Bunbury Outer Ring Road

Southern Section

Ministerial Statement 1191: M3.2

Priority and Threatened Ecological Communities - Baseline Report

Main Roads WA

Revision C

11-Jul-22

SWGA-00-134-00-REP-0007

South West Gateway Alliance

Delivering the Bunbury Outer Ring Road

Document control record

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Report title		BORR (South) Ministerial Statement 1191 – PEC/TEC Baseline Report				
Client		Main Roads WA				
Rev	**Date**	**Revision details/status**	**Author**	**Reviewer**	**Verifier** (if required)	**Approver**
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B	01-Jul-22	SWGA Review	D.B.	E.R.		F.R.
C	11-Jul-22	Main Roads Review	E.R.	Main Roads		M.S.
Current revision		**C**				

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1 Introduction

1.1 Proposal

Main Roads Western Australia (Main Roads) is proposing to construct a 27-kilometre highway, the Bunbury Outer Ring Road (BORR), that links Forrest Highway to Bussell Highway. The BORR (Southern Section) includes 11 kilometres (km) of dual carriageway connecting the South-Western Highway to Bussell Highway (Figure 1).

The Proposal area is located approximately 200 km south of Perth and occurs within the City of Bunbury and Shires of Capel, Dardanup and Harvey.

1.2 Overview and Scope

The Commissioner of Main Roads Western Australia (Main Roads) has been granted conditional approval for the Bunbury Outer Ring Road Southern Section (the Proposal) under Part IV Division 2 (section 45) of the *Environmental Protection Act 1986* by the Minster for Environment. The Proposal is subject to the implementation conditions of Ministerial Statement 1191 (MS 1191) which was issued on 31 May 2022 (Minister for Environment, 2022).

In their Report and Recommendations in relation to the Proposal (EPA Report 1714, October 2021), the EPA noted that in relation to Flora and Vegetation, the following Priority Ecological Communities (PECs) (Priority 3) were identified in the development envelope (Figure 2):

- Banksia woodlands of the Swan Coastal Plain (referred to as the Banksia Woodlands)
- Tuart *(Eucalyptus gomphocephala)* woodlands and forests of the Swan Coastal Plain (referred to as the Tuart Woodlands)
- Southern Swan Coastal Plain *Eucalyptus gomphocephala – Agonis flexuoasa* woodlands (FCT 25) (referred to as the Tuart-Peppermint Woodlands PEC).

Two of these communities are listed as Threatened Ecological Communities (TECs) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and are considered Matters of National Environmental Significance for the Commonwealth assessment. The Banksia Woodlands is listed as Endangered, and the Tuart Woodlands is listed as Critically Endangered.

The proposal has the potential to directly impact these communities through clearing, and potential indirect impacts include fragmentation and edge effects, the introduction/spread of weeds and disease (including dieback *Phytophthora cinnamomi*) and altered hydrological regimes.

To address these impacts, the EPA recommended Condition 3. Ministerial Statement 1191, therefore, includes the following conditions in relation to Flora and Vegetation:

Condition 3-1

The proponent shall implement the proposal to achieve the following environmental outcomes:

(1) clear no more than:

(a) 23.4 ha of vegetation representative of the Banksia Woodlands of the Swan Coastal Plain Priority Ecological Community (PEC) (Banksia Woodlands);

(b) 4.4 ha of vegetation representative of the Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain PEC (Tuart Woodlands); and

(c) 4.5 ha of vegetation representative of the Southern Swan Coastal Plain Eucalyptus gomphocephala – Agonis flexuosa Woodlands PEC (Tuart-Peppermint Woodlands), overlapping the Tuart Woodlands PEC.

(2) ensure there are no project attributable indirect impacts, when compared to preconstruction baseline conditions, to Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands within twenty (20) metres outside the development envelope and within the clearing exclusion areas.

Condition 3-2

> *Prior to ground-disturbing activities, the proponent shall undertake monitoring of the values listed in condition 3-1(2) and submit a report about the preconstruction baseline conditions to the CEO.*

1.3 Purpose and Objective

The purpose of this report is to present the results of baseline surveys of the areas identified in Condition 3-1(2) of MS 1191.

This report has been prepared to satisfy the requirements of Condition 3-2 of MS 1191, which states:

> *Prior to ground-disturbing activities, the proponent shall undertake monitoring of the values listed in condition 3-1(2) and submit a report about the preconstruction baseline conditions to the CEO.*

The areas of Banksia Woodlands PEC/TEC and Tuart Woodlands PEC/TEC adjacent to the development are indicated in Figure 3, noting the Tuart-Peppermint Woodlands PEC largely overlaps the Tuart Woodlands PEC/TEC.

The monitoring locations of Banksia Woodlands PEC/TEC and Tuart Woodlands PEC/TEC adjacent to the development are indicated in Figure 4.

The baseline report prepared by EcoEdge (2022) is attached.

Figure 1. Proposal area (Ministerial Statement 1191)

33000 34000 35000 36000 37000

105000 104000 103000 102000 101000 100000

GELORUP

1

2

LEGEND

Proposal Area

Major Road

SLIP

Paper Size ISO A3

0 100 200 300 400 500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994

N

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Main Roads Western Australia
Bunbury Outer Ring Road Southern Section

Proposal Area

Date 13/06/2022

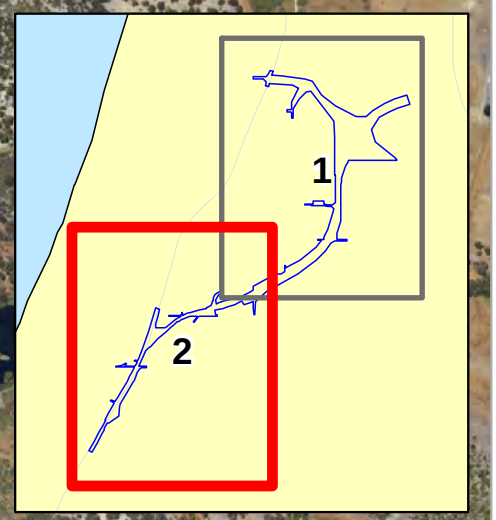
FIGURE 1

30000 31000 32000 33000

101000 100000 99000 98000 97000 96000

Bussell Highway

SLIP



LEGEND

Proposal Area

Major Road

Paper Size ISO A3

0 100 200 300 400 500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994

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Main Roads Western Australia
Bunbury Outer Ring Road Southern Section

Proposal Area

Date 13/06/2022

FIGURE 1

Figure 2. Distribution of Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands in proximity to the Proposal area

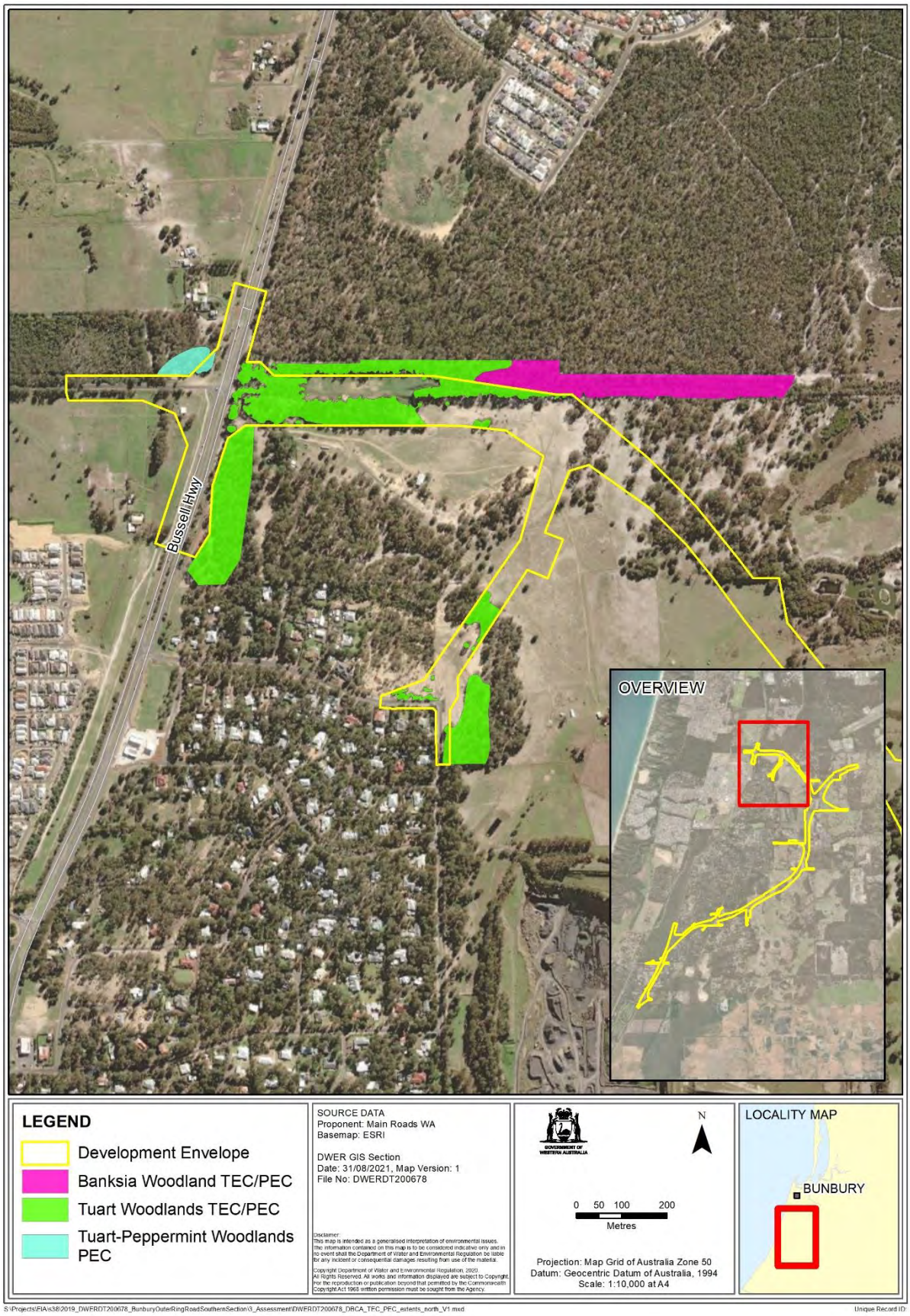

Figure 2a Priority Ecological Communities Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands (north)

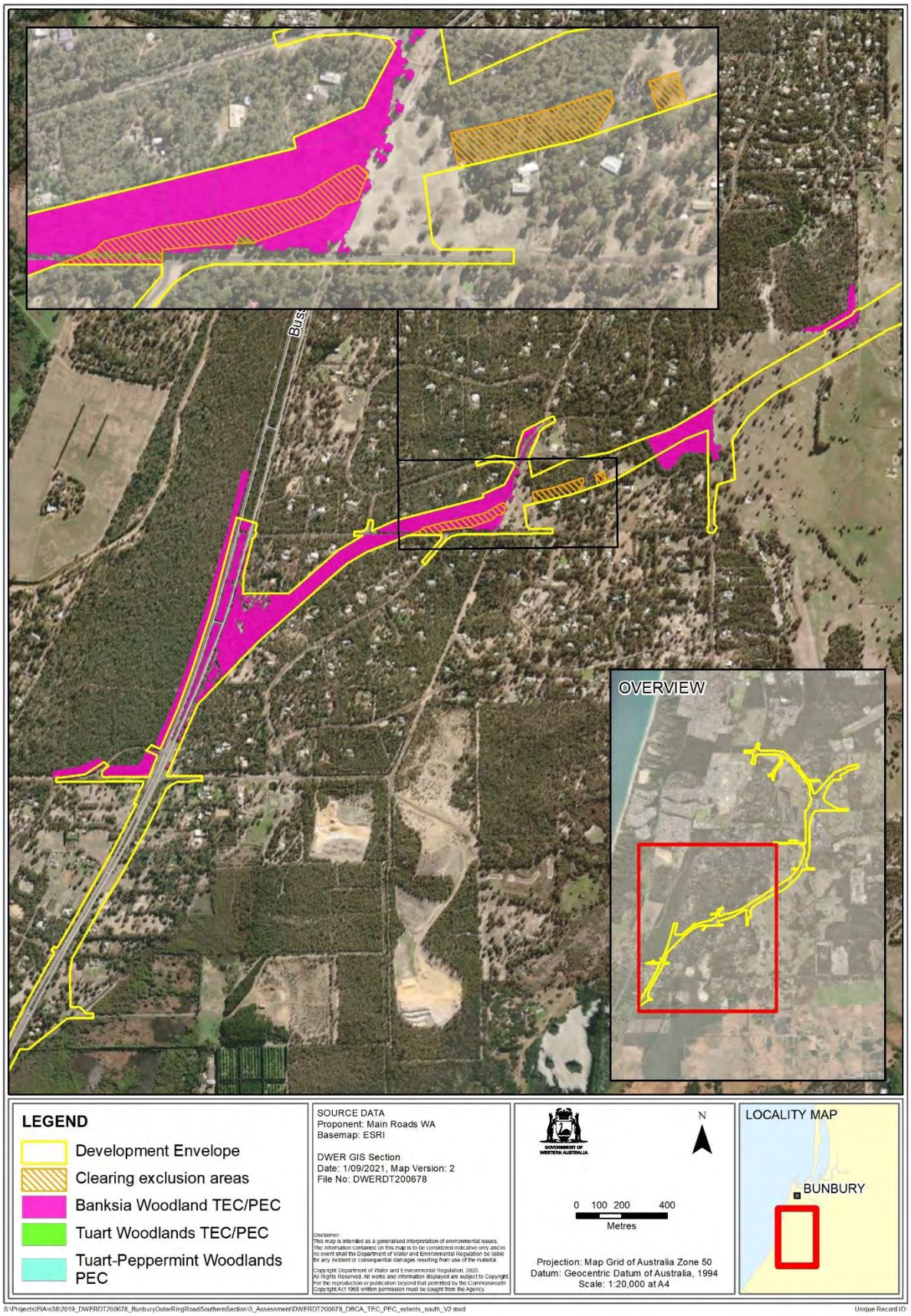

Figure 2b Priority Ecological Communities Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands (south)

Figure 3. Distribution of Banksia Woodlands and Tuart Woodlands adjacent to the Development Envelope

Note: A 60 m buffer to the development envelope is included in this figure in relation to monitoring requirements under Commonwealth Approval Notice EPBC 2019/8543.

LEGEND

- Major road
- Banksia Woodland TEC
- Tuart Woodland TEC
- BORR Southern Section Referral Boundary
- BORR Southern Section Referral Boundary 60m Buffer
- BORR Southern Section Referral Boundary 20m Buffer

33500 33600 33700 33800 33900 34000 34100 34200 34300 34400 34500

104900 104800 104700 104600 104500 104400 104300 104200 104100 104000 103900 103800 103700 103600

1 2 3 4 5 6

USHER
COLLEGE GROVE
DALYELLUP
GELORUP

TW-S-PI-2
TW-S-PI-2
BW-S-PI-1
TW-S-PI-3
TW-S-PI-4
TW-S-PI-4

Centenary Rd
Neslite Rd
Ashberg Link
Starlite Bend
Rutile Lane
Ferndale Av
Ferndale Av
Epidote Loop
Logan Lane
Crystal Bend
Bussell Hwy
Holly Hill Av
Sleaford Dr
Meadow View Rd
Maynard Pde
Dunmow Rise
Jules Rd

SLIP POWERED BY LANDGATE

Paper Size ISO A3

0 20 40 60 80

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994

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TECs adjacent to the Development Envelope

Project No. 61-37041
Revision No. 6
Date 30/06/2022

FIGURE 3

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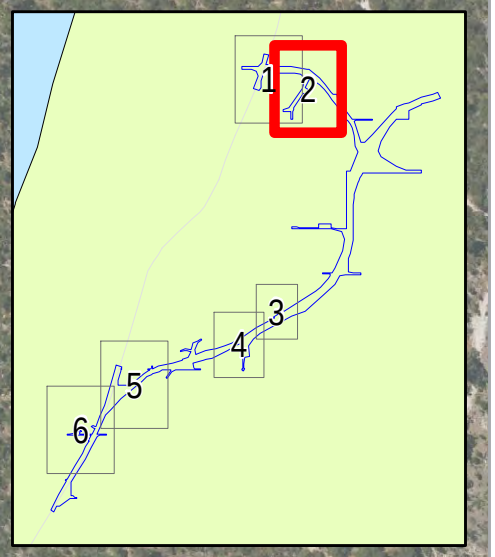
LEGEND

- Banksia Woodland TEC
- Tuart Woodland TEC
- BORR Southern Section Referral Boundary
- BORR Southern Section Referral Boundary 60m Buffer
- BORR Southern Section Referral Boundary 20m Buffer

34200 34300 34400 34500 34600 34700 34800 34900 35000 35100 35200

104800 104700 104600 104500 104400 104300 104200 104100 104000 103900 103800 103700 103600 103500 103400



COLLEGE GROVE

TW-S-PI-2

BW-S-PI-1

BW-S-PI-1

Centenary Rd

NORTH BOYANUP

TW-S-PI-4

GELORUP

TW-S-PI-4

Sleaford Dr

Jules Rd

Dunmow Rise

Maynard Pde

SLIP
POWERED BY LANDGATE

Paper Size ISO A3

0 20 40 60 80

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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Bunbury Outer Ring Road Southern Section

TECs adjacent to the Development Envelope

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33900 34000 34100 34200 34300 34400 34500

100800 100700 100600 100500 100400 100300 100200 100100 100000

LEGEND

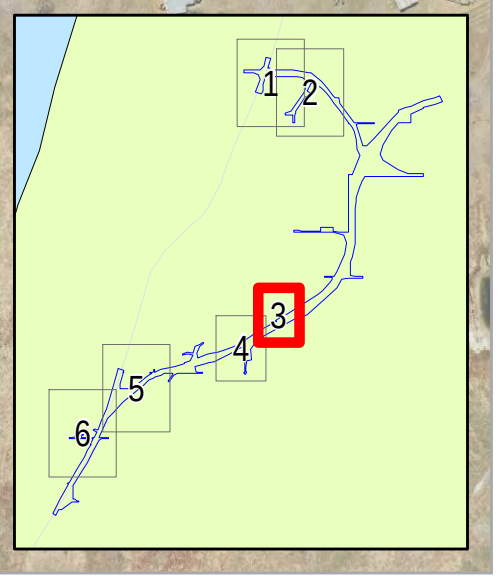
- Banksia Woodland TEC
- BORR Southern Section Referral Boundary
- BORR Southern Section Referral Boundary 60m Buffer
- BORR Southern Section Referral Boundary 20m Buffer

Marchetti Rd

GELORUP

BW-S-PI-3

SLIP POWERED BY LANDGATE



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Map Projection: Transverse Mercator
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33200 33300 33400 33500 33600 33700 33800 33900

100400 100300 100200 100100 100000 99900 99800 99700 99600 99500 99400

LEGEND

- Banksia Woodland TEC
- BORR Southern Section Referral Boundary
- BORR Southern Section Referral Boundary 60m Buffer
- BORR Southern Section Referral Boundary 20m Buffer

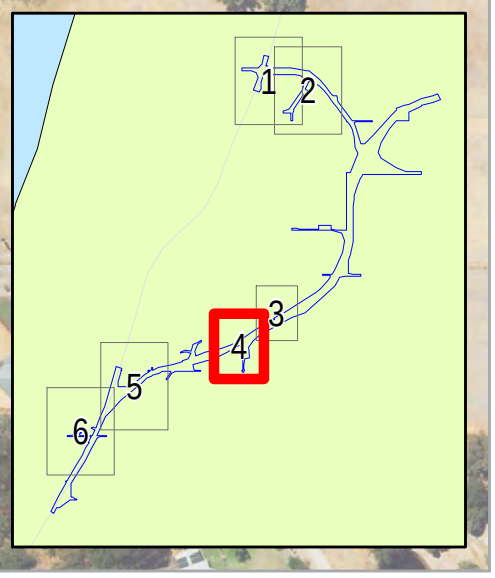
Yalinda Dr

BW-S-PI-4

GELORUP

Woods Rd

Jilley Rd



SLIP POWERED BY LANDGATE

Paper Size ISO A3

0 20 40 60 80

Metres

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TECs adjacent to the Development Envelope

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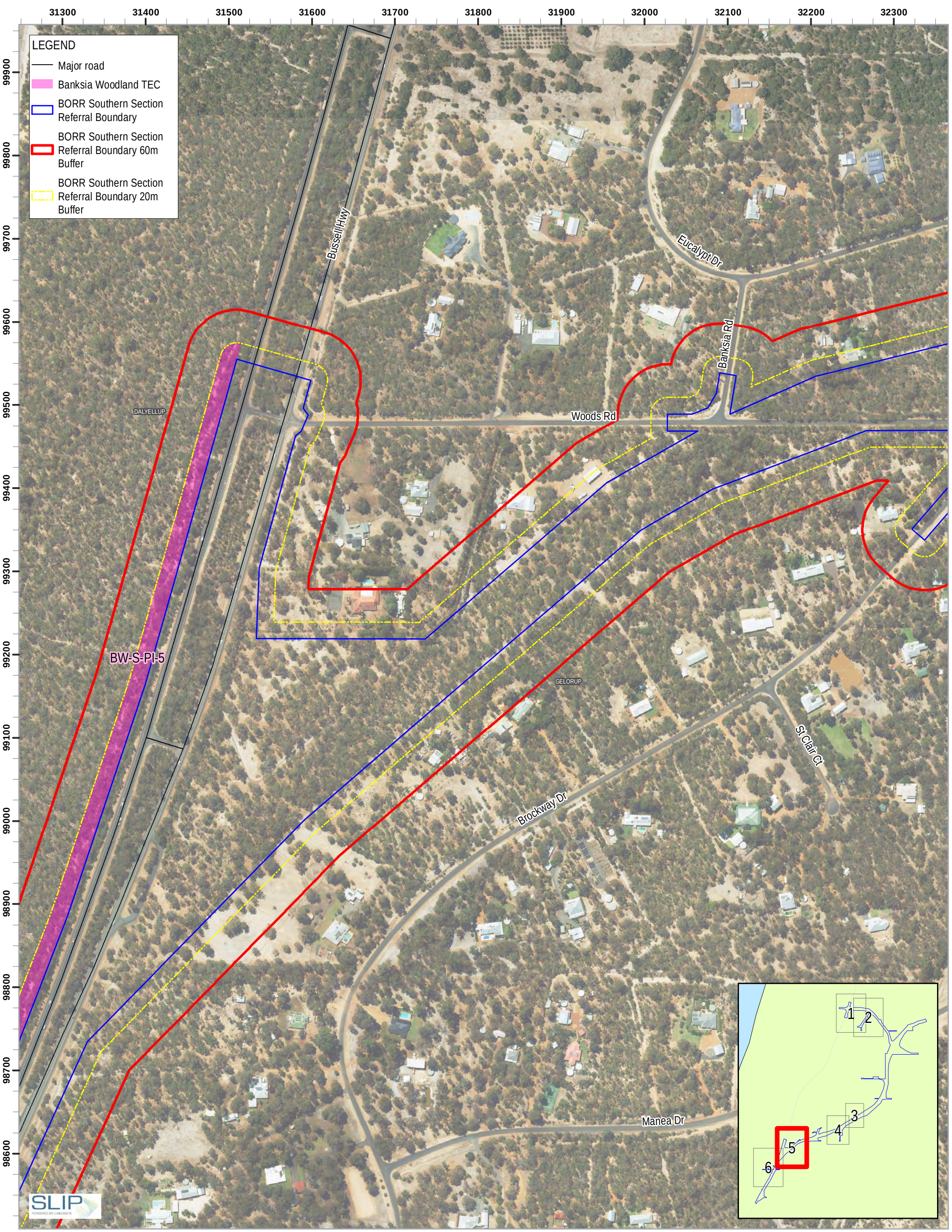

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30400 30500 30600 30700 30800 30900 31000 31100 31200 31300 31400

99200 99100 99000 98900 98800 98700 98600 98500 98400 98300 98200 98100 98000 97900 97800

LEGEND

- Major road
- Banksia Woodland TEC
- BORR Southern Section Referral Boundary
- BORR Southern Section Referral Boundary 60m Buffer
- BORR Southern Section Referral Boundary 20m Buffer

Quambi Dr

DALYELLUP

BW-S-PI-5

GELORUP

Bussell Hwy

Lakes Rd

BW-S-PI-5

Tamra Cl

BW-S-PI-5

Calinup Rd

STRATHAM

Jaym

SLIP POWERED BY LANDGATE

1 2 3 4 5 6

Paper Size ISO A3

0 20 40 60 80

Metres

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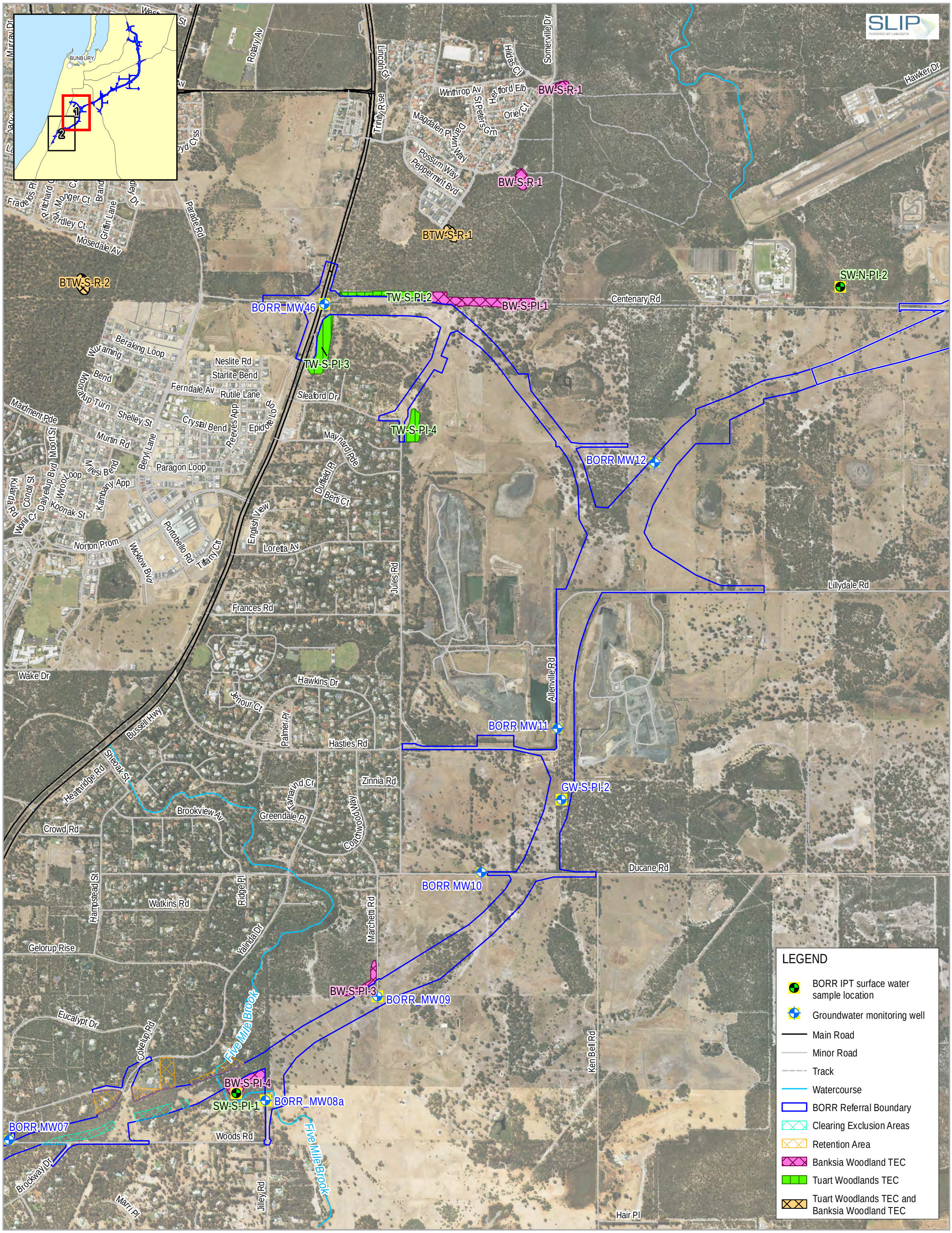
Figure 4. Overview of monitoring location for Banksia Woodlands and Tuart Woodlands



