KBR

Inland Rail Phase 2 Tottenham to Illabo Technical & Approvals Consultancy Services

We Deliver

Threatened Flora Survey Report

Threatened Flora Survey Report

Inland Rail Phase 2 Tottenham to Illabo Technical & Approvals Consultancy Services

Prepared for:
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Limitation Statement

The sole purpose of this report and the associated services performed by Kellogg Brown & Root Pty Ltd (KBR) is to assess the presence of listed flora species in accordance with the scope of services set out in the contract between KBR and Australian Rail Track Corporation ('the Client'). That scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

KBR derived the data in this report primarily from visual inspections and examination of records in the public domain. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, KBR has relied upon and presumed accurate certain information (or absence thereof) relative to the project areas provided by government officials and authorities, the Client and others identified herein. Except as otherwise stated in the report, KBR has not attempted to verify the accuracy or completeness of any such information.

No warranty or guarantee, whether express or implied, is made with respect to the data reported or to the findings, observations and conclusions expressed in this report. Further, such data, findings, observations and conclusions are based solely upon site conditions and information supplied by the Client, in existence at the time of the investigation.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between KBR and the Client. KBR accepts no liability or responsibility

Revision History

Revision	Date	Comment	Signatures			
			Originated by	Checked by	Technical Approval	Project Approval
A	12/12/19	Preliminary	J. Manders	N/A	N/A	R. Hunt
0	09/01/20	Final	J. Manders	A. Rigg	A-M. Penna	D. Phimister
1	04/02/20	Final	J. Manders	A. Rigg	A-M. Penna	R. Hunt
						

Contents

1 Introduction

Targeted Threatened Flora Surveys were undertaken by Kellogg Brown & Root (KBR) as part of a larger assessment of the ecological values of the Victorian section of the Inland Rail project.

Inland Rail is a major national project that will enhance Australia's existing national rail network by constructing a high performance and direct interstate freight rail corridor between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland.

1.1 BACKGROUND

Ecological surveys were undertaken by KBR for the Australian Rail Track Corporation (ARTC) in consideration of proposed enhancement works at several sites along the rail and associated road networks to facilitate the project. Previous ecological surveys and assessments have been completed on various project components of the Tottenham to Albury section of the Inland Rail Project. These include:

- *Inland Rail Phase 2 Tottenham to Albury Biodiversity Assessment Report* (KBR 2020)
- *VIC and NSW Enhancement Works Phase 2 Preparatory Works, Ecological assessment – Tottenham to Albury* (WSP/PB 2016)

These assessments included recommendations for further survey work to determine the presence or absence of threatened flora species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) and *Flora and Fauna Guarantee Act 1988* (FFG). The *VIC and NSW Enhancement Works Phase 2 Preparatory Works, Ecological assessment – Tottenham to Albury* (WSP/PB 2016) identified potential threatened flora habitat at several project areas, which were reviewed and further assessed during the detailed habitat assessments and ecological investigations undertaken by KBR (KBR 2020).

One FFG-Act listed species, buloke (*Allocasuarina luehmannii*) was previously recorded at Seymour-Avenel Road Overbridge (Seymour) (KBR 2020). Several species listed under the *Advisory list of rare or threatened plants in Victoria 2014* (DEPI 2014), were also recorded (WSP/PB 2016; KBR 2020).

The detailed ecological assessment (KBR 2020) recommended targeted surveys for threatened flora within the project areas for 3 enhancement sites:

- Hume Highway Tallarook Precinct, Tallarook
- Seymour Avenel Road Overbridge, Seymour
- Hume Highway Seymour Precinct, Seymour

High quality woodland habitat was identified in these project areas through field investigations undertaken by KBR in 2018 and 2019. Through a review of habitat requirements for threatened flora species, this woodland habitat was identified as potential habitat for threatened flora species. These species are discussed below.

Targeted surveys were undertaken during the recommended survey periods for the targeted species according to the *Survey guidelines for Australia's threatened orchids – Guidelines for detecting orchids listed as 'threatened' under the Environment and Biodiversity Conservation Act 1999* (DoE 2013b).

1.2 SPECIES FOR TARGETED SURVEY

Three threatened flora species, Euroa guinea-flower (*Hibbertia humifusa* subsp. *erigens*), crimson spider-orchid (*Caladenia concolor*) and purple diuris (*Diuris punctata*) were identified as having potential habitat (KBR 2020). Threatened species and locations of targeted surveys are provided in Table 1.

