

23 Flora

23.1 Introduction

The conservation of existing native vegetation is a key objective of the project. This section outlines the existing vegetation, the effects of the project and the proposed management measures for vegetation along the Northern Expressway route. During consultation, questions were raised about weeds, revegetation and landscaping opportunities, offset plantings for native vegetation removal, and safety of trees near roadways.

Detailed information about all aspects of vegetation within the study area is contained in the *Flora Technical Paper*.

23.2 Assessment methodology

The flora assessment has included the following investigations:

- investigation of historic vegetation communities in the region
- a literature review of previous investigations in the area
- a search of database records from local, South Australian and Australian governments
- consultation with local council officers and other individuals and groups familiar with the flora of the study area and region
- field surveys by qualified botanists.

23.3 Legislative requirements

23.3.1 Commonwealth

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) provides for the protection and conservation of matters of national environmental significance, including nationally threatened species and communities, and for the management of Australian Government-owned and controlled areas. Approval from the Australian Government Minister for the Environment and Water Resources is required for any action that will have a significant impact on a matter of national environmental significance.

Based on detailed environmental investigations undertaken in accordance with the Australian Government's EPBC Act Policy Statement 1.1 Significant Impact Guidelines (DEH 2006) it has been determined that the project will not have a significant impact on any matter of national environmental significance and therefore no referral under the EPBC Act has been made.

23.3.2 State

National Parks and Wildlife Act 1972

The *National Parks and Wildlife Act 1972* (NPW Act), especially Schedules 7, 8 and 9, lists threatened flora and fauna species. The Act protects native flora and fauna and provides lists of species that are endangered, vulnerable and rare in South Australia.

Native Vegetation Act 1991

The *Native Vegetation Act 1991* was established to protect and control the clearance of South Australia's native vegetation and requires approval for the removal of native vegetation.

Natural Resources Management Act 2004

The *Natural Resources Management Act 2004* (NRM Act) contains provisions for the management of the State's natural resources, including pest plants and animals, land, and water resources.

Development Act 1993

The *Development Act 1993* contains provisions requiring approval for removal of significant trees.

23.4 Existing conditions

For biological matters, the past conditions are as important as those currently existing or influencing the distribution of communities and species. Therefore, this section discusses both past and present information relevant to the distribution of flora.

23.4.1 Pre-European settlement vegetation communities

In the northern part of the study area, Armstrong et al. (2003), Beecroft et al. (1981), Cleland (1953) and Turner (2001) provide additional information recording communities of:

- open to dense mallee scrubland dominated by one or up to five mallee eucalypt species, especially *Eucalyptus odorata* (peppermint box) and *E. socialis* (red mallee)
- *Callitris gracilis* (native pine) low open forest and woodland north of the flood plain and growing on the sand dunes.

Kraehenbuehl (1996) identified four main vegetation communities which existed prior to European settlement in the broader study area south of the Gawler River, namely:

- *Eucalyptus camaldulensis* (river red gum) woodland and forest along the margins and flood plains of the Gawler River (and Little Para River) together with other woodland, shrub and grass species.
- *Eucalyptus porosa* (mallee box) woodland and mallee across the Peachey Belt dominated most of the area between Penfield, Angle Vale and Virginia.
- Native tussock grassland dominated by red-leg grass, windmill grasses and kangaroo grass between Parafield and Paralowie.
- Low shrublands, dominated by samphires, with areas of salt tolerant sedgeland, along the western edge of the coastal plain.

23.4.2 Vegetation communities present in the study area

Native vegetation in the study area has been almost completely cleared. The area is characterised by the lack of native vegetation and the high number and diversity of introduced and pest plants. However, there are small remnant areas of native vegetation, mostly along roadsides (Figure 23.1 and 23.2), some of which are of good quality with relatively high native species diversity and lower infestation of weeds, and/or with threatened species present.

Most of the highest quality and largest remnants are located well away from the proposed Expressway corridor and will not be affected by the project.

23.4.3 Native plant species recorded in the study area

Lists of all species recorded in or predicted to occur in the region and study area are provided in the *Flora Technical Paper*.

