Native Vegetation Clearance Application

Morgan Whyalla Number 1 Pipeline Renewal Stage 1, Package A-**1C**

Data Report

Clearance under the *Native Vegetation Regulations 2017*

February 2022

Prepared by Alice Si and Tobias Scheid (Eco Logical Australia)

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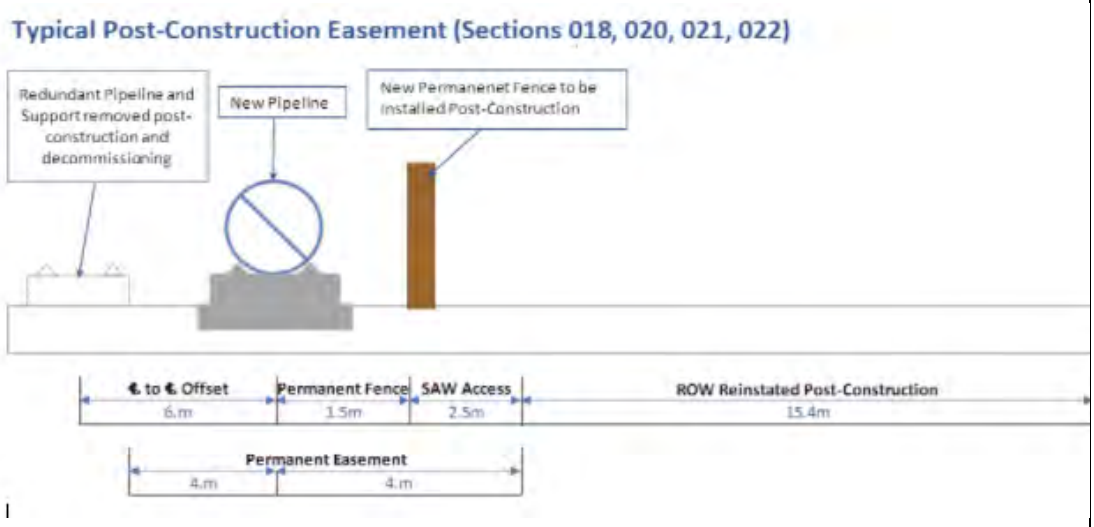
1. Application information

Application Details

Applicant:	SA Water		
Key contact:	Melissa Peake (Environmental Impact Assessment Officer) **E:** Melissa.peake@sawater.com.au **M**: 0484 593 830		
Landowner:	Crown/ utility easement		
Site Address:	Various locations between Morgan and Burra, SA		
Local Government Areas:	Mid Murray and Goyder	Hundreds:	Hanson Apoinga Bower Maude Beatty Eba
Title IDs:	CT/5696/313 CT/6119/373 CT/5168/840 CT/5973/369 CT/5569/79 CT/5335/613 CT/5851/697 CT/6172/977 CR/5759/528 CR/5757/829 CT/6078/898	Parcel ID	H230900 S213 H230900 S43 H230900 S55 F170362 A111 F218130 Q100 H200100 S156 H201000 S4 H201000 S248 H120300 S272 H120300 S166

Summary of proposed clearance

Purpose of clearance	To facilitate Package A-1C of the first stage of the renewal of the SA Water Morgan Whyalla Pipeline Number 1 (MWPL1) between Morgan and Whyalla. The renewal of the full 358km long pipeline will be undertaken in stages over the next 40 years,
Native Vegetation Regulation	Regulation 12. Schedule 1: Clause 34, Infrastructure
Description of the vegetation under application	The majority of vegetation associations within the proposed clearance area were *Austrostipa* spp. grassland (9.62 ha). There was also 3.55 ha of *Maireana brevifolia* and *Lycium australe* low shrubland over *schlerolaena* spp., for a total impact of 13.17 ha to native vegetation. Up to 5 threatened fauna species have been assessed as "possible" or "likely" to use this area for habitat: White-winged Chough, Elegant Parrot, Hooded Robin, Little Eagle and Peregrine Falcon. No threatened flora species were recorded in the study area despite active searching during the field survey.
Total proposed clearance - area (ha) and number of trees	13.17 ha
Level of clearance	Level 4

Overlay (Planning and Design Code)	N/A
See Figure 3 for a map of proposed clearance area	
Mitigation hierarchy	Vegetation along the existing pipeline (25 m corridor) will require full clearance as part of this pipeline upgrade project. The design and planning of the renewal has limited clearance by locating the new pipeline as close to the existing pipeline, whereby utilizing existing maintenance corridors and ancillary infrastructure such as access tracks, roads and laydown areas. In addition, where new laydown areas are required, these have been located in previously disturbed areas with little or no remaining native vegetation present. Following construction (25m impact corridor) 15.4m will be allowed to naturally regenerate and will not be subject to slashing or other maintenance activities. Permanent impacts will be limited to a 8m permanent easement contain both the old and new pipeline. This easement will be maintained and vegetation cleared as required to ensure access is maintained to the reinstated pipeline. See Figure 1 , below.  *Figure 1: Post Construction Easement*
SEB Offset proposal	A SEB payment of $100,937.57 plus Admin fee of $5,486.57 for a total of $106,424.14 is proposed to be paid into the Native Vegetation Fund

2. Purpose of clearance

2.1 Description

This application is for areas that will be disturbed during the 2020-2024 phase of the renewal of MWPL No. 1 at four renewal sections along the alignment (S16, S17, S22, S21) (Figure 3). Table 1 includes all details of each section of clearance. All effort will be made to minimize the vegetation disturbance during the renewal of this pipeline through controls implemented at the planning, design and construction phases. Including placing the new pipeline as close as practicably possible to the existing pipeline, making use of existing maintenance corridors and previously disturbed areas, preventing the need for large areas of new clearance zones.

A schematic of the proposed construction corridor (impact area) is detailed in Figure 2 below.

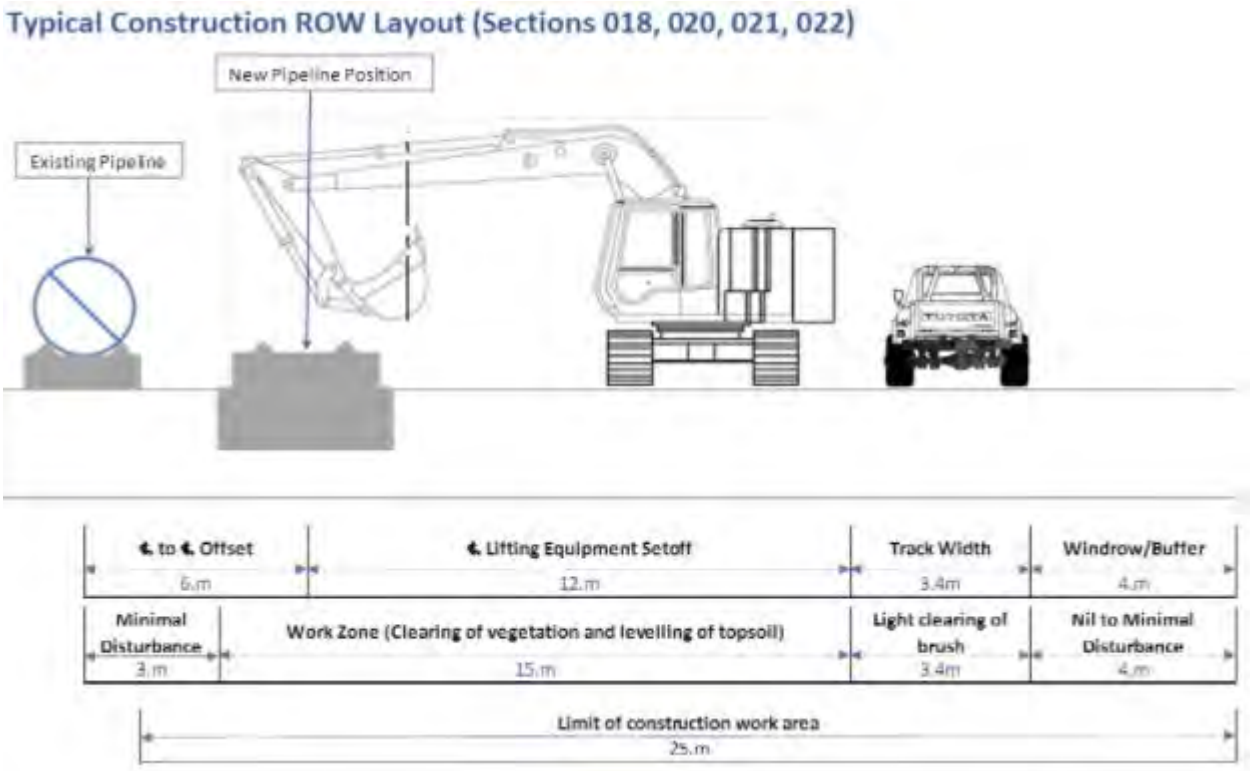


Figure 2: Proposed Construction Corridor and impact area

* Note Sections **18** and **22** will be limited to a 21 m maximum corridor not a 25 m corridor as pictured above in Figure 2. The corridor reduction in these areas will reduce impacts to the *Mallee Bird Community of the Murray Darling Depression Bioregion* listed as Endangered under the EPBC Act.

2.2 Background

The Morgan Whyalla Pipeline No.1 was constructed during World War II (1941-1944). The 358km-long rigid mild steel with cement lining pipeline (MSCL) runs parallel to the more recently built Morgan Whyalla Pipeline No.2 from Morgan to Baroota.

The Morgan Whyalla Pipeline is used for the transfer of bulk water supplies from the River Murray at Morgan to the Iron Triangle cities and to significant areas of the Mid North, Yorke Peninsula and Eyre Peninsula via an extensive distribution system. The Morgan Whyalla Pipeline No.1 and No.2 provide a critical water supply to approximately 100,000 customers in these regional areas, including some large industrial customers., The largest customers in the system are Liberty OneSteel at Whyalla and the Nyrstar lead smelter at Port Pirie.

