

Ballarat Line Upgrade

MELBOURNE METRO
RAIL AUTHORITY

BLU-AJM-PWAA-RP-NN-000157 SUMMARY OF ECOLOGICAL RESULTS FOR THE BALLARAT LINE UPGRADE

DATE 27 JUNE 2017

REVISION P3



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Document control record



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DOCUMENT CONTROL

Report title	Summary of Ecological Results for the Ballarat Line Upgrade Project					
Document ID	BLU-AJM-PWAA-RP-NN-000157			Contract No.	CMS332569	
File path	https://geodocs.ajmjb.com/sites/BLU/WIPLibrary/BLU-AJM-PWAA-RP-NN-000157.docx					
Client	Melbourne Metro Rail Authority		Client contact	Mark Havryluk		
Rev	Date	Revision details/status	Prepared by	Author	Verifier	Approver
P3	27/06/2017	Response to MMRA comments	David Endersby / Rob Marks	Alicia Michael	Sharon Stewart	Deb Neumann
P3	22/06/2017	Inclusion of construction areas	David Endersby / Rob Marks	David Endersby / Rob Marks	Sharon Stewart	Deb Neumann
P1	16/05/2017	Draft for MMRA Review	David Endersby / Rob Marks	David Endersby / Rob Marks	Sharon Stewart	Deb Neumann
Current revision	P3					

APPROVAL

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This report should be read in full and no excerpts are to be taken as representative of the findings.

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Executive Summary

The Ballarat Line Upgrade comprises a series of new railway and station upgrades to the existing Ballarat railway line between Deer Park West, in Melbourne's outer western suburbs and Warrenheip, outside Ballarat, to improve transport services on the Ballarat rail line. The new railway and station upgrades involve duplication of track and installation of passing loops, station upgrades, new stabling facilities and associated works. As the scope of the Ballarat Line Upgrade has developed, three ecological assessments have been undertaken, as documented in the following reports:

- Ecology and Heritage Partners (2017) *Existing Ecological Conditions Report, Ballarat Line Upgrade*
- AJM JV (2017a) *Ballarat Line Upgrade – Ecology Assessment Additional Areas.*
- AJM JV (2017b) *Ballarat Line Upgrade – Ecology Assessment Secondary Construction Areas*

This report summarises the findings of the above assessments and reports.

The purpose of the ecological assessments was to identify the ecological values within the project area, and the likely impact the project will have on the ecological values identified in light of relevant Commonwealth, State and local legislative and policy requirements. In summary, these requirements include:

- the Melton and Moorabool Planning Schemes;
- Melbourne Strategic Assessment (MSA) (including areas where the Biodiversity Conservation Strategy (BCS) applies);
- Relevant Precinct Structure Plans and the associated Native Vegetation Precinct Plans (NVPP);
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and associated policy/guidelines;
- *Environment Effects Act 1978* (Vic) and associated policy/guidelines;
- *Flora and Fauna Guarantee Act 1988* (Vic) (FFG Act);
- Victoria's Permitted Clearing of Native Vegetation: Biodiversity Assessment Guidelines.

The project area is located predominately in the existing rail reserve, which is largely disturbed and dominated by exotic grasses. However, some ecological values relating to native vegetation, threatened ecological communities and threatened species have been identified in discrete locations throughout the project area. Based on the ecological assessments undertaken to date, the project is likely to have the following impacts on ecological values:

- Direct disturbance/clearing of approximately 29.652 ha of native vegetation and 81 scattered trees, including:
 - » 20.941 ha of Time-stamped native vegetation within the MSA area, subject to the BCS;
 - » 6.032 ha of native vegetation and 13 scattered trees mapped within the Toolern NVPP; and
 - » 2.679 ha of native vegetation of which 0.192 ha is classified as the FFG Act listed community Western (Basalt) Plains Grassland community and 68 scattered trees located outside of the MSA area.

- Direct disturbance of 145 Spiny Rice-flower plants and 22 Large-fruited Groundsel (listed under the EPBC Act, the FFG Act and the Vic Adv) within the MSA area, subject to the BCS. In accordance with the BCS a salvage and translocation plan will be prepared for these species, to be approved by DELWP prior to the commencement of the Ballarat Line Upgrade.
- Direct disturbance of a number of flora species listed as protected under the FFG Act including the Slender Onion-orchid, Cotton Fireweed and Acacias (as a protected genera¹).

The following ecological values have also been identified within the project area but will not be impacted by the Ballarat Line Upgrade:

- One threatened ecological community, Natural Temperate Grasslands of the Victorian Volcanic Plain (0.20 ha) (listed as Critically Endangered under the EPBC Act) and
- One threatened flora species the Matted Flax-lily (three clumps) (listed under the EPBC Act, the FFG Act and the Vic Adv).

Mitigation measures, including fencing and signing of exclusion zones, will be implemented to ensure the protection of the occurrences of the community and species from direct and indirect impacts.

Potential habitat for a number of threatened fauna species was identified within the project area, including the Dwarf Galaxias, Golden Sun Moth, Growling Grass Frog and Striped Legless Lizard (listed under the EPBC Act, the FFG Act and the Vic Adv). However, targeted surveys did not locate these species in relevant habitat identified in the project area. A minor area (0.15 ha) of potential foraging habitat was also identified for the Swift Parrot within the project area. Mitigation measures will be implemented to avoid impacts to identified waterway habitat and minimise impacts to potential foraging habitat of the Swift Parrot. As a result of the low likelihood of threatened fauna species persisting within project area and the implementation of mitigation measures to minimise the impact to potential habitat, it is considered highly unlikely that the project will have a significant impact on any threatened fauna species.

In summary, the project will not have an impact on any National listed threatened flora, fauna or ecological communities outside of the MSA. The project is proposed to remove 81 scattered native trees and 29.652 ha of remnant native vegetation. In addition, minor areas of vegetation supporting FFG protected flora species and Fragrant Saltbush, listed as Rare on the VicAdv will require removal.

¹ Unless listed under species exemptions. The following Acacia species are excluded from protection excluding *Acacia dealbata*, *Acacia decurrens*, *Acacia implexa*, *Acacia melanoxydon*, *Acacia paradoxa*.

1 Introduction

1.1 Project

The Ballarat Line Upgrade comprises a series of new railway and station upgrades to the existing Ballarat railway line between Deer Park West, in Melbourne's outer western suburbs and Warrenheip, outside Ballarat, to improve transport services on the Ballarat rail line. The new railway and station upgrades involve duplication of track and installation of passing loops, station upgrades, new stabling facilities and associated works.

1.2 Scope of this report

This report aims to provide a summary of the identified ecological values within the project area, and the likely impact the project will have on the ecological values identified. Ecological values have been previously defined in the following reports:

- Ecology and Heritage Partners (2017) *Existing Ecological Conditions Report, Ballarat Line Upgrade*
- AJM JV (2017a) *Ballarat Line Upgrade – Ecology Assessment Additional Areas.*
- AJM JV (2017b) *Ballarat Line Upgrade – Ecology Assessment Secondary Construction Areas*

1.3 Project Area

The project area as shown in Figure 1.1 and in Appendix A is broken into five 'project elements' as confirmed by MMRA on 1 May 2017. These elements supersede previous versions of the project elements, particularly the Melton and Rowsley Stabling Yards assessed by EHP which are no longer within the scope of the project. As the scope of the project has changed, additional ecological assessments as listed in Section 1.2 have been completed, ensuring ecological assessment has been completed of the entire project area.

Within this report, the following terms are referred to:

- Study area – Ecological surveys have been completed over a wide study area to inform decisions as to design options, and to allow the extent of project area to be defined to exclude identified significant ecological values where possible, given the location of critical construction elements in relation to the area of significance.
- Project area – inclusive of the entire VicTrack corridor where planned Project activities are located, for the extent of each of the proposed elements, and the secondary construction areas. Ecological assessments have been completed across the extent of the project area to inform minimisation and avoidance of potential impacts to ecological values where construction requirements allow for it.
- Indicative construction footprint – the area identified as likely to require direct disturbance, including clearing of native vegetation, to enable the construction of Ballarat Line Upgrade. The extent of the construction footprint is not yet finalised. Where significant ecological values have been identified in this report as not to be impacted by the project, they will continue to be protected and excluded from the construction footprint as it is finalised. Mitigation measures to enable the protection of these values will be detailed within the Construction Environmental Management Plan (CEMP).

The project area extends along the Ballarat Rail Corridor from Christies Road in Ravenhall through to Warrenheip Road, Warrenheip. The project does not involve works along the entire length of the railway line, but rather the project comprises new railway and station upgrades at five discrete areas (elements). The new railway and station upgrades in the five elements will be mostly located in the railway corridor within the existing VicTrack rail corridor and broadly include:

- 18 km of track duplication
- installation of passing loops at Ballan and between West Moorabool River and Old Melbourne Road
- station upgrades at Rockbank, Bacchus Marsh and Ballan
- new stabling facilities at Kerrs Road
- decommissioning of the Bungaree loop. The existing rail infrastructure will remain in place and no physical works are required for the decommissioning.

The project includes both construction and use of the new railway and station upgrades.

To support safe construction in a live rail environment, a number of temporary secondary construction areas are required within and adjacent to the rail corridor.

Details of the scope of work for the new railway and station upgrades and use and locations of the secondary construction areas in the five elements are provided in Table 1.1.

TABLE 1.1 BALLARAT LINE UPGRADE SCOPE OF WORK BY ELEMENT

ELEMENT	SCOPE OF WORK FOR THE NEW RAILWAY AND STATION UPGRADES	USE AND LOCATION OF THE SECONDARY CONSTRUCTION AREAS ²
<p>Element 1: Deer Park West and Melton</p>	<ul style="list-style-type: none"> • Duplication of approximately 18 km of rail line between Deer Park West and to the west of Melton Station. • Rebuilding of platforms at Rockbank station, provision of a pedestrian link between platforms, and a new sealed car park. • Site preparation works for a future station at Toolern, including raised tracks and pedestrian infrastructure. 	<ul style="list-style-type: none"> • #DM-01 Laydown area (0.47 ha) • #DM-02 Access (0.20 ha) • #DM-03 Laydown (1.79 ha) • #DM-04: Rock crushing site (2.52 ha) • #DM-05 Laydown area for stock pile (0.23 ha) • #DM-06 Laydown area (0.43 ha) • #DM-07: Laydown and site office compound (9.89 ha) • #DM-08: Laydown and site office prior to carpark being built (2.61 ha) • #DM-09: Laydown and site office compound (0.72 ha) • #DM-11: Laydown and site office compound (5.30 ha) • #DM-12: Laydown (0.87 ha) • #DM-13 Laydown area across Toolern Creek (0.15 ha) • #DM-14 Laydown area (0.39 ha) • #DM-15 Turnout preassembly pad (0.23 ha) • #DM-18 Laydown area and stabling facilities (0.54 ha) • #DM-19 Laydown area (0.39 ha) • #DM-20 Laydown area (0.07 ha) • #DM-21 Access (0.01 ha) • #DM-22 Laydown area (0.77 ha) • #DM-23 Turnout preassembly pad (0.20 ha)

² Areas identified are indicative only.

ELEMENT	SCOPE OF WORK FOR THE NEW RAILWAY AND STATION UPGRADES	USE AND LOCATION OF THE SECONDARY CONSTRUCTION AREAS ²
Element 2: Bacchus Marsh Second Platform / Maddingley Stabling	<ul style="list-style-type: none"> Removal of overnight stabling facilities at Bacchus Marsh station. Construction of a second platform at Bacchus Marsh station, providing a pedestrian link between original and new platforms, and sealed car parking areas. Construction of new train stabling and driver facilities at Kerrs Road, Maddingley. 	<ul style="list-style-type: none"> #BM01 Construction pad for turnout preassembly (0.15 ha) #BM02 Construction pad for turnout preassembly (0.15 ha) #BM03 Site compound and high value stock storage (0.65 ha) #BM04 Laydown area (0.18 ha) #BM05 Turnout preassembly pad (0.18 ha) #BM06 Stabling Amenities and temporary site compound (0.27 ha) #BM07 Stabling Amenities and temporary site compound (1.64 ha) #BM08 Laydown area (0.26 ha) #BM09 Stabling amenities and temporary site compound (1.31 ha)
Element 3: Ballan Loop	<ul style="list-style-type: none"> Construct approximately 5km of crossing loop situated either <ul style="list-style-type: none"> from Ingliston Road to approximately 2km west of Ballan Station ; OR from Ballan Station to just west of the East Moorabool River crossing Build a second platform at Ballan station and new pedestrian link between the new and original platform. 	<ul style="list-style-type: none"> #BP02 Laydown area and turnout preassembly pad (0.17 ha) #BP01 Laydown area(0.18 ha) #BP03 Potential bridge construction area on former track formation (1.93 ha) #BP04 Turnout preassembly area, site compound, high value shock items and bulk materials (1.43 ha) #BP05 Station construction laydown area (0.20 ha) #BP07 Laydown area (0.09 ha) #BP06 Laydown area (0.09 ha) #BP08 Laydown area (0.21 ha) #BP09 Laydown area (0.27 ha) #BP10 Laydown area (0.19 ha) #BP11 Laydown area (1.02 ha) #BP12 New haul road (1.04 ha) #BP13 Bulk material laydown road access (0.56 ha)
Element 4: Spreadeagle (new Bungaree) Loop	<ul style="list-style-type: none"> Construct a new 4 km crossing loop between West Moorabool River and Old Melbourne Road Widen two roads over rail bridges at Peerewerrh and Spreadeagle Roads 	<ul style="list-style-type: none"> #SP01 Turnout preassembly pad (0.33 ha) #SP02 Laydown area (1.56 ha) #SP03 New Haul Road (0.97 ha) #SP04 Laydown area (0.33 ha) #SP05 Construction and bulk material laydown (0.31 ha) #SP06 Turnout preassembly pad (0.33 ha) #SP07 Turnout preassembly pad (0.24 ha)
Element 5: Warrenheip Duplication	<ul style="list-style-type: none"> Duplicate approximately 3 km of rail line east of Warrenheip Road, Warrenheip. 	<ul style="list-style-type: none"> #WD01 Laydown area (0.27 ha) #WD02 Turnout area preassembly pad (0.75 ha) #WD03 New haul road for future maintenance access (3.65 ha) #WD04 Construction and bulk material laydown (1.05 ha) #WD05 Culvert construction laydown area (1.05 ha) #WD06 Former Warrenheip yard site compound and bulk storage yard (2.37 ha)

1.4 Applicability of Melbourne Strategic Assessment and Associated Documents

Part of the project involves railway upgrades located between Deer Park West and Toolern Creek in Melton South (MSA project area). These works, with the exception of one secondary construction area (DM#09), lie within the Melbourne Strategic Assessment (MSA) area and fall within the definition of 'actions associated within the urban development in the western growth corridor (Melton and Wyndham)'. Such actions have already been assessed and approved under an EPBC Act S146B decision and when undertaken in compliance with that approval, do not require separate referral, assessment or approvals under the EPBC Act.

The MMRA intends to undertake works in the MSA project area in accordance with the conditions of the S146B decision and associated requirements. The applicability of the MSA and associated documents to project elements is summarised in Table 1.2. A brief description of the strategic documents is provided in Section 1.4.1 and Section 1.4.2.

TABLE 1.2 APPLICABILITY OF STRATEGIC DOCUMENTS WITHIN THE PROJECT AREA

ELEMENT	APPLICABILITY OF THE MELBOURNE STRATEGIC ASSESSMENT (MSA)	REFERENCE DOCUMENT FOR DETERMINING BIODIVERSITY OFFSETS	CONSIDERATION UNDER THE EPBC ACT
Element 1a Duplication between Deer Park West and Melton (rail reserve between Western Freeway, Caroline Springs and Paynes Road, Rockbank)	Within MSA area (no approved precinct structure plan applies)	Biodiversity Conservation Strategy (DEPI, 2013a)	Assessed and approved under S146B decision. No further consideration required where project works will be undertaken consistent with approval conditions.
Element 1b Duplication between Deer Park West and Melton (rail reserve between Paynes Road, Rockbank and Toolern Creek, Melton)	Within MSA area (Toolern Precinct Structure Plan applies (approved November, 2011) (MPA, 2011))	DELWP to determine appropriate offsetting on a case by case basis in consideration of the Toolern Native Vegetation Precinct Plan (NVPP) <i>Permitted Clearing of Native Vegetation – Biodiversity Assessment Guidelines 2013</i> (DEPI, 2013) applies to vegetation marked as 'to be retained' within the NVPP.	Assessed and approved under S146B decision. No further consideration required where project works will be undertaken consistent with approval conditions.
Element 1c Duplication between Deer Park West and Melton (west of Toolern Creek, Melton)	Outside MSA area	<i>Permitted Clearing of Native Vegetation – Biodiversity Assessment Guidelines 2013</i> (DEPI, 2013)	Not within the section of the S146B decision. These elements must be separately considered for the purposes of the EPBC Act.
Element 2: Bacchus Marsh Second Platform / Maddingley Stabling			
Element 3: Ballan Loop			
Element 4: Spreadeagle (new Bungaree) Loop			

ELEMENT	APPLICABILITY OF THE MELBOURNE STRATEGIC ASSESSMENT (MSA)	REFERENCE DOCUMENT FOR DETERMINING BIODIVERSITY OFFSETS	CONSIDERATION UNDER THE EPBC ACT
Element 5: Warrenheip Duplication			

1.4.1 IMPLICATIONS OF THE MELBOURNE STRATEGIC ASSESSMENT

The MSA was initiated following an agreement between the Victorian and Commonwealth Environment Departments aimed at simplifying the approvals pathway for developments within the expanded Urban Growth Boundary introduced in 2010. The eastern extent of the project area from Deer Park West to Toolern Creek (Elements 1a and 1b) is subject to the MSA. As an outcome of the MSA, assessment of State and Commonwealth biodiversity values has been completed within the MSA area and the required offsets for impacts to applicable values within the MSA project area are pre-defined.

The major biodiversity values relevant to this project that have been assessed under the MSA are:

- The threatened communities Native Temperate Grasslands of the Victorian Volcanic Plain (NTGVVP) and Grassy Eucalypt Woodlands of the Victorian Volcanic Plains;
- Threatened fauna species including Golden Sun Moth and Growling Grass Frog; and
- Threatened flora species including Matted Flax-lily and Spiny Rice-flower.

The MSA has identified the extent of native vegetation and areas of habitat for threatened species. Areas with high ecological values have been identified as Conservation Areas to be retained in the *Biodiversity Conservation Strategy* (BCS) (DEPI 2013a) whilst important habitats for Growling Grass Frog and Golden Sun Moth have been identified under separate sub-regional strategies. There are no conservation areas present within the project area.

Proposed impacts to native vegetation and habitat generate offset requirements as outlined in *Habitat Compensation under the Biodiversity Conservation Strategy* (DEPI 2013b).

1.4.2 PRECINCT STRUCTURE PLANS

Precinct Structure Plans (PSPs) are high level master plans for whole communities prepared by the Growth Areas Authority. The project area from Paynes Road, Rockbank to Toolern Creek, Melton South (Element 1b) is subject to the Toolern PSP. The Toolern PSP, and its incorporated Toolern Native Vegetation Precinct Plan (TNVPP), was approved in 2011 and is one of the existing 28 urban precincts within the 2005 Urban Growth Boundary that is subject to the MSA. This area is not subject to the BCS, but rather actions within the Toolern PSP must take place in accordance the prescriptions. Prescriptions relevant to this project are as follows:

- *Final Prescription for Natural Temperate Grassland of the Victorian Volcanic Plain* (DSE, 2010a)
- *Final Prescription for Spiny Rice-flower* (DSE, 2010b)
- *Final Prescription for Grassy Eucalypt Woodland of the Victorian Volcanic Plain* (DSE, 2010c).

The removal and offset of native vegetation within the Toolern Precinct is governed by the Toolern Native Vegetation Precinct Plan contained within the PSP. Since the implementation of the MSA and the BCS, the determination of offsets within the MSA for areas covered by a PSP is advised by the Department of Environment, Land, Water and Planning (DELWP) on a case-by-case basis.