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TEC habitat potential impact monitoring locations

Project No.	61-37041
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FIGURE 5

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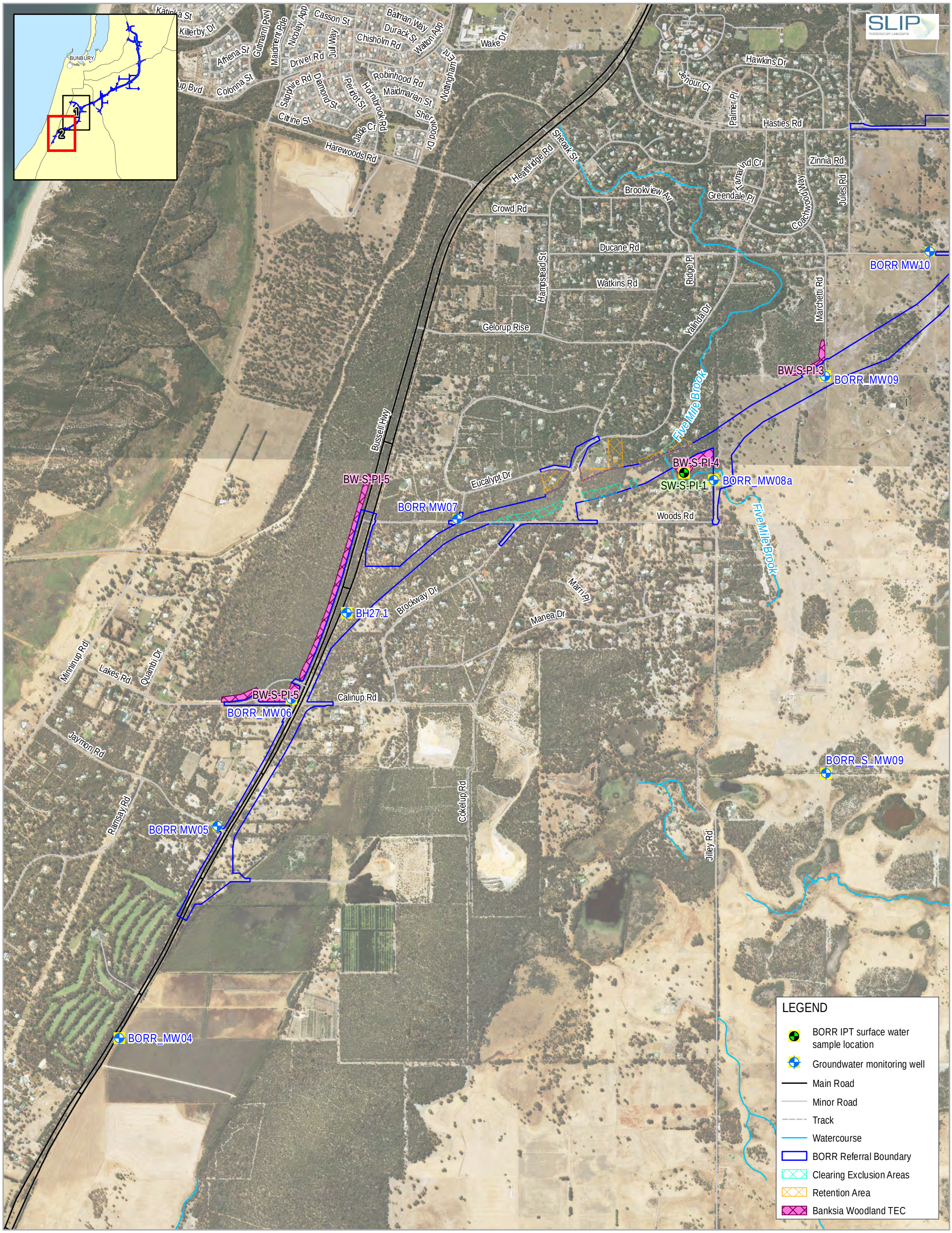

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TEC habitat potential impact monitoring locations

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FIGURE 5

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South West Gateway Alliance

Report

Bunbury Outer Ring Road (Southern Section) - Threatened and Priority Ecological Communities

Vegetation and Drainage Monitoring - Baseline Report (EcoEdge, 2022)

Bunbury Outer Ring Road

Southern Section

Threatened and Priority Ecological Communities, Vegetation and Drainage Monitoring

Baseline Report

Prepared for
South West Gateway Alliance
2022

Ecoedge

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Version	Origin	Review	Review date	Release approval	Issue date
Draft V1	CS	DB	25/6/2022		
Draft V2	Ecoedge	SWGA	20/6/2022	Ecoedge	1/7/2022
Final draft	SWGA	MRWA	08/7/2022	SWGA	11/7/2022

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Statement of Limitations

Reliance on Data

In the preparation of this report, Ecoedge has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report. Unless stated otherwise in the report, Ecoedge has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Ecoedge will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed to Ecoedge.

Report for the Benefit of Client

The report has been prepared for the benefit of the Client and for no other party. Ecoedge assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including, without limitation, matters arising from any negligent act or omission of Ecoedge or for any loss or damage suffered by any other party relying on the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions, and should make their own enquiries and obtain independent advice in relation to such matters.

1 Introduction

Ecoedge Environmental Services (Ecoedge) has been engaged to undertake baseline monitoring of Threatened Ecological Communities (TEC), Priority Ecological Communities (PEC) and other remnant native vegetation adjacent to the Bunbury Outer Ring Road (BORR) Southern Section proposal area. Vegetation monitoring has been undertaken on a regular basis since Spring 2019.

Occurrences of TEC and PEC vegetation monitored in this program include:

- Banksia Woodlands of the Swan Coastal Plain, listed as both a TEC (Commonwealth (Cth)) and Priority 3 PEC (state) ('Banksia Woodlands TEC/PEC').
- Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain, listed as both a TEC (Cth) and Priority 3 PEC (state) (Tuart Woodlands TEC/PEC[1]).
- Southern Swan Coastal Plain *Eucalyptus gomphocephala - Agonis flexuosa* woodlands (floristic community type 25)[2].
- State-listed Herb Rich Shrublands in Claypans (Floristic Community Type (FCT) 08) TEC, part of the Commonwealth protected Claypans of the Swan Coastal Plain TEC ('Claypan TEC').

The monitoring program aims to establish a set of data (including baseline data) that can be used to detect and measure change in occurrences of vegetation (and other site variables) adjacent to the BORR proposal area, which may result from the road construction project, or from other causes over the coming years. Data is collected from Potential Impact sites that have a potential to be impacted due to their close proximity to the proposal and Reference sites that are unlikely to be impacted due to their distance away from the proposal.

There are two components to the monitoring program:

1. Vegetation health monitoring (including photopoint monitoring) and
2. Drainage monitoring.

The vegetation monitoring program focuses on monitoring changes in the status of vegetation at reference sites and potential impact sites, such as its condition, species composition and structure. Vegetation monitoring is carried out bi-annually (autumn and spring) at photopoints, and in spring at transects which have four quadrats placed along them. Transects within claypan vegetation are also monitored twice a year to obtain maximum species per quadrat.

The drainage monitoring focuses on impacts of drainage and changes in hydrology on vegetation, specifically impacts from erosion, inundation/flooding and drying. Drainage monitoring is carried out quarterly (summer, autumn, winter and spring).

Approximate monitoring site locations were provided by Main Roads Western Australia (Main Roads) in consultation with Ecoedge, with Ecoedge determining the specific locations of transects and photopoints after conducting a field assessment. The final location of the

[1] Tuart woodland and Banksia woodlands co-occur in the Proposal Area and are referred to as Banksia Tuart Woodlands in this report.

[2] Can be a component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC or the Critically Endangered Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain EPBC Act listed TEC.

Potential Impact and Reference monitoring sites within, and adjacent to, the associated BORR footprint is shown in **Figure 1**.

This report presents the results of all monitoring data to date starting in spring 2019 to early winter 2022.

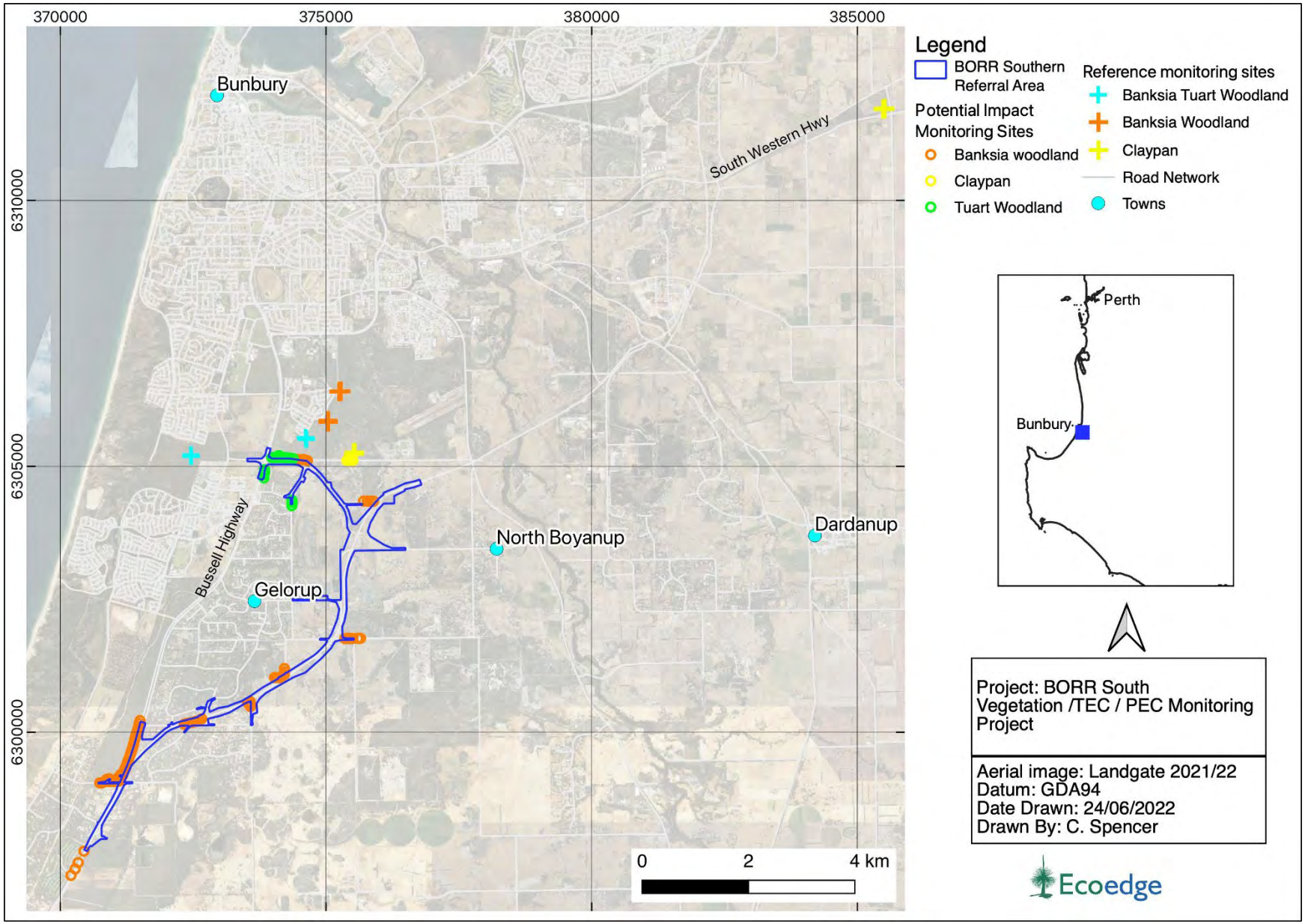

Figure 1. Location of Potential Impact and Reference sites within the BORR Southern vegetation monitoring program.

2 Scope

A summary of the scopes of both the vegetation monitoring and drainage monitoring programs are presented below. The full scope of works for prior monitoring rounds are detailed in **Appendix 1.** The main elements were:

2.1 Vegetation Monitoring.

1. Conduct initial assessments at each Potential Impact and Reference sites to determine whether the vegetation met the definition of Banksia Woodlands TEC/PEC or Tuart Woodlands TEC/PEC. The TEC/PEC determination to be based on visual assessment of vegetation, not on a quadrat based multivariate analysis.
2. For all sites assigned TEC/PEC status, including those later confirmed not to be TEC/PEC[3], establish transects and/or photopoints.
3. Conduct photopoint monitoring assessments at each site. This included all boundary photopoints and photopoints at the start and end of each transect at both Potential Impact and Reference sites.
4. Preparation of a report.
5. Delivery of raw data, photographs and shapefiles, with all electronic data provided (including excel spreadsheets) compliant with Main Roads data standards.

2.2 Drainage Monitoring

The scope of the drainage monitoring program was to undertake quarterly (each season) visual assessments at both Potential Impact and Reference sites to record site information and changes in plant health including site photographs and evidence of:

1 Flooding and/or inundation: resulting from runoff from a roadway or associated construction

2 Erosion: primarily caused by water that has resulted from run-off from a roadway or associated construction

3 Drying effects: yellowing and/or death of vegetation that may have been caused by changes in hydrology due to roadway construction (abnormal as in not related to the normal changes occurring throughout the seasons).

[3] DBCA revised the status of both the Tuart Woodlands PEC and Banksia Woodlands PEC in mid-2020 to align with the definitions of the corresponding Commonwealth listed TECs. As a result of this, vegetation could no longer be identified as an occurrence of the PEC unless it also comprised an occurrence of the TEC. Therefore, some sites previously listed as PEC occurrences that do not meet the definition of the Commonwealth TEC are now listed as 'not TEC/PEC'.

3 Methods

3.1 Location of Monitoring Sites

There are currently thirteen potential impact and five reference monitoring sites within the BORR Southern proposal area (**Table 1**). These sites were identified based upon local knowledge and formal surveys of flora and vegetation conducted within the area**.** One the original sites was removed from the monitoring program due to changes in the referral area, refer to **Appendix 2** for further information regarding this change. To comply with Ministerial Statement 1191 (Condition 3), a new site was established to monitor the banksia PEC within the Clearing Exclusion Area, near Woods Road, Gelorup. This site was established on the 20th June 2022.

Table 1. Baseline site name and location within the Southern proposal area.

No	Current Site Name	Location	Comments
Potential impact sites			
1	BW-S-PI-1	South of Centenary Road, east of Bussell Hwy	
2	BW-S-PI-2	North of Ducane Road, east of Allenville Road, opposite Ken Bell Road	Not TEC / PEC
3	BW-S-PI-3	East of Yalinda Drive, west of Marchetti Road	
4	BW-S-PI-4	Jilley Road north of Woods Road. Photopoints established along the BORR boundary	
5	BW-S-PI-5	West of Bussell Hwy	
6	BW-S-PI-6	Bussell Highway road reserve northbound, south of the alignment adjacent to the Capel Golf Course	Not TEC / PEC
7	BW-S-P1-7	North of Lilydale Road	Not TEC / PEC
8	BW-S-PI-8	Woods Road, Gelorup	Site established in early winter 2022
9	CP-S-PI-1	Manea Park middle claypan, south of CP-NS-R-2	
10	TW-S-PI-1	North side of Centenary Rd west of Bussell Hwy, north westernmost part of proposal area	Not TEC/PEC
11	TW-S-PI-2	Road reserve on the north side of Centenary Road east of Bussell Hwy, and extending into the adjacent reserve to the north	
12	TW-S-PI-3	Bussell Hwy southbound, south of Centenary Road (adjacent the parking bay)	
13	TW-S-PI-4	Jules Road near Sleaford Drive	
Reference sites			
1	BW-S-R-1	Manea Park (R 32963)	
2	BTW-S-R-1	Manea Park corner of Lakeside and Melaleuca Drive	
3	BTW-S-R-2	North-side of Centenary Rd east of Bussell Hwy	
4	CP-NS-R-1	Waterloo Nature reserve (R46108)	
5	CP-NS-R-2	Manea Park (R16044)	

3.2 Site Nomenclature

Initially, monitoring sites were named according to a simple system that ran from Site 1 to Site 10, with Reference sites running from Reference Site R1 to R7. Once the dataset was finalised, a new naming convention was formulated according to the following variables:

1. Which vegetation/TEC/PEC type (BW = Banksia Woodlands, BTW = Banksia/Tuart Woodlands, CP = Claypan, TW= Tuart Woodland)
2. Whether it's in the North or South (Northern & Central or South proposal areas)
3. Whether it's a Potential Impact site, or a Reference site.

The following additional notifiers were recorded for data captured at each site:

4. Whether it's a transect T or boundary photopoint P
5. Site number if more than one site monitored in the TEC/PEC.

For example, TW-S-PI-1 is a potential impact Tuart Woodlands TEC site in the Southern proposal area. The history of the site names can be seen in **Appendix 2**.

The nomenclature for drainage monitoring points is as follows:

Example monitoring point: BTW-S-R-1_E1(a21)

BTW-S-R-1 - site name

D - drying, **E** - erosion, **I** - inundation

1 - chronological number of particular issue recorded at site.

(**a** - autumn, **w** - winter, **sp** = spring, **su** - summer) – the season first recorded.

21 -2021, the year it was first recorded.

3.3 Timing and Frequency of Survey

The boundary photopoint vegetation monitoring program is carried out bi-annually in autumn and spring. Transect vegetation monitoring is carried out annually in spring, except for the Claypan transects which are carried out twice a year, in [4]August and October.

An overview of the aspects of the monitoring program is presented in **Table 2** and the timing of monitoring rounds conducted to date are presented in **Table 3**.

All monitoring transects established in 2019 were revisited and rescored in 2020, and 2021.

[4] NOTE: that with the exception of CP-NS-R-2 (which was set up on the 30 July) claypans were not monitored in August of 2020 because the majority of annual species were not yet germinated as sites were too wet. Monitoring was delayed to the scheduled spring 2020 monitoring round.

Table 2. Monitoring program overview.

Monitoring type	Activity	Sites	Frequency	Timing
Vegetation	Transects	All sites	Annually	Spring
Vegetation	Transects	Claypan TEC	Bi-annually	Dependent on rainfall, but typically August and October - November.
Vegetation	Photopoints	Boundary points	Bi-annually	Spring and autumn
Drainage	Visual inspection	All sites	Quarterly	Spring, summer, autumn and winter

Table 3. Monitoring rounds timeline.

Year	Season	Drainage	Boundary photopoint	Transect/quadrat assessment
2019	Spring / summer	Not started	19 November to 3 December	
2020	Summer	Not started	N/A	
2020	Autumn	29-30 April	20-26 May	N/A
2020	Winter	28 – 31 July	N/A	4 August
2020	Spring	9 October – 28 October		
2020/2021	Summer	10-12 February	N/A	
2021	Autumn	31 May	No monitoring	N/A
2021	Winter	7 September	N/A	N/A
2021	Spring	13 October	13 October	8 September - 14 October
2021/2022	Summer	22 February	1 December	N/A
2022	Autumn	25 May	25 & 26 May	N/A
2022	Winter	20 June	20 June	N/A

3.4 Transects and Quadrats

Monitoring transects of 30 m in length were established within both Potential Impact and Reference sites[5]. The ends of each transect were marked with a steel peg which will be left in place until the end of the monitoring program (noting that the stakes were removed from all roadside sites). Along each transect, 2 x 2 m quadrats were established at 10 m intervals, the first at 0 m and the last at 30 m. Each quadrat, marked at the corners with temporarily placed steel pegs was placed alternately, left and right of the transect line. A total of four quadrats were established per transect. At most sites only one transect was established. A photopoint was established at either end of the transect. The layout of a transect is shown in **Figure 2.**

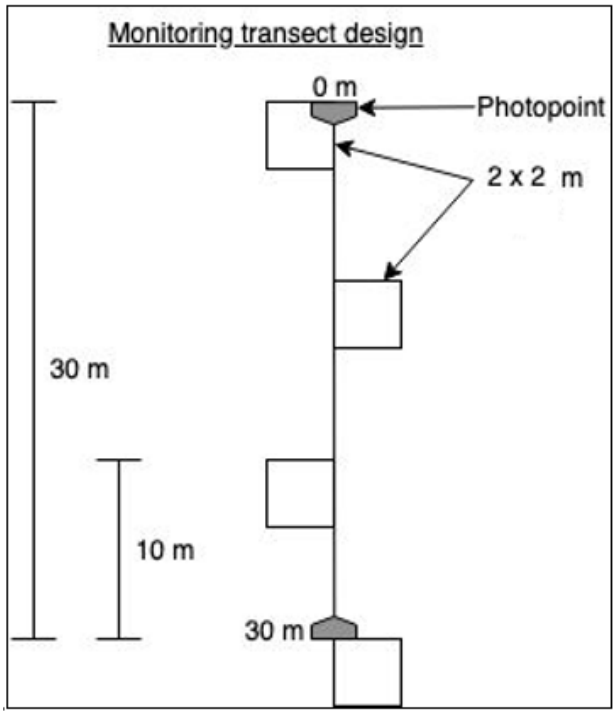

Figure 2. Layout plan for a transect.

To the extent practicable, the locations of transects at Reference sites were placed in vegetation that was similar to Potential Impact sites for the Banksia and Tuart Woodlands and Claypan TEC/PECs.

Parameters recorded for each quadrat are described below. Plant species, cover, plant stress within transect quadrats are recorded using Quadmon (custom made online database and app; developed by Geomedia: http://gminteractive.com.au/) and/or Microsoft Excel.

[5] Transects were not installed in Potential Impact sites located on private property and that are not under Main Roads jurisdiction.

3.4.1 Physical characteristics

The physical characteristics recorded for each quadrat include:

- Species composition: species identified in each quadrat.
- Vegetation cover[6]: assessed using the scale presented in **Table 4**. The cover assessment forms part of the plant stress assessment detailed below.
- Evidence of disease: note taken on presence of dieback, scale or other diseases.
- Bare ground: assessed using the same scale as the vascular plant cover, from 1 equalling no bare ground to 10, which equalled 100% bare ground.
- Leaf litter: recorded as a % coverage of the quadrat.

Table 4. Cover scores for vascular plants within transect quadrats (BORR IPT 2019).

Cover score	Description
1	Seldom found species with insignificant cover
2	Very scattered individuals of a species with less than 1% cover
3	Scattered individuals of a species with 1-5% cover
4	Any number of individuals of a species with 5-10% cover
5	Any number of individuals of a species with 10-25% cover
6	Any number of individuals of a species with 25-33% cover
7	Any number of individuals of a species with 33-50% cover
8	Any number of individuals of a species with 50-75% cover
9	Any number of individuals of a species with greater than 75 % but less than 100%
10	Any number of individuals of a species with complete cover (100%) in the stand

3.4.2 Plant stress

Within each quadrat the stress status of each shrub or tree is noted. The scale stress is presented in **Table 5 (**BORR IPT, 2019). The scale for vascular plant cover is from 1 (minimal cover) to 10, (100% cover). To enable a more comprehensive assessment of plant stress, the scale presented in **Table 5** contains additional descriptive parameters to those used in the initial monitoring round. The amount of stress plants are under is rated from 5 (not stressed)

[6] **Vegetation cover scale**: Vegetation cover at non-transect monitoring sites is recorded using the Braun-Blanquet scale instead of the Domin-Krajina scale as agreed to previously by the BORR IPT. The Braun-Blanquet scale 1 to 5 denoting both the numbers of species and the proportion of the area covered by that species, ranging from + (sparse and covering a small area) to 5 (covering more than 75% of the area). The reason for this is that it more easily applied than the Domin-Krajina scale in non-quadrat estimates of cover and abundance.

to 1 (stressed). These scales do not contain a zero rating for the purpose of statistical analysis. A zero rating represents no data recorded for this characteristic.

Table 5. Revised plant stress scale for shrubs and trees within transect quadrats (BORR IPT 2020).

Plant Stress Level	Description
5	Plant with >81 % of the original canopy present; healthy overall; little or no leaf yellowing. No evidence of wilting of foliage. Plants not stressed.
4	Plant with 61-80% of the original canopy present; occasional dead branches (< 20 % of canopy); small patches of leaf yellowing. Plant leaves may show signs of wilting at periphery. Plants potentially stressed.
3	Plant with 41-60 % of the original canopy present; some smaller dead branches evident (21-40 % of canopy); moderate amount of leaf yellowing (21-40 % of canopy). Plant leaves may show signs of wilting with noticeable curling of leaf periphery. Plants exhibiting symptoms of stress.
2	Plant with 21-40 % of original canopy present; some main branches dead (50 – 80 % of canopy; abundant leaf yellowing (> 41 % of canopy). Plant leaves may show signs of wilting with noticeable curling of leaf. Plants exhibiting signs of stress.
1	Plant with <20 % of original canopy; most main branches dead; remaining leaves mostly dying off. Plant leaves may show signs of wilting with noticeable curling of leaf (approaching closure). Plants clearly stressed.

Transect vegetation monitoring is carried out once in spring, except for the Claypan transects which are carried out twice, once in mid spring and again in late spring to early summer. Changes in species composition and other recorded variables within the quadrats along these transects are compared between data collected at Reference and Potential Impact sites and between data collected at the same site during previous monitoring rounds.

3.5 Boundary Photopoints

Boundary photopoints are located at approximately 50 m intervals along the boundary of the monitoring site and the BORR proposal area (not around the perimeter of monitoring sites). Photopoints are also situated at each end of transects (transect photopoints). Boundary photographs are taken looking at right angles to the boundary towards the monitoring site vegetation using the phone/tablet app Photomon (Northern Agricultural Catchments Council, 2014). With the use of the Photomon application the exact location and direction can be guaranteed.

The number of boundary photopoints increased from 79 in spring 2019 to 94 in early winter 2022 due to modifications in the alignment of the proposal area and the addition of a new monitoring site in the clearing exclusion area. The total number of transect photopoints increased from 18 to 20 with the addition of a further Claypan potential impact transect monitoring site. A breakdown of the number and type of photopoints within each monitoring site is provided in **Table 6**.

Appendix 3 shows the location of Potential Impact sites, Reference Sites, photo boundary points and transect photo point locations.

An index to all photographs taken during monitoring is provided in **Appendix 4.**

Table 6. Breakdown of baseline monitoring points at each site.

Number	Site	Number boundary monitoring sites	Number transects (number of photopoints in brackets)
Potential impact sites			
1	BW-S-PI-1	5	1 (2)
2	BW-S-PI-2	6	
3	BW-S-PI-3	7	
4	BW-S-PI-4	4	
5	BW-S-PI-5	34	1 (2)
6	BW-S-PI-6	4	
7	BW-S-PI-7	4	
8	BW-S-PI-8	8	
9	TW-S-PI-1	3	
10	TW-S-PI-2	9	1 (2)
11	TW-S-PI-3	4	
12	TW-S-PI-4	3	
13	CP-S-PI-1	3	1 (2)
	Total	**94**	**4(8)**
Reference sites			
1	BW-S-R-1		2 (4)
2	BTW-S-R-1		1 (2)
3	BTW-S-R-2		1 (2)
4	CP-NS-R-1[7]		1 (2)
5	CP-NS-R-2		1 (2)
	Total		**6(12)**
	Grand Total	**94**	**10(20)**

[7] The CP-NS-R-1 and CP-NS-R-2 sites serve as Reference Sites for both the BORR Northern & Central Section and BORR Southern Section due to the limited number of suitable Claypan TEC occurrences within reasonable proximity to the referral area.

At each photopoint the following information was collected:

- The location using a handheld GPS unit.
- A photograph (using the Photomon app) taken looking into the vegetation/TEC/PEC or along the length of the transect.
- A description of the vegetation (including dominant tree, shrub, grass, sedge and herbaceous species), weed cover percentage, vegetation condition, evidence of erosion, flooding, pathogens, fire, litter[8], rubbish dumping and grazing impacts,
- The major weed species and their percentage cover (except at transect photopoints[9]).
- The percentage cover of natives (autumn 2020 onwards) this value was assessed as a single, composite value in the autumn 2020 monitoring round. Prior to this native cover was assessed as part of the assessment of vegetation structure[10].
- A record of stress of the trees (dominant shrubs, in the absence of trees) within the 20 x 20 m assessment area using the revised stress scale presented in **Table 5.**

Variables of species/cover, disease, disturbance, etc. are recorded using Fulcrum (https://www.fulcrumapp.com/).