The approximately 131km section of Morgan Whyalla Pipeline No.1 from Baroota to Whyalla is the sole water supply to Port Augusta and surrounding areas.

The existing pipeline requires ongoing maintenance due to increasingly frequent failures caused by its age and continuing deterioration.

SA Water has identified the current condition of the existing pipeline as high risk with failures potentially resulting in multi day outages which could impact between 15,000 and 100,000 customers. The repair and restoration of service would take 1-2 weeks.

SA Water undertook extensive condition assessments of the Morgan Whyalla Pipeline No.1 in 2018, identifying the key issues as the loss of the internal cement mortar lining, internal pipeline corrosion and control valves becoming blocked due to the dislodged cement lining.

A system augmentation review was undertaken in 2019 to assess the long-term plan for the Morgan Whyalla Pipeline. This review assessed multiple options including full pipeline renewal, selected section renewal and decommissioning of parts of the pipeline with supply replaced by the construction of a strategically placed desalination plant. It was determined that the Morgan Whyalla Pipeline No.1 was still required to be operational to meet future customer demand.

Accordingly, SA Water has identified the requirement for replacing multiple sections of the pipeline, a combined length of up to 34km during the 2020-24 regulatory period to meet customer demand and be in line with SA Water's business strategy. The renewal will improve the reliability of water supply to customers.

SA Water undertook an extensive options assessment in 2020 to determine the most cost-effective and productive solution considering the entire pipeline, including sections which require renewal now and those that will require renewal over 40+ years. As a result, an above ground mild steel with cement lining pipeline was identified as the preferred delivery option as it offered the highest operational and construction efficiencies, fewer impacts to the environment and stakeholders, and most sustainable construction solution.

The preferred alignment for the new pipeline is parallel to the existing pipeline. The design will utilise existing maintenance access tracks for install and decommissioning of the old pipeline (MWPL No.1) wherever possible, to minimise impacts to native vegetation. The pipeline renewal will be staged to ensure continued access to water supplies to customers. This vegetation clearance assessment report provides information for a native vegetation clearance approval where native vegetation was recorded within the proposed construction corridor.

The construction corridor will be limited to a 25 m wide footprint from the point of existing infrastructure, including the maintenance access track, see Figure 2.

This first package in stage 1 of renewal works (Package A-1C) will cover four separate areas between Morgan and Burra for pipeline renewal and associated access/ laydowns, and two additional laydown areas. These four sections (S16, S17, S22, S21) are split across different IBRA associations, and therefore each section corresponds to a BAM block (Figure 3, Table 1). Impacts within Sections S21 and S22 subject to this clearance application are to previously disturbed areas that will be utilised for project laydown areas only, impacts associated with the pipeline renewal in these sections will be included in a separate Native Vegetation Clearance Application. This project in the longer term is planned to span 40 years of pipeline renewal activity. Once replaced, it is estimated that renewal of new pipes will not need to occur for another 100 to 150 years.

2.3 General location map

See Figure 3, below.

Figure 3: Proposed clearance areas

Proposed clearance area

IBRA subregions

Landscape management regions

Conservation parks

White Dam

Hopkins Creek

Mimbara

0 5 10

Kilometres

Datum/Projection:
GDA 1994 MGA Zone 54
20649-OK Date: 1/03/2022

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2.4 Details of the proposal

This report covers four individual pipeline blocks with accompanying site access and laydowns along the pipeline from Morgan to Burra as shown in Figure 3. This assessment covers all areas that may be impacted during the renewal activity for this package of works. The blocks occur across four Interim Biogeographic Regionalisation for Australia (IBRA) Associations and contain five vegetation associations (Table 1).

Table 1. Site details

Block	Renewal Section	Clearance purpose	Site	Vegetation Association	Map reference	Coordinates
A	MWPL1-0016 **(S16)**	Southern site access and laydown	A1	*Austrostipa* spp. and *Avena barbata* grassland	Figure 4	Start Lat -33.757445^{o} Lon 138.839048^{o} Finish Lat -33.760011^{o} Lon 138.837212^{o}
A	MWPL1-0016 **(S16)**	Rail corridor access and laydown	A2	*Austrostipa scabra, Austrostipa blackii, Rytidosperma fulvum* and *Avena barbata* grassland	Figure 4	Start Lat -33.753322^{o} Lon 138.836365^{o} Finish Lat -33.756456^{o} Lon 138.836693^{o}
B	MWPL1-0017 **(S17)**	Laydown/turnaround	N/A – No native vegetation	Exotic	Figure 5	Lat -33.858617^{o} Lon 139.985724^{o}
B	MWPL1-0017 **(S17)**	Koo-owie Gap Road, Emu Downs. 1.4km of pipeline renewal.	B1	*Austrostipa* spp. grassland	Figure 5	Start Lat -33.860039^{o} Lon 138.986067^{o} Finish Lat -33.848364^{o} Lon 138.979515^{o}
B	MWPL1-0017 **(S17)**	Site access	B1	*Austrostipa* spp. grassland	Figure 5	Start Lat -33.848364^{o} Lon 138.979515^{o} Finish: entrance off Koo-owie Gap Rd
D	Pump Station 2 **(S22)**	Laydown for machinery and material delivery, plus site offices.	D6	*Eucalyptus oleosa +/- Eucalyptus gracilis* over *Maireana sedifolia* shrubland	Figure 6	Lat -33.970723^{o} Lon 139.425591^{o}
E	MWPL1-0021 **(S21)**	Laydown (intersection of Pipeline and Wonga Roads)	E4	Low open Maireana sedifolia shrubland with emergent Eucalyptus oleosa	Figure 7	Lat -33.971426^{o} Lon 139.527434^{o}

2.5 Approvals required *or* obtained

The main approval required for this project relates to native vegetation removal and is the subject of this data report. Additional information is provided in regard to other relevant legislation and why it is / is not applicable each case.

- *Native Vegetation Act 1991* (NV Act)

The clearance of native vegetation is necessary and will occur under the *Native Vegetation Regulations 2017* (Regulation 12. Schedule 1: Clause 34, Infrastructure). Clearance approval and offsetting will be required for the removal of any native vegetation (the subject of this data report). Risk Level is 4 due to a Total Biodiversity Score of greater than 250.

- *Planning, Development and Infrastructure Act 2016* (PDI Act)

No development approval is required (exempt) for these works in accordance with Division 2 of the *Planning, Development and Infrastructure Act* 2016 (PDI Act).

The project also falls outside of the designated area in which the Regulated and Significant tree controls apply – which is limited to the whole of Metropolitan Adelaide (with exceptions), and parts of the Adelaide Hills Council and the District Council of Mount Barker (with exceptions).

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

The removal of vegetation subject to this Native Vegetation Clearance Application will not result in significant impacts to Matters National Environmental Significance (MNES) listed under the EPBC Act..

- *National Parks and Wildlife Act 1972* (NPW Act)

ELA have a current scientific permit (permit number M27061-1) for flora collection, issued by DEW under section 49(1)(a) of the NPW Act.

The project is not impacting directly on any state reserves. Five bird species listed by Schedules 7, 8 and 9 of the NPW Act have a "highly likely", "likely" or "possible" assessment of occurrence: White-winged Chough, Peregrine Falcon, Little Eagle, Elegant Parrot and Hooded Robin (Table 9).

- *Aboriginal Heritage Act 1988*

The site assessed as medium risk and all works will follow SA Water standard operating procedures if sites are found during construction.

- *Landscapes South Australia Act 2019* (LSA Act)

According to section 104(4)(g) of the LSA Act a Water Affecting Activity (WAA) permit is required when destroying vegetation growing in a watercourse or lake or growing on the floodplain of a watercourse. There is a riparian corridor within the impact area. SA Water understands a WAA may be required by the project.

2.6 Native Vegetation Regulation

Regulation 12, Schedule 1; clause 34, Infrastructure
This application is made to provide essential water supply infrastructure.

2.7 Development Application information (if applicable)

Not Applicable, exempt development.

3. Method

3.1 Desktop assessment

A desktop assessment was undertaken to determine the potential for any threatened flora and fauna species and Threatened Ecological Communities (TECs) (listed under the NPW Act and EPBC Act) to occur within the clearance area. This was achieved by undertaking database searches for occurrence records of rated species within a 5km buffer of the study area.

3.1.1 PMST report

A Protected Matters Search Tool (PMST) report was generated to identify nationally threatened flora and fauna, migratory fauna and TECs under the EPBC Act within the study area (Department of Agriculture, Water and the Environment, 2021). In accordance with the Native Vegetation Council (NVC) Bushland Assessment Methodology occurrence records within 5km of the study area are assessed to determine a likelihood of occurrence within the clearance area.

3.1.2 BDBSA data extract

A data extract from the Biological Database of South Australia (BDBSA) was obtained from Department for Environment and Water (DEW) to identify flora and fauna species that have been recorded within 5 km of the study area (Department for Environment and Water, 2021). The BDBSA is comprised of an integrated collection of species records from the South Australian Museum, conservation organisations, private consultancies, Birds SA, Birdlife Australia, and the Australasian Wader Study Group, which meet DEWs standards for data quality, integrity, and maintenance. In accordance with the Bushland Assessment Manual, only species with records since 1995 and a spatial reliability of less than 1 km were assessed for their likelihood of occurrence.,

3.2 Flora assessment

The existing pipeline (MWPL1) runs through two Local Government areas (Mid Murray and Goyder) and four IBRA Associations (Hansen, Burra Hill, Neales Flat and Mt Mary). A field survey of the study area was undertaken by Catherine Miles and Alice Si (NVC Accredited Consultants) on 13th to 15th December 2021. Features of ecological significance were recorded including instances of native vegetation, habitat features as well as presence of *Landscape South Australia Act 2019* (LSA Act) declared weeds. Field surveys were undertaken accordance with the NVC Bushland Assessment Methodology (BAM) in areas of remnant vegetation within the study area. This enabled losses to be calculated under the permitted clearing regulations should impacts be unavoidable.