Gawler River and surrounds

Surrounding the Gawler River is a narrow corridor of remnant river red gum woodland with scattered blackbox over an understorey dominated by proclaimed and environmental weeds. Common reed, cumbungi, spiny sedge and a few other native species are present at a few sites in the study area. The Northern Expressway crosses the Gawler River near Wingate Road where the condition of the woodland is rated as fair to poor.

Areas of mallee woodland and scrubland (*Eucalyptus porosa*, *E. socialis*, *E. dumosa* and *E. odorata*) and *Callitris gracilis* woodland north of the Gawler River are reasonably intact, although limited in distribution and distant from the alignment.

Other areas

River red gum woodland remnants also occur as scattered single trees and as small areas of woodland on private properties and roadsides throughout the survey area south to about Womma Road. Remnant mallee box woodland, grassland and sedgeland areas remain throughout the survey area. All sites are small in size and many are confined to individual or small groups of trees and/or understorey plants. The best quality areas of remnant native species within road reserves have been listed by local councils or DTEI as either roadside marker sites or roadside significant sites. These sites are generally located away from the project area and will therefore not be affected by the proposed Expressway.

Small areas of sparse native shrubland, grassland and herbland vegetation are present elsewhere throughout the study area.

Revegetation

Revegetation areas occur throughout the region. Most roadsides are part of a landscape and revegetation scheme, with many areas planted using local native species. A number of broad-scale revegetation sites exist in the region including the Urban Forest Biodiversity Program (UFBP) One Million Trees Project. Smaller programs include Landcare projects, such as the Roadside Revegetation Project, Trees for Life Bush for Life sites and the Gawler River Restoration Plan.

Threatened species

Three nationally threatened species (listed under the EPBC Act) are predicted to occur in the region, bead glasswort (*Halosarcia flabelliformis*), greencomb spider-orchid (*Caladenia tensa*) and pale leek-orchid

(*Prasophyllum pallidum*). Bead glasswort (Vulnerable) occurs in coastal samphire communities and it is entirely confined to the areas within 1 km of the eastern coastline of Gulf St Vincent. It will not be affected by the project.

Greencomb spider-orchid (Endangered) and pale leek-orchid (Vulnerable) occur in woodland and mallee communities. The spider-orchid is known to occur at two sites north of the alignment that are within the region. The Northern Expressway corridor has been subject to land clearance and intensive farming for more than 100 years, and no longer contains suitable habitat for either species. There is a low possibility that either of these orchid species occur in the survey area.

Two species (listed under Schedules of the *National Parks and Wildlife Act 1972* [SA]) were recorded for the wider region and only two species were located along the proposed Northern Expressway route:

- wire-grass (*Aristida australis*): two small populations were recorded on the south side of Angle Vale Road and it is likely that this species is present elsewhere
- barren cane-grass (*Eragrostis infecunda*): the species occurs on low-lying areas along the western side of Greyhound Road and around the Greyhound and Mill Road intersection.

23.4.4 Introduced flora species

The entire region is dominated by anthropogenic plant communities with many introduced and invasive plant species. Based on analysis of species lists for the council areas and past reports, over 220 introduced plant species have been recorded in the region, with about 130 weed species observed during the field assessment. Species recorded are listed in the *Flora Technical Paper*.

A total of 54 weed species present in the region are of particular environmental concern due to their agricultural impacts and/or adverse effects on remnant native vegetation and native fauna. Many of these species are represented by a sparse or relatively limited distribution, while others are widespread. All are important when considering conservation and agricultural impacts.

No areas of *Phytophthora cinnamomi* (Cinnamon fungus, dieback) or Mundulla Yellows were recorded during field survey.

23.5 Effects of the proposed Northern Expressway on the existing environment

The study area is a highly disturbed environment with the major land uses being agriculture and horticulture.