Vegetation condition is assessed against the method of the EPA (2016) (**Appendix 5**).

Assessment of vegetation structure is based on the Keighery (1994) structural classification which is similar to that of the Foliage cover of the NVIS Structural formation (NVIS 2017).

The percentage cover of natives and weeds vegetation cover at non-transect monitoring sites is recorded using the Braun-Blanquet scale.

Impact from Phytophthora dieback and Marri Canker were recorded as part of standard vegetation monitoring undertaken at all monitoring locations. Four scales of impact were recorded:

1. Low impact: 1-2 plants
2. Medium impact: active front visible, some death
3. Heavy impact: active front visible, lots of death
4. Old impact site: vegetation structure altered.

[8] Man-made items that had been blown into the survey area were classified as litter and rubbish was anything that had been dumped or put there.

[9] This information was not collected at photopoints associated with transects because it was collected for the transect quadrats.

[10] The method of assessment for native vegetation cover was not stipulated in the original scope for the project, just that it should be assessed as a percentage.

3.6 Drainage Monitoring

Drainage monitoring was first undertaken in autumn 2020. Drainage monitoring[11] is conducted via a foot traverse along the length of Potential Impact site boundaries and along the transects within Reference sites. Three drainage disturbance variables are measured, flooding/inundation, erosion and non-seasonal drying effects (**Table 7**). If noted, the locations of these are recorded using a hand-held GPS, and a photograph and description of the disturbance is taken. Where a disturbance is considered to have impacted vegetation, a plant stress assessment is conducted using the scale shown in **Table 5.** This scale is used to describe non-seasonal drying effects i.e., those that would not normally be expected during the particular season.

The visual assessment field sheet used in the monitoring was provided by the BORR IPT and is provided in **Appendix 6.** Drainage monitoring is carried out quarterly.

Table 7. Descriptions of the three disturbance variables recorded during drainage monitoring.

Disturbance Variable	Description
Flooding/Inundation	Flooding or inundation of vegetation resulting from runoff from a roadway.
Erosion	Erosion, primarily caused by water that has resulted from run-off from a roadway.
Drying effects	Drying off (yellowing and/or death) of vegetation that may have been caused by changes in hydrology caused by roadway construction. (Potentially as a result of new *Phytophthora* disease infection, but not including normal seasonal leaf drop in summer and early autumn).

The triggers for investigation with regards to 'drainage disturbance impacts' are:

- If TEC vegetation is inundated or flooded for 24 hours as a result of Proposal activities,
- Evidence of new erosion in monitored TEC vegetation,
- TEC vegetation health declined relative to reference sites.

3.7 Comparative Analysis

Comparative analysis of data occurs on two bases: between different monitoring rounds for the same sites, and between Potential Impact and Reference sites of the same community type. The analysis considers changes with regard to absolute number (e.g., number of species) and category score (e.g., cover or stress rating).

For the comparative analysis, data from the four quadrats at each transect was amalgamated in order to account for variability across the site.

While it is not considered likely that statistical analysis will be required to detect changes reaching either specified trigger or threshold levels (BORR IPT 2020), where warranted, a paired t-test or repeated measures ANOVA may be used, noting that, due to differences in some vegetation characteristics between Potential Impact and Reference sites, and the

[11] Drainage impacts i.e. flooding/inundation, erosion and non-seasonal drying effects are also recorded at 104 boundary monitoring points, refer to Section 3.5.

relatively low number of sites, the tests would have a low "power" to detect a real difference between the two means.

A change is considered to be potentially significant and worthy of further investigation when there is a variation in the result for any measured variable, in particular for dominant vegetation structure, vegetation condition, weed cover and native cover at anyone monitoring point. For example, a significant change may include:

- Vegetation structure: A Banksia Low Woodland changing to a Banksia Open Low Woodland
- Vegetation condition: Good condition vegetation changing to Degraded condition vegetation
- Weed cover: <2% weed cover changing to 2-10% weed cover
- Native cover: 30-70% native cover changing to 10-30% native cover and
- Plant Stress: trees / largest shrubs within the survey area changing by one grade point, for example, from a 5 to 4.

These changes are compared against Reference sites of the same vegetation type, or data from previous rounds at the same site, to determine whether the change is the result of project-attributable impacts, or of other more regional scale impacts, such as drought.

3.8 Reportable Decline

The trigger for a Reportable Decline to TEC/PEC vegetation is that TEC / PEC vegetation health shows a decline on baseline levels. The threshold for a Reportable Decline is where monitoring shows a 20 percent decline over baseline levels at Potential Impact sites but not at Reference sites (BORR IPT 2020).

In regard to drying of Claypan TEC vegetation, the trigger is if plant health/stress scores decline by one health/stress class (category) relative to Reference Sites in two consecutive monitoring periods (Reportable decline). The threshold for drying is if it continues to breach trigger levels two months after management/mitigation measures are implemented.

3.9 Storage and Provision of Data

Data is stored in an either Excel or Access database and in relevant Fulcrum, Photomon, Geomedia data online database storage facilities.

Copies of all data are provided in accordance with Main Roads data standard requirements in Microsoft Excel spreadsheets, ESRI shapefiles and jpeg image file formats.

4 Personnel

Monitoring for the Autumn and early winter 2022 survey was conducted by Colin Spencer, Botanist (flora permit FB62000169) and Debbie Brace Environmental Officer (flora permit FT61000764).

Drainage monitoring in 2021 and 2022 was conducted by Debbie Brace.

Appendix 7 indicates the personnel involved in previous monitoring rounds.

5 Limitations

Limitations regarding the Autumn 2022 and early winter 2022 monitoring rounds are addressed in **Table 8.** The limitations of previous surveys are shown in **Appendix 7.**

Table 8. Autumn 2022 early winter 2022 limitations of the field monitoring with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	Minor	The monitoring setup and data capture was carried out as per the scope.
Proportion of flora identified	Minor	Sufficient material was available in the field to allow for assessment of all monitoring parameters required in autumn, including vegetation condition, vegetation structure and plant stress. Sufficient material was also available to assess the new site BW-S-PI-8 established in early winter.
Climatic and seasonal effects	Minor	The program schedules a monitoring round during autumn to pick up any seasonal variations in flora and vegetation which may be observed during this round. There were no climatic or seasonal constraints limiting collection of this data.
Availability of contextual information	Minor	Data and reports from numerous studies conducted on Swan Coastal Plain vegetation are available to provide context for the monitoring program.
Completeness of the survey	Minor	Most monitoring sites were accessible and able to be easily assessed. Site BW-S-PI-7 was not surveyed due to access restrictions.
Skill and knowledge of the botanists	Nil	The botanist has over 5 years of experience under taking formal flora and vegetation surveys on the Swan Coastal Plain.
Disturbance (fire, grazing, clearing etc.)	Negligible	At the time of survey, no sites were impacted / disturbed, such that they could not be meaningfully surveyed.
Collection and storage of data	Minor	Data was collected and stored using various applications on electronic devices and pen/paper notebooks. A coordinated approach is required, so data does not get lost or corrupted.

6 Results

6.1 Weather

Rainfall and temperature statistics for the survey period for the Bunbury Weather Station (No.009965) are shown in **Figure 3** and **Table 9**. This information provides context to observed changes or trends in vegetation that may arise from variations in weather, for example from prolonged, unseasonal drought impacts reducing plant germination and increasing plant stress.

Figure 3 and **Table 9** show rainfall for the 2021 May to September wet season (652 mm) exceeded the wet season average of 575.2 mm by over 100 mm. Both the 2019 and 2020 wet season where significantly below the average at 433.2 and 549.4 respectively.

Average maximum temperatures do not appear to vary significantly over the 2019 – 2022 monitoring period.

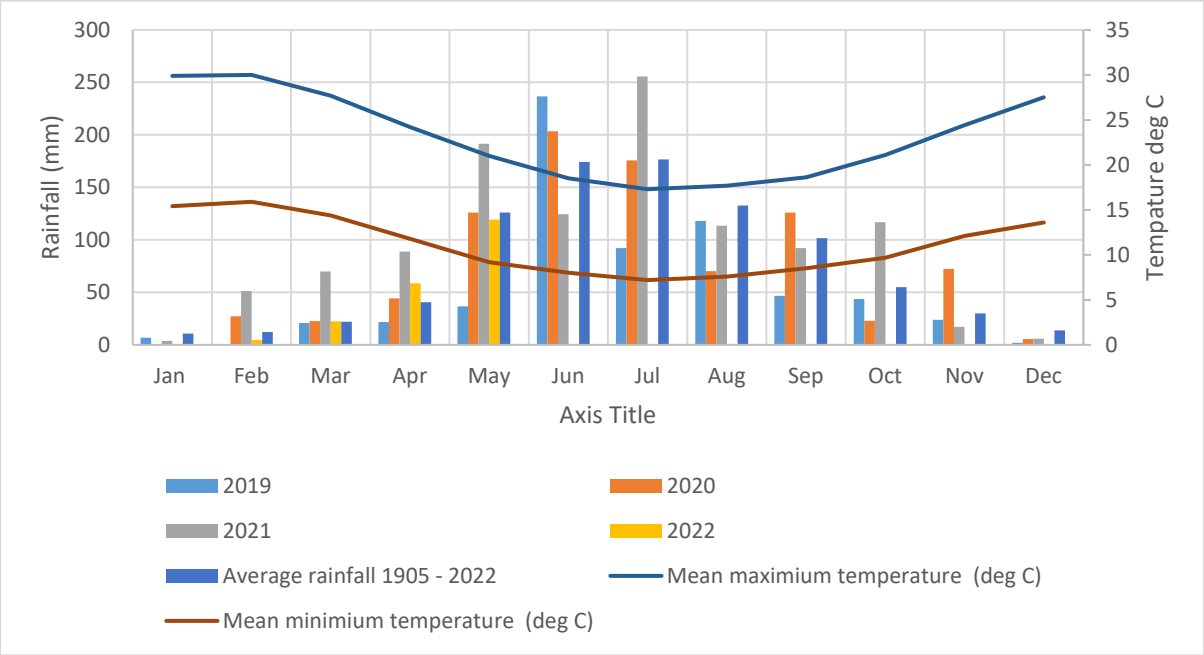

Figure 3. Long term mean and 2019, 2020 and 2021 mean rainfall for Bunbury Rain station 009965 BOM (2022) and long term mean temperature for Bunbury.

Table 9. Rainfall and temperature statistics for 2019 - 2021 for the Bunbury weather station No. 9965 (BOM 2022).

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall													
Monthly Total 2019	10.6	0	21.2	16.2	34.8	182	94.6	91.8	30	53.2	15.4	0.2	550
Monthly Total 2020	1.2	12.4	35.2	23.6	114.4	152.2	129	65.6	88.2	23	3	5	652.8
Monthly Total 2021	0.2	54.6	36.4	74.0	147.8	101.0	199.8	108.2	95.2	123.4	12.6	10.6	963.8
Mean rainfall 1995 - 2021	10.8	8.8	19.9	38.4	99.5	135.5	142.4	117.7	80.1	36.7	21.5	16.3	727.6
Maximum temperature													
Monthly mean 2019	28.6	29.9	28.2	23.9	20.6	18.8	17.9	18.9	19.9	21.2	26.1	30.4	
Monthly mean 2020	28.9	30.6	27.7	24.2	20.1	19.6	18.1	17.6	19.4	22.6	22.6	29.3	
Monthly mean 2021	31.5	28.5	27.4	24.2	20.8	18.0	17.2	17.9	19.1	19.4	23.7	28.2	
Mean temperatures 1995 - 2021	29.9	30.0	27.7	24.2	21.0	18.5	17.3	17.7	18.6	21.1	24.4	27.5	

6.2 Transect Monitoring

Data is presented below in tables and graphs which indicate changes with regard to absolute number (e.g., number of species) and category score (e.g., cover or stress rating) and compares data between the first round of monitoring in 2019 with that recorded in 2020.

The variables analysed for transects include:

1. Total number of taxa (within the four quadrats along a transect)
2. Number of native herbaceous taxa (includes annual and perennial herbs)
3. Number of native orchid taxa
4. Number of weed (non-locally-native) taxa
5. Average weed cover score
6. Average stress score (shrubs).

Unfortunately, the data from one site is missing for the 2019 survey (BTW-S-R-2). This occurred because of a failure of this data to properly save in Quadmon. Steps have been taken to ensure this does not re-occur. This has not impacted on the results of other data collected.

These variables were chosen because they integrate vegetation conservation values at each of the sites and provide important information about vegetation health (e.g. stress score) and vegetation integrity (e.g. weed cover). An example of data collected is shown in **Appendix 8**.

6.2.1 Potential Impact and Reference Site Descriptions

A description of the modal vegetation for each site is presented in **Table 10.** These descriptions are based on an assessment of dominant vegetation made at each photopoint across the sites.

Table 10. Vegetation descriptions for current monitoring sites.

Site Name	Vegetation Description Spring 2019 and Autumn 2020
BW-S-PI-1	*Corymbia calophylla* and *Eucalyptus marginata* Open Woodland over *Banksia attenuata, Agonis flexuosa, Xylomelum occidentale, Banksia grandis* Low Open Woodland over *Kunzea glabrescens* Tall Open Shrubland over *Jacksonia sternbergiana, Acacia extensa, Stirlingia latifolia brunonis* Open Shrubland over *Xanthorrhoea brunonis, Hibbertia hypericoides* and *Macrozamia riedlei* Low Open Shrubland over Lomandra micrantha, *Phlebocarya ciliata* Very Open Herbland and **Ehrharta calycina*, **Briza maxima* Very Open Grassland and *Lepidosperma squamatum* and *Hypolaena exsulca* Very Open Sedgeland.
BW-S-PI-2	*Corymbia calophylla* and *Eucalyptus marginata* Open Woodland over *Banksia attenuata* Low Open Woodland over *Kunzea glabrescens* Tall Open Shrubland over *Jacksonia furcellata, Macrozamia riedlei* Open Shrubland over *Xanthorrhoea brunonis, Hibbertia hypericoides* and *Dasypogon bromeliifolius* Low Open Shrubland *over *Hypochaeris glabra, Phlebocarya ciliata and Conostylis aculeata* Very Open Herbland over *Ehrharta calycina, *Briza maxima* Very Open Grassland.
BW-S-PI-3	*Eucalyptus marginata* Open Woodland over *Banksia attenuata Banksia ilicifolia, Xylomelum occidentale* Low Open Woodland over *Kunzea glabrescens* Tall Open Shrubland over *Macrozamia riedlei, Stirlingia latifolia* Open Shrubland over *Hibbertia hypericoides, Melaleuca thymoides, Acacia pulchella* Low Shrubland over *Phlebocarya ciliata Dasypogon bromeliifolius* Very Open Herbland over *Lepidosperma pubisquameum* Very Open Sedgeland and **Ehrharta calycina* Very Open Grassland.
BW-S-PI-4	*Eucalyptus marginata, Corymbia calophylla* Woodland Corymbia calophylla, Banksia attenuata, Banksia grandis, Xylomelum occidentale Low Open Woodland *Kunzea glabrescens, Persoonia longifolia* Tall Open Shrubland over *Hibbertia hypericoides, Acacia pulchella, Dasypogon bromeliifolius, Opercularia hispidula* Low Shrubland *Phlebocarya ciliata, Lomandra micrantha* Open Herbland *Lepidosperma squamatum, Lyginia imberbis, Lepidosperma pubisquameum* Open Sedgeland
BW-S-PI-5	*Eucalyptus marginata* and *Corymbia calophylla* Open Woodland over *Banksia attenuata, Xylomelum occidentale, Banksia grandis* Low Open Forest over *Hibbertia hypericoides, Xanthorrhoea brunonis* and *Macrozamia riedlei* Low shrubland over *Phlebocarya ciliata*, *Conostylis aculeata*, *Burchardia congesta*, *Orthrosanthus laxus* Very Open Herbland **Ehrharta calycina*, **Briza maxima* Very Open Grassland and *Lepidosperma squamatum*, *Lepidosperma pubisquameum* and *Hypolaena exsulca* Very Open Sedgeland.
BW-S-PI-6	*Eucalyptus marginata, Corymbia calophylla* Open Woodland over *Agonis flexuosa, Banksia grandis, Banksia attenuata* Low Open Woodland over **Euphorbia terracina* Very Open Shrubland over *Lupinus cosentinii* Very Open Herbland over **Ehrharta calycina, *Avena barbata, *Briza maxima* Open Grassland to Grassland.
BW-S-PI-7	*Corymbia calophylla or Eucalyptus marginata Open Woodland over Banksia attenuata, Banksia grandis, Xylomelum occidentale Low Open Woodland over Kunzea glabrescens Tall Open Shrubland (in places) over Macrozamia riedlei, Leucopogon propinquus, Jacksonia furcellata Open Shrubland (in places) over Xanthorrhoea brunonis, Hibbertia hypericoides Low Open Shrubland over Phlebocarya ciliata, Dasypogon bromeliifolius, *Hypochaeris glabra Very Open Herbland over Lepidosperma squamatum, Hypolaena exsulca Very Open Sedgeland and *Ehrharta calycina, *Briza maxima Very Open Grassland.*
BW-S-PI-8	*Eucalyptus marginata, Corymbia calophylla Open Woodland over Agonis flexuosa, Banksia attenuata, Banksia grandis and Xylomelum occidentale Low Open Forest over Spyridium globulosum, Jacksonia horrida, Acacia cochlearis, * Acacia iteaphylla Open Shrubland over Hibbertia hypericoides, Macrozamia riedlei, Xanthorrhoea brunonis, Phyllanthus calycinus and Styphelia racemulosa Low Shrubland to Open Low Heath over Dichopogon capillipes, Lagenophora huegelii, Lomandra micrantha, Orthrosanthus laxus and *Hypochaeris glabra Open Herbland over *Briza maxima, *Ehrharta calycina Open Grass land and Morelotia octandra and Lepidosperma squamatum Very Open Sedgeland.*

Site Name	Vegetation Description Spring 2019 and Autumn 2020
BTW-S-R-1	*Eucalyptus gomphocephala, Eucalyptus marginata, Corymbia calophylla* Open Woodland over *Banksia attenuata, Xylomelum occidentale* Low Woodland over *Macrozamia riedlei, Xanthorrhoea brunonis* Open Shrubland over *Hibbertia hypericoides, Phyllanthus calycinus* Low Shrubland over Lomandra caespitosa, **Ursinia anthemoides* Open herbland over **Briza maxima* Very Open Herbland.
BTW-S-R-2	*Eucalyptus gomphocephala* Open Woodland over *Agonis flexuosa*, *Banksia grandis* Low Woodland over *Spyridium globulosum* Tall Open Shrubland over *Macrozamia riedlei* Open Shrubland over *Hibbertia hypericoides* Very Open Shrubland over *Orthrosanthus laxus*, *Phlebocarya ciliata* Open Herbland, *Morelotia octandra*, *Lepidosperma squamatum* Very Open Sedgeland and **Briza maxima* Very Open Grassland.
BW-S-R-1	*Eucalyptus marginata* Open Woodland over *Banksia attenuata, Eucalyptus marginata* Low Woodland over *Kunzea glabrescens* Tall Shrubland over *Hibbertia hypericoides, Calytrix flavescens, Gompholobium tomentosum, Bossiaea eriocarpa* Low Shrubland over *Lepidosperma squamatum* Very Open Sedgeland.
CP-S-PI-1	*Eucalyptus marginata, Corymbia calophylla* Open Woodland over *Banksia attenuata, Banksia grandis, Banksia ilicifolia* Low Open Woodland over *Macrozamia riedlei* Open Shrubland over *Macrozamia riedlei, Hibbertia hypericoides, Xanthorrhoea brunonis* Low Shrubland over *Lomandra micrantha, Conostylis aculeata, Burchardia congesta* Very Open Herbland over *Lepidosperma squamatum* Very Open Sedgeland and **Briza maxima, *Ehrharta calycina* Open Grassland.
CP-NS-R-1	*Corymbia calophylla, Eucalyptus rudis* Open Woodland over *Melaleuca rhaphiophylla, Acacia saligna Low* Open Woodland over *Viminaria juncea* Tall Shrubland over *Xanthorrhoea preissii, Hakea varia* Shrubland over *Hakea varia, Grevillea bipinnatifida, Hypocalymma angustifolia* Low Open Shrubland over **Babiana angustifolia* Open Herbland over *Mesomelaena tetragona, Morelotia octandra, Cyathochaeta avenacea* Open Sedgeland.
CP-NS-R-2	*Melaleuca viminea Tall Shrubland* over *Blennospora doliiformis, Centrolepis aristatus, *Bartsia viscosa* Herbland.
TW-S-PI-1	*Eucalyptus gomphocephala* Open Woodland over *Agonis flexuosa, Acacia saligna, Banksia grandis* Low Open Woodland over *Kunzea glabrescens.* Tall Open Shrubland over *Acacia pulchella, Hibbertia cuneiformis* Open shrubland over *Melaleuca thymoides, Acacia pulchella* Low Open Shrubland over *introduced species.* Very Open Herbland over **Ehrharta calycinus* Very Open Grassland.
TW-S-PI-2	*Eucalyptus gomphocephala* Open Woodland over *Banksia attenuata, Agonis flexuosa, Xylomelum occidentale* Low Woodland over *Spyridium globulosum* Tall Open Shrubland over *Hibbertia hypericoides, Xanthorrhoea brunonis* and *Macrozamia riedlei* Low Shrubland over *Orthrosanthus laxus, Dichopogon capillipes*, **Ursinia anthemoides* Very Open Herbland and **Briza maxima, *Avena barbata, *Ehrharta calycina* Open Grassland and *Lepidosperma squamatum* Very Open Sedgeland.
TW-S-PI-3	*Eucalyptus gomphocephala, Corymbia calophylla* and *Eucalyptus marginata* Woodland over *Agonis flexuosa* and *Banksia attenuata Low* Woodland *over Jacksonia furcellata and Daviesia divaricata Open Shrubland over Xanthorrhoea brunonis and Macrozamia riedlei* Very Open Shrubland over *Lomandra micrantha, Conostylis aculeata* var. *preissii* Very Open Herbland and *Ehrharta calycina* Open Grassland.
TW-S-PI-4	*Eucalyptus gomphocephala, Eucalyptus marginata* Woodland over *Agonis flexuosa, Banksia attenuata, Banksia grandis* Low Woodland *over Xanthorrhoea brunonis* Very Open Shrubland *Lomandra suaveolens, Lomandra micrantha, Conostylis aculeata* var. *preissii, *Anagallis sp., Oxalis pes-caprae* Open Herbland *Briza maxima Ehrharta calycina* Open Grassland.

* Denotes introduced species.

6.2.2 Reference site and Potential Impact site Similarity

To determine the similarity between Potential Impact and Reference sites of the same vegetation type, the averages of scores for the six key variables recorded for all transects in the spring 2020 monitoring round were compared, and are provided in **Table 11** and **Figure 4.**

The closest matches between Potential Impact and Reference sites occur between the Banksia Woodland sites and Tuart (or Banksia-Tuart Woodland sites), where for instance, the total number of taxa, the number of native herbaceous taxa and weed cover are all quite similar. Matches between Banksia Woodland Potential Impact and suitable Reference sites were easier to find because there is a much greater extent of Banksia and Banksia-Tuart Woodland in the Bunbury area than is the case with Claypan communities.

Also evident from **Table 11** is the higher proportion of weeds in Claypan community sites than in Banksia-Tuart or Banksia woodlands. The high proportion of weeds in Claypan sites may make it difficult to pick up subtle changes going forward.

Table 11. Average of the key variables for the different vegetation types for Potential Impact and Reference groups in 2020 only.

Vegetation Type	Type	No. Sites	Total Taxa	Native Herbaceous Taxa	Orchids	Weeds	% Weeds	Weed Cover* (1-10)	Stress **(1-5)
Banksia woodland	PI	5	33.4	20.2	2.0	3.8	11.4	2.9	4.5
Banksia woodland	R	5	31.2	17.6	2.8	3.2	10.3	2.4	4.3
Claypan	PI	3	25.7	10.0	0.0	12.7	49.4	2.4	3.0
Claypan	R	2	31.0	18.5	0.5	9.5	30.6	2.5	4.3
Tuart woodland	PI	1	38	21	0	12	31.6	2.0	4.7
Banksia-Tuart woodland	R	2	37.0	21.5	0.5	5.5	14.9	2.9	4.2

*Weed cover scored using the ten-point Domin Krajina Scale.

** Stress is measured using a five-point scale.

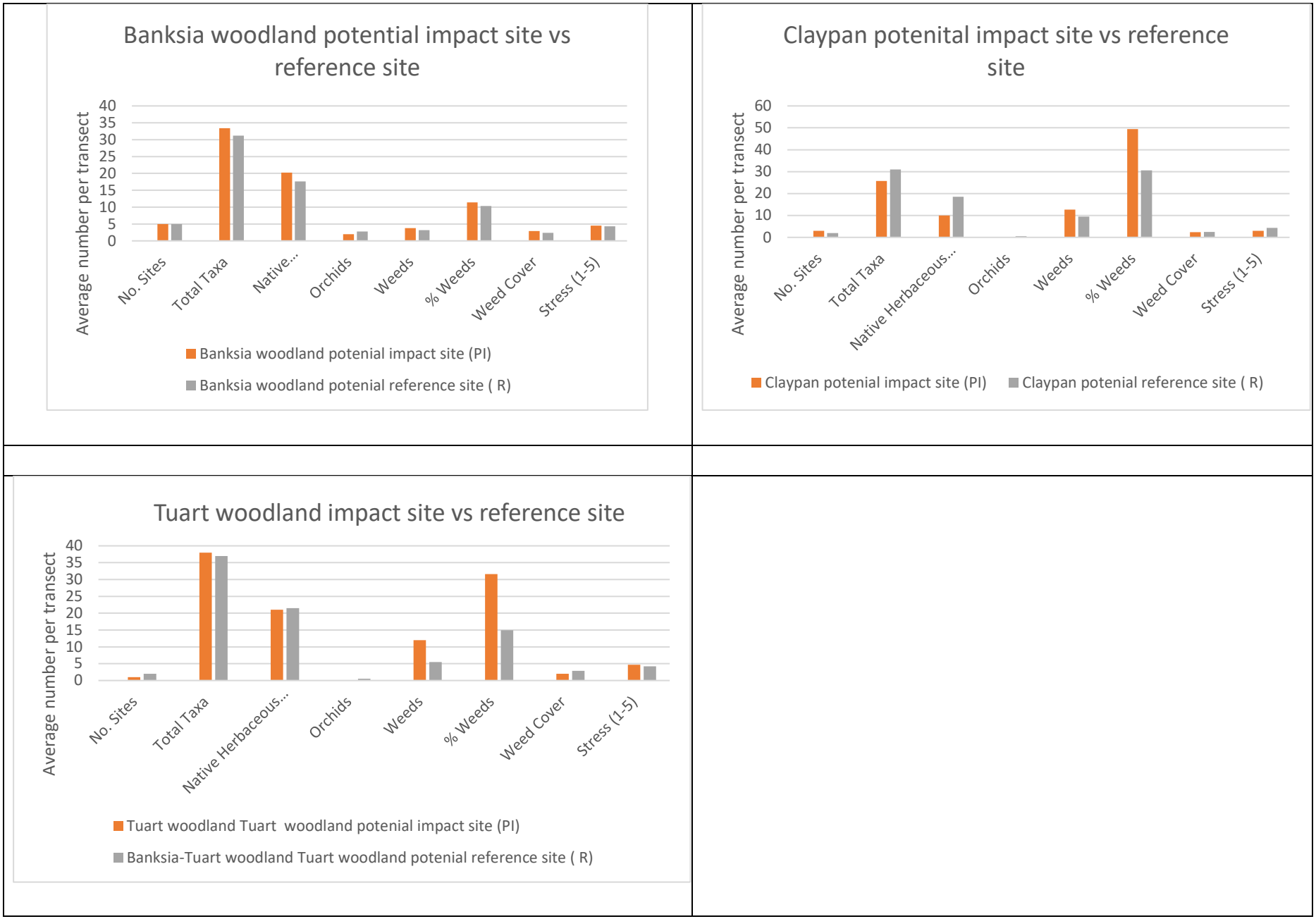

Figure 4. Potential Impact sites compared to Reference sites in 2020 for Southern BORR transect sites.

