



Dampier to Bunbury Natural Gas Pipeline

ENVIRONMENT PLAN REVISION 7.0

SUMMARY DOCUMENT

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1. Introduction

The Dampier to Bunbury Natural Gas Pipeline (DBNGP) was constructed and commissioned in 1984 to transport natural gas from the north west of Western Australia (starting near the township of Dampier) to commercial, industrial and domestic markets in the south west of the State (finishing at MLV157 (Clifton Road) near the city of Bunbury).

Pipeline licences (PL 40, 41, 47, 69, 91, 94, 95, 100 and 101) have been issued under the Western Australian (WA) *Petroleum Pipelines Act 1969* (PP Act) to allow the DBNGP to be operated (Pipeline Licences). Additionally, Pipeline Licence 38 and 74 have been issued to allow the operation of Burrup Extension Pipeline and the Maitland Pipeline respectively, both laterals connected to the DBNGP.

The *Petroleum Pipeline (Environment) Regulations 2012* (the Regulations) require the development and implementation of an Environment Plan (EP) to the satisfaction of the Department of Mines and Petroleum (DMP). The DBNGP Environment Plan (DBNGP EP) has been prepared to collectively satisfy this requirement for each of PL 38, 40, 41, 47, 69, 74, 91, 94, 95, 100 and 101.

The objective of this document is to provide a succinct and publically available summary of the DMP approved DBNGP EP as required under regulation 11 (7) of the Regulations.

2. Proponent

The Pipeline Licences for the DBNGP and other connected pipelines have been issued to various instrument holders, each of whom have nominated either DBNGP (WA) Transmission Pty Ltd or DDG Operations Pty Limited as the Operator. As these operators are both part of the DBP Group of companies, throughout this document, the Operators will be collectively referred to as DBP. Table 1-1 sets out for each Pipeline Licence covered under the scope of this EP, the instrument holder and the nominated Operator.

DBP has been engaged in a range of construction and operational projects associated with its assets located across Western Australia. Most of the activities have been regulated with respect to approval of environmental impacts and management under both State and Federal environmental legislation. These approvals have been subject to a range of compliance audits and environmental performance reviews that demonstrate a good record of responsible environmental management.

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Table 1-1 Identification of Licencee and Operator for all Pipeline Licences covered under the EP

Pipeline/ Facility	PL	Instrument Holder	ABN	Operator	ABN
DBNGP	PL40	DBNGP (WA) Nominees Pty Limited	78 081 609 289	DBNGP (WA) Transmission Pty Limited	69 081 609 190
Kemerton Lateral	PL69				
Fortescue River Crossing	PL91				
Mondarra Inlet	PL94				
Brown Range Interconnect	PL95				
Wagerup Meter Station	PL100				
Pinjarra Meter Station	PL101				
Lateral to TiWest, Kwinana	PL41	DBNGP (WA) Transmission Pty Limited	69 081 609 190		
CS10 and Lateral	PL47				
BEP	PL38	APA (Pilbara Pipelines) Pty Ltd	46 081 971 173		
Maitland	PL74	EDL LNG (WA) Pty Ltd	92 064 437 789	DDG Operations Pty Limited	76 166 900 170

3. Location

The DBNGP is a buried pipeline that transports natural gas approximately 1,600km from the Burrup Peninsula, starting near the township of Dampier, running parallel to the west coast of Western Australia and finishing near Bunbury. Figure 1 provides an overview of the route traversed by the DBNGP. The distribution of compressor stations (CS) and main line valves (MLV) along the pipeline is shown in Figure 1 also. Appendix A provides locality coordinates.

4. Existing Environment

The DBNGP extends through the following 6 bio-geographical regions:

- Pilbara Region
- Carnarvon Region
- Gascoyne Region
- Yalgoo Region
- Geraldton Sandplains Region
- Swan Coastal Plains Region

Figure 2 provides a spatial representation of the biogeographical regions that the DBNGP traverses.