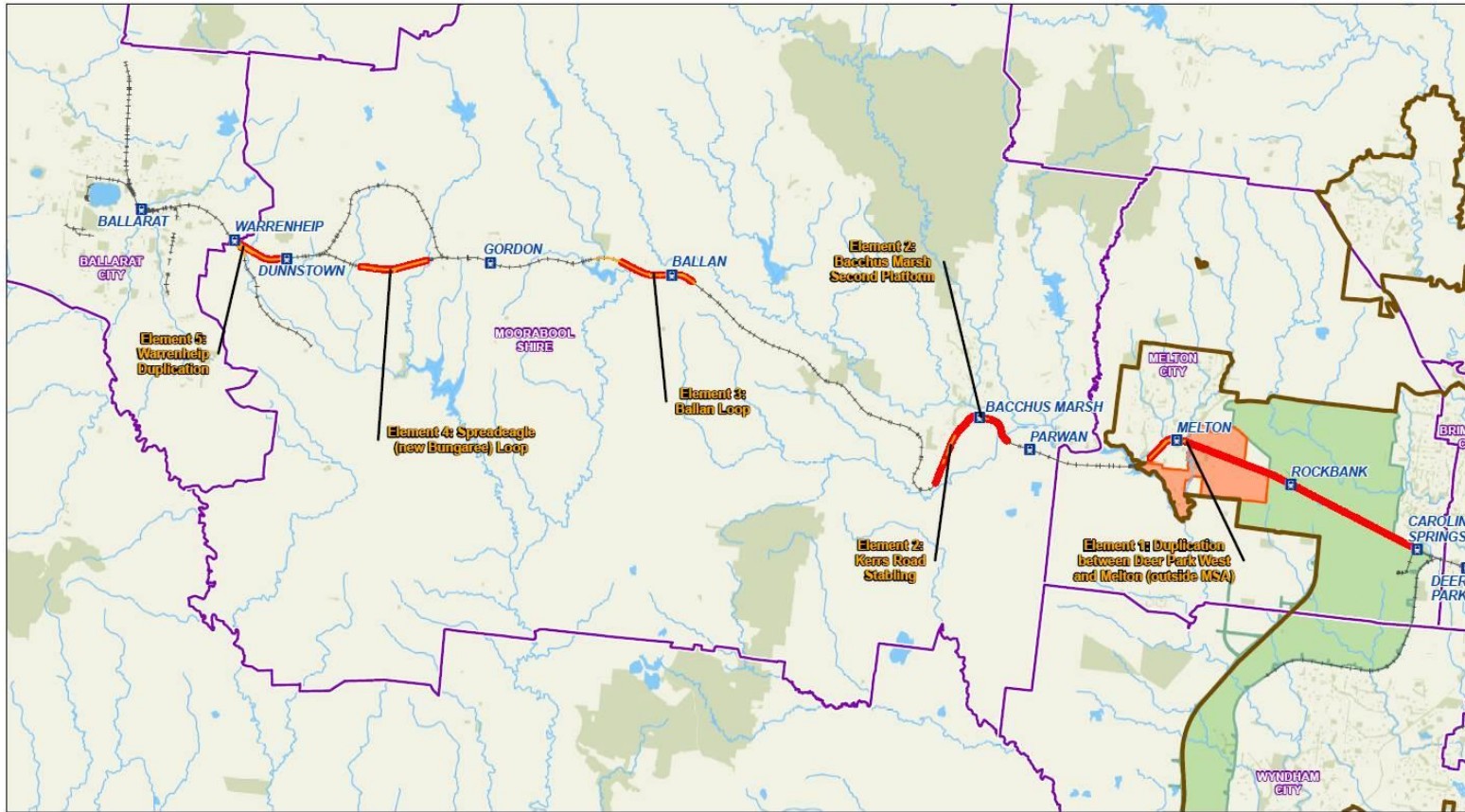


FIGURE 1-1 PROJECT AREA AND WORK ELEMENTS, BALLARAT LINE UPGRADE

1.5 Legislation

A brief summary of the legislation and policies referred to throughout the document is provided in Table 1.3

TABLE 1.3 DESCRIPTION OF RELEVANT LEGISLATION

POLICY / LEGISLATION	DESCRIPTION
<p><i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i></p>	<p>Has significant implications for natural resource and environmental management in Australia. This Act provides for the listing of threatened species, threatened ecological communities and key threatening processes. It also relates to actions likely to have a significant impact on Matters of National Environmental Significance (MNES). There are nine MNES:</p> <ul style="list-style-type: none"> • World Heritage Sites • National Heritage Places • Ramsar Wetlands • Nationally threatened species and ecological communities • Migratory species • Commonwealth marine areas • Nuclear actions • the Great Barrier Reef Marine Park • Water resources from coal seam gas development or large coal mining development
<p>Melbourne Strategic Assessment (MSA)</p>	<p>Streamlines the assessment of impacts under the EPBC Act for urban development within the expanded urban growth boundary. Projects undertaken within the MSA have pre-approved permission for impacts on a range of MNES provided the works are undertaken in line with the approved BCS and relevant PSPs which identify required Habitat Compensation Obligations and areas to be retained for conservation in perpetuity (Conservation Areas)</p>
<p><i>Environment Effects Act 1978 (EE Act)</i></p>	<p>Provides for the assessment of actions that are capable of having a significant environmental effect.</p> <p>Actions which might have a significant environmental effect should be referred to the Victorian Minister for Planning, who decides if an Environment Effects Statement (EES) is required. An EES might be required where:</p> <ul style="list-style-type: none"> • There is a likelihood of regionally or state significant adverse environmental effects • There is a need for an integrated assessment of social and economic effects of a project or relevant alternatives • Normal statutory processes would not provide a sufficiently comprehensive, integrated and transparent assessment <p>This Act also allows an applicant to write to the Secretary of DELWP to confirm no EES is required.</p>
<p><i>Flora and Fauna Guarantee Act 1988 (FFG Act)</i></p>	<p>Provides a framework for biodiversity conservation in Victoria.</p> <p>Threatened species and communities of flora and fauna, as well as threatening processes, are listed under this Act.</p> <p>A number of non-threatened flora species are also listed as protected under the FFG Act. A Permit to Take is required to remove these species from public land.</p> <p>NOTE – the FFG Act is currently under review with changes expected in late 2017. This report has been prepared based on the current requirements of the report and these may change prior to the construction of the project.</p>
<p>DELWP (formally DEPI/DSE) Victorian Advisory Lists (VicAdv)</p>	<p>Not a statutory list of threatened species, but rather list of species for which conservation management is recommended by DELWP. The VicAdv lists are comprised of the <i>Advisory List of Rare or Threatened Plants in Victoria – 2014</i> (DEPI, 2014), the <i>Advisory List of Threatened</i></p>

POLICY / LEGISLATION	DESCRIPTION
	<p><i>Vertebrate Fauna in Victoria – 2013</i> (DEPI, 2013), and the <i>Advisory List of Threatened Invertebrate Fauna in Victoria – 2009</i> (DSE, 2009).</p> <p>The presence, or likely presence, of a species listed on the VicAdv lists is used to determine whether species specific habitat is required to be offset.</p>
<p><i>Planning and Environment Act 1987</i></p>	<p>Applications to remove, destroy, or lop native vegetation in Victoria invoke relevant municipal planning schemes and the <i>Planning and Environment Act 1987</i>, which are given authority through the Victoria Planning Provisions.</p> <p>A range of exemptions apply under this Act.</p> <p>Depending on the scale of the native vegetation clearance, statutory referral to the DELWP may be required.</p>
<p>Permitted Clearing of Native Vegetation – Biodiversity Assessment Guidelines 2013 ('the Guidelines')</p>	<p>The Guidelines determines how impacts on biodiversity are to be considered when assessing an application for a permit to remove, lop or destroy native vegetation. For the purpose of the Guidelines the term 'remove native vegetation' includes to lop or destroy native vegetation.</p> <p>NOTE – the Native Vegetation regulations under the P&E Act are currently under review with changes expected in late 2017, including changes to the Guidelines. This report has been prepared based on the current requirements of the report and these may change prior to the construction of the project.</p>
<p><i>Catchment and Land Protection Act 1994</i> (CaLP Act)</p>	<p>Defines requirements to:</p> <ul style="list-style-type: none"> • Avoid land degradation • Conserve soil • Protect water resources • Eradicate and prevent the spread and establishment of noxious weed and pest animal species. <p>The Act defines four categories of noxious weeds: State Prohibited Weeds, Regionally Prohibited Weeds, Regionally Controlled Weeds and Restricted Weeds. Noxious weeds species and the category they are placed in is specific to individual CMA regions.</p>
<p><i>Wildlife Act 1975</i></p>	<p>The Wildlife Act establishes procedures for the protection and conservation of wildlife; the prevention of wildlife becoming extinct; and the sustainable use of and access to wildlife and to prohibit and regulate the conduct of persons engaged in activities concerning wildlife.</p>

2 Methods

This report summarises the findings of previous ecological assessments identified in section 1.2. A brief overview of the methods utilised in those reports to identify ecological values within the Project area is provided below.

2.1 Desktop Assessment

2.1.1 AREAS SUBJECT TO THE MELBOURNE STRATEGIC ASSESSMENT

Biodiversity mapping (DELWP, 2016a) was reviewed to provide information on threatened flora and fauna species and vegetation communities identified within the area subject to the MSA. The following datasets were reviewed:

- Time Stamped Native Vegetation: the extent and quality of all areas of native vegetation within areas subject to the MSA have been mapped. This dataset is used to determine offsets required for the removal of native vegetation for areas subject to the MSA.
- Habitat Compensation Obligations: areas of potential habitat for the following species has been mapped within areas subject to the MSA:
 - » Growling Grass Frog (*Litoria raniformis*)
 - » Golden Sun Moth (*Synemon plana*)
 - » Spiny Rice Flower (*Pimelea spinescens* subsp. *spinescens*)
 - » Matted Flax-lily (*Dianella amoena*)This dataset is used to determine offsets required for the removal of potential habitat for each of the above species.

2.1.2 AREAS NOT SUBJECT TO THE MELBOURNE STRATEGIC ASSESSMENT

For areas not subject to the Melbourne Strategic Assessment, a review of the following DELWP and Commonwealth Department of Environment and Energy (DoEE) databases was undertaken to provide information on threatened flora and fauna species and vegetation communities in proximity to the project area.

- **Biodiversity mapping (DELWP 2016a)** – This database comprises large scale mapping and classification of native vegetation across Victoria.
- **Victorian Biodiversity Atlas (DELWP 2016b)** – This database comprises historical records of flora and fauna species from across the state. Records are added opportunistically, as flora and fauna surveys are conducted within Victoria for a variety of purposes. The mapping of flora and fauna distribution and determination of species' habitat preferences is an ongoing process.
- **Protected Matters Search Tool (DoEE, 2016)** – The Protected Matters Search Tool (PMST) highlights any matters of National Environmental Significance (NES) relevant to the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) that are likely to occur within an area.
- Previous ecological or other relevant assessments of the study area (refer to Section 2.1 of the Existing Ecological Conditions Report, EHP 2017).

2.2 Field Assessment

2.2.1 GENERAL ECOLOGICAL ASSESSMENT

Field assessments were undertaken for the project area to determine the presence of native vegetation, scattered trees and the potential for threatened flora and fauna species. Assessments of native vegetation and scattered trees were conducted in accordance with the *Vegetation Quality Assessment Manual (V1.3)* (DSE 2004). The potential presence of threatened species was assessed by walking over the project site and recording incidental sightings of flora and fauna, any sign of fauna utilisation of the project site (e.g. scats, tracks, etc.) and undertaking a brief assessment of habitat available within the project area. Noxious species, as defined under the CaLP Act, and weed infestations were also recorded across the project area. Dates for field assessments for each of the reports reviewed in compiling this summary are provided in Table 2.1.

TABLE 2.1 DATES FIELD ASSESSMENT COMPLETED ACROSS THE PROJECT AREA

ASSESSMENT REPORT	DATES OF FIELD SURVEY	AREA ASSESSED
Ecology and Heritage Partners (2017) Existing Ecological Conditions Report, Ballarat Line Upgrade	18, 19 October, 2, 3, 7, 9 November 2016	The preliminary project area as defined in January 2017. Six elements, including Melton Stabling and Rowsley Stabling which are now outside of project scope.
AJM JV (2017) Ballarat Line Upgrade – Ecology Assessment Additional Areas.	29 and 31 March and 7 April 2017	<ul style="list-style-type: none"> • Kerrs Road Stabling • Rowsley Stabling (outside current project scope) • Ballan Loop • Warrenheip Duplication
AJM JV (2017) Ballarat Line Upgrade – Ecology Assessment Secondary Construction Areas	2, 6 June 2017	Secondary Construction Areas identified through a desktop assessment as requiring field validation.

2.2.2 TARGETED FLORA AND FAUNA SURVEYS

In order to inform approval requirements, and to advise on avoidance and minimisation measures, the need for targeted surveys was determined based on the combined results of the desktop assessment and the general ecological assessment (Sections 2.1 and 2.2.1). Targeted flora and fauna surveys were completed for species identified as having a moderate to high likelihood of presence within the project area, as defined below:

- High likelihood –
 - » Previous records of the species in the local vicinity; and/or,
 - » The study area contains areas of high quality habitat.
- Moderate likelihood –
 - » Limited previous records of the species in the local vicinity; and/or,
 - » The study area contains poor or limited habitat.

Field-verified areas of suitable habitat were the focus of targeted survey efforts.

Targeted assessments were completed in accordance with the relevant Significant Impact Guidelines where available. The methods utilised for targeted field assessments are detailed in the *Existing Ecological Conditions Report, Ballarat Line Upgrade Report* (EHP, 2017). The type, extent and timing of targeted field assessments completed within the project area is summarised in Table 2.2.

TABLE 2.2 TERRESTRIAL AND AQUATIC SURVEYS UNDERTAKEN FOR THE BALLARAT LINE UPGRADE

SURVEY TYPE		DATES	ELEMENTS						
			1a	1b	1c	2	3	4	5
			MSA's BCS	MSA's Prescriptions	Outside MSA area				
Targeted Flora Surveys	Spiny Rice-flower Survey (Winter)	23, 24 and 25 August 2016, 2 and 6 June 2017	x ¹	x ¹	x ²				
	Flora species with known, high, or moderate likelihood of occurrence (including Matted Flax-lily and Large-fruit Groundsel Survey) (spring/summer)	17, 21 November, 15, 20, 22 December 2016	x ¹	x ¹	x	x	x	x	x
Targeted Fauna Surveys	Striped Legless Lizard Survey	14, 21 October, 4, 11, 18, 21 November 2016		x ¹					
	Growling Grass Frog survey	20 December 2016, 11 January 2017			x		x		x
	Golden Sun Moth Survey	19, 23 December 2016, 6, 17 January 2017			x	x	x		
	Aquatic Surveys	8, 9, 10 February, 2017			x		x		

Note: ¹ denotes surveys that were conducted within the MSA area to determine the presence of Matters of NES to inform avoidance, minimisation, and where necessary, salvage and translocation requirements, particularly for significant flora.

2.3 Identification of Secondary Construction Areas

To support safe construction in a live rail environment, a number of temporary secondary construction areas are required within and adjacent to the rail corridor. Assessment of the ecological values present within the SCAs is detailed within the *Ballarat Line Upgrade – Ecology Assessment Secondary Construction Areas* (AJM JV, 2017b). The following process has been completed to identify feasible Secondary Construction Areas (SCAs) that have minimal impact on ecological values:

1. Project engineers highlighted a number of sites both within and in close proximity to the rail corridor that were deemed technically suitable for use as secondary construction areas;

2. A desktop assessment of land use, planning and ecological constraints was completed for all identified sites to determine the requirement for additional ecological assessment and to identify sites that were considered unsuitable for use as SCAs due to constraints identified. The desktop review included consideration of online databases, aerial imagery and previous reports (as per Section 2.1). Sites were classified into one of the following three categories based on an assessment of the likely presence of ecological values:
 - a. **Green** – known or considered likely to contain exotic vegetation with no native vegetation, MNES or other significant ecological values predicted to occur. Will still require some field assessment to confirm unless it is stated that no further assessment required.
 - b. **Yellow** – Native vegetation known or predicted to be present but has low risk of MNES or other significant ecological values based on understanding of the local landscape. Will require some field assessment to confirm unless it is stated that no further assessment required.
 - c. **Red** – Known or expected MNES or other significant ecological values present based on mapping and understanding of the local landscape. Will require some field assessment to confirm unless it is stated that no further assessment required.
3. A workshop was held with project engineers, planners, project managers and ecologists to shortlist sites for consideration as SCAs. The extents of some sites were reduced to account for landowner access constraints. The following process was completed for each category of SCAs:
 - a. **Green** – Sites retained for consideration. Where previous ecological assessment has not been completed brief field verification will be carried out.
 - b. **Yellow** – Sites retained for consideration. Where previous ecological assessment has not been completed an ecological field assessment of the site will be carried out.
 - c. **Red** – Where sites are not critical to construction, sites were removed from consideration. Where sites are critical to construction, 'No-Go' areas have been identified to enable the protection of significant ecological values. Project Engineers have confirmed that activities planned for sites with known ecological constraints identified, can be configured so as to avoid 'No-Go' areas. For these sites, mitigation measures as detailed in Section 3.4 will be implemented to ensure ecological values are not impacted.
4. Ecological field assessment was completed by qualified and experienced ecologists of all SCAs identified within the desktop as requiring field assessment. As per step 3 for red areas, areas identified as comprising threatened species or potential habitat for threatened species were identified as 'No-Go' areas. Project Engineers have confirmed that activities planned for sites with known ecological constraints, will be configured so as to avoid 'No-Go' areas. For these sites, mitigation measures as detailed in Section 3.4 will be implemented to ensure ecological values are not impacted.

For SCAs within the MSA, targeted flora surveys are scheduled for July 2017 to inform the translocation plan that will be implemented for Spiny Rice-Flower and Large Fruit-Groundsel. Previous targeted survey completed by EHP (2017) did not detect any threatened fauna species within the project area. Additionally, grassland patches identified during the field assessment of SCAs are small, degraded, and isolated, therefore it is considered unlikely that the SCAs assessed provide suitable habitat for threatened flora and fauna species to persist within the landscape. As such, it is not considered that any targeted flora or fauna surveys are required for SCAs identified outside of the MSA.

3 Matters of National Environmental Significance outside the MSA area

3.1 Threatened Ecological Communities

The Protected Matters Search Tool (PMST) identified six threatened ecological communities as having potential to occur within the project area. A review of the likely presence of these communities within the project area was completed, based on previous reports and modelled mapping of native vegetation communities in the project area (Table 3.1). From the review, it was determined that three listed ecological communities were highly likely to be present within the project area. Table 3.2 outlines EVCs predicted from modelled mapping (DELWP, 2016a) as likely to occur within the project area, that are considered synonymous with listed ecological communities (EPBC) where quality considerations are identified in the relevant Significant Impact Guidelines are met (Table 3.2). It was considered there was only a low likelihood of the other three ecological communities listed in Table 3.1 being present within the project area.

TABLE 3.1 EPBC ACT LISTED COMMUNITIES IDENTIFIED FROM THE PMST AS POTENTIALLY PRESENT WITHIN THE PROJECT AREA

COMMUNITY NAME	STATUS	ASSESSED LIKELIHOOD OF SIGNIFICANT IMPACT
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	High. Synonymous EVC mapped as occurring throughout the project area. Presence of community dependant on the quality of structure and quality of vegetation considered against the relevant EPBC assessment guidelines.
Natural Damp Grassland of the Victorian Coastal Plain	Critically Endangered	Low. Community not present or expected to occur in area. Outside natural range.
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	High. Synonymous EVC mapped as occurring throughout the project area. Presence of community dependant on the quality of structure and quality of vegetation considered against the relevant EPBC assessment guidelines.
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	Low. Although the project area occur within the right landscape and climate zone, the history of land use, particularly construction of rail infrastructure is likely to have removed the geomorphic units where community would occur
White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Low. Community not present in area. Outside natural range.
Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia	Endangered	High. Synonymous EVC mapped as occurring throughout the project area. Presence of community dependant on the quality of structure and quality of vegetation considered against the relevant EPBC assessment guidelines.

