance are described under the Queensland *Nature Conservation (Wildlife) Regulation 2006* (NCWR) and under the Commonwealth *EPBC Act*. Detailed search results are presented in **Appendix A**. The database searches produced the following results:

- A total of 10 threatened flora species including two listed under the NCWR, one from the EPBC Act and 7 listed under both the NCWR and EPBC Act; and
- A total of 19 threatened fauna species including six listed under the NCWR, three from the EPBC Act and ten listed under both the NCWR and the EPBC Act.

Specific potential impacts on these threatened flora and fauna species of each of the alignment options being considered have not been quantified at this stage. Detailed field investigations at the Environmental Impact Statement stage (i.e. site-specific investigations) will however determine whether the final alignment impacts upon areas potentially supporting threatened species. It should be noted that during the preliminary field investigations, *Philotheca sporadica* (listed under the EPBC Act and NCWR) individuals were recorded at two locations within the vicinity of the central and southern alignments. Habitat suitable for the species is found throughout the Study Area and detailed field investigations to follow will record any additional individuals or populations. Extensive populations of *Philotheca sporadica* were managed during the construction of the Kogan Creek – Braemar Transmission Line.

During preliminary field investigations across the Study Area, environmental and noxious weeds were recorded. Three declared weed species, listed under the *Land Protection (Pest and Stock Route Management) Act 2002* (LPA), were identified during the field assessment. These were:

- *Senecio madagascariensis* (Fireweed) - Class 2 Declared Plant;
- *Opuntia tomentosa* (Velvety Tree Pear) – Class 2 Declared Plant; and
- *Opuntia stricta* (Prickly Pear) – Class 2 Declared Plant.

The occurrence of these weeds is however common across all three corridor options and therefore has not been used as an assessment option.

4.2.5 Forest and Conservation Areas

To determine the potential impacts on the Study Area's ecological and recreational assets and values, the presence of regionally recognised state forests and conservation areas has been investigated.

There are no National Parks within the Study Area. The south-east corner of the Study Area traverses the northern section of the Dalby State Forest, and the Braemar State Forest is located south of the Study Area but still within the immediate vicinity.



4.2.6 Cultural Heritage

Review of the Queensland Heritage Register (European) indicates an absence of non-indigenous cultural heritage sites within the immediate vicinity of the Study Area (DERM, 2009). Australian Heritage Database searches for the localities of Warra, Kogan, Dalby and Chinchilla, have identified the Boonarga Cactoblastis Memorial Hall (for its association with the defeat of the prickly pear plague; a major event in Australia's agricultural history), and the Chinchilla Sands Local Fossil Fauna Site (a highly significant Pliocene fossil site), neither of which are located within the Study Area (DEWHA, 2009). The Cactoblastis Memorial Hall is situated approximately 10km north of the Study Area, on Horswoods Road (along the Warrego Highway), Boonarga. The Chinchilla Sands Local Fossil Fauna Site is situated approximately 15km north-west of the Study Area, along the northern bank of the Condamine River.

All significant Aboriginal cultural heritage in Queensland is protected under the *Aboriginal Cultural Heritage Act 2003*, and penalty provisions apply for any unauthorized harm. Under the legislation a person carrying out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal Cultural Heritage.

The construction activities that are proposed for this transmission line is subject to both Category 4 and Category 5 activities of the Duty of Care Guidelines. For example:

Where an activity is proposed under category 5 there is generally a high risk that it could harm Aboriginal cultural heritage. In these circumstances, the activity should not proceed without cultural heritage assessment.

Where an activity is proposed under category 5, it is necessary to notify the Aboriginal Party and seek:

- (a) Advice as to whether the feature constitutes Aboriginal cultural heritage; and*
- (b) If it does, agreement as to how best the activity may be managed to avoid or minimise harm to any Aboriginal cultural heritage.*

A search of the Cultural Heritage Database and Register completed on the 5th of November 2008 shows significant Aboriginal cultural heritage areas and objects in the central study area option (only area searched). This includes scarred trees, artefact scatters, artefacts, shell material and a stone well. It is worth noting that significant cultural heritage is likely to be found in those areas that have not been previously subjected to a cultural heritage survey.

There are two previously known Aboriginal parties for the study area. However, recent native title activity now poses some initial constraints to the project but nevertheless this does not have any impact on selection of the northern, central, or southern route options. Note, further investigations are required by Powerlink to identify who is the Aboriginal party(s) for this project.

Aboriginal cultural heritage, which may occur on the study area, is protected under the terms of the *Aboriginal Cultural Heritage Act 2003* even if there are no records are recorded in an official register and whether or not they are located in, on or under private land.



Powerlink Queensland will be required to obtain a registered cultural heritage management plan (CHMP) with the identified Aboriginal Party(s) for this project. The approved CHMP will include a cultural heritage survey of the areas identified as being subject to Category 5 activities and a final report proposing how Powerlink Queensland should avoid harm to cultural heritage during construction.

The Project is not expected to impact upon areas or objects of social importance or cultural significance, however, the likely presence of remnants of cultural heritage has not been dismissed.

4.2.7 Contaminated Land

Contaminated land could impact on the alignment of the transmission line. No visual evidence of contaminated land or contaminating activities was identified during the field investigation however further investigations are warranted.

4.2.8 Noise

Noise is unlikely to vary between the potential corridor options. Noise issues will generally be insignificant but where considered will relate to proximity to dwellings which will be assessed elsewhere. Consequently, noise has not been considered a key criterion for the purposes of determining the preferred corridor.

4.2.9 Air Quality

Air quality is unlikely to vary between corridor options. Air quality issues will generally be insignificant during construction, but where considered an issue will relate mainly to proximity to dwellings. This issue will be addressed in the Environmental Impact Statement. Consequently, air quality has not been considered a key criterion for the purposes of determining the preferred corridor.

4.2.10 Electro Magnetic Fields (EMF)

Any potential effects would be greatest in houses near the corridor. There are 2 houses within 500m of each of the alignment options and Consequently, EMF has not been adopted as a criterion for the purposes of determining the preferred corridor, however it will be evaluated in determining the study alignment. Any potential impacts will be examined in detailed within the Environmental Impacts Statement.

4.2.11 Flood, Bushfire and Landslide

Areas of bushfire risk, as determined by the Queensland Rural Fire Service, have been identified on Western Downs Regional Council's Chinchilla Town Planning Scheme Overlay Map 4 *Bushfire Hazard Areas*. The mapping identifies the Study Area as occurring within a Low to Medium Bushfire Hazard classified area.

Preliminary desktop studies have indicated that the threat of fire within the Study Area is not expected to cause significant impacts to the proposed transmission line options, but will however be considered in more detail at the Environmental Impact Statement stage in accordance with *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*.



4.2.12 Traffic and Infrastructure

All three alignment options intersect road infrastructure within the study area. The northern alignment intersects Banana Bridge Road, Healeys Crossing Road, and Warra Kogan Road. The central alignment option intersects a total of 5 roads, comprising 5 local roads (Banana Bridge Road, Muhlings Road, Taylors Road, Wolskis Road and Healeys Crossing Road) and 1 main road (Warra Kogan Road). The southern alignment route intersects a total of 5 roads, namely Banana Bridge Road, Muhlings Road, Beelbee Road, Braemar Warra Road, and Warra Kogan Road.

None of the alignment options will intercept train lines within the study area.

4.3 PLANNING ASSESSMENT CONSIDERATIONS

The following planning assessment criteria have been examined in light of the Study Area. Major constraints/factors for consideration are raised in the following sections.

4.3.1 Visual Amenity

The key landscape characteristics that will influence the visual impact of transmission lines in this location will be topography, existing vegetation and visibility of the proposed route from local houses and roads. The feature within the study area with the highest visual amenity is the Condamine River valley, any route crossing this feature will have an impact on the visual amenity of the river. The topography of the region is generally flat, ranging from 310m to 380m above sea level, allowing long views across agricultural fields where there is no mature vegetation to provide a visual break. All three options are through sparsely populated rural areas with a mixture of large blocks of existing vegetation and open agricultural fields with scattered mature trees. The most significant viewing location will be from the Warrego Highway with the Warra-Kogan Road, Kogan-Condamine Road and the Banana Bridge Road as secondary roads from which parts of the three options are visible. The vegetation along the Condamine River will limit the views south west from the Warrego Highway.

Each of the three routes will cross the Warra Kogan Road and will be visible from Banana Bridge Road. The visual impact of any of these routes within the landscape will be reduced where they can follow existing transmission line routes, the southern route benefits from this factor more than either of the others.

4.3.2 Planning Scheme Requirements

4.3.2.1 Current Zoning

The proposed corridors traverse land that is included in the Rural Zone and is primarily used for rural purposes. The purpose of the Rural Zone is to retain the viability of the land within this zone for primary production.

The zoning of the land reflects the current land uses and Council's expectations for future land uses that can occur in this zoning. Consequently, the zoning of the land affords land owners certain use rights over their land. The land to be traversed by the three proposed transmission line routes are zoned 'Rural' in the Planning Scheme for both the former Chinchilla Shire and Wambo Shire areas.



As outlined in the Easement and Land Acquisition Route Study Report prepared by Powerlink Queensland, there are a number of land uses that may affect the ultimate alignment of the proposed route. These land uses include dwellings, Tong Park Piggery and irrigated farming. It is also noted that Coal resources are also identified between the Kogan Power Station and the Queensland – New South Wales Interconnector corridor.

It is acknowledged that there are a number of land uses and resources that need to be taken into consideration when determining the preferred route. However, as the proposed routes traverse land within the same zone, the current zoning affects the proposed routes equally and therefore has not been used as an assessment option.

4.3.2.2 Good Quality Agricultural Land

The major land use within the study area is agriculture and therefore the potential impacts on Good Quality Agricultural Land (GQAL) need to be considered. The proposed transmission line routes traverse land mapped as *Good Quality Agricultural Land (Class A and Class B)* as identified on Sheet 3 of 7 in the former Chinchilla Shire Council Planning Scheme and Sheet 5 of 9 of the former Wambo Shire Planning Scheme (**Figure 4.5**). Consideration is given to the length of the proposed corridor routes that traverse GQAL.

As outlined in the Guidelines for State Planning Scheme Policy 1/92, GQAL is land which is capable of sustainable use for agriculture, with a reasonable level of inputs, and without causing degradation of land or other natural resources. In this context, *agricultural land* is defined as land used for crop or animal production, but excluding intensive animal uses such as feedlots, piggeries, poultry farms and plant nurseries based on either hydroponics or imported growth media. Four classes of GQAL have been defined for Queensland and are described in **Table 4.3**.

TABLE 4.3 GQAL IN THE STUDY AREA WHICH ALIGNMENTS TRAVERSE

CLASS	DESCRIPTION
Class A	Crop land - Land that is suitable for current and potential crops with limitations to production which range from none to moderate levels.
Class B	Limited crop land - Land that is marginal for current and potential crops due to severe limitations; and suitable for pastures. Engineering and/or agronomic improvements may be required before the land is considered suitable for cropping.
Class C	Pasture land - Land that is suitable only for improved or native pastures due to limitations which preclude continuous cultivation for crop production; but some areas may tolerate a short period of ground disturbance for pasture establishment.
Class D	Non-agricultural land - Land not suitable for agricultural uses due to extreme limitations. This may be undisturbed land with significant habitat, conservation and/or catchment values or land that may be unsuitable because of very steep slopes, shallow soils, rock outcrop or poor drainage.

Agricultural land classes are based on an assessment of the agricultural suitability of the land for specified agricultural uses. Agricultural land suitability is a rating of the ability of land to maintain a sustainable level of productivity. The factors used to assess agricultural land suitability are the soil, topographic and climatic limitations which determine sustainable productivity. Explicit evaluation of economic factors, such as the size of production units, is not included as they are not considered relevant to the quality of the resource.



In this Instance, both Planning Schemes map their GQAL land as either Class A or Class B. Class A is suitable for crop production and Class B land is suitable for crop production however has limitations (e.g. nutrient deficient, erosion, stoniness).

All three corridor options traverse either or both Class A and Class B GQAL, as summarised in **Table 4.4**.

TABLE 4.4 **LENGTH OF GQAL TRAVERSED**

ALIGNMENT OPTION	CLASS A LAND	CLASS B LAND	TOTAL CLASS A AND B LAND
Northern	4.2km	5.6km	9.8km
Central	1.5km	3.7km	5.2km
Southern	0	2.7km	2.7km

For the purpose of considering this matter, we have focused on the extent to which the three corridor routes traverse land that is Class A GQAL. This approach has been adopted given that Class B GQAL, as described above, is considered by the Department of Environment and Resource Management as having severe limitations to current and potential crops.

4.3.3 Bushfire Hazard

Both of the Planning Schemes relevant to the project have incorporated mapping and planning provisions that are in accordance with the *State Planning Scheme Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*.

In both Planning Schemes, the Bushfire Hazards has been mapped as being either:

- Low Hazard;
- Medium Hazard; or
- High Hazard.

(refer to Chinchilla Shire Planning Scheme Sheet 4 of 7 & Wambo Shire Planning Scheme Sheet 6 of 9).

For the purpose of this report, we note that both Planning Schemes contain a *Rural Zone Code* that include the Performance Criteria and Acceptable Solution associated with the development of land and bushfire hazard.

These provisions indicate that development is preferred on land mapped as having a 'Low Hazard' bushfire risk. Where development is proposed in areas with a 'Medium Hazard' or 'High Hazard', bushfire management measures are required.

In this instance, it is proposed to assess each route based upon the length of proposed corridors that traverse land that is mapped as being of a 'Low Hazard'.



An assessment of the Council mapping and the proposed routes indicates that the entire Northern Route is mapped as being affected by 'Low Hazard' bushfire risk. The Central Route traverses land mapped as both 'Low Hazard' and 'Medium Hazard', with the majority of the Southern Route traversing land mapped as being of a 'High Hazard'. The central route is predominately located over land mapped as 'Low Hazard', with only approximately 500m of the corridor of the entire route traversing land identified as being of 'Medium Hazard'. The majority of the southern route traverses land mapped as having a 'Medium Hazard' bushfire risk.

TABLE 4.5 BUSHFIRE HAZARD RISK

OPTION	LOW HAZARD	MEDIUM HAZARD	HIGH HAZARD
Northern	X		
Central	X	X	
Southern			X

4.3.4 Mineral Development Licence Area

Both Planning Schemes have mapped areas contained with a Mineral Development License area (refer to Chinchilla Shire Planning Scheme Sheet 5 of 7 & Wambo Shire Planning Scheme Sheet 8 of 9) (**Figure 4.6**). The status of the licenses areas mapped is unknown at this stage. It is however noted that each of the Planning Schemes identifies the real property description for those lots included in the license area.

The mapping in the Planning Scheme also makes it difficult to confirm the true extent of the Mineral Development License area that might be affected by each of the proposed routes. A visual assessment of Council's mapping indicates that the length of the northern and central routes that traverse these mapped areas is similar and the southern route does not traverse any land mapped as a Mineral Development Licence area.

4.3.5 Biodiversity Planning

The Chinchilla Planning Scheme is the only Local Government area for this project that has a Biodiversity Planning Assessment Area mapped (Map 6 of 7).

The purpose of the Biodiversity Planning Assessment area is to ensure that sufficient detail is provided as part of Development Application to enable Council to accurately assess the impact of the proposal on habitats for essential habitat for endangered, rare or threatened species.

For the purpose of considering this matter, we have focused on the extent to which the three routes traverse land that is mapped as requiring a 'Biodiversity Planning Assessment'. Preliminary interrogations of the plan indicate the approximate length of each route affected by this trigger is considered to be similar

4.3.6 Groundwater Vulnerability

Both Planning Schemes have mapped areas considered to be subject to 'Ground Water Vulnerability' (refer to Chinchilla Shire Planning Scheme Sheet 7 of 7 & Wambo Shire Planning Scheme Sheet 7 of 9). The purpose of the mapping is to trigger an assessment the groundwater on mapped sites. In doing so, Council is provided with



sufficient information as part of a Development Application to determine the likely impacts of the development on the quality of groundwater.

Groundwater vulnerability is common across all three corridor options and therefore has not been used as an assessment option.

4.3.7 Transmission Line Separation

The Planning Schemes for both the former Chinchilla Shire Planning Scheme and former Wambo Shire contemplate the provision of separation distances between Powerline/Electricity Easements and development. The relevant Performance Criteria and Acceptable Solutions for development in the Rural Zone located in proximity to electricity easements is contained within Section 4.1 of each Planning Scheme. Similarly, Schedule 2, Division 3 of each Planning Scheme also articulates and illustrates the relevant separation or buffer distances.

For a 275kV transmission line easement, both Planning Schemes require 'habitable buildings' and 'child orientated uses' to maintain a minimum separation distance of 40 metres from the most proximate boundary of a transmission line easement.

These provisions relate to the separation distance to be provided when development, such as a house, is being erected near an electricity transmission line easement. The converse can apply. That is, to ensure the proposed routes do not result in an existing dwelling becoming non-compliant with the Planning Scheme requirements, each of the proposed routes should maintain a minimum separation distance of 40 metres from any 'habitable building' and 'child orientated use'. A 'Habitable Building' is defined by both Planning Schemes as "...any building, part of building or structure able to be lawfully used for "residential activities". The term 'Residential Activities' is further defined to include an Accommodation Building, Bed and Breakfast Premises, Caretaker's Residence, Detached House, Homes Business, Multiple Dwelling and Visitor Accommodation.

For the purpose of this assessment, it is noted that Powerlink Queensland has identified that houses are located within 500 metres of the proposed routes.

The Easement and Land Acquisition Route Study Report (CP.01422) prepared by Powerlink states the following for each of the proposed routes:



- Northern Route - houses are located close to a possible route (less than 200 metres);
- Central Route - one house is in close proximity of the possible route (less than 200 metres); and
- Southern Route - there are two houses less than 500 metres to the south of the existing Kogan – Breamer easement.

In all instances, the preferred route will need to confirm that no habitable dwellings are located within 40 metres of the transmission lines easement.

4.3.8 Construction and Maintenance

As mentioned in **Section 1.1**, in relation to construction and maintenance of Transmission Lines, Powerlink Queensland is required by the National Electricity Rules to select the lowest cost option to electricity consumers. Certain construction and maintenance methods/issues are associated with each potential corridor option and are a potential impact upon the cost of construction.

The length of each corridor option has been determined to compare potential construction and maintenance costs. Longer corridor options will logically have greater costs for both construction and maintenance phases and are therefore less preferred. In addition, changing alignment direction with steep angles also increases cost with this to be considered further during the Environmental Impact Statement and detailed design stages.

4.4 SUMMARY

This assessment has focused upon the Study Area and area in the immediate vicinity. During this discussion, it has been determined that some of the considerations examined illustrated no discernable difference between corridor options. Therefore, these considerations provide no further assistance in the selection of the preferred alignment option. Whilst the potential impacts of these considerations will be further investigated (and mitigated for) at the Environmental Impact Statement stage, they will not be considered further within this selection report. **Table 4.5** provides a summary of the issues raised for consideration in this section and provides advice pertaining to whether further analysis is required.

TABLE 4.6 SUMMARY OF KEY ISSUES FOR COMPARATIVE ASSESSMENT

CRITERION/ CONSIDERATION	SUMMARY OF ISSUES	FURTHER PAR ANALYSIS REQUIRED?
Topography	Topography does vary throughout the route alignments; however there are not significant topographical features that have the potential to impact on alignment of the transmission line.	No.
Geology	Geology is not significantly different for the alignment option. All routes traverse Kumbarella sandstone rises and alluvial valleys and there are no significant geological features that impact on the route alignment.	No.
Soils	Soils vary for the different for the route alignment options; more alluvial clays in the Northern option, Central and Southern tend to be more on the sandstone derived duplexes; all alignment options have sodic soils, but the degree of variability in sodicity is uncertain with current information. Management of sodicity issues could impact on the constructability and cost of the transmission lines.	Yes.



CRITERION/ CONSIDERATION	SUMMARY OF ISSUES	FURTHER PAR ANALYSIS REQUIRED?
Hydrology	Major hydrologic features are characterised. Northern route traverses the Condamine River and Cooranga Creek twice and Kogan and Braemar Creeks once, Central and Southern options both traverse Kogan and Braemar Creeks, the Central option also crosses Eastern Branch Creek. Potential for impacts at crossings could impact on the alignment of the transmission line.	Yes.
Flora and Fauna	Potential impacts on flora and fauna could vary throughout the route. Alignment options may influence the final alignment. The presence of 'endangered' remnant vegetation (namely River Red Gum communities along the Condamine River and tributaries and Brigalow dominant/subdominant communities) and endangered flora species such as <i>Philotheca sporadica</i> may require alternative alignment or construction management techniques.	Yes.
Contaminated Land	Contaminated land could impact on the alignment of the transmission line. Further investigations are warranted at a micro scale during the EIS.	No.
Cultural Heritage	Review of the Queensland Heritage Register (European) indicates an absence of non-indigenous cultural heritage sites within the immediate vicinity of the Study Area (DERM, 2009). Australian Heritage Database searches for the suburbs of Warra, Kogan, Dalby and Chinchilla, have identified the Boonarga Cactoblastis Memorial Hall, and the Chinchilla Sands Local Fossil Fauna Site, neither of which are located within the vicinity of the Study Area (DEWHA, 2009). The Project is not expected to impact upon areas or objects of social importance or cultural significance. The likely presence of remnants of cultural heritage has not been dismissed, however.	No.
Visual Amenity	Potential impacts due to the visibility of the preferred route from local roads and the visual impact of the route on the Condamine River corridor.	Yes.
Infrastructure	Each of the alignment options traverse roads and therefore may have associated impacts on construction and maintenance.	Yes.
Good Quality Agricultural Land	A desktop assessment of the mapping prepared by Council based upon the proposed routes indicate that approximately 9.8km of the Northern Route traverses land designated as Class A and B GQAL. The Central Route is estimated to affect 5.2km of Class A and B GQAL, and the Southern Route affects 2.7km of Class A and B GQAL.	Yes.
Bushfire Hazard Mapping	The entire Northern Route is mapped as being affected by 'Low Hazard' bushfire risk. The Central Route traverses land mapped as both 'Low Hazard' and 'Medium Hazard', with the majority of the Southern Route traversing land mapped as being of a 'High Hazard'. The central route is predominately located over land mapped as 'Low Hazard', with only approximately 500m of the corridor of the entire route traversing land identified as being of 'Medium Hazard'. The majority of the southern route traverses land mapped as having a 'Medium Hazard' bushfire risk.	Yes.
Mineral Development Licence Area	A visual assessment of Council's mapping indicates that the length of the northern and central routes that traverse these mapped areas is similar and the southern route does not traverse any land mapped as a Mineral Development Licence area.	Yes.

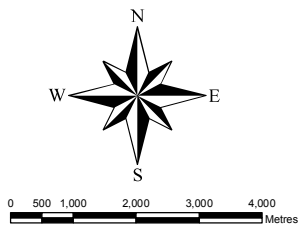
Powerlink Western Downs PAR Topography

Figure 4.1

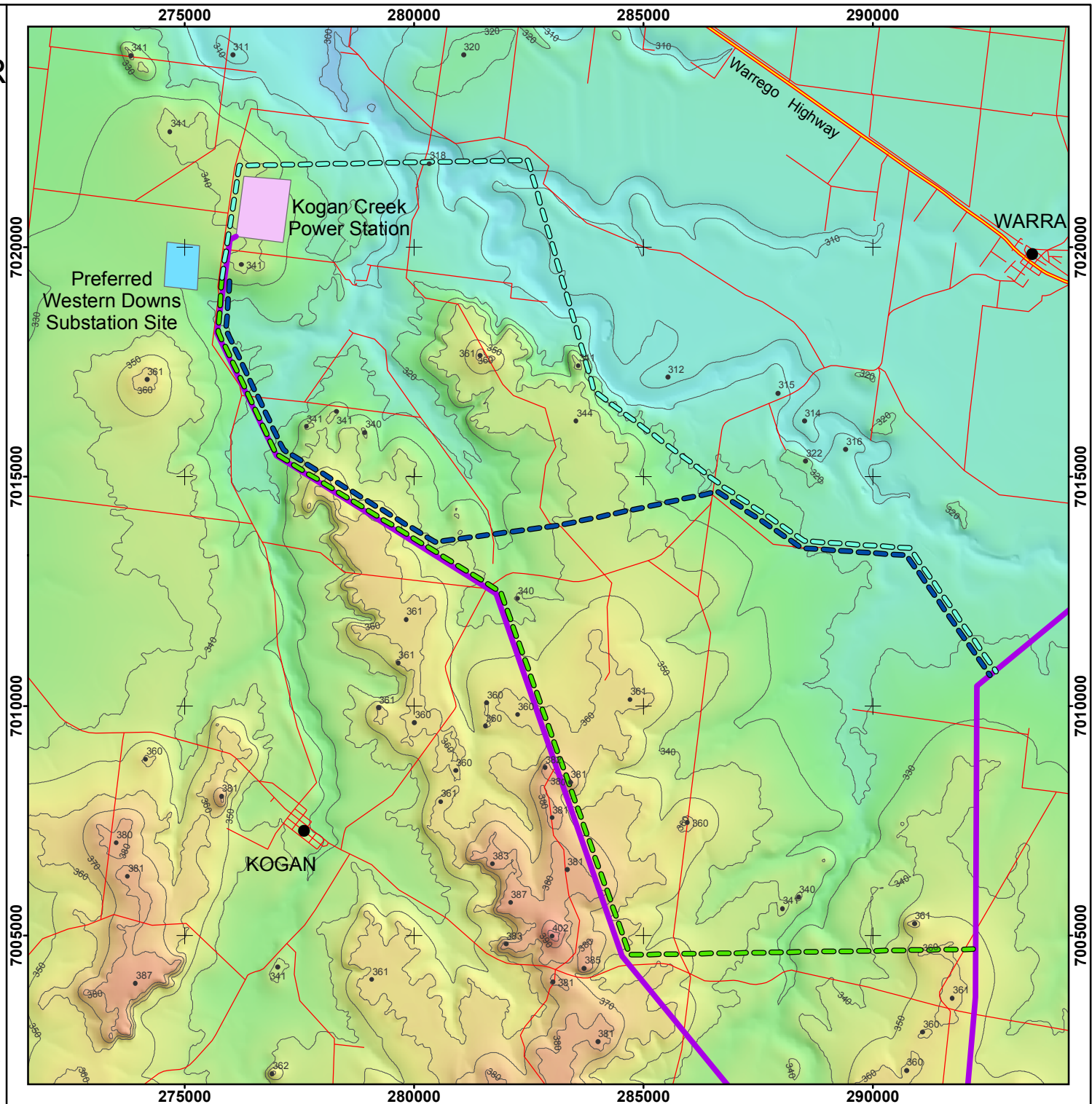
Alignment Options

- Northern Route
- Central Route
- Southern Route

- Spot Height
- Contour
- Highway
- Road
- 275 kV
- Power Station
- Sub-station



Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56



Powerlink Western Downs PAR Soil

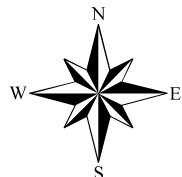
Figure 4.2

Alignment Options

- Northern Route
- Central Route
- Southern Route

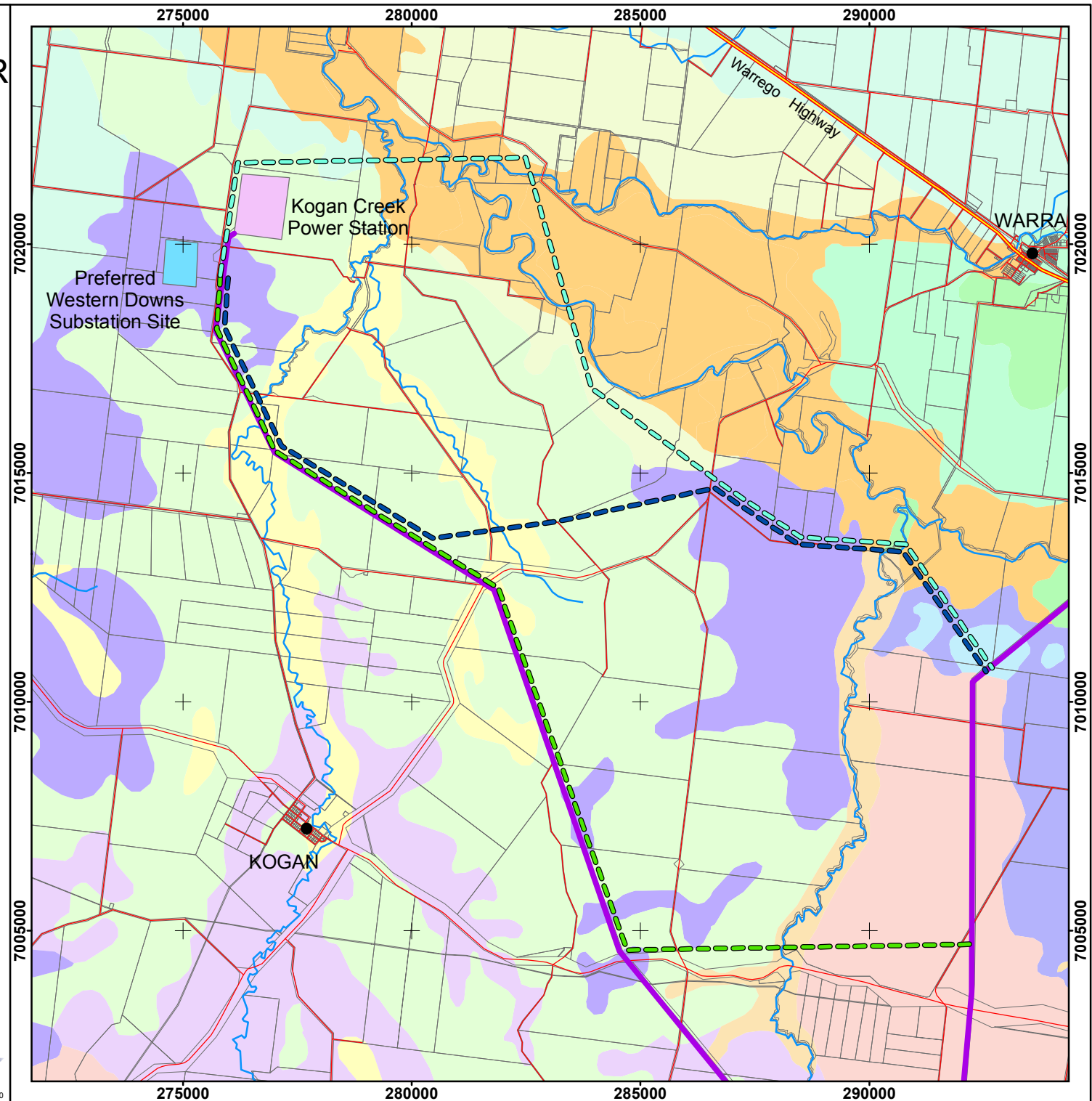
Land Resource Area

- Clay Alluvial Plains
- Poplar Box Flat Plains
- Cypress Pine Sands
- Brigalow Plains
- Ironbark / Bull Oak Forests
- Poplar Box Rises
- Light Forests
- Recent Alluvial Plains
- Older Alluvial Plains
- Alluvial Plains - Sandy Sodosols
- Brigalow Uplands
- Sandstone Forests
- Ironbark / Bull Oak Sodosols
- 275 kV
- Power Station
- Sub-station
- Highway
- Road
- Watercourse
- Cadastre



0 500 1,000 2,000 3,000 4,000
Metres

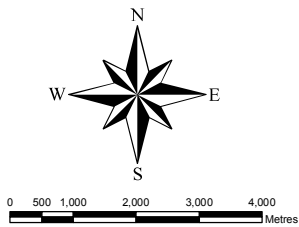
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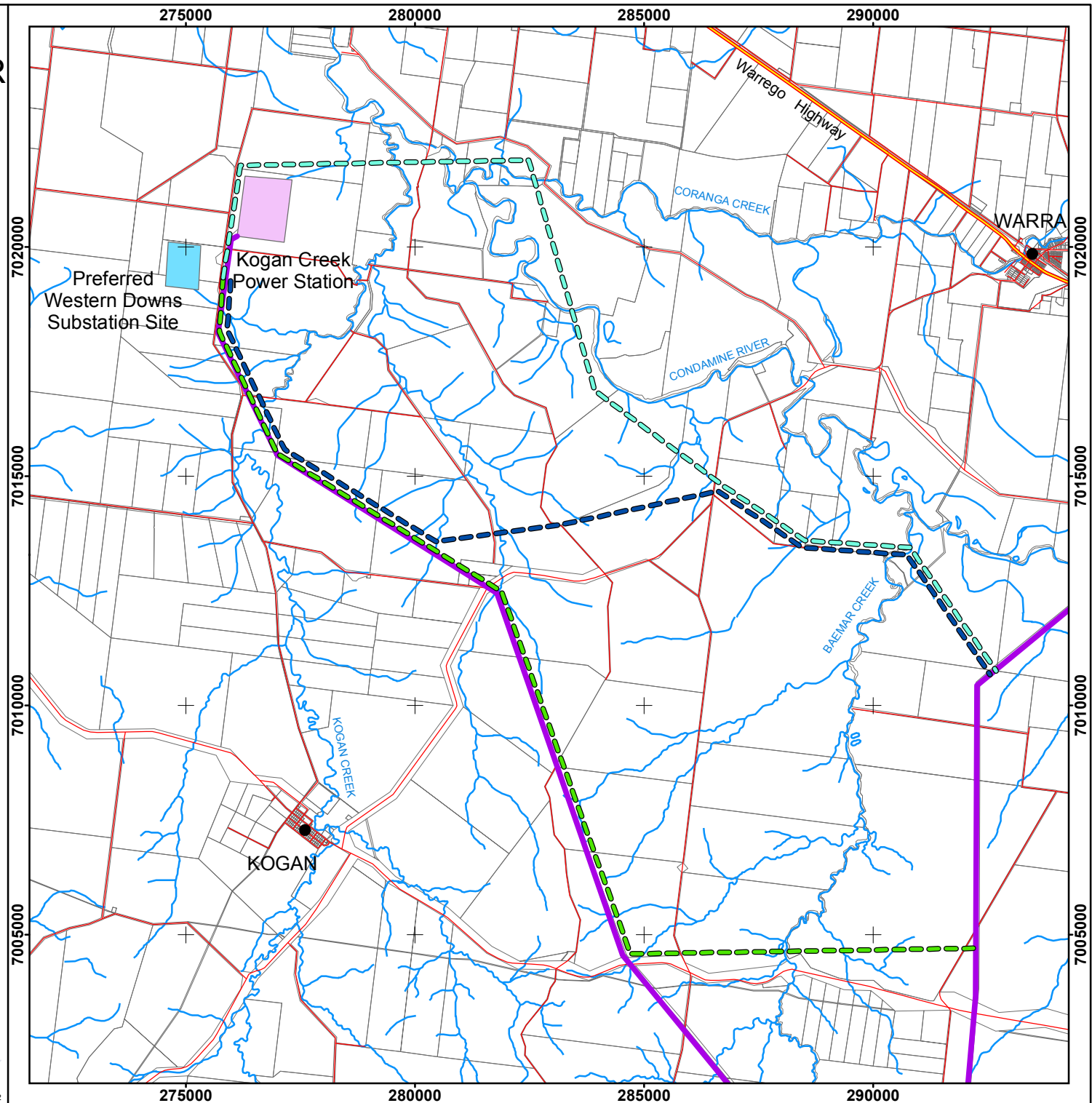
Powerlink Western Downs PAR Rivers and Creeks Figure 4.3

Alignment Options

- Northern Route
- Central Route
- Southern Route
- 275 kV
- Power Station
- Sub-station
- Highway
- Road
- Watercourse
- Cadastre



Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56



Powerlink Western Downs PAR Regional Ecosystems

Figure 4.4

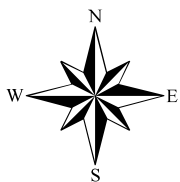
Alignment Options

- Northern Route
- Central Route
- Southern Route

Regional Ecosystems

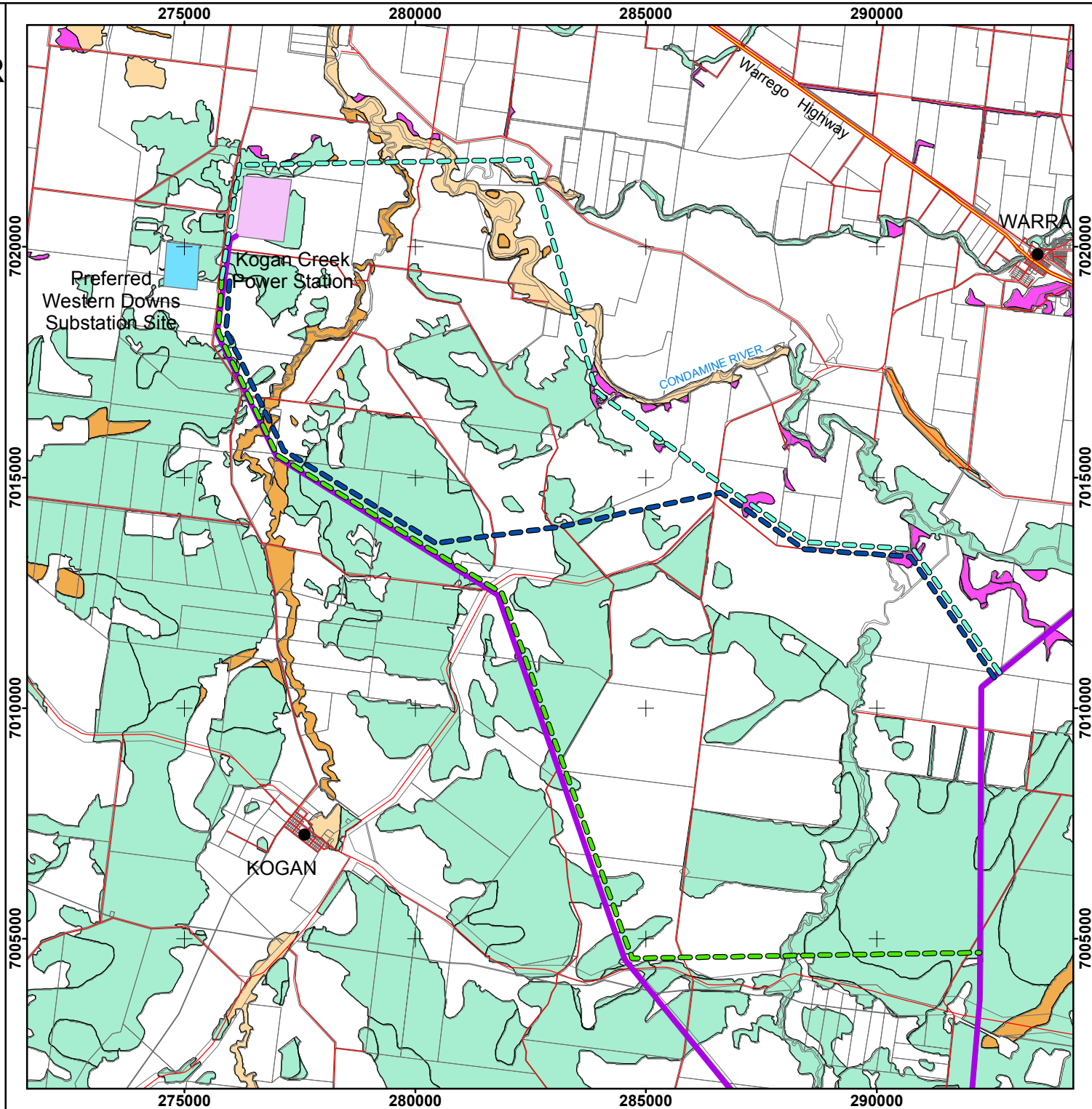
- Non-remnant / regrowth
- Endangered - Sub-dominant
- Endangered - Dominant
- Of Concern - Sub-dominant
- Of Concern - Dominant
- Not Of Concern
- Plantation forest

- 275 kV
- Power Station
- Sub-station
- Highway
- Road
- Cadastre



0 500 1,000 2,000 3,000 4,000
Metres

Scale 1 : 120 000
Datum / Projection: GDA94 MGA Zone 56



Powerlink Western Downs PAR Planning Scheme

Good Quality Agricultural Land
Figure 4.5

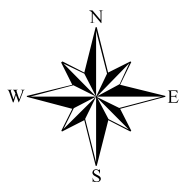
Alignment Options

- Northern Route
- Central Route
- Southern Route

- 275 kV
- Highway
- Road
- Power Station
- Sub-station
- Cadastre

Good Quality Agricultural Land

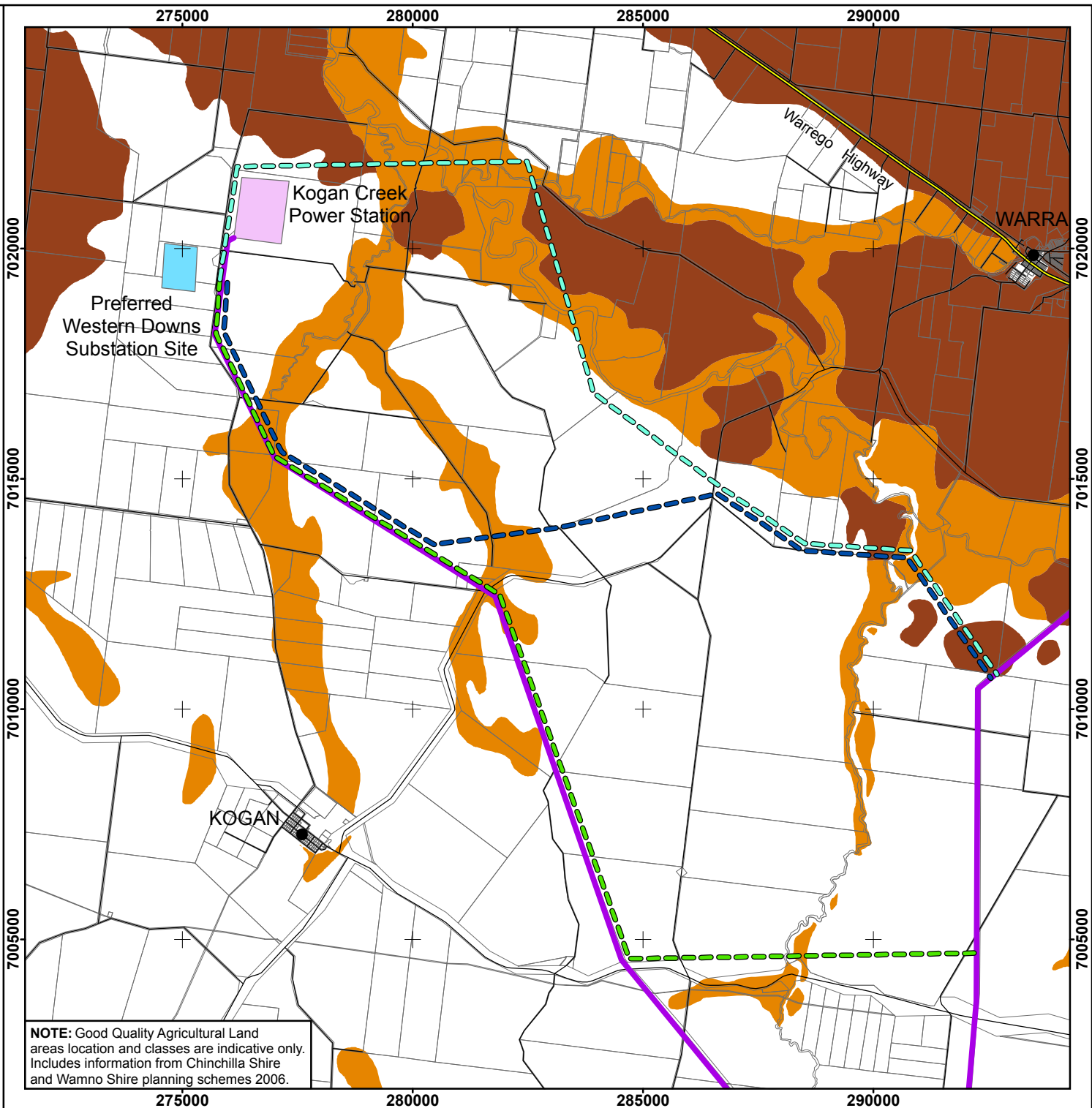
- Class A
- Class B



0 500 1,000 2,000 3,000 4,000
Metres

Scale 1 : 120 000

Datum / Projection: GDA94 MGA Zone 56

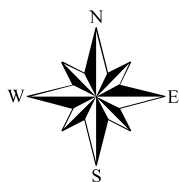


Powerlink Western Downs PAR Planning Scheme

Features
Figure 4.6

Alignment Options

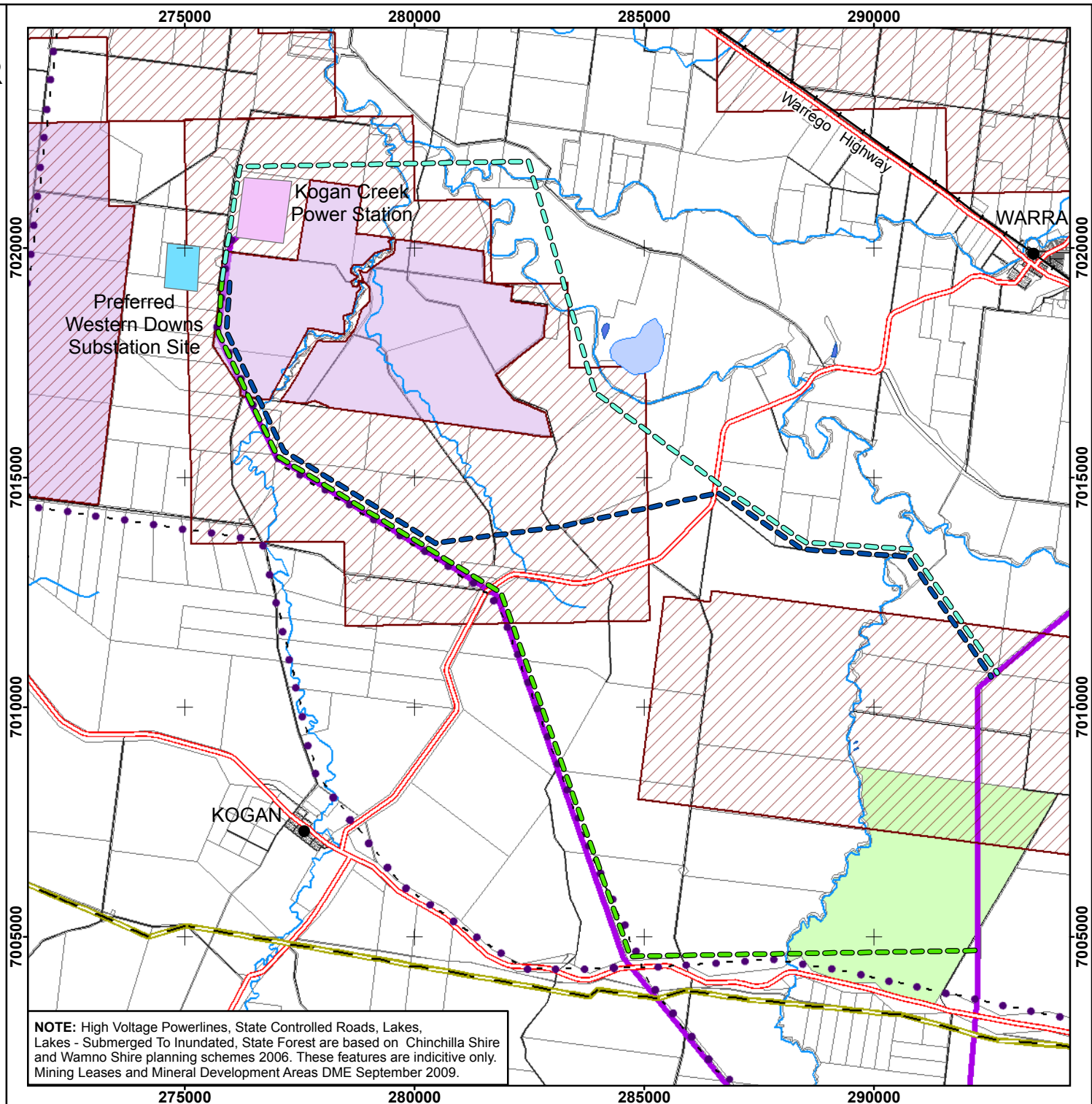
- Northern Route
- Central Route
- Southern Route
- State Controlled Roads
- Petroleum and Gas Pipeline
- Highway
- Road
- Railway
- High Voltage Powerline
- 275 kV
- Watercourse
- Power Station
- Sub-station
- Lake
- Lake - Submerged to Inundated
- Mineral Development License
- Mining Lease
- Cadastre
- State Forest



0 500 1,000 2,000 3,000 4,000
Metres

Scale 1 : 120 000

Datum / Projection: GDA94 MGA Zone 56





5.0 COMPARATIVE ASSESSMENT OF OPTIONS

5.1 QUANTITATIVE AND QUALITATIVE ANALYSIS OF OPTIONS

This section provides a comparative assessment of corridor options for criterion identified in **Table 5.1** below to develop a preferred alignment. **Table 5.1** provides a list of the criteria selected, a rationalisation for these selections and describes the performance measures used to comparatively assess the three alignment options.

A 'quantitative' and 'qualitative' assessment has been adopted in order to adequately select a preferred corridor. The 'quantitative' assessment involved comparing the issues associated with each alignment option for each criterion numerically (where possible). The 'qualitative' assessment involved outlining, comparing and discussing the issues associated with each alignment option for each criterion.

The 'quantitative' assessment is outlined in **Table 5.2**. The 'qualitative' assessment is outlined in **Table 5.3** and provides the reasons behind or the 'why' and 'how' of the results of the 'quantitative' assessment.

TABLE 5.1 CRITERIA RATIONALISATION AND PERFORMANCE MEASURES

CRITERION	REASON FOR UTILISATION AND PERFORMANCE MEASURES
Water Crossings	There are possible impacts on waterways due to construction of the proposed transmission line. In order to comparatively assess the options, the impact was determined by counting the number of times an option traversed a mapped watercourse or wetland.
Vegetation Cover and Clearing	There are possible impacts on site ecology due to construction of the proposed transmission line. In order to comparatively assess the alignment options, the impact was determined by measuring (in length) the amount of mapped REs each option spans.
Houses and Land Titles	There is a potential impact on residents and land (title) owners in the Study Area. In order to comparatively assess the options, the impact was determined by counting the number of buildings within a 50m and 100m buffer of each alignment option. The impact for land (title) owners was determined by counting the number of land titles traversed by an option.
Good Quality Agricultural Land	There is a potential impact on Good Quality Agricultural Land in the Study Area. In order to comparatively assess the alignment options, the impact was determined by measuring (in length) the amount of Good Quality Class A and B land traversed by each option.
Infrastructure	The presence of infrastructure along each option is a potential impact upon the cost of construction/maintenance and the feasibility of the proposed alignment option. In order to comparatively assess the alignment options, the impact was determined by counting the number of times each option crossed a road.
Visual Amenity	There is a potential impact on visual amenity within the Study Area. The impact on visual amenity was determined by counting the number of major roads (i.e. the number of times the proposed option would be seen from the road), the amount (in length) of the proposed option crossing a major public road (i.e. for how long would the proposed option be seen from the road) and the presence of any natural/visual screening.
Construction and Maintenance	Certain construction and maintenance methods/issues are associated with each option and are a potential impact upon the cost of construction and maintenance and the feasibility of the proposed option. For ease of assessment it is assumed that the construction cost/km remains the same for each option. Therefore, in order to comparatively assess the options, the impact was determined by measuring the length of each option.
Proximity to Tong Park Piggery	Tong Park Piggery is the largest piggery in the southern hemisphere. Where possible, disturbance to this area should be minimised. In order to comparatively assess the options, the impact was determined by measuring the length that the alignment option traverses in close proximity to the piggery.
Irrigation Country Traversed	There are irrigation properties along the Condamine Floodplain in the northern part of the Study Area. In order to comparatively assess the alignment options, the impact was determined by measuring the length of irrigation country traversed.

TABLE 5.2 **QUANTITATIVE ASSESSMENT OF PROPOSED ALIGNMENT OPTIONS**

CRITERIA CATEGORY	CRITERIA	NORTHERN OPTIONS	CENTRAL OPTION	SOUTHERN OPTION
Waterway Crossings	Number of 'watercourses' or 'wetlands' traversed	6	3	2
Vegetation Cover and Clearing	Length of Remnant Vegetation Traversed	4.3km	8.3km	13.6km
	Length of Endangered Remnant Vegetation Traversed	0.8km	0.3km	0.0km
Houses and Land Titles	Number of houses within 500m of the proposed alignment	2	2	2
	Number of land titles affected	24	16	17
Good Quality Agricultural Land	Length of Good Quality Class A and B land traversed by each proposed alignment	11.8	5.4	2.8
Infrastructure	Number of times roads crossed by proposed alignment	3	2	5
Visual Amenity	Number of principal roads or rail line crossed	0	0	0
	Length of line traversing major public roads	0	0	0
	Natural/visual screening	Low	Medium	Medium
Construction and Maintenance	Length of each proposed alignment	24.5km	24.6km	35.5km
Proximity to Tong Park Piggery	Length of proposed alignment within close proximity to Tong Park Piggery	2.8km	2.8km	8.2km
Irrigation Country Traversed	Length of irrigation country traversed by proposed alignment	3km	0	0

TABLE 5.3 **QUALITATIVE COMPARATIVE ASSESSMENT OF ALIGNMENT OPTIONS**

CONSTRAINT TYPE	NORTHERN ALIGNMENT	CENTRAL ALIGNMENT	SOUTHERN ALIGNMENT	COMPARISON OF CRITERIA
Water Crossings	The alignment traverses the Condamine River and Cooranga Creek twice and Braemar Creek and Kogan Creek once.	- The alignment traverses Kogan, Eastern Branch and Braemar Creek. - The alignment is downstream of a lacustrine wetland on Braemar Creek.	The alignment traverses Kogan and Braemar Creek.	- All options cross creeks and drainage lines. - The northern option has the most creek/river crossings including two crossing of the Condamine River. - The central option traverses three creeks - The southern option traverses two creeks. - Therefore, the Central and Southern Options are the preferred options.
Vegetation Cover and Clearing	- The alignment traverses a number of riparian corridors and involves traversing 0.8km of endangered remnant vegetation (largest spans through 'endangered' and 'of concern' remnant vegetation of the three options). - Relatively high risk of endangered ecological grassland communities to be found within this alignment.	- The alignment traverses 0.3km of endangered and 0.9km of 'of concern' remnant vegetation. There is potential to deviate the alignment slightly to minimise or avoid disturbance of these endangered REs. - Moderate risk of impacting upon Weeping Myall woodlands endangered ecological communities, particularly throughout RE 11.3.2. - The amount of vegetation which may be impacted is relatively high given the large tracts of mapped remnant vegetation this alignment traverses.	- The alignment traverses the highest amount of remnant vegetation, spanning across 13.6km. - Moderate risk of risk of impacting upon Weeping Myall woodlands endangered ecological communities, particularly throughout RE 11.3.2. - The amount of vegetation which may be impacted is relatively high given the large tracts of mapped remnant vegetation this alignment traverses. - Incremental clearing along existing line.	- The southern option will require the longest span over mapped REs followed by the central route. - The northern options traverses the longest length of 'endangered' RE. - The southern option traverses no 'endangered' RE. - There is a high risk of encountering threatened grassland ecological communities protected under the EPBC Act in the northern option. - Therefore, the Central option is the preferred option, particularly if the option can be deviated slightly to avoid crossing the 0.3km of 'endangered' RE, in terms of vegetation cover and clearing.
House and Land Titles	- There are two houses within 500m of the northern alignment. - The northern alignment traverses 24 separate land titles.	- There are two houses within 500m of the central alignment. - The central alignment traverses 16 separate land titles.	- There are two houses within 500m of the southern alignment. - The southern alignment traverses 17 separate land titles.	- All three options pass within 500m of two houses. - The northern option traverses the highest number of land titles, followed by the southern option.

CONSTRAINT TYPE	NORTHERN ALIGNMENT	CENTRAL ALIGNMENT	SOUTHERN ALIGNMENT	COMPARISON OF CRITERIA
				Therefore, the Central option is the marginally preferred option in terms of potential impacts on house and land titles.
Good Quality Agricultural Land	Traverses 9.8km of A and B Class Good Quality Agricultural Land (GQAL).	Traverses 5.2km of A and B Class GQAL.	Traverses 2.7km of B Class GQAL.	- The Northern and Central options both traverse land which is designated Class A GQAL. The Northern option crosses substantially more of this GQAL land compared with the Central option. The Southern option does not cross any Class A land. - Therefore, the Southern option is the preferred option in terms of the potential impacts on GQAL.
Flora and Fauna	The risk of impacting on endangered species known to the study area is moderate.	The risk of impacting on endangered species known to the study area is moderate.	The risk of impacting on endangered species known to the study area is moderate.	- There is potential for species of conservation significance to occur across the Study Area and the three options. - Due to a lack of site specific investigations, it is difficult to determine which option may have the least impact on flora and fauna of conservation significance. - Therefore, there is no clear preferred option for this criteria due to a lack of detailed understanding of the potential impacts on flora and fauna of conservation significance and potential mitigation measures.
Infrastructure	The northern option crosses 3 roads.	The central alignment option crosses over 2 roads.	The southern alignment option crosses over 5 roads.	- The southern and central options cross over the most roads. - Therefore, the northern option is the preferred alignment with regard to infrastructure.

CONSTRAINT TYPE	NORTHERN ALIGNMENT	CENTRAL ALIGNMENT	SOUTHERN ALIGNMENT	COMPARISON OF CRITERIA
Visual Amenity	- The two crossings of the Condamine River will have a significant impact on the scenic amenity of the river corridor. - The section of the route north of the Condamine River is likely to be visible from the Warrego Highway. - Houses are within 200m of the route.	- One house is located within 200m of the route. - The route will be intermittently visible to the east of the Warra Kogan Road where the route rises up a ridge.	The route will be intermittently visible from the Kogan Condamine Road.	The southern option has the least visual impact and therefore the Southern option is the preferred alignment from a visual impact perspective.
Forest and Conservation Areas	Alignment does not traverse any State Forest or Conservation Area.	Alignment does not traverse any State Forest or Conservation Area.	Traverses 3.8km of Dalby State Forest.	The southern option is least preferred and either the northern or central options would have a lesser impact on Conservation areas.



5.2 SUMMARY OF ANALYSIS

A three-tiered approach to this corridor selection process has been undertaken to consider the three tenets of sustainable development: social, economic and environment.

When considering the potential social impacts of the alignment options, this assessment considered the number of houses within proximity to each of the alignments, the number of land titles affected and visual amenity issues. It is considered that the potential social impacts of all three alignments are low because of the location of the Project as well as the surrounding land uses and low population density. From a visual impact perspective, the central and southern alignment options have the potential to have a lesser impact due to greater natural screening afforded by existing vegetation. As the northern alignment crosses vast areas of open pasture and cropping country, there is a higher probability that visual impacts will occur. The northern alignment also crosses the highest number of land titles which may result in impacts to a larger number of landholders than the central and southern alignments. From a social impact perspective, the southern and central alignments are preferred over the northern alignment.

When addressing the potential economic impacts of the alignment options, this assessment considered the number of land titles affected, the length of GQAL to be traversed, the number of times the alignment crosses infrastructure such as roads, the length of irrigated country traversed, the proximity to Tong Park Piggery and the total length of the alignment. The southern and northern alignments both pose potential threats to the economic values of the study area and additionally, may result in higher acquisition, construction and maintenance costs for Powerlink. Over 8km of the southern route travels within close proximity to Tong Park which may impact on the piggery operations. In addition to this, the southern route is approximately 10km longer than both the northern and central routes and thus higher construction and maintenance costs can be expected. Of the three alignment options considered, the northern alignment traverses the most GQAL Class A and B land. In addition to this, the northern alignment is the only alignment option that traversed irrigated country which could result in disruption of farming practices for landholders and increased acquisition costs should Powerlink need to acquire this land. Overall, the central alignment has the least potential to negatively impact the area's economic values. In addition to this, the central option provides the most economically viable option for Powerlink when considering acquisition, construction and maintenance costs.

The environmental criteria considered during this assessment included the number of watercourses traversed, the length of remnant vegetation traversed, the length of endangered REs traversed, potential for impacts on flora and fauna and the potential to impact on forest and conservation areas. Whilst all options cross creeks and drainage lines, the northern option is the least preferred option from a waterways perspective due to the fact that it has the most creek crossings and additionally requires two crossings of the Condamine River. When considering potential impacts on vegetation, the southern options will require the longest span over mapped REs (13.6km) however the northern option will traverse the largest amount of Endangered RE. In addition to this, there is a high risk of encountering threatened grassland ecological communities protected under the EPBC Act along the northern alignment. When considering potential impacts to forest and conservation areas, the southern option is the only option which will impact such values, traversing 3.8km through Dalby State Forest. Therefore, from an environmental perspective, the central alignment is the preferred alignment.



6.0 CONCLUSION

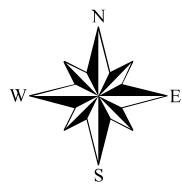
This Preferred Alignment Report has considered the social, economic and environmental values of the Study Area and has assessed the potential for each corridor alignment to impact these values. A range of criteria were developed to assess the potential impacts on these values. On balance and in consideration of all criteria, the Central Option is the preferred alignment.

In consideration of the adoption of the central alignment as the preferred alignment for the proposed route, a Study Corridor has been created around this alignment. It is now intended that this alignment will form the basis of the environmental impact assessment and community consultation to determine the preferred alignment for the transmission line.

Powerlink Western Downs PAR Preferred Transmission Corridor

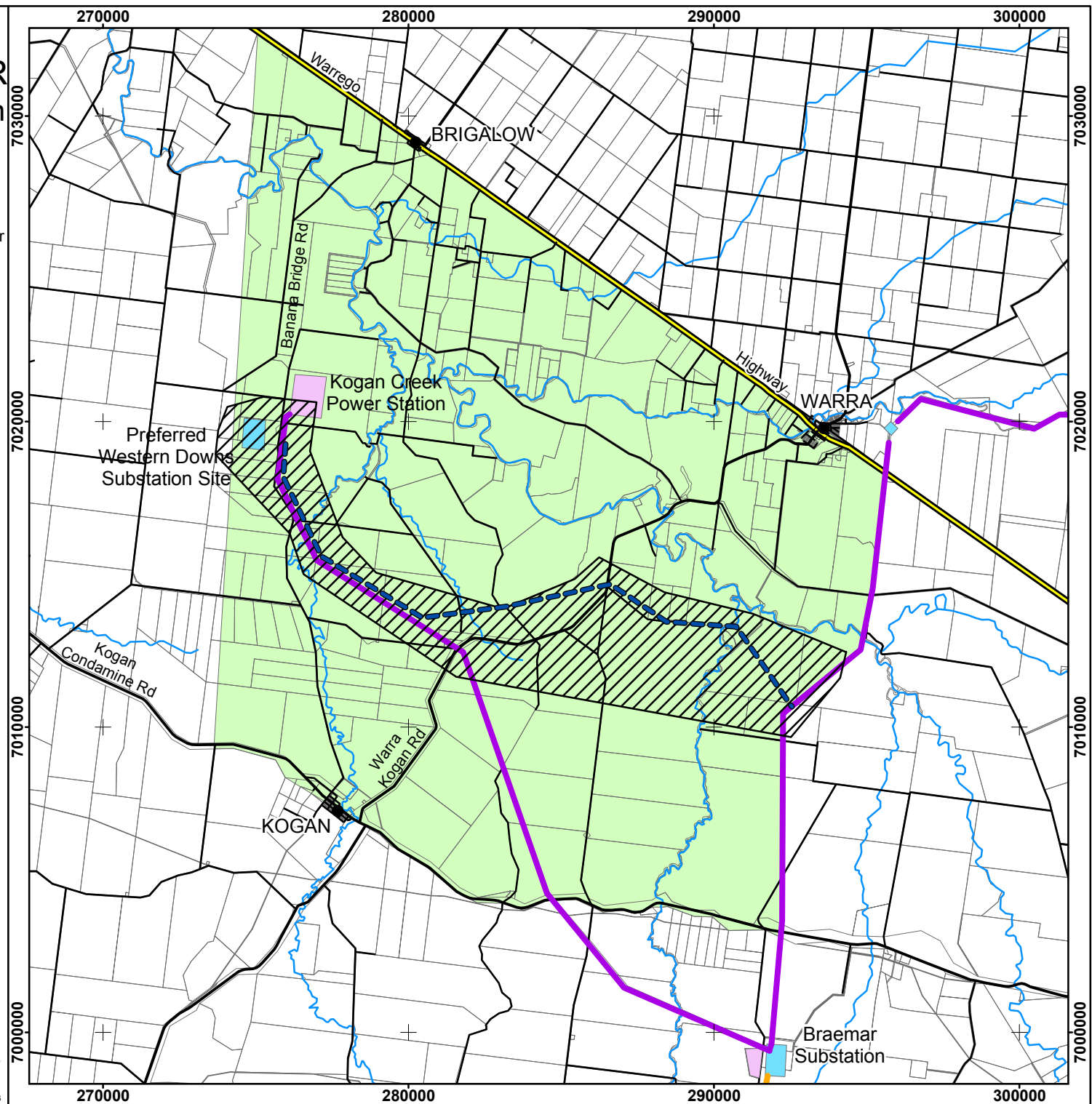
Figure 6.1

-  Preliminary Alignment
-  Preferred Transmission Corridor
-  275 kV
-  330 kV
-  Power Station
-  Sub-station
-  Highway
-  Main Road
-  Local Road
-  Watercourse
-  Cadastre
-  Study Area



0 1,000 2,000 4,000 6,000 8,000 Metres

Scale 1 : 180 000
Datum / Projection: GDA94 MGA Zone 56



APPENDIX A SPECIES OF CONSERVATION SIGNIFICANCE

Table A1 Flora Species of Conservation Significance

SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT
<i>Eucalyptus curtisii</i>	Plunkett Mallee	R	-	Sandstone ridges in woodland / open forest
<i>Philotheca sporadica</i>		V	V	Condamine River catchment on soils derived from low fertility laterised Cretaceous sandstones
<i>Solanum papaverifolium</i>		E	-	Grows in heavy clay soils, sometimes as a weed of crops
<i>Acacia chinchillensis</i>		NT	V	Confined to sandy or gravelly soil in the Chinchilla area.
<i>Cadellia pentastylis</i>	Ooline	V	V	Occurs in vine thickets or dry rainforest, and more rarely woodlands. It is a relict rainforest species and tends to favour upper and mid slope positions, often with a northerly aspect. It commonly occurs on sandy-loam to clay soils of low to medium fertility
<i>Dichanthium queenslandicum</i>	King Blue-grass	V	V	Confined to black clay soils that support Bluegrass communities.
<i>Digitaria porrecta</i>	Finger Panic Grass	R	E	Grasslands and grassy woodlands, particularly Qld bluegrass communities
<i>Diuris sheaffiana</i>	Tricolour Diuris	-	V	Dry sclerophyll woodland and forest among grass; often with Callitris. Soils are often sandy or lateritic and landform ranges from flat to low lateritic hills
<i>Homopholis belsonii</i>	Belson's Panic	E	V	Dry woodlands including Mountain Coolibah, Wilga, Poplar Box and Belah, on basaltic and other soils.
<i>Rhaponticum australe</i>	Austral Cornflower	V	V	Grasslands and grassy woodlands on heavy soils

(Source: Wildlife Online (DERM) & EPBC Database (DEWHA)) E = Endangered V = Vulnerable R= Rare NT= Near Threatened

Table 1B Fauna Species of Conservation Significance

SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT
<i>Furina dunmalli</i>	Dunmall's Snake	V	V	Prefers Brigalow (<i>Acacia harpophylla</i>) forest and woodland growing on cracking black clay and clay loam soils on the Darling Downs.
<i>Hemiaspis damelii</i>	Grey Snake	E	-	Favours cracking flood-prone soils in the Brigalow Belt. Shelters in soil cavities.
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	E	V	Natural grasslands on deep cracking clays.
<i>Tympanocryptis pinguicollis</i>	Grassland Earless Dragon	E	V	All specimens are known from highly modified agricultural land. Large areas of native and introduced grasses existing as headlands, and along drainage lines are a feature of the farmlands where the dragon exists. Soils are essentially black, cracking clays of the Condamine River flood plain.
<i>Apis pacificus</i>	Fork-tailed Swift	-	M	Low to very high airspace over varied habitat, rainforest to semi-desert.
<i>Ardea alba</i>	Great Egret	-	M	Wetlands, flooded pastures, dams, estuarine mudflats, mangroves and reefs.
<i>Ardea ibis</i>	Cattle Egret	-	M	Wide range of open habitats from grazing paddocks to wetlands and tidal mudflats.
<i>Lophoictinia isura</i>	Square-tailed Kite	R	-	Eucalyptus woodland, open forest and heath-woodland.
<i>Erythrorhynchus radiatus</i>	Red Goshawk	E	V	Open forests, woodlands especially near rivers, wetlands, rainforest fringes
<i>Gallinago hardwickii</i>	Latham's snipe	-	M	Soft wet ground or shallow tussocks and other green or dead growth.
<i>Geophaps scripta scripta</i>	Squatter Pigeon	V	V	Grassy understorey of eucalypt woodland, usually with ready access to water
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	-	M	Usually coastal, over islands, reefs, headlands, beaches, bays, estuaries, mangroves, seasonally flooded inland swamps, lagoons and floodplains.
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	M	High open spaces above almost any habitat.
<i>Lathamus discolor</i>	Swift Parrot	E	E	Eucalypt forests and woodlands, plantations and banksias
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V	-	Forests and woodlands with abundant Casuarina trees.
<i>Lophochroa leadbeteri</i>	Major Mitchell's Cockatoo	V	-	Open, sparsely timbered grasslands, drier farmlands with well-treed paddocks, Callitris and Casuarina country.
<i>Neophema pulchella</i>	Turquoise Parrot	R	-	Woodland and open grassland, natural or partially cleared.
<i>Merops ornatus</i>	Rainbow Bee-eater	-	M	Open country of woodlands, open forest, semi-arid scrub, grasslands, clearings in heavier forests and farmlands.

SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT
<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose	R	M	Deeper freshwater swamps, lagoons, dams.
<i>Neochima ruficauda ruficauda</i>	Star Finch	E	E	Swamp vegetation, open grassland with sparse vegetation, cultivated land.
<i>Rostratula australis</i>	Australian Painted Snipe	-	V	Well vegetated shallows and margins of wetlands and other water courses.
<i>Rostratula benghalensis</i>	Painted Snipe	V	V/M	Surrounds and shallows of wetlands that are well vegetated with dense low cover.
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	R	V	Caves and mines in dry sclerophyll forests and woodlands as well as higher altitude moist eucalypt forest and edges of rainforest.
<i>Dasyurus hallucatus</i>	Northern Quoll	-	E	Variety of vegetation types, but particularly in rocky eucalypt woodlands and near creeks.
<i>Nyctophilus timoriensis</i> (South-eastern form)	Eastern Long-eared Bat	V	V	A range of dry woodland and shrubland communities, roosts mainly in tree hollows, forages low amongst the canopy and shrub layers.
<i>Maccullochella peelii peelii</i>	Murray Cod	-	V	Prefers deep holes with abundant snags in slow-moving rivers

(Source: Wildlife Online (DERM) & EPBC Database (DEWHA)) E = Endangered V = Vulnerable R= Rare NT= Near Threatened M = Migratory



APPENDIX D TRANSMISSION LINE ACCESS TRACKS STANDARD

Transmission Line Access Tracks Standard

Version Number:	1.0	Principal Author:	M. Whiting
Objective ID:	A576805	Checked by	N/A
Issue Date:	8 March 2010	Authorised by:	A. Gray
Previous Document	N/A	Team:	Land Management

Date	Version	Nature of Change	Ergon App.	Author	Authorisation
8/3/10	1.0	New Document	Not Yet Effective	M. Whiting	A. Gray

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TABLE OF CONTENTS

1.	Introduction	3
2.	Scope	3
3.	Acceptable Standard	3
4.	Track Location	3
5.	Surfacing	4
5.1.	Slashing	4
5.2.	Blading	4
5.3.	Patch Gravelling	4
6.	Track Formation	4
7.	Formation Profiles	5
7.1.	Crowned Surface Formation	5
7.2.	Crowned Side Cut Formation	5
7.3.	Outslope Formation	6
8.	Clearing and Track Widths	6
9.	Drainage of Access tracks	6
9.1.	Berms	6
9.2.	Spacing	7
9.3.	Turnouts (Also Called Side or Spur Drains)	7
9.4.	Diversion Drains	8
10.	Cross Road Drainage Techniques	8
10.1.	Culverts	8
10.2.	Inverts	9
10.3.	Cross Flow Whoa Boys	9
10.3.1.	Locating Cross Flow Whoa Boys	9
10.3.2.	Dimensions of Cross Flow Whoa Boys	10
11.	Down Road Drainage Techniques	11
11.1.	On Formed Tracks	11
11.2.	On Unformed Tracks	11
11.3.	Minor Whoa Boys	12
11.3.1.	Locating Minor Whoa Boys	12
11.3.2.	Dimensions of Minor Whoa Boys	12
12.	Creek , gully & waterway Crossings	12
13.	Attachment 1	13
14.	Attachment 2	14
15.	Attachment 3	15

TRANSMISSION LINE ACCESS TRACKS STANDARD

1. INTRODUCTION

The intent of this document is to ensure access to transmission line structures for both routine and emergency work is established and maintained at an acceptable level.

Work is to be carried out in accordance with the Cultural Heritage Management Plan and the Environmental Management Plans for the specific area.

All work is to be planned to:-

1. Ensure the use of the area for its basic intended purpose is not nullified nor diminished by the tracks present.
2. Prevent destruction of, or damage to, the general area by taking steps to avoid erosion of lands, silting of waterways & diversion of water from natural drain paths.
3. Retain as far as possible the aesthetic nature of the surrounding area.
4. Limit the destruction of, or damage to, trees, shrubs, bushes, flora & other vegetation to the minimum necessary to maintain access.
5. Avoid damage to historical sites, Aboriginal sacred sites, Aboriginal relics, monuments and other memorials.

Powerlink is very dependent on the goodwill of property owners and others for access to and information on transmission lines. Every effort must be made to foster and enhance this goodwill.

2. SCOPE

This Standard covers the work to be done on establishing easement access tracks and retaining them in, or returning them to, an acceptable condition.

This maintenance work may be preventive or corrective. Corrective maintenance covers both emergency and deferred work.

3. ACCEPTABLE STANDARD

The minimum standard requires dry weather 4WD access. In most cases a somewhat higher standard of surface will be desirable. The standard may be raised by the Principal's Representative in sections where:

1. Minimal extra expenditure would be involved or
2. The section of track is liable to be subjected to additional usage, demands, or conditions.

4. TRACK LOCATION

Initial track locations shall be determined by the Principal's Representative. The Landowner/Occupier shall be consulted by Powerlink before final decisions are made.

Existing tracks should be used where ever possible. The Principal's Representative must be contacted if there are good reasons to deviate from the existing tracks. Approval in writing must be obtained from the Principal's Representative before any deviation work proceeds.

TRANSMISSION LINE ACCESS TRACKS STANDARD

Any bypassed section of track is to be subject to restoration work to ensure it is environmentally acceptable. The scope of work required will be determined by the Principal's Representative.

5. SURFACING

5.1. Slashing

Slashing should be considered as the preferred maintenance option if no erosion or drainage problems are evident.

A well grassed running surface is considered ideal for the Principal's purposes.

5.2. Blading

Blading is to be kept to a minimum on existing formed tracks and on track locations not requiring formation.

In these situations, blading should only be performed to remove potential management hazards (eg. Fallen limbs, stakes, etc), or to repair potential environmental damage (e.g. Drainage restriction, wheel ruts, etc).

5.3. Patch Gravelling

Patch gravelling should be used only when required to ensure traction, avoid rutting, or to maintain effective drainage.

No patch gravelling should be undertaken without the approval of the Principal's Representative and the land owner.

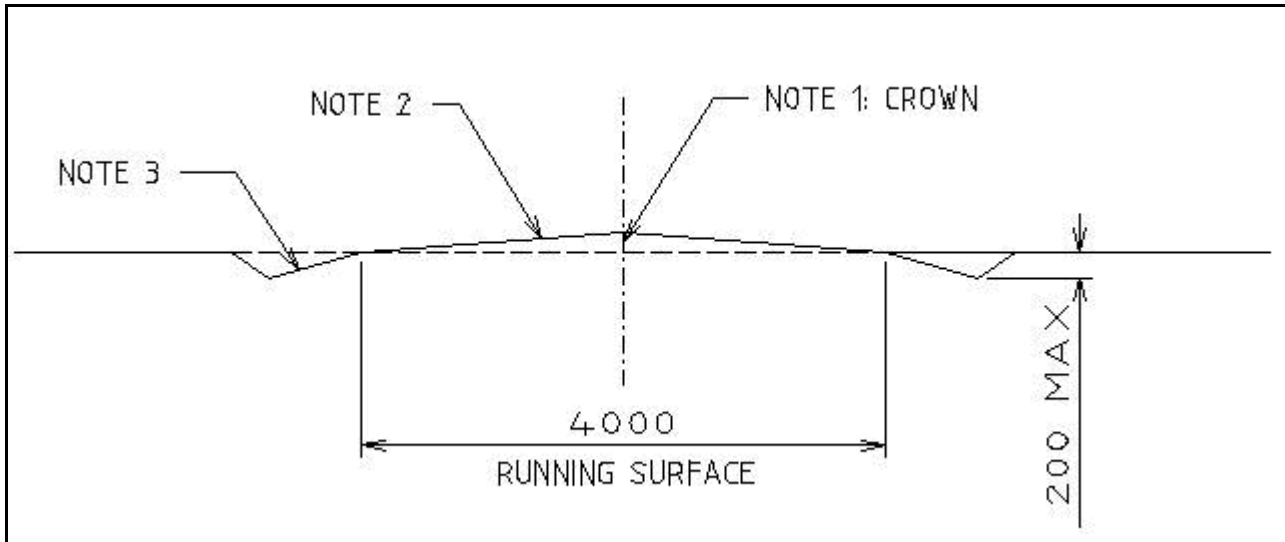
6. TRACK FORMATION

Track formation is required for the following reasons:

1. Drainage control, especially in areas where any wheel rutting or compaction is likely to intercept, concentrate and channel water.
2. Where topography of the track location or the drainage characteristics of the soil are likely to hinder access for a protracted time period following rain (e.g. 1 to 2 weeks)
3. Where natural side-slope would pose a safety hazard to potential users of the track (e.g. Patrolling officers, contractors, and land owners)
4. Where patch gravelling would be required. Often track formation can reduce or eliminate the need for patch gravelling. Where gravelling is still considered to be warranted, the formation process can remove undesirable material and / or box the imported material where it is required.

7. FORMATION PROFILES

7.1. Crowned Surface Formation

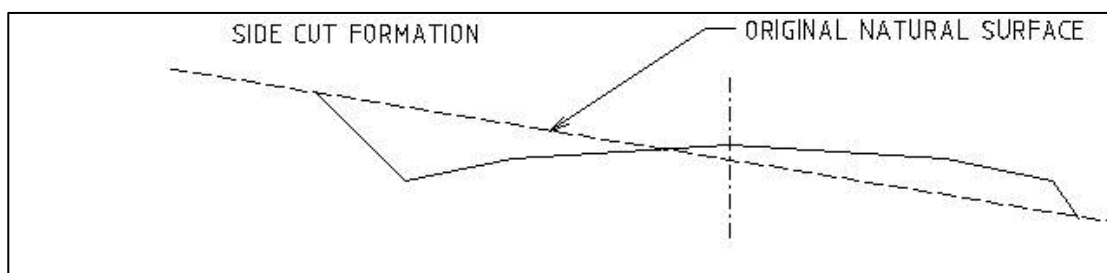


- Note (1) Normally 0.1m above natural surface after consolidation i.e. ≈ 0.15 unconsolidated
 Note (2) Nominal design crossfall of 5% after consolidation i.e. $\approx 7\%$ unconsolidated
 Note (3) Nominal shoulder batter of 1:5

Crowned Surface Formation

- Is suitable for tracks where water can be shed from both sides of the formation
- May be used in other situations in conjunction with suitable cross road drainage techniques (see Section 10.)
- May require down road drainage (see Section 11.)

7.2. Crowned Side Cut Formation

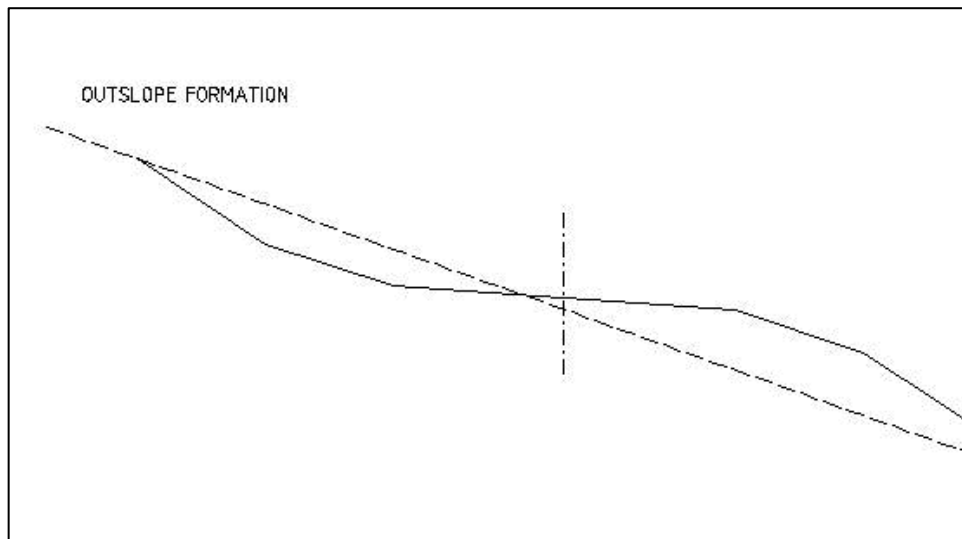


Notes and dimensions as per 7.1.

Crowned Side Cut Formation

- Suitable for smaller lengths of side cut where water can be shed from the confined water table further down the road e.g. at ridge top saddle.
- May be used in limited situations for longer runs if used in conjunction with acceptable cross drainage techniques (see Section 10).

7.3. Outslope Formation



- Note (1) Normally 0.1m above natural surface after consolidation i.e. $\approx$ 0.15m unconsolidated
Note (2) Nominal design crossfall of 5% after consolidation i.e. $\approx$ 7% unconsolidated
Note (3) Nominal shoulder batter of 1:5 (20%)

Outslope Formation

- Suitable for longer lengths of side cut where water cannot be shed from the confined shoulder of the road except across the running surface
- This design profile should be used in conjunction with approved cross drainage techniques (see Section 10).

8. CLEARING AND TRACK WIDTHS

- The normal formation width (including batters, table-drains and running surface) should be $\approx$ 6metres
- Clearing should extend 1 metre either side of the formation width
- On steep topography, especially in areas of long lengths of side cut, hand felling is the required method of clearing outside the formation widths.
- Clearing may be extended to remove unsafe or unsound trees.
- Long batter lengths will require limited additional formation and clearing widths.

9. DRAINAGE OF ACCESS TRACKS

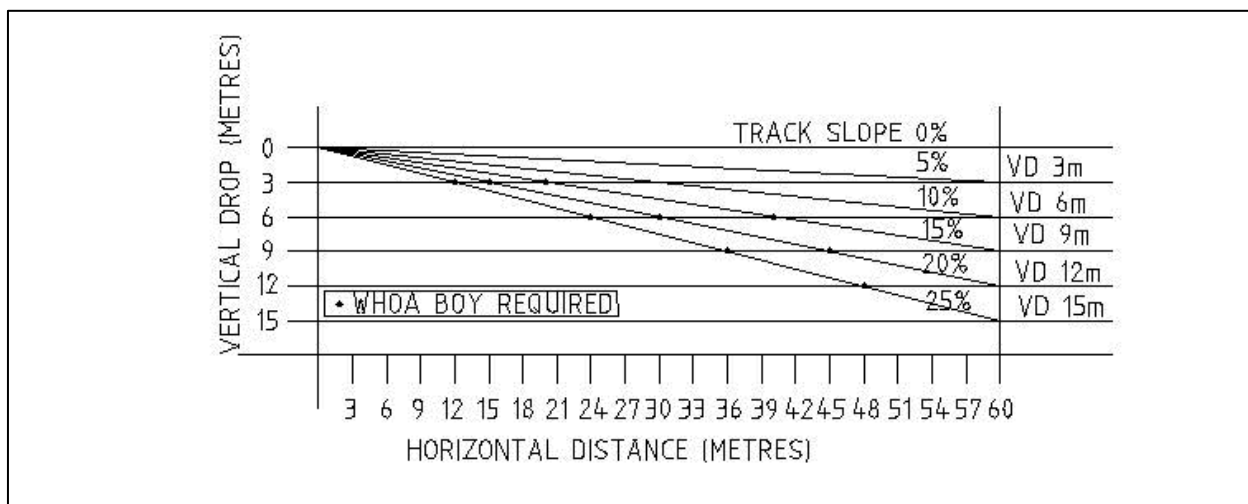
9.1. Berms

- Berms are rills of excess or unsuitable roading material windrowed on to the side of the worked area.
- Any berm must be discontinuous. Breaks must be opened at intervals of less than 20m.
- Any drainage must extend through the berm
- Berms should be placed on the uphill side of workings; especially in locations suitable for outflow track formation. (See Section 7.3). Where possible they should be incorporated into the track shoulder.

9.2. Spacing

Water flow should be intercepted and dispersed from table drains at safe locations at least every 3 metres of vertical fall of the track centre line.

It is acknowledged that soil type, slope and climatic zones may vary the ideal from this specification. This specification is to be used as a minimum requirement; any variation to this standard must be authorised in writing by the Principal's Representative



Calculating:

$$\text{Slope \%} = \frac{\text{Vertical Drop (m)}}{\text{Horizontal Distance (m)}} \times 100$$

e.g. $\frac{1.5\text{m}}{15\text{m}} \times 100 = 10\% \text{ slope}$

Calculating:

$$\text{Maximum Horizontal Spacing (m)} = \frac{\text{Maximum Allowable Vertical Drop (m)}}{\text{Actual Slope (\%)}} \times 100$$

e.g. $\frac{\text{Max Allowance Vertical Drop } 3\text{m}}{\text{Actual Slope } 10\%} \times 100 = 30\text{m}$

So

$$\text{Maximum Horizontal Spacing (m)} = \frac{3}{10} \times \frac{100}{1} = 30\text{m}$$

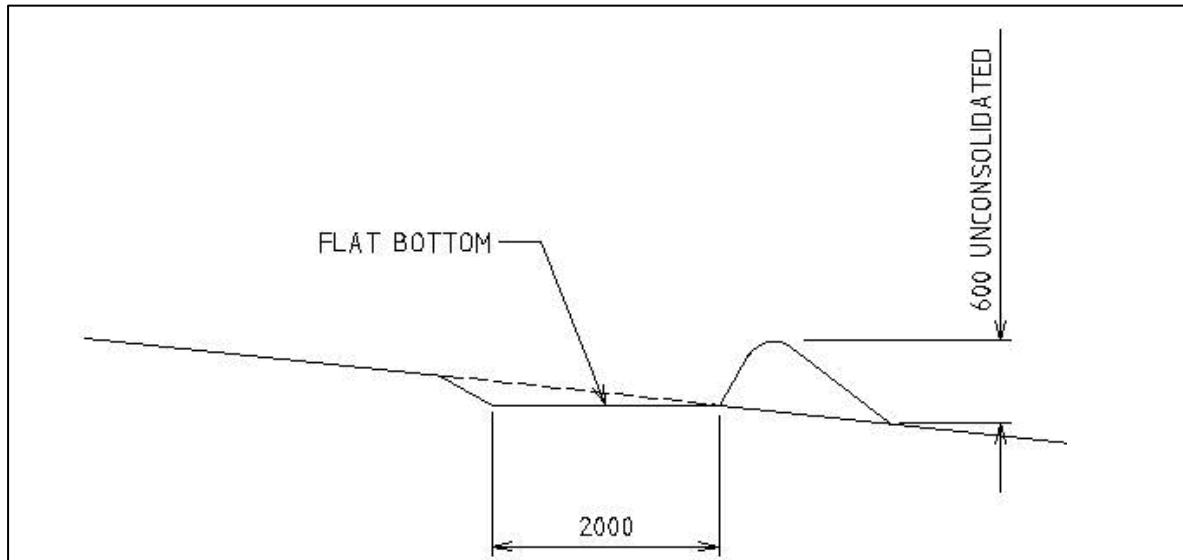
9.3. Turnouts (Also Called Side or Spur Drains)

Turnouts generally:

1. Should be as short as possible.
2. Should be terminated in as wide (level) a discharge as is practical.
3. Should run at approximate 1.5% grade (the lead out of the table drain may exceed this limit but must not be more than 1.5 metre in length).
4. Must have an effective table drain stop.
5. Should extend as far as is required to prevent discharged water from flowing back to the road further down the slope (see diversion drains Section 9.4.)

TRANSMISSION LINE ACCESS TRACKS STANDARD

6. Must discharge onto stable areas of undisturbed vegetation and not onto fill slopes, exposed soils or directly into a water course.

9.4. Diversion Drains


All batters less than 1:1.5.

Slope of Diversion Drain 0.5% to 1.5%.

These structures may need to be constructed to:

1. Intercept a major concentration of overland water flow.
2. Prevent road discharge water from flowing back onto the formation

They should:

1. Be constructed with a grader
2. Be flat bottomed $\approx$ 2 metres wide
3. Capture no more than 2Ha of catchment
4. Run at $1.0\% \pm 0.5\%$
5. Discharge onto stable areas of undisturbed vegetation and not onto fill slopes, exposed soils, or directly into a water course.
6. Be surveyed (eg using dumpy level and staff) prior to construction.
7. May need to be seeded with approved and appropriate grass species (e.g. Jap millet, oats, couch, natives) as specified by the Principal's Representative.
8. Have batters of less than 1:1.5
9. Have an unconsolidated mound height of 600 mm.

10. CROSS ROAD DRAINAGE TECHNIQUES
10.1. Culverts

A culvert is defined as any pipe box or arch construction used for cross road drainage that is covered and below the surface of the road. Culverts are only to be installed at the express and written instructions of the Principal's Representative.

Existing culverts are to be preserved and culvert heads left in a clean and functional condition.

TRANSMISSION LINE ACCESS TRACKS STANDARD

If existing culverts are damaged during maintenance, the location and extent of damage is to be recorded in writing and relayed to the Principal's Representative within 24 hrs.

10.2. Inverts

Inverts are man-made or naturally occurring open topped depressions in the surface of the roadway which allow for concentrated cross road drainage.

10.3. Cross Flow Whoa Boys

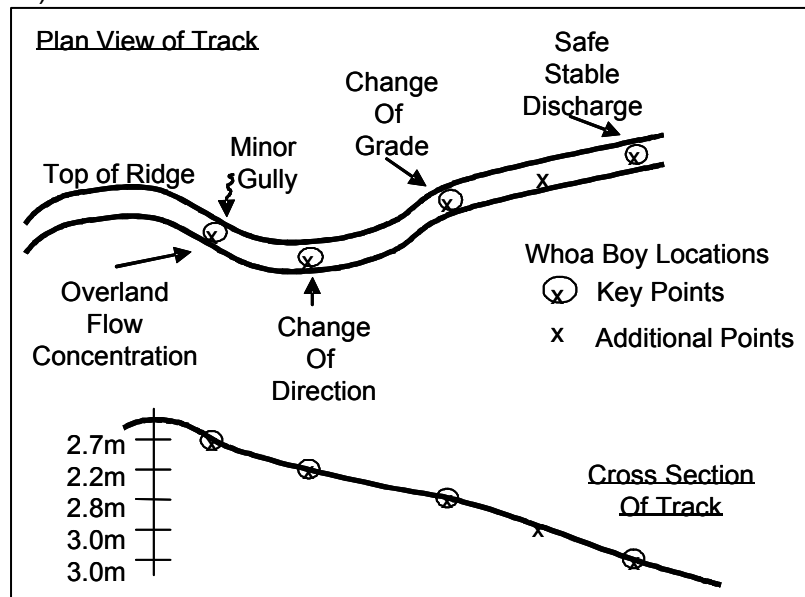
These structures are used to invert water across the road.

10.3.1. Locating Cross Flow Whoa Boys

Placement of cross flow Whoa Boys requires care and planning. They should be constructed at critical points where there is:

- A significant change of grade
- A significant change of road direction
- A significant point of overland flow concentration
- A safe stable discharge point.

After these key points are located, additional Cross Flow Whoa Boys will need to be constructed so as to remain within the minimum specification of 3 metres of vertical fall. (see spacing of access track drainage Section 9.2.)

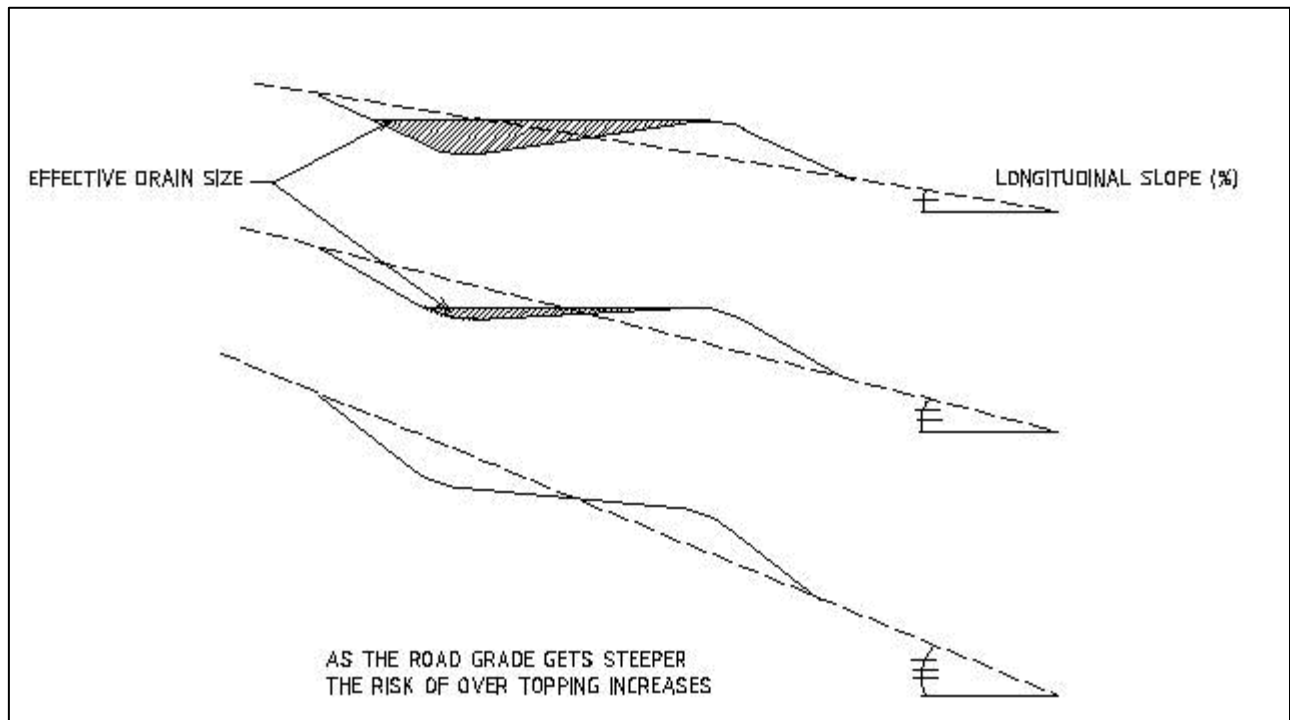


10.3.2. *Dimensions of Cross Flow Whoa Boys*

Whoa Boys must be easily trafficable and must drain water across the road without scouring, ponding or overtopping.

They should be $\approx 0.6\text{m}$ high (unconsolidated) and be battered for a minimum of 2 metres on both top & bottom sides of the mound.

As the longitudinal slope (grade) increases so too does the risk of overtopping. A corresponding degree of care with construction is warranted to preclude any risk of the structure failing.



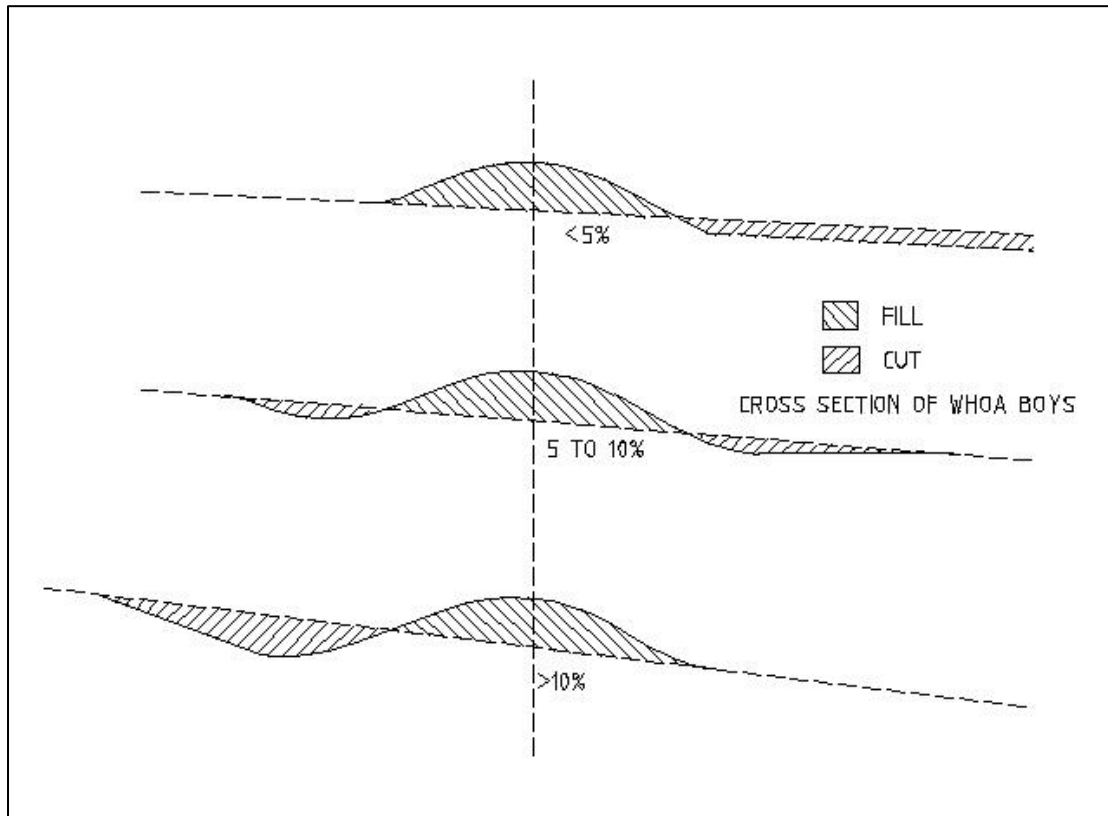
Generally:

For slopes $<5\%$, materials should be sourced from the lower side of the mound.

For slopes 5% to 10% , materials should be sourced from both sides of the mound

For slopes $>10\%$, all material should be sourced from above the mound

In some very steep situations additional material may be required. Gravel may need to be sourced externally and imported to the required Whoa- Boy location.



11. DOWN ROAD DRAINAGE TECHNIQUES

These techniques specifically relate to dispersal of water confined or concentrated on the running surface of the track (eg in wheel ruts or compacted zone).

Water is to be dispersed using:

- Cross Fall of running surface
- Whoa boys
- Combination of a) & b)

11.1. On Formed Tracks

Normally the cross fall of the running surface will suffice. Exceptions occur where the formation is :

- On very steep slopes where the longitudinal slope is much greater than the cross fall of the formation and even minor ruts may channel the water and frustrate water shedding from the running surface.
- In areas of highly erodible soil types

In these situations additional protective techniques should be incorporated. The techniques include cross road drainage structures if applicable; or if not applicable, Minor Whoa Boys should be installed.

11.2. On Unformed Tracks

If the track intercepts and concentrates overland flows of water then normal cross flow Whoa Boys should be constructed. In these situations it is imperative that the structure discharge extends a sufficient distance to preclude any chance of this water migrating back to the track.

If overland flow is not a problem then Minor Whoa Boys would be acceptable.

11.3. Minor Whoa Boys

11.3.1. *Locating Minor Whoa Boys*

Placement of minor Whoa Boys requires care and planning. They should be constructed at a critical point where there is:

- A significant change of grade
- A significant change of road direction
- A safe stable discharge point.

After these key points are located, additional Minor Whoa Boys will need to be constructed so as to intercept the potential flow every 6 metres of vertical fall.

These structures must be free draining. Discharges must extend a sufficient distance to preclude any chance of this water migrating back to the track.

11.3.2. *Dimensions of Minor Whoa Boys*

Minor Whoa Boys must be easily trafficable and must drain water off the running surface without scouring, ponding or overtopping.

They should be $\approx 0.4\text{m}$ high (unconsolidated) and be battered for a minimum of 2 metres on both top & bottom sides of the mound.

As the longitudinal slope (grade) increases so too does the risk of overtopping. A corresponding degree of care with construction is warranted to preclude any risk of the structure failing.

Generally:

For slopes $<5\%$, materials should be sourced from the lower side of the mound.

For slopes 5% to 10% , materials should be sourced from both sides of the mound

For slopes $>10\%$, all material should be sourced from above the mound

In some very steep situations additional material may be required. Gravel may need to be sourced externally and imported to the required Whoa- Boy location.

(See Section 10.3.2 for indicative diagrams)

12. CREEK, GULLY & WATERWAY CROSSINGS

As far as possible, these should:

- Be avoided (alternative access to the next section of track may be possible and desirable)
- Cross at right-angles
- Be situated to avoid box cuts
- Have minimal clearing
- Be protected by drainage structures immediately above the approach slopes.

If the watercourse bed requires gravel or stone, the existing surface should be excavated to the depth of anticipated fill. The completed crossing surface should approximate to the original bed level. Any resulting spoil should be removed from the bed and banks of the watercourse and disposed of as directed by the Principal's Representative.

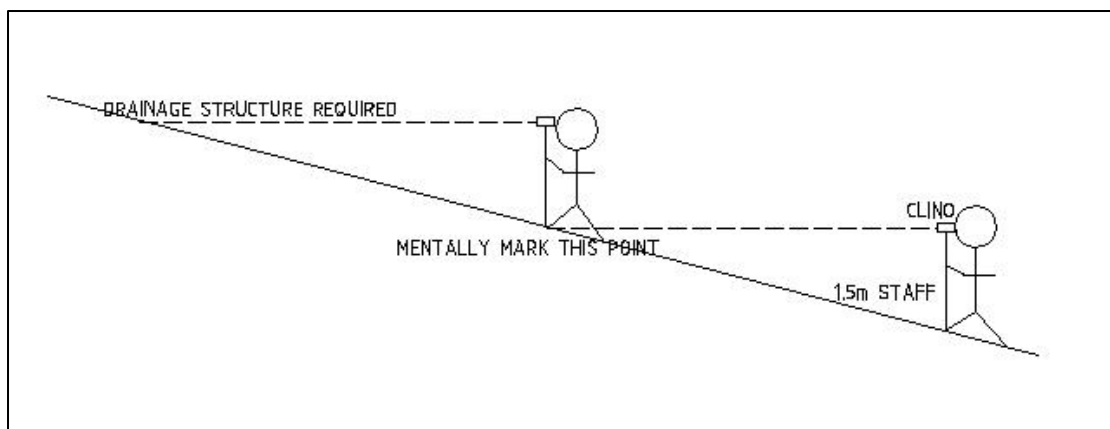
13. ATTACHMENT 1

Suitable Methods of Estimation of 3m Vertical Fall.

- A) Dumpy Level and Staff.
- B) Laser Distomat Device.
- C) Clinometer.
- D) Any other method approved by the Principal's Representative.

Method C)

Mark turnout from bottom of slope



Equipment Required:

Clinometer.
1.5m Stake.

Method:

From bottom of slope or last drainage structure.

1. Carefully sight along road to a point 1.5m above original ground level.
2. Mentally mark this location and move to it, placing the staff on this mark.
3. Repeat step 1)
4. Repeat step 2)
5. Assess suitability. If unsuitable, move the location of structure downhill.
6. Mark proposed structure position on ground. From this position repeat steps 1 to 6 until crest is reached.

**TRANSMISSION LINE ACCESS TRACKS STANDARD****14. ATTACHMENT 2**

Guidelines for Value Ratings of Access Track Construction & Maintenance

>20% deviation from specifications is considered MAJOR.
<20% deviation from specifications is considered MINOR.

Major Deviation from Specifications on __ % of Work = ____

Component Rating (a)

> 10%	2
5 to 10%	4
2 to 5%	6
< 2 %	8
Nil	10

Minor Deviation from Specifications on ____ % of Work = ____

Component Rating (b)

> 10 %	1
5 to 10%	2
2 to 5%	3
< 2 %	4
Nil	5

Value Rating = Component Rating (a) + Component Rating (b)

Components with qualitative rather than quantitative criteria require a subjective evaluation on scale of deviation from the specified ideal.

The decision to carry out remediation work is a function of perceived environmental damage potential, location within the landscape, economic costs, and equipment availability.

The final determination on the appropriate response rests with the Principal's Representative



TRANSMISSION LINE ACCESS TRACKS STANDARD

15. ATTACHMENT 3

Access Track Audit Sheet

Sect. Ref	Component Accessed	NA	YES	NO	NOTINGS	Remediation required	Value	Rating
4	Track location						+	=
5	Surfacing-Appropriate degree of working						+	=
6 & 7	Appropriate track formation used						+	=
5.2 & 7	Track profile constructed to specs.						+	=
8	Clearing & track widths OK						+	=
9.1	Berms absent or discontinuous						+	=
9.2	Turnout drains - spacing OK						+	=
9.3	Turnout drains - construction OK						+	=
9.4	Diversion drains OK						+	=
10.1	Culverts clean and sound						+	=
10.3.1	Whoa-boys - spacing OK						+	=
10.3.2	Whoa-boys - construction OK						+	=
11	Down road drainage OK						+	=
11.3.1	Minor Whoa-boys - spacing OK						+	=
11.3.2	Minor Whoa-boys - construction OK						+	=
12	Crossings OK for location						+	=

**TRANSMISSION LINE ACCESS TRACKS STANDARD**

Sect. Ref	Component Accessed	NA	YES	NO	NOTINGS	Remediation required	Value	Rating
12	Crossings OK for construction						+	=
	Communications & supervision OK						+	=
		OVERALL VALUE RATING as a % Rating of Work Components Assessed						#DIV/0!