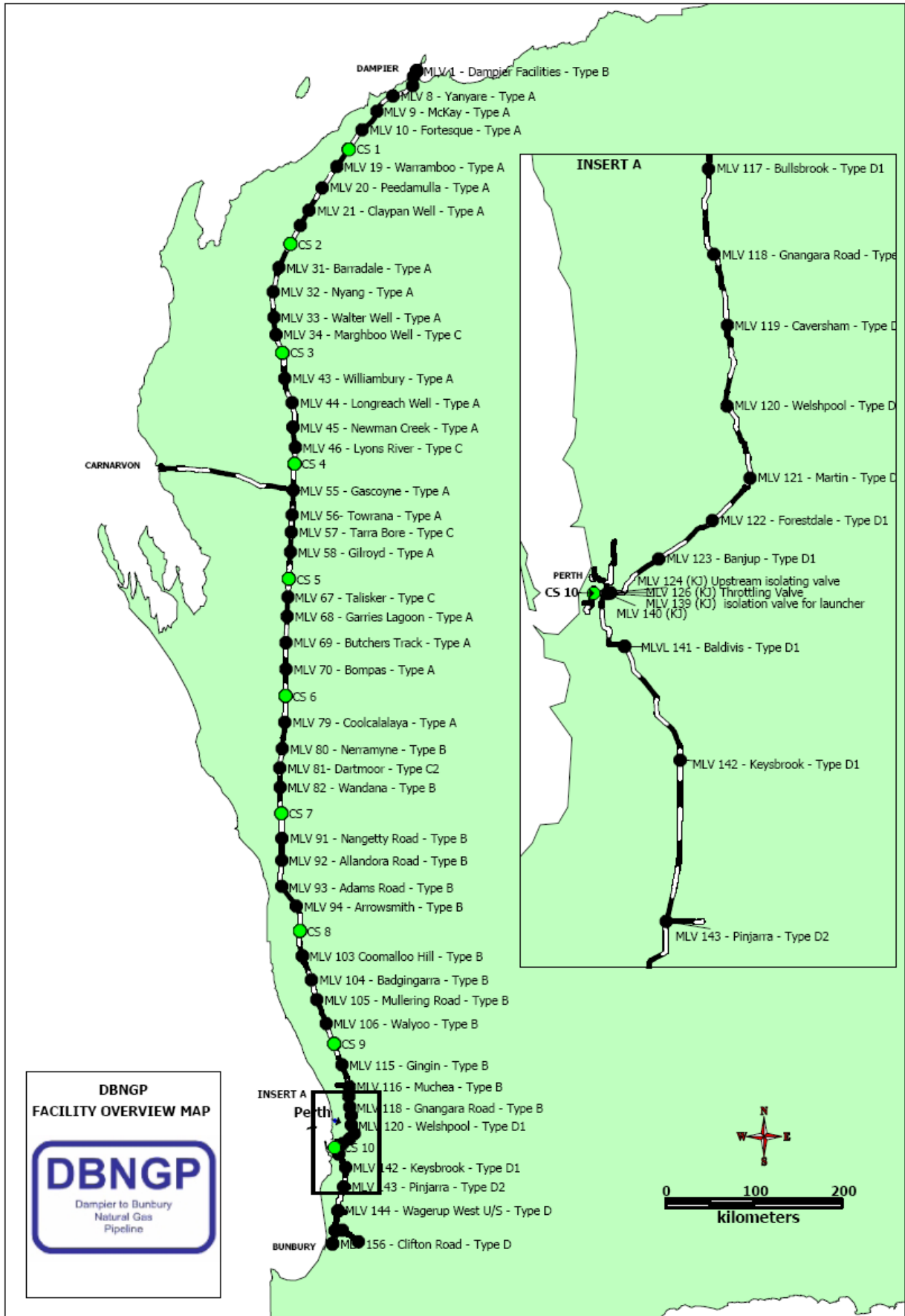


Figure 1 Overview of the DBNGP

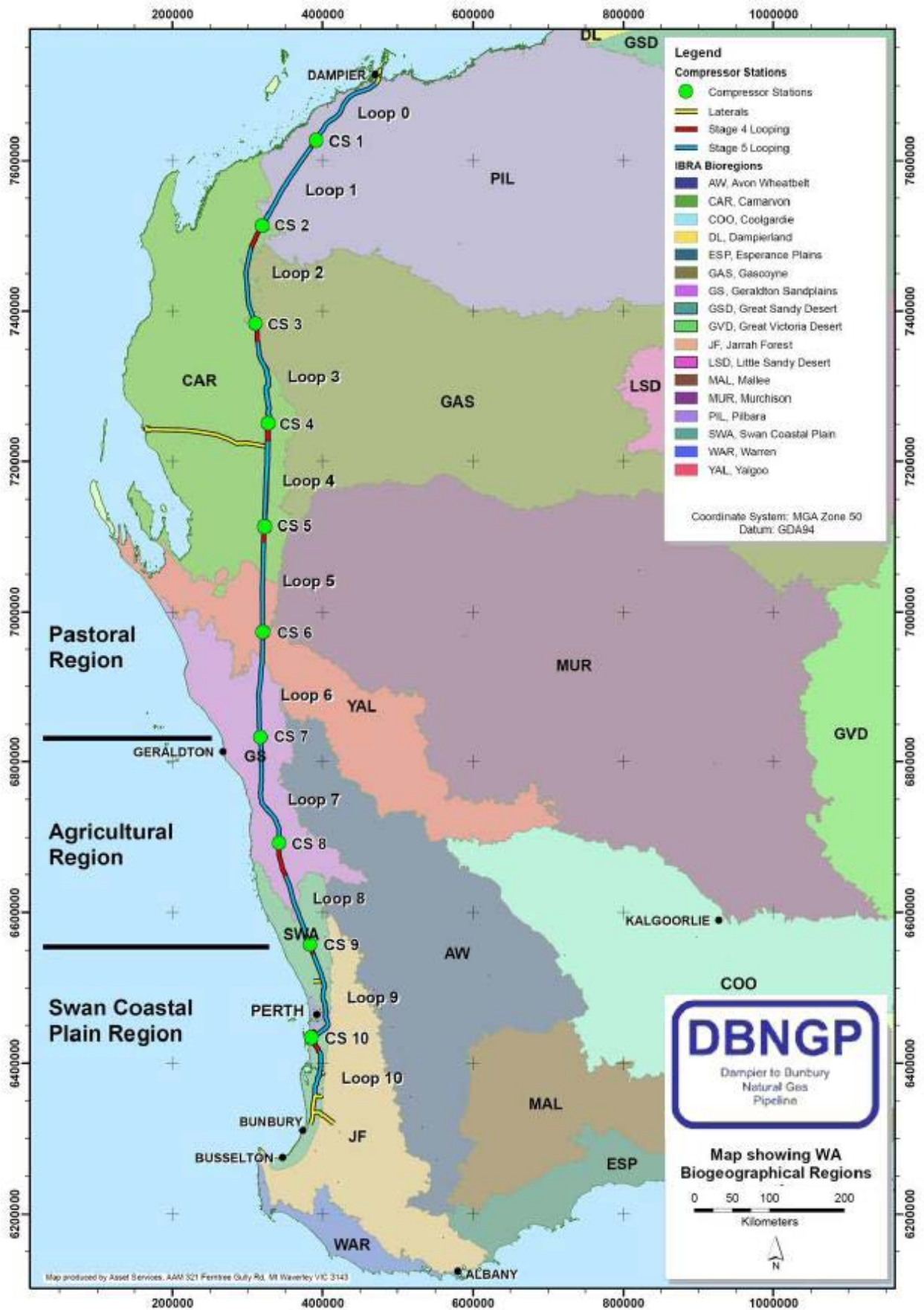


Figure 2 Biogeographical regions traversed by the DBNGP

4.1. Pilbara Region

The Pilbara Region has an arid climate with summer rainfall that is strongly influenced by tropical cyclones. The mean annual rainfall in Karratha is 289.3 mm (BOM 2013).

The Pilbara Region consists of mountainous ranges and plateaus, alluvial plains, granite and basalt plains (LAWA 2001).

The DBNGP within the Pilbara Region is located within the Fortescue Botanical District of the Eremaean Botanical Province as defined by Beard (1975). The vegetation of this area is characterised by tree and shrub-steppe communities. Dominant genera of the area are *Eucalyptus*, *Acacia* and *Triodia* (Mattiske 2006). Based on publically available information, there is one species of conservation significant flora known to occur within a 50 m buffer of the DBNGP corridor within the Pilbara Bioregion. *Terminalia supranitifolia*, a Priority 3 (P3) species, is located in the vicinity of KP 8.

Bancroft and Bamford (2006) conducted a Level 1 fauna survey of the entire pipeline corridor in accordance with EPA Position Statement No. 3 (Bancroft and Bamford 2006). A total of 51 species of conservation significance were identified as potentially occurring within the Pastoral region of the DBNGP corridor (i.e. Pilbara, Carnarvon, Gascoyne, Yalgoo and a portion of the Geraldton Sandplains). These species are presented below:

- Gilled Slender Blue-tongue
- Fortescue Grunter
- Western Spiny-tailed Skink
- *Lerista lineata*
- Woma
- *Lerista planiventralis maryani*
- Pilbara Olive Python
- *Lerista yuna*
- Carpet Python
- Grey Falcon
- Malleefowl
- Australian Bustard
- Great Egret
- Bush Stone-curlew
- Glossy Ibis
- Black-footed Rock-wallaby
- Orange Leaf-nosed Bat
- Barking Owl
- White-bellied Sea-Eagle
- Thick-billed Grasswren
- Peregrine Falcon
- Rufous Fieldwren
- Little Curlew
- Slender-billed Thornbill
- Common Greenshank
- White-browed Babbler
- Wood Sandpiper
- Crested Bellbird
- Common Sandpiper
- Spectacled Hare-wallaby
- Red-necked Stint
- Northern Quoll
- Bilby
- Barn Swallow
- Mulgara
- Tammar
- Sharp-tailed Sandpiper
- Ghost Bat
- Curlew Sandpiper
- Short-tailed Mouse
- Oriental Plover
- Western Pebble-mound Mouse
- Oriental Pratincole
- Caspian Tern
- White-winged Black Tern
- Carnaby's Cockatoo
- Major Mitchell's Cockatoo
- Night Parrot
- Fork-tailed Swift
- Rainbow Bee-eater
- Star Finch

The major water courses crossed by the DBNGP in the Pilbara bioregion are summarised below:

- Maitland River
- Melford Creek
- Yanyare River
- Devils Creek
- Du Boulay Creek
- Peter's Creek
- Robe River North
- Robe River South
- Warrambo Creek
- Peedamulla Creek
- Fortescue River
- Trevarton Creek
- Cane River
- Peepingee Creek

Cane River Station (a C class Conservation Park) lies adjacent to the DBNGP corridor between KP 208 and KP 262 (inclusive of former leasehold areas proposed for conservation). It should be noted that the DBNGP corridor is excised from this reserve. Nevertheless, the adjacent area is still classified as "of conservation value" for the purpose of operational activities.

4.2. Carnarvon Region

The coastal areas of the Carnarvon Region experience a semi-desert climate with winter rainfall while the Shark Bay area has a Mediterranean climate. Further inland the climate is arid with a low rainfall which is predominantly received in the winter.

The Carnarvon Region is characterised by low gently undulating relief and open drainage and large undulating sand plains (ECOS 2003). The soils of the Carnarvon system are erodible and disperse readily when they come into contact with water.

This area intersected by the DBNGP is classified as the Carnarvon Botanical District as defined by Beard (1975). Dominant genera are *Acacia* and *Triodia* with occurrences of species from the *Chenopodiaceae* (Chenopods) family such as *Halosarcia*, *Atriplex* and *Maireana* on flats and claypans. Based on publically available information, there are no species of conservation significant flora known to occur within a 50 m buffer of the DBNGP corridor within the Carnarvon Bioregion.

A summary of the fauna species likely to occur within the entire pastoral region (inclusive of the Carnarvon Bioregion) is provided under Section 5.1

A summary of the major water courses crossed by the DBNGP in the Carnarvon bioregion is provided below:

- Ashburton River
- Minilya River South
- Newman Creek
- Davis Creek
- Gascoyne River
- Gascoyne River South
- Wooramel River
- Lyons River

The Toolonga Nature Reserve (a C Class Nature Reserve) lies adjacent to the DBNGP corridor between KP 746 and KP 818, spanning the Carnarvon and Yalgoo bioregions. It should be noted that the DBNGP corridor is excised from this reserve. Nevertheless, the adjacent area is still classified as “of conservation value” for the purpose of operational activities.

4.3. Gascoyne Region

The region experiences a moderate arid tropical climate with very hot summers and warm winters. Rainfall is erratic and unreliable (LAWA 2001).

The Gascoyne region has moderately high relief, a close dendritic drainage pattern and mature valley topography (Payne et al 1987). Soils in the bioregion include shallow stony earthy loams, hard alkaline red soils, acidic or neutral shallow red earths, brown calcareous loams and red sands (Beard 1976).

The region is dominated by acacia shrublands and acacia forests and woodlands. Other shrublands and acacia open woodlands, salt lakes, and chenopod and samphire shrublands occur in the west (LAWA 2001). Based on publically available information, there are no species of conservation significant flora known to occur within a 50 m buffer of the DBNGP corridor within the Carnarvon Bioregion.

A summary of the fauna species likely to occur within the entire pastoral region (inclusive of the Gascoyne Bioregion) is provided under Section 5.1.

The major water courses crossed by the DBNGP in the Gascoyne bioregion are summarised below:

- Yannarie
- Lyndon River
- Monkey Creek North
- Monkey Creek South
- Minilya River North

There are no areas of conservation estate that intersect the DBNGP corridor within the Gascoyne Bioregion.

4.4. Yalgoo Region

The climate varies from semi-desert to Mediterranean with hot dry summers and mild winters with winter rainfall (LAWA 2001).

This region is characterised by sand and alluvial plains, lateritic breakaways, low ranges and salt lakes. Broad alluvial valleys separate the breakaways and low ranges (LAWA 2001).

The vegetation in the region is dominated by acacia shrublands, acacia forests and woodlands, hummock grasslands and smaller areas of Eucalypt woodlands and chenopod shrublands and samphire shrublands (LAWA 2001). Based on publically available information, there are no species of conservation significant flora known to occur within a 50 m buffer of the DBNGP corridor within the Yalgoo Bioregion.