TABLE 3.2 VEGETATION COMMUNITY SYNONYMS

EVC	EPBC
EVC 132_61: Plains Grassland	Natural Temperate Grasslands of the Victorian Volcanic Plain (NTGVVP) – Quality parameters apply including: <ul style="list-style-type: none"> • Patch must be at least 0.05 ha in size • 50% of the perennial tussock grass cover is native • there is less than 30% cover of broad leaf weeds (DSEWPaC, 2011)
EVC 55_61: Plains Grassy Woodland	Grassy Eucalypt Woodland of the Victorian Volcanic Plain - Quality parameters apply including: <ul style="list-style-type: none"> • Patch must be at least 0.05 ha in size • 50% of the ground layer is perennial native species • There are at least 3 trees per hectare with a DBH of greater than 70 cm (DSEWPaC, 2011)
EVC 803: Plains Woodland	Grey Box Grassy Woodland – Quality parameters apply including: <ul style="list-style-type: none"> • Patch must be at least 0.05 ha in size • 50% of the ground layer is perennial native species • Less than 30% ground cover of non-grass weeds (DSEWPaC, 2012)

The field assessment identified three small patches (0.25 ha) of the threatened ecological community NTGVVP within the Study area. No other threatened ecological communities listed under the EPBC Act were identified. Direct and indirect impacts to these NTGVVP patches will be avoided by the Ballarat Line Upgrade. Based on the location of the patches, where possible the extent of the project area has been defined to avoid the occurrence of the community. This resulted in the exclusion of one patch of NTGVVP from the project area. The other two patches remain within Element 1c of the project area and will be avoided through the use of exclusion fencing. Mitigation measures, including the use of exclusion fencing, will be implemented as documented within Section 3.4.1, to ensure that the occurrences of this community are not directly or indirectly impacted by the project.

The extent of threatened ecological community identified within the study area, outside of the MSA, and the implications of the presence of this community is presented in Table 3.3.

TABLE 3.3 THREATENED ECOLOGICAL COMMUNITIES IDENTIFIED IN THE STUDY AREA OUTSIDE OF THE MSA

THREATENED ECOLOGICAL COMMUNITY	CONSERVATION STATUS	LOCATION IDENTIFIED	IMPLICATION OF PRESENCE
Natural Temperate Grasslands of the Victorian Volcanic Plain	EPBC Critically Endangered	• 0.05 ha in Element 3 – directly south of Ballan Station	Not impacted. Extent of project area altered to exclude extent of community. Mitigation measures will also be implemented to clearly define the perimeter of the project area on the ground and on Construction Drawings as specified in Section 3.4.1.
		<ul style="list-style-type: none"> • 0.13ha in Element 1c – southwest of Melton station, at the western extent of the carpark • Approximately 0.07 ha in Element 1c – located north of DM23, at the western end of Torrington Circuit, Melton South. 	Not impacted. To be retained within the project area. Identified extent of community will be retained within the Project area however will not be subject to direct disturbance as a result of project works. Mitigation measures, including fencing the location and signing it as a No Go area, will also be implemented as specified in Section 3.4.2.

The ecological assessments have therefore determined there will be no impact to EPBC listed threatened ecological communities as a result of the project.

3.2 Threatened flora

A search of records from 10 km surrounding the project area of the Victorian Biodiversity Atlas (DEPI, 2014b) and the Protected Matters Search Tool returned 23 species as potentially occurring within the project area (refer to Appendix 2.3 in EHP, 2017).

Of these 20 nationally listed species, the desktop assessment completed by EHP (2017) identified four species as having a moderate or high likelihood of occurrence within the project area, or recent known presence (within 10 years), as provided in Table 3.4. Targeted surveys confirmed that four of these eight species are present within the study area; Spiny Rice-flower, Matted Flax-lily and Large-fruited Groundsel. However, Spiny Rice-flower and Large-fruited Groundsel were only identified as occurring within the MSA area. On this basis, it is considered highly unlikely that these species will be impacted by the project, outside of the MSA area.

TABLE 3.4 THREATENED FLORA SPECIES IDENTIFIED FROM DESKTOP REVIEW AS HAVING A MODERATE, HIGH OR KNOWN LIKELIHOOD OF BEING PRESENT IN THE PROJECT AREA (EHP, 2017)

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS			LAST DOCUMENTED RECORD (NO. VBA RECORDS)					LIKELIHOOD
		EPBC	FFG	VicAdv	Element 1	Element 2	Element 3	Element 4	Element 5	
National Significance										
<i>Dianella amoena</i>	Matted Flax-lily	EN	L	e	2011 (49)	PMST	PMST	PMST	1770 (1)	1 – Element 1
<i>Diuris basaltica</i>	Small Golden Moths	EN	L	e	2012 (36)	2006 (4)	-	-	-	2 – Element, 1,Element 2
<i>Pimelea spinescens subsp. spinescens</i>	Spiny Rice-flower	CR	L	e	2015 (848)	2003 (5)	PMST	2010 (3)	2010 (3)	1 – Element 1, Element 2, Element 4, Element 5
<i>Senecio macrocarpus</i>	Large-fruit Groundsel	VU	L	e	2015 (25)	PMST	-	-	-	1 – Element 1

1 - Known occurrence

- Recorded within the study area recently (i.e. within ten years)

2 - High Likelihood

- Previous records of the species in the local vicinity; and/or,
- The study area contains areas of high quality habitat.

3 - Moderate Likelihood

- Limited previous records of the species in the local vicinity; and/or,
- The study area contains poor or limited habitat.

4 - Low Likelihood

- Poor or limited habitat for the species however other evidence (such as a lack of records or environmental factors) indicates there is a very low likelihood of presence.

5 – Unlikely

- No suitable habitat and/or outside the species range.

Key:

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

FFG *Flora and Fauna Guarantee Act 1988* (FFG Act)

DEPI *Advisory List of Threatened Flora in Victoria* (DEPI 2014)

EX Extinct
CR Critically endangered
EN Endangered
VU Vulnerable
K Poorly Known (Briggs and Leigh 1996)
Records identified from EPBC Act Protected Matters Search Tool.
* Records identified from the FIS

X Extinct
e Endangered
v Vulnerable
r Rare
k Poorly Known
L Listed

Four clumps of the nationally-listed Matted Flax-lily were identified within the Study area, outside of the MSA area (two in Element 2 and two in Element 3). There will be no direct disturbance of these clumps as a result of project works. The extent of the Project area has been altered to avoid one of these clumps, and the remaining three clumps will be avoided through the use of exclusion fencing. Mitigation measures, including the use of exclusion fencing, will be implemented as documented in Section 3.4.1, to ensure that the occurrences of this species are not directly or indirectly impacted by the project. The location of the Matted Flax-lily and implications of the presence of these species is listed in Table 3.5 below. No other threatened flora species were identified within the project area, outside of the MSA.

TABLE 3.5 THREATENED FLORA SPECIES IDENTIFIED WITHIN THE PROJECT AREA AND IMPLICATIONS OF PRESENCE.

FLORA SPECIES	CONSERVATION LISTING	LOCATION IDENTIFIED	IMPLICATION OF PRESENCE
Matted Flax-lily	EPBC Endangered FFG Listed VicAdv Endangered	<ul style="list-style-type: none"> One clump located directly south of Ballan Station in Element 3 	Not impacted. Extent of project area altered to exclude occurrence of Matted Flax-lily. Mitigation measures will be implemented to clearly define the perimeter of the project area on the ground and on Construction Drawings as specified in Section 3.6.1.
		<ul style="list-style-type: none"> One clump located within Secondary Construction Area BM-09 in Element 2 Two clumps located on the northern side of the rail, to the west of Geelong-Ballan Road in Element 3. 	Not impacted. To be retained within the project area. Clumps of Matted Flax-lily will be retained within the Project area. Mitigation measures, including fencing the location and signing it as a 'No Go' area are to be implemented as specified in Section 3.4.2

While specific targeted surveys were not completed for Small Golden Moth Orchid, it is considered unlikely the species is present within the project area outside of the MSA based on the lack of suitable habitat identified. The species is known to grow in herb-rich native grasslands, dominated by Kangaroo Grass (*Themeda triandra*) on heavy basaltic soils, often embedded with basalt boulders. All identified locations of Small Golden Moth are from within patches of the NTGVVP (DoEE, 2017). Where NTGVVP has been identified outside of the MSA, it has either been excluded from the project area or where present within the project area will not be directly disturbed by project works and also protected through the implementation of mitigation measures. On this basis, targeted surveys for the species were not determined to be required and it is also considered unlikely that the species will be impacted by the project, outside of the MSA area.

Supplementary targeted flora surveys within SCAs assessed within *Ballarat Line Upgrade – Ecology Assessment Secondary Construction Areas* (AJMJV, 2017b) were not considered necessary for the following reasons:

- The general ecological assessment of the SCAs was completed in June 2017 during the flowering period of the Spiny Rice-flower, and so survey for the presence of this species could be completed at the time of the assessment. No Spiny Rice-flower was identified within any of the SCAs assessed outside of the MSA, and it is highly unlikely this species will be impacted outside of the MSA.
- Occurrences of Matted Flax-lily were able to be identified during the general ecology assessment, by the presence of their distinctive leaves.
- Patches of grassland identified during the SCA assessment were small, fragmented patches with a high cover of introduced species, and were considered unlikely to support threatened flora species.

Where threatened flora listed under the EPBC Act have been identified within the project area, they have been either excluded from the project area or will be subject to mitigation measures, including exclusion fencing, preventing any impact to the occurrence of these species. As a result, it is considered unlikely the project will have an impact on any threatened flora species outside of the MSA area.

3.3 Threatened fauna

A search of records from 10 km surrounding the project area of the Victorian Biodiversity Atlas (DEPI, 2014a) and the Protected Matters Search Tool returned 26 nationally listed threatened species as potentially occurring within the project area. The desktop assessment completed by EHP (2017) identified seven species as having a low to high likelihood of being present within the project area, or as known to recently occur within the project area (within 10 years); provided in Table 3.5. General ecological field surveys identified the presence of suitable habitat for four of these seven species - Dwarf Galaxias, Golden Sun Moth, Growling Grass Frog and Striped Legless Lizard. These four species were the focus of targeted fauna surveys undertaken for the project.

TABLE 3.5 THREATENED FAUNA SPECIES IDENTIFIED FROM DESKTOP REVIEW AS HAVING A LOW, MODERATE, OR HIGH LIKELIHOOD OF BEING PRESENT IN THE PROJECT AREA (EHP, 2017)

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS			LAST DOCUMENTED RECORD (NO. VBA RECORDS)					LIKELIHOOD
		EPBC	FFG	VicAdv	Element 1	Element 2	Element 3	Element 4	Element 5	
National Significance										
Dwarf Galaxias	<i>Galaxiella pusilla</i>	VU	L	EN	PMST	PMST	PMST	PMST	PMST	3 - Toolern Creek (Element 1c), 3/4 rivers/creeks upstream of Bostock Reservoir(Element 4).
Golden Sun Moth	<i>Synemon plana</i>	CR	L	CR	2012 (757)	2012 (334)	PMST	PMST	PMST	3 – not detected during targeted surveys
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	VU	L	VU	2010 (9)	1968 (2)	PMST	PMST	PMST	2 - most Elements (fly over)
Growling Grass Frog	<i>Litoria raniformis</i>	VU	L	EN	2011 (276)	2007 (20)	2010 (1)	1962 (4)	2011 (10)	2 – Toolern Creek (Element 1c), rivers/creeks upstream of Bostock Reservoir(Element 4), farm dams and wetlands nearby to Element 6.
Plains-wanderer	<i>Pedionomus torquatus</i>	CR	L	CR	1979 (17)	1988 (3)	PMST	1911 (2)	1911 (3)	3 – Element 3
Striped Legless Lizard	<i>Delma impar</i>	VU	L	EN	2014 (458)	PMST	PMST	PMST	PMST	3 – Element 1(not recorded during targeted surveys)
Swift Parrot	<i>Lathamus discolor</i>	CR	L	EN	2008 (31)	2008 (12)	1957 (1)	1977 (2)	1977 (2)	2 – Element 1, Element 2

1 - High Likelihood

- Known resident in the study area based on site observations, database records, or expert advice; and/or,
- Recent records (i.e. within five years) of the species in the local area (DELWP 2016d); and/or,
- The study area contains the species' preferred habitat.

2 - Moderate Likelihood

- The species is likely to visit the study area regularly (i.e. at least seasonally); and/or,
- Previous records of the species in the local area (DELWP 2016d); and/or,
- The study area contains some characteristics of the species' preferred habitat.

3 - Low Likelihood

- The species is likely to visit the study area occasionally or opportunistically whilst en route to more suitable sites; and/or,
- There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or,
- The study area contains few or no characteristics of the species' preferred habitat.

Key:

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

FFG *Flora and Fauna Guarantee Act 1988 (FFG Act)*

DEPI *Advisory List of Threatened Flora in Victoria (DEPI 2014)*

NAP *National Action Plan (Cogger et al. 1993; Duncan et al. 1999; Garnet and Crowley 2000; Lee 1995; Maxwell et al. 1996; Sands and New 2002; Tyler 1997, Woinarski et al. 2014)*

EX Extinct
CR Critically endangered
EN Endangered
VU Vulnerable
K Poorly Known (Briggs and Leigh 1996)
Records identified from EPBC Act Protected Matters Search Tool.
* Records identified from the FIS

X Extinct
e Endangered
v Vulnerable
r Rare
k Poorly Known
L Listed

Consideration of the likely impact to threatened fauna species identified from the desktop assessment as having a low to high likelihood of being present within the project area has been completed based on the findings of field and targeted fauna assessment completed to date (Table 3.6). Based on the results of the field and targeted fauna assessment completed, it is considered there is a low risk of the project having a significant impact on fauna species listed on the EPBC Act.

TABLE 3.6 LIKELY RISK OF SIGNIFICANT IMPACT TO FAUNA SPECIES IDENTIFIED AS POTENTIALLY PRESENT WITHIN THE PROJECT AREA BASED ON THE RESULTS OF FIELD AND TARGETED FAUNA ASSESSMENT

SPECIES	CONSERVATION LISTING	ELEMENTS IN WHICH TARGETED SURVEYS UNDERTAKEN	RESULTS	LIKELIHOOD OF SIGNIFICANT IMPACT
Dwarf Galaxia	EPBC Vulnerable FFG Listed VicAdv Endangered	Element 1c, 3	<p>Not recorded No Dwarf Galaxias were identified. It is considered very unlikely that this species would occur in Toolern Creek, as the creek is situated in a residential area and is subject to poor water quality.</p> <p>Only exotic species were identified in Toolern Creek (Melton South); including Eastern Gambusia <i>Gambusia holbrooki</i>, Common Carp <i>Cyprinus carpio</i> and Redfin Perch <i>Perca fluviatilis</i></p> <p>Four fish species, one crustacean and one frog species were identified with the Bostock Reservoir (Table 3.1.5). Native species identified included Maribyrnong Galaxias <i>Galaxias maculatus</i>, Flathead Gudgeon <i>Philypnodon grandiceps</i>, Yabbies <i>Cherax</i> spp. and the Spotted Marsh Frog, Introduced species included the Eastern Gambusia and the Tench <i>Tinca tinca</i>. It is considered the species may persist within the greater Bostock Reservoir.</p>	<p>Low Risk. Based on the following:</p> <ul style="list-style-type: none"> It is considered highly unlikely that Dwarf Galaxias occurs in Toolern creek or upstream of the Bostock Reservoir. It is possible that Dwarf Galaxias are present elsewhere within the Bostock Reservoir waterway where potentially suitable habitat is available. Proposed project works at the Bostock Reservoir are to occur at grade and are not anticipated to result in significant impacts to streamflows or water quality through the construction phase of the project and continual operation of the Ballarat rail line. Given the low likelihood of the species occurring in these waterbodies it is highly unlikely that the project will impact Dwarf Galaxias. For any proposed works that may occur within or in the vicinity of these waterbodies, specific Environmental Performance Requirements (EPRs) will be included in the Environmental Management Framework that the Alliance contracting partner will be required to comply with. EPRs will include the implementation of best practise sediment and erosion control measures for works in the vicinity of waterbodies.
Golden Sun Moth	EPBC Critically Endangered FFG Listed VicAdv Critically Endangered	Element 1c, 2, 3	<p>Not recorded No Golden Sun Moth were detected, and the species has not previously been recorded within the study area.</p> <p>Habitat within the project area is of low quality, being small and fragmented and interspersed with less desirable pasture species.</p> <p>Targeted surveys were undertaken in accordance with significant impact guidelines (DEWHA, 2009b)</p>	<p>Low Risk. Based on the following:</p> <ul style="list-style-type: none"> Species was not identified in targeted surveys undertaken in accordance with the significant impact guidelines (DEWHA, 2009b) Habitat within the project area is of low quality, being small and fragmented and interspersed with less desirable pasture species that are not preferred feeding plants of the Golden Sun Moth. <p>As such, it is unlikely the species is present and therefore the project will not have a significant impact on the species.</p>

SPECIES	CONSERVATION LISTING	ELEMENTS IN WHICH TARGETED SURVEYS UNDERTAKEN	RESULTS	LIKELIHOOD OF SIGNIFICANT IMPACT
Grey-headed Flying-fox	EPBC Vulnerable FFG Listed VicAdv Vulnerable	Targeted Survey not completed	This species is likely to overfly much of the alignment, whilst foraging. However the species roosts in large camps, with permanent camps located at Yarra Bend and Dowell Creek near Mallacoota. The Project area does not contain significant roosting habitat for this species. Previous records of the species exist within the vicinity of Element 1. No suitable foraging habitat was identified within the Element 1 Project Area for the species.	Low Risk. As significant habitat for this species is not present within the project area and the project area is remote from recorded camp sites, the species is unlikely to be present and therefore the project will not have a significant impact on the species.
Growling Grass Frog	EPBC Vulnerable FFG Listed VicAdv Endangered	Element 1c, 3, 5	<p>Not recorded Potential habitat for the species was identified at Toolern Creek, Bostock Reservoir and at large permanent dams adjacent to and within close proximity to the study area. These areas were considered to provide low quality habitat based on shading, high level of disturbance, poor water quality and lack of diversity of aquatic vegetation. No evidence of Growling Grass Frog (adults, juveniles and tadpoles) was detected during the targeted nocturnal surveys. Furthermore, Growling Grass Frog was not heard calling during auditory surveys adjacent and in proximity to the study area.</p> <p>A total of five locally common frog species were recorded throughout the study area, including Common Froglet <i>Crinia signifera</i>, Eastern Banjo Frog <i>Limodynastes dumerilii</i>, Spotted Marsh Frog <i>Limnodynastes tasmaniensis</i>, Brown Tree Frog <i>Litoria ewingii</i>, and Whistling Tree Frog <i>Litoria verreauxii</i>.</p>	<p>Low Risk. Given the extensive nature of targeted surveys across all areas with the potential to be directly and/or indirectly impacted by the proposed development and low likelihood that the study area provides permanent and/or important habitat for the species, the project will not result in a significant impact to the species.</p> <p>For any proposed works that may occur within or in the vicinity of waterbodies, specific EPRs will be included in the Environmental Management Framework that the Alliance contracting partner will be required to comply with. EPRs will include the implementation of best practise sediment and erosion control measures for works in the vicinity of waterbodies.</p>
Plains-wanderer	EPBC Critically Endangered FFG Listed VicAdv Critically Endangered	Targeted Surveys not completed	This species is considered regionally extinct. Recent literature points to this species only persisting in the northern plains of Victoria, within the Patho Plains to the west of Echuca and Avoca Plains west of Kerang (David Baker-Gabb, 2016).	Low Risk. As the species is considered locally extinct, the species is unlikely to be present and therefore the project will not have a significant impact on the species.