TRANSMISSION LINE ACCESS TRACKS STANDARD

Sect. Ref	Component Accessed	NA	YES	NO	NOTINGS	Remediation required	Value	Rating
4	Track location		#				10+5 =	15
5	Surfacing-Appropriate degree of working		#				10+5 =	15
6 & 7	Appropriate track formation used			#	1	Yes	8+5 =	15
5.2 & 7	Track profile constructed to specs.			#	2	No	8+1 =	9
8	Clearing & track widths OK			#	3	No	2+1 =	3
9.1	Berms absent or discontinuous		#				10+5 =	15
9.2	Turnout drains - spacing OK			#	4	Yes	8+1 =	9
9.3	Turnout drains - construction OK			#	5	No	10+2 =	12
9.4	Diversion drains OK	#					+ =	
10.1	Culverts clean and sound	#					+ =	
10.3.1	Whoa-boys - spacing OK			#	6	Yes	8+1 =	9
10.3.2	Whoa-boys - construction OK		#				10+5 =	15
11	Down road drainage OK			#	7	Yes	2+1 =	3
11.3.1	Minor Whoa-boys - spacing OK			#	7	Yes	2+1 =	3
11.3.2	Minor Whoa-boys - construction OK			#	7	Yes	2+1 =	3
12	Crossings OK for location	#					+ =	
12	Crossings OK for construction	#					+ =	
	Communications & supervision OK				8		10+2 =	12
		OVERALL VALUE RATING as a % Rating of Work Components Assessed						65.7

TRANSMISSION LINE ACCESS TRACKS STANDARD**Comments by Assessor**

1. Track needs Crowned Surface Formation for 200m between tower 716 & 717 Low swampy ground. FIX
2. Shoulders on formed track a bit too steep Talk to Contractor
3. Clearing Width Excessive Warn Contractor that this practice is not acceptable
4. Drain Missing 200m Nth of Tower 714, 100m Nth of Tower 723, 300m Nth of Tower 327. FIX
~25% of drains @ 3.5m Vertical. Spacing Talk to contractor.
5. All acceptable. ~10% a bit long.
6. 3.6m vertical spacing very common. Explain that this is not the desired spacing.
3 Missing as per noting 4 FIX
7. ~20% of track requires down road drainage. No minor whoa-boys installed. FIX
8. A few minor problems with communications



APPENDIX E TERRESTRIAL SPECIES LISTS



Fauna Species List

FAMILY / SCIENTIFIC NAME	COMMON NAME
MAMMALS	
MACROPODIDAE	
<i>Macropus giganteus</i>	Grey Kangaroo
<i>Macropus rufogriseus</i>	Red Necked Wallaby
<i>Wallabia bicolor</i>	Swamp Wallaby
PHALANGERIDAE	
<i>Trichosurus vulpecula</i>	Brush-tail Possum
PETAURIDAE	
<i>Petaurus breviceps</i>	Sugar Glider
REPTILES	
SCINCIDAE	
<i>Carlia pectoralis</i>	Open litter rainbow skink
<i>Cryptoblepharus virgatus</i>	Cream-striped Shining skink
VARANIDAE	
<i>Varanus panoptes</i>	Yellow Spotted Monitor
BIRDS	
COLUMBIDAE	
<i>Geopelia humeralis</i>	Bar-shouldered Dove
<i>Geopelia placida</i>	Peaceful Dove
<i>Ocyphaps lophotes</i>	Crested Pigeon
PODARGIDAE	
<i>Podargus strigoides</i>	Tawny Frogmouth
CACATUIDAE	
<i>Nymphicus hollandicus</i>	Cockatiel
PSITTACIDAE	
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo
<i>Cacatua roseicapilla</i>	Galah
<i>Psephotus haematonotus</i>	Red-rumped Parrot
<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted Lorikeet
<i>Platycercus adscitus</i>	Pale-headed Rosella
CUCULIDAE	
<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo
HALCYONIDAE	
<i>Todiramphus sanctus</i>	Sacred Kingfisher
MEROPIIDAE	
<i>Merops ornatus</i>	Rainbow Bee-eater
MALURIDAE	



<i>Malurus cyaneus</i>	Superb Fairy-wren
PARDALOTIDAE	
<i>Acanthiza nana</i>	Yellow Thornbill
<i>Pardalotus striatus</i>	Striated Pardalote
<i>Smicromis brevirostris</i>	Weebill
MELIPHAGIDAE	
<i>Acanthagenys rufogularis</i>	Spiny-Cheeked Honeyeater
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater
<i>Lichenostomus penicillatus</i>	White-Plumed Honeyeater
<i>Manorina melanocephala</i>	Noisy Miner
<i>Philemon corniculatus</i>	Noisy Friarbird
<i>Philemon citreogularis</i>	Little Friarbird
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater
POMATOSTOMIDAE	
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler
CAMPEPHAGIDAE	
<i>Coracina novahollandiae</i>	Black-faced Cuckoo-shrike
<i>Coracina tenuirostris</i>	Cicadabird
<i>Lalage tricolor</i>	White-winged Triller
PACHYCEPHALIDAE	
<i>Colluricincla harmonica</i>	Grey Shrike Thrush
<i>Pachycephala rufiventris</i>	Rufous Whistler
ORIOLIDAE	
<i>Oriolus sagittatus</i>	Olive-backed Oriole
ARTAMIDAE	
<i>Cracticus nigrogularis</i>	Pied Butcherbird
<i>Cracticus torquatus</i>	Grey Butcherbird
RHIPIDURIDAE	
<i>Rhipidura leucophrys</i>	Willie Wagtail
<i>Rhipidura fuliginosa</i>	Grey Fantail
<i>Grallina cyanoleuca</i>	Magpie-lark
CORVIDAE	
<i>Corvus orru</i>	Torresian Crow
MONARCHIDAE	
<i>Myiagra inquieta</i>	Restless Flycatcher
PETROICIDAE	
<i>Eopsaltria australis</i>	Eastern Yellow Robin
ESTRILDIDAE	
<i>Taeniopygia bichenovii</i>	Doube-barred Finch



Flora Species List

FAMILY / SCIENTIFIC NAME	COMMON NAME
ACANTHACEAE	
<i>Brunoniella australis</i>	Blue Trumpet
ADIANTACEAE	
<i>Cheilanthes sieberi</i>	Rock Fern
AMARANTHACEAE	
<i>Gomphrena celosioides</i>	Gomphrena weed
APOCYNACEAE	
<i>Gomphocarpus physocarpus</i>	Balloon Cotton Bush
ASTERACEAE	
<i>Brachyscome</i> sp.	Daisy
<i>Conyza albida</i>	Fleabane
<i>Xanthium occidentale</i>	Noogoora Burr
<i>Chrysocephalum apiculatum</i>	Yellow Buttons
BRASSICACEAE	
<i>Rapistrum rugosum</i>	Turnipweed
CACTACEAE	
<i>Opuntia aurantiaca</i>	Tiger Pear
<i>Opuntia stricta</i>	Prickly pear
<i>Opuntia tomentosa</i>	Velvety Tree Pear
CASUARINACEAE	
<i>Allocasuarina inophloia</i>	Hairy Oak
<i>Allocasuarina luehmannii</i>	Bull oak
<i>Casuarina cristata</i>	Belah
CHENOPODIACEAE	
<i>Atriplex</i> sp.	Saltbush
<i>Einadia nutans</i>	Climbing Saltbush
<i>Einadia</i> sp.	
<i>Sclerolaena birchii</i>	Galvanized burr
<i>Sclerolaena</i> sp.	Burr
CUPRESSACEAE	
<i>Callitris glaucophylla</i>	Cypress Pine
CYPERACEAE	
<i>Cyperus</i> sp.	A sedge
<i>Fimbristylis dichotoma</i>	Common Fringe-sedge
ERICACEAE	
<i>Leucopogon</i> sp.	Heath



FAMILY / SCIENTIFIC NAME	COMMON NAME
<i>Melichrus</i> sp.	Heath
DILLENIACEAE	
<i>Hibbertia</i> sp.	Hibbertia
JUNCACEAE	
<i>Juncus</i> sp.	Rush
MALVACEAE	
<i>Sida</i> sp.	Sida
MIMOSACEAE	
<i>Acacia fimbriata</i>	Fringed Wattle
<i>Acacia floribunda</i>	Sally Wattle
<i>Acacia harpophylla</i>	Brigalow
<i>Acacia ixiophylla</i>	Wattle
<i>Acacia inophloia</i>	Fibre-barked Wattle
<i>Acacia leiocalyx</i>	Black Wattle
<i>Acacia melvillei</i>	Yarran
<i>Acacia pendula</i>	Weeping Myall
<i>Acacia shirleyi</i>	Lancewood
<i>Acacia</i> sp.	Wattle
<i>Acacia stenophylla</i>	River Cooba
MYRTACEAE	
<i>Angophora leiocarpa</i>	Rusty Gum
<i>Corymbia</i> sp.	Bloodwood
<i>Corymbia tracyphloia</i>	Brown Bloodwood
<i>Eucalyptus camaldulensis</i>	River Red Gum
<i>Eucalyptus coolabah</i>	Mountain Coolabah
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
<i>Eucalyptus exserta</i>	Peppermint
<i>Eucalyptus microcarpa</i>	Grey Box
<i>Eucalyptus molucanna</i>	Gum Topped Box
<i>Eucalyptus pilligaensis</i>	Narrow-leaved Grey Box
<i>Eucalyptus populnea</i>	Poplar Box
<i>Eucalyptus tereticornis</i>	Blue Gum
<i>Lysicarpus angustifolius</i>	Budgeroo
PHORMIACEAE	
<i>Dianella revoluta</i>	Flax Lily
<i>Dianella caerulea</i> var. <i>producta</i>	Blue Flax Lily
POACEAE	
<i>Aristida calycina</i>	Wiregrass



FAMILY / SCIENTIFIC NAME	COMMON NAME
<i>Aristida ramosa</i>	Purple wiregrass
<i>Aristida sp.</i>	
<i>Chloris gayana</i>	Rhodes Grass
<i>Chloris sp.</i>	
<i>Chloris truncata</i>	Windmill grass
<i>Cynodon dactylon</i>	Green couch
<i>Cymbopogon refractus</i>	Barbwire grass
<i>Digitaria sp.</i>	
<i>Eragrostis brownii</i>	Brown's Lovegrass
<i>Eragrostis sororia</i>	Woodland Lovegrass
<i>Enteropogon ramosus</i>	Curly Windmill Grass
<i>Leptochloa digitata</i>	Umbrella Canegrass
<i>Panicum maximum</i>	Green Panic
<i>Urochloa sp.</i>	Grass
PORTULACACEAE	
<i>Portulaca sp.</i>	Portulaca
PROTEACEAE	
<i>Grevillea striata</i>	Beefwood
<i>Hakea sp.</i>	Hakea
RUTACEAE	
<i>Philotheca sp.</i>	Wax-flower
SAPINDACEAE	
<i>Dodonaea viscosa subsp. spatulata</i>	Sticky Hopbush
SOLANACEAE	
<i>Solanum esuriale</i>	solanum
VERBENACEAE	
<i>Phyla canescens</i>	Lippia
<i>Verbena tenuisecta</i>	Maynes Pest
XANTHORRHOEACEAE	
<i>Lomandra longifolia</i>	Spiny-headed Mat Rush
<i>Lomandra multiflora</i>	Many-headed Mat Rush



APPENDIX F ENVIRONMENTAL MANAGEMENT PLAN



WESTERN DOWNS Transmission Line Environmental Management Plan

Built section/Functional Location: Kogan

Version Date: November 2010

Document Control Page:

Document name:	Western Downs Transmission Line: Environmental Management Plan.	
Date:	June 2010	
Original Author	Shelley Ford	
Version number:	DRAFT1	
Documented change record:	Date:	Changes: (summary of the change including the name of the person making the change)
1	7 July 2010	Table of Contents, added section 5.4 Biosecurity (Tong Park), updated number of houses section 5.7, deleted SF6 reference section 5.18. Megan Batterham.
2		
3		
4		
5		
6		
7		
8		
9		
10		

Notes:

- Legislation referenced in this EMP can be found at:
 - Local Laws - <http://www.localgovernment.qld.gov.au/Laws/LocalGovernment/LocalLaws/Locallawsdatabase.aspx>
 - State legislation – www.legislation.qld.gov.au
 - Commonwealth Legislation - www.comlaw.gov.au
- Obj. ref: - is the document reference number for Powerlink's internal electronic document and record management system (eDRMS). The Powerlink eDRMS is called Objective.

Table of Contents

1	Purpose.....	5
2	Powerlink Environmental Management Structure	7
2.1	Preconstruction	7
2.2	Construction.....	8
2.3	Operation and Maintenance	9
3	Background to the Environmental Management Plan	10
3.1	Implementation.....	10
3.1.1	Preconstruction	10
3.1.2	Construction:.....	11
3.1.3	Operation and Maintenance:.....	11
3.1.4	Asset Removal or Replacement.....	12
3.2	Legislative requirements	12
3.3	Review, update and continuous improvement.....	15
3.4	Training requirements	16
3.4.1	Preconstruction Phase	16
3.4.2	Construction Phase:.....	16
3.4.3	Operation and Maintenance Phase:.....	16
3.5	Reporting and records procedure.....	17
3.5.1	Preconstruction Phase	17
3.5.2	Construction Phase	17
3.5.3	Operation and Maintenance Phase	18
3.6	Complaints procedure	18
3.6.1	Preconstruction Phase	18
3.6.2	Construction Phase	19
3.6.3	Operation and Maintenance Phase	19

4	Environmental Aspects	20
4.1	Cultural Heritage	21
4.2	Environmental Aspect Management	21
5	Environmental Management Strategies	22
5.1	Air Quality.....	22
5.2	Biosecurity (inc. red imported fire ants).....	26
5.3	Biosecurity (Tong Park).....	28
5.4	Cultural Heritage	31
5.5	Electric and Magnetic Fields (Interference Considerations)	33
5.6	Electric and Magnetic Fields (Health Considerations).....	35
5.7	Energy Use/Greenhouse Gas	36
5.8	Erosion and Sediment Control	39
5.9	Fauna.....	44
5.10	Hazardous Materials	47
5.11	Land Contamination	50
5.12	Noise and Vibration.....	52
5.13	Traffic and Site Access	55
5.14	Unexploded Ordnances (UXOs).....	59
5.15	Vegetation.....	61
5.16	Visual Amenity	65
5.17	Waste.....	67
5.18	Weed Management.....	69
	Appendix A – Environmental Policy.....	72

1 Purpose

The Western Downs Transmission Line Environmental Management Plan (EMP) provides an environmental management framework and procedures to avoid or minimise the actual and potential environmental impacts resulting from activities undertaken for the Western Downs Transmission Line project.

This EMP covers Powerlink's activities only (activities carried out by Powerlink, its contractors or representatives). Powerlink is not responsible for the activities in the project area (e.g. easement) of other parties (such as activities carried out by landholder or of other utilities).

The purpose of the EMP is to ensure:

- Effective and efficient environmental management is carried out through the construction and operation of the asset;
- Principles and objectives of the National Strategy for Ecologically Sustainable Development (1992) are incorporated into all phases of the project; and
- Compliance with relevant State and Commonwealth legislation.

It will provide:

- Evidence of practical and achievable plans for the management of the project to ensure that environmental requirements are complied with, by providing an integrated planning framework for comprehensive monitoring and control of construction and operational impacts;
- Relevant local, state and Commonwealth authorities with a framework to confirm compliance with policies and requirements; and
- The community with evidence of the management of the project in an environmentally acceptable manner.

This EMP contains:

- A description of Powerlink's environmental management objective and policy;
- A description of typical activities to be undertaken;
- Details of Powerlink and other's responsibilities; and
- Environmental aspects, including key performance objectives, management strategies and performance indicators of potential impacts from the proposed activities.

Each environmental aspect of the EMP is divided into preconstruction, construction, and operation and maintenance phases, with the following structure within each phase:

- The **operational policy** which applies;
- The **performance criteria** for each aspect;
- The **implementation strategies** to achieve the performance standards;
- The **monitoring and auditing procedures** to assess performance;

- The procedure for **reporting** of monitoring and auditing results; and
- The **corrective action** or choice of corrective action.

This EMP has also been prepared to meet the Environmental Protection Agency's (now Department of Environment and Resource Management – DERM) Guideline "Preparing environmental management plans" dated March 2003. The general requirements of ISO14000 suite of Environmental Management System Standards were also taken into consideration in the preparation of this Environmental Management Plan.

2 Powerlink Environmental Management Structure

Powerlink's organisation structure for the preconstruction, construction and maintenance phases of the project are shown in Figures 1, 2 and 3.

2.1 Preconstruction

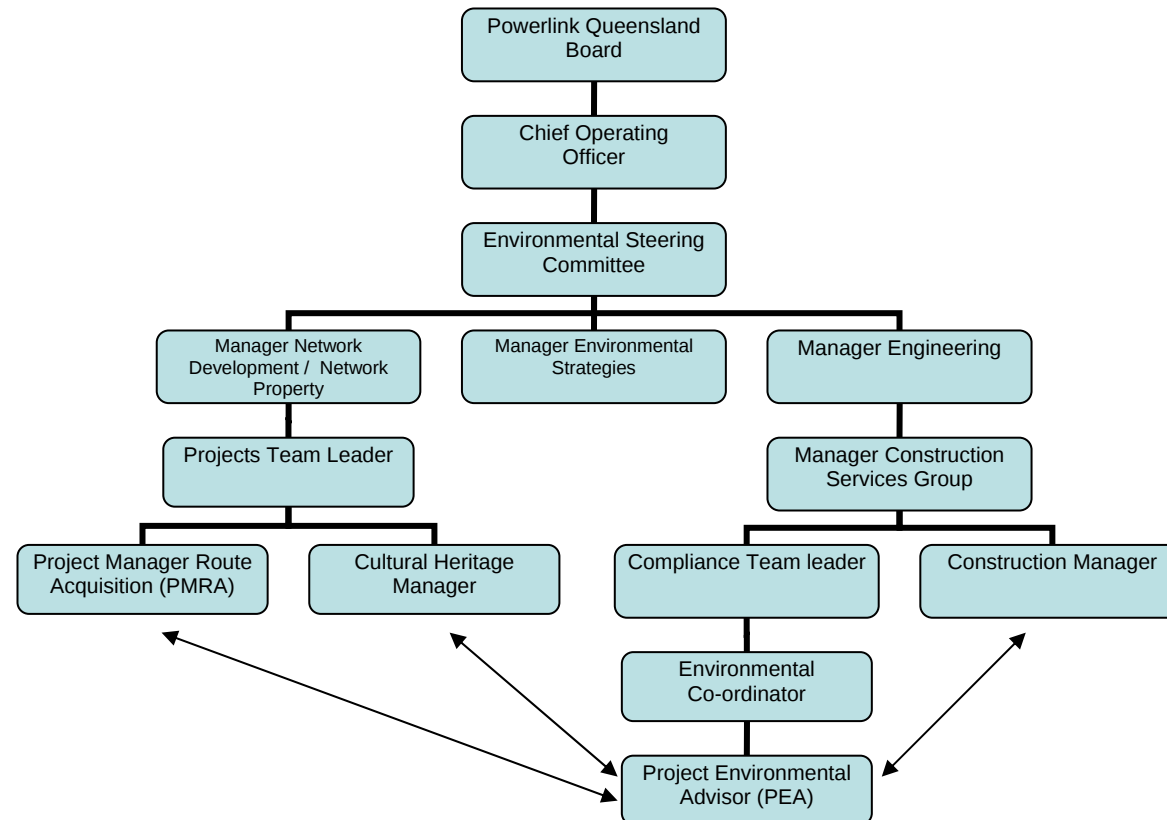


Figure 1: Powerlink's Environmental Management Structure – Preconstruction Phase

2.2 Construction

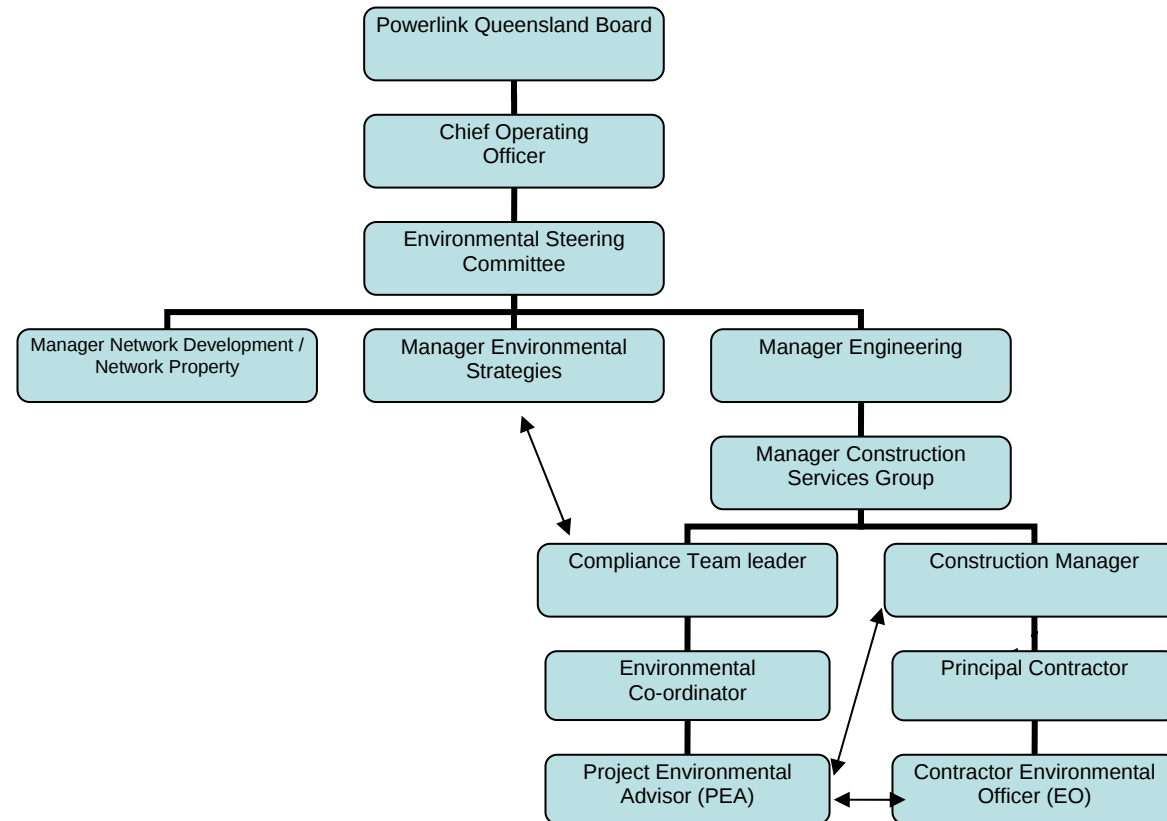


Figure 2: Powerlink's Environmental Management Structure – Construction Phase

Key project contacts during the construction phase of the project will be:

Position Title	Contact Person	Phone Number	Email
Manager Transmission Environment			
Manager Environmental Strategies			
Manager Engineering			
Construction Manager			
Principal Contractor			
Cultural Heritage Liaison Officer			
Project Environmental Advisor			

2.3 Operation and Maintenance

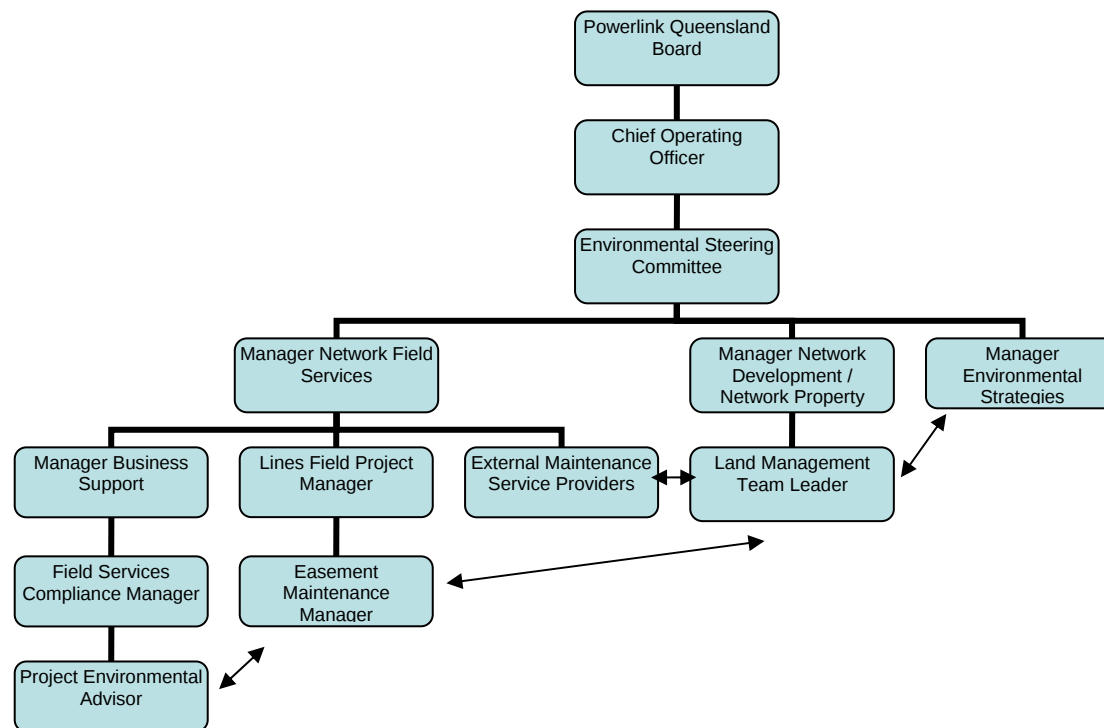


Figure 3: Powerlink's Environmental Management Structure – Maintenance Phase

Powerlink is committed to carrying out its activities in an environmentally responsible manner and has integrated responsible environmental management into all its business activities (See Appendix A – Environmental Policy).

3 Background to the Environmental Management Plan

3.1 Implementation

Powerlink is responsible for implementing the EMP for the whole project and ensuring compliance with the nominated requirements. Powerlink will also be responsible for ensuring appropriate corrective actions arising from a failure to meet stated performance requirements are implemented.

3.1.1 Preconstruction

Powerlink will have the necessary authority and responsibility for ensuring compliance with the EMP and the monitoring performance requirements for the preconstruction phase of the project. Initially this responsibility will be held by the Network Property Project Manager Route Acquisition (NP PMRA). The NP PMRA will be responsible for communicating EMP requirements to design and other teams, where applicable to their involvement in the project.

The NP PMRA will also be responsible for handing over the requirements of the environmental management plan to the construction project team, prior to the commencement of construction. During the handover, information on approvals/permits/licences, commitments and agreements will be provided.

Environmental Work Plans (EWPs) will also be prepared to assist in the implementation of this EMP. Information presented on the EWPs may include and not necessarily be limited to:

- Vegetation communities;
- Clearing extents and methods;
- Access tracks;
- Areas of cultural significance;
- Significant environmental management measures;
- Land status (e.g. weed status, contaminated land status); and
- Special access requirements and controls.

The environmental work plans will be prepared in accordance with the Construction Services Group Clearing and Environmental Work Plan guideline (Obj. ref: A471860). The EWPs preparation will be facilitated by the Project Environmental Advisor (PEA) in conjunction with the NP PMRA.

3.1.2 Construction:

Powerlink will appoint a PEA who will have the necessary authority¹ and responsibility for ensuring compliance with the EMP and monitoring performance requirements for construction phases of the project. The PEA and construction team will facilitate the preparation of EWPs, which will provide a summary of environmental management requirements during the construction phase.

Where contracts are entered into for work associated with this project, Powerlink will:

- Include the EMP in contract documents for all work to be undertaken by contractors;
- Induct the contractor on the requirements of the EMP and Powerlink's expectations, on awarding of the contract;
- Ensure that all contractors comply with the requirements of the EMP and appoint a suitably qualified and/or experienced Environmental Officer (EO) with the necessary authority to implement the relevant requirements of the EMP;
- Ensure that the contractor prepares a contractor's environmental management plan (CEMP) which demonstrates how the contractor will meet the requirements of this plan. As required by contract, the CEMP should be submitted to Powerlink prior to any works being carried out to ensure that the CEMP meets the requirements of the contract and statutory obligations;
- Require the contractor to report non-conformances to the EMP;
- Require the contractor to report on a monthly basis on the implementation of this EMP; and
- Monitor and measure the performance of the contractor against the requirements of the EMP.

The PEA will also be responsible for handing over the requirements of the environmental management plan to those parts of the business responsible for maintenance and operation activities at the completion of construction. During the handover, information on approvals/permits/licences, commitments, ongoing management requirements and agreements will be provided.

At the end of the construction phase of the project, the PEA will also prepare a report outlining how each of the policy, performance criteria and implementation strategies contained in this EMP were met during the construction phase of the project. The PEA will also be responsible for documenting the implementation of this EMP, and ensuring that any records, reports or registers nominated in this EMP are prepared and filed in Powerlink's eDRMS (Objective).

Should works be carried out by using a contractor, the roles and responsibilities of the Principal and Contractor will be outlined in contracts prepared and issued by the Principal.

3.1.3 Operation and Maintenance:

Powerlink will appoint a PEA with the necessary authority and responsibility for ensuring compliance with the EMP and monitoring performance requirements for the operation and maintenance phase of the project.

¹ Refer to the contract for the project for authorities of the PEA.

3.1.4 Asset Removal or Replacement

As the asset will have a minimum design life in the order of 40-50 years, specific measures relating to asset removal or replacement (e.g. specific handling and management of wastes from asset removal, specific reinstatement outcomes to meet stakeholder requirements, work methods and environmental controls for asset removal) have not included in this EMP.

Asset removal or replacement will trigger a full review of the EMP prior to the carrying out of such activities. The review will ensure that the requirements of this EMP meet legislative and community expectations at the time of the asset removal or replacement. Specific work methods or instructions may also be prepared at that time to guide asset removal and replacement activities.

Any agreements, requirements or conditions relating to asset removal or replacement (e.g. conditions of a development approval) have been included in this Environmental Management Plan to ensure that such measures are not overlooked at the end of the asset's life.

3.2 Legislative requirements

A summary of the legislation and other applicable standards which establish the performance criteria for the environmental strategies can be found in Table 1.

Table 1
Legislative and other controls for Environmental Strategies

Environmental Aspect	Legislative/standards cross-reference
General	State Legislation
	<i>Electricity Act 1994</i>
	<i>Electricity Regulation 2006</i>
	<i>Environmental Protection Act 1994</i>
	<i>Environmental Protection Regulation 1998</i>
	<i>Workplace Health and Safety Act 1995</i>
	<i>Workplace Health and Safety Regulation 1997</i>
Air Quality	State Legislation
	<i>Environmental Protection (Air) Policy 1997</i>
	Powerlink Procedures
	<i>Air Quality – Management and Control of Dust AM-PR-0917 (Obj. ref: A596707)</i>
	Guidelines and Standards
	<i>Environment Protection Measures for Ambient Air Quality</i> <i>National Environment Protection Council, National</i>

Environmental Aspect	Legislative/standards cross-reference
Cultural Heritage	Federal Legislation <i>Aboriginal and Torres Strait Islander Heritage Protection Act 1986</i> <i>Aboriginal Cultural Heritage Act 2003</i> <i>Australian Heritage Council (Consequential and Transitional Provisions) Act 2003</i> <i>Australian Heritage Council Act 2003</i> <i>Environment and Heritage Legislation Amendment Act (No. 1)2003</i> <i>Environment Protection and Biodiversity Conservation Act 1999</i> <i>Native Title Act 1993</i> State Legislation <i>Native Title (Queensland) Act 1993</i> <i>Queensland Heritage Act 1992</i>
Energy Use/Greenhouse gas	Federal Legislation <i>National Greenhouse and Energy Reporting Act 2007</i>
Erosion and Sediment Control	State Legislation <i>Environmental Protection (Water) Policy 1997</i> <i>Water Act 2000</i> Powerlink Procedures <i>Maintenance of Access Tracks, Powerlink Procedure AM-PR- 0035 (Obj. ref: A510284)</i> <i>Soil Erosion and Sediment Control – Powerlink Policy AM-POL- 0830 (Obj. ref: A517)</i> Guidelines and Standards <i>Best Practice Erosion and Sediment Control – IECA 2008</i> <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC, 2000</i>
Fauna and Vegetation	Federal Legislation <i>Environment Protection and Biodiversity Conservation Act 1999</i> State Legislation <i>Agricultural Chemicals Distribution Control Act 1966</i> <i>Animal Care and Protection Act 2001</i> <i>Nature Conservation (Wildlife) Regulation 2006</i> <i>Nature Conservation Act 1992</i> <i>Vegetation Management Act 1999</i> <i>Vegetation Management Regulation 2000</i> <i>Water Act 2000</i> Powerlink Procedures

Environmental Aspect	Legislative/standards cross-reference
	<i>Assessment of Hazardous Marginal Trees AM-PR-0855 (Obj. ref: A676)</i> <i>Vegetation Control Standards, Powerlink Standard AM-STA-0834 (Obj. ref: A462955)</i> <i>Vegetation Management for Transmission Corridors and Sites, Powerlink Policy AM-POL-0050 (Obj. ref: A462945)</i>
Land Contamination	Guidelines and Standards <i>Draft Guidelines for the Assessment and Management of Contaminated Land, May 1998</i>
Noise and Vibration	State Legislation <i>Environmental Protection (Noise) Policy 2008</i> Guidelines and Standards <i>AS 2436: 1981 – Guide to noise control on construction, maintenance and demolition sites</i> <i>Noise Measurement Manual Department of Environment and Heritage 1995</i> <i>User's guide to the Environment Protection (Noise) Policy Environmental Protection Agency 1997</i> <i>AS 1055. 1/2: 1997 – Acoustics – Description and management of environmental noise</i>
Hazardous Materials	State Legislation <i>Carriage of Dangerous Goods by Road Act 1984</i> <i>Carriage of Dangerous Goods by Road Regulation 1989</i> <i>Dangerous Goods Safety Management Act 2001</i> Powerlink Procedures <i>Management of insulating and petroleum based liquid spills AM-POL-0076 (Obj. ref: A520843)</i> <i>Management, Transport and Disposal of Waste Insulating and Petroleum-Based Liquids (Regulated Wastes) AM-PR-0926 (Obj. ref: A598354)</i> Guidelines and Standards <i>AS 1940: 2004, The storage and handling of flammable and combustible liquids</i>
Biosecurity (Pest and Disease)	State Legislation <i>Integrated Planning Act 1997</i> <i>Land Protection (Pest and Stock Route Management) Act 2002</i> <i>Pest Management Act 2001</i> <i>Plant Protection Act 1989</i> Powerlink Procedures <i>Biosecurity Management – Pest and Pathogen Control Measures AM-PR-0039 (Obj. ref: A513014)</i> <i>Fire Ant Management Plan AM-PR-0781 (Obj. Ref: A582069)</i> <i>Vehicle and equipment cleardown AM-PR-0968 (Obj. ref: A256951)</i>
Traffic and Site Access	State Legislation

Environmental Aspect	Legislative/standards cross-reference
	<i>Transport Operations (Road Use Management) Act 1995</i>
	Guidelines and Standards
	<i>Queensland Department of Main Roads Manual for Uniform Traffic Control Device</i>
Waste	State Legislation
	<i>Environment Protection (Waste Management) Policy 2000</i>
	<i>Environmental Protection (Waste Management) Regulation 2000</i>
	Guidelines and Standards
	<i>Waste Management Strategy for Queensland 1996</i>

3.3 Review, update and continuous improvement

The EMP and EWPs will be reviewed and updated as required to ensure that they address any site related environmental issues or changes in guidelines, policies, procedures or legislation. The EMP and EWPs will also be reviewed at the completion of the construction phase of the project. The PEA, in consultation with other Powerlink staff, shall be responsible for this review and the internal GIS will be updated to reflect any new information discovered as part of this review.

Maintaining the currency of the EMP after the construction phase is completed will be the responsibility of the Manager Environmental Strategies, or delegate.

The EMP will also be amended or updated from time to time during the construction and operation of the asset to reflect:

- New information or discoveries occurring after the preparation of the EMP;
- Change in site conditions or requirements;
- Changes in statutory requirements or community expectations; and
- Changes in construction and/or operational activities, technology or equipment.

The review and update of the EMP and EWPs is to allow for a process of continuous improvement.

Any identified changes or deficiencies in the EMPs and EWPs will be promptly addressed and new revisions of the EMP/EWPs will be issued as necessary.

Any changes or updates to the EMP/EWPs will be discussed with the Manager Environmental Strategies to determine if such changes/updates trigger an external approval process.

3.4 Training requirements

3.4.1 Preconstruction Phase

The NP PMRA will be responsible for ensuring that all personnel working on the project during the preconstruction or planning phase of the project are aware of the requirements of this EMP.