6.2.3 Potential Impact and Reference Site Comparison

Representative data the key variables for the spring 2021, spring 2020 and spring 2019 data for the Southern Section proposal area transects is presented in **Table 12.** A comparison of average data for shrub and tree stress, average weed cover and total number of natives and weeds over the three monitoring rounds is presented in **Figure 5, Figure 6** and **Figure 7**.

Table 12. Representative data for the six key variables for Potential Impact and Reference sites in the Southern proposal area.

Site Name	Year	Total Taxa	Natives	Orchids	Weeds	Average Weed cover	Average Stress	Date	Date 2
TW-S-PI-2_T1	2019	25	22	0	3	2.00	5.00	19/11/2019	
TW-S-PI-2_T1	2020	33	20	0	12	2.10	4.67	26/10/2020	
TW-S-PI-2_T1	2021	44	29	2	14	2.15	4.71	15/10/2021	
BTW-S-R-1_T1	2020	42	37	0	5	3.14	4.75	26/10/2020	
BTW-S-R-1_T1	2021	43	37	2	6	2.60	4.67	12/10/2021	
BTW-S-R-2_T1	2020	30	25	1	5	2.75	3.50	26/10/2020	
BTW-S-R-2_T1	2021	29	23	1	6	2.24	4.33	20/10/2021	
BW-S-PI-1_T1	2019	21	17	0	4	2.00	4.67	19/11/2019	
BW-S-PI-1_T1	2020	20	15	1	5	2.88	4.50	26/10/2020	
BW-S-PI-1_T1	2021	32	24	1	8	2.87	3.67	14/10/2021	
BW-S-PI-5_T1	2019	23	21	0	2	2.60	4.88	20/11/2019	
BW-S-PI-5_T1	2020	40	38	1	2	5.40	4.46	14/10/2020	
BW-S-PI-5_T1	2021	34	32	2	2	1.33	2.06	12/10/2021	
BW-S-R-1_T1	2019	23	23	0	0	0.00	4.95	22/11/2019	
BW-S-R-1_T1	2020	25	24	2	1	2.00	5.00	22/10/2020	
BW-S-R-1_T1	2021	27	24	3	3	1.00	4.71	20/10/2021	
BW-S-R-1_T2	2020	29	28	2	1	4.00	5.00	22/10/2020	
BW-S-R-1_T2	2021	27	26	2	1	3.00	4.44	20/10/2021	
CP-NS-R-1_T1	2019	23	18	0	5	2.17	4.81	1/10/2019	
CP-NS-R-1_T1	2020	26	19	0	7	2.25	3.83	12/10/2020	
CP-NS-R-1_T1	2021	24	17	0	7	2.90	4.50	9/11/2021	22/11/2021
CP-NS-R-2_T1	2019	40	25	0	15	1.68	0.00	1/10/2019	
CP-NS-R-2_T1	2020	35	14	0	21	2.59	0.00	6/11/2020	
CP-NS-R-2_T1	2021	49	29	0	20	2.10	0.00	15/10/2021	9/11/2021
CP-S-PI-1_T1	2020	34	22	0	12	2.57	5.00	6/11/2020	
CP-S-PI-1_T1	2021	37	23	0	14	2.54	5.00	15/10/2021	9/11/2021

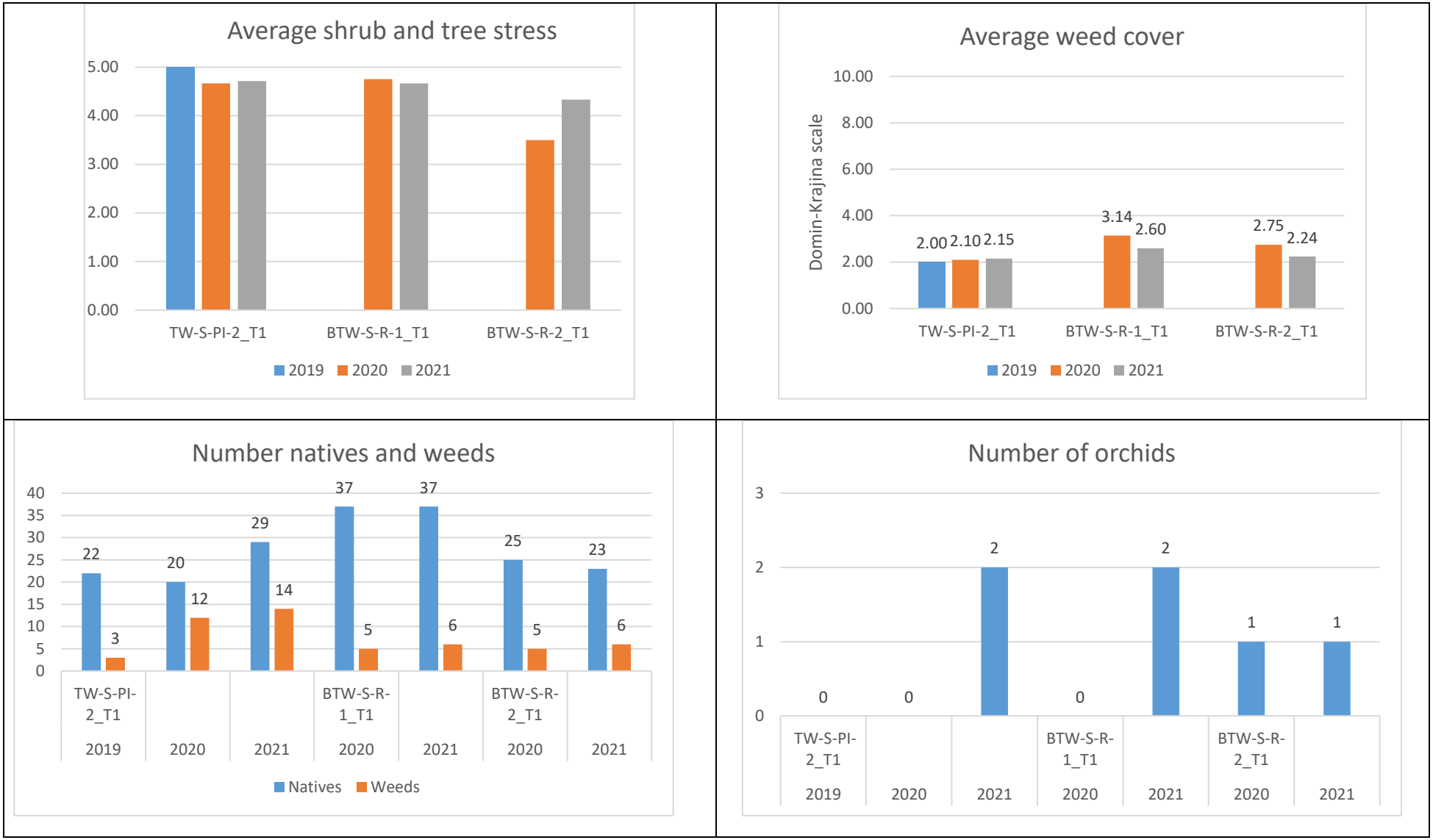

Figure 5. Tuart woodland transect potential impact site averages compared to reference sites for plant stress, weed cover and number of natives and number of weeds

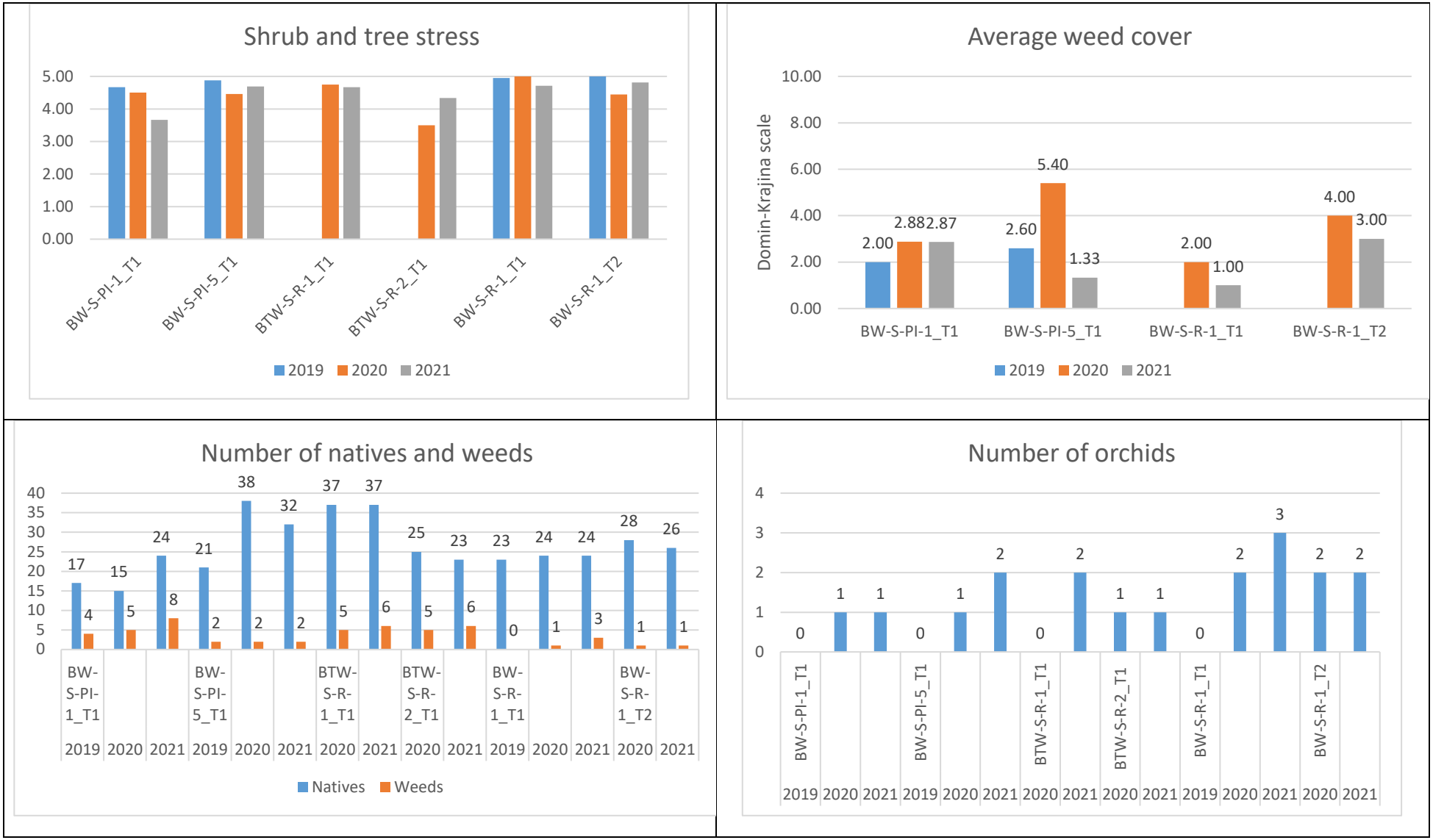

Figure 6. Banksia woodland transect potential impact site averages compared to reference sites for plant stress, weed cover and number of natives and number of weeds

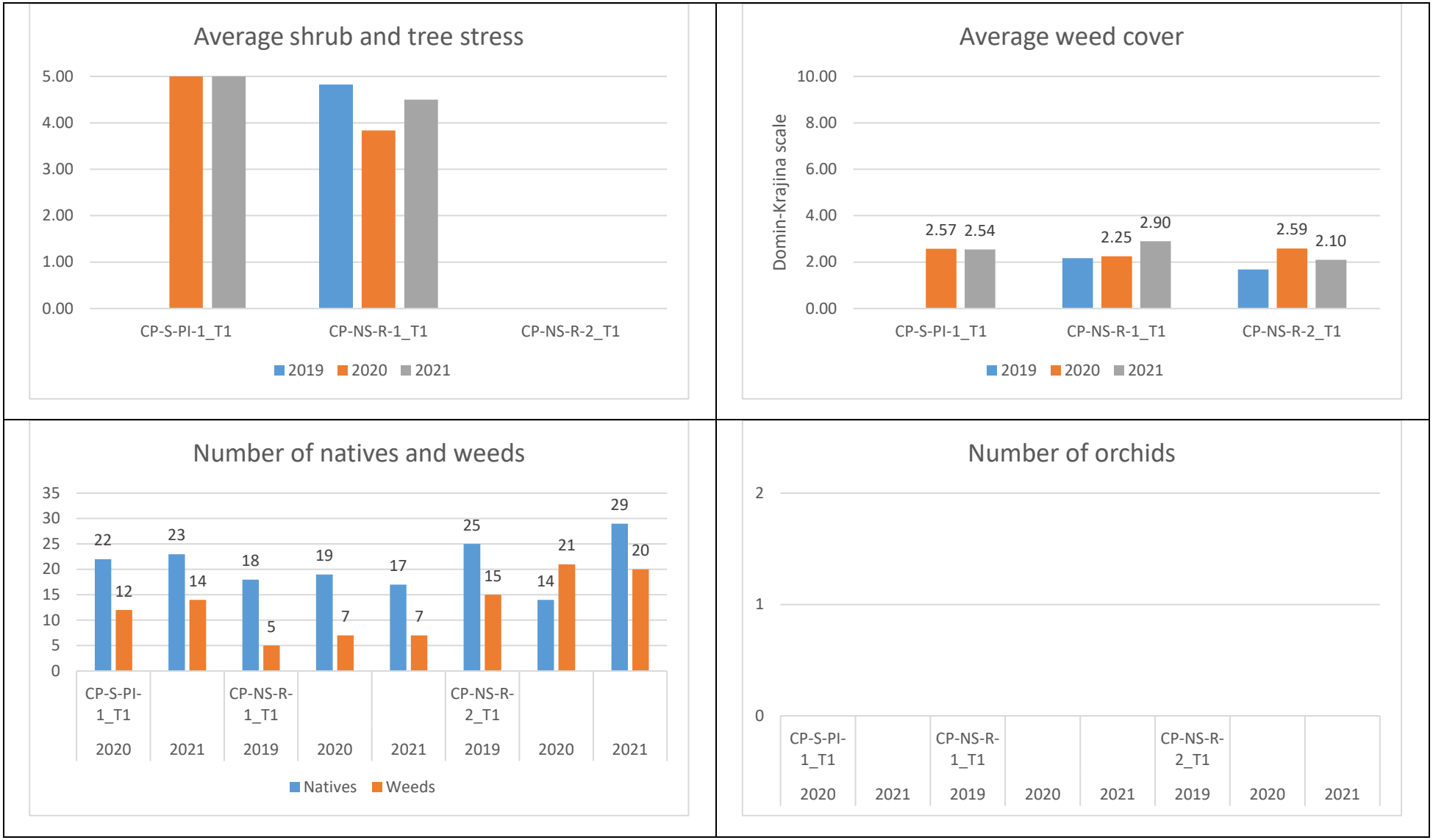

Figure 7. Clay pan transect potential impact site compared to reference sites for plant stress, weed cover and number of natives and number of weeds. Note CP-NS-R-2_T1 does not have any large shrubs or trees within the transect area, so no stress data is recorded for this site.

6.2.4 Weed Cover

In general, there was an increase in the number of weed species across transects between the spring 2019 and spring 2021 monitoring rounds with the most significant increase occurring between the 2019 and 2020. This trend was generally reflected in the observed percentage cover of the weeds across transects. The increase in the number of weeds and weed cover affected both the Potential Impact and Reference sites.

The increases are attributed to two reasons:

1. the 21% higher rainfall from May to September in 2020 (549.4 mm) compared to the same period in 2019 (433.2 mm) and generally higher than mean average temperatures over this 2020 rainfall period (**Figure 3**).
2. The later monitoring time in 2019 compared to 2020 and 2021 meaning that annually renewed, small herb weeds, such as *Galium murale* and *Aira caryophyllea* may not have been observed.

6.2.5 Native Species

Significant increases in the number of natives in both Banksia woodland PI sites BW-S-PI-1_T1 and BW-S-PI-5_T1 were observed between the 2019 and 2020 monitoring rounds, in particular BW-S-PI-5_T1 which increased from 21 species in 2019 to 38 species in 2020. Increases of this magnitude were not observed at any of the other sites, so it is likely that this is a result of recording errors for this site, rather than substantial changes on the ground. The higher number of plants is likely to be a more accurate reflection of the number of native species observed on the ground. The four Banksia woodland reference sites were stable with respect to the number of native species.

There was a reasonable increase in the number of native plants recorded at TW-S-PI-2 from 2020 to 2021 with this difference attributed primarily to a higher number of annual herbs recorded for this site in the 2021 season. The two Tuart woodland reference sites were stable with regards to native species.

The potential impact site CP-PI-S-1_T1 and reference site CP-NS-R-1_T1 were relatively stable with regards to the number of native species, varying by only one species. However, the other claypan reference site CP-NS-R-2_T1 showed a substantial dip to 14 species in 2020 from 25 in 2019 rising to 29 in 2021. It is possible that the decrease maybe attributed to seasonal effects with the increased rainfall delaying the germination of annually renewed native species in 2020. CP-NS-R-2_T1 is subject to a slightly higher level of winter inundation than CP-S-PI-1_T1 and CP-NS-R-1_T1, so this effect may be more pronounced at this site. Whilst this reason is plausible, the magnitude of the dip is more likely attributed to recording errors for this site, such as mismatched data, as similarly affected weed species increased at the site. The higher level of natives recorded in 2019 and 2021 are likely more representative of the site.

6.2.6 Native Orchids

Orchids were not recorded in any site during the 2019 monitoring round, but with the exception of all claypan transect sites have been subsequently recorded at all Banksia woodland and Tuart woodland transect sites. The absence of orchids in the 2019 season is attributed to two reasons; the very dry May to September wet season which was about 142 mm less than average and to the later monitoring time as the orchid leaves are most likely to have withered and not been able to be seen.

Native orchids are very sensitive to the amount of growing season rainfall. In prolonged droughts, orchids may not appear at all, or if leaves do appear, they may be very small or wither before flowering, or the young flower spike may abort. The failure to find orchids in drought years or when rainfall events do not occur at the right time does not necessarily mean that they are truly absent as they can remain dormant as underground tubers (Commonwealth Government 2013).

As orchids are particularly sensitive to degradation of their original habitat, for instance, through weed invasion or changes in hydrology, the number of orchid species can provide a good indicator of the overall health of an ecosystem (Newman 2009).

6.2.7 Plant Stress

Generally, the level of foliar stress in shrubs and trees within the transects was steady between the spring 2019 and Autumn 2022 monitoring rounds with average scores varying by less than one increment across all sites for all monitoring rounds.

6.3 Biannual Photopoint Monitoring

6.3.1 Vegetation Structure

There were no changes in dominant species or vegetation structure at any of the 114 photo monitoring points (94 boundary points and 20 transect end points) between spring 2019 and the spring 2021 monitoring rounds.

6.3.2 Vegetation Condition

Vegetation condition across all 114 photo monitoring sites has remained stable between spring 2019 and Autumn 2022. Vegetation condition was reassessed at a number of sites in the Autumn 2020 monitoring round based on a cumulative understanding of the sites. The 2019 assessment was updated with the Autumn 2020 vegetation condition score. Vegetation condition for each site is shown in **Appendix 9**.

6.3.3 Weed Cover

Weed cover increased at 35 of the 114 monitoring points between the Spring 2019 and Autumn 2022 monitoring rounds. The increases occurred 10 of the 18 monitoring sites with the changes affecting all vegetation types including Reference and Potential Impact sites. A breakdown of the number of sites with increased weed cover between the autumn 2020 and autumn 2022 monitoring rounds is shown in **Table 13.**

At three of these sites weed cover increased several times BW-S-PI-3_P02 (<2% - 10-30%), BW-S-PI-5_P02 (2-10% - 30-70%) and BW-S-PI-5_P10 (<2% - 10-30%). The two BW-S-PI-5 sites are in Good condition but adjacent to cleared edges and susceptible to weed invasion. The BW-S-PI-3 site is in Very Good condition, but is near the perimeter of the reserve. A fire in the last five years is likely to have stimulated weed invasion at this site.

The dominant weeds observed to increase across most sites included *Briza maxima, Avena barbata*, *Ehrharta calycina, E. longiflora* and *Bromus diandrus*. These are all introduced grasses.

Weeds were also observed to decrease at five monitoring sites, most of these sites were in Very Good to Excellent condition where competition from native plants is likely to have reduced germination of annual weeds.

The comparative data of weed cover for the boundary photopoints sites is presented in **Appendix 10** and the transect photopoints in **Appendix 11.**

Table 13. Comparative number of photopoints with increased weed cover per site.

Site	Type of site	Autumn 2022
BW-S-PI-1	Potential Impact	4 (5)
BW-S-PI-2	Potential Impact	2 (6)
BW-S-PI-3	Potential Impact	4 (7)
BW-S-PI-4	Potential Impact	2 (4)
BW-S-PI-5	Potential Impact	11 (35)
BW-S-PI-6	Potential Impact	0 (4)
BW-S-PI-7	Potential Impact	-
BW-S-PI-8	Potential Impact	-
CP-S-PI-1	Potential Impact	2 (3)
TW-S-PI-1	Potential Impact	0 (3)
TW-S-PI-2	Potential Impact	6 (9)
TW-S-PI-3	Potential Impact	0 (4)
TW-S-PI-4	Potential Impact	1 (3)
BW-S-R-1	Reference	0 (4)
BTW-S-R-1	Reference	0 (2)
BTW-S-R-2	Reference	2 (2)
CP-NS-R-1	Reference	1 (2)
CP-NS-R-2	Reference	0 (2)
		35 (114)

6.3.4 Native Cover

There was no change in the percentage cover of native plants between the autumn 2020[12] and autumn 2022 monitoring rounds. The comparative data for the boundary photopoints sites is presented in **Appendix 10** and the transect photopoints in **Appendix 11.**

6.3.5 Plant stress

Plant stress of the dominant trees / shrubs within a 20 m x 20 m area of all boundary photopoints was recorded for the first time in spring 2020 (with a score of 1 indicating high stress and a score of 5 indicating low stress).

Plant stress ranging from scores of '3' to '4' was observed at eight of the 13 boundary monitoring sites. No sites had stress scores less than 3. Four sites recorded scores of 5 for all monitoring points. BW-S-PI-7 has not been monitored for stress since plant stress monitoring commenced.

In 2020 BW-S-PI-5 exhibited the most stress, with nearly a third of the monitoring points at this site having a '3' rating with almost all the remaining sites having a '4' rating. However, in

[12] Noting that monitoring of native cover commenced at all boundary photopoints sites in autumn 2020.

autumn 2022 the overall stress across this site reduced with five of the level '3' sites recording a reduced level '4' stress score. This is likely attributed to the higher than average rainfall recorded for the wet season in 2021.

Other sites showing stress were BW-S-PI-6 and BW-S-PI-1. Three of the four sites at BW-S-PI-6 recorded level '4' stressed trees and four of the five BW-S-PI-1 site exhibited a level '4' stress.

A breakdown of plant stress per site is provided **Table 14**, noting that only stress values less than 5 are recorded in this table.

Table 14. Plant stress by boundary photopoint Spring 2020.

Site	2020			2022			Total no. photopoints
	Stress rating*			Stress rating*			
	'3'	'4'	'5'	'3'	'4'	'5'	
BW-S-PI-1	0	4	1	0	4	1	5
BW-S-PI-2	0	1	5	0	1	5	6
BW-S-PI-3	0	2	5	0	2	5	7
BW-S-PI-4	0	1	3	0	1	3	4
BW-S-PI-5	11	19	4	6	24	4	34
BW-S-PI-6	0	3	1	0	3	1	4
BW-S-PI-7	-	-	-	-	-	-	4
BW-S-PI-8	-	-	-	0	0	5	8
TW-S-PI-1	0	1	2	0	1	2	3
TW-S-PI-2	0	3	6	0	3	6	9
TW-S-PI-3	0	0	4	0	0	4	4
TW-S-PI-4	0	0	3	0	0	3	3
CP-S-PI-1	0	0	3	0	0	3	3
Total	**11**	**34**	**37**	**6**	**39**	**42**	**94**

6.4 Drainage Monitoring

6.4.1 Drying, inundation and erosion

Vegetation displayed varying level of stress due to drying impacts across all the sites typical of what might naturally occur across a broad area of vegetation. This stress included trees which appeared drought stressed, some of which appeared to show thinning canopies. Trees exhibiting this level of stress were mostly localised and occurred in pockets amongst healthy vegetation. These occurrences, whilst considered 'not abnormal', were recorded as potentially susceptible, future drying impact sites, which will be monitored in future rounds. These occurrences were recorded at ten monitoring sites, shown in **Table 15**. All other eight sites have not had any drying, inundation or erosion issues.

Table 15. Occurrences issues recorded.

#	PI sites	Monitoring point	Effect	Previous rounds	Autumn 2022
1	BTW-S-R-2	BTW-S-R-2_D1(w20)	Drying effects	Stressed Jarrah, Agonis flexuosa slightly stressed	Site appears generally healthy, no abnormal drying effects observed.
2	BW-S-PI-3	BW-S-PI-3_D1(w20)	Drying effects	Thinning of canopies in Marri	No issue canopy normal
3	BW-S-PI-4	BW-S-PI-4_D1(w20)	Drying effects	New growth after winter rains	No issue
4	BW-S-PI-5	BW-S-PI-5_D1(w20)	Drying effects	*Eucalyptus marginata, Eucalyptus gomphocephala*	No issue
5	BW-S-PI-6	BW-S-PI-6_D1(w20)	Drying effects	Drought affected Jarrah, note all *Xanthorrhoea* healthy which is a Pc susceptible species	No issue
6	CP-S-PI-1	CP-S-PI-1_I1(w20)	Inundation	About 50 mm water in ruts, otherwise no issues	Normal amount of water for winter
7	TW_S-PI-2	TW_S-PI-2_D1(w20)	Drying effects	Tuart thinning canopy	New tip growth. Looking healthier
8	TW-S-PI-1	TW-S-PI-1_D1 (w20)	Drying effects	Marris stressed	No issue, less stress after winter rain
	R sites				
9	BW-S-R-1	BW-S-R-1_D1(w20)	Drying effects	Drought-affected site, thinning canopies in Jarrah and Banksia attenuata	No issue
10	CP-NS-R-1	CP-NS-R-1_I3(w20)	Inundation	Evidence of yellowing of *X.p* Leaves across site - unknown cause - water table is high at site	No issue - autumn 2022, all leaves of *X.p* green.

One potentially abnormal issue was recorded in 2020, this being many *Xanthorrhoea preissii* individuals showing yellowing of leaves at CP–NS–R-1 in the three monitoring periods of autumn, winter and spring of 2020. High water table and inundation was observed at this site for portions of this time which is typical for the site at this time. The site was reassessed in summer 2021 when the water had receded, but there was no change to the yellow colouration of the leaves (**Figure 8**). However, when the site was visited in autumn 2022, the *X. preissii* were healthy with mostly green foliage.

There were no other unseasonal, or abnormal erosion, inundation or drying issues for autumn 2022. The latest summary reports (with photos) for the autumn 2022 round of drainage monitoring are present in **Appendix 12**.

Figure 8. No inundation but yellowing of *Xanthorrhoea preissii* leaves at site CP-NS-R-1, in 2020 and in 2022 in a healthier state.

6.5 Phytophthora Dieback

Phytophthora cinnamomi is a microscopic, soil borne plant pathogen which impacts about 40% of native vegetation in the Southwest of WA. Impacts on vegetation from *Phytophthora cinnamomi,* referred to as Phytophthora dieback, may appear similar in appearance to impacts of drying but Phytophthora dieback can usually be distinguished from drying and other plant stressors by its rapid impact on Phytophthora sensitive plants, normally occurring at the end of the summer and dry period.

There was evidence of disease caused by Phytophthora dieback present at 16 of the 106 photopoint sites. Impact from Phytophthora dieback was recorded as part of standard vegetation monitoring undertaken at all monitoring locations. Four scales of impact were recorded:

1. Low impact: 1-2 plants
2. Medium impact: active front visible, some death
3. Heavy impact: active front visible, lots of death
4. Old impact site: vegetation structure altered.