SPECIES	CONSERVATION LISTING	ELEMENTS IN WHICH TARGETED SURVEYS UNDERTAKEN	RESULTS	LIKELIHOOD OF SIGNIFICANT IMPACT
Striped Legless Lizard	EPBC Vulnerable FFG Listed VicAdv Endangered	Element 1b	<p>Not recorded. No suitable habitat for the species was identified within the Project areas outside of the MSA. No Striped Legless Lizards were detected within the study area.</p> <p>Six locally common reptile species; Eastern Brown Snake <i>Pseudonaja textilis</i>, Little Whip Snake <i>Rhinoplocephalus flagellum</i>, Blue-tongue Lizard <i>Tiliqua scincoides scincoides</i>, Bougainvillii's Skink <i>Lerista bougainvillii</i>, Eastern Three-lined Skink <i>Bassiana duperreyi</i>, Southern Grass Skink <i>Pseudemoia entrecasteauxii</i>, one unidentified skink, and one introduced mammal species (House Mouse <i>Mus musculus</i>) were recorded under tiles during the tile checks.</p>	<p>Low Risk. Suitable habitat for the species was only identified within the MSA area. Targeted surveys were completed to inform potential Salvage and Translocation Requirements. DELWP has recently conducted an evaluation which outlines salvage and translocation of the Striped Legless Lizard is not a feasible activity under the program. Salvage of Striped Legless Lizard has been suspended pending the finalisation of the evaluation.</p> <p>The Striped Legless Lizard is unlikely to be present outside of MSA. Grassland identified outside of the MSA area is considered unsuitable to support a significant population of the Striped Legless Lizard as defined in the Significant Impact Guidelines (DSEWPac, 2011) as they are:</p> <ul style="list-style-type: none"> • less than 0.5 ha • Small isolated areas of habitat which are currently under pressure, or are likely to experience long-term pressures (within an active rail corridor). • Small sites which support marginal or low quality habitat (dominated by high threat weeds). <p>On this basis, the project will not have a significant impact on the species.</p>
Swift Parrot	EPBC Critically Endangered FFG Listed VicAdv Endangered	Targeted Surveys not completed	<p>A suitable extent of Box forest comprising favoured food trees of this species including Grey Box, Golden Wattle and Yellow Gum was identified to the north of Kerrs Road (Element 2), to the west of the railway line (0.15 ha is located within the project area, the majority of the extent is outside the project area). There are no records of the species within the project area, The nearest record within the VBA is from 3 km north of the project area. A number of large habitat trees were identified within proximity to the project area. This species is migratory and overwinters in Victoria. Based on the results of annual surveys completed within Victoria to detect the presence of Swift Parrot, it is unlikely that the site is a significant feeding ground for the species.</p> <p>Other areas of Plains Woodland identified within the project area are not considered to provide favourable foraging habitat as they are</p>	<p>Low Risk. Identified habitat features (namely habitat trees) are to be retained within project area. Clearing of vegetation from the patch of potential foraging habitat will be minor, where required. Should smaller trees, not identified as habitat trees require removal, pre-clearance fauna assessments will be completed by a qualified spotter/handler.</p> <p>As this area is unlikely to be a significant feeding ground for the species, the minor removal of vegetation associated with the project at this location will not constitute a significant impact under the EPBC Act (AJM JV, 2017).</p>

SPECIES	CONSERVATION LISTING	ELEMENTS IN WHICH TARGETED SURVEYS UNDERTAKEN	RESULTS	LIKELIHOOD OF SIGNIFICANT IMPACT
			less than 10 ha in size and do not support favoured food trees, Yellow Gum and Golden Wattle.	

It was considered for the following reasons that targeted surveys were not required within secondary construction areas that were not already covered by *Existing Ecological Conditions Report, Ballarat Line Upgrade (EHP, 2017)*:

- Areas identified as comprising high quality grassland, namely patches of NTGVVP, that may provide habitat for threatened fauna species have been excluded from use as SCAs outside of the MSA area.
- Many of the locations of targeted assessment completed by EHP (2017) are in very close proximity to areas identified as SCA. Given the targeted fauna surveys did not identify threatened fauna species in similar habitat identified within those areas, it is considered unlikely that threatened fauna species are present within the SCA. This is particularly relevant to the following sites:
 - » DM-13 and DM-14 – adjacent to the Toolern Creek. Targeted surveys completed by EHP (2017) did not identify Growling Grass Frog or Dwarf Galaxias at this location.
 - » WD-01 – marginal wetland habitat identified. Targeted surveys completed by EHP (2017) did not identify Growling Grass Frog in a number of farm dams surrounding this location
 - » BM-08, BM-09 - Grassland identified as low potential habitat for the Golden Suns Moth due to mowing regime identified in road reserve either side of rail corridor. Targeted surveys completed by EHP (2017) within the rail corridor at this location did not detect the Golden Sun Moth. Given the low potential of the habitat and results of previous surveys it is unlikely the Golden Sun Moth persists at this location
 - » Other grassland habitat identified within the secondary construction areas was considered unlikely to support threatened fauna species, given their small, degraded nature within a highly disturbed setting.

Where potential threatened fauna habitat was identified within the project area outside of the MSA it was assessed as being of low quality due to its fragmented, small extent and highly disturbed nature. Subsequent targeted fauna surveys have not detected any threatened fauna species within the project area. Mitigation measures will be implemented to avoid impacts to identified waterway habitat and minimise impacts to potential foraging habitat of the Swift Parrot.

As a result of the low likelihood of threatened fauna species persisting within project area and the implementation of mitigation measures to minimise the impact to potential habitat, it is considered highly unlikely that the project will have a significant impact on any threatened fauna species listed under the EPBC Act outside of the MSA area.

3.4 Migratory Species

Several Migratory and/or Marine species were either recorded during the site assessment or have been recorded within 10 km of the study area (EHP, 2017). The project area is not classed as an 'important habitat' as defined under the EPBC Act Policy Statement 1.1 Principal Significant Impact Guidelines (DoE 2013) for these species. The project will not have a significant impact on any listed migratory species.

3.5 Ramsar Wetlands

The Project area occurs upstream (29 km north) of the catchment for the Ramsar wetland, Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Wetland Site (DoEE 2016a).

Management practices and construction techniques will be consistent with *Construction Techniques for Sediment Pollution Control* (EPA 1991) and *Environmental Guidelines for Major Construction Sites* (EPA 1996).

Given the remoteness of the project to any Ramsar wetland, the proposed action will not impact the ecological character of any Ramsar wetland.

3.6 Mitigation measures

Mitigation measures have been recommended and will be implemented to avoid any impacts to MNES identified within the project area. Additional mitigation measures will be outlined in the Construction EMP.

3.6.1 IDENTIFICATION OF PROJECT AREA

The following measures apply to the identification of the project area to ensure all works are completed within the works area and avoid any impact to significant ecological values identified outside of the project area.

- The project area is to be clearly marked on all maps and construction drawings associated with the project.
- Site induction will clearly specify the extent of the project area and the restriction of activities to within the project area.
- Where significant ecological values have been identified adjacent to the project area, the delineation of the project area is to be fenced using either high visibility mesh bunting or temporary construction fencing (including erosion fencing if necessary) and marked as a 'No Go' area.

3.6.2 PATCHES OF NATURAL TEMPERATE GRASSLANDS OF THE VICTORIAN VOLCANIC PLAIN AND CLUMPS OF MATTED FLAX-LILY TO BE RETAINED

Exclusion zones to prevent any impact to known occurrence of Matted Flax-lily and Natural Temperate Grasslands of the Victorian Volcanic Plain are to be implemented. Exclusion zones will apply to the occurrence of Matted Flax-lily identified in Element 2 and 3 and Natural Temperate Grasslands of the Victorian Volcanic Plain identified within Element 1c and 3. The following process will be implemented:

- Exclusion zones are to be included on all site maps.
- The Exclusion Zone should encompass a 2 m buffer around the perimeter of the identified area of Grassland and clumps of Matted Flax-lily. The extent of this buffer may be reduced where an existing cleared access track is present, such as in Element 1c. In this case exclusion fencing will be erected at the perimeter of the existing access track.
- The Exclusion Zone should be fenced with high-visibility mesh bunting or temporary construction fencing (including erosion fencing if necessary). The area is to be signed as a 'No-Go' zone.
- The erection of the fencing surrounding the Matted Flax-lily and Grassland is to be supervised by a qualified and experienced ecologist, and the fencing is to be maintained for the duration of the works.
- The induction of all staff to the site will include a discussion of the importance of sensitive environmental areas, and activities which are prohibited from these areas ('No-Go' areas).
- No construction vehicles, machinery or equipment, lay down of materials or unauthorised personnel will be allowed within 'No-Go' areas.

3.6.3 POTENTIAL FORAGING HABITAT FOR THE SWIFT PARROT

The following mitigation measures apply to the woodland area (0.15 ha) identified as potential foraging habitat for the Swift Parrot to the north of Kerrs Road in Maddingley.

- The perimeter of the Construction corridor is to be fenced using either high visibility mesh bunting or temporary construction fencing and marked as a 'No Go' area.
- The consultant arborist is to assess and implement tree protection measures to enable the retention of trees where possible at this location, prioritising the retention of the three identified habitat trees.
- Where clearing of vegetation is required, it will be completed outside of the foraging season of the Swift Parrot in Victoria (May through to August).
- Where trees are required to be cleared at this location a pre-clearance fauna assessment will be completed by a qualified fauna spotter/handler.

3.7 Summary of Matters of NES present within the project area

The Ballarat Line Upgrade will avoid any direct or indirect impacts to known MNES. Specifically, for the following Matters of NES located within the project area, the predicted outcomes are set out below:

- Two patches of NTGVVP (listed as Critically Endangered) are present within the project area, within Element 1c, totalling 0.20 ha. Mitigation measures will be implemented as documented within Section 3.4.2, to ensure that the occurrences of these communities are protected from direct and indirect impacts during construction and operation.
- Three clumps of Matted Flax-lily, listed as Endangered, are present within the project area, within Element 2 and 3. Mitigation measures will be implemented as documented within Section 3.4.2, to ensure that the occurrences of this species are protected from direct and indirect impacts during construction and operation.
- A minor area (0.15 ha) of potential foraging habitat for the Swift Parrot (listed as Critically Endangered) is present within the project area within Element 2. Mitigation measures will be implemented as documented within Section 3.4.3 to minimise any impact to foraging resources within the project area. The area is not considered a critical feeding resource for the Swift Parrot, and so minor removal of vegetation at this location outside of the foraging season will not constitute a significant impact under the EPBC Act.
- Given the extensive survey effort undertaken in accordance with flora and fauna survey guidelines, the predominantly modified condition and lack of moderate or high quality habitat across the majority of the study area, there is a low likelihood that any other EPBC listed species will be impacted by the project.
- Given the extensive survey effort undertaken in accordance with flora and fauna survey guidelines, the predominantly modified condition and lack of moderate or high quality habitat across the majority of the study area, there is a low likelihood that any other EPBC listed species will be impacted by the project outside of the MSA area.

4 Areas subject to the MSA (State significance)

The results presented in the following section provide a summary of ecological values of state significance identified within the current project area subject to the MSA.

4.1 Areas subject to the BCS (Element 1A)

The eastern end of the project area through to Paynes Road is located within the MSA area and subject to the BCS.

4.1.1 EXTENT OF NATIVE VEGETATION

Table 4.1 summarises the extent of native vegetation mapped within Element 1A of the project area. A total of 20.941 ha of time-stamped native vegetation is mapped within the portion of the project area subject to the BCS. Habitat compensation obligations will apply to the removal of this native vegetation and are documented in Section 4.1.3.

TABLE 4.1 NATIVE VEGETATION (AS EVC) IMPACTS FOR BALLARAT LINE UPGRADE (EHP, 2017)

PROJECT ELEMENT	EVC	BIOREGION	AREA (HA) MSA	EVC CONSERVATION STATUS
Element 1a Project Area Duplication between Deer Park West and Melton (rail reserve between Western Freeway, Caroline Springs and Paynes Road, Rockbank)	132 Plains Grassland	VVP	10.277	Endangered
Secondary Construction Areas DM-01 to DM-08	132 Plains Grassland	VVP	10.6635	Endangered
Total area of native vegetation mapped			20.941	

4.1.2 PRESENCE OF THREATENED FLORA

Targeted surveys for the presence of threatened flora were completed within the project area subject to the BCS to inform the preparation of salvage and translocation plans. Targeted surveys have not yet been completed for secondary construction areas identified after the preparation of the EHP (2017) report. Further targeted surveys in these areas will be completed in winter and spring of 2017 to address the secondary construction areas and verify the locations and total numbers of threatened flora species that require translocation. It is currently known that 145 Spiny Rice-flower and 33 Large-fruited Groundsel will be proposed for translocation from Element 1A the project area (Table 4.2). A salvage and translocation plan for these species will be prepared in consultation with DELWP in accordance with the BCS.

TABLE 4.2 THREATENED FLORA SPECIES IDENTIFIED WITHIN THE PROJECT AREA (EXCLUDING SECONDARY CONSTRUCTION AREAS) AND IMPLICATIONS OF PRESENCE.

FLORA SPECIES	CONSERVATION LISTING	LOCATION IDENTIFIED	IMPLICATION OF PRESENCE
Spiny Rice-flower	EPBC Critically Endangered FFG Listed VicAdv Endangered	Within MSA area. 145 individuals were identified within Element 1a during targeted surveys.	To be impacted. It is proposed that 145 individuals will require removal. In accordance with the BCS, a salvage and translocation plan will be prepared for the species to be approved by DELWP prior to the commencement of works. The Translocation Plan will incorporate results of the pending targeted surveys to be completed within the secondary construction areas.
Large-fruited Groundsel	EPBC Vulnerable FFG Listed VicAdv Endangered	Within MSA area. 33 individuals were identified within Element 1a during targeted surveys.	To be impacted. It is proposed that 22 individuals will require removal. In accordance with the BCS, a salvage and translocation plan will be prepared for the species to be approved by DELWP prior to the commencement of works. The Translocation Plan will incorporate results of the pending targeted surveys to be completed within the secondary construction areas.

4.1.3 HABITAT COMPENSATION OBLIGATIONS

DELWP datasets were consulted, including Time-stamped native vegetation and habitat compensation obligation mapping, to understand potential offset obligations should areas subject to the BCS be cleared (Table 4.3). Final determination of the offsets for the removal of this habitat and vegetation will be determined in consultation with DELWP.

TABLE 4.3 MODELLED HABITAT WITHIN PROJECT AREA UNDER THE BIODIVERSITY CONSERVATION STRATEGY

HABITAT TYPE	AREA (HECTARES)
Within Element 1a of the Project area	
Native Vegetation	10.277
Spiny Rice-flower	10.277
Golden Sun Moth	9.532
Growling Grass Frog	0.370
Within Secondary Construction Areas in the MSA area	
Native Vegetation	10.663
Spiny Rice-flower	10.663
Golden Sun Moth	6.776
Growling Grass Frog	0.895

4.2 Areas subject to the Toolern PSP

4.2.1 NATIVE VEGETATION

The extent of native vegetation mapped within the project area subject to the Toolern PSP is provided in Table 4.4. The nine scattered trees and one small patch of Plains Woodland identified as PW1.07 within the Toolern NVPP are identified as 'Trees to be removed' and 'Remnant patches to be removed'. All other patches of native vegetation have been identified within the Toolern NVPP as 'to be protected'. In this circumstance as directed by DELWP (Chris Johnstone. Pers comm), native vegetation planned to be removed is assessed in accordance within the *Permitted Clearing of Native Vegetation – Biodiversity Assessment Guidelines 2013* (DEPI, 2013).

TABLE 4.4 EXTENT OF NATIVE VEGETATION MAPPED WITHIN THE PROJECT AREA SUBJECT TO THE TOOLERN PSP.

PROJECT ELEMENT	EVC	BIOREGION	EVC CONSERVATION STATUS	AREA (HA)	TOTAL NATIVE VEGETATION (AS EVC)	SCATTERED TREES
Element 1a Duplication between Deer Park West and Melton (rail reserve between Paynes Road, Rockbank and Toolern Creek, Melton)	132 Plains Grassland	VVP	Endangered	3.364	5.557	9
	55 Plains Grassy Woodland	VVP	Endangered	0.001		
	803 Plains Woodland	VVP	Endangered	2.192		
Element 1b DM-11, DM-12 (Partial), DM-13 (Partial)	68 Creekline Grassy Woodland	VVP	Endangered	0.475	0.475	4
Total					6.032	13

4.2.2 PRESENCE OF THREATENED FLORA

Targeted surveys for the presence of threatened flora completed within the project area subject to the Toolern NVPP identified one Spiny Rice-flower. The individual was identified to the west of Paynes Road, on the northern side of the rail corridor. This individual will be included within the Salvage and Translocation Plan. To date targeted flora surveys have not identified any other threatened flora species within the Project area subject to the Toolern PSP.

Targeted surveys have not yet been completed for secondary construction areas identified after the preparation of the EHP (2017) report. Targeted surveys in these areas will be completed in winter and spring of 2017 to identify threatened flora species that require translocation.

4.3 Summary of impacts to ecological values within the MSA

4.3.1 SUBJECT TO THE BCS

Within the MSA area, subject to the BCS, the following items have been identified within the project area:

- 145 Spiny Rice-flower plants and 22 Large-fruited Groundsel (listed under the EPBC Act, the FFG Act and the Vic Adv). In accordance with the BCS a salvage and translocation plan will be prepared for these species, to be approved by DELWP prior to the commencement of the project.
- 20.941 ha of Time-stamped native vegetation has been identified as potentially impacted, based on the indicative construction footprint
- Based on the indicative construction footprint, the following habitat compensation obligations apply to the project area:
 - » 20.941 ha for Spiny Rice-flower,
 - » 16.308 ha for Golden Sun Moth and
 - » 1.265 ha for Growling Grass Frog,

4.3.2 SUBJECT TO THE TOOLERN PSP

Within the MSA area, subject to the Toolern PSP, the following items of ecological value have been identified within the project area:

- A total of 6.032 ha of native vegetation, including 3.364 ha of EVC 132: Plains Grassland, 0.369 ha of EVC 55 Plains Grassy Woodland, 0.475 ha of Creepline Grassy Woodland and 2.192 ha of Plains Woodland all within the Victorian Volcanic Plain Bioregion.
- 13 scattered trees
- One Spiny Rice-flower
- No threatened fauna species were identified as likely to be impacted.

5 Areas outside of the MSA (State Significance)

The following ecological values were identified within the Project area and Secondary Construction Areas outside of the MSA, in accordance with State and Local Government legislation and policy.

5.1 Native Vegetation

Remnant vegetation present was mapped into five Ecological Vegetation Classes. All EVCs have a Bioregional Conservation Significance of 'Endangered' under the Guidelines. A breakdown of the location of remnant vegetation within the various project elements, from the various surveys undertaken is provided in Table 5.1 below.

Outside of the MSA area, approximately 2.679 ha of native vegetation and 68 scattered trees have been identified as potentially impacted by the project (Table 5.1).

TABLE 5.1 NATIVE VEGETATION IDENTIFIED AS POTENTIALLY IMPACTED BY THE PROJECT

ELEMENT	EVC	BIOREGION	EVC EXTENT (HA)	EVC CONS. STATUS	NATIVE VEGETATION EXTENT (HA)	SCATTERED TREES
Element 1c Duplication between Deer Park West and Melton (west of Toolern Creek, Melton)	68 Creepline Grassy Woodland	VVP	0.013	Endangered	0.099	10
	55 Plains Grassy Woodland	VVP	0.020	Endangered		
	803 Plains Woodland	VVP	0.065	Endangered		
Element 1c: DM-09; DM-12 (Partial), DM-13 (Partial); DM-14 to DM-21	68 Creepline Grassy Woodland	VVP	0.043	Endangered	0.044	1
	803 Plains Woodland	VVP	0.001	Endangered		
Element 2: Bacchus Marsh Second Platform / Maddingley Stabling	803 Plains Woodland	VVP	0.060	Endangered	0.083	10
	55 Plains Grassy Woodland	VVP	0.023	Endangered		
Element 2: BM-01 to BM-09	55 Plains Grassy Woodland	VVP	0.112	Endangered	0.242	4
	803 Plains Woodland	VVP	0.130	Endangered		

ELEMENT	EVC	BIOREGION	EVC EXTENT (HA)	EVC CONS. STATUS	NATIVE VEGETATION EXTENT (HA)	SCATTERED TREES
Element 3: Ballan Loop	132 Plains Grassland	VVP	0.142	Endangered	1.764	8
	55 Plains Grassy Woodland	VVP	1.623	Endangered		
Element 3: BP-01 to BP-13	55 Plains Grassy Woodland	VVP	0.214	Endangered	0.214	
Element 4: Spreadeagle (new Bungaree) Loop	55 Plains Grassy Woodland	VVP	0.117	Endangered	0.137	21
	821 Tall Marsh	VVP	0.020	Endangered		
Element 4: SP-01 to SP-07	Native vegetation where mapped is already accounted for within Project area calculation					
Element 5: Warrenheip Duplication	132 Plains Grassland	VVP	0.050	Endangered	0.070	4
	55 Plains Grassy Woodland	CVU	0.019	Endangered		
Element 5: WD-01 to WD-06	125 Plains Grassy Wetland	VVP	0.025	Endangered	0.025	
Total area of vegetation proposed to be impacted outside of the MSA					2.679	68

5.1.1 PERMITTED CLEARING OF NATIVE VEGETATION - BIODIVERSITY ASSESSMENT GUIDELINES

Under the Guidelines, a risk-based level of assessment is determined using both the Location Risk and the extent of proposed native vegetation clearing. Location Risk is the risk that removing native vegetation in a particular location will have an impact on the persistence of a rare or threatened species. All areas of Victoria have been classified into one of three Location Risk categories, A, B or C. The current project area includes areas of Location A, B and C and therefore the entire project is allocated to Location Risk C.