The NP PMRA is also responsible for handing over the project, and providing details on the project to the PEA and construction team. Such information will be used by the PEA to prepare inductions and updating/preparing construction related records.

3.4.2 Construction Phase:

The PEA shall be responsible for ensuring that relevant staff are adequately trained regarding the contents, interpretation, responsibilities and performance measures contained in this EMP, and that personnel working on the project have sufficient knowledge and awareness to identify potential environmental issues. Unless stated otherwise in a contract, the Principal Contractor will be responsible for ensuring that all site personnel are trained/inducted on the requirements of this EMP and the procedures outlined within the CEMP, prior to site personnel carrying out any work.

All construction personnel shall be required to participate in an environmental induction, prior to their commencement of work on site. Records of personnel who have completed the inductions will be maintained.

This induction shall include:

- Awareness of the general environmental requirements for the project, including key site specific management measures;
- Knowledge of the roles and responsibilities of the various parties on site, including the key contacts for reporting and notifications;
- Training in appropriate corrective action in event that they become aware of an environmental issue;
- Instruction on procedures and reporting on issues that may result in environmental degradation; and
- Awareness of cultural heritage (this may take the form of a separate induction and will be nominated in the cultural heritage requirements for the project).

3.4.3 Operation and Maintenance Phase:

Powerlink will appoint an officer with the necessary authority and responsibility for ensuring relevant training is provided to field staff to ensure compliance with the EMP during the operation and maintenance phase of the project.

3.5 Reporting and records procedure

3.5.1 Preconstruction Phase

Where development approval or designation is required, the NP PMRA will be responsible for finalising the EMP prior to construction commencing. The NP PMRA will also be responsible for ensuring that all approvals, agreements or commitments are documented and handed to the construction team.

For projects not requiring development approval or designation, the PEA will be responsible for finalising the EMP prior to construction commencing. The PEA will be responsible for maintaining the EMP currency during the construction phase of the project.

3.5.2 Construction Phase

All Powerlink and Contractor staff are required to report environmental issues or incidents to their direct Supervisor, who shall be responsible for reporting to the Powerlink Construction Manager, who will, in consultation with the PEA be responsible for implementing initial mitigation measures, and subsequent reporting to the Project Manager.

Processes for resolving environmental issues or incidents from a contractor working within a contractual framework, will also carried out in accordance with this contractual framework. During the construction phase, an environmental issues register will be established to resolve any environmental, community relation or cultural heritage issues associated with the construction phase. Items in the register may include actions to rectify observed non-conformances with the EMP or actions to prevent reoccurrences of a non-conformance.

Response to any environmental incident shall be carried out in accordance with the requirements of Powerlink's Emergency Response Management Handbook. This includes external reporting to the relevant Government Agencies (e.g. Environmental Protection Agency, Department of Environment and Resource Management, or relevant Local Authority)

Records of implementation of the EMP will also be completed during the construction phase. Non-conformance with the EMP will also be recorded and will include corrective actions to resolve these non-conformances. The PEA will prepare a monthly report which will summarise the performance of construction activities, non-conformances with the EMP and corrective and preventative actions.

Other records and reports which will be prepared during the construction phase include, but not necessarily limited to:

- Cultural Heritage Requirements;
- Local Weed Management Plan;
- Environmental Work Plans;
- Landholder Consultation Records (esp. for clearing and access);
- Record of Activities within a Watercourse under s269 of the Water Act 2000;

- Complaints Register;
- Construction Close Out Records; and
- Any records pertaining to any approval, permit or licence.

Completing and collating records associated with and the reporting of environmental, community relations and cultural heritage is the responsibility of the PEA.

3.5.3 Operation and Maintenance Phase

All staff shall report any non-conformances with this EMP to their direct Supervisor, who shall be responsible for reporting to their relevant Manager. The manager, in consultation with the PEA will be responsible for implementing initial mitigation measures, and subsequent internal monthly and quarterly reporting.

When necessary, the Manager in consultation with Manager Environmental Strategies will be responsible for implementing a response in accordance with the requirements of Powerlink's Emergency Management Handbook. This includes external reporting to the relevant Government Agencies (e.g. DERM, relevant Local Authority).

Inspections such as those required by AM-FM-0354 Maintenance of Concrete Pole Built Sections (Obj. ref: A535910), AM-FM-0377 Maintenance of Steel Pole Built Sections (Obj. ref: A537505), AM-PR-0034 Maintenance of Easements (obj. ref: A510274) and AM-POL-0154 Transmission Line Patrols (Obj. ref: A572682) will also be carried out on a regular basis during the life of the asset.

3.6 Complaints procedure

Landowners, occupiers and the general community will be consulted to ensure that any impact or disruption to their operations or infrastructure is minimised.

Any complaint received onsite or by the contractor must be reported verbally to Powerlink as soon as possible, and a followed up in writing within 24 hours.

The environmental issues register will be used to provide actions and timeframes to resolve complaints.

Media enquiries are to be addressed in accordance with the Media Policy in the Workplace Conduct for Powerlink Contractors (Obj. ref: A497976).

3.6.1 Preconstruction Phase

Concerns of landholders during the preconstruction phase of the project will be recorded and actioned. Powerlink's Management of Property Contact Information (Obj. ref: 388589) will be followed and a Land Owner Action Request Spreadsheet (Obj. ref: A387454) will be established to record and resolve the concerns.

Any concerns which are identified as impacting on construction, operation or maintenance activities will also be documented and provided to the PEA or PEA/Easement Maintenance Manager.

3.6.2 Construction Phase

A complaints handling protocol will be established and managed by the PEA, and all complaints received will be investigated, and where necessary actions will be implemented to resolve reasonable and relevant complaints.

An Environmental Complaints Register shall be established, and the following details recorded in the event of a complaint:

- Time and date of the incident/complaint;
- Nature of the incident/complaint;
- Name of person receiving / investigating the complaint;
- Type of communication (e.g. telephone, letter, in person);
- Name and contact details of complainant (if provided);
- Investigation and response undertaken;
- Corrective action taken as a result of the incident/complaint investigation; and
- Follow up with complainant.

Powerlink Corporate Communications or Network Development / Network Property will also, where necessary, assist in the resolution of complaints or feedback from Local, State or Commonwealth Government.

3.6.3 Operation and Maintenance Phase

A complaints procedure will be established and managed by Powerlink and all complaints received will be investigated. An Environmental Complaints Register shall be established, consistent with the outline provided in section 3.6.

Powerlink Corporate Communications or Network Development / Network Property will also, where necessary, assist in the resolution of complaints or feedback from Local, State or Commonwealth Government.

4 Environmental Aspects

Key environmental aspects associated with the project, and their relationship to various activities carried out can be found in the following matrix:

		Environmental Aspects																
		Acid Sulphate Soils	Air Quality	Biosecurity (excluding weeds)	Cultural Heritage	EMF	Energy Use/GHG	Erosion and Sediment Control	Fauna	Hazardous Materials	Land Contamination	Noise and Vibration	Traffic	UXO	Vegetation (Flora)	Visual amenity	Waste	Weed Management
Activity	Preconstruction: Site inspections and surveys	•	○	•	○	○	•	•	•	•	•	○	○	•	•	○	•	●
	Preconstruction: Design	•	•	•	●	●	•	•	•	•	○	•	•	•	●	●	•	•
	Construction: Access, clearing and earthworks	•	●	●	●	•	●	●	●	○	○	●	●	•	●	●	●	●
	Construction: Foundations	•	●	●	●	•	●	●	○	○	○	●	●	•	○	○	●	●
	Construction: Tower and Steel Erection	•	●	○	•	•	○	○	○	○	○	●	●	•	○	●	●	●
	Construction: Hardware Installation	•	○	○	•	•	○	○	○	○	○	●	●	•	○	●	●	○
	Construction: Stringing and connections	•	●	○	○	•	○	○	○	○	○	●	●	•	○	●	●	○
	Construction: Reinstatement/Rehabilitation	•	●	○	○	•	○	○	○	○	○	●	●	•	○	●	●	●
	Maintenance: Built Asset Ground Patrol	•	○	•	○	○	○	•	•	•	•	○	○	•	•	•	•	●
	Maintenance: Asset Inspection	•	○	•	○	○	•	•	•	•	•	○	○	•	•	•	•	○
	Maintenance: Earth Testing	•	○	•	○	○	•	•	•	•	•	○	○	•	•	•	•	○
	Maintenance: Insulator Testing	•	○	•	○	○	•	•	•	•	•	○	○	•	•	•	•	○
	Maintenance: Additional Earthing	•	●	●	●	•	○	●	○	○	○	●	○	•	○	•	○	●
	Maintenance: General Tower Maintenance	•	●	●	○	•	○	●	○	○	○	●	○	•	○	•	○	○
	Maintenance: Insulator Replacement	•	○	●	○	•	○	○	○	○	○	○	○	•	○	•	○	○
	Maintenance: Vibration Damper Replacement	•	●	●	○	•	○	○	○	○	○	○	○	•	○	•	○	○
	Maintenance: OPGW Installation	•	●	●	○	•	○	○	○	○	○	○	○	•	○	•	○	○
	Maintenance: Vegetation management	•	○	○	○	●	●	●	●	○	○	●	○	•	●	○	●	●
	Maintenance: Access Track Maintenance	•	●	○	○	●	●	●	●	○	○	●	○	•	●	○	●	●
	Maintenance: Declared Plant Control	•	○	•	○	●	○	•	•	•	•	○	○	•	•	○	•	●
	Operation: Energised Asset Operation	•	•	•	•	●	○	•	○	○	○	•	•	•	•	●	•	•
	Asset Removal or Replacement	•	●	●	●	•	●	●	●	●	○	○	●	●	•	●	●	●
• No significant impact		○ Potential low impact		● Potential moderate to high impact														

• No significant impact ○ Potential low impact ● Potential moderate to high impact

The Environmental Aspect Matrix is a quick cross-reference table to identify what aspects need to be effectively managed at each stage of the project.

Management of environmental risks associated with works during the construction of new assets, refurbishing existing assets and maintaining/operating existing assets is to be carried out in accordance with Powerlink's procedure AM-PR-0045 Managing Environmental Risks (Obj. ref: A510304). This Procedure establishes responsibility for ensuring that environmental impacts have been considered and evaluated at an appropriate level for all activities. This procedure should also be read in conjunction with AM-POL-0019 Environmental Compliance Whole of Life for Powerlink Assets (Obj. ref: A530492) and AM-PR-0304 Determining the Level of Environmental Assessment for Powerlink Activities (Obj. ref: A530610).

4.1 Cultural Heritage

Powerlink resolves cultural heritage in accordance with the provisions and processes outlined in the *Aboriginal Cultural Heritage Act 2003* and *Queensland Heritage Act 1992*. As a result, specific cultural heritage management measures for the project may be developed to protect cultural heritage. These specific cultural heritage management measures are presented in other plans and documents and will be issued by the Powerlink Cultural Heritage team prior to commencement of any construction, maintenance or operational activities.

This Environmental Management Plan must be read in conjunction with any project specific cultural heritage management measures. It is worth noting that Environmental Management Plan does not replace or override such measures. An environmental management strategy has been prepared for cultural heritage to recognise and cross-reference these other documents and plans.

4.2 Environmental Aspect Management

Management measures to mitigate potential impacts on environmental aspects identified for the project have been prepared and are presented in Section 5.0 "Environmental Management Strategies". Potential impacts associated with the project were identified in the Environmental Impact Statement for the Western Downs Transmission Line.

During the construction, operational and maintenance phase of the project, there will be an ongoing process of monitoring, evaluation and review to enhance the Environmental Management Strategies to achieve continuous improvements in overall environmental performance in line with Powerlink's environmental policy (refer to section 3.3).

5 Environmental Management Strategies

5.1 Air Quality

The Transmission Line has been located to maximize (where practicable) the distance from sensitive receptors such as houses. During construction activities, air quality impacts may arise as a result of traffic movements and emissions, unsealed access tracks, bulk earthworks and vegetation clearing. All impacts are expected to be short in duration and restricted to the localised area surrounding construction works. The operation of the transmission line is not expected to impact upon air quality. Maintenance activities are unlikely to cause a dust nuisance.

5.1.1 Policy

- o To prevent dust and other atmospheric emissions generated by preconstruction, construction, operation and maintenance activities from causing a hazard or nuisance to neighbouring landowners.
- o To comply with the *Environmental Protection Act 1994* and *Environmental Protection (Air) Policy 1997*

5.1.2 Performance Criteria

- o Compliance with the *Environmental Protection Regulation 1998* and *Environmental Protection (Air) Policy 1997*.
- o To maintain acceptable limits of vehicular and machinery operating emissions, including dust, associated with construction activities (i.e. both on-site and vehicles transporting materials to and from the site).
- o Powerlink's procedure AM-PR-0917 Air Quality – Management and Control of Dust (Obj. ref: A596707).
- o No complaints regarding air quality or dust nuisance.

5.1.3 Preconstruction Phase

Implementation Strategy:

- o Restrict vehicle travelling speed (<40km/h) on unsealed access tracks, where possible (there is a direct correlation between speed and the amount of material that is released into the air).
- o In consultation with Western Downs Regional Council, identify potential water sources for dust suppression during the construction phase. If water source extraction is required, the PEA will prepare and lodge applications where required.
- o Obtain permits, where required, to extract water.
- o Identify dust sensitive locations (e.g. residences) prior to construction activities occurring.
- o The transmission line is required to conform to the appropriate Australian Standards.

Monitoring and Auditing:

- o Not applicable to this phase.

Reporting:

- o Not applicable to this phase.

Corrective Action:

- o Not applicable to this phase.

5.1.4 Construction Phase**Implementation Strategy:**

- o Carrying out activities in accordance with Powerlink procedure *AM-PR-0917 Air Quality – Management and Control of Dust* (Obj. ref: A596707).
- o Ensure that Powerlink notifies all adjacent landholders of the timing and sequence of Powerlink's construction activities.
- o Ensure that vehicles and machinery will be fitted with appropriate exhaust systems and devices. Such devices will be maintained in good working order, in accordance with the manufacturer's recommendations.
- o Watering of or application of dust suppressants to work areas and access tracks will be carried out on an as required basis to prevent dust nuisance.
- o Restricting vehicles to approved access tracks, and only those vehicles required for the safe, efficient and essential construction activities will be allowed on the work area.
- o Implement and ensure that all construction personnel to work in accordance with the Workplace Conduct for Powerlink Contractors (Obj. ref: A497976)
- o Cover all loose loads for transport to and from the work site.
- o Maintain sealed public roads (i.e. Banana Bridge Road, Warra Kogan Road) free of trafficked soil materials. When required, sealed roads are to be swept regularly.
- o Maintain stockpiles, for example stripped topsoil, in a condition which prevents wind blown dust generation. This may include watering, covering of the stockpiles or limiting the height of stockpiles.
- o Limit bare earth exposure to that essential to the efficient and effective construction of the asset. Using vegetation cover, mulch covers or other suitable methods will be adopted where possible.
- o Rehabilitate or allow natural regeneration of bare areas as soon as the area is no longer needed for construction.
- o Restrict vehicle travelling speed (<40km/h) on unsealed access tracks, where possible (there is a direct correlation between speed and the amount of material that is released into the air). Vehicle speeds will be further reduced on unsealed access tracks during dry, windy weather, to a speed whereby visible dust emanating from soil type interaction is minimised.
- o Time dust generating activities in proximity to dust sensitive locations (e.g. neighbouring dwelling), when possible, to prevent dust nuisance at the sensitive receptors. Consideration shall be given to local site conditions, including soil type, rainfall, wind speed and direction, proximity to receptors and duration of the activity.
- o Where practicable, locate access tracks away from dust sensitive locations (e.g. neighbouring residence) to reduce likelihood of dust nuisance or complaint.
- o Construct access tracks from materials which are more stable and less likely to turn to bull dust.
- o Cleared vegetation should be left in-situ (e.g. where appropriate to assist revegetation or erosion control), mulched, stockpiled and/or removed in accordance with landholder instructions. The selected disposal method will be assessed on a site specific basis. The option for stockpiling & or burning may be adopted where there is a large amount of material, and it would be impractical or inefficient to use other disposal methods. This is especially relevant where substantial volumes of cleared material would result in significant timber heaps, or unmanageable volumes of wood chip. Spread vegetation is to be "topped and tailed", the root ball removed and trunks/branches laid across the contour to impede cross country flow and provide micro sediment traps. If cleared vegetation is stockpiled, the stacks are to be free of

dirt and clear of standing trees. No burning is to occur unless permitted by the local fire warden. Permits for vegetation burning must be obtained and provided to the Powerlink Construction Manager/PEA prior to the burn. All conditions of any permit must be adhered to.

Monitoring and Auditing:

- o All site personnel will monitor condition of access tracks and work areas, and report to the PEA any areas where dust nuisance is likely to occur
- o The Environmental Issue Register shall be used to record and resolve any dust issues. The environmental issues register is to also provide corrective and preventative actions
- o The PEA and contractor are to carry out regular visual surveillance of vehicles, plant and equipment working or moving within proximity to residences or other dust sensitive locations. The surveillance is to determine when actions are required to reduce potential dust nuisance
- o Quantitative monitoring may be conducted to investigate a complaint, if required by an administering authority, to determine if dust levels comply with the performance criteria specified in this EMP.

Reporting:

- o All complaints received to be reported to the Powerlink Construction Manager or PEA immediately, and in writing within 24 hours
- o Actions taken to mitigate dust nuisance and complainants to be recorded as implemented, and reported on a monthly basis
- o All complaints recorded in the complaints register for the project (refer section 3.6 of this EMP). The resolution of the complaint will also be recorded
- o Any air quality observations or test results to be presented in the monthly compliance report
- o Any EMP non-compliances to be documented and reported to Powerlink Construction Manager
- o Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report
- o Any material or serious environmental harm to be reported to the Manager Environmental Strategies by the Powerlink Construction Manager.

Corrective Action:

- o If a dust complaint is received, the PEA will investigate and provide advice on measures to reduce the nuisance and the likelihood of further complaints
- o Review of the implementation strategies will be carried out following any complaint to determine their adequacy, and whether additional measures need to be implemented. Where further measures need to be implemented, these will be added to the EMP.
- o Corrective and preventative actions will be implemented, on an as needed basis, to address dust nuisance.

5.1.5 Operation and Maintenance Phase

Implementation Strategy:

- o Carrying out activities in accordance with Powerlink procedure AM-PR-0917 Air Quality – Management and Control of Dust (Obj. ref: A596707)
- o Maintain ground covers in accordance with surrounding land use and current groundcover vegetation levels
- o Restrict speed limits on off road access tracks to 40km/h. Vehicle speeds will be further reduced on unsealed access tracks during dry, windy weather, to a speed whereby visible dust emanating from soil tyre interaction is minimised
- o Coordinate activities generating dust or other atmospheric emissions to coincide with favourable climatic conditions
- o Cleared vegetation should be left in-situ (e.g. where appropriate to assist revegetation or erosion control), mulched and/or removed. If burning of cleared vegetation is planned, no burning is to occur unless permitted by the local fire warden. Permits for vegetation burning must be obtained and provided by the External Maintenance Service Provider prior to the burn. All conditions of any permit must be adhered to.

Monitoring and Auditing:

- o As specified for the Construction Phase and Complaints Management Procedure outlined in Section 3.6 of this EMP

- o Operation and maintenance activities will be monitored to ensure compliance with the performance requirements as specified in this Environmental Strategy or as frequently as necessary.

Reporting:

- o Any dust related complaints will be reviewed quarterly and reported to the Asset Manager
- o Actions taken to mitigate dust nuisance and complainants to be recorded and reported on a monthly basis

Corrective Action:

- o Any dust complaints received will be investigated and steps taken to reduce impact (refer to Section 3.6 of this EMP)
- o Corrective and preventative actions will be implemented, on an as needed basis, to address dust nuisance.

5.2 Biosecurity (inc. red imported fire ants)

Biosecurity issues (including Red Imported Fire Ants) were not identified during the EIS, however generic pest and pathogen controls (including the potential for importation of Red Imported Fire Ants) need to be considered and managed on the project.

5.2.1 Policy

- o No introduction, release, movement or transportation of red imported fire ants or other pests and diseases declared under the *Plant Protection Act 1989*.
- o Compliance with Powerlink's *AM-PR-0039 Biosecurity Management – Pest and Pathogen Control Measures* (Obj. ref: A513014) and *AM-PR-0781 Fire Ant Management Plan* (Obj. ref: A582069).

5.2.2 Performance Criteria

- o No new pest or disease outbreaks observed on the project area.

5.2.3 Preconstruction Phase

Implementation Strategy:

- o Identify properties which have been mapped as restricted or quarantined by Biosecurity Queensland.
- o Implement *AM-PR-0781 Fire Ant Management Plan* (Obj. ref: A582069) in relation to movement of high risk materials onto the transmission line site.
- o Implement any specific measures prescribed or nominated by Biosecurity Queensland in relation to the management of pests and diseases.
- o Prepare, when required, pest/disease management plans for declared pests and diseases in restricted and quarantined areas.
- o Prepare a local weed management plan (refer to Weed Management Strategy) and incorporate weed management plan in Environmental Work Plan.

Monitoring and Auditing:

- o Monitoring for the presence of new outbreaks of pests and diseases
- o When required, monitoring will be conducted to ensure compliance with the Fire Ant Management Plan and any other specific requirements during entry, on and leaving properties.
- o

Reporting:

- o Report any suspected pest or disease outbreaks to the Manager Environmental Strategies and Biosecurity Queensland
- o Record location of any pest or disease outbreaks.

Corrective Action:

- o Any new outbreaks forward to the Land Management Team for inclusion into the Powerlink's PQ Maps
- o Develop management measures for new outbreaks.

5.2.4 Construction Phase

Implementation Strategy:

- o Review land information databases prior to construction to determine current status of quarantined or restricted areas
- o Implement the pest/disease management plan
- o Implement *AM-PR-0781 Fire Ant Management Plan* (Obj. ref: A582069)
- o Implement the local weed management plan (refer to Weed Management Strategy).

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Pest/Disease Management Plan.

Reporting:

- o Report any suspected pest or disease outbreaks to the Manager Environmental Strategies and Biosecurity Queensland
- o Record location of any pest or disease outbreaks
- o Prepare and keep records required by the pest/disease management plan
- o Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- o Any new outbreaks forward to the Land Management Team for inclusion into the Powerlink's PQ Maps
- o Update pest/disease management plans for new outbreaks.

5.2.5 Operation and Maintenance Phase

Implementation Strategy:

- o Refer to the implementation strategy of the construction phase of this Environmental Strategy.

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Pest/Disease Management Plan.

Reporting:

- o Report any suspected pest or disease outbreaks to the Manager Environmental Strategies and Biosecurity Queensland
- o Record location of any pest or disease outbreaks
- o Prepare and keep records required by the pest/disease management plan.

Corrective Action:

- o Any new outbreaks forward to the Land Management Team for inclusion into the Powerlink's PQ Maps
- o Update pest/disease management plans for new outbreaks.

5.3 Biosecurity (Tong Park)

Biosecurity issues were not identified during the EIS, however generic pest and pathogen controls, particularly regarding Tong Park Piggery, need to be considered and managed on the project. Work in and around Tong Park Piggery is to be in accordance with their Biosecurity protocols, as summarised below.

5.3.1 Policy

- o No introduction, release, movement or transportation of pests or diseases in Tong Park
- o Compliance with Tong Park Pty Ltd *Tong Park: Biosecurity Procedures*..

5.3.2 Performance Criteria

- o No new pest or disease outbreaks observed within Tong Park

5.3.3 Preconstruction Phase

Implementation Strategy:

- o Identify properties which have been mapped as restricted or quarantined by Biosecurity Queensland.
- o Implement Tong Park's *Biosecurity Procedures*
- o Implement any specific measures prescribed or nominated by Biosecurity Queensland in relation to the management of pests and diseases.
- o Prepare pest/disease management plans for declared pests and diseases in restricted area.
- o Prepare a local weed management plan (refer to Weed Management Strategy) and incorporate weed management plan in Environmental Work Plan.
- o Visitors, contractors and contractor's personnel must not enter Tong Park without the prior permission of the Tong Park General Manager or Tong Park Operations Manager
- o Contractors must provide the Tong Park Operations Manager prior to, or upon entry to the site, with a work plan showing anticipated work areas and not proceed further on site unless the Tong Park Operations Manager has approved that work plan. Any change to this work plan must be approved by Tong Park Operations Manager in advance of work.
- o Visitors and contractors coming onto Tong Park must comply with following restrictions:
 - o Must not live on a farm where pigs are kept
 - o Must not engage in any activity which may bring them into contact with pigs e.g. pig shooting
 - o Must not visit other piggeries, any animal saleyards or animal slaughterhouses, agricultural shows or exhibitions (or reside with or have close personal contact with, any person who has done so) within 72 hours preceding coming onto Tong Park

Monitoring and Auditing:

- o When required, monitoring will be conducted to ensure compliance with Tong Park's *Biosecurity Procedures* during entry, on and leaving Tong Park.

Reporting:

- o Report any suspected pest or disease outbreaks to the Manager Environmental Strategies and Tong Park Operations Manager.
- o Record location of any pest or disease outbreaks.

Corrective Action:

- o Any new outbreaks forward to the Land Management Team for inclusion into the Powerlink's PQ Maps
- o Develop management measures for new outbreaks.

5.3.4 Construction Phase**Implementation Strategy:**

- o Visitors, contractors and contractor's personnel must not enter Tong Park without the prior permission of the Tong Park General Manager or Tong Park Operations Manager
- o Contractors must provide the Tong Park Operations Manager prior to, or upon entry to the site, with a work plan showing anticipated work areas and not proceed further on site unless the Tong Park Operations Manager has approved that work plan. Any change to this work plan must be approved by Tong Park Operations Manager in advance of work.
- o Visitors and contractors coming onto Tong Park must comply with following restrictions:
 - o Must not live on a farm where pigs are kept
 - o Must not engage in any activity which may bring them into contact with pigs e.g. pig shooting
 - o Must not visit other piggeries, any animal saleyards or animal slaughterhouses, agricultural shows or exhibitions (or reside with or have close personal contact with, any person who has done so) within 72 hours preceding coming onto Tong Park
- o All vehicles and equipment coming onto any part of Tong Park must enter through disinfection station at the Main Gate between 6am and 6pm only after contacting Tong Park Operations Manager by telephone 07 4668 1296
- o Machinery that has been used on other piggery sites must not be brought onto Tong Park
- o All vehicles and machinery must be cleared of mud and heavy dirt before proceeding onto any part of Tong Park
- o All visitors and contractors must report to the maintenance office for permission to proceed and to undergo induction to Tong Park and carry a Tong Park pass at all times while on site
- o All visitors and contractors must travel directly to their authorised work area and must not go to any other area
- o Visitors and contractors must complete the piggery visitor book and certify compliance with these procedures
- o All vehicles must travel on constructed roads unless previously approved by Tong Park Operations Manager
- o Implement the pest/disease management plan
- o Personnel must ensure that all rubbish including food scraps are placed in proper waste bins and removed from site daily
- o If contractor's personnel are on Tong Park for extended periods, portable toilets must be provided by the contractor and must be used by the contractor's personnel at all times.
- o Implement the local weed management plan (refer to Weed Management Strategy).

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Pest/Disease Management Plan.
- o Monitoring will be conducted to ensure compliance with Tong Park's *Biosecurity Procedures*

Reporting:

- o Report any suspected pest or disease outbreaks to the Manager Environmental Strategies and Tong Park Operations Manager
- o Record location of any pest or disease outbreaks
- o Prepare and keep records required by the pest/disease management plan
- o Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- o Any new outbreaks forward to the Land Management Team for inclusion into the Powerlink's PQ Maps
- o Update pest/disease management plans for new outbreaks.

5.3.5 Operation and Maintenance Phase**Implementation Strategy:**

- o Refer to the implementation strategy of the construction phase of this Environmental Strategy.

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Pest/Disease Management Plan and Tong Park's *Biosecurity Procedures*

Reporting:

- o Report any suspected pest or disease outbreaks to the Manager Environmental Strategies and Tong Park Operations Manager
- o Record location of any pest or disease outbreaks
- o Prepare and keep records required by the pest/disease management plan.

Corrective Action:

- o Any new outbreaks forward to the Land Management Team for inclusion into the Powerlink's PQ Maps
- o Update pest/disease management plans for new outbreaks.

5.4 Cultural Heritage

The proposed transmission line is not expected to impact upon areas or objects of social importance or non-indigenous cultural significance. Commonwealth and State heritage registers have not identified non-indigenous cultural heritage sites on or within the immediate vicinity of the proposed transmission line. With consideration of the broader context of the area surrounding the Study Alignment, the proposed development is not expected to have a negative impact on the lifestyle of local residents, or on the appeal of places frequently visited within the region. However, the likely presence of remnants of non-indigenous cultural heritage has not been dismissed.

5.4.1 Policy

- o Compliance with the *Aboriginal Cultural Heritage Act 2003* and *Queensland Heritage Act 1992*.

5.4.2 Performance Criteria

- o Provide effective recognition, protection and conservation of cultural heritage.

5.4.3 Preconstruction Phase

Implementation Strategy:

- o Contact Powerlink's Cultural Heritage Team prior to carrying out any works, for the cultural heritage management measures² which require implementation during the carrying out of such works
- o Management measures will be developed by Powerlink's Cultural Heritage Team (refer section 4.1 of this EMP) which meet Powerlink's obligations under the *Aboriginal Cultural Heritage Act 2003* and *Queensland Heritage Act 1992*. These measures are to be implemented.

Monitoring and Auditing:

- o Refer to the preconstruction implementation strategy.

Reporting:

- o Refer to the preconstruction implementation strategy.

Corrective Action:

- o Refer to the preconstruction implementation strategy.

5.4.4 Construction Phase

Implementation Strategy:

- o Management measures will be developed by Powerlink's Cultural Heritage Team (refer section 4.1 of this EMP) which meet Powerlink's obligations under the *Aboriginal Cultural Heritage Act 2003* and *Queensland Heritage Act 1992*. These measures are to be implemented.

² Note: Specific preconstruction, construction, maintenance and operation cultural heritage management measures are not included in this EMP as they may vary depending on the nature, intensity and location of any works. Contact must be made with Powerlink's Cultural Heritage Team to ascertain the management measures to be implemented for the proposed works. Such specific preconstruction, construction, maintenance and operation cultural heritage management measures issued by Powerlink's Cultural Heritage Team must be read and implemented in conjunction with the requirements of this EMP.

Monitoring and Auditing:

- o Refer to the cultural heritage requirements for construction phase of the project.

Reporting:

- o Refer to the cultural heritage requirements for construction phase of the project.

Corrective Action:

- o Refer to the cultural heritage requirements for construction phase of the project.

5.4.5 Operation and Maintenance Phase

Implementation Strategy:

- o Management measures will be developed by Powerlink's Cultural Heritage Team (refer section 4.1 of this EMP) which meet Powerlink's obligations under the *Aboriginal Cultural Heritage Act 2003* and *Queensland Heritage Act 1992*. These measures are to be implemented.

Monitoring and Auditing:

- o Refer to the cultural heritage requirements for maintenance and operational phase of the project.

Reporting:

- o Refer to the cultural heritage requirements for maintenance and operational phase of the project.

Corrective Action:

- o Refer to the cultural heritage requirements for maintenance and operational phase of the project.

5.5 Electric and Magnetic Fields (Interference Considerations)

The Transmission Line has been located to maximize (where practicable) the distance from sensitive receptors such as houses. The EMF levels at sensitive receivers close to the transmission line are expected to be quite low and comparable to those for small electrical appliances. The closest sensitive receiver (a currently unoccupied house) is within 250m of the proposed transmission line, however the EMFs become negligible at a distance of less than 100m from the type of line proposed for this project.

5.5.1 Policy

- To minimise the potential interference caused by electric and magnetic fields at nearby residences or facilities by:
 - Appropriate separation distances between the asset and residences.
 - Use of latest technology to minimise interference effects (e.g. low surface voltage gradient on conductors, corona free support hardware, sectionalising, earthing).

5.5.2 Performance Criteria

- No observable deterioration of radio or television signals received at nearby residences.
- No perceptible (i.e. nuisance) electric shock effects from nearby metal structures.
- No reasonable or relevant complaints in relation to EMF.

5.5.3 Preconstruction

Implementation Strategy:

- During the design stage of the project, an appropriate separation distance from nearby residences, particularly the residence within 250m of transmission line, has been included to ensure no impact of EMF on these residences.
- Design conductors, insulators, and hardware for minimal corona initiation.
- Identify any adjacent metal structures to determine whether precautionary measures are needed.

Monitoring and Auditing:

- Where landholders raise concerns in relation to EMF interference, carry out sample measurements of TV and radio signal reception quality prior to transmission line commissioning for comparison after the asset is energised.

Reporting:

- Record concerns of landholders/residents and provide information on the impact of the asset on background EMF.
- Report detailing measurements carried out.

Corrective Action:

- Determine appropriate corrective actions where there is a difference in TV or radio signals at a residence between preconstruction and post-energising conditions.

5.5.4 Construction Phase

Implementation Strategy:

- Ensure that during construction / installation:
 - No burring or damage is caused to conductors or hardware.
 - All related hardware (e.g. domed nuts etc.) correctly installed.
- Identify adjacent metal structures to determine whether precautionary measures (e.g. earthing) are needed and install precautionary measures as necessary.

Monitoring and Auditing:

- Random inspection of hardware and conductors
- Random checking of adjacent metal structures for implemented precautionary measures
- General surveillance for metal structures during routine inspections by the Powerlink Construction Manager or Inspectors.

Reporting:

- Any defects or damaged hardware or conductors are to be recorded routine inspections
- Non Conformance Reports (NCRs) are issued by the contractor in relation to defects or damage. NCR to be addressed by the contractor.

Corrective Action:

- Defective hardware or conductor is to be replaced or repaired to ensure compliance with the construction specification.

5.5.5 Operation and Maintenance Phase

Implementation Strategy:

- Identify newly installed metal structures to determine whether precautionary measures (e.g. earthing) are needed. Install precautionary measures, such as earthing, as necessary
- Maintain the asset to reduce the likelihood of EMF interference
- Confirm TV and radio reception at nearby residences to ensure reception quality is not impacted.

Monitoring and Auditing:

- Monitor during routine inspections to confirm that precautionary measures (e.g. earthing) are installed at adjacent metal structures where an electric shock hazard could occur
- Monitor for any encroachments or proposed developments adjacent to the transmission line.

Reporting:

- Any potential hazards are to be recorded during routine inspections
- Report any encroachments or proposed developments to the Land Management Team Leader
- Report on any EMF interference complaints after commissioning of the transmission line to the resident EMF expert in Transmission Environment.

Corrective Action:

- Implement precautionary measures, such as earthing, as required
- Investigate EMF interference complaints and installed appropriate control measures, where necessary, to resolve the complaint
- If required, upgrade antenna facility to reinstate TV or radio reception.

5.6 Electric and Magnetic Fields (Health Considerations)

The Transmission Line has been located to maximize (where practicable) the distance from sensitive receptors such as houses. Powerlink appreciates that transmission of electricity via the proposed transmission line has the potential to generate electrical and magnetic fields which have the potential to raise public health concerns. Whilst an assessment has been conducted which illustrates that exposure levels are well below the ARPANSA Draft Standard and NHMRC limits of exposure, the following management arrangements should be undertaken to ensure Powerlink policy is met.

5.6.1 Policy

- o Prudent avoidance when determining transmission line alignment. This approach recommends that unnecessary exposure to electric and/or magnetic fields should be avoided if this is feasible in terms of both cost and technical considerations.
- o Electric and magnetic field strengths for the proposed asset will be well below the exposure limits set down by the National Health and Medical Research Council for members of the general public³

5.6.2 Performance Criteria

- o For the seven houses within 750m of the Transmission Line, EMF attributable to the transmission line will not significantly increase the background EMF levels normally found in any home using electricity.
- o Owners are informed and educated about the EMF/ health issue.
- o No reasonable or relevant complaints in relation to EMF.