3.3 Fauna assessment

Active fauna searches were undertaken at each BAM site surveyed. This included conducting bird counts at each site, as well as inspecting refugia used by fauna, such as hollows, which were also noted as an indication of availability of suitable habitat. Any fauna observed incidentally were also recorded. Particular attention was paid to identifying habitat for threatened species with a high likelihood of occurrence (Table 9).

All native and exotic fauna species encountered (directly observed, or tracks, scats, burrows, nests and other signs of presence) during the field survey were recorded. For each opportunistic fauna observation, the species, number of individuals, GPS location, detection methodology (sight, sound or other evidence) and habitat were recorded.

Given the study area is either a maximum of 25 m corridor or very open, previously disturbed areas of up to 3 ha and most was traversed on foot, the fauna survey conducted is adequate. Due to the nature of the application area – extremely long, linear, very narrow and often degraded patches immediately adjacent access tracks, roads and service easement corridors– very few fauna species (several birds) were present. A dedicated fauna survey would be impractical and is extremely unlikely to reveal significantly more species than were observed during the site inspections.

4. Assessment Outcomes

4.1 Vegetation Assessment

General description of the vegetation, the site and matters of significance

S16 and S17 of the proposed clearance area occurs on mostly low hills with gentle footslopes forming intramontane plains, with soils varying from calcareous loamy sand to clay loam. There are no watercourses or wetlands recorded within the study area. The Murray River is the closest substantial waterbody, at approximately 15 km south-east of S21. The main land use surrounding all proposed clearance areas is Production from Dryland Agriculture and Plantations.

S16, S17 and S21 are comprised of mainly *Austrostipa* ssp. grasslands in varying conditions. Hopkins Creek Conservation Park is the closest protected area to S16 and S17, occurring approximately 2 km east. White Dam Conservation Park is the closest protected area to S21, occurring approximately 1.5 km north.

S22 contains *Maireana brevifolia* and *Lycium australe* low shrubland over *Sclerolaena* ssp. There are also planted trees and shrubs in this proposed laydown area, including *Tamarix aphylla* (Athel Pine; a Weed of National Significance (WoNS) and Declared under the LSA Act) which have been planted in a windrow formation. White Dam Conservation Park is the closest protected area to this site, occurring approximately 7 km north-east (Figure 3).

Five native vegetation associations have been described within the proposed impact areas, these vegetation associations have been summarised in Table 2 and discussed in further detail below in Table 3 to Table 7.

Impacts to these vegetation associations occur through lengths of clearances up to 25 m in width, along the existing pipeline, and up to 3.55 ha rectangular areas in previously disturbed areas for laydowns.

Table 2. Native vegetation associations within the proposed impact area

MWPL renewal section ID	BAM Block	BAM Site	Vegetation Association Name	TEC	Impact area (ha)
MWPL1-0016 **(S16)**	A	A1	*Austrostipa spp*. and *Avena barbata* grassland	No	0.454
		A2	*Austrostipa scabra, Austrostipa blackii, Rytidosperma fulvum* and *Avena barbata* grassland	No	0.423
MWPL1-0017 **(S17)**	B	B1	*Austrostipa* ssp. grassland	No	4.863
MWPL1-0022 **(S22)**	D	D6	*Maireana brevifolia* and *Lycium australe* low shrubland over *Sclerolaena* ssp.	No	3.55
MWPL1-0021 **(S21)**	E	E4	*Austrostipa nitida* grassland with emergent *Lycium australis* and *Acacia nyssophylla* shrubs	No	3.882

Details of the vegetation associates/scattered trees proposed to be impacted

Table 3. Summary table for Vegetation Association A1; Austrostipa spp. and Avena barbata grassland

Renewal Section	S16				
Vegetation Association	Vegetation Association A1; *Austrostipa spp.* and *Avena barbata* grassland				
 *Plate 1 – taken facing SW at easting: 299711, Northing: 6262933*					
General description	Native vegetation within A1 occurred near roads and disused rail lines. The native vegetation within VA1 had high native species diversity, with 23 native species present. However these were present in low densities, and were scattered throughout the dominant exotic Oat grass. Dominant species of this grassland were *Austrostipa* spp. and *Avena barbata*. Declared weeds present: *Convolvulus arvensis* (Field Bindweed), *Echium plantagineum* (Salvation Jane), *Marrubium vulgare* (Horehound), *Rosa canina* (Dog Rose), *Gazania linearis* (Gazania).				
Threatened species or community	Threatened species with current occurrence records nearby which may use this as habitat include: White-winged Chough, Peregrine Falcon, Little Eagle, Elegant Parrot and Hooded Robin. Refer to the likelihood of occurrence table (Table 9) for the full assessment.				
Landscape context score	1.16	Vegetation Condition Score	26.41	Conservation significance score	1.08
Unit biodiversity Score	33.09	Area (ha)	0.454 ha	Total biodiversity Score	15.01

Table 4. Summary table for Vegetation Association A2 Austrostipa scabra, Austrostipa blackii, Rytidosperma fulvum and Avena barbata grassland

Renewal Section	S16				
Vegetation Association	Vegetation Association A2 *Austrostipa scabra, Austrostipa blackii, Rytidosperma fulvum* and *Avena barbata* grassland				
 *Plate 2 – taken facing NE at easting: 299735, Northing: 6262418*					
General description	A2 was recorded in moderate condition with grasses dominating the ground stratum, comprising *Austrostipa scabra, Austrostipa blackii, Rytidosperma fulvum* and *Avena barbata.* This site has been previously disturbed, with a track passing through along the northern fence line, outside of the proposed clearance area, leading to fragmentation of this vegetation association. Declared weeds present: *Echium plantagineum* (Salvation Jane), *Marrubium vulgare* (Horehound).				
Threatened species or community	Threatened species with current occurrence records nearby which may use this as habitat include: White-winged Chough, Peregrine Falcon, Little Eagle, Elegant Parrot and Hooded Robin. Refer to the likelihood of occurrence table (Table 9) for the full assessment.				
Landscape context score	1.16	Vegetation Condition Score	30.60	Conservation significance score	1.08
Unit biodiversity Score	38.33	Area (ha)	0.423 ha	Total biodiversity Score	16.53

Table 5. Summary table for Vegetation Association B1; Austrostipa spp. grassland

Renewal Section	S17				
Vegetation Association	Vegetation Association B1; *Austrostipa* spp. grassland				
 *Plate 3 – taken facing NE at easting: 299711, Northing: 6262933*					
General description	*Native vegetation within B1 was limited to a scattered mix of Austrostipa spp. (Austrostipa Eremophila, Austrostipa nodosa, Austrostipa scabra* ssp.) *amongst a ground cover almost entirely dominated by annual exotic grasses namely Bearded Oats and common agricultural weeds including Salvia verbenaca* var. *verbenaca* (Wild Sage), *Heliotropium europaeum* (Common Heliotrope) and *Onopordum acaulon* (Horse Thistle). B1 was recorded in a highly disturbed state which is likely a result of vegetation clearing associated with the pipeline construction, ongoing maintenance of the pipeline easement as well as grazing and agricultural land practices in the area . Declared weeds present: *Echium plantagineum* (Salvation Jane), *Marrubium vulgare* (Horehound).				
Threatened species or community	Threatened species that have been recorded since 1995 within 5 km of the study area and may use this as habitat include: White-winged Chough, Peregrine Falcon and Little Eagle. Refer to the likelihood of occurrence table (Table 9) for the full assessment.				
Landscape context score	1.15	Vegetation Condition Score	28.09	Conservation significance score	1.08
Unit biodiversity Score	34.89	Area (ha)	4.863 ha	Total biodiversity Score	170.18

Table 6. Summary table for Vegetation Association D6; Maireana brevifolia and Lycium australe low open shrubland over Sclerolaena spp.

Renewal Section	S22 - Laydown				
Vegetation Association	Vegetation Association D6; *Maireana brevifolia* and *Lycium australe* low open shrubland over *Sclerolaena spp.*				
 *Plate 4 – taken facing SW at easting: 299711, Northing: 6262933*					
General description	*Maireana brevifolia* and *Lycium australe* low open shrubland over *Sclerolaena spp.* in low condition as it has been previously cleared. There are also planted trees within this area. Declared weeds: *Tamarix aphylla* (Athel Pine)				
Threatened species or community	Threatened species with current occurrence records nearby which may use this as habitat include: White-winged Chough, Peregrine Falcon, Little Eagle, Elegant Parrot and Hooded Robin. Refer to the likelihood of occurrence table (Table 9) for the full assessment.				
Landscape context score	1.09	Vegetation Condition Score	34.74	Conservation significance score	1.08
Unit biodiversity Score	40.90	Area (ha)	3.55 ha	Total biodiversity Score	145.2

Table 7. Summary table for Vegetation Association E4; Austrostipa nitida grassland with emergent Lycium australis and Acacia nyssophylla shrubs

Renewal Section	S21- Laydown				
Vegetation Association	Vegetation Association E4; *Austrostipa nitida* grassland with emergent *Lycium australis* and *Acacia nyssophylla* shrubs				
 *Plate 5 – taken facing SW at easting: 363983, Northing: 6240074*					
General description	*Austrostipa nitida* grassland with emergent *Lycium australis* and *Acacia nyssophylla* shrubs in moderate condition. The site had been previously cleared however a moderate number of annual herbs were recorded which acted to increase the overall vegetation condition score of the vegetation association.				
Threatened species or community	Threatened species with current occurrence records nearby which may use this as habitat include: White-winged Chough, Peregrine Falcon, Little Eagle, Elegant Parrot and Hooded Robin. Refer to the likelihood of occurrence table (Table 9) for the full assessment				
Landscape context score	1.09	Vegetation Condition Score	36.84	Conservation significance score	1.08
Unit biodiversity Score	43.37	Area (ha)	3.882 ha	Total biodiversity Score	168.37