A summary of the fauna species likely to occur within the entire pastoral region (inclusive of the Yalgoo Bioregion) is provided under Section 5.1.

Due to the low and erratic rainfall of the region there is little or no surface water. There are numerous salt lakes present in the region. The only major watercourse crossed by the DBNGP in the Yalgoo bioregion is the Murchison River at KP 845.

The Toolonga Nature Reserve (a C Class Nature Reserve) lies adjacent to the DBNGP corridor between KP 746 and KP 818, spanning the Carnarvon and Yalgoo bioregions. It should be noted that the DBNGP corridor is excised from this reserve. Nevertheless, the adjacent area is still classified as "of conservation value" for the purpose of operational activities.

4.5. Geraldton Sandplains Region

The coastal climate is Mediterranean with mild wet winters and hot dry summers. Inland areas experience semi-desert arid climate with low un-seasonal rainfall, hot dry summers and mild dry winters.

The Geraldton bioregion consists of undulating lateritic red sand plains overlaying sediments and gravels or cap-rock (LAWA 2001). Ranges include the flat topped Moresby Ranges near Geraldton, the Weld, Nicholas, Dividing, Montague, and Robinson ranges. However, these are minor and with a few other exceptions the region tends to be relatively flat.

Twenty-nine different vegetation systems have been identified within the Geraldton bioregion reflecting the influences of the high winter rainfall and soils in the region (Beard 1976). Areas in the region that have been cleared are susceptible to wind and water erosion and many areas suffer from land degradation from spread of weeds, uncontrolled fire and overgrazing by introduced pests such as feral goats, foxes and rabbits (WA Planning Commission 1999). The plant disease Dieback (*Phytophthora cinnamomi*) occurs in this bioregion. This fungal pathogen is soil borne and kills susceptible vegetation by killing root and tissue cells.

Based on publically available information, there are two species of conservation significant flora known to occur within a 50 m buffer of the DBNGP corridor within the Pilbara Bioregion. *Grevillea florida* (P3) is located in the vicinity of KP 1143. *Eucalyptus ebbanoensis* subsp. *Photina* (P4) is located in the vicinity of KP 1027.

Bancroft and Bamford (2006) conducted a Level 1 fauna survey of the entire pipeline corridor in accordance with EPA Position Statement No. 3 (Bancroft and Bamford 2006). A total of 47 species of conservation significance were identified as potentially occurring within the Agricultural region of the DBNGP corridor (i.e. Geraldton Sandplains and portion of Swan Coastal Plains). These species are listed below:

- Jewelled Ctenotus
- Gilled Slender Blue-tongue
- *Lerista lineata*
- Western Spiny-tailed Skink
- *Lerista yuna*
- Woma
- Black-striped Snake
- Carpet Python
- Black Bittern
- Malleefowl
- Western Swamp Tortoise
- Barking Owl
- White-bellied Sea-Eagle
- Shy Heathwren
- Peregrine Falcon
- Rufous Fieldwren
- Common Greenshank
- Slender-billed Thornbill
- Wood Sandpiper
- White-browed Babbler
- Common Sandpiper
- Sharp-tailed Sandpiper
- Quenda
- Curlew Sandpiper
- Tammar
- Hooded Plover
- Brush Wallaby
- Caspian Tern
- Water-rat
- White-winged Black Tern
- Carnaby's Cockatoo
- Baudin's Cockatoo

- Australasian Bittern
- Great Egret
- Australian Bustard
- Cattle Egret
- Bush Stone-curlew
- Glossy Ibis
- Crested Bellbird
- Red-necked Stint
- Brush-tailed Phascogale
- Chuditch
- Western Ringtail Possum
- Major Mitchell's Cockatoo
- Fork-tailed Swift
- Rainbow Bee-eater
- Black-footed Rock-wallaby

The major water courses crossed by the DBNGP in the Geraldton Sandplains bioregion are summarised below:

- Greenough River
- Irwin River
- Arrowsmith River
- Donkey Creek
- Flood Creek
- Milyulo Brook (north)
- Boothendarra Creek
- Hill River
- Mullering Brook

The conservation estates intersected by the DBNGP in the Geraldton Sandplains bioregion are summarised below. It should be noted that the DBNGP corridor has been excised from all Conservation Estates listed. Nevertheless, sections of the corridor adjacent to (and intersecting) these reserves are still classified as “of conservation value” for the purpose of operational activities.

- Coomallo nature Reserve *C Class Nature Reserve*
- Hill River Nature Reserve *A Class Nature Reserve*
- Twyata Nature Reserve *C Class Nature Reserve*
- Badgingarra National Park *A Class National Park*
- Minyulo Nature Reserve *A Class Nature Reserve*

4.6. Swan Coastal Plains Region

This bioregion experiences a Mediterranean climate with warm dry summers and cool wet winters (LAWA 2001). Rainfall increases with proximity to the western side of the Darling Scarp (Beard 1981).

The vegetation in the region is dominated in the south by eucalypt open forests and eucalypt woodlands with small areas of heath, open forests and woodlands, melaleuca forests and woodlands, acacia shrublands and shrublands. In the north large areas of eucalypt open woodlands, other forests and woodlands, heath, acacia shrublands and eucalypt woodlands occur (LAWA 2001). Based on publically available information, there are nine species of conservation significant flora known to occur within a 50 m buffer of the DBNGP corridor within the Swan Coastal Plains Bioregion. Table 1 presents the species name, conservation significance and location (via nearest KP) of each.

Table 1 Conservation significant flora known to occur within the Swan Coastal Plains Bioregion component of the DBNGP corridor

Species Name	Conservation Status	KP
<i>Isopogon drummondii</i>	Priority 3	1361
<i>Conospermum undulatum</i>	Threatened (Vulnerable)	1361, 1362 and 1363
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	Priority 4	1362
<i>Diuris purdiei</i>	Threatened (Endangered)	1382
<i>Jacksonia sericea</i>	Priority 4	1382
<i>Drakaea elastica</i>	Threatened (Critical)	1416
<i>Synaphea stenoloba</i>	Threatened (Critical)	1448
<i>Caladenia procera</i>	Threatened (Critical)	1511
<i>Diuris drummondii</i>	Threatened (Vulnerable)	1513

Bancroft and Bamford (2006) conducted a Level 1 fauna survey of the entire pipeline corridor in accordance with EPA Position Statement No. 3 (Bancroft and Bamford 2006). A total of 40 species of

conservation significance were identified as potentially occurring within the Swan Coastal Plains region of the DBNGP corridor. These species are listed below:

- Western Swamp Tortoise
- Jewelled Ctenotus
- Woma
- *Lerista lineata*
- Carpet Python
- Black-striped Snake
- Malleefowl
- Curlew Sandpiper
- Water-rat
- Hooded Plover
- Baudin's Cockatoo
- Major Mitchell's Cockatoo
- Fork-tailed Swift
- Chuditch
- Black Bittern
- Great Egret
- Australasian Bittern
- Cattle Egret
- Australian Bustard
- Glossy Ibis
- Bush Stone-curlew
- White-bellied Sea-Eagle
- Barking Owl
- Peregrine Falcon
- Caspian Tern
- White-winged Black Tern
- Carnaby's Cockatoo
- Rufous Fieldwren
- Common Greenshank
- White-browed Babbler
- Wood Sandpiper
- Crested Bellbird
- Common Sandpiper
- Brush-tailed Phascogale
- Red-necked Stint
- Quenda
- Sharp-tailed Sandpiper
- Brush Wallaby
- Rainbow Bee-eater
- Western Ringtail Possum

The major water courses crossed by the DBNGP in the Swan Coastal Plains bioregion are summarised below:

- Caren Caren Brook
- Moore River
- Red Gully
- Gingin Brook
- Swan River
- Helena River
- Murray River
- Harvey River
- Canning River
- Serpentine River
- North Dandalup River
- South Dandalup River

The corridor traverses numerous wetlands, including wetlands of regional conservation significance. The corridor is also in close proximity to two Ramsar wetlands, Forrestdale Lake and the Peel-Harvey Estuary.

The conservation estates intersected by the DBNGP in the Swan Coastal Plains bioregion. Are summarised below:

- Gnagara-Moore River State Forest *A Class State Forest*
- Leda Nature Reserve *A Class Nature Reserve*
- 1943/161 *A Class Nature Reserve*
- Myalup State Forest *A Class State Forest*

Additionally the Southern Loop Worsely Lateral intersects the Harris River State Forest (a Class A State Forest) between KP 41 and KP 58. An unnamed parcel vested to CALM is intersected by the DBNGP between KP 1512 - KP1515 and KP 1518 – KP 1521. It should be noted that unlike in all other bioregions, the DBNGP corridor has not been excised from any areas vested for conservation within the Swan Coastal Plains.

5. Activity Description

The DBNGP has twelve loops (Loops 0 to 10 and the South West Loop) and seventeen laterals (branch pipelines) along its length. It also has ten compressor stations (CS) which are equipped with two, three or four compressor units and associated facilities located on or along the pipeline, such as meter stations, mainline valves (MLVs) and communication equipment.