Table 1 Threatened species with potential habitat

Threatened Species	Scientific Name	Legislation	Survey area
Euroa guinea-flower	*Hibbertia humifusa* subsp. *erigens*	EPBC Act (Vulnerable) FFG Act (threatened)	Hume Highway Seymour Precinct (Seymour)
Crimson spider-orchid	*Caladenia concolor*	EPBC Act (Vulnerable) FFG Act (threatened)	Hume Highway Tallarook Precinct (Tallarook) Seymour Avenel Road Overbridge (Seymour) Hume Highway Seymour Precinct (Seymour)
Purple diuris	*Diuris punctata*	FFG Act (threatened)	Hume Highway Tallarook Precinct (Tallarook) Seymour Avenel Road Overbridge (Seymour) Hume Highway Seymour Precinct (Seymour)

1.3 SURVEY AREA LOCATIONS AND CHARACTERISTICS

The below characteristics of each survey area have been summarised from vegetation and habitat assessments provided in KBR (2020). All potential flora habitat within the project areas (KBR 2020) were assessed and thus formed the targeted flora survey area. The survey areas and locations in relation to project areas are detailed in the maps included in Appendix A.

1.3.1 Hume Highway Tallarook Precinct (Tallarook)

Hume Highway Tallarook Precinct (Tallarook) is located on the north east rail line at chainage 88.498 km. It is intersected by the Hume Highway running northeast to southwest, and the rail corridor. There is a Hume Highway off ramp to the south east and private land to the north of the project area. To the southwest is Gairns Lane.

The survey area consists of 2.65 ha of good quality EVC 55 Plains grassy woodland and EVC 175 Grassy woodland vegetation. The majority of this vegetation is located on the west side of the rail reserve, where there is a band of native vegetation contiguous with the adjacent road reserve. Beyond the road reserve, is grazed farmland.

The vegetation is a mixed eucalypt forest, mainly dominated by river red gum (*Eucalyptus camaldulensis*), red box (*Eucalyptus polyanthemos*), with a diverse understory including golden wattle (*Acacia pycnantha*), sifton bush (*Cassinia sifton*), flax-lilies (*Dianella* spp.), wallaby-grasses (*Rytidosperma* spp.), spear grasses (*Austrostipa* spp.), kangaroo grass (*Themeda triandra*), purple coral-pea (*Hardenbergia violacea*), small grasstree (*Xanthorrhoea minor*) and mat-rushes (*Lomandra* spp.) (KBR 2020).

1.3.2 Seymour Avenel Road Overbridge (Seymour)

Seymour Avenel Road Overbridge (Seymour) is located at chainage 102.392 km. The Seymour Avenel Road Overbridge Project Area is intersected by Seymour Avenel Rd and Granville Drive.

The survey area consists of 3.29 ha of relatively good quality EVC 61 Box ironbark forest and EVC 55 Plains grassy woodland vegetation, which is predominantly bordered by farmland.

Vegetation within the survey area is dominated by grey box (*Eucalyptus microcarpa*), with scattered individuals of river red gum. There is one FFG Act listed buloke individual recorded within the current survey area, with scattered individuals occurring in the area surrounding the project area.

The survey area has a high abundance and diversity of understory shrubs, including golden wattle, sifton bush and black wattle (*Acacia mearnsii*). It has low levels of ground cover including wallaby-grasses, flax-lilies, mat-rushes, chocolate lily (*Arthropodium strictum*) and sun orchids (*Thelymitra* spp.) (KBR 2020).

1.3.3 Hume Highway Seymour Precinct (Seymour)

Hume Highway Seymour Precinct (Seymour) is located at chainage 103.801 km. There is private land to the east and west of the project area. There is also road reserve along Seymour Avenel Road to the east.

The survey area contains 1.89 ha of good quality EVC 61 Box ironbark forest and EVC 55 Plains grassy woodland vegetation, which is mainly surrounded by farmland.

Vegetation at the survey area is dominated by grey box, of which large individuals are present, two of which contain hollows of varying sizes. The survey area has a diverse, but generally sparse understory including golden wattle, gold dust wattle (*Acacia acinacea*), sifton bush, hedge wattle (*Acacia paradoxa*), flax-lilies, rushes (*Juncus* spp.), sticky everlasting (*Xerochrysum viscosum*), showy parrot-pea (*Dillwynia sericea*) and mat-rushes (KBR 2020).