Impacts were mostly recorded in Banksia Woodland, with relatively little observed impact within the Banksia/Tuart Woodland and no evidence recorded in the Claypan sites. This is not unusual as the Banksia/Tuart Woodland, which typically occurs on more alkaline soils which is not favoured by *Phytophthora cinnamomi*.

A breakdown of impacts from Phytophthora dieback at each monitoring site is provided in **Table 16.**

Table 16. Breakdown of observed impacts of Phytophthora dieback at monitoring sites.

Site	Low	Medium	Heavy	Old*	Site total	Photopoints
Potential impact sites						
BW-S-PI-1					0	5
BW-S-PI-2				1	1	6
BW-S-PI-3				4	4	7
BW-S-PI-4	1				1	4
BW-S-PI-5	1	3			4	34
BW-S-PI-6					0	4
BW-S-PI-7	1	1	2		4	4
BW-S-PI-8					0	8
CP-S-PI-1					0	3
TW-S-PI-1					0	3
TW-S-PI-2					0	9
TW-S-PI-3					0	4
TW-S-PI-4					0	3
Reference sites						
BW-S-R-1		2			2	4
BTW-S-R-1					0	2
BTW-S-R-2					0	2
CP-NS-R-1					0	2
CP-NS-R-2					0	2
Totals	**3**	**6**	**2**	**5**	**16**	**106**

* The site is devoid of *P. cinnamomi*-susceptible species and therefore *P. cinnamomi* is not perceived to be actively causing death.

7 Conclusion

7.1 Vegetation Monitoring

Baseline monitoring of vegetation including occurrences of State and Commonwealth protected Banksia Woodlands TEC/PEC, Tuart Woodlands TEC/PEC, Claypan TEC as well as non-TEC/PEC vegetation in proximity to the BORR Southern proposal area was conducted by Ecoedge on a quarterly basis from Spring 2019 until Autumn 2022 with monitoring of one new Banksia woodland site, BW-S-PI-8 in early Winter 2022.

Monitoring occurred at:

- Thirteen Potential Impact sites comprising eight Banksia Woodland sites, four Tuart Woodland sites one Claypan site
- Five reference sites comprising one Banksia Woodland site, two Banksia-Tuart Woodland sites and two Claypan sites.

Data collected for each boundary monitoring site included site photographs, a description of the vegetation, percentage weed cover, vegetation condition, evidence of erosion, flooding, pathogens, fire, litter, rubbish dumping and grazing impacts. Data collected from transects also included plant stress of perennial species and percentage cover of all plants.

This report presents a consolidated picture of the health of the vegetation for each of the 18 monitoring sites. It provides a solid baseline for comparison of the health of vegetation post road construction.

Monitoring results indicate that the system is not static with some variation in parameters such as weed cover, plant stress and the number of native or weed species changing in response to environmental factors such as rainfall. The monitoring shows that these fluctuations generally affect all vegetation types and both reference and potential impact sites. This means that abnormal impacts to a site are likely to be picked up, as they will not affect all sites.

It is also evident that some parameters such as vegetation condition and vegetation structure remain relatively stable over time, as these assessments are less prone to short term fluctuations in the environment. This means that abnormal site impacts affecting these attributes are likely be differentiated from longer term changes, such as climate change.

A summary of the status of key variables relating to vegetation health of all photopoint monitoring sites between monitoring rounds is provided below.

7.1.1 Vegetation Structure

There was no change in vegetation structure described for the monitoring sites and monitoring points between any of the rounds of monitoring from Spring 2019 to Autumn 2022.

7.1.2 Vegetation Condition

There was no change in vegetation condition for any of the monitoring points between any of the rounds of monitoring from Spring 2019 to Autumn 2022.

7.1.3 Weed Cover

Weed cover varied in response to environmental conditions, in particular for introduced grasses which increased at 35 of boundary photopoint sites and five of the nine transects. The number of weed species increased at 6 of the 11 transects. This increase in weeds affected all vegetation types monitored and was generally similar for both Reference and Potential Impact sites. This increase was attributed to the over 50% increase in wet season rainfall for 2021 compared to 2019.

7.1.4 Native Cover

There was no change in native cover recorded for boundary photopoint monitoring sites for between any of the rounds of monitoring.

Whilst there was variation in the number of native species recorded in transect sites over the total monitoring period, these species (which included orchids) were not in significant enough numbers to effect a change in assessed cover or vegetation structure.

7.1.5 Plant Stress

Plant stress been found to be generally consistent, varying by less than one increment across all monitoring points since plant stress monitoring commenced in spring 2020.

The most plant stress was observed at BW-S-PI-5. In spring 2020 11 of its 34 monitoring points recording a '3' stress level and almost all of the balance of sites recording a stress score of '4'. The Autumn 2022 monitoring round showed a reduction in stress at this site with five sites increasing from a '3' stress level to a '4' level.

Two other sites exhibited stress, three of the four points at BW-S-PI-6 recorded scores of '4' and four of the five points at BW-S-PI-1 recorded scores of '4'. Stress levels at these sites remained constant for the monitoring program

7.2 Drainage Monitoring

No changes in erosion, inundation/flooding or abnormal drying issues were recorded across the monitoring sites since drainage monitoring commenced in autumn 2022.

8 References

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9 Appendices

Appendix 1. Chronology of Scope and Objectives

Appendix 2. Site naming history and locations.

Appendix 3. Figures of Potential Impact sites and Reference sites.

Appendix 4. Index to photographs.

Appendix 5. Vegetation condition scale EPA (2016).

Appendix 6. Visual assessment field sheet (provided by the BORR IPT).

Appendix 7. Survey Personnel and Limitations.

Appendix 8. Example of summary data.

Appendix 9. Vegetation condition and locations of Potential Impact and Reference sites.

Appendix 10. Comparison of key boundary photopoint monitoring variables Spring 2019 – Spring 2020.

Appendix 11. Comparative Photomon photographs Spring 2019 – Spring 2020.

Appendix 12. Drainage monitoring results summer 2020/21 site reports.

Appendix 1 Chronology of Summarised Scope

1 Spring 2019 Scope and Objectives

1.1 Vegetation Monitoring

The scope and objectives for the monitoring project included:

1. Initial assessments at each Potential Impact and Reference Site to determine:
    - whether the vegetation meets the definition of Banksia Woodlands of the Swan Coastal Plain TEC or PEC. For sites that do not, no further monitoring of these sites is required. Once the TEC / PEC status has been confirmed for these sites, please inform the BORR IPT via email.
    - For all sites, exact transect and / or photopoint locations.
2. Preparation of data recording sheets for use in the field, designed to record the parameters detailed in project methodology.
3. Monitoring assessments conducted at each site.
4. Design of an electronic spreadsheet(s) for data input and analysis
5. Data entry, photo labelling, data analysis as required.
6. Preparation of a brief report.
7. Delivery of: raw data, electronic spreadsheet(s) containing entered data and any corresponding analysis, labelled photographs, shapefile(s) of all monitoring sites (these must specify the site name, transect name/number, photopoint name/number, etc in the attributes), brief report summarising findings and any recommendations for future monitoring rounds.
8. All electronic data provided (including excel spreadsheets) must be compliant with Main Roads' data standards.

Including:

- The addition of photographs to be taken of all 2 x 2 m quadrats.
- Recording of plant stress and death of perennial species only. Not annual species.
- Boundary monitoring to be undertaken at 50 m intervals along roadside boundaries. Not around the perimeter of monitoring sites.
- Banksia woodland PEC/TEC determination to be based on visual assessment of vegetation, and not on a quadrat based multivariate analysis.

2 Autumn 2020 Scope and Objectives

2.1 Vegetation Monitoring

The scope of the Autumn 2020 baseline vegetation monitoring program included:

1. Desktop review of the locations of all existing Potential Impact site photopoints to ensure they are sited near enough to the current referral area boundary to capture evidence of any impact from the Proposal (or lack thereof).
2. Liaison with BORR IPT as required to confirm sufficient monitoring coverage of all Potential Impact sites
3. Conduct site assessments for all new Potential Impact sites and determine whether the vegetation meets the definition of any TEC or PEC. If vegetation is resolved to be TEC or PEC, determine the optimum locations for photopoints, and establish photopoints.
4. Conduct photopoint monitoring assessments at each site (in accordance with project methodology). This included all boundary photopoints and photopoints at the start and end of each transect at both Potential Impact and Reference sites.
5. Delivery of all data including the updated shapefile showing existing, revised and new monitoring sites.
6. Update the original baseline monitoring report to include the results of the spring round, noting any significant change in monitored parameters (or lack of). Include a comparison with Reference Sites, and updated maps to show the new sites and new photopoint locations.

2.2 Drainage Monitoring

The scope of the drainage monitoring program was to undertake visual assessments at both Potential Impact and Reference sites using field recording sheets to record site information and plant health including site photographs and evidence of:

1. Flooding and / or inundation: resulting from runoff from a roadway or associated construction.
2. Erosion: primarily caused by water that has resulted from run-off from a roadway or associated construction.
3. Drying effects: yellowing and / or death of vegetation that may have been caused by changes in hydrology due to roadway construction.
4. Delivery of: raw data, electronic copies of completed field recording sheets, labelled photographs, a shapefile of photograph way points. All electronic data provided (including excel spreadsheets) must be compliant with Main Roads' data standards Version 6 (previously provided).
5. Incorporate the results of this monitoring into the baseline TEC/PEC vegetation monitoring previously submitted to BORR Note any effect or impact detected (or lack of). Include a comparison with reference sites, and maps as relevant showing labelled locations of any photographs taken during the assessments.
6. If effects from any of the three drainage-related potential impact areas listed above are identified, inform the BORR IPT as soon as possible after monitoring is completed.

2.2.1 Variation to Scope

Vegetation Monitoring

Vegetation cover scale: vegetation cover at non-transect monitoring sites will be recorded using the Braun-Blanquet scale instead of the Domin-Krajina scale as agreed to previously by the BORR IPT.

Winter 2020

2.3 Drainage Monitoring:

Undertake drainage monitoring in accordance with project methodology.

2.3.1 Variations to scope

Drainage Monitoring

Vegetation health monitoring is to be conducted at each photo point monitoring site via an assessment of crown density per the scale presented in **Table 1** as agreed to by GHD and Ecoedge. This is to supplement the results of the drainage monitoring rounds.

e 1. Plant stress assessment scale.

Plant Stress Level	Description
5	Plant with >81 % of the original canopy present; healthy overall; little or no leaf yellowing. No evidence of wilting of foliage. Plants not stressed.
4	Plant with 61-80% of the original canopy present; occasional dead branches (< 20 % of canopy); small patches of leaf yellowing. Plant leaves may show signs of wilting at periphery. Plants potentially stressed.
3	Plant with 41-60 % of the original canopy present; some smaller dead branches evident (21-40 % of canopy); moderate amount of leaf yellowing (21-40 % of canopy). Plant leaves may show signs of wilting with noticeable curling of leaf periphery. Plants exhibiting symptoms of stress.
2	Plant with 21-40 % of original canopy present; some main branches dead (50 – 80 % of canopy; abundant leaf yellowing (> 41 % of canopy). Plant leaves may show signs of wilting with noticeable curling of leaf. Plants exhibiting signs of stress.
1	Plant with <20 % of original canopy; most main branches dead; remaining leaves mostly dying off. Plant leaves may show signs of wilting with noticeable curling of leaf (approaching closure). Plants clearly stressed.

2.4 Vegetation Monitoring

Undertake monitoring of existing claypan quadrats in accordance with project methodology.

Install a transect and carry out the first monitoring of an additional claypan transect in Manea Park[1], away from the referral area boundary, north of current CP-S-PI-1 transect.

[1] Note this transect is shared with the vegetation monitoring for the BORR N&C project due to limited suitable claypan reference sites.

3 Spring 2020

3.1 Drainage and Vegetation Monitoring

- Update the Autumn 2020 baseline monitoring report to include the results of the winter and spring monitoring rounds noting any significant change in monitored parameters (or lack of). Include a comparison with Reference Sites, and updated maps to show the new sites and new photopoint locations.
- Delivery of raw data, electronic copies of completed field recording sheets, labelled photographs, a shapefile of photograph way points. All electronic data provided (including excel spreadsheets) must be compliant with Main Roads' data standards Version 6 (previously provided).
- If effects from any of the three drainage-related potential impact areas listed above are identified, inform the BORR IPT as soon as possible after monitoring is completed.

Note: Site TW-S-PI-4:

- Relocate existing photopoint P02 to within 20 m of the referral area boundary (as with all sites not under MRWA's jurisdiction, this site is just photographed from the property boundary).
- Add additional point to capture potential impacts occurring to the south of the referral area boundary at this site.

Table 2. Plant stress assessment scale.

Plant Stress Level	Description
5	Plant with >81 % of the original canopy present; healthy overall; little or no leaf yellowing. No evidence of wilting of foliage. Plants not stressed.
4	Plant with 61-80% of the original canopy present; occasional dead branches (< 20 % of canopy); small patches of leaf yellowing. Plant leaves may show signs of wilting at periphery. Plants potentially stressed.
3	Plant with 41-60 % of the original canopy present; some smaller dead branches evident (21-40 % of canopy); moderate amount of leaf yellowing (21-40 % of canopy). Plant leaves may show signs of wilting with noticeable curling of leaf periphery. Plants exhibiting symptoms of stress.
2	Plant with 21-40 % of original canopy present; some main branches dead (50 – 80 % of canopy; abundant leaf yellowing (> 41 % of canopy). Plant leaves may show signs of wilting with noticeable curling of leaf. Plants exhibiting signs of stress.
1	Plant with <20 % of original canopy; most main branches dead; remaining leaves mostly dying off. Plant leaves may show signs of wilting with noticeable curling of leaf (approaching closure). Plants clearly stressed.

4 Spring 2021

4.1 Drainage and Vegetation Monitoring

- Provide data to SWGA for inclusion to the annual report.
- Delivery of raw data, electronic copies of completed field recording sheets, labelled photographs, a shapefile of photograph way points. All electronic data provided (including excel spreadsheets) must be compliant with Main Roads' data standards Version 6 (previously provided).
- If effects from any of the three drainage-related potential impact areas listed above are inform the SWGA as soon as possible after monitoring is completed.
- Assessment scales are the same as previous rounds.

5 Vegetation monitoring 2022

5.1 Drainage and Vegetation Monitoring

- Drainage monitoring has occurred four times a year, once in each season. Reports provided in **Appendix 12.**
- Photo points were visited, and photos recaptured in May 2022 using the Photomon application.

Appendix 2 Site naming history and location.

No	Current Site Name	Second Name	First Name	Location	Comments
Potential impact sites					
1	BW-S-PI-1	BTW-S-I-3	Site 2b	South of Centenary Road, east of Bussell Hwy	Road reserve
2	BW-S-PI-2	BTW-S-I-6	Site 7	North of Ducane Road, east of Allenville Road, opposite Ken Bell Road	Road reserve, not a TEC / PEC
3	BW-S-PI-3	BW-S-I-7	Site 9	East of Yalinda Drive, west of Marchetti Road	Private property
4	BW-S-PI-4	BW-S-I-6	Nil	Jilley Road north of Woods Road. Photopoints established along the BORR boundary	Road isolation
5	BW-S-PI-5	BTW-S-I-4	Site 10	West of Bussell Hwy (two land parcels)	Reserve
6	BW-S-PI-6	BW-S-I-5	Nil	Bussell Highway road reserve northbound, south of the alignment adjacent to the Capel Golf Course	Road reserve, not a TEC / PEC
7	BW-S-PI-7	BW-S-I-4	Site 3	North of Lilydale Road	Private Property
8	N/A	BTW-S-I-5	Site 4	North of Lilydale Road, west of Queelup Road.	Removed from the monitoring program as it is no longer near the proposal area boundary.
8	BW-S-PI-8 (new in 2022)	-	-	Woods Road, Gelorup	Established in June 2022. Road reserve and private property
9	CP-S-PI-1	CP-S-I-1	Sth6	Manea Park middle claypan, south of CP-NS-R-2	Reserve
10	TW-S-PI-1	BTW-S-I-1	Site 1	North side of Centenary Rd west of Bussell Hwy, north westernmost part of referral area	Private property
11	TW-S-PI-2	BTW-S-I-2	Site 2a	Road reserve on the north side of Centenary Road east of Bussell Hwy, and extending into the adjacent reserve to the north	Road reserve
12	TW-S-PI-3	BTW-S-I-7	N/A	Bussell Hwy southbound, south of Centenary Road (adjacent the parking bay)	Private property

No	Current Site Name	Second Name	First Name	Location	Comments
13	TW-S-PI-4	BW-S-I-3	Nil	Jules Road near Sleaford Drive (Jenour's boundary)	Private property

No	Current Site Name	Second Name	First Name	Location	Comments
Reference sites					
1	BW-S-R-1	BW-S-R-1	Sthr1	Manea Park (R 32963)	Reserve
2	CP-NS-R-1	CP-N-R-1	R3	Waterloo Nature reserve (R46108)	Reserve
3	CP-NS-R-2	CP-N-R-2	R4	Manea Park (R16044)	Reserve
4	BTW-S-R-1	BTW-S-R-1	Sthr3	Manea Park corner of Lakeside and Melaleuca Drive	Reserve
5	BTW-S-R-2	BTW-S-R-2	Sthr4	North-side of Centenary Rd east of Bussell Hwy	Reserve

Appendix 3 Location of current boundary and transect photopoints, with current vegetation condition, percentage cover for weeds and native plants at site.

Maps are arranged in order from north to south of their location within the BORR southern section referral area.

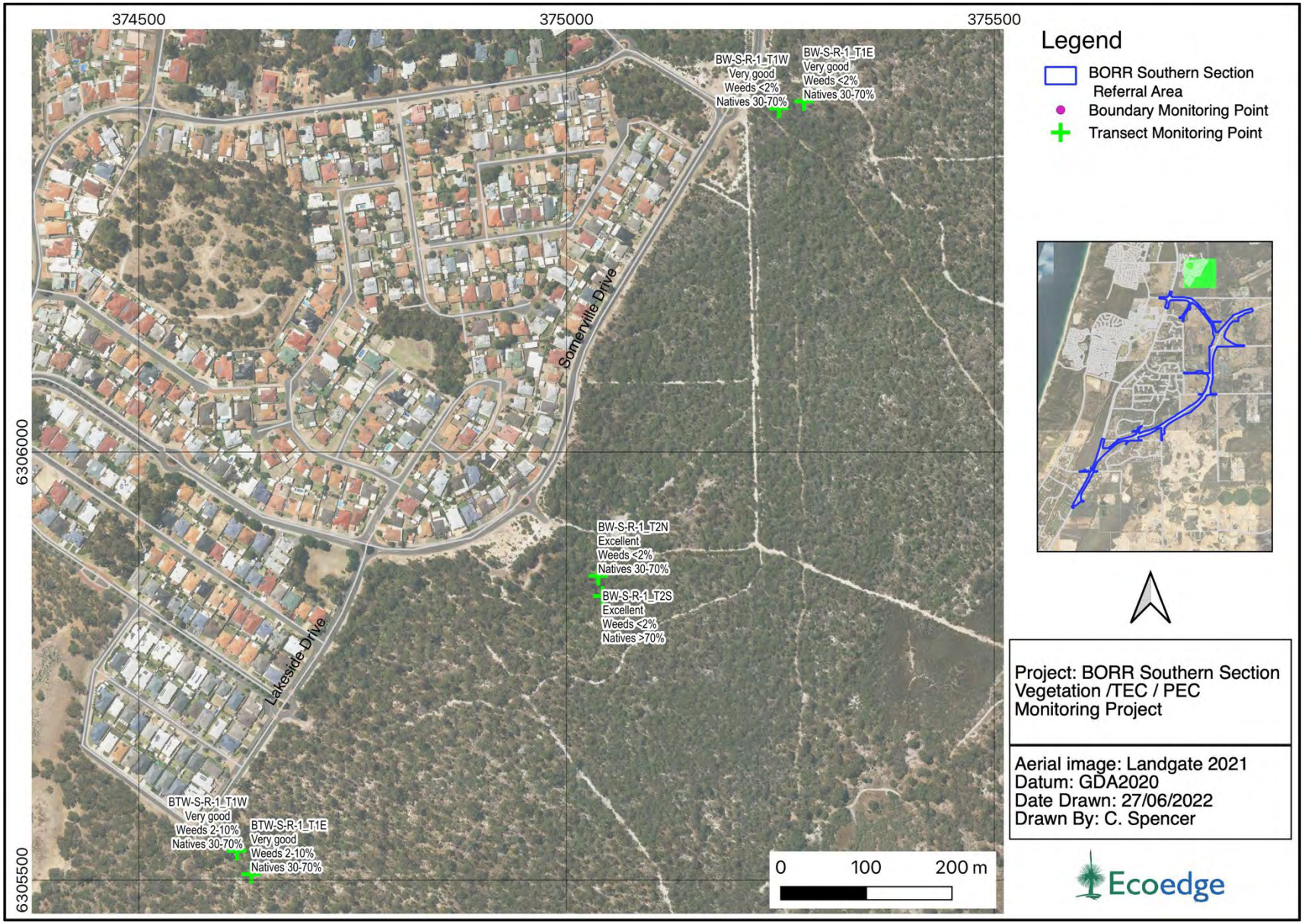

Figure 1. Reference Site BW-S-R-1 and BTW-S-R-1 vegetation condition, weed and native cover.

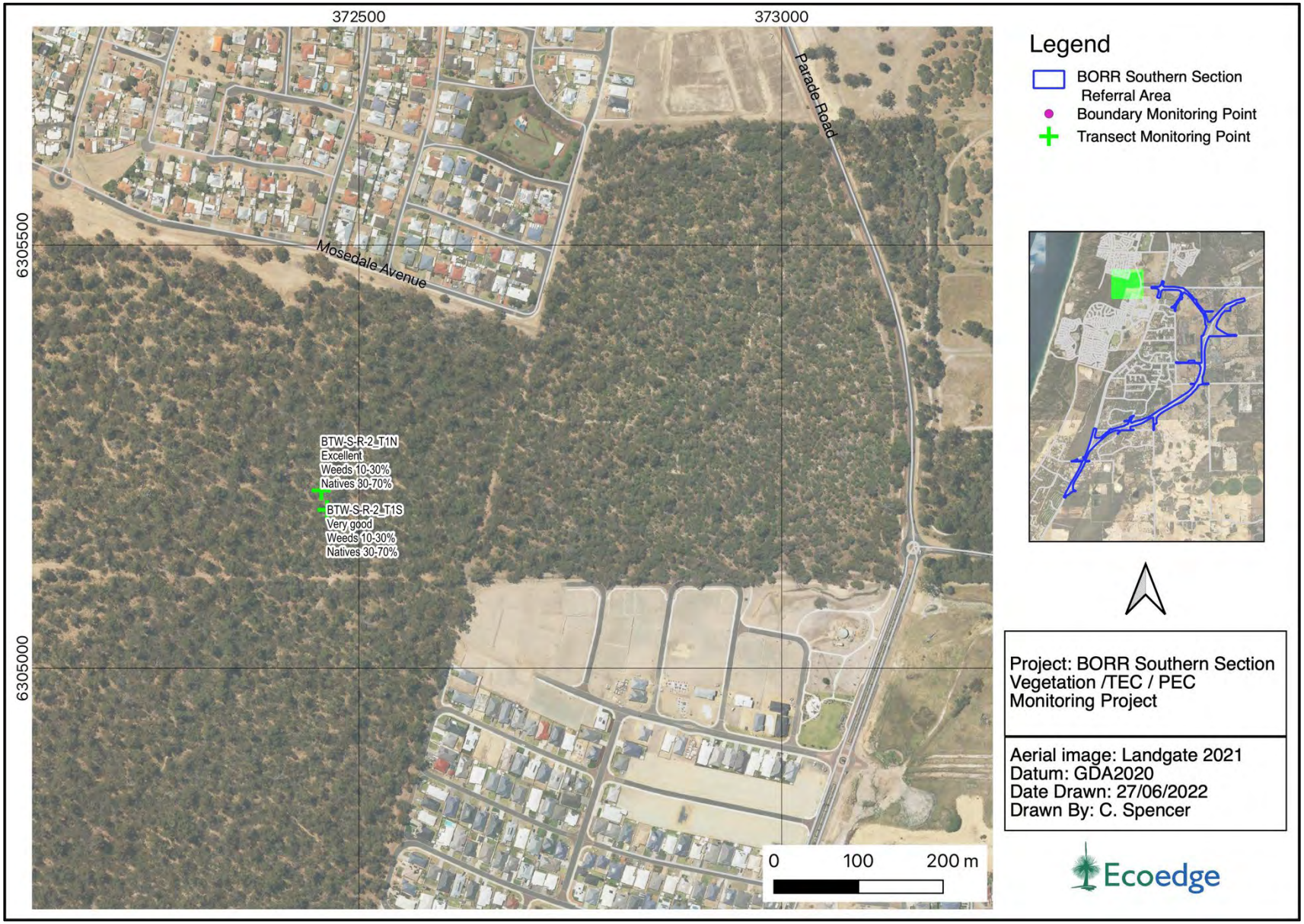

Figure 2. Reference Site BTW-S-R-2 vegetation condition, weed and native cover.

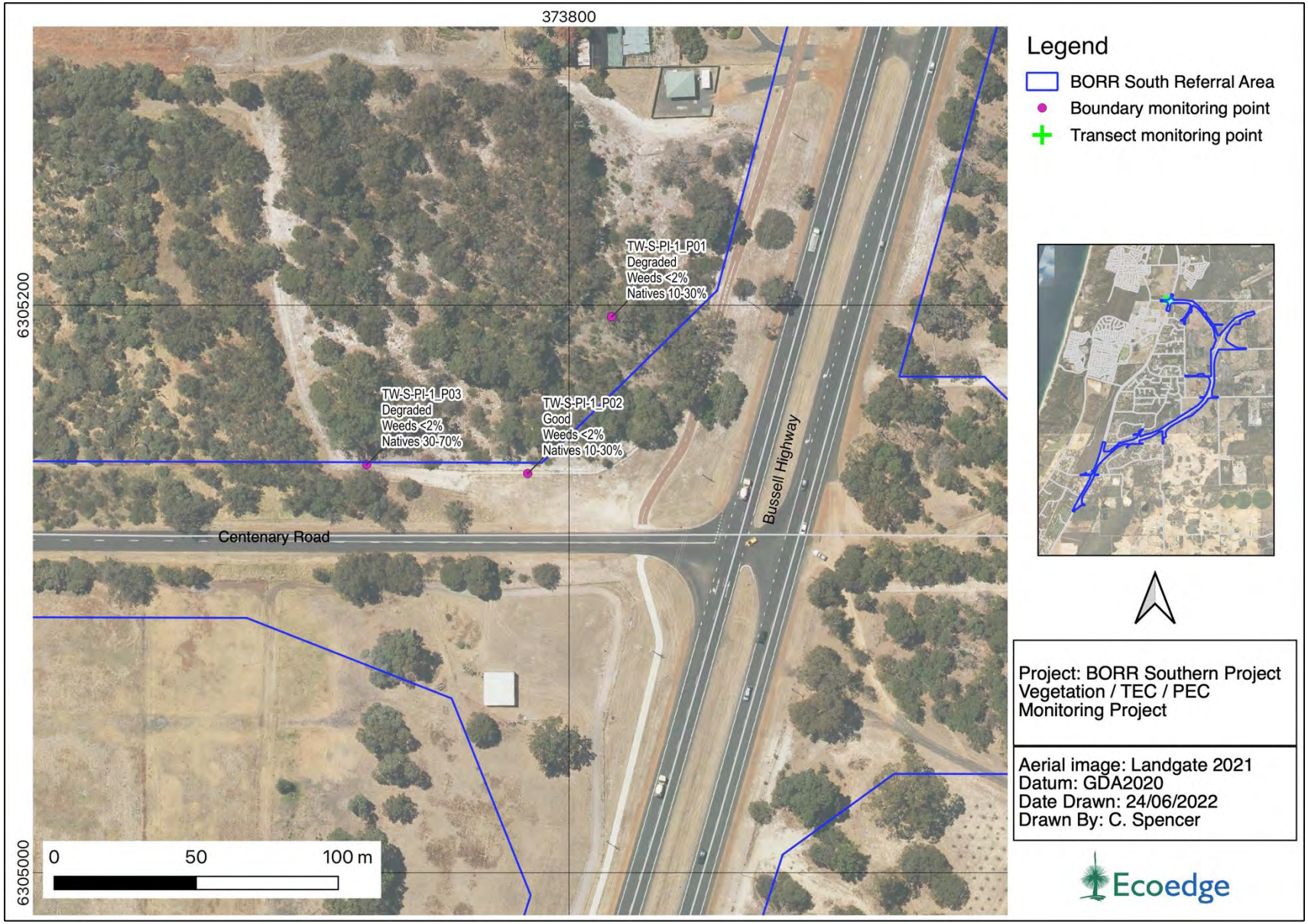

Figure 3. Potential Impact Site TW-S-PI-1 vegetation condition, weed and native cover.