Extent includes the area of native vegetation to be removed; both remnant patches and scattered trees. The current extent of native vegetation potentially impacted outside of the MSA is 2.679 ha and 68 scattered trees. As illustrated in Table 5.2 this means the native vegetation removal associated with the project will be assessed under the high risk pathway. For moderate and high risk applications, greater information requirements apply and a shapefile of native vegetation to be removed must be submitted to DELWP to determine the type and extent of offsets required. The required offset must be secured prior to the removal of native vegetation.

TABLE 5.2 RISK PATHWAY FOR NATIVE VEGETATION CLEARANCE ACCORDING TO BIODIVERSITY ASSESSMENT GUIDELINES (DEPI, 2013C)

REMNANT PATCHES EXTENT	LOCATION		
	LOCATION A	LOCATION B	LOCATION C
<0.5 ha	Low	Low	High
>0.5 and < 1 ha	Low	Moderate	High
>1 ha	Moderate	High	High
SCATTERED TREES EXTENT	LOCATION A	LOCATION B	LOCATION C
<15 Scattered Trees	Low	Moderate	High
≥ 15 Scattered Trees	Moderate	High	High

5.2 Threatened Ecological communities

Assessments for the presence of threatened ecological communities listed under the FFG Act were completed throughout the Project area outside of the MSA. The extent of threatened ecological communities identified within the project area, outside of the MSA and the implications of the presence of these ecological communities is presented in Table 5.3.

TABLE 5.3 THREATENED ECOLOGICAL COMMUNITIES IDENTIFIED WITHIN THE PROJECT AREA OUTSIDE OF THE MSA.

THREATENED ECOLOGICAL COMMUNITY	CONSERVATION STATUS	LOCATION IDENTIFIED	IMPLICATION OF PRESENCE
Western (Basalt) Plains Grasslands Community	FFG Listed	<ul style="list-style-type: none"> 0.142ha in Element 3 mapped as EVC 132 Plains Grassland. 0.050 ha in Element 5 mapped as EVC 132 Plains Grassland. 	To be impacted. A Permit to Take will need to be obtained from DELWP for the removal of these species from public land.
Western Basalt Plains (River Red Gum) Grassy Woodland	FFG Listed	<p>The presence of this community was not identified within the EHP report. However, the description within the report of Plains Grassy Woodland present within the project area correlates with the description of this threatened community where the following parameters apply:</p> <ul style="list-style-type: none"> Overstorey of River Red Gum (<i>Eucalyptus camaldulensis</i>) present Located within the Victorian Volcanic Plains Mapped in Element 3 as EVC 55 Plains Grassy Woodland where canopy is present. 	Not currently impacted. Identified extent of community is outside of the construction footprint of the Project.

The ecological assessments have therefore determined that 0.192 ha of the FFG Listed community, Western (Basalt) Plains Grasslands Community are likely to be impacted by the project, outside of the MSA.

5.3 Threatened fauna

A search of records from 10 km surrounding the project area of the Victorian Biodiversity Atlas (DEPI, 2014a) Tool returned 79 state listed threatened species as potentially occurring within the project area. The desktop assessment completed by EHP, (2017) identified fourteen species as having a low to high likelihood of being present within the project area, or as known to recently occur within the project area (within 10 years); provided in Table 5.4 below. General ecological field surveys identified the presence of suitable habitat for four of these fourteen species - Dwarf Galaxias, Golden Sun Moth, Growling Grass Frog and Striped Legless Lizard. These four species were the focus of targeted fauna surveys undertaken for the project.

TABLE 5.4 THREATENED FAUNA SPECIES IDENTIFIED FROM DESKTOP REVIEW AS HAVING A LOW, MODERATE, HIGH LIKELIHOOD OF BEING PRESENT IN THE PROJECT AREA (EHP, 2017).

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS		LAST DOCUMENTED RECORD (NO. VBA RECORDS)					LIKELIHOOD
		FFG	VicAdv	Element 1	Element 2	Element 3	Element 4	Element 5	
Black Falcon	<i>Falco subniger</i>	-	VU	2009 (17)	1988 (10)	-	2000 (1)	2000 (1)	2 – may forage over the study area and land adjacent.
Brown Toadlet	<i>Pseudophryne bibronii</i>	L	EN	2010 (10)	1990 (5)	2008 (18)	-	-	3 – Element 4 drainage lines along rail corridor.
Diamond Firetail	<i>Stagonopleura guttata</i>	L	NT	2011 (178)	2011 (70)	1996 (3)	1996 (3)	-	3 – Element 1, Element 2
Dwarf Galaxias	<i>Galaxiella pusilla</i>	L	EN	PMST	PMST	PMST	PMST	PMST	3 - Toolern Creek (Element 1c), 3/4 rivers/creeks upstream of Bostock Reservoir(Element 4).
Golden Sun Moth	<i>Synemon plana</i>	L	CR	2012 (757)	2012 (334)	PMST	PMST	PMST	3 – not detected during targeted surveys
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	L	VU	2010 (9)	1968 (2)	PMST	PMST	PMST	2 - most Elements (fly over)
Growling Grass Frog	<i>Litoria raniformis</i>	L	EN	2011 (276)	2007 (20)	2010 (1)	1962 (4)	2011 (10)	2 – Toolern Creek (Element 1c), rivers/creeks upstream of Bostock Reservoir(Element 4), farm dams and wetlands nearby to Element 6.
Hooded Robin	<i>Melanodryas cucullata cucullata</i>	L	NT	1999 (29)	1990 (8)	-	-	1975 (1)	3 – Element 1
Masked Owl	<i>Tyto novaehollandiae novaehollandiae</i>	L	EN	1989 (2)	-	1995 (1)	1995 (1)	-	3 – Element 3, Element 4
Plains-wanderer	<i>Pedionomus torquatus</i>	L	CR	1979 (17)	1988 (3)	PMST	1911 (2)	1911 (3)	3 – Element 2
Striped Legless Lizard	<i>Delma impar</i>	L	EN	2014 (458)	PMST	PMST	PMST	PMST	3 (not recorded during targeted surveys)
Swift Parrot	<i>Lathamus discolor</i>	L	EN	2008 (31)	2008 (12)	1957 (1)	1977 (2)	1977 (2)	3 – Element 1
Tussock Skink	<i>Pseudemoia pagenstecheri</i>	-	VU	2009 (78)	-	-	2007 (5)	2004 (1)	2 – Element 1b, 2, 5.
Yellow-bellied Sheathtail Bat	<i>Saccolaimus flaviventris</i>	L	DD	2000 (22)	-	-	-	-	2 – Element 1 and 2

1 - High Likelihood

- Known resident in the study area based on site observations, database records, or expert advice; and/or,
- Recent records (i.e. within five years) of the species in the local area (DELWP 2016d); and/or,
- The study area contains the species' preferred habitat.

2 - Moderate Likelihood

- The species is likely to visit the study area regularly (i.e. at least seasonally); and/or,
- Previous records of the species in the local area (DELWP 2016d); and/or,
- The study area contains some characteristics of the species' preferred habitat.

3 - Low Likelihood

- The species is likely to visit the study area occasionally or opportunistically whilst en route to more suitable sites; and/or,
- There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or,
- The study area contains few or no characteristics of the species' preferred habitat.

Key:

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

FFG *Flora and Fauna Guarantee Act 1988* (FFG Act)

DEPI Advisory List of Threatened Flora in Victoria (DEPI 2014)

NAP National Action Plan (Cogger *et al.* 1993; Duncan *et al.* 1999; Garnet and Crowley 2000; Lee 1995; Maxwell *et al.* 1996; Sands and New 2002; Tyler 1997; Woinarski *et al.* 2014)

EX Extinct

CR Critically endangered

EN Endangered

VU Vulnerable

K Poorly Known (Briggs and Leigh 1996)

Records identified from EPBC Act Protected Matters Search Tool.

* Records identified from the FIS

X Extinct

e Endangered

v Vulnerable

r Rare

k Poorly Known

L Listed

Targeted surveys did not detect the presence of any state listed threatened fauna species. Further details as to the results of the targeted assessments are provided in Table 3.6 in Section 3.3. The extent of native vegetation to be removed will be submitted to DELWP to determine offset requirements, including any requirements for specific offsets to account for the removal of modelled habitat for threatened species in accordance with the Guidelines.

Targeted fauna surveys within SCAs that are the subject of this assessment are not considered necessary for the following reasons;

- Areas identified as comprising high quality grassland, namely patches of NTGVVP, that may provide habitat for threatened fauna species have been excluded from use as secondary construction areas outside of the MSA area
- Many of the locations of targeted assessment completed by EHP (2017) are in very close proximity to areas identified as SCA. Given the targeted fauna surveys did not identify threatened fauna species in similar habitat identified within those areas, it is considered unlikely that threatened fauna species are present within the SCA. This is particularly relevant to the following sites:
 - » DM-13 and DM-14 – adjacent to the Toolern Creek. Targeted surveys completed by EHP (2017) did not identify Growling Grass Frog or Dwarf Galaxias at this location.
 - » WD-01 – marginal wetland habitat identified. Targeted surveys completed by EHP (2017) did not identify Growling Grass Frog in a number of farm dams surrounding this location
 - » BM-08, BM-09 - Grassland identified as low potential habitat for the Golden Sun Moth due to mowing regime identified in road reserve either side of rail corridor. Targeted surveys completed by EHP (2017) within the rail corridor at this location did not detect the Golden Sun Moth. Given the low potential of the habitat and results of previous surveys it is unlikely the Golden Sun Moth persists at this location
 - » Other grassland habitat identified within the secondary construction areas was considered unlikely to support threatened fauna species, given their small, degraded nature within a highly disturbed setting.

Where potential threatened fauna habitat was identified within the project area outside of the MSA it was assessed as being of low quality due to its fragmented, small extent and highly disturbed nature. Subsequent targeted fauna surveys have not detected any threatened fauna species within the project area. Mitigation measures will be implemented to avoid impacts to identified waterway habitat and minimise impacts to potential foraging habitat of the Swift Parrot.

As a result of the low likelihood of threatened fauna species persisting within project area and the implementation of mitigation measures to minimise the impact to potential habitat, it is considered highly unlikely that the project will have a significant impact on any state listed threatened fauna species outside of the MSA area.

5.4 Threatened flora

A search of records from 10 km surrounding the project area of the Victorian Biodiversity Atlas (DEPI, 2014b) was completed returned 109 species as potentially occurring within the project area (refer to Appendix 2.3 in EHP, 2017).

Of these 109 state listed species, the desktop assessment completed by EHP, (2017) identified 15 species as having a moderate or high likelihood of occurrence within the project area, or recent known presence (within 10 years), as provided in Table 5.5. Targeted flora surveys were completed in Winter and Spring/Summer to determine whether species identified within Table 5.5, were present within the project area. Two of the threatened flora species identified within Table 5.5, the Matted Flax-lily and the Fragrant Saltbush were identified within the project area.

TABLE 5.5 THREATENED FLORA SPECIES IDENTIFIED FROM DESKTOP REVIEW AS HAVING A MODERATE, HIGH OR KNOWN LIKELIHOOD OF BEING PRESENT IN THE PROJECT AREA (EHP, 2017).

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS		LAST DOCUMENTED RECORD (NO. VBA RECORDS)					LIKELIHOOD
		FFG	VicAdv	Element 1	Element 2	Element 3	Element 4	Element 5	
<i>Acacia aspera</i> subsp. <i>Parviceps</i>	Rough Wattle	-	r	-	2011 (33)	1998 (1)	-	-	3 – Element 2
<i>Acacia howittii</i>	Sticky Wattle	-	r	-	-	2007 (1)	2007 (1)	-	3 – Element 3, Element 4
<i>Amphibromus pithogastrus</i>	Plump Swamp Wallaby-grass	L	e	2004 (3)	-	-	-	-	3– Element 1
<i>Amphibromus sinuatus</i>	Wavy Swamp Wallaby-grass	-	v	-	-	-	-	2008 (1)	3- Element 5
<i>Austrostipa exilis</i>	Heath Spear-grass	-	r	2006 (35)	2008 (13)	-	-	-	3– Element 1, Element 2
<i>Austrostipa hemipogon</i>	Half-bearded Spear-grass	-	r	2006 (4)	-	-	-	-	3 – Element 1
<i>Dianella amoena</i>	Matted Flax-lily	L	e	2011 (49)	PMST	PMST	PMST	1770 (1)	1 – Element 1
<i>Diuris basaltica</i>	Small Golden Moths	L	e	2012 (32)	2006 (4)	-	-	-	2 – Element, 1,Element 2
<i>Eucalyptus baueriana</i> subsp. <i>Thalassina</i>	Werribee Blue-box	-	e	2011 (627)	2011 (304)	-	-	-	2– Element 1, Element 2
<i>Eucalyptus goniocalyx</i> subsp. <i>Laxa</i>	Gum-barked Bundy	-	v	-	2011 (27)	-	-	-	3 – Element 2
<i>Eucalyptus leucoxydon</i> subsp. <i>Connate</i>	Melbourne Yellow-gum	-	v	2013 (98)	2013 (66)	-	-	-	3 – Element 1, Element 2
<i>Eucalyptus yarraensis</i>	Yarra Gum	-	r	-	-	2000 (9)	2007 (28)	2011 (51)	3 – Element 3, Element 4 and Element 5
<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Spiny Rice-flower	L	e	2015 (843)	2003 (5)	PMST	2010 (3)	2010 (3)	1 – Element 1, Element 2, Element 4, Element 5
<i>Rhagodia parabolica</i>	Fragrant Saltbush		r	2015 (1016)	2015 (655)	2011 (3)			3- – Element 1, Element 2, Element 3
<i>Senecio macrocarpus</i>	Large-fruit Groundsel	L	e	2015 (25)	PMST	-	-	-	1 – Element 1

1 - Known occurrence

- Recorded within the study area recently (i.e. within ten years)

2 - High Likelihood

- Previous records of the species in the local vicinity; and/or,
- The study area contains areas of high quality habitat.

3 - Moderate Likelihood

- Limited previous records of the species in the local vicinity; and/or,
- The study area contains poor or limited habitat.

4 - Low Likelihood

- Poor or limited habitat for the species however other evidence (such as a lack of records or environmental factors) indicates there is a very low likelihood of presence.

5 – Unlikely

- No suitable habitat and/or outside the species range.

Key:

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

FFG *Flora and Fauna Guarantee Act 1988* (FFG Act)

DEPI *Advisory List of Threatened Flora in Victoria* (DEPI 2014)

EX Extinct

CR Critically endangered

EN Endangered

VU Vulnerable

K Poorly Known (Briggs and Leigh 1996)

Records identified from EPBC Act Protected Matters Search Tool.

* Records identified from the FIS

X Extinct

e Endangered

v Vulnerable

r Rare

k Poorly Known

L Listed

Targeted flora surveys were completed throughout the project area in areas of potential habitat. A number of species protected under the FFG Act have also been identified during field assessment within the project area. The location of threatened and protected flora species and implications of the presence of these species is listed in Table 5.6.

TABLE 5.6 THREATENED FLORA SPECIES IDENTIFIED WITHIN THE PROJECT AREA AND IMPLICATIONS OF PRESENCE.

FLORA SPECIES	CONSERVATION LISTING	LOCATION IDENTIFIED	IMPLICATION OF PRESENCE
Matted Flax-lily	EPBC Endangered FFG Listed VicAdv Endangered	Three clumps of Matted Flax-lily are present within the project area: <ul style="list-style-type: none"> One clump located within SCA BM-09 in Element 2 Two clumps located on the northern side of the rail, to the west of Geelong-Ballan Road in Element 3. 	Not impacted. Identified individuals are outside of the construction footprint of the project. Mitigation measures, including fencing the location and signing it as a No Go area are to be implemented as specified in Section 3.4.2.
Slender Onion-orchid (<i>Microtis parviflora</i>)	FFG Protected	Five patches of approximately 20 Slender Onion-orchids were recorded in Element 5 – Spreadeagle loop.	To be impacted. A Permit to Take will need to be obtained from DELWP for the removal of these species from public land. Given this is a locally common species the removal of five patches is not considered significant.
Cotton Fireweed (<i>Senecio quadridentatus</i>)	FFG Protected	One patch of approximately 20 Cotton Fireweed plants was also recorded in Element 5 – Spreadeagle loop, and an additional individual was recorded in Element 6 – Warrenheip Duplication	To be impacted. A Permit to Take will need to be obtained from DELWP for the removal of these species from public land. Given this is a locally common species the removal of one patch is not considered significant.
Acacias including Gold-dust Wattle (<i>Acacia acinacea</i>), Wirilda (<i>A. provincialis</i>), Golden wattle (<i>A. pycnantha</i>)	FFG Protected	Located within patch of native vegetation to the north of Kerrs Road (Element 2).	To be impacted. A Permit to Take will need to be obtained from DELWP for the removal of these species from public land. Given these are locally common species the removal of one patch is not considered significant.
Fragrant Saltbush (<i>Rhagodia parabolica</i>)	Vic Adv Rare	Located within patch of native vegetation to the north of Kerrs Road (Element 2).	To be impacted. No legislative implications. Given this is a locally common species the removal of one patch is not considered significant.

Supplementary targeted flora surveys within SCAs that are the subject of this assessment are not considered necessary given that the general ecological assessment of the SCAs was completed in June 2017 during the flowering period of the Spiny Rice-flower, and so survey for the presence of this species could be completed at the time of the assessment. In addition, occurrences of Matted Flax-lily were able to be identified during the June ecological assessment. One clump of Matted Flax-lily was identified at BM-09. Mitigation measures including fencing with high visibility bunting will be implemented to ensure avoidance of any impact to this species at BM-09.

Where threatened flora listed under the FFG Act have been identified within the project area, they have been either excluded from the project area or mitigation measures, including exclusion fencing, have been committed to, to prevent any direct or indirect impacts to the occurrence of these species. Minor areas of protected species listed under the FFG Act and Fragrant Saltbush listed as Rare on the Vic Adv will require removal from the

project area. Given these species are locally common, the removal of a discrete number of small patches comprising these species is not considered significant.

The extent of native vegetation to be removed will be submitted to DELWP to determine offsets required, including any requirements for specific offsets to account for the removal of modelled habitat for threatened species in accordance with the Guidelines.

5.5 Threatening Processes

There is potential for the occurrence of eight threatening processes listed under the FFG Act as a result of the works, including:

- Degradation of native riparian vegetation along Victorian rivers and streams.
- Increase in sediment input into Victorian rivers and streams due to human activities.
- Loss of coarse woody debris from Victorian native forests and woodlands.
- Invasion of native vegetation by Blackberry *Rubus fruticosus* L. agg.
- Input of toxic substances into Victorian rivers and streams.
- Habitat fragmentation as a threatening process for fauna in Victoria.
- Invasion of native vegetation by 'environmental weeds'.
- Spread of *Pittosporum undulatum* in areas outside its natural distribution.

To mitigate against the occurrence of threatening processes, specific EPRs will be included in the Environmental Management Framework that the Alliance contracting partner will be required to comply with. EPRs will include the implementation of best practise sediment and erosion control measures for works in the vicinity of waterbodies, and the implementation of biosecurity controls to prevent the spread and establishment of weeds.

5.6 CaLP Act listed weed species

Twenty-one noxious weed species were identified within the project area, including SCAs. Species listed under the CaLP Act and their classification (AV, 2017) is listed in Table 5.7. Where species are listed under the CaLP Act, the landowner is required to control these species, in particular preventing the spread of these species.