2 Species Descriptions

2.1 CRIMSON SPIDER-ORCHID

Crimson spider-orchid (*Caladenia concolor*) is listed as vulnerable under the EPBC Act and threatened under the FFG Act. It is a terrestrial herb with a single sparsely hairy leaf and produces one or two purple/red flowers measuring 8 cm across, see figure 1 below. In Victoria crimson spider-orchid occurs in the Beechworth and Chiltern areas, and has also been reported in the Broadford area (DoEE 2012). It grows in grassy or heathy open woodlands, usually consisting of box-ironbark forests and occurring on sand or clay loam soils that are often stony or gravelly and always well drained (DoE 2019a). The leaf emerges from a subterranean tuber annually in response to autumn/winter rainfall, with flowering occurring from late August to October, usually in September.

Threats to crimson spider orchid in Victoria include weed invasion by exotic annual grasses, grazing by rabbit (*Oryctolagus cuniculus*) and kangaroo (*Macropus* sp.), inappropriate fire regimes, disturbance due to uncontrolled access and roads and tracks and their maintenance, timber harvesting and illegal collection.

The habitat assessments previously undertaken by KBR (2020) identified that crimson spider-orchid has the potential to occur at the enhancement sites between Tallarook and Seymour, where suitable habitat has been identified at Seymour Avenel Road Overbridge (Seymour) and Hume Highway Seymour Precinct (Seymour). No known populations of the species are nearby (KBR 2020, Glen Johnson pers comm. 2019).

Figure 1 Crimson spider-orchid (Powers 2015)

2.2 EUROA GUINEA-FLOWER

Euroa guinea-flower (*Hibbertia humifusa*) is listed as vulnerable under the EPBC Act and threatened under the FFG Act. It is a procumbent shrub with branches up to 25cm long and produces yellow flowers from September – November, see figure 2 below. It occurs in woodland dominated by Blakely's red gum (*Eucalyptus blakelyi*), red box and red stringybark (*E. macrohyncha*), and occasionally in buloke woodland. The species is endemic to north-eastern Victoria and occurs in several locations at Longwood, Euroa, Creighton, Avenel and Locksley. Populations occurring in road and rail reserves face threats including weed invasion, soil disturbance, grazing, rubbish dumping, inappropriate fire regimes, population fragmentation and infection by cinnamon fungus (*Phytophthora cinnamomi*) (Murphy & Downe 2006).

The review of desktop information (KBR 2020) noted that Euroa guinea-flower is known to occur in the rail reserve south of Euroa. This location was reviewed during other ecological surveys as part of the Inland Rail Project, and was observed flowering in the rail reserve near Creighton. Potential woodland habitat has been identified at Hume Highway Seymour Precinct (Seymour) (KBR 2020).

Figure 2 Euroa guinea-flower (Manders 2019)

2.3 PURPLE DIURIS

Purple diuris (*Diuris punctata var. punctata*) is listed as threatened under the FFG Act. It is a terrestrial herb which produces one to three leaves annually, with one to ten purple flowers, see figure 3 below. The leaves appear from March or April, with flowering occurring in October or November (Earl & Barlow 2004). Purple diuris occurs in rich grasslands and grassy woodlands with high abundance of kangaroo grass (*Themeda triandra*), and a high diversity of native grasses and forbs. Threats to purple diuris in Victoria include competition for resources, often as a result of a lack of burning or slashing to remove biomass, grazing by native and introduced herbivores, soil disturbance associated with road and rail maintenance and agricultural activities, recreational damage from heavy trampling and vehicles, and illegal collection of plants.

The previously undertaken habitat assessments identified suitable grassy woodlands in the area around Seymour that provide potential habitat for the species (KBR 2020). This location was reviewed during other ecological surveys as part of the Inland Rail Project, and the species was observed flowering in the rail reserve to the north of Glenrowan. Suitable habitat for this species has been identified at Seymour Avenel Road Overbridge (Seymour), and Hume Highway Seymour Precinct (Seymour) (KBR 2020).

Figure 3 Purple diuris (Manders 2019)

3 Methodology

The targeted surveys were completed over four days in Spring, on the 19th of September and the 7th, 23rd and 24th of October 2019 at Hume Freeway, Tallarook, Seymour-Avenel Road, Seymour and Hume Freeway, Seymour (Table 1 and Appendix A).

The surveys were undertaken in accordance with the methodology stipulated in *Survey Guidelines for Australia's Threatened Orchids* (DoE 2013b) (the guidelines).