5.6.3 Preconstruction Phase

Implementation Strategy

- o During the design stage of the project, an appropriate separation distance has been included to ensure there is no impact of EMF on the seven adjacent residences
- o Configure phase conductors and circuits to produce the lowest practical possible EMF levels at the easement boundaries.
- o Provide EMF information to owners and adjacent residents and / or conduct magnetic field readings on request.

Monitoring and Auditing:

- o On request, measure, to allay concerns of residents in proximity to the asset, EMF levels in and adjacent to near residences before and after energising of the transmission line

Reporting:

- o A copy of any EMF readings taken or information sent to an owner is to be recorded in Objective.

Corrective Action:

- o Advise and consult with affected property owners to implement corrective action acceptable to both parties.

³ The National Health and Medical Research Council (NHMRC) in 1989 issued interim guidelines for limitations of exposure to electric and magnetic fields (EMF), *Radiation Health Series No. 30 "Interim guidelines of exposure to 50/60 Hz electric and magnetic fields."* The NHMRC rescinded this publication in accordance with its policy of reviewing documents published more than 10 years ago. The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has taken over responsibility of the review process for this publication.

In the absence of any other Australian guidelines, ARPANSA still refers to the NHMRC guidelines. In December 2006, ARPANSA released its own draft guidelines "*Exposure Limits for Electric & Magnetic Fields – 0 Hz to 3 kHz*" for public comment, with a final document expected in 2009. It is expected that the ARPANSA review, when finalised, will replace the NHMRC publication.

5.6.4 Construction Phase

Implementation Strategy:

- o Provide EMF information to owners and adjacent residents and / or conduct pre-energising and post-energising magnetic field readings on request.

Monitoring and Auditing:

- o Not applicable to this phase.

Reporting:

- o Report on any EMF health concerns to the resident EMF expert in Transmission Environment.

Corrective Action:

- o Not applicable to this phase.

5.6.5 Operation and Maintenance Phase

Implementation Strategy:

- o As specified for the Construction phase of this EMP.

Monitoring and Auditing:

- o As specified in the Construction phase of this EMP.

Reporting:

- o As specified by Section 3.5.

Corrective Action:

- o As specified in the Construction phase of this EMP

5.7 Energy Use/Greenhouse Gas

Powerlink appreciates that the construction, operation and maintenance of a transmission line will result in greenhouse emissions through tree clearing (removal of carbon sink) and where liquid fossil fuels are used to transport materials and equipment for construction and operation. Energy (as both fuel and electricity generated from fossil fuels) is also consumed in the manufacture and production of the materials used, and can be considered to be 'embedded' in the final product. Many of these contributions can be significantly reduced or eliminated through better planning and design decisions by recognising these links and accounting for them in the development phase. The following management arrangements should be undertaken to reduce, where practicable, energy use and greenhouse gas emissions.

5.7.1 Policy:

- o To be more efficient in the use of resources in the construction, operation and maintenance of the transmission line.

5.7.2 Performance Criteria

- o Energy use and waste generation is considered in all activities
- o The 'Environmental Footprint' is reduced wherever practicable.

5.7.3 Preconstruction Phase

Implementation Strategy:

- Prepare a waste management plan which identifies measures to reduce, reuse and recycle materials generated by the construction. The waste management plan is to establish a preferred waste management hierarchy and develop principles for achieving good waste management in accordance with the *Environmental Protection (Waste Management) Policy 2000*.
- Design to reduce the amount of resources required for the project.
- Reduce to the maximum extent the amount of waste produced during the preconstruction phase.
- Use, where appropriate, telephone hook-ups/ video-conferencing in preference to driving for face to face meetings.

Monitoring and Auditing:

- Not applicable for this stage.

Reporting:

- Not applicable.

Corrective Action:

- Identified opportunities should be incorporated into future projects as part of a process of continual improvement.

5.7.4 Construction Phase

Implementation Strategy:

- Induct all site personnel on general measures to reduce energy use and emissions associated with the construction activities
- Implement the waste management plan, including clear segregation and collection of materials fit for reuse
- Minimise vegetation clearing to that only essential for the effective, efficient and safe operation of the transmission line
- Turn off plant, equipment and vehicles not in use to prevent unnecessary idling
- Burning of waste, other than cleared vegetation permitted by the local fire warden, is not to occur
- Limit the number of vehicles used to that essential for efficient construction activities. Car pooling for visits to work sites should occur to reduce the number of vehicle movements associated with the project.
- Schedule delivery truck movements, where possible, such that delivery trucks can backload waste or excess construction materials to reduce the number of truck movements on the project
- Investigate backloading for delivery of materials where feasible
- Implement a process to reduce the likelihood or amount of rework
- Restrict the number of plant and equipment movements by ensuring, wherever possible, that all staged works are completed prior to departure from the work area
- Use, where appropriate, telephone hook-ups/ video-conferencing in preference to driving for face to face meetings.

Monitoring and Auditing:

- General surveillance of construction activities for the implementation of this strategy
- General surveillance to ensure that unnecessary construction activities are not being carried out.

Reporting:

- Include in the monthly compliance report, initiatives employed to meet the requirements of this strategy
- Report on a quarterly basis, initiatives implemented during the construction phase to reduce the 'environmental footprint' of activities
- Report unnecessary construction activities to the Powerlink Construction Manager and resolve such works with the contractor.

Corrective Action:

- o Identify additional opportunities, and implement measures where practicable to reduce waste from foundations, tower erection and stringing activities
- o Remind all site personnel the requirement to reduce, where possible, the 'environmental footprint' of construction activities
- o Identify opportunities to be incorporated into future projects as part of a process of continual improvement.

5.7.5 Operation and Maintenance Phase**Implementation Strategy:**

- o Induct all site personnel on general measures to reduce the 'environmental footprint' of operation and maintenance activities
- o Consider the waste management hierarchy when carrying out operation and maintenance activities
- o Identify opportunities to reduce the number of routine inspections by combining with other activities where possible
- o Turn off plant, equipment and vehicles not in use to prevent unnecessary idling
- o Burning of waste, other than cleared vegetation permitted by the local fire warden, is not to occur
- o Limit the number of vehicles used to that essential for efficient operational activities. Car pooling to work sites should occur to reduce the number of vehicle movements associated with the project
- o Schedule delivery truck movements, where possible, such that delivery trucks can backload waste or excess construction materials to reduce the number of truck movements on the project
- o Restricting the number of plant and equipment movements by ensuring, wherever possible, that all staged works are completed prior to departure from the work area
- o Use, where appropriate, telephone hook-ups/ video-conferencing in preference to driving for face to face meetings.

Monitoring and Auditing:

- o General surveillance of construction activities for the implementation of this strategy
- o General surveillance to ensure that unnecessary construction activities are not being carried out.

Reporting:

- o Include in the monthly report, initiatives employed to meet the requirements of this strategy
- o Report on a quarterly basis, initiatives implemented during the operation and maintenance phase to reduce the 'environmental footprint' of activities
- o Report unnecessary construction activities to the Construction Manager and resolve such works with the contractor.

Corrective Action:

- o Identify additional opportunities, and implement measures where practicable to reduce waste from operation and maintenance activities
- o Remind all site personnel the requirement to reduce, where possible, the 'environmental footprint' of activities
- o Identify opportunities to be incorporated into future projects as part of a process of continual improvement.

5.8 Erosion and Sediment Control

Desktop investigations have illustrated that soils on site have been identified as having/being:

- low salinity in the surface, increasing with depth;
- low nutrient status; and
- sodic in the surface and strongly sodic in the subsoils (i.e. highly dispersive).

Because of these characteristics, there is a need to reduce the risk that erosion of the subsoils occurs due to construction activities. Also, there is a need to avoid impacting the erosion that already exists on the site. Mitigation and management measures to assist reducing the risks which exist on site are described below.

5.8.1 Policy:

- All Erosion and sediment control to be consistent with the International Erosion Control Association (2008) *Best Practice Erosion and Sediment Control for Building and Construction Sites (Australasia)*
- To comply with the *Environmental Protection Act 1994*, *Environmental Protection (Water) Policy 1997* and *Water Act 2000*.

5.8.2 Performance Criteria

- All sites are stable.
- No new tunnel and/or gully erosion resulting from Powerlink's activities within and adjacent to the project area.
- No deterioration in water quality in creeks or drainage lines caused by erosion from the project area.
- No release of untreated water to roadside gutter, stormwater drain or to waterways.
- Suitable vegetative cover or erosion and sediment controls in work areas.
- Powerlink's *AM-POL-0830 Erosion and Sediment Control* (Obj. ref: A517).
- No complaints or reports of significant erosion or downstream sedimentation as a result of Powerlink's activities.
- Where quantitative monitoring of discharge water quality is required (such as in response to an inquiry from a statutory authority or in investigating a complaint), contamination levels of stormwater discharged through runoff from work areas, dewatering of holes or pits to the drainage system will meet the following nominated targets:
 1. Turbidity < 150 NTU for Condamine River and <100 for associated tributaries.
 2. pH 6.5 – 8.5.
 3. Dissolved Oxygen ≥6.5mg/L.
 4. Electrical conductivity 30 – 350 µs (ANZECC Guidelines)
 5. No visible debris or hydrocarbons.

5.8.3 Preconstruction Phase

Implementation Strategy:

- Implement erosion and sediment control measures which will be effective in controlling sediment from sodic/saline soils present on site (high erosion potential/dispersive soils).

- o Due to the gentle slopes of the site no areas have been identified which would be subject to landslip or mass slope movements.
- o Develop an Erosion and Sediment Control Plan (ESCP) and determine rehabilitation requirements. These ESCPs may include access track sketches and site work plans and show temporary and permanent erosion controls. The ESCP should:
 - o Identify temporary and permanent measures to ensure the short, medium and long term stability of the site.
 - o Identify drainage patterns and discharge points.
 - o Nominate the location and extent of erosion and sediment controls, for each stage of construction.
 - o Provide for cost effective solutions to the management erosion and sediment.
 - o Establish performance and design standards for the sediment and erosion controls.
 - o Provide flexibility and allowance for future upgrades and amendments.
 - o Include details of the maintenance of the controls, and when the controls can be removed.
 - o Identify sodic soils that may require alternative clearing methods such as the use of a mega mulcher, to minimise the risk of erosion. Control measures for sodic soil impacts should limit or avoid vegetation clearing using mechanical means, stock access and grazing pressure should also be limited.

The ESCP should also meet the requirements for an Erosion and Sediment Control Program according to International Erosion Control Association (IECA) (A) Guidelines.
- o Locate, where practicable, tower pads outside existing erosion areas.
- o Search Powerlink's PQ Maps and property register prior to the start of any soil disturbing activities to identify if the land is on the Contaminated Land Register (CLR) or Environmental Management Register (EMR) to ensure no special controls are required.

Monitoring and Auditing:

- o Not applicable to this phase

Reporting:

- o Report and record any identified sodic or saline soils on the project to the PEA.

Corrective Action:

- o Not applicable to this phase

5.8.4 Construction Phase

Implementation Strategy:

- o Carry out all activities in accordance with Powerlink's *AM-POL-0830 Erosion and Sediment Control* (Obj. ref: A517).
- o Implement the requirements of the ESCPs for each stage of construction. Install devices, when possible, prior to soil disturbance from construction activities.
- o Maintain all temporary erosion control measures until the site is stabilised.
- o Maintain access tracks in good condition. Adequate erosion and sediment controls will be installed to reduce the likelihood of track deterioration and soil tracking.
- o Access tracks are to be designed, constructed and maintained in accordance with Powerlink's *AM-STA-0784 Transmission Line Access Tracks Standard* (Obj. ref: A576805).
- o In erosion prone areas, adopt clearing methods which allow the root system and grass cover to be retained. The use of a mega mulcher or similar is recommended in erosion prone areas.
- o The majority of the proposed alignment has been identified as having high erosion potential due to the sodic nature of topsoils and subsoils. Develop specific work plans prior to soil disturbance to ensure soils are not exposed to concentrated water flows from work areas. These work plans will detail the controls/methods to be deployed to reduce the potential for erosion and downstream sedimentation. The PEA will provide advice on the controls required for high erosion potential areas.

- o Soil ameliorants that may be required for soil stabilisation (gypsum to counteract sodicity), and revegetation (fertiliser rates) are recommended at the following rates; gypsum at 18 t/ha and phosphate fertiliser at 10-20 P kg/ha. Gypsum will only be applied in areas which have been disturbed.
- o Topsoil to approximately 30mm should be stripped separately, treated and used for revegetation.
- o Consult with the land owners prior to any modification or removal of sediment and erosion control structures, to determine alternative controls and timeframes for reinstatement.
- o Direct all uncontaminated (clean) stormwater to stable land, ensuring that water is dispersed/diffused to prevent erosion.
- o Where topsoils are disturbed and subsoils exposed they should be covered with topsoil and rehabilitated as soon as practicable on completion of corridor.
- o Carry out clearing activities in and within 50 metres of a watercourse and development of creek crossings only in accordance with the *Guideline for Activities in a Watercourse or Lake for Destroying up to 0.25 Ha of Vegetation, Excavating up to 500m³, and Placing up to 500m³ of Fill*, including:
 - o For minor watercourse crossings (Stream Order 1-2) a buffer of 50m to be flagged from the outside banks that contain water flows.
 - o For intermediate watercourse crossing (Stream Order 3-4) a buffer of 100m to be flagged from the outside banks that contain water flows.
 - o Clearing of vegetation that is to be removed for safety purposes, should be undertaken within the riparian areas and buffer areas, by hand clearing or machinery methods that allow for stumps and roots to be retained. Clearing width of this vegetation is nominally 40m within removal of marginal trees outside the area.
- o Minimise, where practicable, disturbance to ground cover and topsoil disturbance in erosion prone areas and steeply sloping areas during clearing activities. Determine appropriate clearing methods for moderate to high erosion prone areas so that the clearing methods minimises soil disturbance and potential for soil loss. Consideration should also be given to those clearing methods which reduce damage to ground covers.
- o Maintain grass cover in the site and work areas to the maximum practicable extent. Reduce damage to grass cover by limiting vehicle movements to work areas and approved access tracks.
- o While it is unlikely that groundwater will be intercepted, a dewatering plan or work procedure should be prepared and implemented for dewatering of rainwater filled excavations. The contractor/person carrying out the works is to prepare this plan/procedure. The dewatering plan/procedure should consider the following:
 - o Measures to avoid the accumulation of water in pits, trenches and foundations.
 - o Design standards for settling ponds/sediment traps and verification that the pond/traps meet this nominated design standard (only relevant to sites where settling structures have been installed).
 - o Triggers for dewatering (e.g. to maintain free storage capacity in a pond for future storm events, to allow pouring of foundations, reinstatement of settling ponds post construction etc).
 - o If trigger levels occur, what decision making process will be adopted to determine the suitable method for dewatering considering:
 - the receiving environment
 - quality and quantity of the water
 - location and accessibility
 - requirements of this EMP and statutory requirements.
 - o Recording and monitoring details required by the dewatering management plan/work procedure. This may include, but not necessarily limited, to approved copies of dewatering processes, dates when dewatering occurred, photographs, water quality monitoring (qualitative or quantitative), rainfall records and persons conducting dewatering.
- o Keep sealed public roadways clean and free of sediment. Tracking of soil onto local roads will be prevented by:
 - o Limiting off road vehicle movement during and immediately after wet weather to that essential for efficient and safe construction activities, when access tracks may be severely damaged by vehicle movements and there is a high possibility of the transport of soil materials onto sealed public roads.
 - o Installing in areas with problematic soil types, a rock rumble pad or similar device in accordance with the IECA (A) Guidelines near the intersection of the access track and the sealed road.

- Providing brush down equipment to remove loose soil from wheels, wheel arches, tracks, augers and under bodies.
- Limit area and duration of exposed soil to that essential for safe and efficient construction activities.
- Retain temporary erosion and sediment controls in place and maintain until the site has been successfully stabilised. On successful stabilisation, the temporary controls will be removed. For example, temporary sediment controls will be removed from below batters when successful revegetation of the batters is achieved (viz. nominal 70% ground cover established on batters – where the preconstruction environment has less than 70% ground cover, the ground over establishment target will be similar to that which existed prior to construction).
- Ensure fill used for pads is compacted in 200mm layers to prevent subsidence, slippage (bulk soil loss) and change in drainage patterns.
- Energy dissipaters/level spreaders should be installed on permanent discharge points to prevent concentrated flows.
- Store fuels oils and chemicals on-site in accordance with relevant Australian Standards and Fire Safety regulations (e.g. plastic lined earthen bund, portable bunds, appropriate spill kits present, etc).

Monitoring and Auditing:

- The Environmental Issue register shall be used to record and monitor any erosion or sediment control issues. The environmental issues register is to also provide corrective and preventative actions.
- Visual assessment of presence and effectiveness of erosion and sediment control structures and measures, particularly following significant rainfall events (>25mm in 24 hours).
- Monitoring condition and capacity of sediment fences.
- Visual assessment of the condition of adjacent local roads.
- Reviewing adequacy of installed erosion and sediment controls.

Reporting:

- Observations to be recorded in the monthly compliance report.
- Any water quality test results to be recorded in the monthly compliance report.
- Any EMP non-compliances to be documented and reported to Construction Manager.
- Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.
- Any material or serious environmental harm to be reported to the PEA.
- ESCP, Rehabilitation Plans, Dewatering Plans and Site Work Plans/Benching Plans to be prepared and registered in objective.

Corrective Action:

- Existing erosion and sediment structures to be re-instated or repaired.
- Clean affected roadways using a road sweeper or brooms and shovels.
- Review of adequacy of stormwater management measures, and install additional measures were required.
- Repair any damaged access tracks.
- Desilt sediment control devices when the 50% capacity of the device is reached.
- Remove sediment fences when reinstatement of the disturbed area has been successful.

5.8.5 Operation and Maintenance Phase

Implementation Strategy:

- Prepare Erosion and Sediment Control Plans for activities which result in soil disturbance.
- Prepare a dewatering plan/work procedure for activities which cause trenches, pits or ponds to be created.

- o Keep to approved access tracks.
- o Carry out maintenance activities in and within 50 metres of a watercourse in accordance with the *Powerlink Vegetation Control Standard AM-STA-0834* (Obj. ref: A62955) and *Powerlink Guideline for Activities in a Watercourse or Lake for Destroying up to 0.25 Ha of Vegetation, Excavating up to 500m3, and Placing up to 500m3 of Fill* (Obj. ref:A471789).
- o Maintain erosion control measures until the site is stabilised.
- o Maintain all permanent erosion control structures in good working order.

Monitoring and Auditing:

- o During routine maintenance inspections, identify areas where erosion is occurring and undertake corrective action.
- o All remaining erosion control measures should be monitored for their effectiveness for at least 12 months. Remedial measures should be put in place should any controls fail.
- o Ensure that access tracks do not channel water directly into watercourses, but are designed and graded to ensure run-off is filtered through vegetated areas.

Reporting:

- o Advise relevant maintenance crews of any erosion and sediment control issues.
- o Report damage to access tracks or other assets to the Easement Maintenance Manager.
- o Any material or serious environmental harm to be reported to the Manager Environmental Strategies.
- o As specified in Section 3.5 of this EMP.

Corrective Action:

- o Stabilise areas where erosion has occurred or is likely to occur and install/maintain appropriate devices to reduce the potential of further erosion occurring.

5.9 Fauna

Construction activities for the transmission line will require the clearing of both non-remnant and remnant vegetation which may have a direct impact on terrestrial fauna. Vegetated portions of the proposed transmission line have potential to provide excellent cover and resources for local fauna and forest dependent species. Whilst no threatened species were recorded on site during the field survey, background searches suggest that the site may potentially provide suitable habitat for several threatened species (See Section 10 of the EIS).

5.9.1 Policy

- o To minimise the impacts on fauna that are likely to arise from construction, operation and maintenance activities.

5.9.2 Performance Criteria

- o Minimal disturbance to fauna.
- o No fauna injured or killed.
- o Habitat retained where possible across the transmission line.

5.9.3 Preconstruction Phase

Implementation Strategy:

- o Identify opportunities to maintain vegetation links to reinforce habitat connectivity.
- o Transmission line to be positioned to reduce impacts to habitat and minimise harm to wildlife.
- o Retain habitat trees where practical, where the habitat trees will not impact on the safe and secure operation of the transmission line.
- o No fauna listed under the *Environmental Protection, Biodiversity and Conservation Act 1999* were recorded during field assessments however if listed species are identified, development of species specific strategies to minimise impact on such fauna should be undertaken.
- o Identify local fauna carers and fauna associations, who may be able to provide fauna rescue and recovery services if required.
- o Identify any areas of significance which will require specific attention (areas of sensitivity), on the EWP.

Monitoring and Auditing:

- o Not applicable to this phase.

Reporting:

- o A Vegetation Management Plan (VMP) should be prepared for the transmission line to address clearing and protection of habitat vegetation along the transmission line.

Corrective Action:

- o Not applicable to this phase.

5.9.4 Construction Phase

Implementation Strategy:

- o Induct all site personnel on importance of minimising impacts on native fauna, and the requirements of this EMP.
- o Habitat trees on site should be identified (e.g. trees containing nests or hollows) using a suitably trained person such as trained PEA, spotter catcher or ecologist, and

the trees retained if they will not impact on the safe and secure operation of the transmission line.

- o Areas to be cleared should be surveyed by a trained PEA, spotter catcher or ecologist within 24 hours prior to clearing to identify habitat trees that could be occupied by fauna. These trees should be clearly marked and retained during the clearing phase until fauna has had the opportunity to move into nearby habitat on their own accord.
- o Measures to manage the habitat trees are to be prepared and adopted, where practicable, to minimise fauna impacts.
- o No barbed-wire or electric fencing should be used during construction.
- o Construction activities should be restricted to the hours between 6.30am and 6.30pm to reduce potential impact on nocturnal fauna.
- o Clearing should be undertaken in the presence of a fauna spotter/catcher or trained PEA. Carry out clearing methods, on advice of the ecologist/spotter catcher/PEA and clearing contractor to minimise harm to fauna. For example, if the tree requiring removal is occupied by native fauna, considerations should be given to leaving the tree in place until any juveniles present in the tree are fledged or have left hollows.
- o Prohibit the burning of cleared vegetation unless such fires are permitted by the local fire warden. Should burning of cleared vegetation be undertaken, permits for vegetation burning must be obtained and provided to Powerlink prior to the burn. All conditions of any permit must be adhered to.
- o Implement Powerlink's *AM-POL-0050 Vegetation Management for Transmission Corridors and Sites* (Obj. ref: A462945) and *AM-STA-0834 Vegetation Control Standards* (Obj. ref: A462955)
- o Where necessary or specifically required, compensate for habitat loss by including nesting boxes or placing recovered hollows adjacent to cleared areas.
- o Implement measures to recover and rehabilitate injured or orphaned native animals unavoidably impacted by clearing and construction activities.
- o Obtain necessary permits and approvals for any nest removal (with the exception of Corvid (e.g. Crow) species).
- o All vehicles, except in the event of an emergency, should be restricted to designated access tracks with a maximum speed limit of 40km/hr to prevent collision with fauna.
- o Aerial markers should be placed on the earth wire at Braemar Creek where the transmission line crosses the dam in the creek to reduce the risk of impact by migratory bird species.
- o In potential habitat area, signs should be erected to notify speed limits and potential presence of wildlife.

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Performance Criteria and Implementation Strategies specified in this EMP.

Reporting:

- o Clearing fauna reports will be prepared documenting fauna species identified during clearing and measures deployed to minimise impacts on the identified fauna.
- o Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- o Ensure above implementation strategies are in place.
- o Review and amend implementation strategies if necessary.
- o Significant habitats discovered during the construction phase managed in accordance with the EMP.
- o New fauna discoveries, such as listed under the *Environmental Protection, Biodiversity and Conservation Act 1999* or *Nature Conservation Act 1992*, reported to the TEPM and appropriate management strategies for the fauna discovery prepared.

5.9.5 Operation and Maintenance Phase

Implementation Strategy:

- o As specified in the construction phase of this EMP.

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Performance Criteria and Implementation Strategies specified in this EMP.
- o As specified in the construction phase of this EMP.

Reporting:

- o In accordance with Section 3.5.
- o As specified in the construction phase of this EMP.

Corrective Action:

- o Ensure above implementation strategies are in place
- o Implementation strategies to be reviewed and amended where necessary.
- o If new species listed as threatened under the *Environmental Protection, Biodiversity and Conservation Act 1999* or *Nature Conservation Act 1992* are discovered during the construction phase, the species will be reported to the TEPM and appropriate strategies for the management of the species will be prepared.

5.10 Hazardous Materials

Hazardous materials may need to be utilised during the construction and operation of the transmission line. Hazardous materials need to be stored, handled and disposed of in the correct manner to minimise potential harm. The following should be adhered to in order to help reduce/eliminate potential harm.

5.10.1 Policy

- To ensure correct storage, handling, transport and disposal of hazardous materials and waste in accordance with *Environmental Protection Act 1994, Environmental Protection (Waste Management) Policy 2000, Dangerous Goods Safety Management Act 2001, AS 1940: 2004 The storage and handling of flammable and combustible liquids, Workplace Health and Safety Act 1995, Workplace Health and Safety Regulation 1997, Carriage of Dangerous Goods by Road Act 1984 and Carriage of Dangerous Goods by Road Regulation 1989.*

5.10.2 Performance Criteria

Performance Criteria:

- Chemicals stored, handled and disposed of in accordance with legislative requirements, Australian Standards and the MSDS.
- No contamination of land or water as a result of a spill.
- No new lands recorded on the Contaminated Lands Register.
- Powerlink's procedure *AM-PR-0926 Management, Transport and Disposal of Waste Insulating and Petroleum-Based Liquids (Regulated Wastes)* (Obj. ref: A598354).

5.10.3 Preconstruction Phase

Implementation Strategy:

- Prepare an Emergency Response Plan for construction activities (the contractor will prepare such plans where the works are contracted out). It should include procedures to ensure the correct storage, handling and transport of hazardous materials, and proposed response to accidental spills and contamination incidences.
- Obtain approval from landholders for the application of chemicals (e.g. herbicides) on their land.

Monitoring and Auditing:

- Not applicable to this phase.

Reporting:

- Complete landholder consultation records for clearing and access works.

Corrective Action:

- Not applicable to this phase.

5.10.4 Construction Phase

Implementation Strategy:

- Carry out activities in accordance with Powerlink's procedure *AM-PR-0926 Management, Transport and Disposal of Waste Insulating and Petroleum-Based Liquids (Regulated Wastes)* (Obj. ref: A598354).
- Ensure hazardous materials are not stored or allowed to drain onto the ground.

- o Implement measures to prevent hazardous material entering watercourses.
- o Transport, handle and store all oils and chemicals in accordance with the relevant Australian Standards (including secure storages). Temporary bunds may include earthen bund lined with plastic sheeting or portable plastic trays. Long term storages will be installed with Australian Standard and statutory requirements, and capture devices will have a capacity of at least 110% the volume of the maximum chemical storage capacity of the facility.
- o Prohibit the refuelling of vehicles and machinery within 100m of a watercourse or open drain and when possible all refuelling will be off-site at an approved refuelling station (e.g. service station).
- o Maintain machinery in accordance with manufacturer's recommendations/servicing schedules.
- o Keep Material Safety Data Sheets (MSDS) for each chemical used on-site.
- o Ensure MSDS are kept at a location that is easily accessible by all site personnel.
- o Maintain records for chemical inventory and storage locations.
- o Train all site personnel on safety and response procedures during site inductions.
- o Ensure materials and equipment (viz. spill kit) required to respond to a hazardous spill are to be on site at all times when hazardous materials are being used, transported, loaded or unloaded.
- o Ensure waste material will be disposed of appropriately and in accordance with the requirements of the Environmental Protection (Waste Management) Policy.
- o Handle spoil from land on the contaminated land register or environmental management register in accordance with the Environmental Protection Act and its regulations. Where possible, spoil generated on land identified as being contaminated will be kept on the listed parcel of land, stabilised and rehabilitated. Spoil in such cases will not be placed in flood plains, or within 100m of a water course.

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Performance Criteria and Implementation Strategies specified in this EMP.
- o The PEA will carry out monthly inspection of contractor's records and registers to ensure compliance with the requirements of the EMP.

Reporting:

- o Spill Register to be kept on site for all spills.
- o MSDS for all chemicals to be retained on site in a MSDS register.
- o Incident report to be issued for all spills greater than 10 litres, or any other volume nominated by the PEA.
- o All spills of chemicals or hydrocarbons on-site, regardless of amount or nature of the spill, are to be reported to the PEA.
- o Spills with a clean up costs greater than \$5000 will be reported to the Manager Environmental Strategies by the PEA.
- o Summary of spills, non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- o Spills to be remediated depending on nature of product (the Manager Environmental Strategies will advise correct procedure). Immediate action should include:
 - o Small Hydrocarbon Spill (<10L) Apply absorbent material.
 - o Large Hydrocarbon Spill (>10L). Install containment (e.g. block drains, surround with sandbags, dig earthen bund) and apply absorbent material.
 - o Chemical Spill Application of appropriate absorbent material and containment.
- o All spills will be managed as follows:
 1. Stop the equipment causing the spill (only when safe to do so)
 2. Ensure appropriate PPE is worn (refer to MSDS).
 3. Isolate the spill at the point of the release (only when safe to do so)
 4. Use devices or containers to prevent the further spread of spill (only when safe to do so).
 5. Report the spill to PEA. The contractor must notify Powerlink of any spill within 24 hours – and immediately for any major spills of more than 50L.

6. Remove the entire spill including contaminated soil and place into a suitable, sealable containment device ready for removal from site.
7. If the spill is hydrocarbon based, the contaminated soil is to be removed off site and disposed of in accordance with legislative requirements. If another chemical has been released, the contaminated soil is to be disposed off in accordance with the MSDS or at a facility approved to receive such waste. Contractor will identify this facility in the CEMP prior to construction commencing.
8. The equipment causing the spill is not to be used until repaired to prevent further spills. Only minor repairs are permitted onsite (e.g. replacing a blown hydraulic hose). For any major repairs, equipment is to be removed offsite, however, minor/temporary repairs should be carried out to prevent further spills either onsite or during transit to a service facility.
9. Investigate and prepare an incident report/log in the spill register. Incident reports to be prepared for any spill greater than 2 litres, or any other volume nominated by the PEA. Any incident report prepared will identify the causal factors, document corrective actions and nominate preventative actions to prevent a re-occurrence.

5.10.5 Operation and Maintenance

Implementation Strategy:

- o As specified for the Construction Phase of this EMP.
- o Compliance with Powerlink's Policy AM-POL-0076 Management of insulating and petroleum based liquid spills (Obj. ref: A520843).

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Performance Criteria and Implementation Strategies specified in this EMP.

Reporting:

- o As specified by Section 3.5 of this EMP.

Corrective Action:

- o Immediate containment and clean up of spilt material. Contaminated material is to be remediated or disposed of at a licensed disposal facility.

5.11 Land Contamination

A visual site inspection of the project site was conducted on 6 and 7 January 2010. The observation made during the inspection was that there appeared to have been no identifiable contaminating activities conducted on the land parcels.

5.11.1 Policy

- Compliance with the *Environmental Protection Agency Draft Guidelines for the Assessment and Management of Contaminated Land* and Powerlink's *AM-PR-0841 Identification and Management of Contaminated Land 2006* (Obj. ref: A587980) and *Corporate Emergency Management Handbook* (Obj. ref: A547611).

5.11.2 Performance Criteria

- No spillage or leaks of hazardous materials.
- No contamination of land or waters as a result of a spill and no new lands recorded on the Contaminated Lands Register.
- No movement of contaminated material offsite without the relevant approval/permit/tracking.
- Powerlink's procedure *AM-PR-0926 Management, Transport and Disposal of Waste Insulating and Petroleum-Based Liquids (Regulated Wastes)* (Obj. ref: A598354).

5.11.3 Preconstruction Phase

Implementation Strategy:

- Search Powerlink's PQ Maps and property register prior to the start of any soil disturbing activities to identify if the land is on the CLR or EMR.

Monitoring and Auditing:

- Not applicable to this phase.

Reporting:

- Not applicable

Corrective Action:

- Not applicable to this phase.

5.11.4 Construction Phase

Implementation Strategy:

- Carry out activities in accordance with Powerlink's procedure *AM-PR-0926 Management, Transport and Disposal of Waste Insulating and Petroleum-Based Liquids (Regulated Wastes)* (Obj. ref: A598354).
- Retain, wherever possible, any excavated soil or other earthen material on site.
- For any significant quantities of soils contaminated by spills and requiring off site disposal, analysis of the soil (or other earthen material) may be required to enable an application for a disposal permit to be made.
- Cease work in the immediate area if potential land contamination is discovered (evidence to suggest potential contamination may be oil staining, buried waste or surrounding land-use). Work to only resume after appropriate site management measures are prepared and implemented.

- o Cease work in that area, when activities or actions have the potential to cause land contamination.
- o Investigations of the nature, extent and source of the contamination may be required. This may include further control measures to manage contaminated materials.

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Performance Criteria and Implementation Strategies specified in this EMP.

Reporting:

- o The PEA will document the management of contaminated soil for the project. Disposal receipts/waste tracking records to be collated and kept by Powerlink.
- o Any land which has a spill which may result in the registering the land parcel on the Contaminated Land Register will be reported to the Manager Environmental Strategies.
- o Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- o Ensure above implementation strategies are in place.
- o Review and amend Implementation strategies if necessary.
- o Implement management strategies appropriate to the nature of the contamination where a discovery is made.

5.11.5 Operation and Maintenance Phase

Implementation Strategy:

- o Carry out activities in accordance with Powerlink's procedure *AM-PR-0926 Management, Transport and Disposal of Waste Insulating and Petroleum-Based Liquids (Regulated Wastes)* (Obj. ref: A598354).
- o Obtain necessary approvals/permits, should soil materials require removal from land on the CLR or EMR. Contact the PEA to arrange the necessary approvals/permits.
- o Stop work in that area, if potential land contamination is discovered (evidence to suggest potential contamination may be oil staining, buried waste or surrounding land-use).
- o Stop work, if activities have the potential to cause land contamination.

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Performance Criteria and Implementation Strategies specified in this EMP.

Reporting:

- o Report any suspected land contamination to the Environmental Officer and Manager Environmental Strategies.

Corrective Action:

- o Ensure above implementation strategies are in place.
- o Review and amend Implementation strategies if necessary.

5.12 Noise and Vibration

Impacts to the ambient noise and vibration levels as a result of the proposed development are expected to be minimal. Seven noise sensitive receptors (houses) has been identified within approximately 750m of the proposed transmission line, however only one of these (a currently unoccupied house) is within 250m. Construction of the substation may produce short-term increases in noise and vibration as a result of earthworks, machinery traffic etc. However, these impacts will be localized and of short duration and could be minimized through the implementation of appropriate mitigation strategies. During the operational phase, the transformer units of the substation can produce a low-level noise or hum. Noise created during the operation phase is not expected to result in a significant increase in the current ambient noise levels.

5.12.1 Policy

- o Compliance with the *Environmental Protection (Noise) Policy 1997*
- o Compliance with the *Environmental Protection Regulation 1998*

5.12.2 Performance Criteria

- o No noise/vibration complaints received.
- o Consultation with community and relevant Government Agencies.

5.12.3 Preconstruction Phase

Implementation Strategy:

- o Appropriate standards of professional behaviour to be maintained at all times (e.g. no bad language or yelling).
- o Operate vehicles in a manner which gives consideration to other road users and minimises the impact of traffic noise on potentially sensitive areas.
- o Implement Workplace Conduct for Powerlink Contractors (Obj. ref: A497976).

Monitoring and Auditing:

- o Not applicable to this phase.

Reporting:

- o Not applicable to this phase.

Corrective Action:

- o Not applicable to this phase.

5.12.4 Construction Phase

Implementation Strategy:

- o Notify all landholders who may be affected by noisy activities of the timing and sequence of Powerlink's construction activities.
- o Ensure that machinery is fitted with appropriate noise attenuation devices, and will be maintained in accordance with manufacturer's recommendations.
- o Ensure construction noise at sensitive receptors is in accordance with the EPP (Noise).
- o Shut down any equipment generating loud, extraneous (unusual) noise until the source of the noise can be identified and rectified.
- o Carry out construction in the hours of Monday to Saturday, during the hours of 6.30am–6.30pm. Work which can cause a nuisance through noise or other impacts is not

to occur outside these hours unless in an emergency, or required to meet operational constraints or other exceptional circumstances, and is approved by Powerlink. Local government, Department of Environment & Resource Management and near residents will be notified by the PEA of any works outside the normal construction hours, and appropriate actions to mitigate any stakeholder concerns will be implemented where practicable.