The DBNGP has Transportation Services Control Centre (TSCC) and Head Office located at 12-14 Esplanade in the Perth CBD and a maintenance complex located at Jandakot.

A summary description of the DBNGP is below:

- Natural gas from suppliers enters the DBNGP at Burrup Peninsula (North West Shelf Gas), Maitland (Apache Devil Creek), CS1 (Apache Harriet), Macedon near MLV21 (BHP Billiton),

Dongara (APA Mondarra Storage Facility – bidirectional) and Gingin (Empire Oil and Gas Red Gully). Supply from Gorgon near CS1 (Chevron) and Wheatstone near CS2 (Chevron) will in future become operational.

- The gas is cooled at Dampier Facilities and at all compressor stations, primarily to minimise potential for the formation of stress corrosion cracking.
- The gas passes through Mainline Valves (MLVs) the primary function of which is to allow isolation of a section or sections of the DBNGP for emergency response purposes as well as for maintenance. These sites contain Communication infrastructures and facilities for generation and storage of power on site to service the MLVs.
- The gas pressure reduces as it travels down the pipeline, due to friction loss. The pressure of the gas is raised through gas turbine driven compressors at Compressor Stations, which are spaced approximately 140km apart.
- The gas is delivered to shippers through outlet meter stations. While a majority of Meter Stations comprise of duty and standby runs that contain facility to meter, pressure reduce, heat and odourise the gas before delivery to the Shippers, other Meter Stations are a combination of these features depending on the needs of the customer.
- Odourisation is undertaken at some of the Meter Stations depending on the customer requirements. Bulk odourisation to industrial standard is undertaken at the DBNGP W LPG facility located in Kwinana for all gas delivered into the Kwinana and the Pipeline South segments.
- The pipeline is remotely operated through the Supervisor Control and Data Acquisition (SCADA) system from TSCC. The microwave communications system provides back bone for the SCADA system as well as connection for other digital communications systems.
- In order to enable maintenance teams to carry out breakdown and regular maintenance, accommodation facilities have been provided at all compressor stations except CS7 and CS10. The accommodation is motel style, air-conditioned, capable of accommodating between 15 and 23 people, and equipped with cooking, washing, sleeping and recreational facilities.
- The DBNGP is buried for its entire length (except at compressor stations). This protects the pipeline from third party damage and severe weather events. Excavation of the pipeline for maintenance purposes is not commonly required as it is preserved via its external coating and cathodic protection. Regular internal inspections are undertaken via intelligent pigging.

Owing to the ongoing high quality maintenance of the infrastructure, the DBNGP has a remaining design life of over 50 years.

6. Environmental Risk Management

In order to identify, understand and manage all environmental sources of risk and consequent impacts associated with operation of the DBNGP, a comprehensive Environmental Risk Assessment (ERA) was completed. The ERA was conducted by a multidisciplinary team of in house personnel and followed a structured process which sought to:

- outline key activities undertaken on the DBNGP;
- identify, analyse and evaluate associated hazards and corresponding environmental impacts;
- where necessary, establish suitable controls; and
- systematically assess the residual associated environmental risk.

An Environmental Aspects and Impacts Risk Register was developed to document the ERA outcomes (Appendix B). Each hazard and associated impact identified during the ERA has been addressed with an objective to:

- Define the environmental performance objectives that will be required to be achieved in order to ensure environmental protection
- Define the environmental performance standards that relate to the quality of the performance
- Define the measurement criteria for determining whether the objectives and standards have been met for the activity

An implementation strategy has been developed such that the established performance objectives and standards may be met over the life of the DBNGP. Specific control measures have been developed to direct, review and manage activities so that environmental impacts and risks are

continually being reduced to ALARP. Sections 6.1 to 6.14 provide a summary of the key control measures established for identified potential environmental impacts.

6.1. Soil and Sediment

- Vehicle access shall be restricted to stable ground. Additional care shall be taken near waterways and drainage lines.
- If a JHA identifies erosion as a possible impact, erosion and sediment control structures shall be constructed, such as sediment traps or drainage controls.
- If erosion is identified associated with DBP activities, erosion and sediment control structures shall be constructed, such as sediment traps or drainage controls.
- Excavation of watercourse beds and banks shall be minimised, leaving an undisturbed organic mat within the riparian zone, or delayed until construction of the crossing is imminent, thus preventing sediment input to watercourses.
- Windrows shall not block surface water flows or re-direct flows resulting in erosion and sedimentation.
- Where the pipeline is likely to affect or be affected by gully erosion, stabilisation works including diversion structures may be required.
- Topsoil, subsoil and vegetation disturbed through DBPs activities on the DBNGP shall be stockpiled separately such that the soil profile may be maintained during backfilling (i.e. topsoil returned to the top).
- Following back fill and respreading, topsoil shall be ripped to prevent compaction.
- Soil stockpiled as a result of clearing activities (including topsoil and subsoil) will be stored in stockpiles of <2m in height.

6.2. Flora

- Maintain a GIS Environmental Database to present up to date publically available information regarding the location of conservation significant and environmentally sensitive areas.
- Utilising the GIS Environmental Database, conduct pre clearing checks to ensure the proposed clearing is in compliance with an existing permit or approval and not at strong variance with the 10 clearing principles defined under Schedule 5 of the EP Act.
- Appropriate approvals shall be obtained prior to the clearing of any native vegetation.
- Vegetation clearing shall be kept to the minimum amount necessary to allow access or approved works.
- When undertaking line of sight clearing, vegetation slashing will be at the maximum height above ground level practicable (standardly 200 mm).
- Regrowth trees that are within 3 m of the pipeline shall be removed at seedling or sapling stages.
- Trees further than 3 m from the pipeline shall not be removed unless the root system has encroached or is likely to encroach on the pipeline.
- Riparian vegetation shall be trimmed instead of cleared, to the extent practicable. Consideration shall be given to relocating signs that give rise to a requirement for clearing of riparian vegetation.
- Areas of vegetation disturbance not required for future operational use shall be rehabilitated through re-spreading and ripping of salvaged topsoil.
- Areas subject to rehabilitation shall be identified in the DBP GIS.
- Access shall be restricted in areas subject to rehabilitation.

6.3. Weed and pathogens

- As far as practicable routine maintenance work in dieback infected areas will be scheduled for the drier periods during which the risk of spreading dieback is decreased.
- All vehicles and machinery used on unsealed roads and tracks shall be equipped with a stiff bristled brush suitable for clean down.
- Establish dedicated Clean on Entry (COE) areas to delineate locations of high sensitivity to weeds or pathogens. Record these spatially within the GIS Environmental Database.
- Ensure that all COE areas along the corridor are clearly indicated (either through satellite navigation devices or signage) such that drivers may be at all times aware of their proximity to a COE area.
- Vehicles shall be washed down offsite prior to travel to a dedicated COE area.

- Maintain the access track quality to minimise the risk of spread of weeds when travelling down the right of way.
- Any suspected infestation of weed species shall be reported to the Senior Advisor – Environment and Heritage.
- The presence of noxious weeds or suspected pathogens shall be reported to and managed in conjunction with the relevant local regulatory authority.
- Targeted weed management shall be undertaken to promote control of existing populations. This shall involve opportunistic treatment with herbicides. Records shall be retained to demonstrate implementation e.g. date, size and location of area treated.
- All herbicides shall be applied strictly in accordance with the directions on the label.
- Buses shall be used in preference to private vehicles for transport of large workgroups.

6.4. Bushfire

- Pipeline operations and maintenance shall be conducted in accordance with the requirements of regulatory and local fire authorities. In particular, operations shall comply with relevant fire restrictions, notification requirements and permitting procedures.
- All equipment shall comply with relevant fire safety standards (e.g. use of exhaust spark inhibitors).
- Specific work procedures for all discrete maintenance tasks shall include provisions to minimise risk of ignition.
- Machinery and vehicles not in use shall be parked in areas of low fire risk (e.g. not parked over shrubs, tall grass or cleared vegetation residue).
- Vehicles shall be regularly checked to ensure that combustible material such as grass and debris does not build up in critical areas where ignition could occur.
- Where flammable or combustible chemicals are required to be stored on-site, appropriate fire-fighting equipment shall be available. Incompatible chemicals shall not be stored together.
- Firebreaks shall be maintained at facility sites as appropriate.
- All vehicles shall be fitted with a dry chemical powder fire extinguisher. Sizes may vary from 2.5 kg to 9 kg dependent upon the vehicle size.
- Infrastructure shall be equipped with appropriate fire fighting equipment.
- To prevent an accidental ignition of possible hazardous concentrations of flammable vapour or gas, appropriate precautions must be taken, including the display of suitable signs to indicate to the public the extent of any hazardous areas and/or situations.
- The following is prohibited in hazardous areas:
 - smoking
 - the presence of matches, lighters and naked flame
 - the access of any sources of ignition to the area (eg. spark-ignition engines, motor vehicles etc).
 - open fires (barbecues, campfires, rubbish or brush burning) are prohibited at all times.