Small areas of native vegetation may require removal along the route. The construction of the bridge over the Gawler River will require the removal of a small number of river red gums. In addition, the following sites may have an adverse effect on small areas of native vegetation (Figure 23.3):

- the section of the Gawler to Burra railway corridor under the Gawler Bypass and the adjacent section of the Gawler glider field
- Hillier Road, where small areas of spear-grass and wallaby-grass grassland are present
- Angle Vale Road and Bain Road vicinity
- Petherton Road

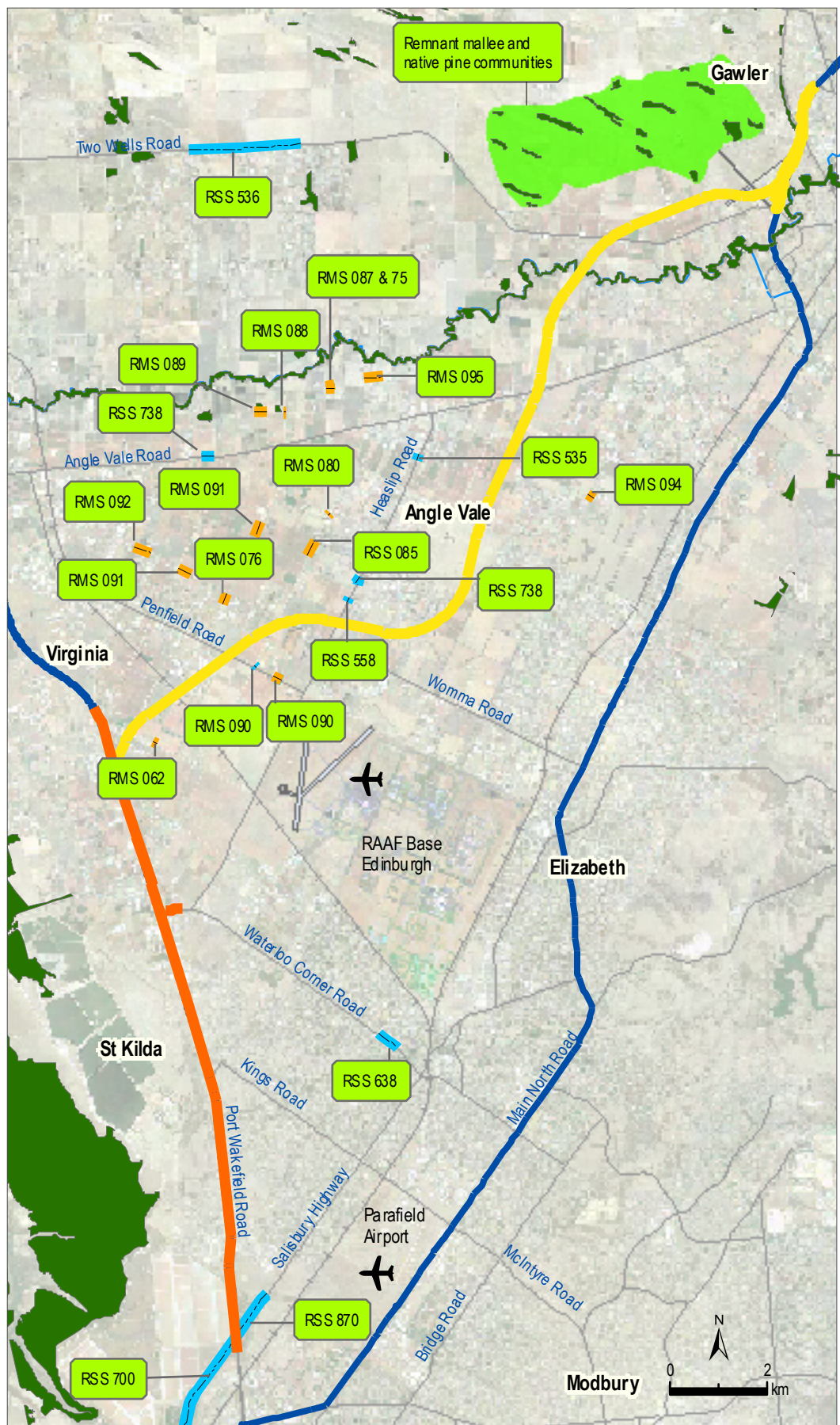


Remnant vegetation on Wingate Road north of Two Wells Road