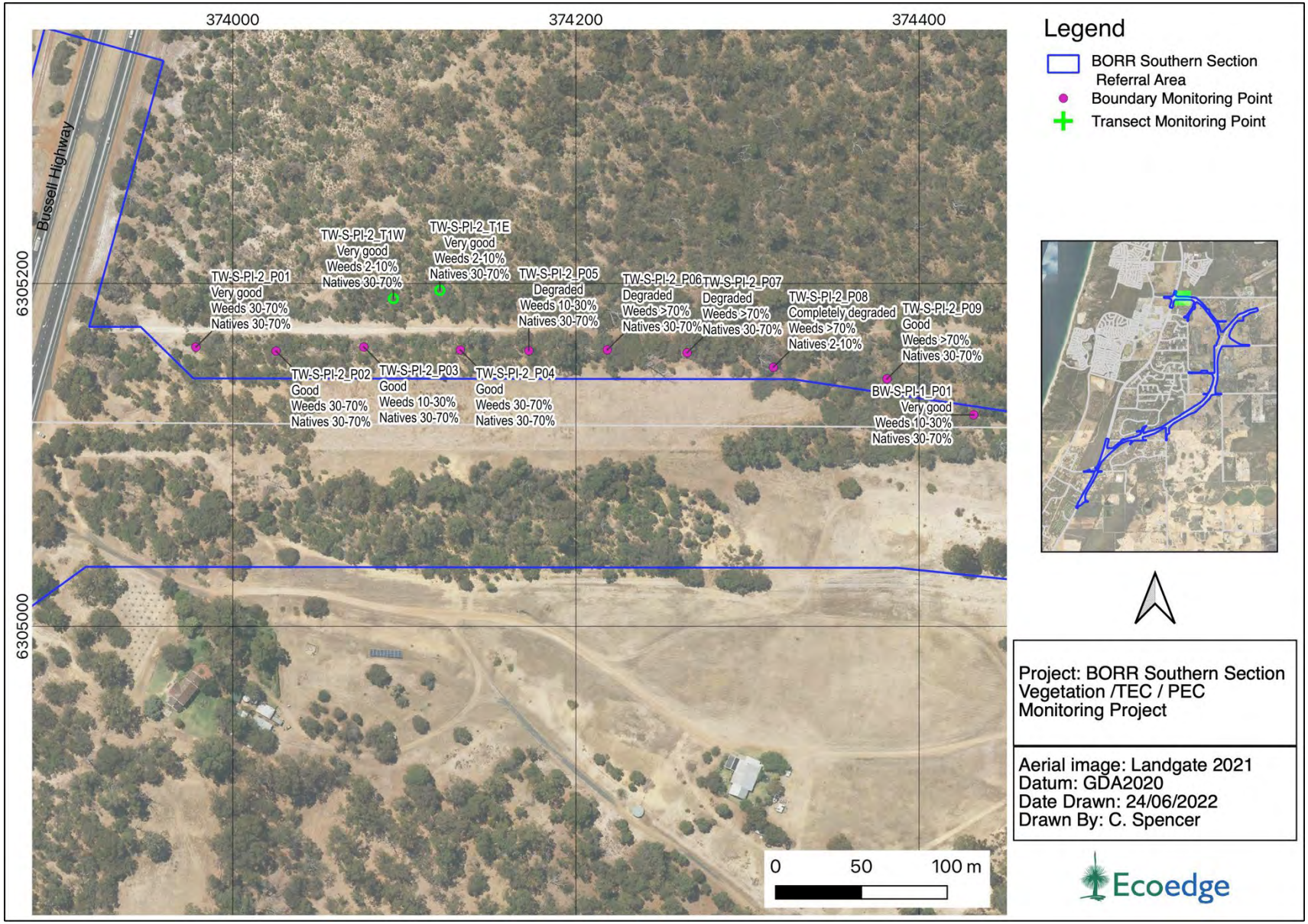

Figure 4. Potential Impact Site TW-S-PI-2 vegetation condition, weed and native cover.

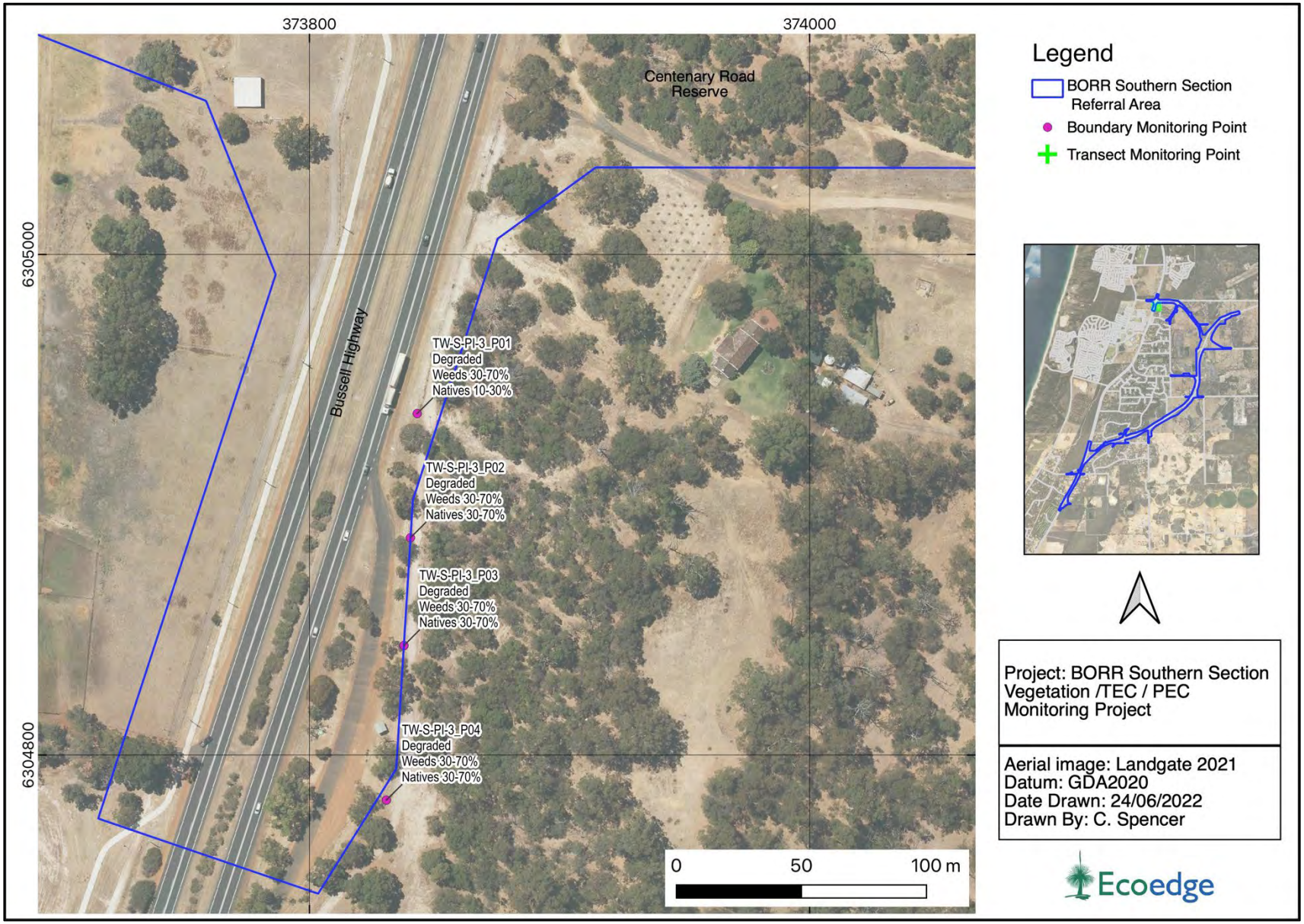

Figure 5. Potential Impact Site TW-S-PI-3 vegetation condition, weed and native cover.

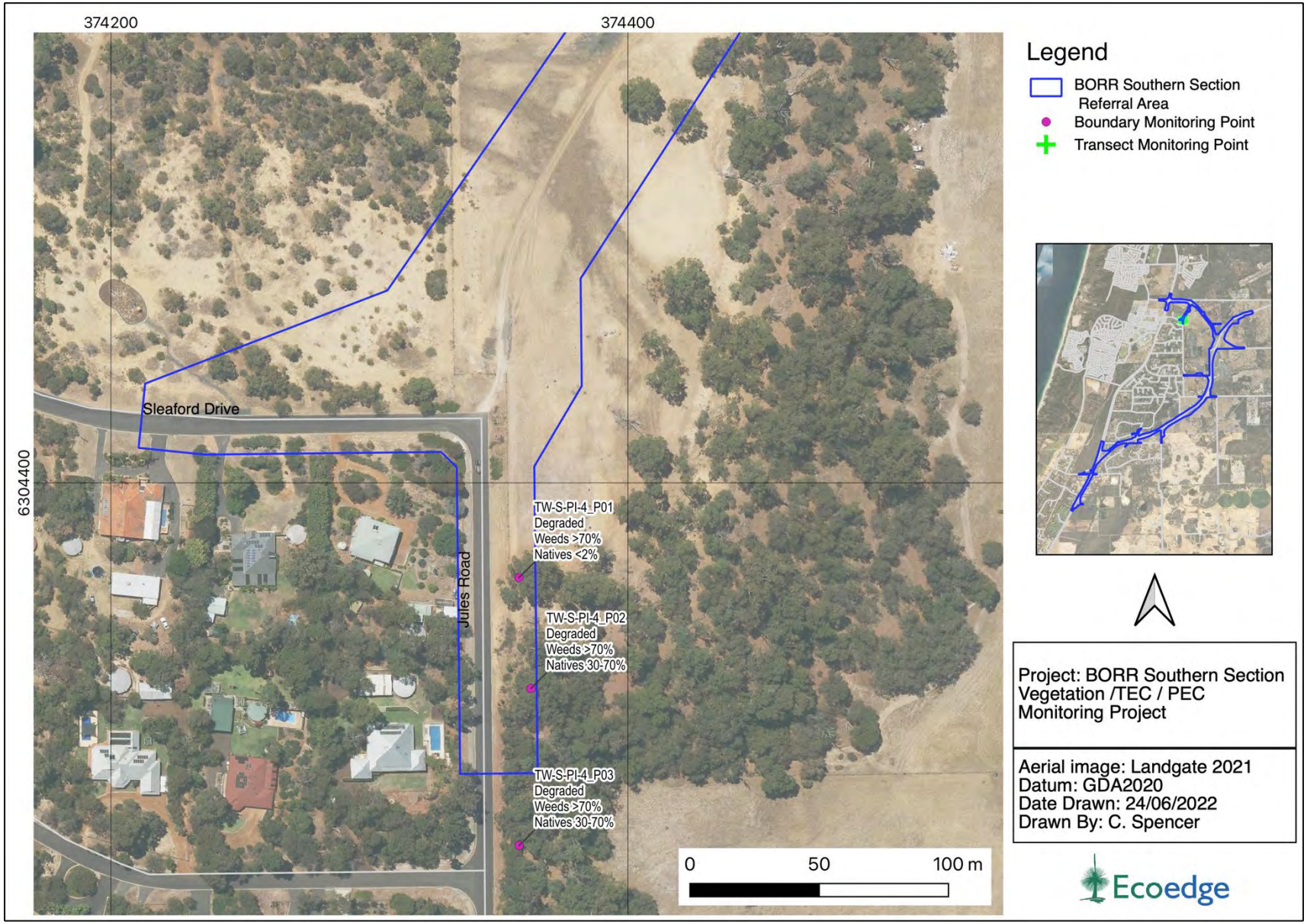

Figure 6. Site TW-S-PI-4 vegetation condition, weed and native cover.

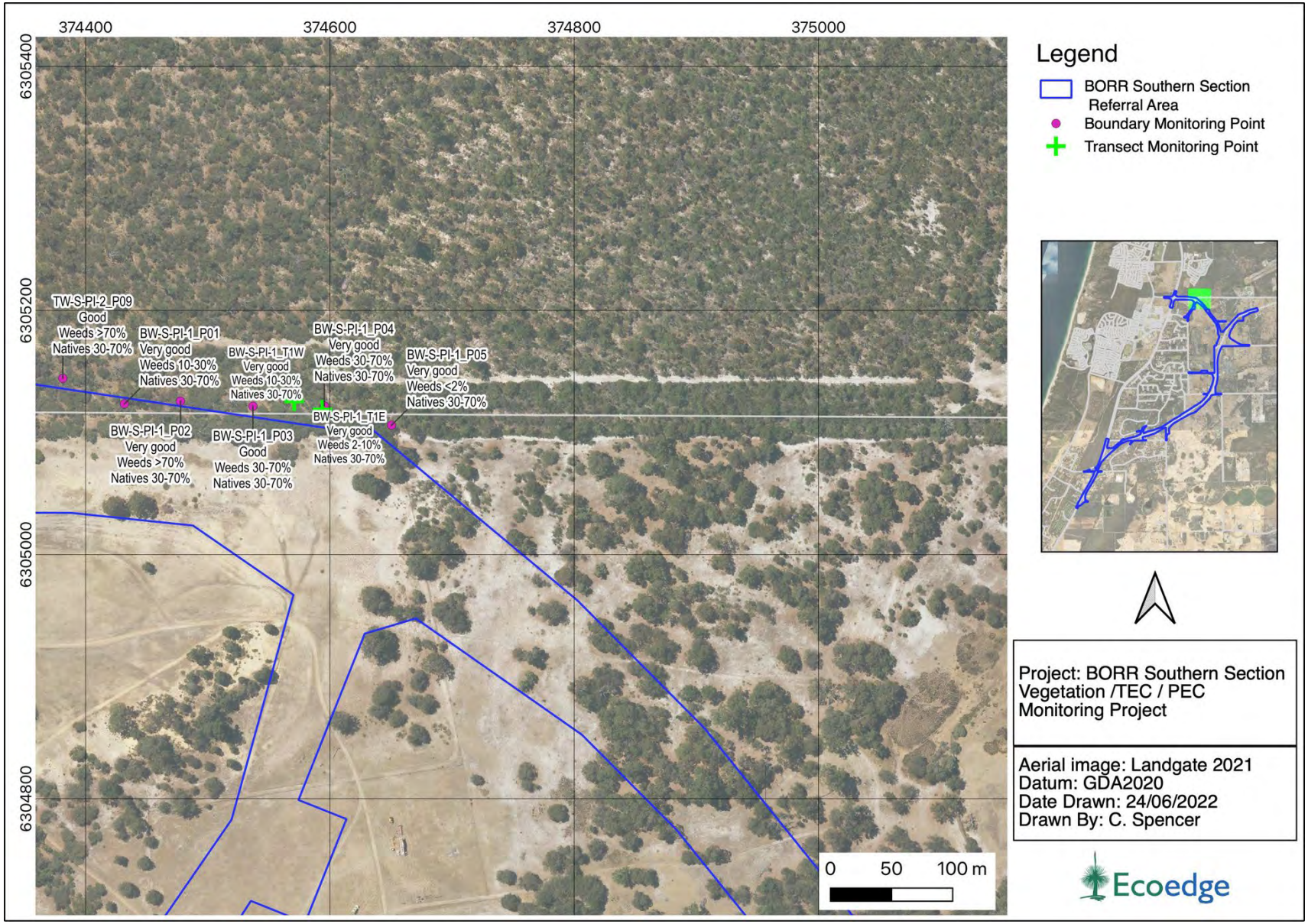

Figure 7. Potential Impact Site BW-S-PI-1 vegetation condition, weed and native cover.

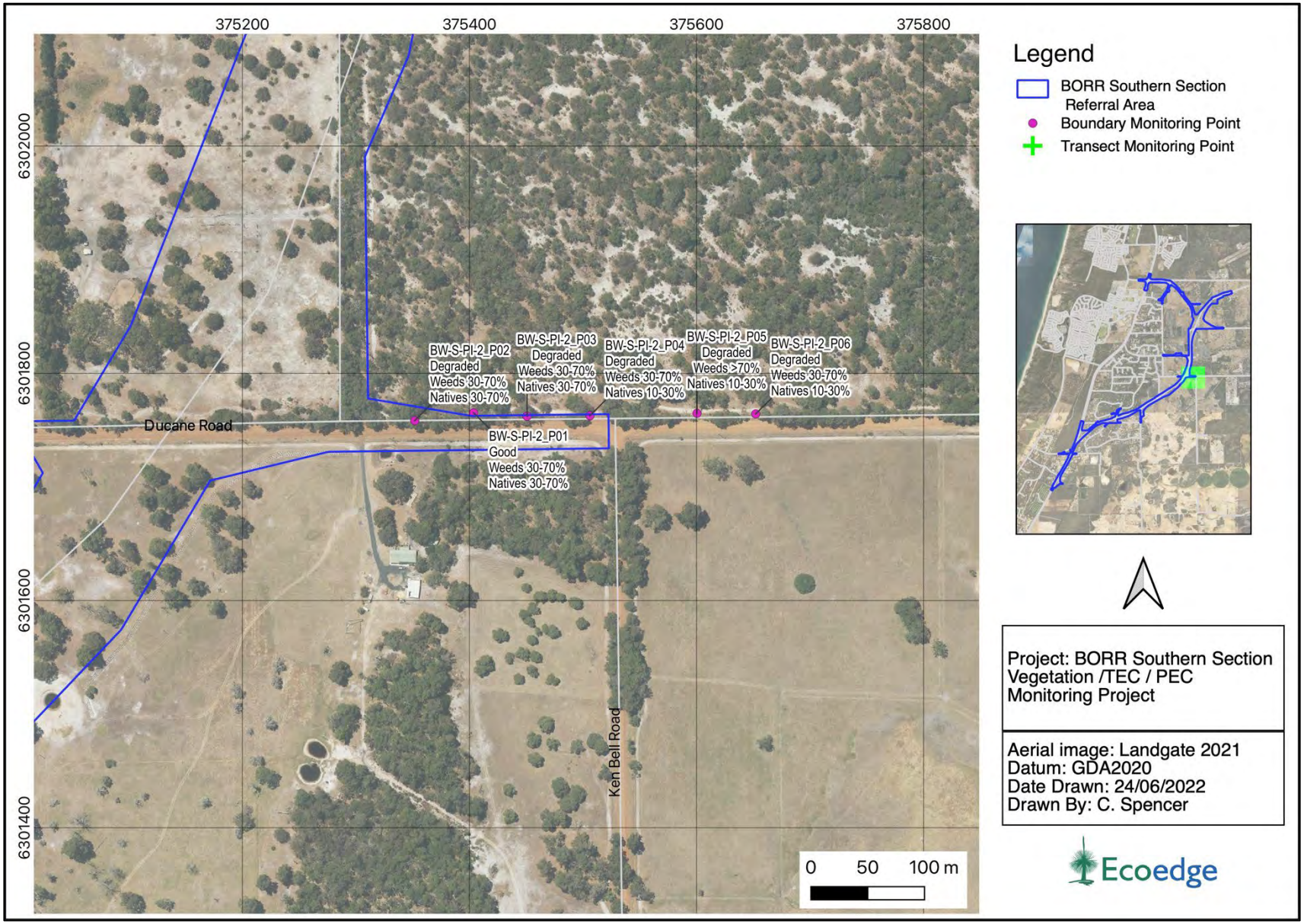

Figure 8. Potential Impact Site BW-S-PI-2 vegetation condition, weed and native cover.

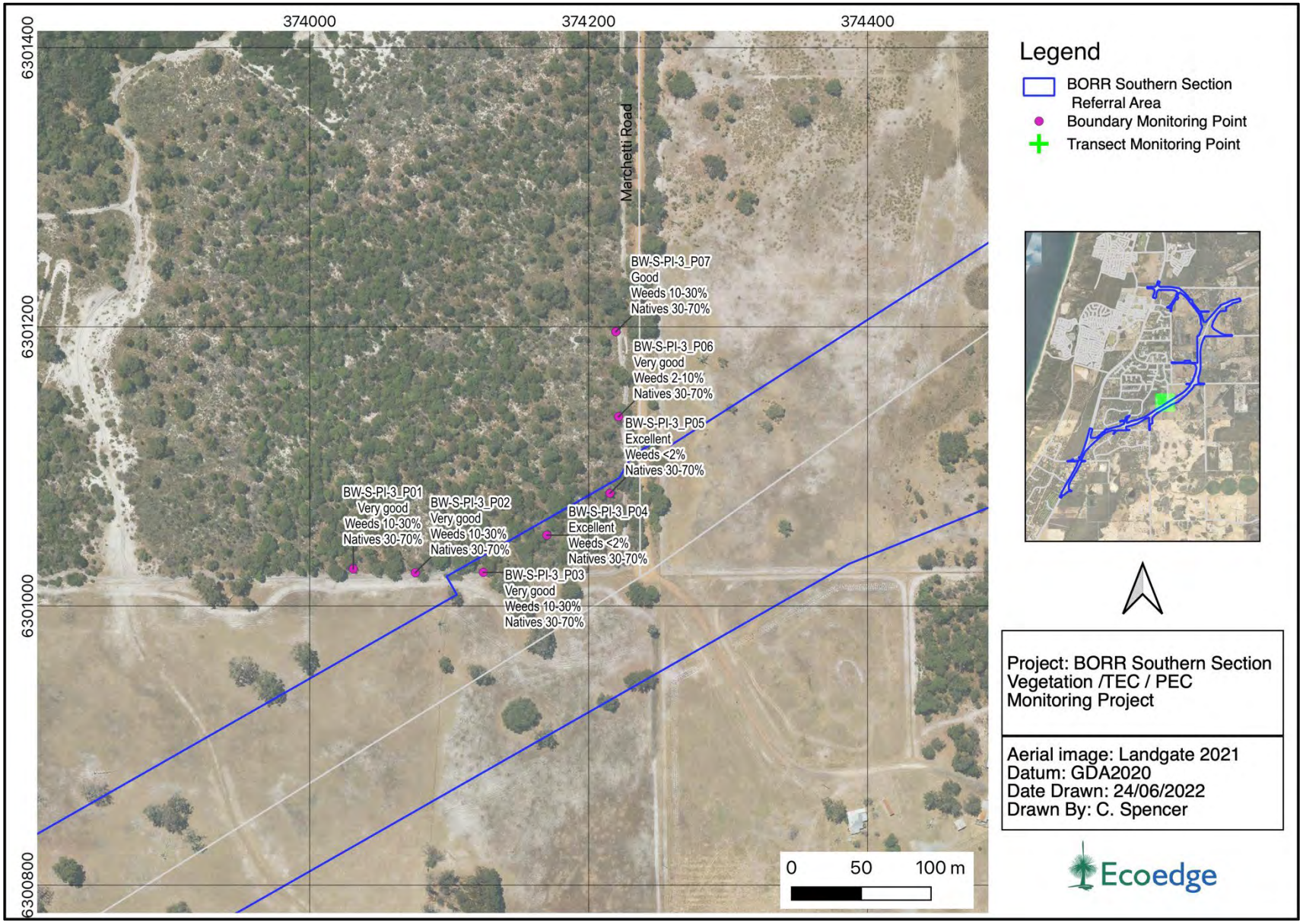

Figure 9. Potential Impact Site BW-S-PI-3 vegetation condition, weed and native cover.

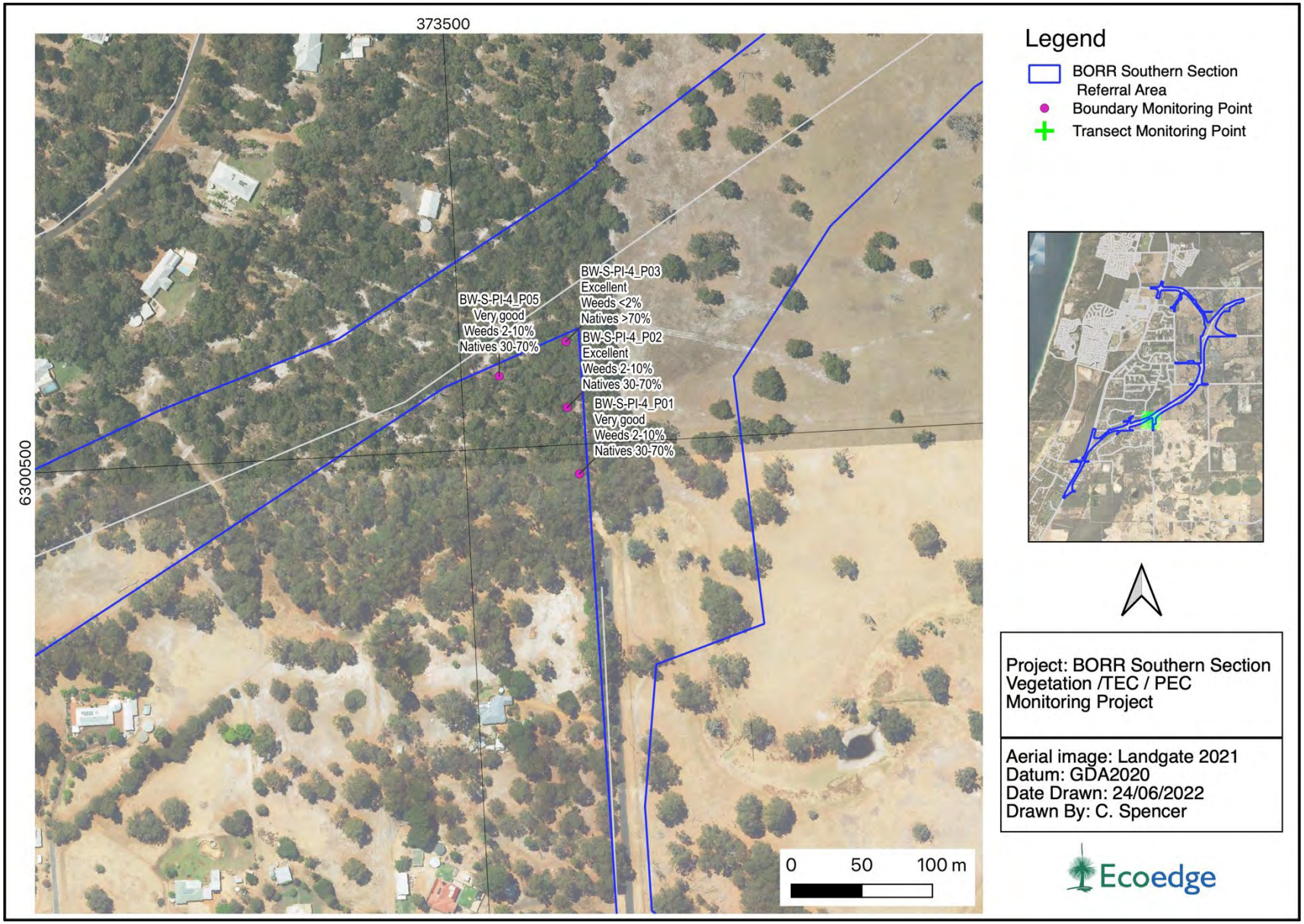

Figure 10. Potential Impact Site BW-S-PI-4 vegetation condition, weed and native cover.