TABLE 5.7 LISTED NOXIOUS WEED SPECIES IDENTIFIED WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	CLASSIFICATION (CALP)
African Boxthorn	<i>Lycium ferocissimum</i>	Regionally Controlled
Blackberry	<i>Rubus fruticosus</i> spp. agg.	Regionally Controlled
Bridal Creeper	<i>Asparagus asparagoides</i>	Restricted
Chilean Needle-grass	<i>Nassella neesiana</i>	Restricted
Common Bindweed	<i>Convolvulus arvensis</i>	Regionally Controlled
Fennel	<i>Foeniculum vulgare</i>	Restricted
Gorse	<i>Ulex europaeus</i>	Regionally Controlled

COMMON NAME	SCIENTIFIC NAME	CLASSIFICATION (CALP)
Great Mullein	<i>Verbascum thapsus</i> subsp. <i>thapsus</i>	Restricted
Hawthorn	<i>Crataegus monogyna</i>	Regionally Controlled
Horehound	<i>Marrubium vulgare</i>	Regionally Controlled
Montpellier Broom	<i>Genista monspessulana</i>	Regionally Controlled
Paterson's Curse	<i>Echium plantagineum</i>	Regionally Controlled
Prickly Pear	<i>Opuntia</i> spp	Regionally Controlled
Serrated Tussock	<i>Nassella trichotoma</i>	Restricted
Soursob	<i>Oxalis pes-caprae</i>	Restricted
Spanish Artichoke	<i>Cynara cardunculus</i>	Regionally Controlled
Spear Thistle	<i>Cirsium vulgare</i>	Regionally Controlled
St. John's Wort	<i>Hypericum perforatum</i> subsp. <i>veronense</i>	Regionally Controlled
Sweet Briar	<i>Rosa rubiginosa</i>	Regionally Controlled
Variegated Thistle	<i>Silybum marianum</i>	Regionally Controlled
Willow	<i>Salix</i> spp.	Restricted

5.7 Mitigation measures

Mitigation measures have been recommended, and will be implemented, to minimise the impact to ecological values identified within the project area. Additional mitigation measures may be outlined in the Construction Environmental Management Plan. These mitigation measures will be implemented in addition to those detailed in Section 3.4.

5.7.1 FFG PROTECTED FLORA SPECIES

The following process will apply to FFG protected flora species and threatened communities that are required to be removed:

- Appropriate Permit to Take to be in obtained prior to planned removal.
- All conditions of permit to be adhered to.
- Where FFG protected species and communities are to be retained, high visibility para-web fencing or temporary mesh fencing will be erected around native vegetation in proximity to the construction area and signed as a 'No Go' zone.

5.7.2 NATIVE VEGETATION

- Where planned and approved for removal, ensure all required native vegetation offsets, in accordance with the guidelines are in place prior to removal.
- Where native vegetation is to be retained high visibility para-web fencing or temporary mesh fencing will be erected around native vegetation in proximity to the construction area and signed as a 'No Go' zone.
- Where scattered trees are retained, the perimeter of the No-Go fencing will align with the outer edge of the prescribed Tree Retention Zones (TRZs). Where trees occur within areas of native vegetation, the TRZ may

be required to extend beyond the patch of native vegetation. The TRZ is a specific area above and below the ground, with a radius 12 x the DBH. At a minimum standard a TRZ should consider the following:

- » A TRZ for trees should be a radius no less than two metres or greater than 15 metres;
 - » Construction, related activities and encroachment (i.e. earthworks such as trenching that disturb the root zone) need to be excluded from the TRZ;
 - » Where encroachment exceeds 10% of the total area of the TRZ, the tree should be considered as lost and offset accordingly;
 - » Directional drilling may be used for works within the TRZ without being considered encroachment. The directional bore should be at least 600 millimetres deep;
 - » The above guidelines may be varied if a qualified arborist confirms the works will not significantly damage the tree (including stags / dead trees). In this case the tree would be retained and no offset would be required; and
 - » Where the minimum standard for a TRZ has not been met an offset may be required.
- Where the extent of works impedes on the TRZ of a tree but do not require the removal of the tree, a qualified arborist is required to assess the tree in consideration of the planned works, to determine whether the following are required:
 - » Additional tree protection measures to ensure survival of the trees; or
 - » Lopping or pruning of roots or branches to enable the works to proceed safely and without injury to the tree

Should the arborist determine that the works cannot proceed without impacting on the survivability of the tree, the tree will be required to be offset in accordance with the Guidelines (DEPI, 2013c).

5.7.3 GENERAL CONSTRUCTION MITIGATION MEASURES

The following general mitigation measure will be implemented to minimise any impact to the ecological values. Additional mitigation measures will be provided within the Construction Environmental Management Plan.

- All works will be restricted to the designated Works Area throughout the project.
- Where possible all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the Works Area through defined entry and exit points subject to the traffic management plan. Additional measures to prevent the spread and establishment of weeds and disease will be provided within the Construction Environmental Management Plan.
- Construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas.
- Sediment and pollutant control measures will be implemented in accordance with Construction Techniques for Sediment Pollution Control (EPA, 1991) and Environmental Guidelines for Major Construction Site (EPA, 1996).
- Minimise creation of potential habitat, or harbour sites for pest animal during construction including the Red Fox, European Rabbit and European Hare that may predate on or deteriorate habitat for the Growling Grass Frog.

All waste, particularly food, must be securely stored and disposed of appropriately, preferably off-site, to inhibit any increase in the Red Fox that may predate threatened species.

5.8 Summary of impacts to ecological values other than MNES identified outside of the MSA

Outside of the MSA area, the following items of ecological value have been identified within the project area as potentially impacted by the project:

- A total of 2.679 ha of native vegetation including the following:
 - » 0.192 ha of EVC 132 Plains Grassland within the Victorian Volcanic Plain, that is also classified as the FFG Act listed community Western (Basalt) Plains Grassland community.
 - » 2.110 ha of EVC 55 Plains Grassy Woodland within the Victorian Volcanic Plain.
 - » 0.056 ha of EVC 68 Creepline Grassy Woodland and 0.256 ha of EVC 803 Plains Woodland mapped within the Victorian Volcanic Plain Bioregion and 0.019 ha of EVC 55 Plains Grassy Woodland within the Central Volcanic Uplands Bioregion.
 - » 68 scattered indigenous trees
- A number of flora species listed as protected under the FFG Act including the Slender Onion-orchid, Cotton Fireweed and Acacias were identified within the project area and are likely to require removal.
- The Fragrant Saltbush listed as Rare under the VicAdv was identified within the project area and will require removal. Given this species is locally common, the removal of discrete patches including this species is not considered significant.

The following ecological values have also been identified but are unlikely to be impacted by the project:

- Three clumps of Matted Flax-lily listed (listed under the FFG Act and the Vic Adv), listed as Endangered, are present within the Project area, within Element 2 and 3. Mitigation measures will be implemented as documented within Section 3.4.2, to ensure that the occurrences of this species are not impacted by the Project.
- An additional threatened ecological community, Western Basalt Plains (River Red Gum) Grassy Woodland (listed under the FFG Act) was also identified within the project area. The current construction footprint does not impact on the community.
- No threatened fauna species listed under Federal or State legislation or policy were identified within the project area.

6 Conclusions

Flora and fauna assessments have been completed within the project area for the Ballarat Line Upgrade to identify ecological values within areas where construction activities may occur. The project area has been assessed to determine the presence of native vegetation, threatened ecological communities and habitat for threatened flora and fauna species.

The ecological assessments undertaken within the Project area have identified that the project area is largely degraded, however, native vegetation in the form of scattered native trees (81) and remnant patches of EVC (29.558 ha) persist within the project area.

The vegetation identified provides some habitat for a range of common and adaptable fauna species. Two threatened fauna species, Golden Sun Moth and Striped Legless Lizard are considered likely to make use of degraded grassland habitat within the project area, however, targeted surveys did not locate these species in relevant habitat identified in the project area. The potential impacts on this habitat are unlikely to significantly impact on these species.

Common and threatened frog species are considered likely to occur within creek line habitat at various locations through the project area and these areas are avoided by existing elevated structures and will require protection through the CEMP process. However, targeted surveys did not identify any threatened frogs or fish within waterways within the project area.

Three threatened flora species were located within the project area. Three clumps of Matted Flax Lily are located in the rail corridor near Ballan station and will not be impacted by development. Numerous Spiny Rice-flowers (145) and Large Fruit Groundsels (22) were located in the MSA area. The Spiny Rice-flower and Groundsels are considered under the MSA requirements and a translocation plan for these plants will be prepared to the approval of DELWP.

In addition, numerous weed species were identified throughout the project area including 21 noxious weeds listed under the CALP Act.

The project will not have an impact on any National listed threatened flora, fauna or ecological communities. The project will potentially impact 81 scattered native trees and 29.558 ha of remnant native vegetation. In addition, minor areas of vegetation supporting FFG protected flora species and Fragrant Saltbush, listed as Rare on the VicAdv are likely to require removal.

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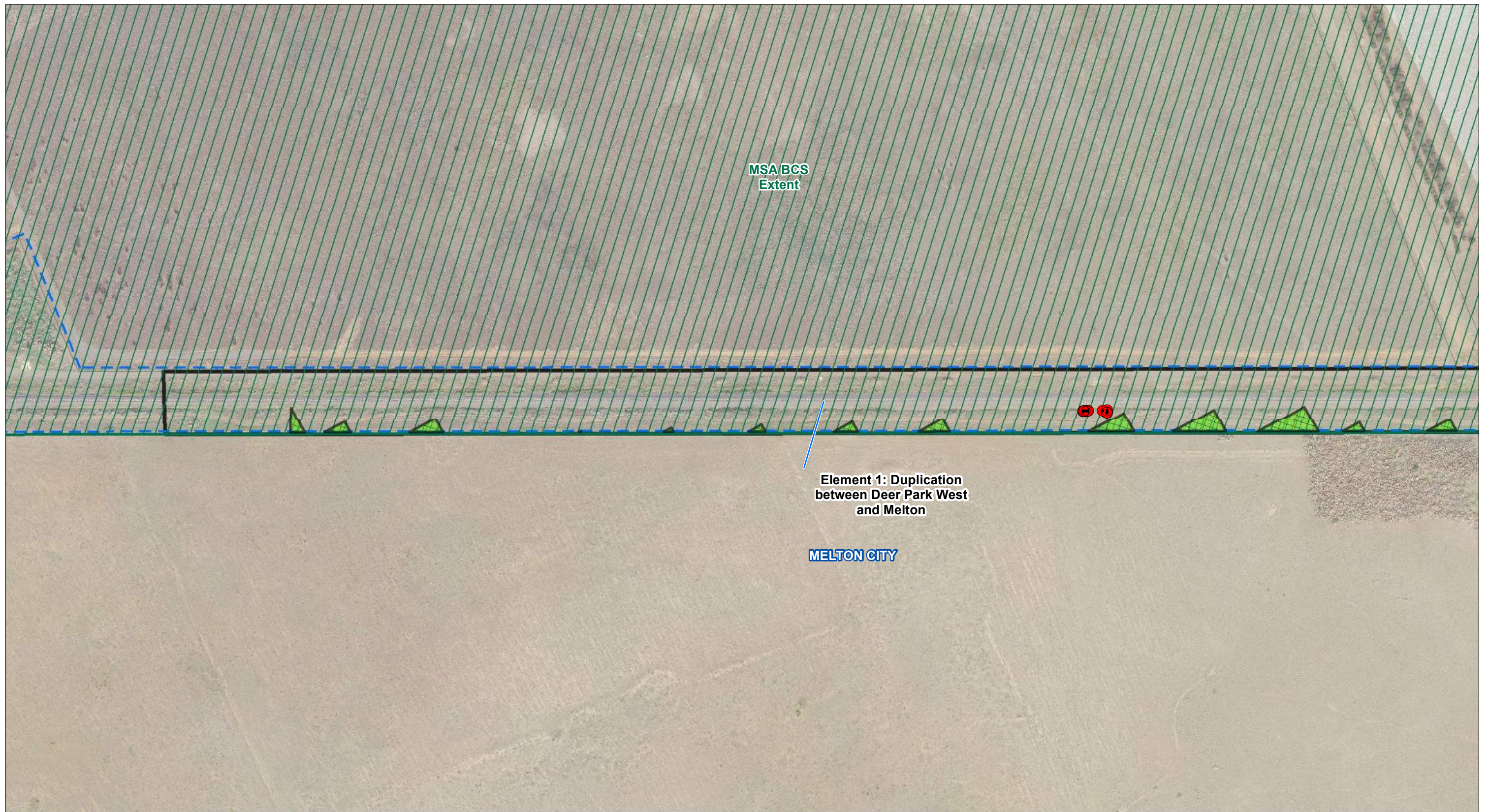
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Appendix A

Ecological Mapping



Appendix A



Legend

- - - VicTrack Reserve boundary
- Project Area
- MSA BCS Extent
- Impacted Vegetation

MSA Time-stamped

- 132 Plains Grassland

Significant Species

- Spiny Rice-flower

Map 1 of 49

Ballarat Line Upgrade Project

Summary Report Mapping

Drawing Number: BLU-AJM-PWAA-MP-NF-600051

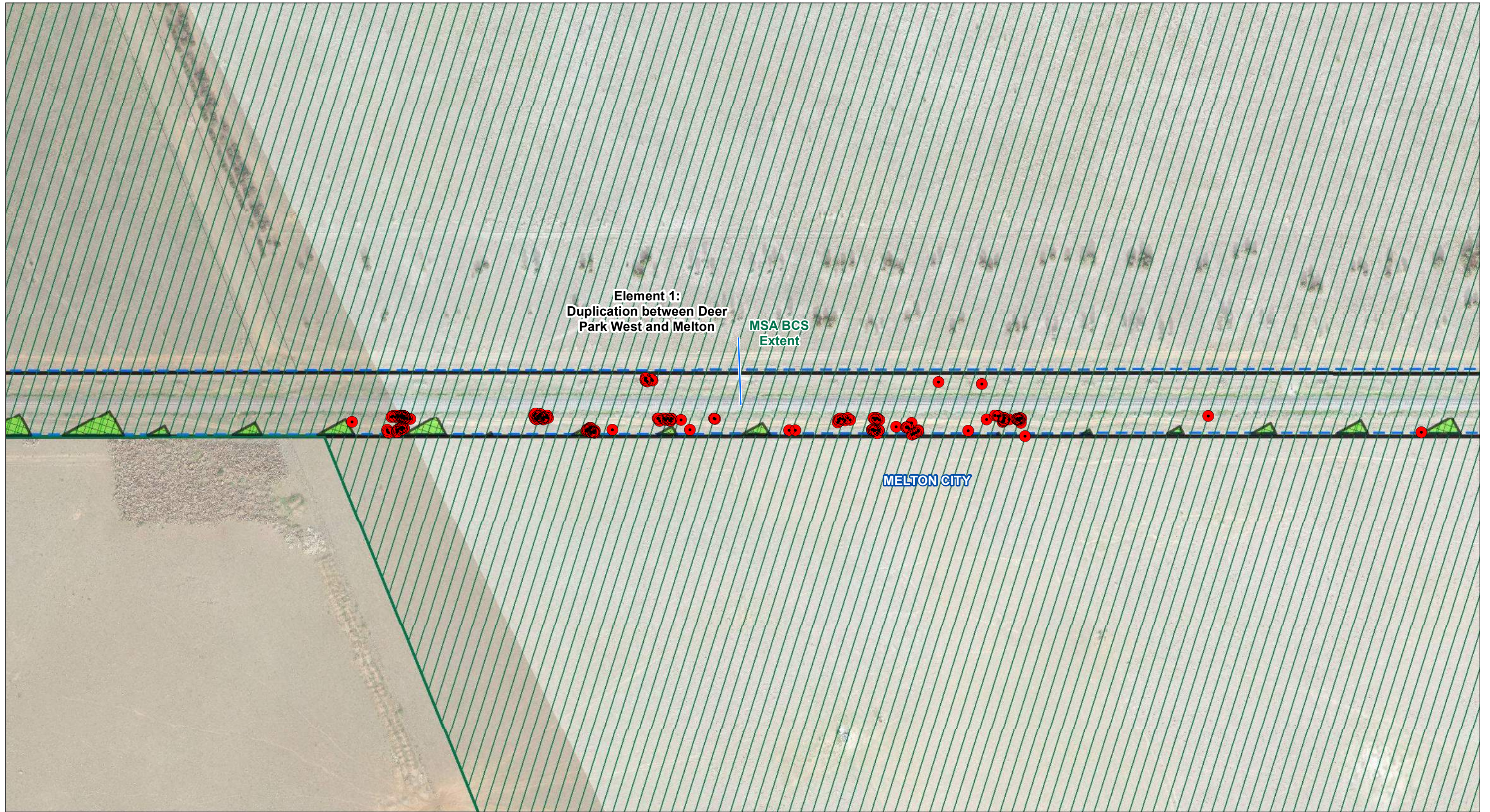
Revision: P1.1

Drawn By: A. Berman	Approved By: A. Michael	Date: 23/06/2017	Map Size: A3
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0 50 100

Metres

Coordinate System: GDA 1994 MGA Zone 55



- Legend**
- - - VicTrack Reserve boundary
 - Project Area
 - MSA BCS Extent
 - Impacted Vegetation
- MSA Time-stamped**
- 132 Plains Grassland
- Significant Species**
- Spiny Rice-flower

Map 2 of 49

Data Sources:
 BLU Reference Design: May 2017
 EHP Ecology data: 25/01/2017
 Vicmap 2016
 VicTrack 2017
 Aerial photo: DELWP 2016

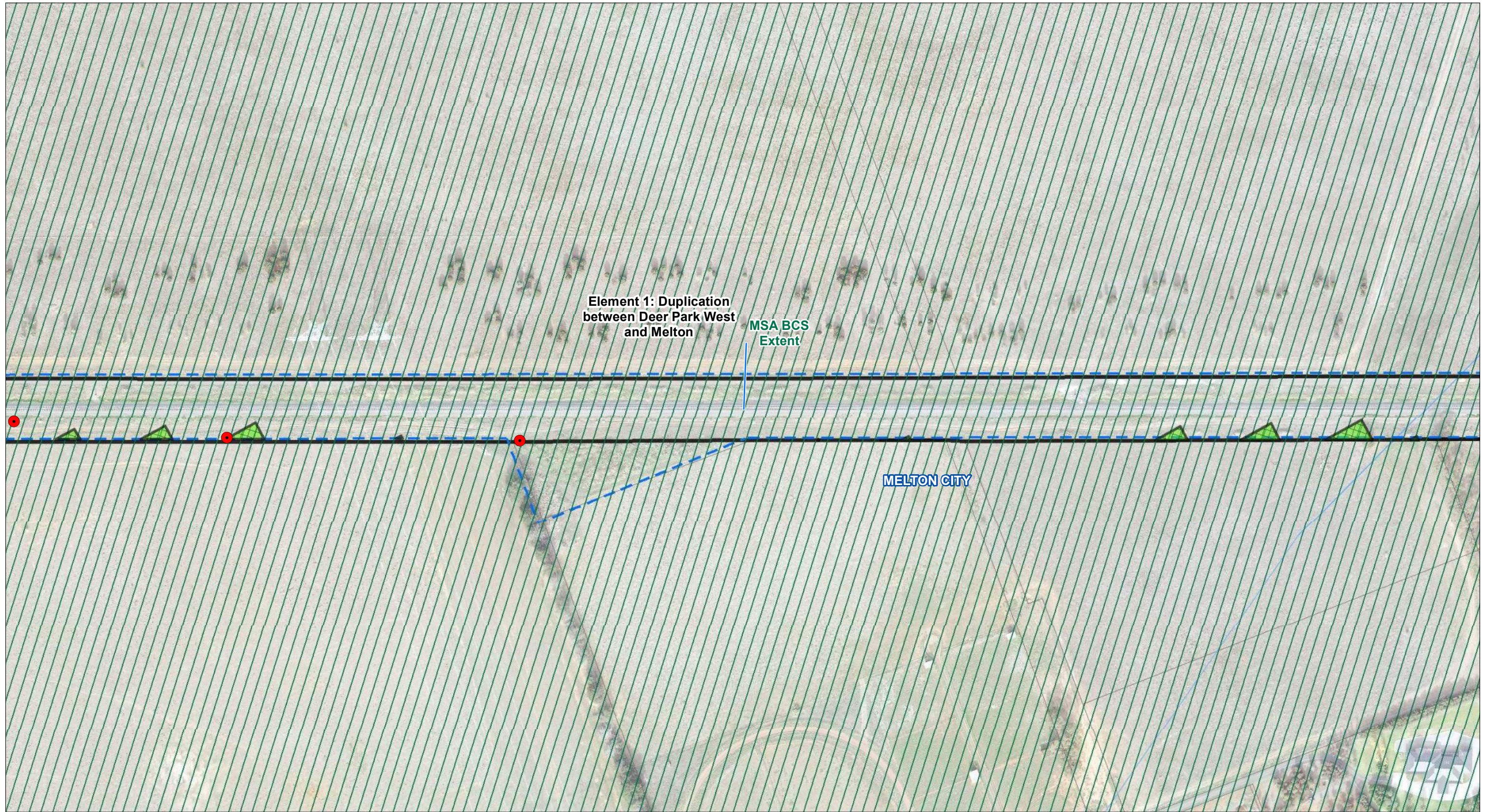


Ballarat Line Upgrade Project

Summary Report Mapping

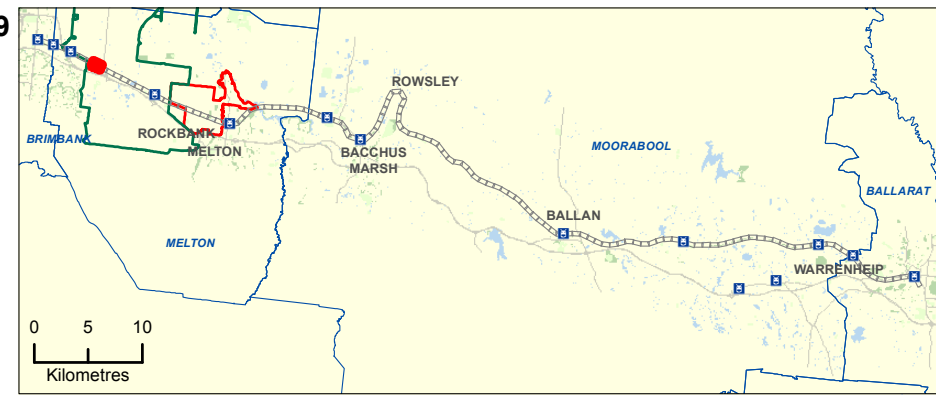
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Drawn By: A. Berman	Approved By: A. Michael	Date: 23/06/2017	Map Size: A3