Site maps showing areas of proposed impact

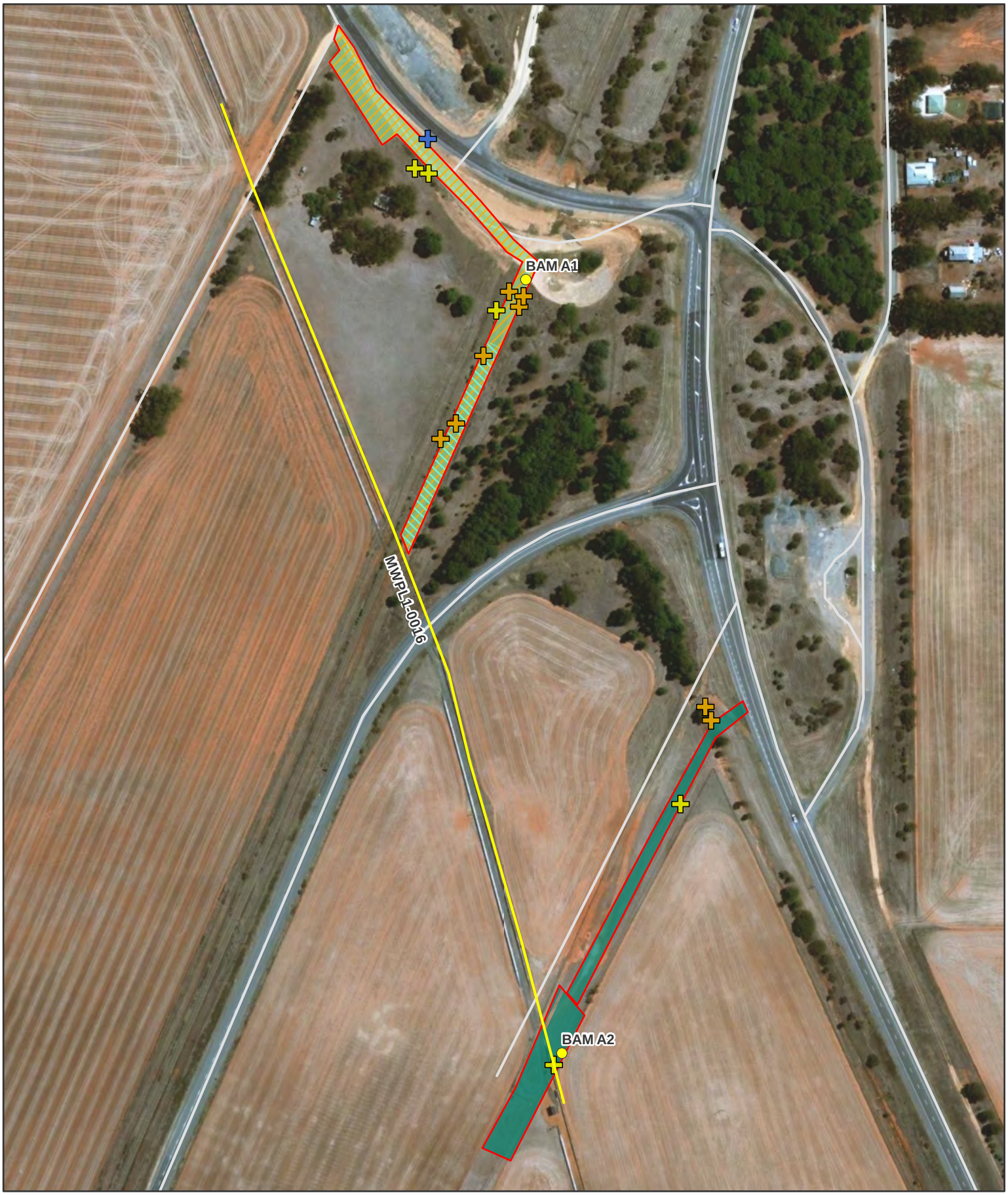

Figure 4: Proposed clearance area for S16

Proposed clearance area

Renewal section

Road

BAM site

Vegetation associations (VA)

A1: *Austrostipa nodosa* and *Avena barbata* grassland

A2: *Austrostipa scabra*, *Austrostipa blackii*, *Rytidosperma fulvum* and *Avena barbata* grassland

Declared weeds

Gazania linearis (Gazania)

Marrubium vulgare (Horehound)

Rosa rubiginosa (Sweet Briar)

Convolvulus arvensis (Field Bindweed) scattered throughout

Echium plantagineum (Salvation Jane) scattered throughout

0 60 120

Metres

Datum/Projection:
GDA 1994 MGA Zone 54

20649-AH/OK Date: 1/03/2022

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Figure 5: Proposed clearance area for S17

Proposed clearance area
Replacement section
Road
BAM site

Vegetation associations (VA)

B1: *Austrotipsa ssp.* grassland
Cereal cropping (Not Native Vegetation)

Declared weeds

Marrubium vulgare (Horehound)
Echium plantagineum (Salvation Jane)
Solanum elaeagnifolium (Silver-leaf Nightshade)

0 200 400
Metres

Datum/Projection:
GDA 1994 MGA Zone 54

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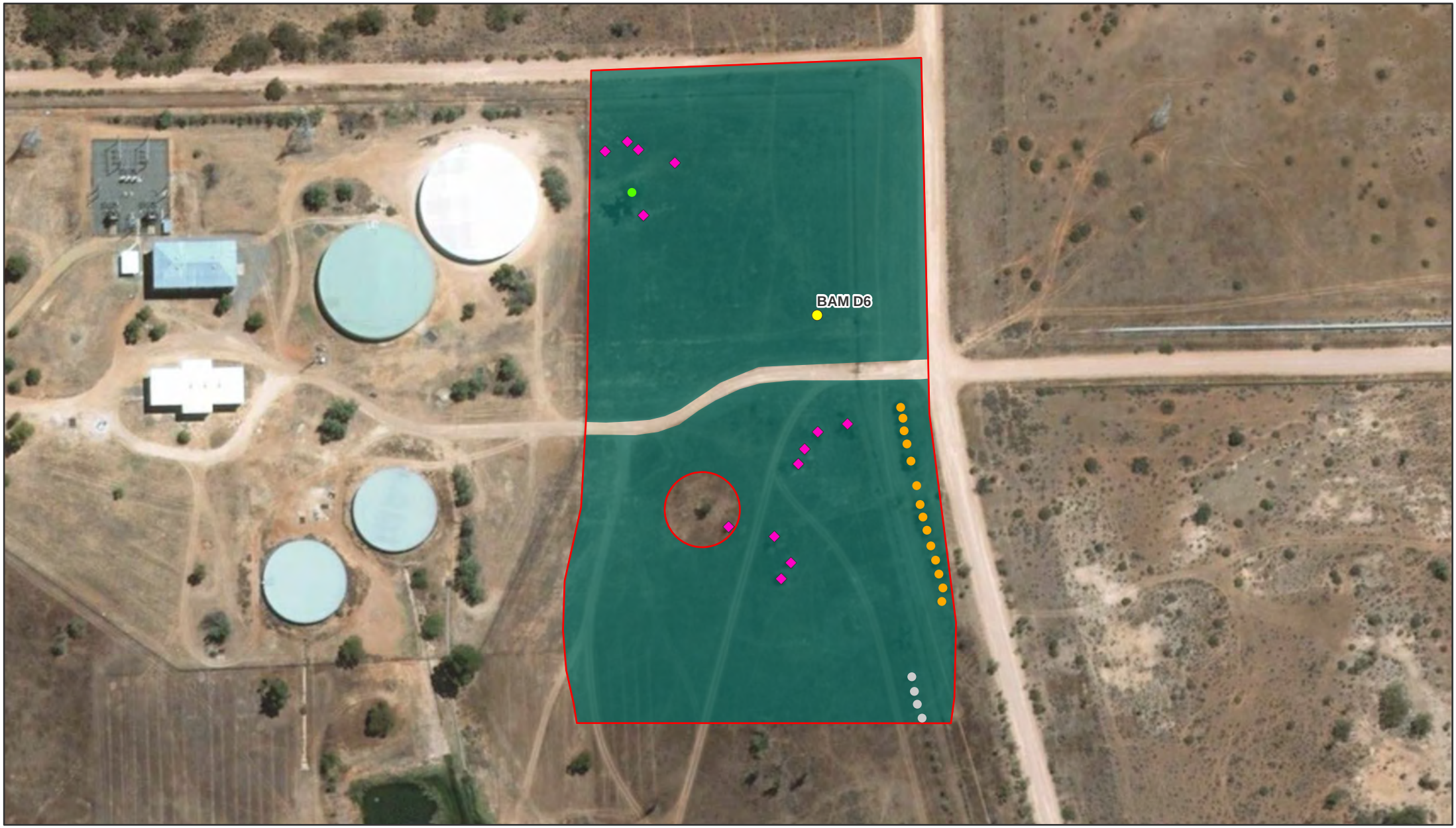

Figure 6: Proposed clearance area for S22

Proposed clearance area

BAM site

Vegetation associations (VA)

D6: *Maireana brevifolia* and *Lycium australe* low shrubland over *Schlerolaena* ssp.

Declared weeds

Tamarix aphylla (Athel Pine)

Planted vegetation

Eucalyptus sp.

Pinus sp.

Unidentified shrub

0 40 80

Metres

Datum/Projection:
GDA 1994 MGA Zone 54
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Figure 7: Proposed clearance area for S21

Proposed clearance area

Replacement section

Road

BAM site

Vegetation associations (VA)

E4: *Austrostipa nitida* grassland with emergent *Lycium australis* and *Acacia nyssophylla* shrubs

0 25 50

Metres

Datum/Projection:
GDA 1994 MGA Zone 54
20649-OK Date: 1/03/2022

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Photo log

Plate 6. Example of emu scat recorded within the proposed clearance area in S21 and S22

Plate 7. Example of a reptile burrow recorded within the proposed clearance area in S21 and S22

Plate 8. Example of a wolf-spider burrow recorded within VA: B1 that may provide habitat for Pygmy Bluetongues (Tiliqua adelaidensis)

Plate 9. Example of Marrubium vulgare (Horehound) recorded within the proposed clearance area

Plate 10. Example of Solanum elaeagnifolium (Silver-leaf Nightshade) recorded within the proposed clearance area in S17

Plate 11. Example of Echium plantagineum (Salvation Jane) recorded within the proposed clearance area

Plate 12. Example of Rosa sp. (Wild Rose/ Briar) recorded within the proposed clearance area.