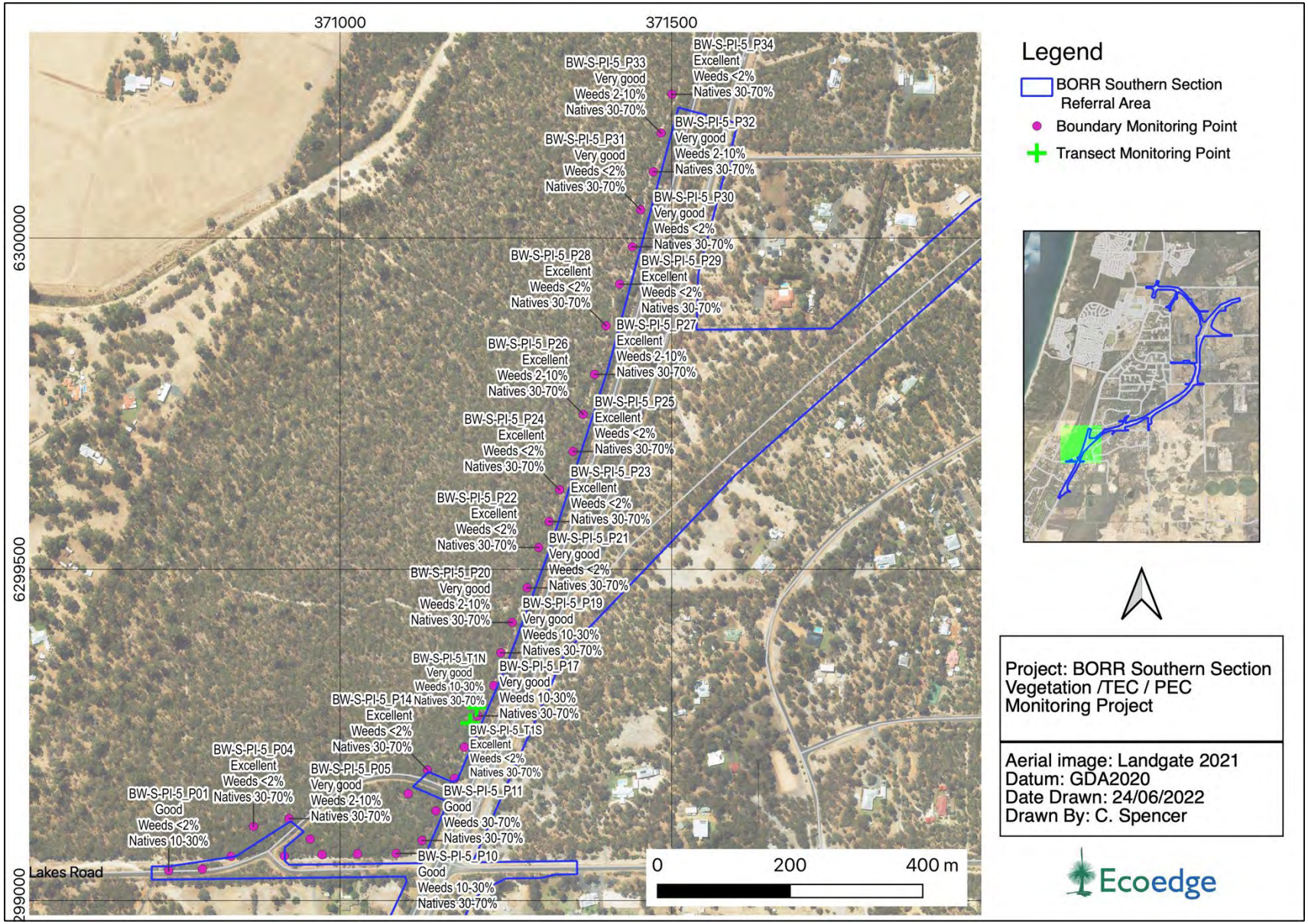

Figure 11. Potential Impact Site BW-S-PI-5 vegetation condition, weed and native cover.

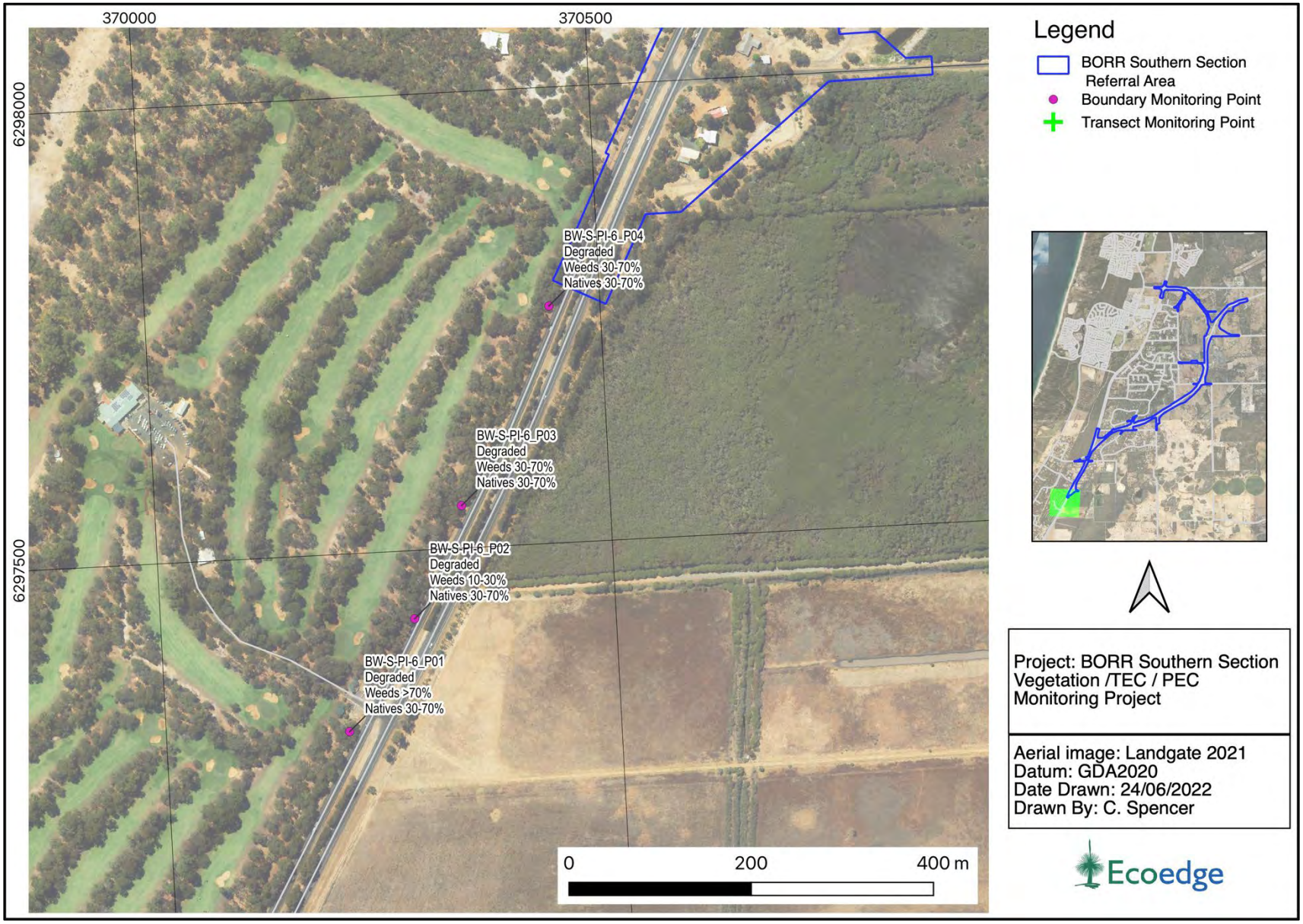

Figure 12. Potential Impact Site BW-S-PI-6 vegetation condition, weed and native cover.

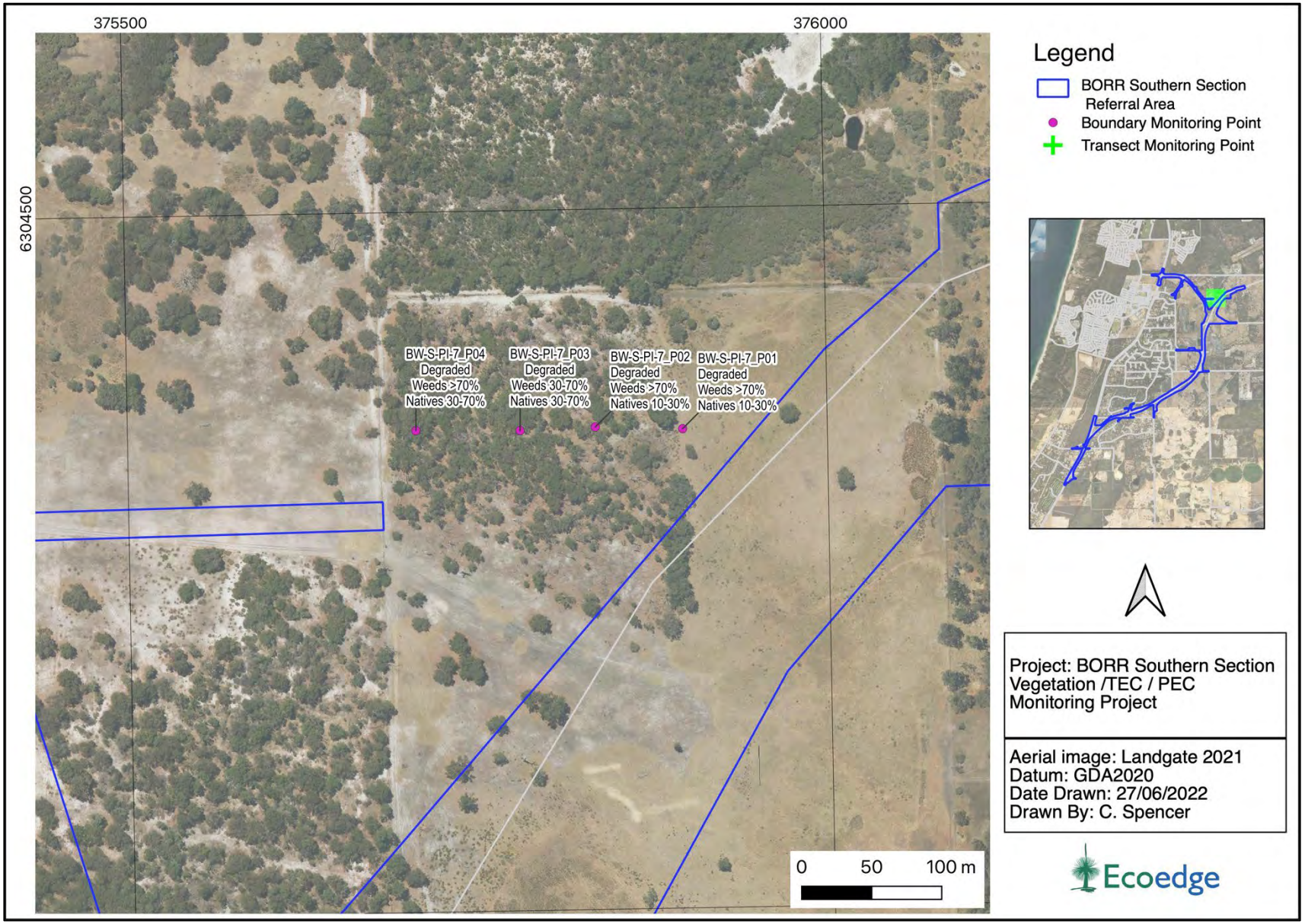

Figure 13. Potential Impact Site BW-S-PI-7 vegetation condition, weed and native cover. **Note** data is only current to Spring 2019 due to site access issues.

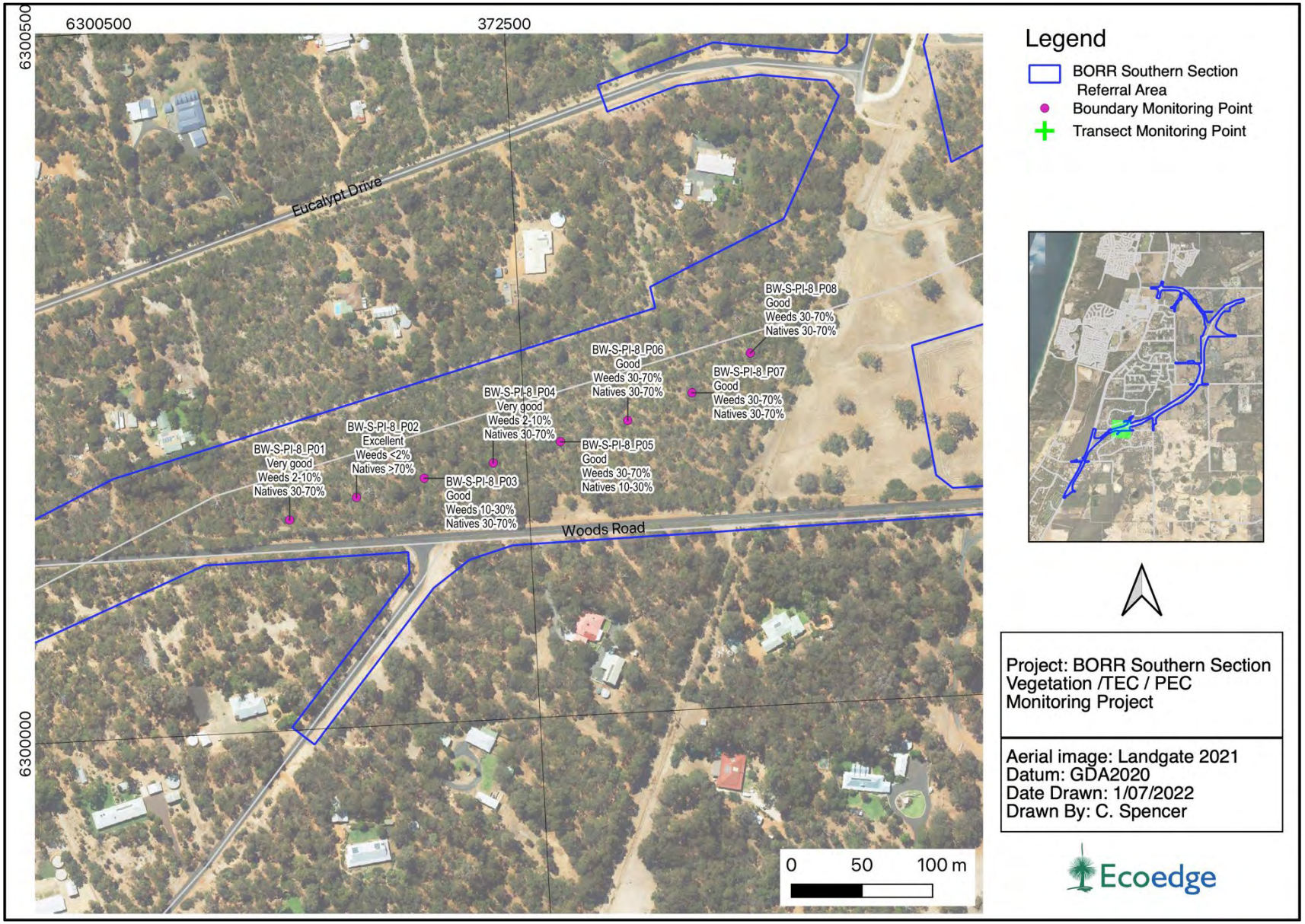

Figure 14. Potential Impact Site BW-S-PI-8 vegetation condition, weed and native cover.

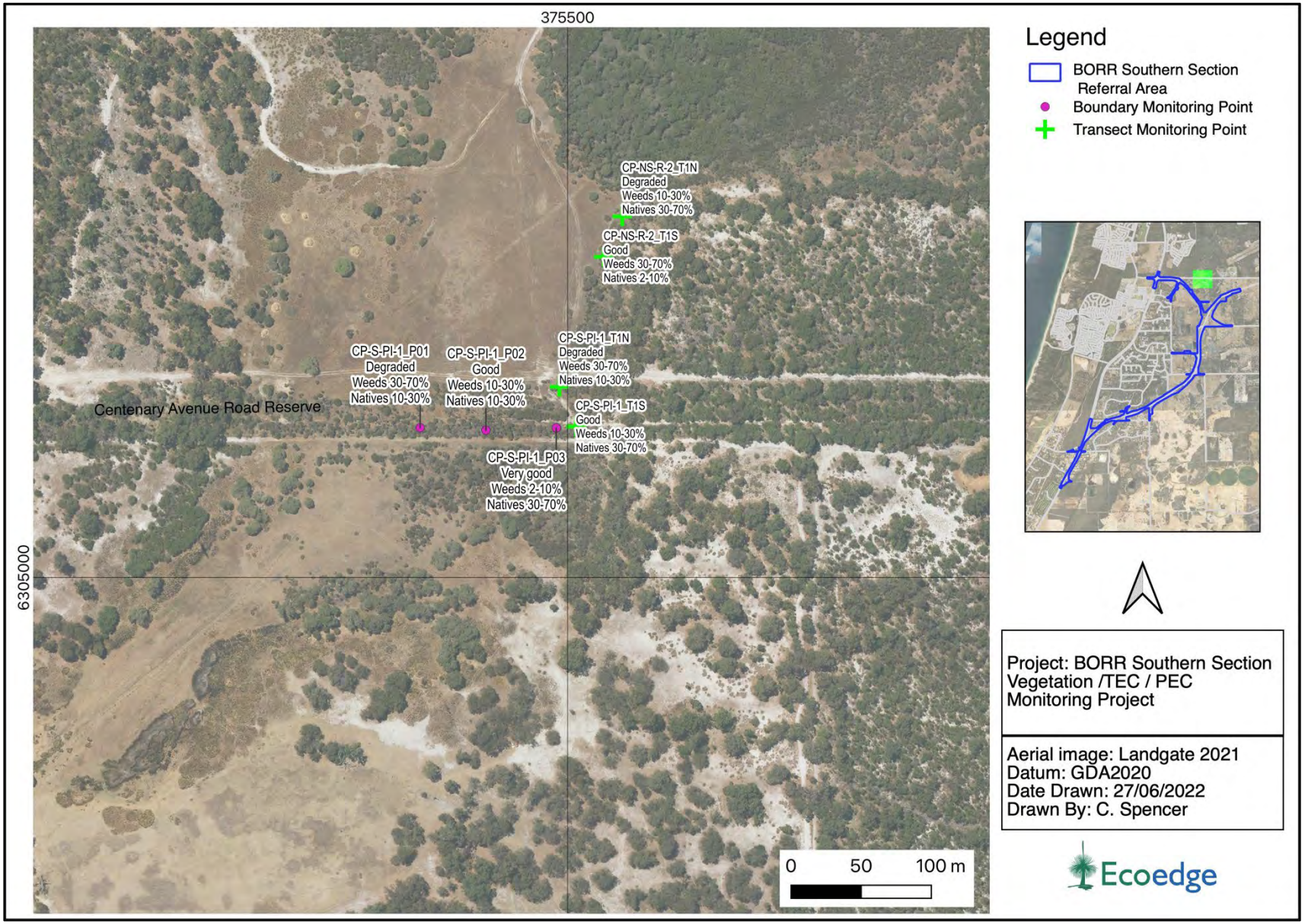

Figure 15. Sites CP-S-PI-1 and Reference Site CP-NS-R-2 vegetation condition, weed and native cover.

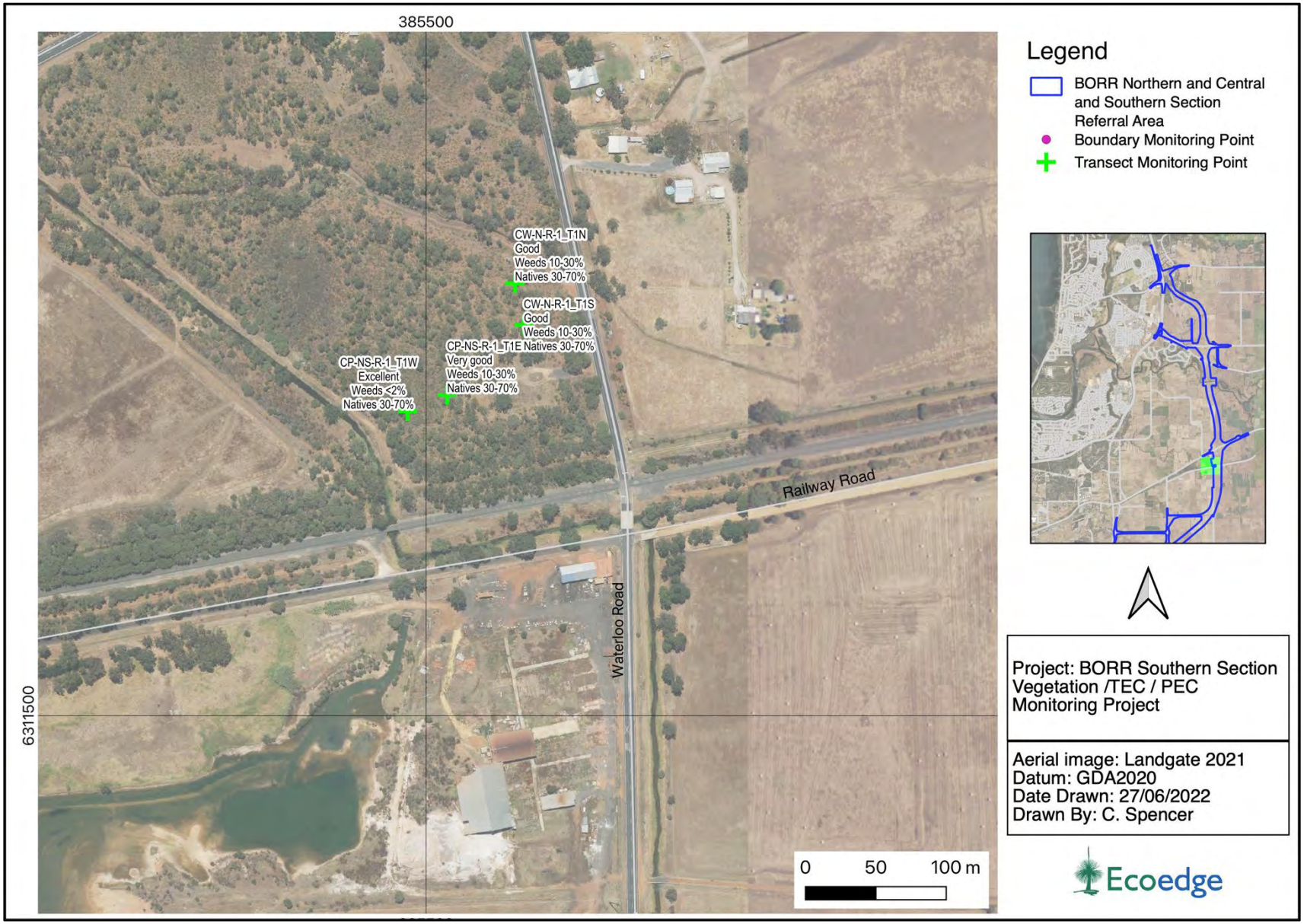

Figure 16 Reference site CP-NS-R-1 vegetation condition, weed and native cover.

Appendix 4. Index to all photographs taken during the monitoring survey.

Boundary and transect end point photographs

Index of photographs for BORR Southern Perimeter Monitoring Spring 2019 – Autumn 2021/Winter 2022
Eco Edge Monitoring | BTW-S-I-3T1E | North | 6167d0d14be8e4203d3cba81.jpg
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Eco Edge Monitoring | BW-S-PI-6P03 | North 25-05-22 | 628dd4e34be8e47fc6d9d02d.jpg

Eco Edge Monitoring | BW-S-PI-6P03 | P03 25-05-22 | 628dd6ce4be8e47fc5af0fa6.jpg

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Eco Edge Monitoring | BW-S-PI-7P01 | West 26-05-20 | 5ecc6ac57f1cccddde000012.jpg

Eco Edge Monitoring | BW-S-PI-7P02 | North 22-11-19 | 5dd76cff7f1ccc82ad00004e.jpg

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Eco Edge Monitoring | BW-S-PI-7P03 | North 22-11-19 | 5dd76dc27f1ccc82ad000052.jpg

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Eco Edge Monitoring | BW-S-PI-8p07 | South 20-06-22 | 62afcb324be8e47fc5af10df.jpg

Eco Edge Monitoring | BW-S-PI-8p08 | South 20-06-22 | 62afce164be8e47fc5af10e3.jpg

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Eco Edge Monitoring | BW-S-R-1T1W | North | 616627394be8e4203d3cb634.jpg

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Eco Edge Monitoring | TW-S-PI-2P6 | North 21-10-20 | 5f8f8b4c7f1ccc23a3000013.jpg

Eco Edge Monitoring | TW-S-PI-2P6 | North 26-05-22 | 628ee8914be8e47fc6d9d0c4.jpg

Eco Edge Monitoring | TW-S-PI-2P6 | North 31-07-20 | 5f23659a7f1cccaf9b000024.jpg

Eco Edge Monitoring | TW-S-PI-2P7 | North 21-10-20 | 5f8f8cb07f1ccc23a3000016.jpg

Eco Edge Monitoring | TW-S-PI-2P7 | North 26-05-22 | 628ee8464be8e47fc6d9d0af.jpg

Eco Edge Monitoring | TW-S-PI-2P7 | North 31-07-20 | 5f2366c47f1cccaf9b000031.jpg

Eco Edge Monitoring | TW-S-PI-2P8 | North | 6167c6b04be8e4203d3cba61.jpg

Eco Edge Monitoring | TW-S-PI-2P8 | North 21-10-20 | 5f8f8e457f1ccc23a3000019.jpg

Eco Edge Monitoring | TW-S-PI-2P8 | North 26-05-22 | 628ee83b4be8e47fc5af0ff2.jpg

Eco Edge Monitoring | TW-S-PI-2P8 | North 31-07-20 | 5f2368fa7f1cccaf9b000035.jpg

Eco Edge Monitoring | TW-S-PI-2P9 | North 31-07-20 | 5f236d9b7f1cccec9d000005.jpg

Eco Edge Monitoring | TW-S-PI-2P9 | P9 26-05-22 | 628ee8bc4be8e47fc5af1007.jpg

Eco Edge Monitoring | TW-S-PI-2P9 | P9 26-05-22 | 628ee8ea4be8e47fc6d9d0cd.jpg

Eco Edge Monitoring | TW-S-PI-2P9 | P9 26-05-22 | 628ee80a4be8e47fc6d9d0a9.jpg

Eco Edge Monitoring | TW-S-PI-2P9 | P9 26-05-22 | 628ee84e4be8e47fc5af0ff5.jpg

Eco Edge Monitoring | TW-S-PI-2P9 | P9 26-05-22 | 628ee90d4be8e47fc5af1016.jpg

Eco Edge Monitoring | TW-S-PI-2P9 | P9 26-05-22 | 628ee93f4be8e47fc5af1019.jpg

Eco Edge Monitoring | TW-S-PI-2P9 | P9 26-05-22 | 628ee8694be8e47fc5af0ff8.jpg

Eco Edge Monitoring | TW-S-PI-2P9 | P9 26-05-22 | 628ee8854be8e47fc5af0ffe.jpg

Eco Edge Monitoring | TW-S-PI-2P9 | P9 26-05-22 | 628ee9594be8e47fc5af101f.jpg

Eco Edge Monitoring | TW-S-PI-2T1E | T1E 26-10-20 | 5f9649427f1cccfefe000004.jpg

Eco Edge Monitoring | TW-S-PI-2T1E | West 19-11-19 | 5dd36dc97f1cccf0cb00000f.jpg

Eco Edge Monitoring | TW-S-PI-2T1E | West 26-05-20 | 5ecc74c07f1ccc22ac000001.jpg

Eco Edge Monitoring | TW-S-PI-2T1E | West 26-05-22 | 628eeaa44be8e47fc6d9d0e5.jpg

Eco Edge Monitoring | TW-S-PI-2T1E | West 26-10-20 | 5f9649347f1cccfefe000001.jpg

Eco Edge Monitoring | TW-S-PI-2T1W | East 19-11-19 | 5dd356de7f1cccf0cb00000b.jpg

Eco Edge Monitoring | TW-S-PI-2T1W | East 26-05-20 | 5ecc73fd7f1cccddde000024.jpg

Eco Edge Monitoring | TW-S-PI-2T1W | East 26-05-22 | 628eeb224be8e47fc6d9d0e8.jpg

Eco Edge Monitoring | TW-S-PI-2T1W | East 26-10-20 | 5f96399b7f1ccc7074000013.jpg

Eco Edge Monitoring | TW-S-PI-2T1W | North | 6167e6514be8e4203d3cba97.jpg

Eco Edge Monitoring | TW-S-PI-3P01 | East 21-10-20 | 5f8fb6d57f1ccca032000007.jpg

Eco Edge Monitoring | TW-S-PI-3P01 | East 26-05-20 | 5eccad987f1ccc361400001d.jpg

Eco Edge Monitoring | TW-S-PI-3P01 | East 26-05-22 | 628ef5444be8e47fc6d9d0ee.jpg

Eco Edge Monitoring | TW-S-PI-3P01 | North | 6167e79a4be8e4203d3cbaa5.jpg

Eco Edge Monitoring | TW-S-PI-3P02 | East 21-10-20 | 5f8fb6c77f1ccca032000004.jpg

Eco Edge Monitoring | TW-S-PI-3P02 | East 26-05-20 | 5eccaf077f1ccc3614000027.jpg

Eco Edge Monitoring | TW-S-PI-3P02 | East 26-05-22 | 628ef4ec4be8e47fc6d9d0eb.jpg

Eco Edge Monitoring | TW-S-PI-3P02 | North | 6167e7b04be8e4203d3cbaa8.jpg

Eco Edge Monitoring | TW-S-PI-3P04 | East 21-10-20 | 5f8fb7ab7f1ccc614700000e.jpg

Eco Edge Monitoring | TW-S-PI-3P04 | East 21-10-20 | 5f8fb7c17f1ccc6147000011.jpg

Eco Edge Monitoring | TW-S-PI-3P04 | East 26-05-20 | 5eccb1317f1ccc361400002f.jpg

Eco Edge Monitoring | TW-S-PI-3P04 | East 26-05-22 | 628ef6794be8e47fc6d9d0f1.jpg

Eco Edge Monitoring | TW-S-PI-3P04 | North | 6168bba44be8e4203d3cbad5.jpg

Eco Edge Monitoring | TW-S-PI-4P01 | East 19-10-20 | 5f8cda227f1ccc7d99000007.jpg

Eco Edge Monitoring | TW-S-PI-4P01 | East 25-05-22 | 628dde3e4be8e47fc6d9d057.jpg

Eco Edge Monitoring | TW-S-PI-4P01 | East 26-05-20 | 5ecc88f77f1ccc23d5000001.jpg

Eco Edge Monitoring | TW-S-PI-4P01a | P01a 25-05-22 | 628dde394be8e47fc5af0fb9.jpg

Eco Edge Monitoring | TW-S-PI-4P01a | P01a 25-05-22 | 628dde444be8e47fc5af0fbc.jpg

Eco Edge Monitoring | TW-S-PI-4P02 | North | 6167701d4be8e4203d3cb8b5.jpg

Eco Edge Monitoring | TW-S-PI-4P02 | North | 616773714be8e4203d3cb8d3.jpg

Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8d24a97f1cccc75a000013.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8d24b77f1cccc75a000016.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8d24747f1cccc75a000010.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8d25357f1cccc75a000019.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8d25447f1cccc75a00001c.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8d26847f1cccc75a000022.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8e37b07f1ccc4ccc000007.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8e38bd7f1ccc39b300000e.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8e386a7f1ccc39b3000008.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8e38387f1ccc39b3000001.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8e38557f1ccc39b3000005.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 19-10-20 | 5f8e39067f1ccc39b3000011.jpg
Eco Edge Monitoring | TW-S-PI-4P02 | P02 25-05-22 | 628dde3b4be8e47fc6d9d054.jpg

Appendix 5. Vegetation condition scale (EPA, 2016).