0 50 100
Metres
Coordinate System: GDA 1994 MGA Zone 55



- Legend**
- VicTrack Reserve boundary
 - Watercourse
 - Project Area
 - MSA BCS Extent
 - Impacted Vegetation
- MSA Time-stamped**
- 132 Plains Grassland
- Significant Species**
- Spiny Rice-flower

Map 3 of 49



Data Sources:
 BLU Reference Design: May 2017
 EHP Ecology data: 25/01/2017
 Vicmap 2016
 VicTrack 2017
 Aerial photo: DELWP 2016

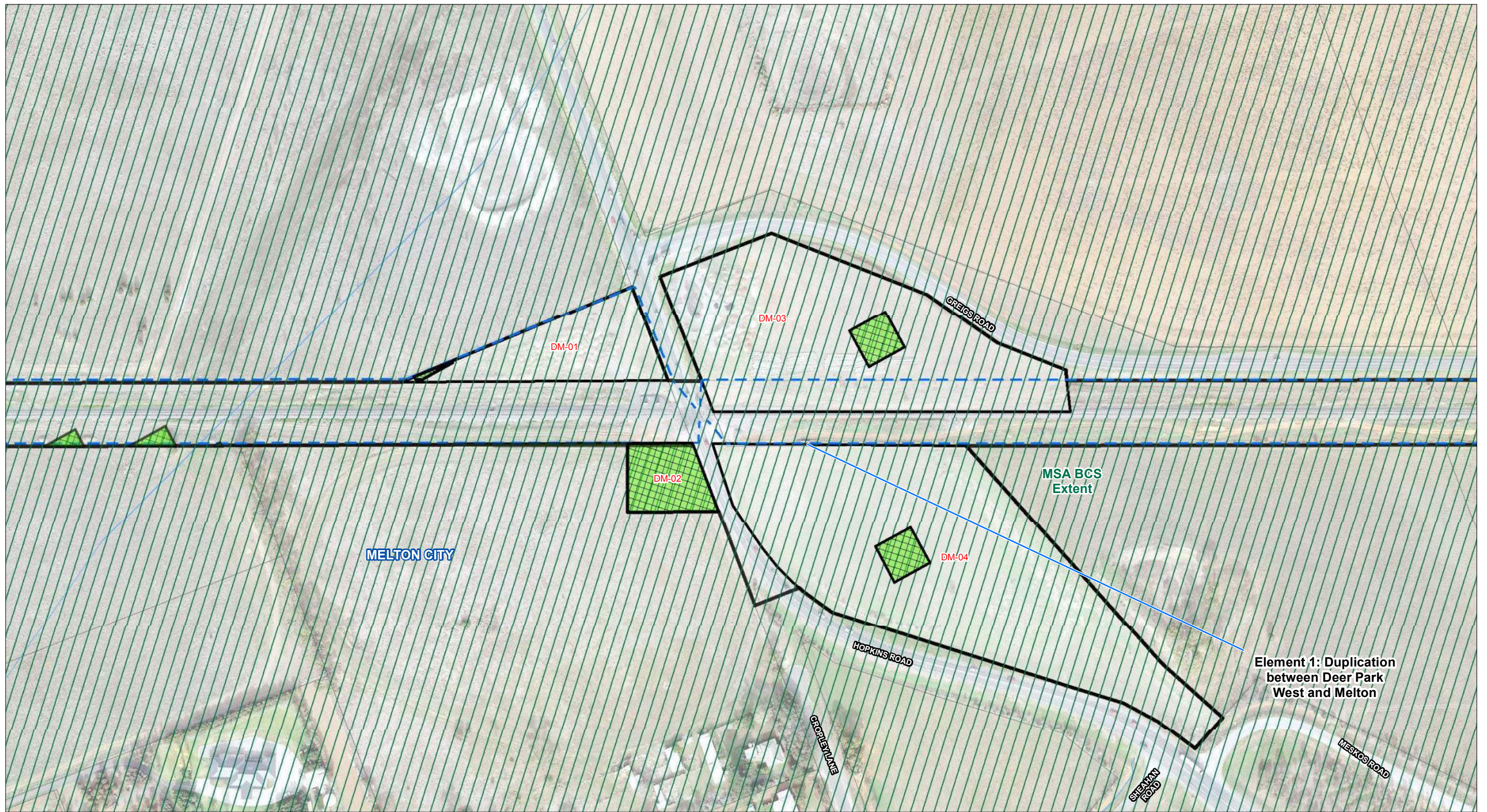


Ballarat Line Upgrade Project

Summary Report Mapping

Drawing Number: BLU-AJM-PWAA-MP-NF-600051	Revision: P1.1
Drawn By: A. Berman	Approved By: A. Michael
Date: 23/06/2017	Map Size: A3

0 50 100 Metres
 Coordinate System: GDA 1994 MGA Zone 55



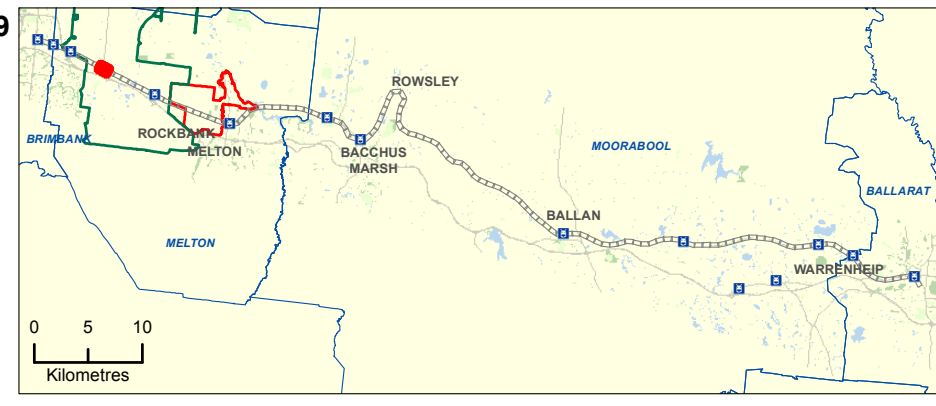
Legend

- - - VicTrack Reserve boundary
- Watercourse
- Secondary Construction
- Project Area
- MSA BCS Extent
- Impacted Vegetation within SCA
- Impacted Vegetation

MSA Time-stamped

- 132 Plains Grassland

Map 4 of 49



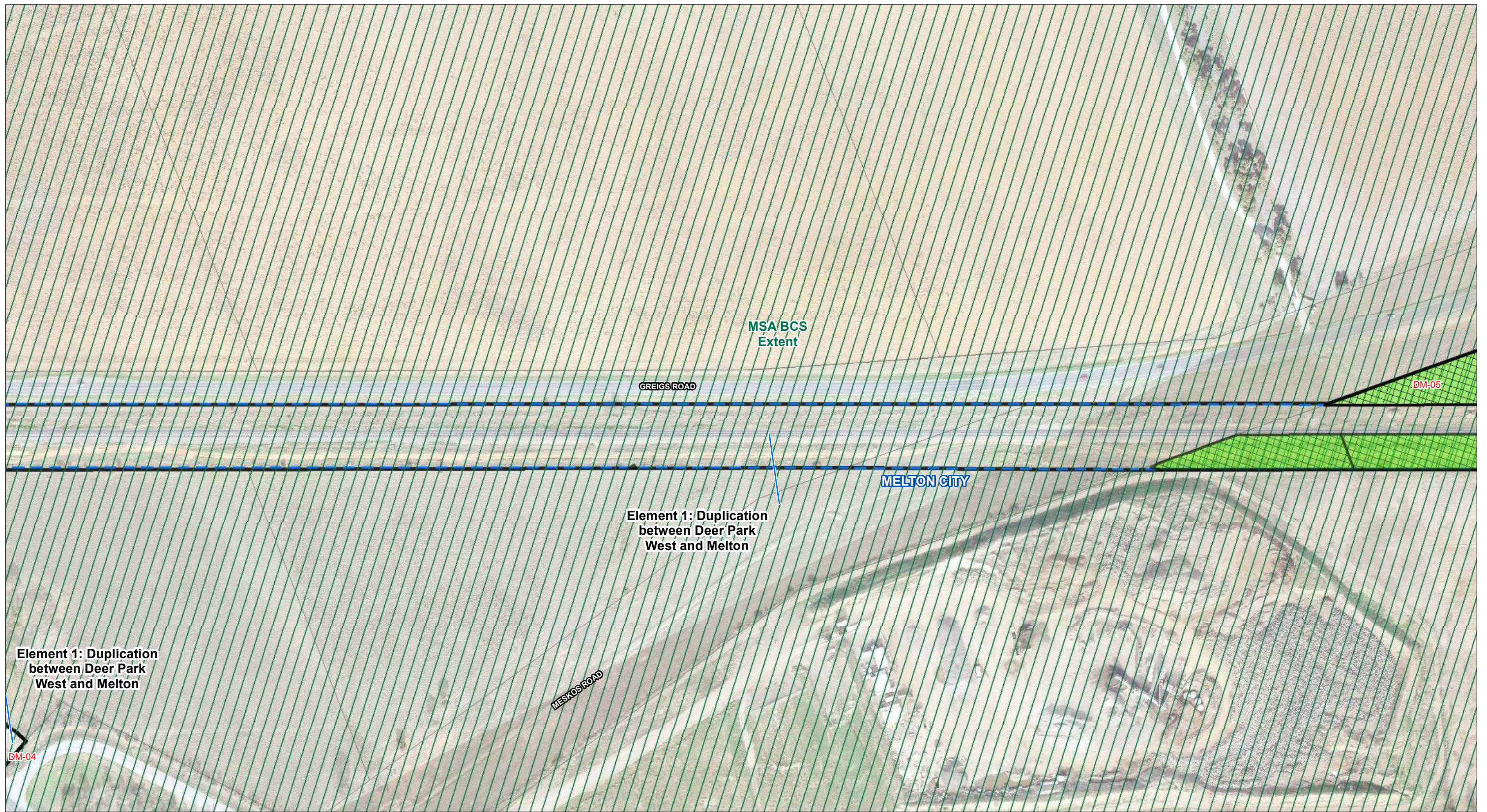
Data Sources:
 BLU Reference Design: May 2017
 EHP Ecology data: 25/01/2017
 Vicmap 2016
 VicTrack 2017
 Aerial photo: DELWP 2016

Ballarat Line Upgrade Project

Summary Report Mapping

Drawing Number: BLU-AJM-PWAA-MP-NF-600051	Revision: P1.1
Drawn By: A. Berman	Approved By: A. Michael
Date: 23/06/2017	Map Size: A3

0 50 100
Metres
Coordinate System: GDA 1994 MGA Zone 55



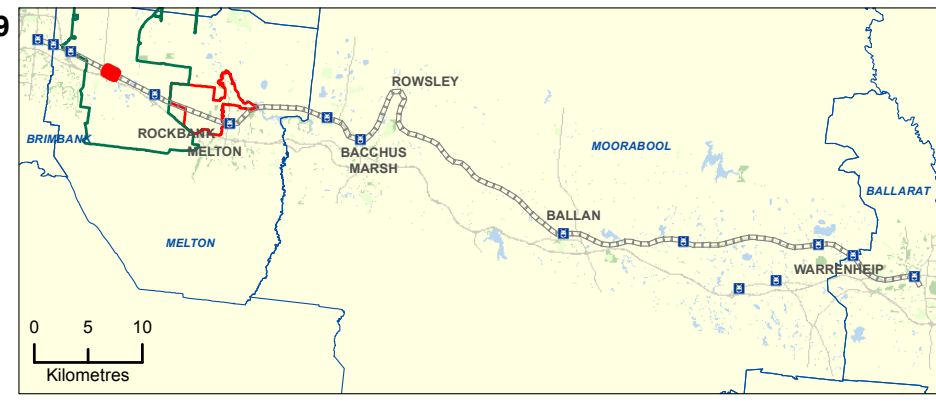
Legend

- VicTrack Reserve boundary
- Secondary Construction Areas
- Project Area
- MSA BCS Extent
- Impacted Vegetation within SCA
- Impacted Vegetation

MSA Time-stamped

- 132 Plains Grassland

Map 5 of 49



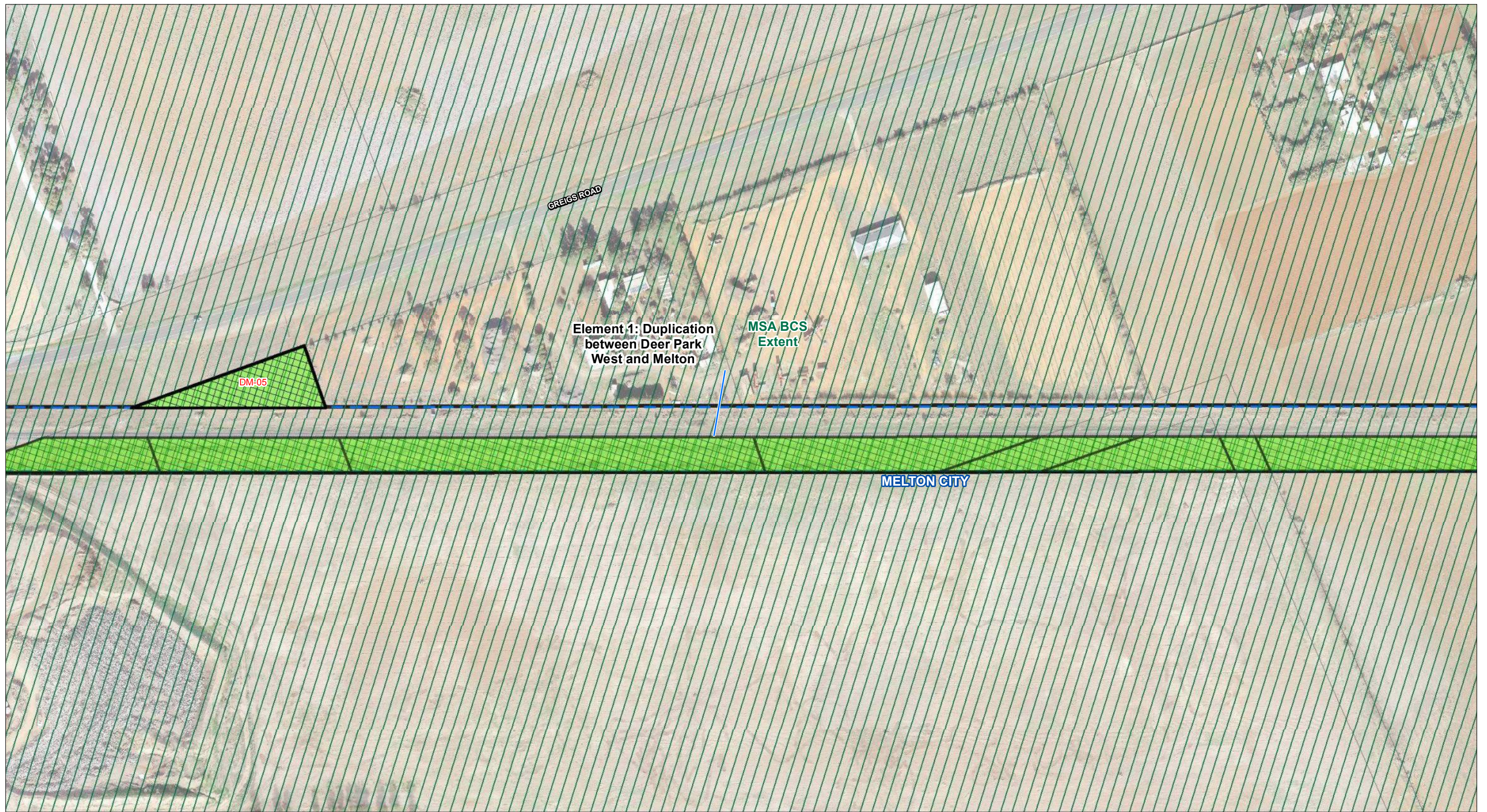
Data Sources:
 BLU Reference Design: May 2017
 EHP Ecology data: 25/01/2017
 Vicmap 2016
 VicTrack 2017
 Aerial photo: DELWP 2016

Ballarat Line Upgrade Project

Summary Report Mapping

Drawing Number: BLU-AJM-PWAA-MP-NF-600051		Revision: P1.1	
Drawn By: A. Berman	Approved By: A. Michael	Date: 23/06/2017	Map Size: A3

0 50 100
Metres
Coordinate System: GDA 1994 MGA Zone 55

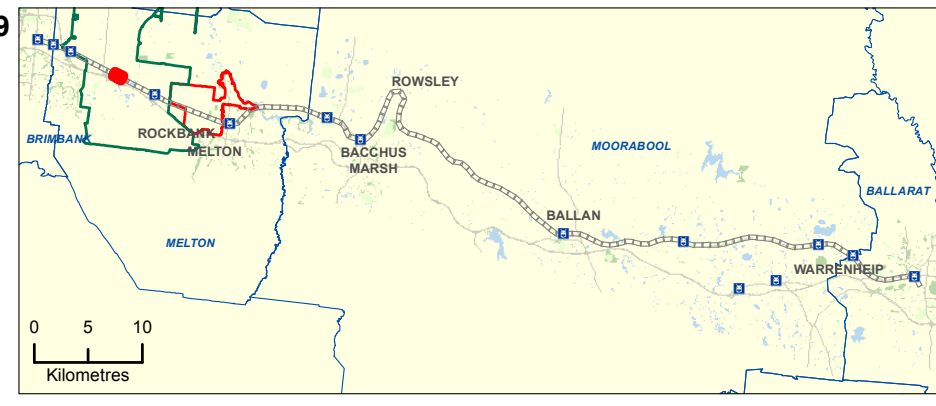


Legend

- VicTrack Reserve boundary
- MSA Time-stamped 132 Plains Grassland
- Secondary Construction Areas
- Project Area
- MSA BCS Extent
- Impacted Vegetation within SCA
- Impacted Vegetation

Map 6 of 49

Data Sources:
 BLU Reference Design: May 2017
 EHP Ecology data: 25/01/2017
 Vicmap 2016
 VicTrack 2017
 Aerial photo: DELWP 2016