- o Unavoidable loud noise activities will be programmed to occur at times to minimise noise nuisance in noise sensitive areas.
- o Delivery or removal of materials and equipment to and from the site will occur within the approved hours for construction. All transport vehicles will be in good working order and will avoid using exhaust brakes in noise sensitive areas, adjacent to the work site.
- o Ensure transport routes to and from the site are located, where possible, so that impact of traffic noise on potentially sensitive areas can be avoided.
- o If the need for blasting is identified, carry out pre-work assessments to identify sensitive areas in proximity to blasting locations (e.g. cultural heritage sites and residences).
- o If the need for blasting is identified,
 - o design blasting, if carried out, so that the airblast overpressure and ground vibration at near noise sensitive places meets the criteria established in the *Environmental Regulation 1998*.
 - o ensure that any blasting to be carried out by a suitably experienced and qualified person (viz. a person with a shot firers licence issued under the *Explosives Act 1999*).
 - o implement measures to prevent ground vibration (such as delays), air blast overpressure and stemming ejection.

Monitoring and Auditing:

- o General auditory observations (qualitative assessments) during site activities.
- o Noise assessments (quantitative) following non-vexatious noise complaint. These noise assessment will be carried out, where necessary, to investigate a complaint. The noise assessment will determine if noise nuisance has occurred, and will also identify measures to reduce the likelihood of further complaint.

Reporting:

- o If the need for blasting is identified, provide 7 days notification
 - o of any works outside of normal construction hours
 - o or the firing of a blast.
- o The complaints register shall be used to record any incidence of noise or vibration nuisance.
- o All complaints to be reported to the PEA immediately and in writing within 24 hours.
- o Complainants will be recorded in the complaints register, including the resolution of the complaint.
- o Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- o Investigate any noise complaints and implement measures, where practicable, to prevent the re-occurrence of a similar complaint. Noise measurement and monitoring may be required.
- o Repair or modify defective or noisy equipment to comply with the above policy requirements.
- o Concerns in relation to work outside normal construction hours will be addressed, and actions will be implemented in negotiation with landholders to achieve a mutually beneficial outcome.
- o The environmental issues register will outline actions to be implemented to prevent the re-occurrence of noise nuisance.

5.12.5 Operation and Maintenance Phase

Implementation Strategy:

- o Ensure noise levels are below 5 dB above the background level (based on a similar type of noise outlined in the Environmental Protection Act - s44OT).

Monitoring and Auditing:

- o As specified for the Construction Phase and Reporting procedure outlined in Section 3.6 of this EMP.

Reporting:

- o Any noise related complaints will be reviewed quarterly and reported to the Asset Manager.

Corrective Action:

- o Investigate any noise complaints and take steps to reduce impact. This may include a noise assessment if appropriate.

5.13 Traffic and Site Access

The area containing the proposed transmission line contains a number of State controlled roads under the management of the Department of Transport and Main Roads (DTMR), and local authority roads under the management of the recently formed Western Downs Regional Council. During the construction phase, a light increase of traffic volumes on the roads adjacent to the transmission line is expected to occur given the necessary transport of materials, equipment and personnel. Vehicle movements related to the maintenance and inspections of the transmission line are expected to be very low, particularly when compared to those that will potentially occur during the construction phase. The anticipated route to be used by construction vehicles should be inspected prior to the commencement of the construction works. The access to the transmission line alignment must be cleared of any obstacles or constraints and the access track must be in good condition to ensure that access to the site can be achieved even under periods of wet weather.

5.13.1 Policy

- o Ensure safe flow of traffic both to and from the site whilst minimising the impact of construction traffic on the amenity of the nearby community.

5.13.2 Performance Criteria

- o No movements off the approved access tracks.
- o Minimal disturbance to community and normal traffic flow.
- o No transport related incidents (including vehicles travelling to and from the project).
- o Nil complaints from surrounding property owners for access conditions or conduct of construction vehicles.
- o Appropriate security, signage and safety fencing.

5.13.3 Preconstruction Phase

Implementation Strategy:

- o Prior to conducting activities, consult landholders and local authorities regarding construction and ongoing maintenance access.
- o Limit speed to 40km/h on unsealed, off road access tracks.
- o Implement Workplace Conduct for Powerlink Contractors (Obj. ref: A497976).
- o Obtain necessary approvals/permits in preparation for temporary road closures. Powerlink's contractor will undertake detailed planning for the stringing across State and Council controlled roads.
- o Liaise with Western Downs Regional Council to agree temporary access points from Council-controlled roads for construction purposes. All access is to be at appropriately signed and highly visible locations.
- o Powerlink to conduct a joint asset condition assessment with the Western Downs Regional Council to determine the state of the road infrastructure prior to commencing the Project and agree on the upkeep and rehabilitation required for the affected road infrastructure during the course of the project.
- o Ensure all gates are to be left as found and any gate handling protocol to be implemented.
- o Implement and meet any agreed landholder requirements for access (e.g. notifications, biosecurity management, weed management etc).
- o Access track to be included on EWP.
- o Survey of road condition by council offices and Powerlink Queensland construction representatives to determine 'bench mark' standard and consider proactive maintenance.
- o Notify the Department of Community Safety construction methods, traffic movements and proposed time frames for the duration of the project. GPS coordinates of each

tower location will be supplied to each entity to accelerate access in an emergency. Relevant Contact Details are:

1. Queensland Fire and Rescue Service Assistant Commissioner Telephone Number (07) 4616 1506
2. Queensland Ambulance Service Assistant Commissioner Telephone Number (07) 4616 1581
3. Emergency Management Queensland Regional Director Telephone Number (07) 4616 1578

Monitoring and Auditing:

- o Not applicable to this phase.
- o

Reporting:

- o Not applicable to this phase.

Corrective Action:

- o Not applicable to this phase.

5.13.4 Construction Phase

Implementation Strategy:

- o Consult with landowners regarding access. Obtain landholder agreement in relation to property access requirements and location.
- o Implement project requirements for access (e.g. notifications, biosecurity management, weed management etc).
- o Handle gates, as a minimum, in accordance with the following protocol:
 - o Open gates are to be left as found.
 - o Closed gates are to be returned to the closed position after vehicles pass through the gate.
 - o The person who opens the gate is to close the gate to ensure that the gate is secured as found.
 - o Gates found closed or locked are not to be left open and unattended, for vehicle convoys or while site personnel visit a property.
 - o Gates which have locks installed must be kept locked at all times.
 - o Signage on the gate must be followed.
- o Consult regulatory bodies regarding new access points from local or State controlled roads.
- o Use, wherever practicable, existing roads and farm/property/access tracks for access.
- o Restrict those off road vehicle movements to those for safe, efficient and essential construction activities.
- o Ensure temporary or permanent road signage complies with the Queensland Department of Main Roads Manual for Uniform Traffic Control Device and be approved by the relevant council and/or the Department of Main Roads.
- o Install appropriate signage, where required, at off road access tracks to assist with construction personnel keeping to approved access tracks.
- o Minimise development of new access tracks, where possible, by using existing roads and property tracks for access. Using existing accesses will avoid/minimise unnecessary soil, vegetation and fauna disturbance.
- o Limit vehicle speed on unsealed accesses to a maximum of 40 km/h. Vehicle speed limit may be reduced on unsealed access tracks where condition of access tracks or potential for environmental nuisances is a concern.
- o Ensure loaded vehicles do not exceed design and standard vehicle weights.
- o Erect truck warning signs where warranted by limited visibility.
- o Conduct stringing lines across Banana Bridge Road, Muhlings Road, Taylor's Road, Healy's Crossing Road and Warra Kogan Road in consultation with the road controlling authority. Where possible, program stringing during low traffic movement periods, such as early morning to minimise disruption to road users. Necessary

- approvals to be obtained by the contractor.
- o Ensure the transport hazardous or dangerous goods in accordance with the Australian Dangerous Goods Code for road and rail and *Transport Operations (Road Use Management) Regulation 1995*.
- o Restrict access to public (non-construction personnel) during construction activities.
- o Install appropriate controls/fencing/barriers in locations where fauna interaction is likely. Ensure that these controls are maintained in good working order while construction is occurring to restrict such intrusions.
- o Induct all personnel on the Traffic and Site Access requirements.
- o Implement Workplace Conduct for Powerlink Contractors (Obj. ref: A497976).
- o Confine all activities to within the approved work area, work pads and approved access tracks. Areas outside approved work areas are not to be used for storage of plant, equipment or vehicles without landholder and Powerlink's approval.
- o Ensure that the contractor prepares a traffic management plan for the project.
- o Clearly identify all project (Powerlink and contractor) vehicles so that the community can identify the vehicles without confusion.

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Performance Criteria and Implementation Strategies specified in this EMP.
- o General surveillance of access tracks and surrounding areas for damage to access tracks, off access movements or impact on other road users.

Reporting:

- o Reporting shall be in accordance with Section 3.5 of this EMP
- o Complaints to be recorded in the Complaint Register. Complaints to be immediately reported to Powerlink upon receipt of a complaint (traffic and security matters).
- o Reporting of traffic issues will be conducted in accordance with the requirements of approvals/licences e.g. development approval conditions.
- o Contractors records of site inductions.
- o Report and document damage to private assets, access tracks and local roads.
- o Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- o Ensure above implementation strategies are in place.
- o Review and amend Implementation strategies if necessary.
- o Repair damage to private assets, access tracks and local roads in consultation with the relevant stakeholder.

5.13.5 Operation and Maintenance Phase

Implementation Strategy:

- o Determine maintenance access routes and protocols in consultation with landowners.
- o Where required, implement weed spread avoidance strategies e.g. wash downs .
- o Use existing roads and tracks only to access the substation site and transmission line.
- o Limit vehicle speed on unsealed access tracks to a maximum of 40 km/h. Vehicle speed limit may be reduced on unsealed access tracks where condition of access tracks or potential for environmental nuisances is a concern.
- o Implement Workplace Conduct for Powerlink Contractors (Obj. ref: A497976).

Monitoring and Auditing:

- o Monitoring and auditing against the Performance Criteria and Implementation Strategy sections of this EMP will be conducted.

Reporting:

- o Reporting in accordance with Section 3.5.

Corrective Action:

- o Ensure above implementation strategies are in place.
- o Review and amend implementation strategies if necessary.

5.14 Unexploded Ordnances (UXOs)

A search of the Department of Defence maps indicates that the site is in an area unaffected by UXOs.

5.14.1 Policy

- o Compliance with Powerlink's *AM-POL-0183 Management of Unexploded Ordnances* (Obj. ref: A58003).

5.14.2 Performance Criteria

- o Work practices recognise the potential to expose UXOs.
- o Appropriate identification, handling and reporting of UXOs.

5.14.3 Preconstruction Phase

Implementation Strategy:

- o Search the Department of Defence maps prior to any works to check UXO status of property has not changed.

Monitoring and Auditing:

- o Not applicable

Reporting:

- o See corrective action.

Corrective Action:

- o If UXOs or suspicious objects are discovered:
 - o Do not disturb, touch or move the object.
 - o Note the general appearance, dimensions and any visible markings on the object.
 - o Safely and clearly mark its location (without disturbing or impacting on the object).
 - o Cease work in the immediate area and inform others in that area of the presence of a suspicious object.
 - o If possible, leave one person at the site to warn others and to prevent disturbance of the object.
 - o Note the route to the object.
 - o Advise the police as soon as possible and seek their action to have the object dealt with
 - o Call 1800 353 031 and report the suspected find to the Powerlink Hotline.
 - o Do not re-enter the area of the discovery until it is made safe.

5.14.4 Construction Phase

Implementation Strategy:

- o General surveillance of work areas for UXO discoveries. Should UXO's be found or Department of Defence status of property change, implement relevant UXO measures.
- o

Monitoring and Auditing:

- o General surveillance for UXOs when working on site.

Reporting:

- o See corrective action.
- o Summary of discoveries, non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- o If UXOs or suspicious objects are discovered:
 - o Do not disturb, touch or move the object.
 - o Note the general appearance, dimensions and any visible markings on the object.
 - o Safely and clearly mark its location (without disturbing or impacting on the object).
 - o Cease work in the immediate area and inform others in that area of the presence of a suspicious object.
 - o If possible, leave one person at the site to warn others and to prevent disturbance of the object.
 - o Note the route to the object.
 - o Advise the police as soon as possible and seek their action to have the object dealt with.
 - o Call 1800 353 031 and report the suspected mine to the Powerlink Hotline.
 - o Do not re-enter the area of the discovery until it is made safe.

5.14.5 Operation and Maintenance Phase

Implementation Strategy:

- o See Construction Implementation Strategy.

Monitoring and Auditing:

- o General surveillance for UXOs when working on site.

Reporting:

- o See corrective action.

Corrective Action:

- o See Construction Corrective Action.

5.15 Vegetation

Construction activities for the transmission line and road infrastructure will require the clearing of both non-remnant and remnant vegetation which may have a direct impact on terrestrial flora. Whilst there is evidence of prior disturbance across much of the vegetation along the transmission line (i.e. substantial evidence of clearing in some areas), there are some areas of mapped remnant vegetation which have potential to have significant habitat values. Vegetated portions of the proposed transmission line provide excellent cover and resources for local fauna and forest dependent species. Two populations of the threatened *Philotheca sporadica* are known to occur on and adjacent to the existing easement at Sites WDH04 and WD07 and there is a potential occurrence of *Diuris sheaffiana* (Tricolour Diuris) (see Section 10.2 of EIS).

5.15.1 Policy

- o To minimise the impacts on vegetation from the construction and operation of the transmission line project, in compliance with *Electrical Safety Act*, *Vegetation Management Act 2000*, *Environmental Protection and Biodiversity and Conservation Act 1999*, and *Nature Conservation Act 1992*.

5.15.2 Performance Criteria

- o Disturbance to flora is minimised, consistent with the space requirements of the transmission line and the safe and reliable operation of the asset, and provision of access in accordance with standard Powerlink construction and maintenance requirements.
- o No damage to populations of *Philotheca sporadica* or other threatened plants discovered within the alignment.
- o Significant habitat retained or connections maintained across the transmission line where possible.
- o Vegetation clearing is consistent with requirements of:
 - o Powerlink's AM-POL-0050 *Vegetation Management for Transmission Corridors and Sites* (Obj. ref: A89739)
 - o Powerlink's AM-PR-0833 *Routine Vegetation Management* (Obj. ref: A667) Note : Operation and Maintenance phase only
 - o Powerlink's AM-STA-0834 *Powerlink Vegetation Control Standard* (Obj. ref: A62955)
 - o Powerlink's AM-PR-0855 *Assessment of Hazardous Marginal Trees* (Obj. ref: A676)
 - o Powerlink's *Guideline for Activities in a Watercourse or Lake for Destroying up to 0.25 Ha of Vegetation, Excavating up to 500m3, and Placing up to 500m3 of Fill* (Obj. ref: A471789)

5.15.3 Preconstruction Phase

Implementation Strategy:

- o The proposed location of the transmission alignment has taken into account the requirements of this EMP (namely reducing, where possible, the impacts of the alignment on vegetation).
- o Identify opportunities to provide habitat connectivity across the transmission line.
- o Prepare EWPs to show the proposed extent and methods of clearing. The EWPs will be compatible with/complement/incorporate the Erosion and Sediment Control Plans and/or benching or site work plans. The clearing methods should consider information presented in the Environmental Impact Statement. Clearing is to be carried out such that the impact on native fauna, downstream water quality and surrounding land use is minimised.
- o One threatened species (*Philotheca sporadica*) was identified during field investigations and the location shall be noted on the EWPs. If other species listed under the *Environmental Protection, Biodiversity and Conservation Act 1999* or the *Nature Conservation Act 1992* are discovered on site, the location shall be noted on the EWPs

- and strategies implemented to minimise impact on such vegetation implemented.
- o Limit the extent of clearing to that for the effective and efficient construction and maintenance activities, as well as the safe and secure operation of the transmission line.
- o Develop a Bushfire Management Plan in conjunction with the Department of Community Safety (Queensland Fire and Rescue Service).
- o Powerlink to provide at least three months notification to DERM of any proposed clearing within State Land so that the necessary assessment can be undertaken to determine the extent of commercial timber present.

Monitoring and Auditing:

- o Not applicable to this phase.

Reporting:

- o Records of habitats to be protected or managed to minimise impacts to be kept and provided to the PEA by the TEPM.
- o A Vegetation Management Plan (VMP) should be prepared for the site to address clearing and protection of vegetation on the site.

Corrective Action:

- o Not applicable to this phase

5.15.4 Construction Phase

Implementation Strategy:

- o Areas of vegetation to be retained and populations of threatened species should be identified and protected by erecting temporary fencing to prevent access by machinery or construction crews. No stockpiling of material or equipment, or dumping of construction waste should be permitted in these areas.
- o All activities in areas adjacent to any vegetation to be retained should be carried out in such a manner as to minimise damage to the vegetation.
- o Clearing should be undertaken in the presence of a fauna spotter/catcher. Carry out clearing methods, on advice of the ecologist/spotter catcher/PEA and clearing contractor to minimise harm to fauna. For example, if the tree requiring removal is occupied by native fauna, considerations should be given to leaving the tree in place until any juveniles present in the tree are fledged or have left hollows.
- o Identify habitat trees (e.g. trees containing nests or hollows) using a suitably trained person such as a spotter catcher, ecologist or PEA. Inspect these trees immediately prior to clearing and adopt, where practicable, measures to minimise fauna impacts.
- o As construction activities may impact on retained vegetation, it is important to ensure that sediment fencing is in place before site preparation and other earthworks commence.
- o Implement the requirements of the EWPs which detail the extent of clearing, clearing methods and other requirements.
- o Limit the extent of clearing to that for the effective and efficient construction and maintenance activities, as well as the safe and secure operation of the transmission line. Any clearing outside the designated area may require additional statutory approval.
- o Prohibit unauthorised clearing.
- o Minimise, where practicable, soil disturbance to that essential for construction activities, as soil on the project site is highly erosion prone.
- o Limit access to the approved access tracks (detailed in the EWPs). Note: additional access may be required during stringing or for emergency purposes and such additional access is to be approved by the landholder.
- o Carry out clearing in identified Regional Ecosystems in accordance with the EWPs.
- o Salvage, where practicable and in accordance with landholder instructions, timber of economic value (e.g. millable, fencing or landscaping). Any other timber waste may be mulched, retained onsite as microhabitat, or stacked for future disposal. Timber left in situ must be placed to prevent concentrated overland flows causing erosion.

- o As the soils on the Project site are highly erosive, natural re-establishment of vegetation cover on disturbed areas is to be encouraged.
- o Restrict the burning of cleared vegetation unless permitted by the local fire warden. Should burning of cleared vegetation be undertaken, permits for vegetation burning must be obtained and provided to Powerlink prior to the burn.
- o Induct all site personnel, on clearing methods and vegetation marking protocols. Work areas will also be clearly defined in the induction.
- o Prepare a rehabilitation or reinstatement plan to guide reinstatement/rehabilitation to close out construction activities.
- o Revegetation (grassing etc) shall be encouraged on non-work areas as required. Batters are to be revegetated/allowed to naturally regenerate on completion of pad development activities to achieve a minimum 70% groundcover. Where the preconstruction environment has less than 70% ground cover, the ground over establishment target will be similar to that which existed prior to construction.
- o Implement the local weed management plan (refer to the Weed Management Environmental Strategy).
- o Restrict all vehicles, plant and equipment movements to the approved access tracks.
- o Promote where possible on the completion of construction activities, natural regeneration. Suppress weed growth as the preferred method of initial site rehabilitation. Revegetation may be used where the likely success of natural regeneration is limited.
- o Rehabilitation of sites may involve the respreading of stockpiled topsoil (and grassing etc) where applicable, to establish cover.

Monitoring and Auditing:

- o Construction activities will be monitored to ensure compliance with the performance requirements as specified in the EMP or as frequently as necessary.
- o Extent of clearing marked up prior to the commencement of works.
- o Inductions register.
- o Any unauthorised works beyond the extent of clearing barriers.
- o Monitoring of clearing extent barriers.
- o Monitoring movements of vehicles, plant and equipment onsite.

Reporting:

- o In accordance with Section 3.5
- o Reporting will be carried out in compliance with conditions of any approval issued under the *Environmental Protection, Biodiversity and Conservation Act 1999*.
- o Clearing consultation records are to be prepared.
- o Construction close out records to be completed.
- o Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- o Ensure above implementation strategies are in place
- o Review and amend implementation strategies as necessary
- o Corrective actions shall be developed in consultation with Powerlink where any unauthorised clearing has occurred.
- o Install fencing/bunting and signage to prevent re-occurrence of off access or work area movements or damage.
- o New flora discoveries, such as listed under the *Environmental Protection, Biodiversity and Conservation Act 1999* or *Nature Conservation Act 1992*, reported to the TEPM and appropriate management strategies for the flora discovery prepared.

5.15.5 Operation and Maintenance Phase

Implementation Strategy:

- Carry all maintenance activities in accordance with:
 - Powerlink's *AM-POL-0050 Vegetation Management for Transmission Corridors and Sites* (Obj. ref: A89739).
 - Powerlink's *AM-PR-0833 Routine Vegetation Management* (Obj. ref: A667) Note: Operation and Maintenance phase only.
 - Powerlink's *AM-STA-0834 Powerlink Vegetation Control Standard* (Obj. ref: A62955).
 - Powerlink's *AM-PR-0855 Assessment of Hazardous Marginal Trees* (Obj. ref: A676).
 - Powerlink's *Guideline for Activities in a Watercourse or Lake for Destroying up to 0.25 Ha of Vegetation, Excavating up to 500m3, and Placing up to 500m3 of Fill* (Obj. ref:A471789).
- Implement the local weed management plan (refer to the Weed Management Environmental Strategy).
- Consider other requirements outlined in the construction phase of this environmental strategy, and implement where necessary.

Monitoring and Auditing:

- Vegetation management activities will be monitored to ensure compliance with the performance requirements as specified in this Work Plan or as frequently as necessary.

Reporting:

- In accordance with Section 3.5.

Corrective Action:

- Vegetation management activities / practices shall be modified to comply with the above requirements.

5.16 Visual Amenity

Local visual impact will be moderate due to clearance of existing vegetation during the site preparation and construction period when the transmission towers and lines and the construction activity will be visible from many of the local roads and local properties. The potential impacts on visual amenity can be mitigated and managed by adhering to visual amenity strategies outlined below.

5.16.1 Policy

- o To minimise the visual impact of the transmission lines at sensitive locations by appropriate clearing techniques and vegetation screening / tree planting, as applicable.

5.16.2 Performance Criteria

- o Minimise reduction of visual amenity from locations where the transmission lines will be visible.

5.16.3 Preconstruction Phase

Implementation Strategy:

- o Where possible, allow natural regeneration of native woodland screens in the vicinity of road crossings to allow early establishment and growth to provide screening during the construction period.
- o In locations where the study alignment crosses roads, existing vegetation should be retained (where possible) to minimise the visual impact of these crossing points on passing traffic. Regeneration associated with existing vegetation south of the Warra Kogan Road will increase the screening effect to the transmission towers and lines along this section of the alignment.
- o Where requested, provide property owners with Powerlink Information Brochure '*Screening your home from Powerlines: A guide for planting trees and shrubs outside of easements to screen Powerlines*'.

Monitoring and Auditing:

- o Not applicable to this phase.

Reporting:

- o Not applicable to this phase.

Corrective Action:

- o Not applicable to this phase.

5.16.4 Construction Phase

Implementation Strategy:

- Minimise vegetation clearing where practicable and maintain and manage woodland vegetation screening along the transmission line route and at road crossings.
- Implement the requirements of this EMP.

Monitoring and Auditing:

- The visual amenity of the project shall be progressively monitored by the PEA.
- Through the use of a complaints register, evaluate the impacts from the construction on the visual amenity of adjacent residents.

Reporting:

- In accordance with Section 3.5 of the EMP
- Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- In the event of a complaint, the PEA will investigate (refer Section 3.6 of this EMP for specific details) and recommend an appropriate mitigation response.

5.16.5 Operation and Maintenance Phase

Implementation Strategy:

- Maintain vegetation to provide visual screening of assets where possible and appropriate.
- Provide property owners with Powerlink Information Brochure '*Screening your home from Powerlines: A guide for planting trees and shrubs outside of easements to screen Powerlines*'.

Monitoring and Auditing:

- Monitoring and auditing against the Performance Criteria and Implementation Strategy sections of this EMP will be conducted

Reporting:

- As specified in Section 3.5.

Corrective Action:

- Investigate any complaint and recommend appropriate mitigation.

5.17 Waste

Waste products, including cleared vegetation, excess spoil, waste concrete, and domestic rubbish will be generated from the construction of the transmission line. In addition, waste water, gas cylinders and sewage will be generated during the operation and maintenance phases of the Project. The potential impacts of waste generation can be mitigated and managed by adopting appropriate waste disposal and tracking procedures, as well as adhering to waste management strategies outlined below.

5.17.1 Policy

- o Compliance with *Environmental Protection (Waste) Policy 1997*

5.17.2 Performance Criteria

- o No uncontrolled waste or litter observed on site.
- o No evidence of uncontrolled releases to surrounding environment (e.g. dewatering or fugitive waste).
- o Appropriate storage and disposal of fuels and waste evident on site.
- o Powerlink's procedure *AM-PR-0926 Management, Transport and Disposal of Waste Insulating and Petroleum-Based Liquids (Regulated Wastes)* (Obj. ref: A598354).

5.17.3 Preconstruction Phase

Implementation Strategy:

- o Not applicable to this phase.

Monitoring and Auditing:

- o Not applicable to this phase.

Reporting:

- o Not applicable to this phase.

Corrective Action:

- o Not applicable to this phase.

5.17.4 Construction Phase

Implementation Strategy:

- o In Consultation with the Western Downs Regional Council, prepare a Waste Management Plan which addresses the collection, handling and disposal of waste. The Waste Management Plan should explore the opportunities to avoid, reduce, reuse and recycle waste materials. Where practical, wastes shall be segregated and reused/recycled (e.g. scrap metal and cable off cuts). The waste management plan is to also establish a preferred waste management hierarchy and develop principles for achieving good waste management in accordance with the Environmental Protection (Waste Management) Policy 2000. This plan must identify waste removal service providers for the removal of the various wastes identified for the construction process.
- o Clearly identify collection bins as "general waste" and "recyclables"
- o Dispose of felled timber in accordance with landholders instructions. If retained on site and not burnt, consult with local rural fire officers so that the residues do not pose a fire hazard. Vegetation residues should not impact on downstream water quality or the easement land use. Consideration should also be given when assessing

- appropriate residual material management to potential fire hazard and impact.
- Sodid soil spoil is not to be respread over the surface during rehabilitation works unless it has been suitably ameliorated.
- Store regulated waste (e.g. hydrocarbons) in appropriately sealed containers suitably marked identifying their contents. Transfer to a waste contractor licensed to receive such waste. Regulated waste quantities over 250kg must be tracked using the methods under the Environmental Protection Act and Regulations/Policies. Records of disposal shall be maintained and be provided to the Superintendent on request.
- Refuse containers to be used and personal waste is to be found on the site. Personal waste, including food scraps, are to be removed from site at the end of each day and disposed of off site at a facility approved to take such waste.
- Collect and dispose of appropriately and regularly, all construction waste. Construction waste waiting collection is to be left in a tidy manner such that it does not impact on stock or have the potential to be wind blown otherwise it will be removed.
- Use ablution facilities/portable toilets when provided.
- Prohibit the discard of cigarette butts to ground. The contractor is to address the management of cigarette butts in the Contractor's Waste Management Plan.
- Dispose all personal and construction waste off site at a facility approved to accept such waste.

Reporting:

- Reporting as specified by Section 3.5 of this EMP.
- Landholder clearing consultation record to be completed.
- Copies of all hazardous waste disposal certificates provided to Powerlink.
- Inductions register.
- Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- Clean up works in accordance with the Performance Criteria and Implementation Strategy sections of this EMP.

5.17.5 Operation and Maintenance Phase

Implementation Strategy:

- As specified for the Construction Phase of this EMP

Monitoring and Auditing:

- Monitoring will be conducted to ensure compliance with the Performance Criteria and Implementation Strategies specified in this EMP

Reporting:

- Reporting as specified by Section 3.5

Corrective Action:

- Clean up works in accordance with the Performance Criteria and Implementation Strategy sections of this EMP

5.18 Weed Management

Weeds impact on the health of native vegetation and ecosystems and need to be controlled to ensure the risk of spread is minimised. There are a number of declared weeds present on the Project site which will need to be managed to avoid being carried on and off the site. Rehabilitation works also need to be implemented to try to avoid outbreaks of both declared and other environmental weeds.

5.18.1 Policy

- o No introduction, release, movement or transportation of declared plants in accordance with the *Land Protection (Pests and Stock Route Management) Act 2002*.
- o Compliance with the *Agricultural Chemicals Distribution Control Act 1996*

5.18.2 Performance Criteria

- o No new weed outbreaks observed along the transmission line or along access tracks.
- o Compliance with Powerlink's *AM-PR-0039 Biosecurity Management – Pest and Pathogen Control Measures* (Obj. ref: A513014)
- o Powerlink's Procedure *AM-PR-0968 Vehicle and Equipment Cleandown* (Obj. ref: A256951)

5.18.3 Preconstruction Phase

Implementation Strategy:

- o Employees to attend site induction training which includes weed species identification (in particular those declared weed species known to occur on the project site i.e. Fireweed and Prickly Pear).
- o Conduct an initial weed survey (to be documented on the EWP) to identify any potential areas of concern and implement appropriate measures to prevent the spread of weeds.
- o All vehicles to be washed and certified 'clean' before mobility to site. Vehicle movements between identified 'clean' and weed infested properties to be undertaken in accordance with constraints detailed in the weed management strategy.
- o Implement Powerlink's Procedure *AM-PR-0968 Vehicle and Equipment Cleandown* (Obj. ref: A256951)
- o Control existing infestations on accesses and worksites, where practical and to assist in reducing risks, prior to the commencement of construction activities.
- o Develop a local weed management plan for declared weeds present on the site. The weed management plan will cover the following items, but not be limited to:
 - o Aim
 - o Introduction
 - o Identification / Methods section
 - o Consultation section
 - o Findings section
 - o Recommended Local Weed Management Program (including all management strategies)
 - o Any Appendices (including survey results)

Note: Management strategies may include but not be limited to:

- o Preconstruction wash downs for all equipment coming to site

- o Documentation procedure
- o Education
- o Treatment of dirty areas preconstruction
- o Specific machinery wash downs depending on risks
- o Placement and use of temporary and permanent wash down facilities (if possible wash down facilities should be located at all “dirty area” exits)
- o Monitoring
- o Continual chemical treatment
- o Response in the event of a weed outbreak
- o Work within local council pest and weed management program

Monitoring and Auditing:

- o Not applicable to this phase

Reporting:

- o Not applicable to this phase

Corrective Action:

- o Not applicable to this phase

5.18.4 Construction Phase

Implementation Strategy:

- o Implement the local weed management plan.
- o All personnel will be trained in the implementation of the Weed Management Plan during the induction.
- o All vehicles to access site along established access tracks. If new infestations identified, no vehicle/construction traffic through this area until controlled.

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the local weed management plan.
- o Employees/contractors working on site to report presence of declared weeds to the supervisor by the end of the working day.
- o

Reporting:

- o Distributions of declared weeds monitored and where feasible, efforts made to eradicate or contain infestations.
- o Report any suspected weed infestations to the Project Environmental Advisor.
- o Records and reporting to be carried out in accordance with the local weed management plan.
- o Summary of non-compliances, corrective actions and preventative actions to be recorded in the monthly compliance report.

Corrective Action:

- o If new weed infestations are identified, the Project Environmental Advisor will advise on appropriate treatment this may include chemical or mechanical control.
- o Add newly identified weed contaminated properties to Powerlink’s PQ Maps.
- o Incorporate weed management measures for newly identified infestations in an update to the local weed management plan.

5.18.5 Operation and Maintenance Phase

Implementation Strategy:

- o Train personnel on the identification of common weeds (pocket guides are available) and in particular declared weed species already identified onsite (i.e. Fireweed and Prickly Pear).
- o Consult Sensitive Area Check and Property Hotspot Information (Powerlink's PQ Maps) to identify known weed contaminated properties.
- o Implement the local weed management plan.
- o All personnel will be trained in the implementation of the Weed Management Plan during the induction.
- o Implement Powerlink's Procedure *AM-PR-0968 Vehicle and Equipment Cleardown* (Obj. ref: A256951).

Monitoring and Auditing:

- o Monitoring will be conducted to ensure compliance with the Performance Criteria and Implementation Strategies specified in this EMP

Reporting:

- o Report new outbreaks to PEA in accordance with Section 3.5
- o Note locations and take photos for identification where possible

Corrective Action:

- o If new weed infestations are identified appropriate treatment and management techniques will be identified.
- o Any new infestations should be included in Sensitive Area Check/Property Hotspot information.

Appendix A – Environmental Policy



Environmental Policy

Powerlink Queensland is responsible for the operation, maintenance and development of the high voltage transmission network in Queensland.

We are committed to responsible environmental management as an integral part of our business activities. We demonstrate that commitment by:

- Consulting openly, honestly and proactively with the community and statutory authorities on the potential environmental impacts of our plans and activities. We are responsive to constructive suggestions to eliminate or minimise potentially adverse impacts.
- Recognising that environmental factors such as land use, public health and safety, noise and visual impact, protection of flora and fauna, environmentally hazardous materials management and waste management are all environmental aspects of our business.
- Maintaining a structured approach to managing our environmental aspects by implementing an Environmental Management System.
- Seeking continual improvement in the environmental performance of our operations.
- Complying with relevant environmental legislation.
- Building and encouraging ownership of environmental care among our people by providing training and support.



APPENDIX G DRAFT EIS SUBMISSIONS AND RESPONSES

Submitter	Issue	Response
Department of Community Safety	11.8 State Planning Scheme Policies It is noted that pursuant to Schedule 1, Part 2, Section 18, subsection (5A) of the repealed Integrated Planning Act 1997, the Minister had identified the following SPP as having been appropriately reflected in both the Chinchilla Shire and Wambo Shire Planning Schemes: - SPP 1/03 Mitigating the adverse impacts of flood, bushfire and landslide Comment: The Minister has identified the SPP as being appropriately reflected for bushfire hazard only	RPS have spoken with the Department of Community Safety (31 August 2010, 11:30am) and the Department now note that the Planning Schemes appropriately reflect both bushfire and landslide in SPP1/03. Flood is the element in the SPP1/03 that has not been addressed in the Planning Schemes. Section 11.8 of EIS to be amended to incorporate landslide. Flooding has been addressed in Section 7.2.4 and Figure 7.2 of the EIS.
	Table 11.1 Town Planning Summary Table The Minister has identified the SPP as having been appropriately reflected in the planning scheme. The development is considered to be consistent with the requirements of the Airport Overlay Code in the planning scheme and is therefore considered to comply with the SPP. Comment This statement is only true for bushfire hazard not flood and landslide. Because these planning schemes do not have ministerial sign off as reflecting flood and landslide elements of SPP 1/03, the SPP itself becomes the default assessment tool for these hazards. This means the proponent must demonstrate how the development will achieve Outcome 3 of the SPP. Information to assist in this task is provided in Appendix 9 of the SPP 1/03 Guideline.	RPS have spoken with the Department of Community Safety (31 August 2010, 11:30am) and the Department now note that the Planning schemes appropriately reflect both bushfire and landslide in SPP1/03. Flooding has been addressed in Section 7.2.4 and Figure 7.2 of the EIS. RPS has amended Section 7.4.1 to identify that the towers have been developed to withstand a Q100 flood in line with the requirements of Appendix 9 and outcome 3 of the SPP 1/03 Guideline.
Department of Community Safety (Queensland Ambulance Service)	The project is likely to increase road usage by heavy vehicles carrying "oversize" loads during the construction phase. During planning for construction, QAS will need to be advised of detailed locations of construction, estimated number of people employed and duration of construction. It is recommended that following	Powerlink's construction teams to advise the QAS of contacts, project information and supply GPS coordinates of each tower to accelerate access in the event of an emergency. This has been amended in the EIS (Section 16.3.1) and the EMP (Section 5.13.3).