These dates coincide with the optimal survey time for the threatened flora species subject of the targeted survey. The guidelines stipulate timing the surveys to coincide with flowering of the target species. The peak detectability for crimson spider-orchid is September-October, for purple diuris is October-November (DoE 2013b), and September-November for Euroa guinea-flower (Murphy & Downe 2006). The survey being spread over a five week period, allows for variation in climatic conditions that influence the flowering time and period of the species at these locations.

As stipulated in the guidelines, the areas were searched using a parallel transect systematic targeted search. Two suitably qualified ecologists searched the survey areas by walking in parallel lines at a maximum spacing of 5 m. This distance was often closer to 2 m given that the targeted flora species are small and cryptic. Any findings were noted, and individual plant locations were captured using a hand-held Global Positioning System (GPS) and mapped, see Table 2 and Appendix A.

4 Results

No EPBC Act listed or FFG Act listed species were observed at any of the project areas surveyed.

The potential habitat varied in quality for threatened flora species, with the two project areas at Seymour (Seymour Avenel Road Overbridge (Seymour) and Hume Highway Seymour Precinct (Seymour)) containing sparse, predominately shrubby vegetation on poor rocky soils. Areas with higher grass cover on sandy soils did occur within small parts of the project area, generally along drainage lines and low points in the landscape.

The vegetation and habitat present at Hume Highway Tallarook Precinct (Tallarook) presented higher understorey and grass cover than the survey areas at Seymour, with greater diversity and abundance of native forbs, including the golden cowslips (*Diuris behrii*), considered vulnerable in Victoria (DEPI 2014), however, is not listed under the EPBC Act or FFG Act. Higher understorey grass cover and diversity was present on the west side of the rail track, both north and south of the Hume Freeway Bridge.

Several species included in the Advisory List of Rare or Threatened Plants in Victoria (VROTS) were identified during the targeted survey. These species have not been mapped, however, their presence was noted during the targeted survey and are detailed in Table 2.

Fragrant saltbush was recorded at Hume Highway Seymour Precinct (Seymour), which is well outside the known distribution for this species (VicFlora 2019c). This individual could be a garden escapee, or it could have been planted.

Table 2 Advisory listed flora (DEPI 2014) identified during the targeted surveys

Species Name	Scientific Name	Conservation Status	Location
Golden cowslips	*Diuris behrii*	VROTS - v	Hume Highway Tallarook Precinct (Tallarook) Located west of rail track, to the north and south of Hume Highway.
Late-flower flax-lily	*Dianella tarda*	VROTS - v	Hume Highway Tallarook Precinct (Tallarook) Seymour Avenel Road Overbridge (Seymour) Hume Highway Seymour Precinct (Seymour) The species was scattered throughout all three survey areas
Seymour wattle	*Acacia verniciflua* (1-nerved variant)	VROTS - v	Seymour Avenel Road Overbridge (Seymour) Hume Highway Seymour Precinct (Seymour) The species was scattered throughout the survey areas
Fragrant saltbush	*Rhagodia parabolica*	VROTS - r	Hume Highway Seymour Precinct (Seymour) An individual was located at the southern end of the survey area.

5 Discussion

The habitat present at Seymour-Avenel Road Overbridge (Seymour) and Hume Highway Seymour Precinct (Seymour) was considered to be marginal, particularly for Euroa guinea-flower and purple diuris, as these survey areas have poor and rocky soils, with a sparse and shrubby understorey. Habitat located at Hume Highway Tallarook Precinct (Tallarook), was present on slightly more sandy, fertile soils– compared to the two Seymour survey areas– with high grass and understorey cover present.

Euroa guinea-flower occurs within grassy woodlands, on more fertile, sandy soils with higher native grass cover (VicFlora 2019a). The species was considered to have potential habitat at Hume Highway Seymour Precinct (Seymour). Potential habitat occurs predominately on the western side of the rail, where there are more sandy soils with a high grass cover, although the understorey is still sparse. Euroa guinea-flower was recorded flowering in the rail reserve near Creighton (35 km north) at the same time as these surveys were carried out. As the species was not observed during the targeted survey, while being in flower at Creighton, it is highly unlikely that the species is present within the project area.

The crimson spider-orchid occurs in drier areas on well-drained stony or skeletal soils, including in box-ironbark forest (VicFlora 2019b). Several populations are known around Victoria, though none are present near rail reserves in north east Victoria; these known populations were reported to be flowering at the time of this targeted survey (Glen Johnson pers comm. 2019).

Potential habitat is considered present at each of these project areas, in particular the two Seymour survey areas. However, as the species was not observed during targeted surveys and no known populations are present nearby the rail reserves it is unlikely that the species is present within the project areas.