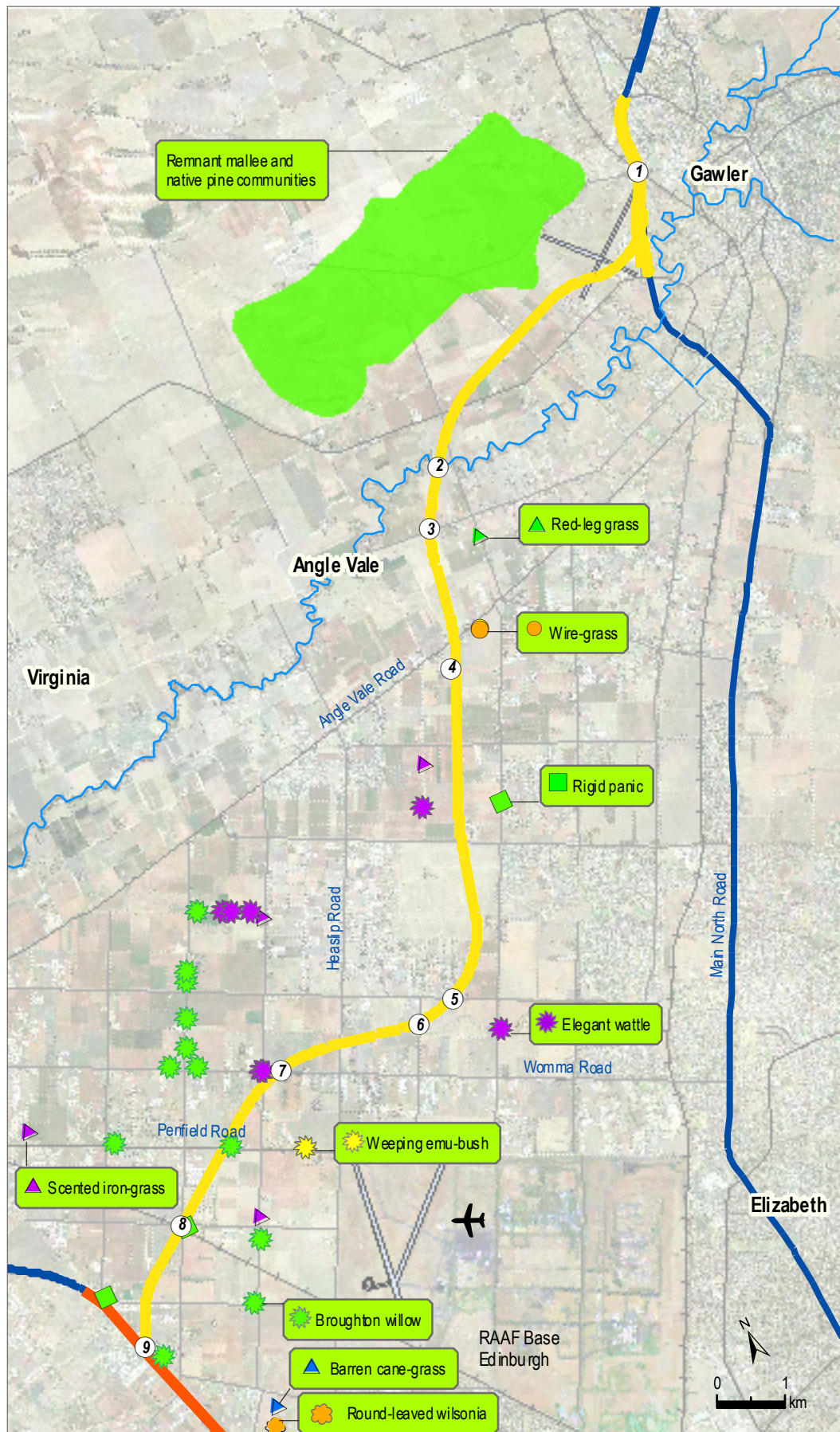
Road side vegetation

Figure 23.1 Roadside vegetation



- DTEI roadside significant site (RSS)
- Council roadside marker site (RMS)
- Remnant native vegetation

Figure 23.2 Existing roadside remnant native vegetation sites



○ Site of significance

Figure 23.3 Significant native flora species
Northern Expressway

- Argent Road
- Womma Road
- railway easement (eastern side of Taylors Road)
- Stanley Road.

The extent of removals at these sites will be determined during the design phase.

Clearance of native vegetation will be offset by environmental benefits required under the *Native Vegetation Act 1991*.