Submitter	Issue	Response
	the appointment of the construction company, arrangements are made to ensure ongoing liaison will occur throughout the term of construction.	
	QFRS has a legislative jurisdiction to provide input into the design of a building or structure's fire safety systems as an advice agency. The advice provided by QFRS must be in accordance with the <i>Sustainable Planning Regulation 2009</i> , Schedule 7, table 1, for Building Work assessable against the <i>Building Act 1975</i> .	Schedule 3, Part 2 of the Sustainable Planning Regulations 2009 identifies that building works is Self Assessable Development as Powerlink is a Public Sector Entity. Therefore, building work as part of this project would be deemed self-assessable development and as such, would not be formally assessable against the SPA and consequently, QFRS cannot be a referral agency.
Department of Community Safety (Queensland Fire and Rescue Service)	QFRS has read the published document concerning the project and has no further comment at this stage. QFRS reserves the right to comment on any future documentation in relation to the project.	Statement only. Noted.
	QFRS invites the company to contact us for advice in the formulation of the final plan in the areas of fire risk identification and mitigation strategies to deal with this risk.	Section 8.4 dot point 1 amended to incorporate comments.
Department of Community Safety (Emergency Management Queensland)	EMQ has concerns in relation to the impact developments may have on existing emergency services. Many of the local emergency services are volunteer based that are used to dealing with minor incidents generally with limited resources. Increased population (work/construction crews), increased road traffic and transportation requirements have the potential to place a significant burden on local services. EMQ requests that Local Government and the local Emergency Services be kept fully informed of proposed developments and timeframes.	This request has been added to Section 16.3 of EIS. Powerlink's Construction Manager will liaise with EMQ regarding time frames and contact details.
	Appropriate regional contacts for the QFRS, QAS and EMQ have been provided by DCS.	Contacts provided have been included in the EMP Section 5.13.3.
Department of Environment and Resource	Alternative clearing techniques for erosive soils (section 3.2.2.2, p21) The EIS identifies clearing methods such as hand clearing for moderate terrain and riparian areas. Alternative clearing methods should also be	Section 3.2.2.2 and Section 5.5.1 of EIS has been amended to reflect alternative clearing methods dependent on soil conditions.

Submitter	Issue	Response
Management	considered for sodic soils. Vegetation clearing methods such as stick raking, chaining or tree spearing and pushing that are likely to expose sodic subsoils are not suitable. Recommendation Alternative clearing methods are considered for areas where it is likely that sodic subsoils could be exposed by traditional clearing methods.	
	Removal of commercial timber on State Land (section 3.2.2.2, p21) The Transmission Line proposes to traverse three reserves (Lots 20 & 21 DY1072 and Lot 24 DY432) that may contain quantities of commercial timber. Therefore, DERM requires early notification (at least 3 months in advance) of the survey and/or construction of the transmission line to enable DERM Forest Product staff to assess and if necessary arrange for the recovery of this material or seek compensation for the material lost. Also if quarry material is proposed to be obtained from these reserves (or other state land) for construction purposes such as for tower pads or access roads, DERM Forest Products will need to be notified so that suitable arrangements for royalties can be determined. Recommendation Powerlink will provide at least three months notification to DERM of any proposed surveying/clearing within State Land so that the necessary surveys can be undertaken to determine the extent of commercial timber present	Section 3.2.2.2 of the EIS has been amended to state: <i>Powerlink will provide at least three months notification to DERM of any proposed clearing within State Land so that the necessary assessment can be undertaken to determine the extent of commercial timber present.</i> Section 5.15.3 of the EMP has been amended to incorporate comments.
	Windrows of cleared vegetation (section 3.2.2.2, p 21) The EIS mentions that “timber will be felled with the residual material normally windrowed within the easement”. Vegetation that is windrowed has	Section 3.2.2.2 of the EIS has been amended to reflect no concentration of overland flows. EMP Section 5.15.4 also amended to reflect these comments.

Submitter	Issue	Response
	the potential to concentrate overland flows and cause erosion. Recommendation If debris is spread back over the easement or stockpiled, care must be taken to ensure the placement of timber does not concentrate overland flow that has the potential to increase erosion.	
	Corridor Clearing (section 3.2.2.2, p 21) Extensive fragmentation of vegetation along corridor means that all areas of remnant vegetation should be considered sensitive environmental areas. Broad scale clearing with a bulldozer is not the preferred method of tree removal along the corridor route. Canopy species and taller mid-storey species should be removed, where possible, using hand or mechanical clearing (chainsaw) techniques. Vegetation material cleared within the corridor should be utilised <i>in-situ</i> to provide habitat for ground dwelling species. Recommendation Include more information in the EIS in relation to the proposed Corridor clearing and clearing methods. For the new easement the clearing width should be restricted to 40m through areas of remnant vegetation. Also the extent of clearing of the new line paralleling the existing Kogan-Braemar Transmission line should be minimised.	Section 3.2.2.2 of the EIS states identifies corridor clearing methods. This section states: <i>Areas of vegetation that may need to be cleared or modified will be defined once the precise location of each tower and the respective conductor height are known. The extent and type of clearing required is dependent upon terrain, vegetation type and to some extent landowner and land use requirements. Clearing methods may vary from selective vegetation removal using chainsaws and other hand tools, bulldozer and stick rake in heavier vegetation, through to mega mulching to minimize soil disturbance. At tower sites, sufficient area will be cleared to allow tower assembly and erection. This area should be sufficient to cater for cranes and elevated work platform trucks. The tower footprint will also be "grubbed" for stumps.</i>
	Disposal of sodic material (section 3.2.2.3 p23) The EIS states that the surplus material will be spread evenly about the site or removed. Care is required in managing sodic and saline subsoils to minimise the risks of impacts on land and water resources. Sodic subsoil material, if left exposed on the surface without amelioration, can cause surface sealing, leading to reduced vegetation	Section 3.2.2.3 amended to state: <i>Where sodic soils have been identified, appropriate treatment methods are to be adopted.</i>

Submitter	Issue	Response
	cover and increased rates of runoff, resulting in accelerated erosion. Also where sodic or saline subsoils are present, chemical analysis of the soils should also be undertaken to ensure there is no risk of corrosion of concrete footings from chlorine or sulphate material. Recommendation At locations where the towers are to be sited, salinity and sodicity of the soils should be analysed to ensure appropriate methods are used to ensure stability of concrete footings; also appropriate disposal methods can be implemented especially for sodic, saline or dispersive subsoils.	
	Rehabilitation/revegetation of Transmission Line easement (3.3 & 3.4 p24-6) Rehabilitation/revegetation should take place as soon after vegetation removal as possible. The proposed methods of revegetation (including species to be used, methods, timing, maintenance, regrowth monitoring, weed removal and monitoring, the potential use of cleared vegetation for rehabilitation/compensatory habitat, provision of ground level habitat or erosion control mulch), etc. should be considered	Issue addressed in EMP. See Section 5.15.4.
	Migratory Birds (Section 4.1.1, p28) Although no listed migratory within the Study Alignment, listed migratory species have been recorded within the local area (details in Section 10.0). Measures need to be included to prevent these species (or any other migratory species or non-migratory species) from injury from flying into the Transmission Line. Recommendation Aerial Power line markers (either spherical ones or propeller-type ones) should be put on the	A review of the potential risk of migratory and non migratory species flying into towers and associated transmission lines was undertaken. This assessment identified the highest risk of this event occurring was at Braemar Creek in the span across the dam in the creek. It is recommended aerial markers are installed on the earth wires at this location. Section 10.3.2.2 of the EIS and Section 5.9.4 of the EMP have been amended to reflect the above.

Submitter	Issue	Response
	Transmission Line in any areas that may have migrating birds passing through them. Land Act Easements (section 4.2.6, p35) Provisions of the <i>Land Act 1994</i> - Division 8, Easements, Section 369, Public Utility Easements – require that easements for public utilities on unallocated State Land or Reserves are to be registered. Recommendation Section 4.2.6 should be amended to reflect the requirements of the <i>Land Act 1994</i>.	Section 4.2.8 in the EIS has been amended to reflect the requirements of the <i>Land Act 1994</i>.
	Consideration of the Forestry Act (section 4.0, p27-40) The provisions of the <i>Forestry Act 1959</i> may apply to this project as it traverses State land including reserves and roads. The application of the <i>Forestry Act</i> is not restricted to only state forest areas. Approvals may be required under the <i>Forestry Act 1959</i> for quarry materials and forest products obtained from State Land. Recommendation Reference to the <i>Forestry Act 1959</i> should be included in the EIS	Reference to the <i>Forestry Act 1959</i> has been incorporated into the EIS Section 4.2.6.
	Appropriate Review of available mapping (section 5.1, p46) No reference made to the <i>Central Downs Land Management Manual Harris et al. 1999</i>, which covers the eastern 6km of the proposed alignment and appears to be used in Figure 5.3 Recommendation All references used should be appropriately acknowledged throughout the EIS including the source of data used in Figures.	All references have been amended and appropriately acknowledged throughout the EIS including the source of data used in Figures.
	Appropriately detailing the impact of the proposal on GQAL (section 5.3.5, p58) Section 5.3.5 says “Cropping (with some safety	Section 5.3.5 and Section 11.4.1.1 has been amended to identify cropping that currently occurs to the east of the study area. Cropping isn’t precluded (with the exception of the tower footprint) and current land use activities can continue

Submitter	Issue	Response
	considerations) and grazing will still be able to occur within the transmission line easement...” While section 11.4.1.1 (p130) stated ‘that Class A GQAL will be restricted to grazing purposes’. It is not clear why cropping practices would not be able to continue on Class A land following the construction of the transmission line. Recommendation Clarification is required on the potential impact on agricultural production on GQAL affected by the proposed alignment. Towers should be located, wherever possible, outside cropping areas to reduce the impact of the proposed transmission line.	unimpeded.
	Flooding (section 7.2.4, p80) Section 7.2.4 says “floodplain mapping indicates the majority of the study corridor is subject to flooding with the exception of the portion west of Kogan Creek (refer Figure 7.2). Due to the nature of this project, flooding should not be an issue.” Flood mapping of the proposed transmission line shows that approximately the eastern 6km of the route has in the past been inundated during significant flood events. Information is required on the impact that flooding could have on the transmission line infrastructure (towers, access tracks etc) and the impact the infrastructure could have on flood flows. The floodplain extent mapping is not consistent with Departmental information (no source reference has been given for the extent used) Recommendation The potential for the proposed transmission line infrastructure to alter/impact flood flows and the effect of this on other infrastructure should be detailed. Measures proposed to minimise this impact should be discussed.	Flooding has been addressed in Section 7.2.4 of the EIS and reference to the data used Figure 7.2 has been included. RPS has amended Section 7.4.1 and notes that towers have been developed to withstand a Q100 flood in line with the requirements of Appendix 9 and outcome 3 of the SPP 1/03 Guideline.

Submitter	Issue	Response
	Sale of Mill Timber (section 9.2, p89) EIS states that cleared native vegetation will be sold as mill timber. The proponent should be aware that timber cleared from state land such as reserves and road remains the property of the State and therefore DERM Forest Products should be contacted prior to the clearing of the route. Recommendation Powerlink will provide at least 3 months notification to DERM of any proposed surveying/clearing within State Land so that necessary surveys can be undertaken to determine the extent of commercial timber present.	Section 9.2 amended to state: <i>Powerlink will provide at least three months notification to DERM of any proposed surveying/clearing within State Land so that the necessary surveys can be undertaken to determine the extent of commercial timber present.</i>
	Windrows of cleared vegetation (section 9.2, p89) Vegetation that is stacked on site has the potential to concentrate overland flows and cause erosion. Recommendation If debris is spread back over the easement or stockpiled, care must be taken to ensure the timber does not concentrate overland flow that has the potential to increase erosion.	Section 9.2 has been amended to reflect the need to for windrows to be established without concentrating flows.
	Excess spoil – sodic soils (section 9.2.1, p89) The identified disposal method in this section is to stockpile excess spoil for reuse during landscaping and rehabilitation works. Care is required in managing sodic and saline subsoils to minimise the risks of impacts on land and water resources. Sodic subsoil material, if left exposed on the surface, can cause surface sealing, leading to reduced vegetation cover and increased rates of runoff, resulting in accelerated erosion. Detailed soil surveys prior to the construction phase would help identify risk sites	The Project does not intend on disposing of sodic/saline soil. The management and location of sodic soils has been identified in the EMP Section 5.8 and discussed in Section 5.3 of the EIS.

Submitter	Issue	Response
	and enable appropriate mitigation measures to be defined to ensure sodic and/or saline soil material are suitably managed. Recommendation The volume of sodic and saline subsoils to be disturbed are identified and suitable mitigation measures are defined to ensure the safe disposal of sodic/saline material.	
	Minimisation of topsoil storage (Section 9.2.1, p89) Topsoil should be stored for a minimum time period. Minimisation of topsoil storage is important to maintain the viability of the seed bank and soil fertility. Recommendation More detail in relation to topsoil storage and its management should be included in the EIS. Details of topsoil management should include the transport, storage and return of topsoil to disturbed areas. The minimisation of topsoil storage times (to retain the viability of the seed bank and reduce fertility degradation) should also be addressed.	Section 5.8.4 of EMP addresses top soil management.
	Reporting of information from further Fauna surveys (section 10.2.2.2 p98) EIS mentions that the fauna surveys carried out to date were not intended to be comprehensive. The report mentions that further fauna surveys using more comprehensive methods and covering a range of seasons have still to be conducted. Recommendation The findings from the further fauna surveys, as well as their associated mitigation strategies, should be reported in the Final EIS.	Section 10.2.2.2 states <i>It must be remembered, however, that this survey was not intended to be comprehensive, and that it represents only a small temporal 'snapshot' of the local fauna. Further surveys encompassing a range of seasonal conditions, and including more comprehensive methods, may yield a higher species richness than that observed during this survey.</i> The project brief does not accommodate further studies therefore additional surveys to allow seasons interpretation are not currently intended. That notwithstanding, Section 5.9.4 of the EMP addresses the use of Spotter Catchers and other fauna management strategies.
	Vegetation Clearing (section 10.3.1.3, p105) It is recommended that the route taken for the	Powerlink routinely undertakes comprehensive environmental impact assessment processes for all its essential electricity projects. The CSR/PAR (EIS Appendix C)

Submitter	Issue	Response
	transmission line and any associated infrastructure avoids, minimises and mitigates (offsets) any remnant or regrowth vegetation that is required to be cleared.	identified the route that, on balance, had the least overall environmental, social and economic impact. In addition, the EIS itself identifies ways to avoid, minimise or mitigate impacts. Further, Powerlink supports a wide range of initiatives that seek to further 'offset' project impacts, such as the Queensland Government Environment Offset Policy.
	Spanning sensitive areas in relation to 'Endangered' and 'Of Concern' Regional Ecosystems (RE), Corridor Vegetation and any high value regrowth vegetation (Section 10.3.1.3, Flora Impact Mitigation, P105) Concerns about easement traversing or within the vicinity of endangered RE, of concern RE, riparian areas, State and Regional corridors, high value regrowth. Supports increasing tower height, particularly eastern and western end to avoid clearing ERE and OC RE. Recommends 'brushing' - putting lopped tree material along the riparian bank area instead of removing entire trees in these areas. Avoid tower placement and vegetation removal in areas of bioregional corridors. Recommendation More information should be included in the EIS in relation to the use of taller towers and placement of towers to span sensitive areas in relation to 'Endangered' and 'Of Concern' REs, Corridor vegetation and any high value regrowth vegetation. Also, consideration should be given to alternative clearing methods such as lopping in riparian zones. Vegetation and/or biodiversity offsets (Section	Section 3.2.1.1 of the EIS amended to include comment regarding tower height and spanning sensitive environmental areas such as Endangered and Of Concern REs and riparian areas. Additional information added to Section 10.3.1.3 about tower height, placement and clearing methods. Powerlink routinely undertakes comprehensive environmental impact assessment

Submitter	Issue	Response
	10.3.1.3, Flora Impact Mitigation, P105) Adequate and detailed information needs to be supplied in the Final EIS for possible/likely vegetation and biodiversity offsets. Any possible losses of endangered and/or of concern REs, corridor vegetation, remnant vegetation and threatened fauna and flora species, need to be addressed through the provision of suitable offset areas. Recommendation Include more information on vegetation and/or biodiversity offsets.	processes for all its essential electricity projects. The CSR/PAR (EIS Appendix C) identified the route that, on balance, had the least overall environmental, social and economic impact. In addition, the EIS itself identifies ways to avoid, minimise or mitigate impacts. Further, Powerlink supports a wide range of initiatives that seek to further 'offset' project impacts, such as the Queensland Government Environment Offset Policy.
	Threatened flora species (Section 10.3.1.3, Flora Impact Mitigation p105) Consideration should be given to avoiding the destruction of threatened flora species recorded. The construction EMP should identify the location of each species and instigate protective measures to avoid disturbance from machines, weeds and soil compaction. Recommendation More information needs to be included in relation to mitigation strategies to avoid destruction of threatened flora species.	Section 10.3.1.1 and Figure 10.2 identify locations of the recorded threatened flora species; <i>Philothea sporadica</i>. The project proposes to span areas that support this species. The management of this species during construction has been addressed in Section 5.15 of the EMP and will also be included in the Environmental Work Plans.
	Species for screening and landscaping (Section 10.3.1.3, flora impact mitigation, p105) More detailed required on species used for revegetation, screening and amenity plantings. Avoid exotics and source species of local provenance. Recommendation More information needed about species for screening and landscaping, as well as where they	Section 10.3.1.3 has been amended to note that natural regeneration is recommended and that where this is inadequate, planting of grasses should be completed.

Submitter	Issue	Response
	will be obtained from and their provenance. Reference sites for monitoring rehabilitation (Section 10.3.1.3, flora impact mitigation, P105) Proponent needs to establish reference sites to provide benchmarks against which to measure the success and progress of rehabilitation activities. Recommendation Include more details on reference sites for monitoring rehabilitation. Details of reference sites (at least two for each ecosystem type being rehabilitated) that will be established and monitored to provide benchmarking for rehabilitation activities.	No detailed monitoring of references sites is proposed, however sensitive clearing and erosion and sediment control methods are to be implemented to minimise potential environmental issues.
	EMP 5.9 Erosion and Sediment Control 5.9.2 Performance Criteria P39 Amend last dot point Water gained through dewatering of holes or pits should also be tested for salinity (Electrical conductivity) prior to disposal	Section 5.8.2 of the EMP amended to reflect these comments.
	EMP 5.9Erosion and Sediment Control 5.9.3 Preconstruction phase Issue: Identification of saline or sodic soils Additional dot point to be considered in the development of the ESCP: Identify sodic soils that may require alternative clearing methods such as the use of a mega mulcher, to minimise the risk of erosion. Control measures for sodic soil impacts should limit or avoid vegetation clearing using mechanical means, stock access and grazing pressure should also be limited.	Section 5.8.3 of the EMP amended to reflect these comments.

Submitter	Issue	Response
	EMP 5.9Erosion and Sediment Control 5.9.4 Construction Implementation Strategy P40 Suggest additional points: • In areas with sodic soils and/or extreme erosion hazard, graded banks should be constructed from the bottom side to minimise soil disturbance where water flow is concentrated. Alternatively, channels with exposed dispersive sub soils should be covered with topsoils and protected with a vegetal cover. • Sodic subsoils are not exposed in the construction of new tracks (as started in p59 of the EIS) • Sodic sub soils are no exposed to water flows during the construction of level pads for the towers. Clearing of riparian vegetation (section 5.9.4, delineation of vegetation clearing, p40) The document Powerlink Guideline for Activities in a watercourse" has not been included. Therefore, additional requirement are suggested: For minor watercourse crossings (Stream Order 1-2) a buffer of 50m to be flagged from the outside banks that contain water flows. For intermediate watercourse crossing (Stream Order 3-4) a buffer of 100m to be flagged from the outside banks that contain water flows. Clearing of vegetation that is to be removed for safety purposes, should be undertaken within the riparian areas and buffer areas, by hand clearing or machinery methods that allow for stumps	Issues concerning Sodic Soils has been addressed in Section 5.8.4 of the EMP. Section 3.2.2.2 of the EIS addresses clearing of riparian vegetation and Table 4.4 notes that if guideline threshold levels are exceeded (in accordance with the <i>Water Act 2000</i>), approval may be required. Any reference in the EIS has been made to the DERM Guideline - Activities in a watercourse, lake or spring carried out by an entity (DERM, Version 3, 2010).

Submitter	Issue	Response
	and roots to be retained. Clearing width of this vegetation is nominally 40m within removal of marginal trees outside the area.	
	5.1 Fauna Additional information proposed (in relation to habitat connectivity, positioning of the transmission line in relation to wildlife and species specific strategies) needs to be included in the Final EIS/EMP (Section 5.10.3 Preconstruction phase, Implementation Strategy:1, 2 and 4 bullet points, P43) Recommendation • Possible opportunities to maintain vegetation links to reinforce habitat connectivity need to be identified and included in the Final EIS/EMP • Information on how the transmission line is positioned to reduce impacts to habitat and minimise harm to wildlife needs to be included in the final EIS/EMP. • If specific fauna species, listed under the EPBC Act (1999) are identified in the course of the project, species specific strategies (to minimise impact on each of these species) should be developed as early in the project as possible. It should be possible to compile species specific strategies for listed species that will possibly or likely be impacted by the project for inclusion in the Final EIS. The EIS should provide detailed descriptions of species specific impacts and mitigation measures for all state or commonwealth listed flor and fauna identified along the alignment. Generic measures can be provided for common species.	Section 10.3.2.1 of the EIS: • Notes the impacts; • Notes the fact that alignment was moved to mitigate impacts on an endangered fauna community; and • Recommends that the <i>impacts will be lessened by the provision and maintenance of ground cover through mulching, as has been done on the existing easement.</i> • In addition, Section 10.2.2.3 notes that no EPBC or NCA (with the exception of the little Pied Bat, whereby the alignment was shifted) fauna species are likely or were identified along the alignment. Section 5.9.3 of EMP also states <i>No fauna listed under the Environmental Protection, Biodiversity and Conservation Act 1999 were recorded during field assessments however if listed species are identified, development of species specific strategies to minimise impact on such fauna should be undertaken.</i> • Opportunities to maintain vegetation links will be identified in the Environmental Work Plans.
	A preliminary VMP should be prepared for inclusion in the final EIS (Section 5.10.3	Vegetation management practices will be included in the Environmental Work Plans.

Submitter	Issue	Response
	Preconstruction phase, reporting: only bullet point, P43) Recommendation A preliminary VMP to address clearing and protection of habitat vegetation along the proposed transmission line, should be prepared. Additional information needs to be included in Final EIS/EMP (Section 5.10.4 Construction Phase, implementation strategy: 2nd bullet point, p43) Recommendation Habitat trees to be retained on site should be identified by a suitable spotter/catcher/ecologist (if they will not impact on the safe operation of the line) as soon as possible/feasible and reported on in the Final EIS/EMP	Where appropriate/feasible, the Environmental Work Plans will reflect the location of habitat trees.
	Rewording of this sentence is required (Section 5.9.4 Operation and Maintenance, corrective action: 3rd bullet point , p45) Recommendation “New fauna discoveries, such as listed under the EPBC Act 1999, or NCA 1992, reported to the TEPM and appropriate management strategies for the fauna discovered prepared” Reword. Vegetation Clearing method for sodic soils (Section 5.16.3 preconstruction phase, implementation strategy, p57) In relation to sites where dispersive soils exist, the clearing method should define practices that minimise exposure of sodic soils Recommendations • The site work plans will define low impact clearing techniques required for areas where sodic subsoils occur • Careful sitting and use of taller towers in areas of endangered and of concern vegetation to reduce the impact on biodiversity and connectivity	Sentence has been rephrased. Sodic soils to be identified on the Environmental Work Plans and clearing strategies detailed.

Submitter	Issue	Response
	5.16.4 Construction Phase, implementation strategy, p57 Suggest additional dot points • Inappropriate practices, such as chemical treatment of stumps and broadscale mechanical clearing within riparian areas will be identified • Felled debris to be used to minimise stock access to vulnerable areas • Ensure cleared debris does not concentrate on overland flow	Section 5.15.4 has been amended to reflect these comments.
	5.16.5 Operation and maintenance phase, implementation strategy p59 Suggest add dot point • Where safety regulations permit, maintain shrub and ground cover vegetation within areas of currently mapped remnant vegetation to improve connectivity	The corridor must be maintained for safety and access, including emergency access, requirements. Where practical, shrub and ground cover vegetation within areas of remnant vegetation will be maintained to improve connectivity Section 5.15.5 amended to reflect this.
	5.18 Waste 5.18.4 Construction phase, implementation strategy p62 Suggest addition dot point • Sodic excess spoil is not respread over the surface during landscaping and rehabilitation works unless it has been suitable ameliorated	Section 5.17.4 has been amended with recommended dot point.
Department of Infrastructure and Planning	Develop a stakeholder engagement plan for the construction and operation phase to address dust, noise, EMF community concerns and to promote active engagement and communication	A complaints procedure/communication strategy has been outlined in Section 3.6 of the EMP. This addresses community notification and response to complaints.
	Given the development activity in the region other issues likely to require stakeholder engagement are: • Traffic management and safety • School bus routes and pick ups/drop off • Use of property access roads • Wide load escorts • Heavy vehicle access through town and	Statement only. Noted.

Submitter	Issue	Response
	roads • Safety of stock on properties • Worker accommodation and location of construction camps, use of local business and facilities	
	Interested stakeholder groups may include WDR Council Toowoomba RC Police Main Roads Local land owners Dep Education and training Local chambers of commerce/individual business groups	Statement only. Noted.
Western Downs Regional Council	Traffic and Transport An increase in projects in the region has put an unsustainable burden on local road network. Therefore, WDRC require: • A comprehensive traffic management study be undertaken to assess the impact of the project, particularly the local road network • The submission of a traffic management plan for approval prior to commencement of the construction phase for any temporary road closures and any variation to receive timely approvals • The development of mitigation and management measures that will minimise the impact on all WDRC roads • PQ entering into an Infrastructure Agreement with WDRC for the life of the project, wherein PQ is to be responsible for the funding of any upgrading of roads and any additional maintenance required during and after the construction phase due to increased traffic levels. • To that end, WDRC requires two joint asset condition assessments to be	New text has been added to Traffic Section 16.2.1 p166: <i>Powerlink Queensland, in conjunction with the construction contractor, will consult with the Western Downs Regional Council about the use and maintenance of local road infrastructure. Joint asset condition assessments will be held to determine the state of the road infrastructure prior to commencing the Project and agreement reached on the upkeep and rehabilitation required for the affected road infrastructure during the course of the Project.</i> New text has been added to the Environmental Management Plan, Section 5.13.3: ▪ <i>Conduct a joint asset condition assessment with the Western Downs Regional Council to determine the state of the road infrastructure prior to commencing the Project and to agree on the upkeep and rehabilitation required for the affected road infrastructure during the course of the Project.</i>

Submitter	Issue	Response
	carried out – one prior to any construction traffic using a WDRC roads and the second at the completion of the project to determine whether any additional maintenance is required to restore the road networks to the original condition. Any identifiable works required shall be at the cost to PQld; and • That all roads providing access to work camps be constructed to an all weather access standard, with appropriate turning facilities provided from major roads.	
	Construction water 5.1.4 EMP “watering of our application of dust suppressants to work areas and access tracks will be carried out on an as required basis to prevent dust nuisance” WDRC requests the proponent advise where the water for these tasks will be sourced from as there will be no water available for construction from WDRC town supplies.	Section 5.1.4 of the EMP has been amended to reflect these comments.
	Groundwater S7.4.3 “in the event that an environmental incident occurs during construction, such as a fuel or oil spill, immediate containment, management and remediation actions “should” be undertaken.....” Replace with work “should” with “will be”	Section 7.4.3 amended to reflect these comments.
	Pest Management The proponent should reference with WDRC Pest Management Plan (October 2010)	EIS Sections 10.2.1.3 Weeds of Management Concern (p.100) and 10.2.2.4 (p.107) and EMP Sections 5.3 and 5.18 have been amended to reflect reference to WDRC Pest Management Plan (October 2010)
	Wash Down of Construction Vehicles and Equipment WDRC require all vehicles entering and leaving the construction sites be adequately washed down to prevent weed spread, e.g. Parthenium, which has been contained in the WDRC northern boundary.	EMP Section 5.18 Weed Management addresses weed spread risk with outcomes according to Council's requirements. While Powerlink Queensland will ensure adequate wash down facilities are available to address specific project requirements as described in the EIS, it is aware that Western Downs Regional Council has a vision to establish a number of permanent facilities across the council area. Powerlink has been involved in discussions with the Western Downs Regional Council concerning identification

Submitter	Issue	Response
	We wish to request the proponent contribute \$100 000 towards essential wash down facilities to be located at Wandoan, Chinchilla, Dalby for all vehicles and heavy equipment entering or existing the region	opportunities for contribution to establishing centralised wash down facilities. Powerlink is keen to continue with these discussions with a view of assistance facilitation of the desired outcome.
	Local Business Engagement Request that every endeavour is taken to include local business for the sourcing of supplies to service the construction accommodation facilities. WDRC request the proponent provide what measures will be undertaken to address how they intend to establish local procurement process to engage with local and regional businesses. The WDRC economic develop division is keen to work with PQ in this regard.	Noted. EIS Section 12 amended to address local economic impacts such as employment. Powerlink will comply with and report on Local Industry Participation in accordance with agreements between Powerlink and the DEEDI.
	Construction labour/camps The EIS identifies employees will be sourced from Dalby/Chinchilla and Toowoomba but it does not address accommodation camps. Issues of concern to WDRC on this matter include: a) Construction Waste Disposal Town sewage treatment plants do not have capacity for accepting large quantities of black water slugged into the systems, as this can cause overloading and subsequently affect effluent quality. If camps are to be used consider purpose built sewage disposal and treatment facility b) Construction Camp Water Town water supplies are under stress. There is no guarantee water will be available for camps. These issues will need to be discussed with WDRC	Noted. Section 12.2 of the EIS has been altered to recognise these constraints. It is proposed Powerlink staff will occupy existing motel/rental accommodation in the region. Should Powerlink or the construction contractor intend on establishing a construction camp the items noted will be considered.
	Waste Management Local waste facilities have minimal capacity to	EMP Section 5.17 amended to reflect these comments:

Submitter	Issue	Response
	accept construction and workers camp waste. Alternative waste handling arrangement will be required. The disposal of waste at large facilities e.g. Dalby and Chinchilla	
	Chemicals WDRC request MSDS sheets for all chemical bought onto properties are provided to each landholder	The construction contractor will be the principal contractor for the construction workplace. The construction workplace will be the transmission line easement, and other specific work areas associated with these works. Material safety data sheets will be maintained by the principal contractor for chemicals used in the works. Powerlink Queensland representatives will consult with landholders affected by the construction activities during the course of the Project. Landholders wishing to see information about the chemicals to be used on their properties can request this information during these consultation activities.
	Cumulative impacts WDRC request the proponent address water supply, sewerage and waste management issues across all projects as a whole in the WDRC region.	Approved DLGP Terms of Reference for the project require the short-term, long-term and cumulative effects of the project on individual environmental values to be addressed. This EIS meets this requirement. EIS section 12.2 has been amended to include: It is recognised that Powerlink Queensland has further network developments planned that affect the Western Downs Region, and that water supply, sewerage, waste management matters and the burden on time and resources require attention across all projects. EIS section 12.3 has been amended to include: Powerlink Queensland and Western Downs Regional Council representatives are consulting on matters such as water supply, sewerage, waste management and the burden on time and resources to ensure a coordinated approach aimed at minimising these impacts.
	Burden on time and resources The WDRC must highlight the enormous time and effort that is used to respond to the EIS and in stakeholder engagement as part of their collective mechanisms to address issues from the project. This places an excessive burden on the valuable time of volunteers, local businesses, local community groups and the WDRC resources, particularly as there are up to 41 current and proposed major projects that are required to be addressed. We therefore, request that a payment of \$150 per	As above.

Submitter	Issue	Response
	hour, per person for the preparation of the EIS responses, attendance at meetings and for travel time be provided by the proponent during the course of the project. Travel costs also to be paid on a kilometre rating for motor vehicles as set by the Australian Taxation Office. Alternatively, as discussed recently at our meeting on the 28th July, the WDRC would be happy to discuss a once off contribution towards costs or an equivalent to support infrastructure costs within the region.	
Department of Employment, Economic Development and Innovation	5.3.6 Mining and Petroleum Summarises mining tenures around the study area as at 18 January 2010. Additional tenure applications immediately adjacent the study area have been lodged since. Recommendation Include reference to competing exploration permits for Coal Application EPC 1982 (Clean Global Energy Operations Pty Ltd) and EPC 1985 (Spinifex Rural Management Pty Ltd).	EIS Section 5.3.6 has been amended to reflect recent changes in tenures.
	5.4 & 5.5 Impacts and mitigation measures Section 5.3.6 does not discuss impacts on any mineral or petroleum resources or measures to mitigate these Recommendation The Final EIS should discuss impacts on proposed exploration activities, potential impact on potential resources as well as mitigation measures. Consultation with permit holders will need to be undertaken as part of the easement acquisition.	The instillation of this essential public infrastructure has the potential to alienate a linear corridor from mineral or resource exploration or permits. Powerlink Queensland has included relevant companies in the consultation for this Project.
	Figure 5.5b Lists tenure holder ATP692 as Origin Energy CGS Ltd. This conflicts with DEEDI records which identified Australian Pacific LNG Pty Ltd. Recommendations Amend figure.	Figure 5.5b amended.
	3.2 Project Description	A cross reference in Section 3.2 has been made to Section 7.

Submitter	Issue	Response
	Section indicates Creek and stream crossings will be required. Recommendation The final EIS should describe any creek or stream crossings proposed and include construction methodology, timing (time of year and duration) of construction and the crossings are expected to remain in place.	
	4.2 State and legislation policies Section does not refer to <i>Fisheries Act 1994</i> despite the potential requirement for waterway barrier works. Recommendation Include a reference to the Fisheries Act 1994 and its relevance to the project with regards to the construction or raising of waterway barrier works.	EIS Section 4.2 has been amended with reference to <i>Fisheries Act 1994</i>
	7.3.1 Surface hydrology and localised flooding Section does not address impacts on flow regimes from the presence of waterway crossings Recommendation Conduct an assessment of the potential impacts of waterway crossings on water velocity and turbulence during flow events.	Section 7.3.1 has been amended in accordance with the DERM comments above.
	10.2.2 Fauna Section does not address the fish fauna that occur in the project area Recommendation Include a description of the fish species that utilise habitat that may be impacted by the project	Amendment made to Section 10.1 regarding aquatic studies.
	10.3.2 Fauna impacts and mitigation Section does not address impacts to fish and fish movement from the construction of waterway crossing Recommendation Provide an assessment of the potential impacts on fish species and their ability to access habitats up or down stream of waterway crossings and any measures that will be implemented to reduce	Section 10.3.2 amended to discuss potential impacts on aquatic species.

Submitter	Issue	Response
	these impacts.	
Telstra	Telstra network along Kogan-Warra road and Wolskis Road are likely to be impacted during single phase to earth line faults. Recommendation Examination of Low Frequency Induction (LFI) and Earth Potential rise (EPR) impacts can be undertaken when the following information is supplied: • Route plan in electronic format • Design plan showing position of towers/poles • Faults current profile Also a table of bends coordinates of the easement centreline would be of benefit to the EIS and Telstra (preferred format information provided with submission)	This information will be provided to Telstra
Queensland Health	Understood PL is discussing operational work camps with WDRC. Would be desirable these discussions continue and any proposal to establish work camps is fully investigated by WDRC.	Statement only. Noted.