4.2 Threatened Species assessment

The database assessment identified 34 national or state significant species (19 fauna and 15 flora) that have either been recently (since 1995) recorded within 5 km of the study area (BDBSA results) or known to occur within 5 km of the study area (PMST report). No threatened flora species were recorded during the field survey.

Flora

Although it was assessed that seven threatened flora species may/ are likely to exist in the study area, they were not recorded during field survey despite active searching, and therefore are considered unlikely to occur. Refer to Table 9 for the full assessment of likelihood for all threatened species identified by the PMST and BDBSA searches.

Fauna

White-winged Choughs (*Corcorax melanorhamphos*) which are listed as Rare under the NPW Act were recorded opportunistically outside of the proposed clearance area, however as they are a highly mobile species and there is suitable habitat, it is likely that they also occur within the proposed clearance area. No other threatened species were recorded during the 2021 fieldwork. Four other NPW Act listed threatened species (Peregrine Falcon, Little Eagle, Hooded Robin and Elegant Parrot) have been assessed as possible or likely to occur within the study area due to their highly mobile nature, presence of suitable habitat, and recent nearby records.

Other threatened species (or their habitat) identified by the BDBSA and PMST searches to occur within 5 km of the proposed clearance area includes: Chestnut Quailthrush, Black Falcon, Shy Heathwren, Malleefowl, Black-chinned Honeyeater, Jacky Winter, Gilbert's Whistler, Scarlet Robin, Regent Parrot, Diamond Firetail, Pained Buttonquail,

Common Brushtail Possum and Flinder's Ranges Worm-lizard. Refer to Table 9 for the full assessment of likelihood for all threatened species identified by the PMST and BDBSA searches.

Table 8: Criteria for the likelihood of occurrence of species within the proposed clearance area.

Likelihood	**Criteria**
Highly Likely/Known	Recorded in the last 10 years, the species does not have highly specific niche requirements, the habitat is present and falls within the known range of the species distribution or; The species was recorded as part of field surveys.
Likely	Recorded within the previous 20 years, the area falls within the known distribution of the species and the area provides habitat or feeding resources for the species.
Possible	Recorded within the previous 20 years, the area falls inside the known distribution of the species, but the area provide limited habitat or feeding resources for the species. Recorded within 20 -40 years, survey effort is considered adequate, habitat and feeding resources present, and species of similar habitat needs have been recorded in the area.
Unlikely	Recorded within the previous 20 years, but the area provide no habitat or feeding resources for the species, including perching, roosting or nesting opportunities, corridor for movement or shelter. Recorded within 20 -40 years; however, suitable habitat does not occur, and species of similar habitat requirements have not been recorded in the area. No records despite adequate survey effort.

Table 9: Species observed on site, or recorded within 5km of the application area since 1995, or the vegetation is considered to provide suitable habitat

Scientific Name	Common Name	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Birds							
Cinclosoma castanotum	Chestnut-backed Quailthrush (Chestnut Quailthrush)	-	R	2	2012	Endemic to arid and semi-arid southern Australia, reaching its northern extent in the south of the Northern Territory. Throughout its distribution it occurs in a wide range of arid and semi-arid habitats; mainly in the low shrubs and undergrowth of mallee scrub, but also in Acacia scrubs, dry sclerophyll woodland, heath, and native pine.	Unlikely - recorded in past ten years, however no suitable habitat present in study area.
Corcorax melanorhamphos	White-winged Chough	-	R	2	2017	White-winged Choughs are found in open forests and woodlands. They tend to prefer the wetter areas, with lots of leaf-litter, for feeding, and available mud for nest building (BirdLife Australia, 2020).	**Highly likely** - recorded in past ten years, open woodland habitat present in study area.
Falco peregrinus macropus	Peregrine Falcon	-	R	2	2003	This species prefers open habitats such as grasslands, tundra and meadows and nests on cliff faces and in crevices. It has an extremely large range and is found world-wide except for rainforests and cold, dry Arctic regions. This species has increasingly been observed inhabiting urban areas. (Dewey and Potter 2002)	**Possible** - recorded within the previous 20 years and the area falls inside the known distribution of the species, but the area provides limited habitat (hunting habitat only).
Falco subniger	Black Falcon	-	R	3	2006	This species is found along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas (BirdLife Australia, n.d.).	Unlikely – no suitable habitat (watercourses or woodlands) in proposed clearance area.

Scientific Name	Common Name	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Hieraaetus morphnoides	Little Eagle		V	2	2002	The Little Eagle is widespread in mainland Australia, central and eastern New Guinea. It is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest (BirdLife Australia, 2020).	**Possible** - recorded within the previous 20 years, the area falls inside the known distribution of the species, but the area provides limited habitat or feeding resources for the species.
Hylacola cauta cauta	Shy Heathwren (EP, YP, FR, MM, upper SE)		R	2	1995	Prefers dense shrubby or heath understorey in mallee woodland, mallee shrubland or mallee heath in coastal and semi-arid regions, often where spinifex (*Triodia*) occurs and with dense shrubs such as Banksia, Hakea and Grevillea, also tea-tree (*Leptospermum*) and cypress pine (*Callitris*) (Gregory, 2020).	Unlikely - not recorded within the past 20 years, lack of dense understorey habitat.
Leipoa ocellata	Malleefowl	VU	V	1	N/A	Occupies shrublands and low woodlands that are dominated by mallee vegetation, with a sandy substrate and an abundance of leaf litter required for breeding. It also occurs in other habitat types including eucalypt or native pine Callitris woodlands, *Acacia* shrublands, Broombush *Melaleuca uncinata* vegetation or coastal heathlands. (Benshemesh 2007; DOE 2014)	Unlikely - not recorded within the past 20 years, lack of dense understorey habitat.
Manorina flavigula	Yellow-throated Miner	ssp	ssp	2, 3	2021	Prefers dry forests and woodlands, especially mallee. It also occurs in parks, gardens and farmlands (Birdlife Australia, N.D). The Endangered subspecies Black-eared Miner (*Manorina melanotis*) is endemic to the Murray Mallee region of Victoria, South	Unlikely - the study area contains suitable unburnt old growth mallee to support the subspecies. Yellow-throated Miners were recorded during 2021

Scientific Name	Common Name	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
						Australia and New South Wales. They inhabit Shallow-sand Mallee and Chenopod Mallee.	field survey, but no (Black-eared Miner - Manorina melanotis).
Melanodryas cucullata cucullata	Hooded Robin (YP, MN, AP, MLR, MM, SE)		R	2	2012	Occurs across south-eastern Australia, most of NSW, VIC and south-eastern SA. South-eastern subspecies found in Eucalypt woodland and mallee and Acacia shrubland (DEH 2008a).	**Possible** - recorded in past ten years, very little habitat (a few Acacia shrubs) present in study area.
Melithreptus gularis	Black-chinned Honeyeater		ssp	2	2006	The Rare subspecies (*Melithreptus gularis gularis)* mostly occurs in eastern Australia, along inland slopes of Great Dividing Range, extending to the coast between Sydney and Newcastle, NSW, and again between Brisbane and Rockhampton, QLD, as well as westward into southeastern SA. They occupy dry Eucalypt woodland with an annual rainfall range of 400-700 mm, particularly associations containing ironbark and box. Favoured habitats incorporate a mixture of mature and regenerating woodland Eucalypts, although adjacent scattered paddock trees are also used (DEH 2008b).	Unlikely - does not fall within known distribution of the rare subspecies
Microeca fascinans	Jacky Winter		ssp	2	2012	This species is widely distributed in mainland Australia and in southeast New Guinea. The Rare subspecies occurs in the Mount Lofty Ranges and South-east areas of SA. They prefer open woodland with an open shrub layer and a lot of bare ground. They are often seen in farmland and parks (Birds in Backyards ND).	Unlikely - does not fall within known distribution of the rare subspecies

Scientific Name	Common Name	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Neophema elegans elegans	Elegant Parrot		R	2	2003	Inhabiting open habitats, the Elegant Parrot can be found in a wide variety of habitats, including grasslands, shrublands, mallee, woodlands and thickets, bluebush plains, heathlands, saltmarsh and farmland (BirdLife Australia, 2020).	**Likely** - Recorded within the previous 20 years, grassland habitat present
Pachycephala inornata	Gilbert's Whistler		R	2	2010	Sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW to the Western Australian wheatbelt (Environment and Heritage 2014). Habitat is shrubby woodland and mallee (Simpson and Day 1999, p. 227).	Unlikely - recorded within the previous 20 years, no shrubby woodland or mallee habitat present
Petroica boodang boodang	Scarlet Robin		R	2	2007	Lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs (Environment, Energy and Science 2021).	Unlikely - recorded within the previous 20 years, however no forest or woodland habitat present
Polytelis anthopeplus monarchoides	Regent Parrot	VU	V	1	N/A	The Regent Parrot (eastern) is confined to the semi-arid interior of southeastern mainland Australia. Primarily inhabits riparian or littoral River Red Gum (Eucalyptus camaldulensis) forests with hollows for breeding or woodlands and adjacent Black Box (E. largiflorens) woodlands (DOE 2014). Feeds within Mallee woodlands in summer, generally within 20km of nest sites (breeding generally occurs along the Murray River). (Baker-Gabb & Hurley, 2011)	Unlikely – No recent records nearby, no suitable habitat in proposed clearance area.