6.5. Fauna

- Vehicle speeds shall not exceed 60 km per hour within the DBNGP corridor and 80km per hour on unsealed roads.
- As far as practicable, restrict driving to within daylight hours and avoid driving at dusk and dawn.
- Prior to starting up machinery, check for native fauna taking shelter under machinery.
- As far as practicable, and subject to the vegetation management requirements of AS2885.3, no habitat trees shall be removed from the corridor during the operation of the pipeline. Avoid disturbance to trees (living or dead) with large hollows as these provide valuable fauna habitat.
- Fauna shall not be fed and direct contact with fauna shall be avoided.
- Domestic waste shall be maintained within sealed bins and collected for appropriate disposal.
- Should excavation be required as part of the maintenance of the pipeline, a JHA shall be undertaken and appropriate measures to mitigate impacts to fauna considered and implemented varying as necessary to address the significance of the adjacent environment.
- All excavations left open overnight shall be equipped with exit ramps and fauna shelters (i.e. hessian bags).
- All excavations left open overnight shall be inspected for trapped fauna within 3 hours of sunrise.

- All excavations shall be filled as soon as practicable.
- All excavations shall be inspected no more than half an hour prior to backfilling.

6.6. Cultural Heritage

- All personnel working on or near an Aboriginal site shall be made aware of their responsibilities under the *Aboriginal Heritage Act 1972*.
- No ground disturbing activity shall be conducted outside the spatial limits of the corridor.
- Ground disturbing activities within waterways shall be avoided at all times unless no other option is available.
- Where ground disturbance is undertaken within a waterway, works shall be planned and executed such that the footprint may be restricted to the minimum area practicable.
- If a previously unidentified cultural site is identified, the following must be undertaken:
 - stop all work within 30 m of potential Heritage site
 - report the location and nature of the site to the Senior Advisor – Environment and Heritage
 - establish a 30 m buffer around the site, outside which work may continue.
- Any interaction with a previously unidentified cultural site shall be recorded as an incident.
- Notify the relevant regulatory body and Aboriginal group regarding any previously unidentified potential sites encountered during works, as soon as practicable.
- All personnel shall be inducted regarding the cultural significance of the DBNGP corridor.

6.7. Land users

- Use of internal farm tracks or private roads must be with the agreement of individual landowners and lessees.
- Except in case of emergency or urgent maintenance, the landowner shall be notified at least 24 hours before access is required.
- Vehicle speeds shall not exceed 60 km per hour within the DBNGP corridor and 80km per hour on unsealed roads.
- All fences and markers shall be left intact and as they were found.
- Stock animals are not to be unduly disturbed and gates are to be left as found.
- Waterholes and bores used for watering stock are not to be polluted or depleted.
- Other infrastructure (e.g. pumps, windmills, stock enclosures etc.) are not to be disturbed.
- Public access to the DBNGP corridor shall not be permitted unless that right already exists.
- Public access shall be controlled by measures such as disguise (i.e. dogleg service tracks), physical barriers and signs, where appropriate.
- Except for specific purposes (e.g. rehabilitation of topsoil, protection of heritage sites, safety hazard control or protection of pipeline facilities), the DBNGP corridor shall not be fenced.
- New landowners shall be briefed on approved and prohibited land uses as well as the safety, emergency response and operational considerations of the DBNGP and associated infrastructure.

6.8. Air emissions

- The planned release of gas shall be minimised.
- Whenever possible, planned gas releases shall be conducted during meteorological conditions that facilitate rapid dispersion of the gas.
- Residents, landowners and appropriate authorities shall be advised of a pending major venting operation prior to undertaking the activity.
- Odourisation of the gas (i.e. mercaptan dosing) shall be undertaken in a manner that minimises the risk of accidental release of odorant. Odouring equipment shall be appropriately maintained.
- Conduct verification monitoring of incinerator atmospheric emissions upon commissioning and annually thereafter to quantify actual concentrations of contaminants of potential concern in incinerator emissions.
- Maintain a register to document the date, duration and estimated quantity of all mercaptan and mercaptan impacted wastes incinerated.
- Estimate incinerator emissions of contaminants of potential concern quarterly based upon verification monitoring results and the incineration register.
- Manage incineration loads to ensure that estimated emissions do not exceed guideline values set out within Annex V to the European Union Waste Incineration Directive (or other more

suitable standard as agreed in consultation with the DMP).

- Document the scale, conditions and justification for all unplanned and planned gas releases.
- Appropriate dust emission controls shall be applied during operation as necessary. If dust problems still occur at particular sections of the pipeline corridor, the following measures shall be adopted as appropriate:
 - Revegetate using existing species and prevent access until the vegetation is established.
 - Ensure speed limits are appropriate and being observed.
 - Minimise vehicle movements.
 - Use geotextiles, hessian or mulched vegetation on localised areas.
 - If available, spray water on the problem areas.

6.9. Noise

- Equipment shall be selected in consideration of its noise emissions. Where practicable, equipment should be selected that is likely to result in the lowest noise impact whilst still completing the required task.
- Equipment shall be fitted with appropriate noise abatement devices (e.g. mufflers, silencers and screens) and maintained in good working order.
- Local residents will be informed of potential noise from maintenance activities prior to the commencement of activities.
- Where practicable, excessively noisy activities shall be scheduled for periods that are less likely to result in a noise nuisance (i.e. daytime). This decision should be made in consultation with the residents.

6.10. Surface and Ground Water

- Water crossings shall be maintained in a stable condition.
- Appropriate approvals shall be obtained prior to the disturbance of the bed or banks of any watercourse (DoW).
- During any maintenance work on watercourse crossings erosion control measures shall be installed as required.
- Maintenance and major works on watercourse crossings shall be avoided during the cyclone season (where relevant).
- Maintenance of mobile equipment and vehicles shall not be conducted within 100 m of any permanent surface water body.
- With the exception of groundwater monitoring events, approval will be sought from DoW or relevant landholder prior to abstraction of groundwater from any bores or artificial water sources.

6.11. Hazardous Materials Storage and Handling

- All sites shall maintain a Material Safety Data Sheet Manifest and the MSDS for all stored hazardous materials shall be readily accessible.
- All chemicals used during operations shall be transported, stored, handled and disposed of in accordance the requirements of the relevant legislation and industry standards.
- All personnel involved in hazardous materials handling shall be adequately trained.
- A licenced contractor shall be sourced for the transport of Dangerous Goods where required.
- Chemical use shall be minimised where practicable.
- The minimum practicable volume of chemicals shall be stored on-site.
- Hazardous materials shall be stored in containment facilities (e.g. bunded areas, leak proof trays) designed to hold 110% of the capacity of the largest container or 25% of the total, whichever is the greater and be impervious to prevent the release of spilt substances to the environment.
- Additional spill containment facilities such as compacted pads or drip trays are to be provided at refuelling stations, oil and chemical storage sites and vehicle maintenance areas.
- Hazardous materials are to be provided, stored and maintained in a sealed condition, without leaks.
- Hazardous materials shall be stored in labelled and lidded containers.
- Storage areas are not to drain to land or streams.
- Refuelling tanks, lines, hoses, pumps, couplings, valves and associated equipment are to be

provided and maintained in good working order.

6.12. Spill response

- Appropriate spill response equipment, including containment and recovery equipment, shall be available on site and in vehicles undertaking work where there is the potential for fuel or chemical spillage.
- All spills must be addressed immediately in accordance with the Spill Response Procedure.
- Spills shall be recorded as an incident requiring internal reporting on the:
 - date, time, location
 - quantity and material spilled
 - circumstances that caused the spill
 - size and type of affected area
 - damage / harm caused
 - description of clean-up activities
- Material from banded areas is not to be buried during rehabilitation. Any contaminated material must be removed and disposed of at a licenced facility.

6.13. Waste management

- All waste shall be disposed of in accordance with signage and site specific procedures. If unsure consult your supervisor.
- All waste shall be disposed of in dedicated, labelled and lidded bins.
- Do not overfill waste bins.
- All waste will be transported to a licenced waste disposal facility.
- All general wastes, including materials such as wood, vegetation, rags, paper and domestic scraps shall be properly disposed of at a Shire or other approved waste facility.
- Recyclables shall be segregated for collection and management by a licenced contractor.
- Residuals from the pipeline as a result of pigging shall be captured in labelled containment vessels and disposed as used oil by a licenced contractor
- No chemicals or cleaning mixtures shall be injected into the pipeline during pigging.
- Liquid hazardous wastes shall be stored in above or underground storage tanks consistent with controls described in Section 6.11 (Hazardous Material Storage and Handling). Oily rags, filters and other solid hydrocarbon waste shall be stored in dedicated, labelled lidded 44 gallon drums stored within a hardstand area. All hazardous waste shall be collected for offsite disposal by a licenced contractor.
- Disposal of any chemical shall be in compliance with approved industry codes of practice, relevant safety guidelines and Australian Standards.
- Scrap metal includes pipe, structural steel and metal off-cuts, etc. Scrap metal shall be disposed of to an approved waste facility or may be returned to the Jandakot Depot for later disposal.
- Sewage shall be treated onsite prior to disposal via spray irrigation or pumped to a septic tank where sludge is retained for collection and offsite disposal by a licenced contractor.