23.6 Environmental management

23.6.1 Principles adopted to minimise effects

General principles adopted to minimise the effect of the proposed Northern Expressway on flora include:

- avoiding impacts on flora species and communities through all project phases (planning, design, construction and operation)
- providing a compensatory habitat (significant environmental benefit) for any vegetation requiring removal in accordance with legislative requirements and in consultation with the Native Vegetation Council and local government.

23.6.2 Measures to minimise effects during planning and design

The following investigations were carried out to minimise the effect on flora throughout the route selection and planning phases:

- a literature review of previous investigations in the area
- a search of plant database records from local, South Australian and Australian governments
- field assessments by qualified botanists.

In addition, ongoing site surveys will occur over summer to assess if other areas of winter-dormant plants are present, such as red-leg grass, warrego grass and garland lily.

Revegetation and landscape design

DTEI is committed to ensuring that, where possible, only local flora is used to revegetate the Expressway corridor. However, it should be noted that native seed is very scarce within the Northern Adelaide Plains. To ensure that the Northern Expressway does not have a long-term impact on native plant populations, seed or cuttings from the wider region may also be used. In some areas, other Australian native plants may be used to provide amenity plantings or for erosion control. The numbers and species of plants required will be determined after the exact areas with particular terrain and soil characteristics are known, and after the detailed design has been completed.

Most of the roadsides and many of the open areas through which the route passes are weed infested. Of these, about 54 species are of special concern due to their effects on agriculture and remnant native vegetation.

Revegetation works will be carried out at key locations along the Expressway corridor to provide screening, amenity, link remnant vegetation; provide offset for vegetation clearance; and provide habitat for fauna. The project has the potential to create a number of positive outcomes in regards to vegetation in the area. The Gawler River bed and its banks are densely infested with weeds such as African boxthorn, castor oil plant, Noogoora burr, fennel, prickly pear and olive, which are proclaimed or major environmental weeds in South Australia. Bridal creeper, a weed of national significance, occurs east of the proposed crossing. Weed management works will be carried out in the immediate construction zone of the project, and this will potentially provide an environmental benefit to a small area of the Gawler River. However, in order for these works to be effective, a combined management program with local councils and landholders is required.

23.6.3 Measures to minimise effects during construction

Measures proposed to minimise potential effects of the project on flora during construction include:

- carrying out a detailed vegetation survey of the entire alignment and mapping the location of all native species and major weed species
- briefing all construction and site staff working on the project as part of an environmental induction program
- carefully removing any important native vegetation for transplanting
- locating and flagging areas of vegetation in the field not requiring removal so that contractors do not disturb these areas
- implementing a comprehensive Vegetation Management Plan to provide a significant environmental benefit for any vegetation requiring removal
- ongoing consultation with South Australian Government environmental agencies and local government authorities
- developing and implementing a weed management plan to minimise the spread of weeds throughout the study area.

Throughout the study area there are a wide range of annual and perennial weed species. Without suitable and stringent management actions, weed species may be transported throughout the construction sites and spread into adjacent areas.

Given the degraded nature of the existing environment, the study area is likely to experience minimal environmental effects due to removal of vegetation during construction of the proposed Northern Expressway.

23.6.4 Measures to minimise effects during operation

Measures proposed to minimise potential effects of the project during operation include:

- ensuring remnant native vegetation that remains in the corridor is protected during weed control and maintenance works
- ensuring revegetated areas become established by providing adequate maintenance
- implementing a program to control proclaimed and environmental weeds that may be present.

23.7 Conclusion

The Northern Expressway passes through land that has previously been cleared and that has little or no native vegetation remaining.

Some remnant vegetation present along the Gawler River will need to be removed to construct the bridge over the river. Additional minor vegetation removal along existing road reserves may also be required at eight smaller sites.

A comprehensive Vegetation Management Plan will be prepared to provide a significant environmental benefit for any vegetation requiring removal. In addition, a weed management plan will be prepared for the construction phase to minimise the spread of weeds throughout the study area.

The risk of causing a major or significant effect on vegetation within the study area is considered to be low to negligible.

There is a low possibility that any nationally threatened species listed under the EPBC Act is likely to occur within the Northern Expressway corridor. Accordingly, no referral pursuant to the EPBC Act has been made.

The project will not have a significant effect on any matter of national environmental significance and therefore no referral under the EPBC Act has been made.