Scientific Name	Common Name	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Stagonopleura guttata	Diamond Firetail		V	2	2017	Endemic to Australia, occurring mainly on the inland slopes of the Great Dividing Range and in the AMLR/Eyre Peninsula region of SA. Reside in a wide range of Eucalypt dominated vegetation communities that have a grassy understorey, including woodland, forest and mallee. Most occur on the inland slopes of the Great Dividing Ranges, with only small pockets near the coast (DEH 2008).	Unlikely - Recorded in the last 10 years, however no suitable habitat present
Turnix varius varius	Painted Buttonquail		R	2	2009	These birds range almost continuously, in appropriate habitat, from about the Atherton Tableland in Qld, round the coast to the Eyre Peninsula and north to the southern Flinders Ranges in SA, avoiding only the driest regions of Qld and NSW. Temperate and eastern tropical forests and woodlands form the habitats of this species. They appear to prefer closed canopies with some understory and deep leaf litter on the ground (BirdLife Australia, 2020).	Unlikely - recorded within the previous 20 years and the area falls inside the known distribution of the species, however there is no suitable forest or woodland habitat present in study area
Mammal							
Trichosurus vulpecula	Common Brushtail Possum		R	2	2003	Anywhere where trees with suitable hollows occur, including open forests and woodlands but also urban areas and cities. The species can be common in urban areas (Strahan, 2004). One of the best-known marsupials; found in most treed environments, including cities, towns and farmland (Menkhorst and Knight 2004).	Unlikely - recorded within the previous 20 years, however no suitable habitat (woodlands with hollows) present

Scientific Name	Common Name	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Reptiles							
Aprasia pseudopulchella	Flinders Ranges Worm-lizard	VU	-	1	N/A	Occurs in open woodland, native tussock grassland, riparian habitats and rocky isolates, and prefers stony soils or clay soils with a stony surface (Cogger et al. 1993).	Unlikely - nearest record approximately 6 km east of MWPL1-0017, all nearby records in hillier areas. Lack of stony/ clay soil habitat that this species prefers.
Tiliqua adelaidensis	Pygmy Bluetongue	EN	E	1 (Likely, not Known)	N/A	Uses wolf and trapdoor spider burrows with highest densities in free draining grey-brown or red calcareous soils on the lower slopes of hillsides. Vegetation is remnant native grassland or grassy woodland in any condition (Duffy, Pound and How, 2012).	Unlikely – No records within 5 km, however a small number of wolf-spider holes (half had spiders within them) were observed in suitable habitat at MWPL1-0017 (Plate 8).
Plants							
Acacia glandulicarpa	Hairy-pod Wattle	VU	E	1, 2	2007	Prefers low hills and plains on loamy soils with rocky (limestone, slate, shale) outcrops. Found in mallee woodland, often with *Callitris preissii* and sheoak. It has also been recorded in acacia shrubland. (Landscape SA, 2015)	Unlikely – habitat unsuitable – no rocky outcrops. Not observed during 2021 field survey
Acacia spilleriana	Spiller's Wattle	EN	E	1, 2	2003	Spiller's Wattle is endemic to South Australia and is currently only known from the northern Mount Lofty Ranges and the ranges around Burra and Auburn. The species grows on rocky hills, commonly along watercourses and roadsides (Whibley and Symon, 1992; Maslin, 2001).	Unlikely - habitat unsuitable – no rocky hills. Not observed during 2021 field survey

Scientific Name	Common Name	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Bothriochloa macra	Red-leg Grass	-	R	2	2000	Eastern States of Australia. Grows on a variety of soil types in humid areas but in drier areas is restricted to run-on areas on clay or loamy soils. Occurs on most soil types but often dominant on poor, lower fertility soils and frequently invades degraded areas. Scattered recent records within southern EP. Mainly found in open grassy woodland communities and is often found in disturbed sites.	Unlikely – Recorded within the previous 40 years, suitable habitat present. Surveyed but not observed during 2021 field survey
Codonocarpus pyramidalis	Slender Bell-fruit	VU	E	1, 2	2013	Occurs as scattered individuals across areas of the Flinders Ranges, Northern Lofty Ranges and the eastern regions of SA such as within the Murray Darling Basin, Eyre Peninsula, Yorke and Adelaide. Grows along the crests of hills and ridges, slopes and along creeks, where the soil is either a loamy sand or sandy clay loam and where the pH is between 8.5–9. Throughout its range it is never common and only scattered trees are to be found.	Unlikely - habitat unsuitable – no hill or ridge crests. Not observed during 2021 field survey
Cullen parvum	Small Scurf-pea	-	V	2	2010	Generally associated with alluvial plains, creeks, ephemeral pools and river channels. It has also been reported from artificial drains and other disturbed sites. It grows in grassy woodland or open forest vegetation dominated by species of Eucalyptus, or in grasslands. In the MLR, one record from 1990's in Shepherds Hill RP. Known from grasslands and grassy woodlands.	Unlikely – recorded in previous 20 years, very limited wetland areas (one section near a dam only), suitable habitat present. Surveyed for but not observed during 2021 field survey

Scientific Name	Common Name	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Daviesia benthamii ssp. humilis	Mallee Bitter-pea	-	R	2	2003	Known from across SA's southern flora regions, on deep sands of sand dunes and sand plains in association with Mallee/Spinifex communities. Habitat preferences include Mallee associations with *Eucalyptus phenax ssp. phenax* (White Mallee) Low Mallee over *Melaleuca uncinata* (Broombush), *Eucalyptus incrassata* (Ridge-fruited Mallee), Low Mallee and *Eucalyptus oleosa* (Red Mallee) / *Eucalyptus brachycalyx* (Gilja) Mallee.	Unlikely - habitat unsuitable – no sand dunes. Not observed during 2021 field survey
Daviesia schwarzenegger	Mallee Bitter-pea	-	R*	2	2005	Prefers shrubland to dry sclerophyll forest, dry open sites, usually on skeletal soils (Charles Sturt University, 2021).	Unlikely – lack of shrubland and skeletal soils. Not observed during 2021 field survey
Lachnagrostis limitanea	Spalding Blown-grass	EN	E	1, 2	2005	Endemic to the Northern Lofty Ranges Region of SA. Occurs in low-lying, flood-prone clay loam near watercourses in the Northern Lofty Flora Region of SA. The associated native vegetation is open sedgeland with *Juncus kraussii* and sedges over low-growing native herbaceous species, including: *Sarcocornia quinqueflora, Distichlis distichophylla* and *Samolus repens.*	Unlikely - habitat unsuitable, outside range. Not observed during 2021 field survey
Lachnagrostis robusta	Tall Blown-grass	-	R	2	2008	Occurs in the NL MU SE regions of SA, and known from marshy, estuarine habitat and moist sandy flats	Unlikely – not suitable habitat. Not observed during 2021 field survey
Leptorhynchos elongatus	Lanky Buttons	-	E	2	2003	Prefers sandy and sandy loam soils in woodlands and grasslands. Flowering period	Unlikely – has been recorded within the previous 20 years, and suitable sandy loam soils in grassland habitat

Scientific Name	Common Name	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
							available, but was not observed during 2021 field survey despite active searching.
Logania saxatilis	Rock Logania	-	R	2	2003	Associated with Grassy Woodlands in the foothills and hills face of the Southern Lofty Ranges	Unlikely – not preferred hills habitat. Not observed during 2021 field survey
Maireana rohrlachii	Rohrlach's Bluebush	-	R	2	2013	Preferred habitat includes heavy clay and calcareous loams in open shrubland (EnviroData SA 2020)	Unlikely – open shrubland habitat present, recent records nearby, however not observed during 2021 field survey
Olearia pannosa ssp. pannosa	Silver Daisy-bush	VU	V	1, 2	2003	Endemic to SA where it is scattered throughout agricultural areas. Collections have been made in the EP, YP, FR, Southern MLR, Northern MLR, Murray Basin and SE botanical districts and a single collection from KI. Is generally found in sandy, flat areas and in hilly, rocky areas in woodland or mallee communities dominated by a wide range of eucalypt, Melaleuca and Callitris species.	Unlikely – recorded within the previous 20 years, suitable habitat, however not observed during 2021 field survey
Olearia picridifolia	Rasp Daisy-bush	-	R	2	2003	Mainly associated with limestone. In mallee and heath communities.	Unlikely - recorded within the previous 20 years, the area falls inside the known distribution of the species, but the area provides limited habitat. Surveyed for but not

Scientific Name	Common Name	EPBC Act	NPW Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
							observed during 2021 field survey
Rytidosperma tenuius	Short-awn Wallaby-grass	-	R	2	2013	Grows in altitudes between 5–750 m, on Tablelands usually in somewhat damp habitats, rarely dominant; along the coastal shelf a very common constituent of disturbed road verges.	Unlikely – record within past 10 years, limited damp habitat, road verges present. Not observed during 2021 field survey

Source; 1- Protected matters search tool, 2 – BDBSA, 3 – BirdLife, 4 – Observed/ recorded in the field,
NP&W Act; E= Endangered, V = Vulnerable, R= Rare
EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable

4.3 Cumulative impact

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must consider the potential cumulative impact, both direct and indirect, that is reasonably likely to result from a proposed clearance activity.

All clearance directly required for the development (i.e. the pipeline easement, access tracks and laydowns) have been included in this report.

There will be no subsequent clearance that will be permitted or required for these pipeline renewal sections in the next 100 – 150 years, until the new pipeline deteriorates and requires Renewal. No new building infrastructure for this section required (i.e. pump station already in existence). No extra clearance will be needed for fire protection.

Indirect clearance that may occur because of the development could include dust smothering related impacts vegetation during construction works. Altered hydrology inundating vegetation may occur if there is a leak in the pipeline. Most of the pipeline repairs will be above-ground, so vegetation will be crushed rather than cleared towards the edges of the clearance area. Hence, tree root zones of trees outside the clearance area are unlikely to be impacted as there should be no ground disturbance.

Further indirect impacts may include spills and leaks of construction vehicles, and damage due to vehicles pulling off track in non-designated areas. Losses from enhanced erosion potential of adjacent construction areas such as gully erosion down watercourses is also possible. These potential impacts are considered in the SA Water Native Vegetation Assessment and Approval Requirements Standard Operating Procedure (SOP) and will be addressed in toolbox talks on-site where possible.