Both the Euroa guinea-flower and crimson spider-orchid are listed under the EPBC Act. The project was identified as potentially having a significant impact upon both species, with regards to the significant impact guidelines for matters of national environmental significance (DoE 2013), if a population of the species was present within the project area (KBR 2020). However, as no population were recorded during this targeted survey, the project is considered unlikely to have a significant impact on either species.

The purple diuris occurs in rich grasslands and grassy woodlands with high abundance of kangaroo grass, and a high diversity of native grasses and forbs (Earl & Barlow 2004). This habitat is generally limited at Seymour-Avenel Road Overbridge (Seymour) and Hume Highway Seymour Precinct (Seymour), although does occur in patches within the project areas and in the surrounding areas (KBR 2020). At Hume Highway Tallarook Precinct (Tallarook), habitat contains a high diversity and cover of native grasses and understorey species, although, generally dominated by tussock-grasses (*Poa* spp.), wallaby-grasses (*Rytidosperma* spp.) and weeping grass (*Microlaena stipoides*). Purple diuris were recorded flowering in the rail reserve approximately 4 km to the north of Glenrowan at the same time these surveys were being conducted. As the species was not observed during targeted searches of the survey area, despite it being in flower at a nearby reference site, it is highly unlikely that the species is present within the project areas.

6 Conclusion

None of the targeted flora species, or any other EPBC Act or FFG Act listed threatened flora species, were observed at the three project areas surveyed. As no species listed under the EPBC were identified in any of the survey areas, the project is not predicted to have any impacts upon the EPBC Act or FFG Act-listed threatened flora species.

One FFG Act listed species, buloke, was previously recorded at Seymour-Avenel Road Overbridge (Seymour) (KBR 2020); however, no further individuals of the species were observed during the targeted survey. One individual buloke is expected to be impacted by the project, see Appendix A. This impact is not considered to be significant for the species. A protected flora permit will be required to remove this tree.

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Appendix A

Survey Area Maps

We Deliver

89km

88km

Hume Highway Tallarook Precinct (Tallarook)

Tottenham TO Illabo

Enhancement Site Targeted Flora Surveys

MAP 1 OF 3

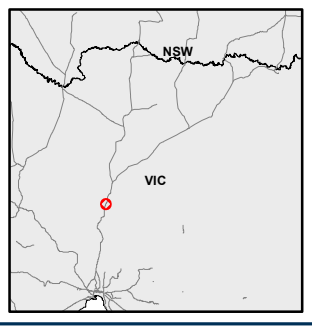
0 75 150 m

Coordinate System: GDA 1994 MGA Zone 55

Date: 04-Feb-20
Paper: A3
Author: MG
Scale: 1:3,300
Data Sources: ARTC

LEGEND

- Enhancement Site Project Areas
- Targeted Flora Survey Areas



INLAND RAIL

ARTC

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Seymour Avenel Road Overbridge (Seymour)

102km

Tottenham TO Illabo

Enhancement Site Targeted Flora Surveys

MAP 2 OF 3

0 60 120 m

Coordinate System: GDA 1994 MGA Zone 55

Date: 04-Feb-20
Author: MG
Data Sources: ARTC

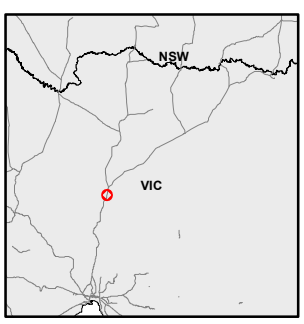
Paper: A3
Scale: 1:2,900

LEGEND

- Enhancement Site Project Areas
- Targeted Flora Survey Areas

Threatend Flora

- Buloke



INLAND RAIL

ARTC

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104km

Hume Highway Seymour Precinct (Seymour)

Tottenham TO Illabo

Enhancement Site Targeted Flora Surveys

MAP 3 OF 3

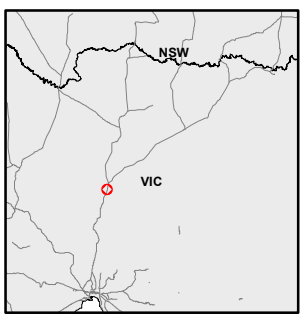
0 50 100 m

Coordinate System: GDA 1994 MGA Zone 55

Date: 04-Feb-20
Author: MG
Paper: A3
Scale: 1:2,300
Data Sources: ARTC

LEGEND

- Enhancement Site Project Areas
- Targeted Flora Survey Areas



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