6.14. Acid Sulphate Soils

- Maintain a GIS Environmental Database to present the DEC ASS Risk Map.
- Prior to excavation to a depth greater than 3m or excavation of a total of 100 m³; or dewatering, consult the GIS Environmental Database and characterise the ASS risk ranking of the proposed disturbance site.
- Within areas of a moderate – high risk of ASS, conduct an ASS investigation prior to conducting the works if those works will either disturb more than 100m³ of soil or require dewatering.
- Within areas of a low - moderate risk of ASS, conduct an ASS investigation prior to conducting the works if those works will either involve lowering of the water table, extend beyond 3 m below the natural ground surface or occur within 500 m of wetlands.
- Where required, ASS investigations shall be conducted in accordance with Identification and investigation of acid sulfate soils and acidic landscapes (DEC, 2013)
- Where practicable, avoid disturbance in areas where ASS are identified.
- Where disturbance to identified ASS cannot be avoided, an ASS Management Plan (ASSMP) shall be prepared and submitted to the DER for approval prior to the commencement of excavation.

- Where required, the ASSMP shall be prepared in accordance with Treatment and management of soils and water in acid sulfate soil landscapes (DEC 2011).
- Where applicable, implement the ASSMP to ensure appropriate treatment and monitoring of ASS.

To monitor the effectiveness of control measures in the management of the environmental impacts and risks, targeted monitoring commitments have been specified where relevant. DBP conducts regular surveillance of the DBNGP corridor to ensure that the integrity of the DBNGP is maintained. These patrols are conducted by 4WD, helicopter, fixed-wing aircraft and by foot with an objective to detect:

- Third party encroachments
- Erosion and changing landforms
- Damaged or missing signage
- Vegetation overgrowth and clearing
- Damaged or missing gates and fences
- Changes in location class
- Indications of gas leaks
- Impediments to and condition of access roads
- Security violations
- Weed infestation
- Water quality and protection of natural flows
- Any other issues of significance to the integrity of the corridor

The DBNGP is subject to an annual environmental compliance review to ensure that the systems and controls detailed within this EP are both adequate and implemented, and also identify opportunities for improvement.

7. Consultation

Key stakeholders including DoL and DMP, along with relevant pipeline operations personnel participated in a HAZID to identify and assess the potential environmental hazards associated with the operations and maintenance activities for the DBNGP. Furthermore, consultation with other stakeholders including the DER, DPaW and DoW is undertaken as the need arises to ensure that operations on the DBNGP are managed in accordance with relevant statutory requirements.

Recent consultation with key regulators is described below:

- Throughout Q1 and Q2 2012 numerous discussions were held with DEC (now DER) regarding identification and correction of the root causes for accidental disturbance to potentially rare flora during LOS clearing.
- In Q2 2013 DMP were consulted regarding interpretation of CPS4241 with respect to the types of activities clearing approved under the permit.
- In Q1 2013 DMP were consulted regarding potential risks associated with discharge of RO waste water directly to ground. Consultation on this matter is ongoing.
- In Q3 2013 EPA were consulted regarding submission of annual compliance reports for all pipeline activities assessed under part IV of the EP Act.

Consultation and communication with relevant landholders, regulatory authorities, Aboriginal and other interest groups and the general public will be undertaken as part of the DBNGP operation activities. Formal contact with all landholders will be determined relevant to the perceived risk, with ongoing liaison throughout the year. All contacts involve the dissemination of information about the DBNGP, discussion of any concerns and education of pipeline safety to increase awareness. This ongoing process is designed to decrease the risk of third party incidents and to encourage ownership of the activities around the pipeline.

DBP target annual consultation with all landholders. In the past 12 months, DBP has conducted over 300 landholder visits. These visits provide an opportunity for the landowner to advise DBP of any change to their contact details, land use requirements and future expectations. DBP promote awareness of risks and emergency protocols.

8. References

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- Beard J.S. (1976) *The Vegetation of the Murchison Region. Vegetation Survey of Western Australia – Murchison 1:1000000 Vegetation Series*. Explanatory Notes to Sheet 6. University of Western Australia Press. Beard 1976).
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- Bureau of Meteorology (BOM) (2013) Weather and Climate Data <http://www.bom.gov.au/climate/data/> Accessed 19/06/2013
- Ecos Consulting (ECOS) (2003) *Bioregion Description Dampier to Bunbury Natural Gas Pipeline*. Unpublished report prepared for Epic Energy. September 2006.
- Land and Water Australia (LAWA) (2001) *Australian Native Vegetation Assessment – 2001. Commonwealth of Australia*
- Mattiske Consulting Pty Ltd (Mattiske) 2006, *Flora and Vegetation Assessment of Alinta Gas pipeline Stage 5 Expansion Geraldton to Dampier*. Unpublished report prepared for Alinta, Perth. September 2006.
- Payne A.L, Curry P.J. and Spencer G.F. (1987) *An inventory and condition survey of rangelands in the Carnarvon Basin, Western Australia*. WA Department of Agriculture Technical Bulletin No.73. Edited by D.A.W Johnston.
- Western Australian Planning Commission (1999) Geraldton Region Plan – Section 5 Natural and Cultural Environment, State of Western Australia.

Appendix A Locality Coordinates

Locality	Easting	Northing
CS 1	391564.4	7627640.4
CS 2	319638.6	7514093.9
CS 3	310908.0	7383648.1
CS 4	327581.3	7251438.5
CS 5	322618.4	7113719.5
CS 6	320489.3	6973600.5
CS 7	317483.6	6832807.2
CS 8	341662.8	6692587.7
CS 9	383392.3	6558132.4
CS 10	384999.6	6433941.1
Dampier	476889.9	7721839.5
Carnavon	163999.7	7245506.6
Carnavon	325709.0	7219737.3
Mungarra	318759.6	6802905.8
Mungarra	316423.3	6802918.8
Pinjar	400938.5	6508218.3
Pinjar	387929.2	6508349.2
Russell Road	387872.0	6441436.6
Russell Road	387261.5	6433993.4
Rockingham - WMC	386774.2	6433877.9
WLPG	384999.5	6434723.2
Rockingham - WMC	384142.6	6431213.9
KNC / BP Lateral (Ep	383670.6	6432545.2
KNC / BP Lateral (Ep	384769.3	6433145.7
Alcoa Kwinana	385207.0	6436035.2
Alcoa Kwinana	385106.3	6437416.8
Kwinana West	387135.5	6433992.4
Alcoa Kwinana	384675.5	6436238.8
BP Co-Gen	384756.6	6433121.7
BP Co-Gen	384635.5	6433724.6
Ti-West Co gen	384421.7	6433712.3
CS 10 Interconnect	385011.9	6433960.4
KJN Pipework	387273.8	6434005.3
KJN Pipework	387291.3	6434028.2
WLPG	387195.5	6434025.4
WLPG	387162.3	6434013.5
Alcoa Pinjarra	395943.4	6387054.6
Alcoa Pinjarra	401095.0	6387138.1
Alcoa Wagerup	398346.2	6356708.8
Alcoa Wagerup	390003.3	6358050.1

Appendix A Locality Coordinates

Worsley Lateral	386819.8	6334555.0
Worsley Lateral	413401.8	6321421.3
Bunbury	384106.5	6318615.3