Furthermore, the following controls from the SA Water Native Vegetation Assessment and Approval Requirements SOP will be put in place to ensure invasive weeds are not spread:

- A baseline weed survey of the clearance area has been completed prior to construction to identify locations of existing weed infestations.
- All vehicles and plant, including third parties, will be clean prior to arrival to the site. Weed and seed (plant hygiene) inspections are to be completed for all vehicles and plant on arrival and captured on system as part of Plant Induction.
- Where vehicles are washed down water should be directed to a sump (onsite earthen bunded sumps if possible) and not discharged to stormwater or a watercourse.
- Ensure imported fill is sourced from a designated weed free source.

Future stages of this project will include clearances of similar widths along the pipeline, running between Morgan and Whyalla.

4.4 Address the Mitigation Hierarchy

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must have regard to the mitigation hierarchy. The NVC will also consider, with the aim to minimize, impacts on biological diversity, soil, water and other natural resources, threatened species or ecological communities under the EPBC Act or listed species under the NP&W Act.

a) Avoidance – outline measures taken to avoid clearance of native vegetation

Native vegetation must be cleared as part of renewal works to ensure a continued water supply between Baroota and Whyalla

The proposed clearance corridors will enable safe operational construction envelopes for the preferred construction equipment required by the construction contractor. This data report presents a worst-case clearance scenario that will be further minimized wherever possible (refer below).

b) Minimization – if clearance cannot be avoided, outline measures taken to minimize the extent, duration and intensity of impacts of the clearance on biodiversity to the fullest possible extent (whether the impact is direct, indirect or cumulative).

- The new pipeline is to be constructed as close to the existing pipeline as possible to make use of existing maintenance corridors, access tracks and roads, and to concentrate new disturbance where possible in areas that have been previously disturbed.
- Laydown areas have been selected in areas with minimal vegetation/previously disturbed areas to minimise disturbance to good condition native vegetation.
- All vegetation clearing works will be confined to the clearance areas identified in this report. The boundary of the clearance areas will be clearly demarcated with survey pegs visible to construction personnel. Areas where disturbance is permitted will be familiarized to all site personnel through an induction package.
- The width of the clearance area will be reduced at environmentally sensitive locations as identified through the use of alternate construction methods, for example, to prevent removal of native trees where possible, as per the SA Waters Native Vegetation Assessment and Approval Requirements SOP.
- Branches of trees on the edge of the clearance area, but overhanging into construction / activity areas, will be trimmed as necessary by a qualified arborist to enable safe access. All pruning will be provided with a clean cut.
- Woody vegetation, trees and hollows to be removed are to be inspected for fauna by a suitably qualified wildlife handler immediately prior to removal. This will include:
    - A walk-through/visual inspection of the habitat to be removed immediately prior to clearance to flush out fauna and capture and relocate.
    - Advice on clearing techniques that minimise fauna impact.
    - Keep records of important fauna interactions, listing the species concerned, the nature of the interaction and GPS coordinates.
    - Hollows and large branches to be reinstated on site prior to site finalisation (or earlier if possible) to provide ongoing habitat for fauna.
- All vehicles and plant, including third parties, will be inspected and be free prom plant material and weed propagules prior to arrival to the site. Weed and seed (plant hygiene) inspections are to be completed for all vehicles and plant on arrival and captured on system as part of Plant Induction

c) Rehabilitation or restoration – outline measures taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been degraded, or destroyed by the impact of clearance that cannot be avoided or further minimized, such as allowing for the re-establishment of the vegetation.

A construction corridor of up to 25 m is proposed for construction machinery, only a 12 m clear zone will be required for pipeline placement. Following construction, 15.4m of the 25m impact area will be allowed to naturally regenerate. This area will be ripped following construction to allow water intrusion and regeneration of the native seed bank within the top soil. See Figure 2 for Post-construction easement schematic.

Where topsoil is to be cleared, the topsoil will be stockpiled separately and then reapplied post construction to allow for natural regeneration of the Right of Way Area (RoW) see Figure 1.

d) Offset – any adverse impact on native vegetation that cannot be avoided or further minimized should be offset by the achievement of a significant environmental benefit that outweighs that impact.

The NVC will only consider an offset once avoidance, minimization and restoration have been documented and fulfilled. The SEB Policy explains the biodiversity offsetting principles that must be met.

This report outlines the offset responsibilities of SA Water. The offset will be achieved by payment into the fund of an SEB payment of $100,937.57 plus Admin fee of $5,486.57 for a total of $106,581.04

4.5 Principles of Clearance (Schedule 1, *Native Vegetation Act 1991*)

The Native Vegetation Council will consider Principles 1(b), 1(c) and 1(d) when assigning a level of Risk under Regulation 16 of the Native Vegetation Regulations. The Native Vegetation Council will consider all the Principles of clearance of the Act as relevant, when considering an application referred under the *Planning, Development and Infrastructure Act 2016*.

Table 10. Principles of Clearance

<table>
<tr><th>Principle of clearance</th><th>Relevant information</th><th>Assessment against the principles</th><th>Moderating factors that may be considered by the NVC</th></tr>
<tr><td>Principle 1b - significance as a habitat for wildlife</td><td>Threatened species that may use the various sections are described in Table 3 to Table 9.

The Threatened Fauna Score (TFS) and Unit Biodiversity Score (UBS) for each VA is shown below:

<table><tr><td>VA</td><td>TFS</td><td>UBS</td></tr><tr><td>A1</td><td>0.08</td><td>33.09</td></tr><tr><td>A2</td><td>0.08</td><td>38.33</td></tr><tr><td>B1</td><td>0.08</td><td>36.18</td></tr><tr><td>D6</td><td>0.08</td><td>40.90</td></tr><tr><td>E4</td><td>0.08</td><td>43.37</td></tr></table></td><td>All sections are seriously at variance to this principle due to possible habitation by rated fauna listed.</td><td>All fauna species identified by the BDBSA and PMST to occur within 5 km of the proposed clearance area have been included in the BAM scoresheets.

See for full likelihood of occurrence. Based on this assessment, 5 species are considered possible or likely to occur in the study area:
White-winged Chough
Peregrine Falcon
Little Eagle
Hooded Robin
Elegant Parrot
Therefore we are seeking moderation to exclude all other species identified as having a known presence within 5 km but are considered unlikely to occur in the study area.</td></tr>
<tr><td>Principle 1c - plants of a rare, vulnerable or endangered species</td><td>No threatened flora species were recorded.
The Threatened Flora Score for all sites is 0.</td><td>Not at variance</td><td>N/A</td></tr>
<tr><td>Principle 1d - the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or endangered:</td><td>No TECs present within proposed clearance area.

Threatened Community Score is 1 for all VAs</td><td>Not at variance</td><td>N/A</td></tr>
</table>

Principles of Clearance (h-m) will be considered by comments provided by the local NRM Board or relevant Minister. The Data Report should contain information on these principles where relevant and where sufficient information or expertise is available.

4.6 Risk Assessment

Determine the level of risk associated with the application

Total clearance	No. of trees	-
	Area (ha)	13.17
	Total biodiversity Score	514.76
Seriously at variance with principle 1(b), 1(c) or 1 (d)		**1(b) – wildlife habitat**
Risk assessment outcome		Level 4

5. Clearance summary

Clearance Areas Summary table

Block	Site	Species diversity score	Threatened Ecological community Score	Threatened plant score	Threatened fauna score	Economies of Scale Factor	Rainfall	UBS	Area (ha)	Total Biodiversity score	Loss factor	Loadings	Reductions	SEB Points required	Approximate hectares required	SEB payment	Admin Fee
A	1	24	1	0	0.08	0.5	470	33.09	0.454	15.01	1	-	0.5	7.88	0.99	$4,953.57	$272.45
A	2	18	1	0	0.08	0.5	470	38.33	0.423	16.53	1	-	0.5	8.68	1.08	$5,454.72	$300.01
B	1	22	1	0	0.08	0.5	421	34.89	4.863	169.65	1	-	0.5	89.07	11.13	$49,457.73	$2,720.18
D	6	30	1	0	0.08	0.35	260	40.9	3.55	145.20	1	-	0.5	76.23	9.53	$19,554.94	$1,010.52
E	4	24	1	0	0.08	0.35	260	43.37	3.882	168.37	1	-	0.5	88.40	11.05	$21,516.61	$1,183.41
								Total	**13.17**	**514.76**				**270.26**	**33.78**	**$100,937.57**	**$5,486.57**

Totals summary table

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	514.76	270.26	$100,937.57	$5,486.57	$106,424.14

6. Significant Environmental Benefit

A Significant Environmental Benefit (SEB) is required for approval to clear under Division 5 of the *Native Vegetation Regulations 2017*. The NVC must be satisfied that as a result of the loss of vegetation from the clearance that an SEB will result in a positive impact on the environment that is over and above the negative impact of the clearance.

ACHIEVING AN SEB

Indicate how the SEB will be achieved by ticking the appropriate box and providing the associated information:

☐ Establish a new SEB Area on land owned by the proponent.

☐ Use SEB Credit that the proponent has established. Provide the SEB Credit Ref. No. _____

☐ Apply to have SEB Credit assigned from another person or body. The application form needs to be submitted with this Data Report.

☐ Apply to have an SEB to be delivered by a Third Party. The application form needs to be submitted with this Data Report.

☒ Pay into the Native Vegetation Fund.

PAYMENT SEB

If a proponent proposes to achieve the SEB by paying into the Native Vegetation Fund, summary information must be provided on the amount required to be paid and the manner of payment:

- A SEB payment of $100,937.57 plus Admin fee of $5,486.57 for a total of $106,424.14 is proposed to be paid into the Native Vegetation Fund.