MELBOURNE METRO RAIL AUTHORITY

aurecon JACOBS

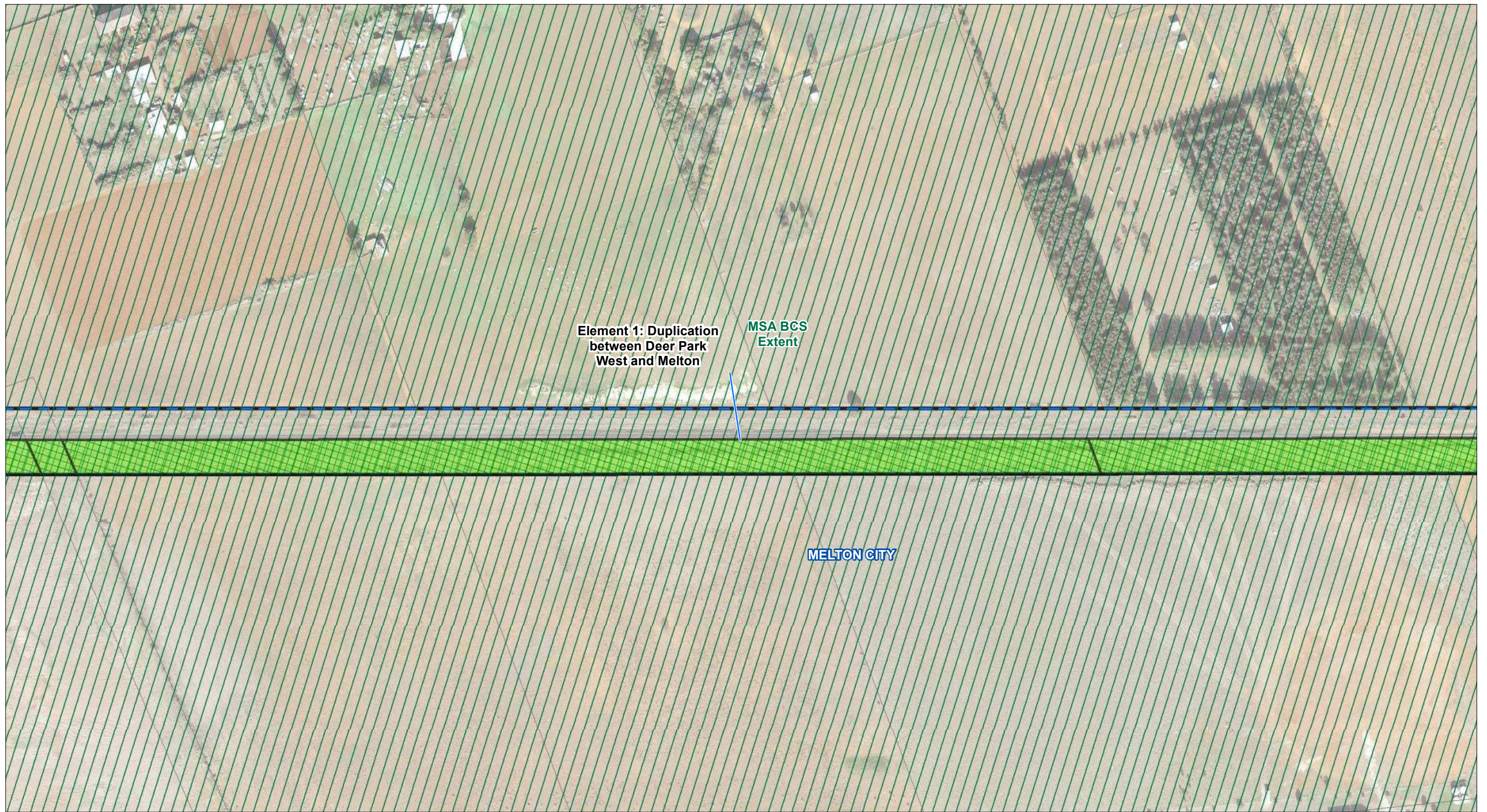
AJM MOTT MACDONALD
Joint Venture

Ballarat Line Upgrade Project

Summary Report Mapping

Drawing Number: BLU-AJM-PWAA-MP-NF-600051		Revision: P1.1	
Drawn By: A. Berman	Approved By: A. Michael	Date: 23/06/2017	Map Size: A3

0 50 100
Metres
Coordinate System: GDA 1994 MGA Zone 55



- Legend**
- VicTrack Reserve boundary
 - MSA BCS Extent
 - Impacted Vegetation
 - Project Area
 - MSA Time-stamped
 - 132 Plains Grassland

Map 7 of 49

Data Sources:
 BLU Reference Design: May 2017
 EHP Ecology data: 25/01/2017
 Vicmap 2016
 VicTrack 2017
 Aerial photo: DELWP 2016

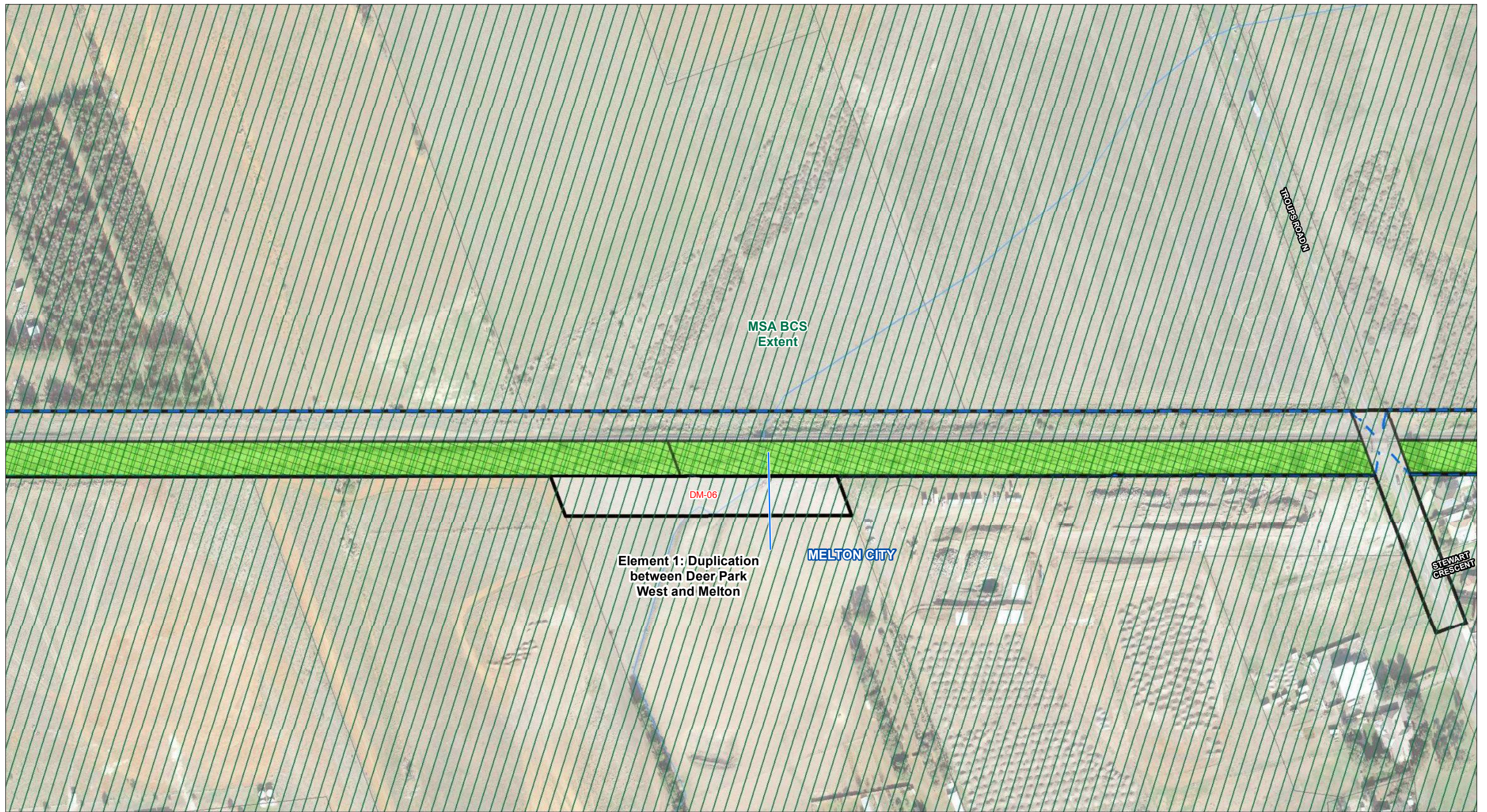


Ballarat Line Upgrade Project

Summary Report Mapping

Drawing Number: BLU-AJM-PWAA-MP-NF-600051		Revision: P1.1	
Drawn By: A. Berman	Approved By: A. Michael	Date: 23/06/2017	Map Size: A3

0 50 100 Metres
 Coordinate System: GDA 1994 MGA Zone 55



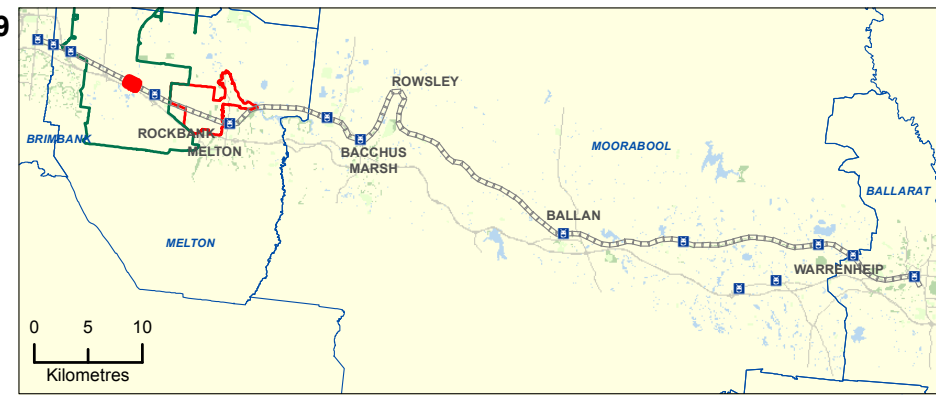
Legend

- VicTrack Reserve boundary
- Watercourse
- Secondary Construction Areas
- Project Area
- ▨ MSA BCS Extent
- ▨ Impacted Vegetation within SCA
- ▨ Impacted Vegetation

MSA Time-stamped

- 104 Lignum Swamp
- 132 Plains Grassland

Map 8 of 49



Data Sources:
 BLU Reference Design: May 2017
 EHP Ecology data: 25/01/2017
 Vicmap 2016
 VicTrack 2017
 Aerial photo: DELWP 2016

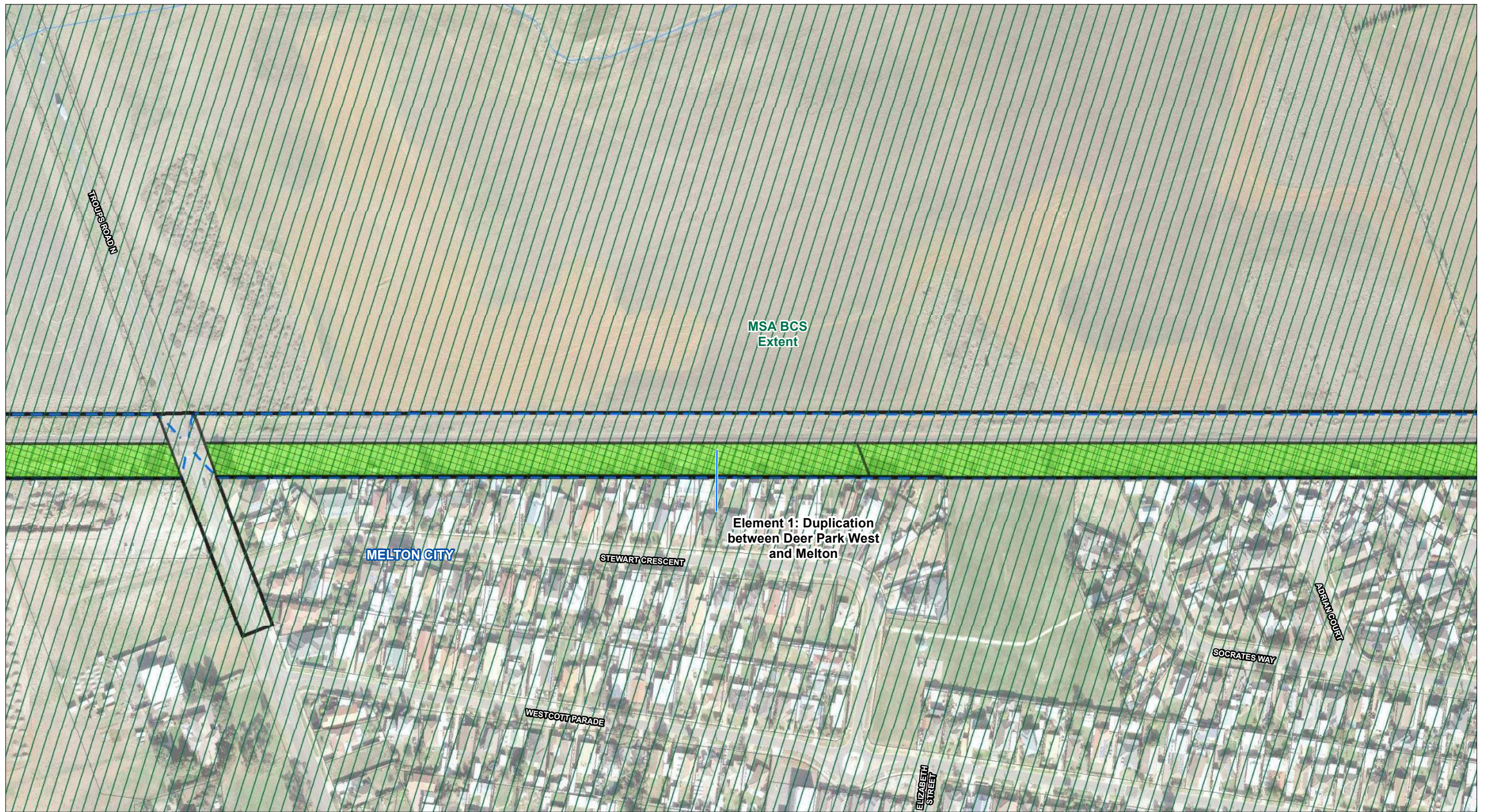
Ballarat Line Upgrade Project

Summary Report Mapping

Drawing Number: BLU-AJM-PWAA-MP-NF-600051
 Revision: P1.1

Drawn By: A. Berman
 Approved By: A. Michael
 Date: 23/06/2017
 Map Size: A3

0 50 100
 Metres
 Coordinate System: GDA 1994 MGA Zone 55



Legend

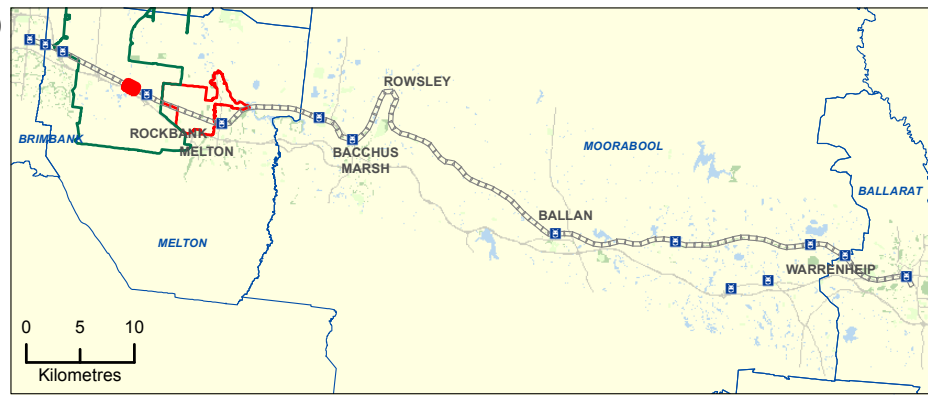
- VicTrack Reserve boundary
- Watercourse
- ▭ Project Area
- ▨ MSA BCS Extent
- ▩ Impacted Vegetation

MSA Time-stamped

- 104 Lignum Swamp
- 132 Plains Grassland

Map 9 of 49

Data Sources:
 BLU Reference Design: May 2017
 EHP Ecology data: 25/01/2017
 Vicmap 2016
 VicTrack 2017
 Aerial photo: DELWP 2016

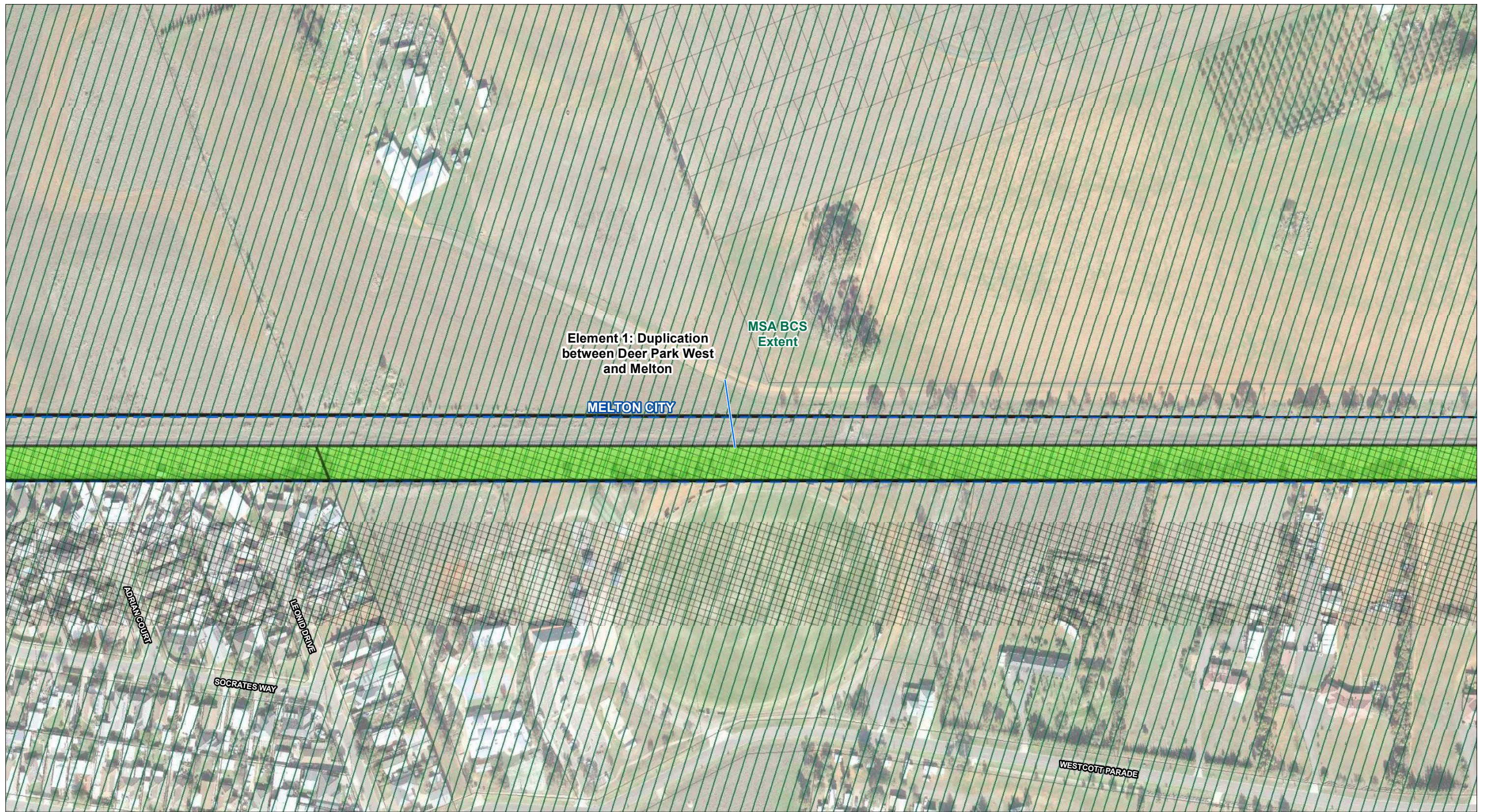


Ballarat Line Upgrade Project

Summary Report Mapping

Drawing Number: BLU-AJM-PWAA-MP-NF-600051	Revision: P1.1		
Drawn By: A. Berman	Approved By: A. Michael	Date: 23/06/2017	Map Size: A3

0 50 100
Metres
Coordinate System: GDA 1994 MGA Zone 55



- Legend**
- VicTrack Reserve boundary
 - Project Area
 - MSA BCS Extent
 - Impacted Vegetation
 - MSA Time-stamped
 - 132 Plains Grassland

Map 10 of 49

Data Sources:
 BLU Reference Design: May 2017
 EHP Ecology data: 25/01/2017
 Vicmap 2016
 VicTrack 2017
 Aerial photo: DELWP 2016



Ballarat Line Upgrade Project

Summary Report Mapping

Drawing Number: BLU-AJM-PWAA-MP-NF-600051		Revision: P1.1	
Drawn By: A. Berman	Approved By: A. Michael	Date: 23/06/2017	Map Size: A3

0 50 100 Metres
 Coordinate System: GDA 1994 MGA Zone 55