Appendix B Environmental Aspects and Impacts Risk Register

ID	EP Reference	ACTIVITY	ASPECT		IMPACT		CONTROLS	CONSEQUENCE	LIKELIHOOD	RISK
			Hazard	Source	Environmental Effect	Business Consequence				
5	6.13	Waste Disposal: Domestic waste	Leachate; Solid Domestic Waste; Liquid Domestic Waste; CO ₂	Inadequate management of domestic waste generated on site.	Odour, Pests, Aesthetics/Visual, Attracts feral animals, Hazard to livestock	Cost of pest and odour control, Surrounding landowner concern, Regulatory penalty	Licensed rubbish removal. Fenced off waste storage area/ covered skips or bins.	Trivial	Unlikely	Negligible
6	6.13	Waste Disposal: Sewage and Grey water to on-site septic tank or BioMax WWTP	Sewage	Inadequate containment of sewage	Soil, groundwater and/or surface water contamination, Increase in nutrient levels entering natural water systems	Regulatory penalty, Cost of remediation, Corporate reputation damage, Adjacent landowner concern	Adequate containment volume, Septic pump out as required by licensed contractor. BioMax maintenance and high level alarm.	Trivial	Unlikely	Negligible
7	6.13	Waste disposal: RO by-product	Salt	Discharge of saline by product of RO to ground	Creating saline ground, vegetation death, contributing to salinity of shallow groundwater, impacting offsite groundwater users.	Remediation, landowner concerns, fines	Minimise our need to produce water on site. Import water for compressor wash. Characterise receiving environment to ensure negligible likelihood of offsite migration of impacts (if any). Localised containment of saline discharge. Appropriate disposal based on site specific risk assessment outcome.	Trivial	Unlikely	Negligible
8	6.11, 6.12, 6.13	Waste Oil storage (underground)	Waste Oil	Leaching of oil through storage tank walls or floor. Spill during transfer to/from tank.	Soil, groundwater and/or surface water contamination	EPA Penalty, Cost of remediation, Corporate reputation damage, Personnel health and safety	Adequate storage (double skin) and / or bunding, Spill contingency procedures, Standard handling and safety procedures, Monitoring (where warranted) of soil adjacent to UST, Monitoring of groundwater quality at relevant locations. High level alarms - monthly inspections.	Minor	Remote	Negligible
9	6.11, 6.12, 6.13	Seal oil storage	Oil spill	Inadequate containment of failed tank	Soil, groundwater and/or surface water contamination	EPA Penalty, Cost of remediation, Corporate reputation damage, Personnel health and safety	Adequate storage (double skin) and / or bunding, Spill contingency procedures, Standard handling and safety procedures, Monitoring (where warranted) of soil adjacent to UST, Monitoring of groundwater quality at relevant locations. High level alarms - monthly inspections. Validate waste storage is sufficient to contain entire contents of tank.	Minor	Unlikely	Low
10	6.11, 6.12, 6.13	Waste Oil Storage (Above ground)	Waste Oil	Inadequate bund capacity or leaching of oil through bund walls or floor	Soil, groundwater and/or surface water contamination	EPA Penalty, Cost of remediation, Corporate reputation damage, Personnel health and safety	Adequate double skin storage, Spill contingency procedures, Standard handling and safety procedures, reduce the quantity & period of oil storage. High level alarms - monthly inspections.	Minor	Remote	Negligible
11	6.11, 6.12, 6.13	Waste Oil sump	Waste Oil	Failure of pump out system leading to overflow	Soil, groundwater and/or surface water contamination	EPA Penalty, Cost of remediation, Corporate reputation damage, Personnel health and safety	Sumps are oversized, monthly inspections.	Minor	Remote	Negligible
12	6.11, 6.12, 6.13	Transfer by vacuum truck	Waste Oil	Spill during transfer from tank	Soil, groundwater and/or surface water contamination	EPA Penalty, Cost of remediation, Corporate reputation damage, Personnel health and safety	Tank design / use of trays, licensed removalist.	Trivial	Unlikely	Negligible

Appendix B Environmental Aspects and Impacts Risk Register

13	6.11, 6.12, 6.13	GEA at MLV sites	Waste Oil	Spillage of oil during filter change	Soil, groundwater and/or surface water contamination	EPA Penalty, Cost of remediation, Corporate reputation damage, Personnel health and safety	Self-contained bunding in building.	Trivial	Unlikely	Negligible
14	6.11, 6.12, 6.13	Hazardous waste disposal	Hazardous Waste including lead acid batteries, Asbestos, Oily filters, Oil soaked coalescer	Inappropriate disposal of hazardous waste	Soil, groundwater and/or surface water contamination	Regulatory penalty, Cost of remediation, Corporate reputation damage, Personal Health and Safety	Standard handling and safety procedures, use of licenced waste disposal contractors.	Trivial	Remote	Negligible
15	6.2, 6.3	Weed control	Herbicide	Overspray	Damage to native vegetation, damage to agricultural crops, Soil, groundwater and / or surface water contamination.	Remediation costs, Landowner concerns, litigation, regulatory penalties, compensation costs, Health and Safety.	Use of approved herbicides, Use correct application procedure and equipment. Register of land owners specific requirements in GIS. Review weed management processes on corridor.	Trivial	Unlikely	Negligible
16	6.3	Weed control	Herbicide	Spillage	Soil, groundwater and/or surface water contamination	Remediation costs, Landowner concerns, litigation, regulatory penalties, compensation costs, Health and Safety Issues.	Use of approved herbicides and, Use correct application procedure and equipment. Register of land owners specific requirements in GIS. Review weed management processes on corridor.	Trivial	Unlikely	Negligible
17	6.8	Venting Purging (e.g. automatic valve operations pressure relief valves compressor casing compressor station start-up/shut down	Methane CO ₂	Venting, Purging, (Controlled release of gases)	Increase in greenhouse gas emissions, Decrease in local air quality.	Negligible as have regulatory approval	Normal operational management, minimise starts and stops.	Trivial	Frequent	Low
18	6.9	General	Noise	Noise	Increase in noise levels at residential locations	Complaints by landholders, corporate reputation	Standard maintenance procedures, appropriate equipment	Trivial	Frequent	Low
19	6.8	Flaring of odourised gas	Smell	Smell	Residential complaints of odour.	Complaints by landholders, corporate reputation. Prosecution by EPA	Standard operating procedures, manned operation.	Minor	Remote	Negligible
20	6.8, 6.9	Failure of relief valve	Methane	Uncontrolled release, noise	Increase in greenhouse gas emissions and noise disturbance. Decrease in local air quality.	Negligible notify regulatory authorities	Standard maintenance procedures, alarms for all significant PRV	Minor	Unlikely	Low
21	6.8	General Compressor Operation	Air pollution	Exhaust emissions	Increase in greenhouse gas emissions, Decrease in local air quality	Regulatory penalty	Adhere to licence conditions, standard maintenance procedures	Trivial	Frequent	Low
22	6.8	General Compressor Operation	Air pollution	Excessive Fuel Consumption as a result of inefficient configuration/operation	Increase in greenhouse gas emissions, Decrease in local air quality	Fuel cost	Standard operating procedures, pipeline efficiency modelling.	Trivial	Occasional	Low
23	6.8	Major Maintenance (Venting)	Methane, noise	Venting major pipeline section for repairs of third party damage	Increase in greenhouse gas emissions, Decrease in local air quality	Negligible as have regulatory approval. Will alert adjacent public.	Standard operating procedures, manned operation.	Minor	Unlikely	Low
24	6.11, 6.12	Draining cooling systems, water bath heaters, radiators etc.	Chemically treated water	Inadequate containment of drained material	Soil, groundwater and/or surface water contamination	EPA Penalty, Cost of remediation, Corporate reputation damage, Personnel health and safety	Standard handling and disposal procedures.	Trivial	Remote	Negligible

Appendix B Environmental Aspects and Impacts Risk Register

25	6.4, 6.11, 6.12	Storage of Hazardous materials / Dangerous Goods e.g. chemicals hydrocarbons, aviation fuel	Oil, chemical, or aviation fuel	Spill of oil, chemical, or aviation fuel	Soil, groundwater and/or surface water contamination. Loss of vegetation / crops. Detrimental effect on native fauna and livestock, odour, Increased risk of fire.	EPA Penalty, Cost of remediation, Corporate reputation damage, Personnel health and safety	Adequate containment and bunding, spill contingency procedures, standard handling and safety procedures, minimise quantities of oil and hazardous materials stored.	Trivial	Unlikely	Negligible
26	6.8, 6.11, 6.12	Injection and handling of Odorant e.g. Mercaptan	Odourant	Spill of odourant	Soil, groundwater and/or surface water contamination. Loss of vegetation / crops. Detrimental effect on native fauna and livestock, odour, Increased risk of fire.	EPA Penalty, Cost of remediation, Corporate reputation damage, Personnel health and safety	Adequate containment and bunding, spill contingency procedures, standard handling and safety procedures.	Trivial	Occasional	Low
27	6.11, 6.12	Transport and handling of Hazardous material / Dangerous Goods e.g. chemicals hydrocarbons, aviation fuel, radioactive sources	Oil, chemical, or aviation fuel	Spill of oil, chemical, or aviation fuel	Soil, groundwater and/or surface water contamination. Loss of vegetation / crops. Detrimental effect on native fauna and livestock, Odour, Increased risk of fire.	Regulatory penalty, land owner concern, cost of remediation.	Adequate Transport equipment, spill contingency procedures, standard handling and safety procedures, Use of competent contractors and staff. Licenced Dangerous Goods Transport - where required.	Minor	Remote	Negligible
28	6.11, 6.12	Transport of Odourant e.g. Mercaptan (WA Only)	Odourant	Major spill of odorant	Soil, groundwater and/or surface water contamination. Loss of vegetation / crops. Detrimental effect on native fauna and livestock.	Regulatory penalty, land owner concern, cost of remediation, Corporate reputation damage, Public Outrage, Personal health and safety.	Adequate Transport equipment, Licenced Dangerous Goods Transport, spill contingency procedures, standard handling and safety procedures.	Severe	Hypothetical	Negligible
29	6.1, 6.2, 6.6	Airstrip maintenance	Grader	Vegetation clearance and grading	Loss of vegetation / habitat. Disturbance of native vegetation, Soil erosion and sedimentation Disturbance to unidentified aboriginal site	Land owner concern	Maintain and inspect strip as required.	Trivial	Remote	Negligible
30	6.1, 6.2	Use of airstrip	Aircraft	Impact through taxi, take-off and landing	Loss of vegetation / habitat. Disturbance of native vegetation, Soil erosion and sedimentation	Land owner concerns	Only use air strip in priority response. Medivacs, etc. Only CS5 for crew changes.	Trivial	Remote	Negligible
31	6.12, 6.13	Pigging	Waste Material from inside pipeline	Waste material is not contained, is spilled or is incorrectly disposed of	Soil, groundwater and/or surface water contamination	Regulatory penalties	Adequate facilities, define waste disposal method, standard maintenance procedures	Trivial	Remote	Negligible
32	6.12, 6.13	Filter changes	Oil and Gas Filter	Waste oil and filter is not contained, is spilled or is incorrectly disposed of.	Soil, groundwater and/or surface water contamination	Regulatory Penalties	Adequate facilities, define waste disposal method, standard maintenance procedures	Trivial	Remote	Negligible
33	6.1	Construction and use of water bores	Abstraction	Use of groundwater for compressor station operations	Decrease in ground water level, Decrease in ground water available to other landowners	Land owner concern, compensation costs	Obtain permit and adhere to conditions, identify and implement water use minimisation measures.	Trivial	Remote	Negligible
34	6.8, 6.11, 6.12	Failure of pipeline	Methane	Unplanned release of methane	Increase in greenhouse gas emissions, Decrease in local air quality.	Loss Revenue, corporate reputation damage, regulatory penalties, remediation costs.	Standard maintenance procedures, monitoring and auditing of pipeline, emergency response	Minor	Hypothetical	Negligible
35	6.8, 6.11, 6.12	Pipeline maintenance resulting in release e.g. Filter Change	Methane	Release of Methane	Increase in greenhouse gas emissions, Decrease in local air quality.	Negligible as have regulatory approval.	Standard maintenance procedures	Trivial	Frequent	Low