7. Appendices

Appendix 1. Fauna recorded during the field survey

Common Name	Sci Name	Introduced	NPW Act (SA)	EPBC Act (Aus.)
Australian Magpie	*Gymnorhina tibicen*			
Australian Pipit	*Anthus australis*			
Australian Ringneck	*Barnardius zonarius*			
Black-faced Cuckooshrike	*Coracina novaehollandiae*			
Black-shouldered Kite	*Elanus axillaris*			
Bourke's Parrot	*Neopsephotus bourkii*			
Brown Falcon	*Falco berigora*			
Chestnut-crowned Babbler	*Pomatostomus ruficeps*			
Chestnut-rumped Thornbill	*Acanthiza uropygialis*			
Common Starling	*Sturnus vulgaris vulgaris*	*		
Crested Bellbird	*Oreoica gutturalis*			
Crested Pigeon	*Ocyphaps lophotes*			
Eastern Bluebonnet (eastern and central SA)	*Northiella haematogaster haematogaster*			
Emu	*Dromaius novaehollandiae*		ssp	ssp
Fox (Red Fox)	*Vulpes vulpes*	*		
Galah	*Eolophus roseicapilla*			
Jacky Winter	*Microeca fascinans*		ssp	
Little Buttonquail	*Turnix velox*			
Little Raven	*Corvus mellori*			
Masked Woodswallow	*Artamus personatus*			
Mulga Parrot	*Psephotellus varius*			
Nankeen Kestrel	*Falco cenchroides*			
Painted Dragon	*Ctenophorus pictus*			
Rabbit (European Rabbit)	*Oryctolagus cuniculus*	*		
Red Kangaroo	*Macropus (Osphranter) rufus*			
Red Wattlebird	*Anthochaera carunculata*			
Rufous Fieldwren	*Calamanthus campestris*			
Singing Honeyeater	*Gavicalis virescens*			
Sleepy Lizard	*Tiliqua rugosa*			
Southern Whiteface	*Aphelocephala leucopsis leucopsis*			

Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*			
Splendid Fairywren	*Malurus splendens*			
Striated Pardalote	*Pardalotus striatus*			
Unidentified Ctenotus	*Ctenotus sp.*			
Wedge-tailed Eagle	*Aquila audax audax*			
Weebill	*Smicrornis brevirostris*			
White-plumed Honeyeater	*Ptilotula penicillata*			
White-winged Chough	*Corcorax melanorhamphos*		R	
Willie Wagtail	*Rhipidura leucophrys leucophrys*			
Yellow-throated Miner	*Manorina flavigula*		ssp	ssp

Appendix 2. Bushland Assessment Scoresheets associated with the proposed clearance and SEB Area (attached in Excel format)

Appendix 3. Recorded Flora Species List

Scientific Name	Common Name	Introduced	WoNs	Declared weed (LSA Act)	VA					Total
					A1	A2	B1	D6	E4	
Acacia colletioides	Veined Wait-a-while							✓	✓	2
Acacia nyssophylla	Spine Bush							✓	✓	2
Acacia pycnantha	Golden Wattle				✓	✓				2
Anthosachne scabra	Native Wheat-grass						✓			1
Aristida behriana	Brush Wire-grass				✓	✓	✓			3
Arthropodium fimbriatum	Nodding Vanilla-lily					✓				1
Asphodelus fistulosus	Onion Weed	*						✓		1
Atriplex leptocarpa	Slender-fruit Saltbush							✓		1
Atriplex semibaccata	Berry Saltbush					✓	✓			2
Austrostipa acrociliata	Graceful Spear-grass							✓		1
Austrostipa blackii	Crested Spear-grass					✓				1
Austrostipa eremophila	Rusty Spear-grass						✓	✓	✓	3
Austrostipa nitida	Balcarra Spear-grass							✓	✓	2
Austrostipa nodosa	Tall Spear-grass				✓		✓			2
Austrostipa scabra group	Falcate-awn Spear-grass					✓				1
Austrostipa scabra ssp.	Rough Spear-grass						✓			1
Avena barbata	Bearded Oat	*			✓	✓	✓			3
Boerhavia sp.	Tar-vine				✓		✓			2
Bromus rubens	Red Brome	*			✓	✓				2
Bromus sp.	Brome						✓			1
Carrichtera annua	Ward's Weed	*						✓	✓	2
Carthamus lanatus	Saffron Thistle	*					✓			1
Chloris truncata	Windmill Grass				✓	✓				2
Chrysocephalum apiculatum	Common Everlasting				✓					1
Convolvulus arvensis	Field Bindweed	*		Y	✓					1
Convolvulus remotus	Grassy Bindweed							✓		1
Conyza sp.	Fleabane	*			✓					1
Cynara cardunculus ssp. flavescens	Artichoke Thistle	*						✓		1
Cynodon dactylon var. dactylon	Couch	*				✓				1
Dissocarpus paradoxus	Ball Bindyi							✓		1
Dysphania pumilio	Small Crumbweed				✓		✓			2
Echium plantagineum	Salvation Jane	*		Y	✓	✓	✓			3
Einadia nutans ssp. nutans	Climbing Saltbush				✓					1

Scientific Name	Common Name	Introduced	WoNs	Declared weed (LSA Act)	VA					Total
					A1	A2	B1	D6	E4	
Enchylaena tomentosa var. tomentosa	Ruby Saltbush							✓		1
Enneapogon nigricans	Black-head Grass				✓		✓			2
Eriochiton sclerolaenoides	Woolly-fruit Bluebush							✓		1
Erodium botrys	Long Heron's-bill	*			✓	✓				2
Eucalyptus camaldulensis ssp.	River Red Gum				✓	✓				2
Eucalyptus sp.								✓		1
Euphorbia sp.	Spurge				✓	✓	✓			3
Gonocarpus tetragynus	Small-leaf Raspwort				✓					1
Goodenia paradoxa	Spur Velleia							✓	✓	2
Heliotropium europaeum	Common Heliotrope						✓			1
Hordeum distichon		*					✓			1
Hordeum leporinum	Wall Barley-grass	*			✓	✓		✓		3
Lactuca serriola f.	Prickly Lettuce	*						✓		1
Lepidium africanum	Common Peppercress	*			✓					1
Lolium sp.	Ryegrass	*				✓				1
Lomandra multiflora ssp. dura	Hard Mat-rush				✓	✓				2
Lycium australe	Australian Boxthorn							✓	✓	2
Lysiana exocarpi ssp. exocarpi	Harlequin Mistletoe								✓	1
Maireana brevifolia	Short-leaf Bluebush						✓	✓		2
Maireana enchylaenoides	Wingless Fissure-plant				✓	✓				2
Maireana rohrlachii	Rohrlach's Bluebush						✓			1
Maireana sedifolia	Bluebush							✓		1
Maireana trichoptera	Hairy-fruit Bluebush								✓	1
Malva sp.	Mallow	*			✓					1
Marrubium vulgare	Horehound	*		Y	✓	✓	✓			3
Medicago polymorpha	Burr-medic	*						✓		1
Minuria leptophylla	Minnie Daisy							✓	✓	2
Myoporum platycarpum ssp. platycarpum	False Sandalwood							✓		1
Nicotiana velutina	Velvet Tobacco							✓		1
Nitraria billardierei	Nitre-bush							✓	✓	2
Onopordum acaulon	Horse Thistle	*				✓	✓			2
Oxalis perennans	Native Sorrel				✓					1
Panicum capillare var. brevifolium	Witch-grass	*				✓				1
Pinus radiata	Radiata Pine	*			✓					1

Scientific Name	Common Name	Introduced	WoNs	Declared weed (LSA Act)	VA					Total
					A1	A2	B1	D6	E4	
Piptatherum miliaceum	Rice Millet	*			✓					1
Polygonum aviculare	Wireweed	*			✓	✓				2
Ptilotus seminudus	Rabbit-tails							✓		1
Reichardia tingitana	False Sowthistle	*						✓		1
Rhagodia sp.	Saltbush							✓		1
Romulea rosea var. australis	Common Onion-grass	*					✓			1
Rosa sp.	Wild Rose/Briar	*			✓					1
Rumex crispus	Curled Dock	*			✓					1
Rytidosperma caespitosum	Common Wallaby-grass				✓	✓	✓			3
Rytidosperma fulvum	Leafy Wallaby-grass				✓	✓				2
Rytidosperma setaceum	Small-flower Wallaby-grass				✓	✓	✓			3
Rytidosperma sp.	Wallaby-grass				✓				✓	2
Salsola australis	Buckbush				✓		✓	✓		3
Salvia verbenaca var.	Wild Sage	*			✓	✓			✓	3
Salvia verbenaca var. verbenaca	Wild Sage	*					✓	✓		2
Scabiosa atropurpurea	Pincushion	*			✓	✓				2
Schismus barbatus	Arabian Grass	*						✓		1
Sclerolaena diacantha	Grey Bindyi							✓		1
Sclerolaena obliquicuspis	Oblique-spined Bindyi							✓	✓	2
Sclerolaena patenticuspis	Spear-fruit Bindyi							✓		1
Sclerolaena sp.	Bindyi				✓			✓	✓	3
Senna artemisioides ssp. petiolaris									✓	1
Senna artemisioides ssp. X coriacea	Broad-leaf Desert Senna							✓	✓	2
Sida corrugata var.	Corrugated Sida					✓	✓	✓		3
Sisymbrium irio	London Mustard	*						✓		1
Sisymbrium sp.	Wild Mustard	*			✓					1
Solanum esuriale	Quena							✓		1
Solanum nigrum	Black Nightshade	*					✓			1
Sonchus oleraceus	Common Sow-thistle	*			✓	✓		✓	✓	4
Tamarix aphylla	Athel Pine	*	Y	Y				✓		1
Tetragonia implexicoma	Bower Spinach							✓		1
Teucrium racemosum	Grey Germander							✓		1
Thysanotus baueri	Mallee Fringe-lily								✓	1
Trifolium angustifolium	Narrow-leaf Clover	*			✓	✓				2

Scientific Name	Common Name	Introduced	WoNs	Declared weed (LSA Act)	VA					Total
					A1	A2	B1	D6	E4	
Trifolium arvense var. arvense	Hare's-foot Clover	*			✓					1
Trifolium fragiferum var.	Strawberry Clover	*				✓				1
Vittadinia blackii	Narrow-leaf New Holland Daisy				✓					1
Vittadinia gracilis	Woolly New Holland Daisy				✓	✓	✓		✓	4
				Total species per site:	**44**	**32**	**28**	**43**	**20**	