Appendix B Environmental Aspects and Impacts Risk Register

36	6.11, 6.12	Cathodic Protection Deep well anode drilling		Soil and Ground Water table pollution	Cross contamination of water table.	Regulatory penalties, remediation costs	Standard design procedures, appropriate assessment prior to installation	Trivial	Remote	Negligible
37	6.3	Vehicle usage	Weed or pathogen infected soil	Soil build up on vehicle	Introduction or spread of dieback disease in native forests / remnant vegetation potentially reducing quality of the forest, causing species loss and / or loss of fauna habitat, Introduction or spread of weed species.	Regulatory penalty, Remediation costs, Corporate reputation damage, landowner concern	Establish COE areas, record their location on GIS, and advertise their occurrence to staff. Wash down offsite prior to travel to COE area. Landholder liaison prior to visit, Use of buses instead of private vehicles for transport of large workgroups. Record dieback areas on GIS.	Severe	Occasional	Intermediate
38	6.1, 6.2, 6.3, 6.5	Vehicle usage	Vehicle	Driving vehicle on corridor	Compaction of topsoil, Loss of vegetation cover. Formation of erosion channels, Sedimentation resulting in a decrease in water quality, Disturbance of native fauna and / or livestock. Decrease in depth of cover or exposure of pipeline.	Regulatory penalty, Remediation costs, Corporate reputation damage, landowner concern, compensation costs	Corridor not to be used as general thoroughfare When use cannot be avoided, standard operating procedures, landowner liaison, obtain permits as required. Consult GIS for specific sensitivities.	Trivial	Occasional	Low
39	6.5	Vehicle usage	Vehicle	Accidental collision with native fauna or livestock	Death or injury of animal, Decrease in depth of cover or exposure of pipeline.	Restoration and repair costs	Driver training, avoid driving at dusk and dawn	Trivial	Frequent	Low
40	6.5, 6.7	Vehicle usage	Access /Interference	Gates left open	Escape of livestock and entry of other animal species.	Landowner Concern, Compensation Costs	Minimise stock crossing points Landholder liaison prior to visit Driver training	Trivial	Occasional	Low
41	6.2, 6.6	Pipeline maintenance - Slashing and clearing	Slasher	Slashing of non-target vegetation	Damage or loss of protected flora species or habitat areas. Soil erosion, Sedimentation resulting in a decrease in water quality. Disturbance to unidentified aboriginal site.	Regulatory penalty, Corporate reputation damage, Compensation costs	Environment Plan, Regular inspection and monitoring, Visually flag sensitive areas to be avoided, Landholder liaison. Application Purpose Permit for Native Vegetation. Restrict activity in waterways.	Severe	Unlikely	Intermediate
42	6.5	Pipeline excavation for inspection	Open excavation	Excavation left open overnight	Native fauna and or livestock fall into the excavation resulting in injury and death. Decrease in population of protected species.	Landowner Concern, Compensation Costs, Regulatory Penalty.	Fence excavation in sensitive areas, Environment Plan, Identify potential sites, Continual liaison with landholders and include in all project aspects.	Trivial	Occasional	Low
43	6.1, 6.2	Pipeline excavation for inspection	Degradation of top soil and impact flora	Machinery used for clearing and excavation	Scouring of water course bank, loss of species and habitat area.	Loss of vegetation, compensation cost, regulatory penalty.	Adequate Separation of top Soil from spoil. Seeding and replanting where required and respread of vegetation.	Minor	Unlikely	Low
44	6.6	Pipeline excavation for inspection	Disturbance to Unearth cultural heritage artefacts or site	Machinery used for clearing and excavation	Disturbance of and / or damage to cultural heritage site or artefacts	Regulatory penalty Poor relationship with traditional owners Compensation costs	Cultural Heritage Site listed on GIS - standard operating procedures, staff training and awareness.	Minor	Remote	Negligible

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45	6.14	Pipeline excavation for inspection	Potentially acid forming soils at depth	Excavation through Acid Sulphate Soil and or contaminated sites	When exposed to air formation of sulphuric acid, Groundwater and / or surface water contamination, Damage to aquatic organisms and ecosystems, Corrosion of pipeline.	Regulatory penalty Restoration and remediation costs Ongoing monitoring costs	Operating Procedure Acid soils listed on GIS. Acid Sulphate Soil Management plan,	Minor	Remote	Negligible
46	6.2, 6.10	Pipeline watercourse crossings	Erosion	Clearing of riparian vegetation	Scouring of water course bank, loss of species and habitat area. Disturbance within aboriginal site of ethnographic significance.	Regulatory penalty Restoration costs	Don't clear / trim riparian zone unless essential - consider relocation of signs.	Minor	Remote	Negligible
47	6.2, 6.10	Pipeline watercourse crossings	Vehicle	Vehicles drive through watercourse	Damage to watercourse banks and bed, Damage to riparian vegetation, introduction or spread of waterborne weeds	Regulatory penalty Corporate reputation damage Remediation costs	Keep to designated roads	Minor	Remote	Negligible
48	6.1, 6.10	Pipeline watercourse crossings	Erosion	Bank recontoured and restored post flood	Inadequate revegetation of riparian zone, Erosion of bank, Sedimentation resulting in a decrease in water quality, Decrease in depth of cover or exposure of pipeline, Loss of pipeline integrity, Cultural impacts	Regulatory penalty Corporate reputation damage Remediation costs	Regular patrol, particularly post cyclones	Minor	Remote	Negligible
49	6.8, 6.9	Pipeline operation / maintenance grit blasting/painting	Noise, Grit, Paint, Thinners	Dust and Noise emission	Disturbance of native fauna and or livestock. Disturbance of landowner.	Adverse community perception Remediation costs Compensation costs	Use of wire brush technique, Adequate equipment, Enclose operations, Conduct operations during daylight hours, Standard Operating Procedures, Landholder liaison	Trivial	Unlikely	Negligible
50	6.11, 6.12	Pipeline operation / maintenance grit blasting/painting	Grit, paint or thinners	Spill or overspray of grit, paint or thinners	Soil, groundwater and/or surface water contamination, loss of vegetation crops. Detrimental effect on native fauna and livestock.	Adverse community perception Remediation costs Compensation costs	Standard procedures, JHA (Job Hazardous Analysis), Training.	Trivial	Unlikely	Negligible
51	6.1	Pipeline borrow pits	Erosion	Inadequate restoration of borrow pit area, Inappropriate excavation of materials	Inadequate revegetation, cave in. Unstable ground, Soil Erosion, Changes to natural drainage. Aesthetics visual.	Corporate reputation damage, Landowner concern, Compensation costs, Remediation costs	Keep pit size to a minimum Restoration procedures Ensure all operators are licenced and well practiced Auditing	Trivial	Unlikely	Negligible
52	6.1, 6.3	Pipeline borrow pits	Changed land contours	Borrow pit fills with water	Habitat suitable for mosquito breeding	Corporate reputation damage, Landowner concern, Compensation costs, Remediation costs	Appropriately shaped pits, with external bunding to avoid filling with water. Use of existing borrow pits. Landowner Liaison, use of local pits to avoid importation of weeds and pathogens.	Trivial	Unlikely	Negligible
53	6.7	Corridor Maintenance	Access /Interference	Third party access	Dumping of rubbish, excavation, Reduction of integrity of pipeline. Damage to pipeline, Erosion water, soil, etc. Contamination of soil and water etc.	Corporate reputation damage, Landowner concern, Compensation costs, Remediation costs	Discourage access, dirt mounds, locked gates, Signage in accordance with AS2885, Education of landholders, contractors, third parties, etc. Surveillance in accordance with AS2885	Trivial	Frequent	Low

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54		Waste incineration	Atmospheric contaminants	Combustion emissions	Reduced air quality	Regulatory penalty Corporate reputation damage	Validation and verification monitoring, emission standards, incineration register, standard operating procedure, quarterly reporting	Minor	Unlikely	Low
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