Vegetation Condition	South West and Interzone Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

Appendix 6. Recording sheet template

BORR Drainage Monitoring Program.
Quarterly visual inspection Sheet

Site name	Date	Field personnel

Flooding/inundation

If flooding/inundation is present, complete a plant health assessment using the scale included below. The plant health assessment should be conducted over the portion of the TEC/PEC that is flooded/inundated.
Considering the degree of impact (or lack of impact), make a recommendation for when the subsequent assessment should occur (quarterly as is the standard or within a shorter timeframe)

Standing water present (Y/N)	
Estimated area of standing water (m^2)	
% of TEC / PEC occurrence impacted by standing water	
TEC/PEC vegetation affected (Y/N) If yes, describe effect.	
List main species affected	
Photograph and waypoint taken (Y)	
Plant health assessment conducted (Y/N)	

Erosion

If TEC/PEC vegetation is impacted by active erosion, complete a plant health assessment using the scale included below. The plant health assessment should be conducted over the portion of the TEC/PEC suspected to be impacted.

Active erosion present (Y/N)	
Estimated area of active erosion (m^2)	
Photograph and waypoint taken (Y)	
TEC/PEC vegetation affected (Y/N) If yes, describe effect. Complete plant health assessment if required.	
Plant health assessment conducted (Y/N)	

Drying

If a drying effect is suspected, complete a plant health assessment using the scale included below. The plant health assessment should be conducted over the portion of the TEC/PEC suspected to be impacted.
Considering the degree of impact (or lack of impact), make a recommendation for when the subsequent assessment should occur (quarterly as is the standard or within a shorter timeframe)

Drying effect present or suspected (Y/N)	
% of TEC / PEC occurrence impacted	
Describe effect	
List main species affected	
Photograph and waypoint taken (Y)	
Plant health assessment conducted (Y/N)	

Appendix 7 Survey Personnel and Limitations of Biannual Vegetation and Drainage Monitoring.

1 Spring 2019 / Summer 2020

1.1.1 Survey personnel

The field survey was undertaken by Russell Smith, Senior Botanist (Flora permit FB62000192) and Colin Spencer Botanist (Flora permit FB62000169) between 29 October 2019 and 11 February 2020.

1.1.2 Limitations

Table 1. Spring 2019 / Summer 2020 Limitations of the vegetation monitoring with regard to assessment adequacy and accuracy

Aspect	Constraint	Comment
Scope	Negligible	The monitoring setup and data capture was carried out as per the scope.
Proportion of flora identified	Minor	Because of the timing of the survey some early growing/flowering herbaceous species would not have been identifiable (see below).
Climatic and seasonal effects	Moderate	The winter of 2019 was significantly drier than normal, which may have negatively influenced herbaceous plant emergence and flowering. In addition, the setup of transects didn't start till late spring (29/10) and continued into early summer – which meant that some early growing and flowering herbaceous species were not able to be identified.
Availability of contextual information	Minor	Data and reports from numerous studies conducted on Swan Coastal Plain vegetation are available to provide context for the monitoring program.
Completeness of the survey	Negligible	All monitoring sites were accessible and able to be easily assessed.
Skill and knowledge of the botanists	Minor	The botanists have over 35 years of experience on the Swan Coastal Plain IBRA region between them.
Disturbance (fire, grazing, clearing etc.)	Negligible	At the time of survey, no sites were impacted / disturbed, such that they could not be meaningfully surveyed.
Collection and storage of data	Moderate	There were issues with the collection of data using the Quadmon app and some transect data was lost.

2 Autumn 2020

2.1.1 Survey personnel

The field survey was undertaken by Russell Smith, Senior Botanist (Flora permit FB62000192) and Colin Spencer Botanist (Flora permit FB62000169) between 20 May 2020 and 26 May 2020.

2.1.2 Limitations

Table 2. Autumn 2020 Limitations of the vegetation monitoring with regard to assessment adequacy and accuracy

Aspect	Constraint	Comment
Scope	Negligible	The monitoring setup and data capture was carried out as per the scope.
Proportion of flora identified	Minor	Because of the timing of the survey some early or late growing/flowering herbaceous species would not have been identifiable (see below).
Climatic and seasonal effects	Minor	The program schedules a monitoring round during autumn to pick up any seasonal variations in flora and vegetation which may be observed during this round. There were no climatic or seasonal constraints limiting collection of this data.
Availability of contextual information	Minor	Data and reports from numerous studies conducted on Swan Coastal Plain vegetation are available to provide context for the monitoring program.
Completeness of the survey	Negligible	All monitoring sites were accessible and able to be easily assessed.
Skill and knowledge of the botanists	Minor	The botanists have over 35 years of experience on the Swan Coastal Plain IBRA region between them.
Disturbance (fire, grazing, clearing etc.)	Negligible	At the time of survey, no sites were impacted / disturbed, such that they could not be meaningfully surveyed.
Collection and storage of data	Minor	Data was collected using Fulcrum app with no issues, except for lots of site name changes.

3 Winter 2020_claypans

3.1.1 Survey personnel

The field survey was undertaken by Russell Smith, Senior Botanist (Flora permit FB62000192) and Colin Spencer Botanist (Flora permit FB62000169) on the 4 August 2020.

3.1.2 Limitations

Table 3. Winter 2020 (Claypans only) Limitations of the vegetation monitoring with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	Negligible	The monitoring setup and data capture was carried out as per the scope.
Proportion of flora identified	Minor	All species present at the time of survey were able to be identified.
Climatic and seasonal effects	Significant	The winter survey is scheduled to pick up any seasonal variations in flora and vegetation at claypan wetlands However, at time of survey the claypans were too wet and there were almost no emergent annuals present. Aside from the establishment of one new transect, CP-NS-R-2 in Manea Park, the claypan surveys were postponed until the spring monitoring round.
Availability of contextual information	Minor	Data and reports from numerous studies conducted on Swan Coastal Plain vegetation are available to provide context for the monitoring program.
Completeness of the survey	Negligible	The monitoring sites were accessible and able to be easily assessed.
Skill and knowledge of the botanists	Minor	The botanists have over 35 years of experience on the Swan Coastal Plain IBRA region between them.
Disturbance (fire, grazing, clearing etc.)	Negligible	The site was not impacted by any disturbances such that it could not be meaningfully surveyed.
Collection and storage of data	Minor	No issues

4 Winter 2020

4.1.1 Survey personnel

The winter drainage monitoring was undertaken by Debbie Brace (FT61000764) on 28 – 31 July 2020.

4.1.2 Limitations

Table 4. Winter drainage monitoring 2020 limitations of the field monitoring with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	Negligible	The monitoring setup and data capture was carried out as per the scope.
Climatic and seasonal effects	Minor	About average rainfall was recorded during the 2020 wet season.
Completeness of the survey	Negligible	All monitoring sites were accessible and able to be easily assessed.
Skill and knowledge of the botanists	Minor	The botanist has over 3 years of experience undertaking vegetation health condition and photopoint monitoring.
Disturbance (fire, grazing, clearing etc.)	Negligible	At the time of survey, no sites were impacted / disturbed.
Collection and storage of data	Minor	Data was collected using Fulcrum app.

5 Spring 2020

5.1.1 Survey personnel

The spring 2020 transect/quadrat monitoring, drainage monitoring and vegetation health was undertaken by Colin Spencer (FB62000169) and Debbie Brace (FT61000764) on 9 October – 28 October 2020.

5.1.2 Limitations

Table 5. Spring monitoring 2020 limitations of the field monitoring with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	Negligible	The monitoring setup and data capture was carried out as per the scope.
Proportion of flora identified	Minor	Monitoring was carried out between in spring, which is within the prime time for botanical surveys in the Bunbury area.
Climatic and seasonal effects	Minor	Climatic and seasonal effects had little impact on the survey as about average rainfall was recorded during the 2020 May - September wet season.
Completeness of the survey	Moderate	All monitoring sites were accessible and able to be easily assessed. Except some private property where there was no access given by the landowner.
Skill and knowledge of the botanists	Minor	The botanist has over 10 years of experience on the Swan Coastal Plain IBRA region.
Disturbance (fire, grazing, clearing etc.)	Negligible	At the time of survey, no sites were impacted / disturbed.
Collection and storage of data	Minor	Data was collected and stored using various applications on electronic devices and pen/paper notebooks. A comprehensive approach was taken to ensure data was not lost or corrupted.

6 Summer 2020/2021

6.1.1 Survey personnel

The summer drainage monitoring was undertaken by Debbie Brace (FT61000764) on 10-12 February 2021.

6.1.2 Limitations

Table 6. Summer drainage monitoring 2020 limitations of the field monitoring with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	Negligible	The monitoring setup and data capture was carried out as per the scope.
Climatic and seasonal effects	Minor	Normal summer rainfall and temperatures for this time of year.
Completeness of the survey	Moderate	All monitoring sites were accessible and able to be easily assessed. Except BW-S-PI_7 on private property where there was no access given by the landowner.
Skill and knowledge of the botanists	Minor	The botanist has over 3 years of experience undertaking vegetation health condition and photopoint monitoring.
Disturbance (fire, grazing, clearing etc.)	Minor	At the time of survey, no sites were impacted / disturbed.
Collection and storage of data	Negligible	Data was collected using Fulcrum app.

7 Autumn 2021

Note no vegetation monitoring was conducted in Autumn 2021.

7.1.1 Survey personnel

The autumn drainage monitoring was undertaken by Debbie Brace (FT61000764) on 31 May 2021.

7.1.2 Limitations

Table 7. Autumn drainage monitoring 2021 limitations of the field monitoring with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	Negligible	The monitoring setup and data capture was carried out as per the scope. No boundary point monitoring occurred during autumn 2021.
Climatic and seasonal effects	Minor	Above average rainfall was recorded during May.
Completeness of the survey	Moderate	All monitoring sites were accessible and able to be easily assessed. Except BW-S-PI_7 on private property where there was no access given by the landowner.
Skill and knowledge of the botanists	Minor	The botanist has over 3 years of experience undertaking vegetation health condition and photopoint monitoring.
Disturbance (fire, grazing, clearing etc.)	Minor	At the time of survey, no sites were impacted / disturbed.
Collection and storage of data	Minor	Data was collected using Fulcrum app.

8 Winter 2021

8.1.1 Survey personnel

The winter drainage monitoring was undertaken by Debbie Brace (FT61000764) on7 September 2021.

8.1.2 Limitations

Table 8. Winter drainage monitoring 2021 limitations of the field monitoring with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	Negligible	The monitoring setup and data capture was carried out as per the scope.
Climatic and seasonal effects	Minor	About average rainfall was recorded during the 2021 wet season.
Completeness of the survey	Moderate	All monitoring sites were accessible and able to be easily assessed. Except BW-S-PI_7 on private property where there was no access given by the landowner.
Skill and knowledge of the botanists	Minor	The botanist has over 3 years of experience undertaking vegetation health condition and photopoint monitoring.
Disturbance (fire, grazing, clearing etc.)	Negligible	At the time of survey, no sites were impacted / disturbed.
Collection and storage of data	Minor	Data was collected using Fulcrum app.

9 Spring 2021

9.1.1 Survey personnel

The spring survey (quadrat monitoring, photopoint monitoring and drainage monitoring) was undertaken by Colin Spencer Botanist (Flora permit FB62000169), Debbie Brace (FT61000764) and Andrew Fry (FB62000002-2). The spring survey was conducted 8 September – 14 October 2021.

9.1.2 Limitations

Table 9. Spring 2021 limitations of the field monitoring with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	Negligible	The monitoring setup and data capture was carried out as per the scope.
Proportion of flora identified	Minor	Monitoring was carried out between in October which is within the prime time for botanical surveys in the Bunbury area.
Climatic and seasonal effects	Minor	Above average rainfall was recorded during the 2021 wet season (May to September, inclusive), which resulted in good flowering and recruitment of annuals and geophytes.
Availability of contextual information	Minor	Data and reports from numerous studies conducted on Swan Coastal Plain vegetation are available to provide context for the monitoring program.
Completeness of the survey	Moderate	All monitoring sites were accessible and able to be easily assessed. Except BW-S-PI_7 on private property where there was no access given by the landowner.
Skill and knowledge of the botanists	Negligible	The botanist has over 10 years of experience undertaking formal flora and vegetation surveys on the Swan Coastal Plain.
Disturbance (fire, grazing, clearing etc.)	Negligible	At the time of survey, no sites were impacted / disturbed, such that they could not be meaningfully surveyed.
Collection and storage of data	Minor	Data was collected and stored using various applications on electronic devices and pen/paper notebooks. A comprehensive approach was taken to ensure data was not lost or corrupted.

10 Summer 2021/2022

10.1.1 Survey personnel

The summer drainage monitoring was undertaken by Debbie Brace (FT61000764) on 22 February 2022.

10.1.2 Limitations

Table 10. Summer 2021/22 limitations of the field monitoring with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	Negligible	The monitoring setup and data capture was carried out as per the scope.
Climatic and seasonal effects	Minor	About average rainfall was recorded during the 2021 / 2022 summer.
Completeness of the survey	Moderate	All monitoring sites were accessible and able to be easily assessed. Except BW-S-PI_7 on private property where there was no access given by the landowner.
Skill and knowledge of the botanists	Minor	The botanist has over 3 years of experience undertaking vegetation health condition and photopoint monitoring.
Disturbance (fire, grazing, clearing etc.)	Negligible	At the time of survey, no sites were impacted / disturbed.
Collection and storage of data	Minor	Data was collected using Photomon and Fulcrum apps.

Appendix 8. Example of data collected at each quadrat along the transects. (BTW-S-PI-2_T1).

Site data for BTW-S-PI-2_T1 (Species, species cover, death & plant stress & site characteristics).

Note: '0' represents no data recorded for that characteristic.

Quadrat Code	Species & site characteristics	Cover Score	Deaths	Stress	Notes
BTW-S-I-2_T1Q1	*Asteraceae* sp. limestone	3	0	0	0
BTW-S-I-2_T1Q1	BARE GROUND	10	0	0	0
BTW-S-I-2_T1Q1	*Craspedia variabilis*	2	0	0	0
BTW-S-I-2_T1Q1	*Desmocladus flexuosus*	3	0	0	0
BTW-S-I-2_T1Q1	*Dichopogon capillipes*	2	0	0	0
BTW-S-I-2_T1Q1	*Hibbertia hypericoides*	5	0	5	0
BTW-S-I-2_T1Q1	*Leucopogon propinquus*	3	0	5	0
BTW-S-I-2_T1Q1	LITTER	80%	0	0	0
BTW-S-I-2_T1Q1	*Lomandra suaveolens*	2	0	0	0
BTW-S-I-2_T1Q2	*Asteraceae* sp. limestone	1	0	0	0
BTW-S-I-2_T1Q2	*Banksia attenuata*	5	0	5	0
BTW-S-I-2_T1Q2	BARE GROUND	2	0	0	0
BTW-S-I-2_T1Q2	*Briza maxima*	3	0	0	0
BTW-S-I-2_T1Q2	*Daucus glochidiatus*	1	0	0	0
BTW-S-I-2_T1Q2	*Desmocladus flexuosus*	2	0	0	0
BTW-S-I-2_T1Q2	*Hibbertia hypericoides*	7	0	5	0
BTW-S-I-2_T1Q2	*Lepidosperma squamatum*	2	0	0	0
BTW-S-I-2_T1Q2	LITTER	90%	0	0	0
BTW-S-I-2_T1Q2	*Lomandra integra*	3	0	0	?
BTW-S-I-2_T1Q2	*Lysimachia arvensis*	1	0	0	0
BTW-S-I-2_T1Q3	*Acanthocarpus preissii*	1	0	0	0
BTW-S-I-2_T1Q3	*Banksia attenuata*	6	0	5	0
BTW-S-I-2_T1Q3	BARE GROUND	1	0	0	0
BTW-S-I-2_T1Q3	*Briza maxima*	3	0	0	0
BTW-S-I-2_T1Q3	*Conostylis aculeata*	2	0	0	0
BTW-S-I-2_T1Q3	*Dichopogon capillipes*	1	0	0	0
BTW-S-I-2_T1Q3	*Hardenbergia comptoniana*	2	0	5	0
BTW-S-I-2_T1Q3	*Hibbertia hypericoides*	5	0	5	0
BTW-S-I-2_T1Q3	*Lepidosperma squamatum*	4	0	0	0
BTW-S-I-2_T1Q3	LITTER	1	0	0	0
BTW-S-I-2_T1Q3	*Lomandra integra*	3	0	0	0
BTW-S-I-2_T1Q3	*Lomandra suaveolens*	1	0	0	0
BTW-S-I-2_T1Q4	*Acacia iteaphylla*	8	0	5	0
BTW-S-I-2_T1Q4	BARE GROUND	1	0	0	0
BTW-S-I-2_T1Q4	*Briza maxima*	2	0	0	0
BTW-S-I-2_T1Q4	*Conostylis aculeata*	1	0	0	0
BTW-S-I-2_T1Q4	*Desmocladus flexuosus*	2	0	0	0
BTW-S-I-2_T1Q4	*Hardenbergia comptoniana*	3	0	5	0
BTW-S-I-2_T1Q4	*Hibbertia hypericoides*	8	0	5	0
BTW-S-I-2_T1Q4	*Hovea trisperma*	2	0	5	0
BTW-S-I-2_T1Q4	LITTER	1	0	0	0
BTW-S-I-2_T1Q4	*Lysimachia arvensis*	1	0	0	0

Appendix 9. Boundary photopoint comparative data for vegetation condition, crown extent density, weed cover and native cover from spring / summer 2019 to autumn / winter 2022.

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-1_P01	2019-11-21	Very good		2-10%		Vegetation condition originally assessed as Good. This was retrospectively reassessed to be Very Good based on a cumulative assessment of the site in autumn 2020.
BW-S-PI-1_P01	2020-05-26	Very good		2-10%	30-70%	
BW-S-PI-1_P01	2020-10-28	Very Good	4	10-30%	30-70%	Weed cover increased.
BW-S-PI-1_P01	2021-10-14	Very Good	4	10-30%	30-70%	
BW-S-PI-1_P01	2022-05-26	Very good	4	10-30%	30-70%	
BW-S-PI-1_P02	2019-11-21	Very good		2-10%		Vegetation condition originally assessed as Good. This was retrospectively reassessed to be Very Good based on a cumulative assessment of the site in autumn 2020.
BW-S-PI-1_P02	2020-05-26	Very good		2-10%	30-70%	
BW-S-PI-1_P02	2020-10-28	Very Good	4	>70%	30-70%	Weed cover increased.
BW-S-PI-1_P02	2021-10-14	Very Good	4	>70%	30-70%	
BW-S-PI-1_P02	2022-05-26	Very good	4	>70%	30-70%	
BW-S-PI-1_P03	2019-11-21	Good		<2%		
BW-S-PI-1_P03	2020-05-26	Good		<2%	30-70%	
BW-S-PI-1_P03	2020-10-28	Good	4	30-70%	30-70%	Weed cover increased.
BW-S-PI-1_P03	2021-10-14	Good	4	30-70%	30-70%	
BW-S-PI-1_P03	2022-05-26	Good	4	30-70%	30-70%	
BW-S-PI-1_P04	2019-11-21	Very good		<2%		
BW-S-PI-1_P04	2020-05-26	Very good		<2%	30-70%	
BW-S-PI-1_P04	2020-10-28	Very good	4	30-70%	30-70%	Weed cover increased.
BW-S-PI-1_P04	2021-10-14	Very good	4	30-70%	30-70%	
BW-S-PI-1_P04	2022-05-26	Very good	4	30-70%	30-70%	
BW-S-PI-1_P05	2019-11-21	Very good		<2%		Vegetation condition originally assessed as Good. This was retrospectively reassessed to be Very Good based on a cumulative assessment of the site in autumn 2020.
BW-S-PI-1_P05	2020-05-26	Very good		<2%	30-70%	
BW-S-PI-1_P05	2020-10-28	Very good	5	<2%	30-70%	
BW-S-PI-1_P05	2021-10-14	Very good	5	<2%	30-70%	
BW-S-PI-1_P05	2022-05-26	Very good	5	<2%	30-70%	
BW-S-PI-2_P01	2019-11-22	Good		10-30%		
BW-S-PI-2_P01	2020-05-20	Good		10-30%	30-70%	
BW-S-PI-2_P01	2020-10-28	Good	4	30-70%	30-70%	Weed cover increased.
BW-S-PI-2_P01	2021-10-13	Good	4	30-70%	30-70%	
BW-S-PI-2_P01	2022-05-25	Good	4	30-70%	30-70%	
BW-S-PI-2_P02	2019-11-22	Degraded		30-70%		
BW-S-PI-2_P02	2020-05-20	Degraded		30-70%	30-70%	
BW-S-PI-2_P02	2020-10-28	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P02	2021-10-13	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P02	2022-05-25	Degraded	5	30-70%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-2_P03	2019-11-22	Degraded		10-30%		
BW-S-PI-2_P03	2020-05-20	Degraded		10-30%	30-70%	
BW-S-PI-2_P03	2020-10-28	Degraded	5	10-30%	30-70%	
BW-S-PI-2_P03	2021-10-13	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P03	2022-05-25	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P04	2019-11-22	Degraded		30-70%		
BW-S-PI-2_P04	2020-05-20	Degraded		30-70%	10-30%	
BW-S-PI-2_P04	2020-10-28	Degraded	5	30-70%	10-30%	
BW-S-PI-2_P04	2021-10-13	Degraded	5	30-70%	10-30%	
BW-S-PI-2_P04	2022-05-25	Degraded	5	30-70%	10-30%	
BW-S-PI-2_P05	2019-11-22	Degraded		30-70%		
BW-S-PI-2_P05	2020-05-20	Degraded		30-70%	10-30%	
BW-S-PI-2_P05	2020-10-28	Degraded	5	>70%	10-30%	Weed cover increased.
BW-S-PI-2_P05	2021-10-13	Degraded	5	>70%	10-30%	
BW-S-PI-2_P05	2022-05-25	Degraded	5	>70%	10-30%	
BW-S-PI-2_P06	2019-11-22	Degraded		30-70%		
BW-S-PI-2_P06	2020-05-20	Degraded		30-70%	10-30%	
BW-S-PI-2_P06	2020-09-09	Degraded		30-70%	10-30%	
BW-S-PI-2_P06	2021-10-13	Degraded	5	30-70%	10-30%	
BW-S-PI-2_P06		Degraded	5	30-70%	10-30%	
BW-S-PI-3_P01	2019-11-21	Very good		<2%		
BW-S-PI-3_P01	2020-05-20	Very good		<2%	30-70%	
BW-S-PI-3_P01	2020-09-09	Very good		<2%	30-70%	
BW-S-PI-3_P01	2021-10-13	Very good	5	10-30%	30-70%	Weed cover increased.
BW-S-PI-3_P01	2022-05-25	Very good	5	10-30%	30-70%	
BW-S-PI-3_P02	2019-11-21	Very good		<2%		
BW-S-PI-3_P02	2020-05-20	Very good		<2%	30-70%	
BW-S-PI-3_P02	2020-10-28	Very good	4	2-10%	30-70%	Weed cover increased.
BW-S-PI-3_P02	2021-10-13	Very good	4	10-30%	30-70%	Weed cover increased.
BW-S-PI-3_P02	2022-05-25	Very good	4	10-30%	30-70%	
BW-S-PI-3_P03	2019-11-21	Very good		<2%		
BW-S-PI-3_P03	2020-05-20	Very good		<2%	30-70%	
BW-S-PI-3_P03	2020-10-28	Very good	5	10-30%	30-70%	Weed cover increased.
BW-S-PI-3_P03	2021-10-13	Very good	5	10-30%	30-70%	
BW-S-PI-3_P03	2022-05-25	Very good	5	10-30%	30-70%	
BW-S-PI-3_P04	2019-11-21	Excellent		<2%		
BW-S-PI-3_P04	2020-05-20	Excellent		<2%	30-70%	
BW-S-PI-3_P04	2020-10-28	Excellent	5	<2%	30-70%	
BW-S-PI-3_P04	2021-10-13	Excellent	5	<2%	30-70%	
BW-S-PI-3_P04	2022-05-25	Excellent	5	<2%	30-70%	
BW-S-PI-3_P05	2019-11-21	Excellent		<2%		
BW-S-PI-3_P05	2020-05-20	Excellent		<2%	30-70%	
BW-S-PI-3_P05	2020-10-28	Excellent	5	<2%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-3_P05	2021-10-13	Excellent	5	<2%	30-70%	
BW-S-PI-3_P05	2022-05-25	Excellent	5	<2%	30-70%	
BW-S-PI-3_P06	2019-11-21	Very good		<2%		
BW-S-PI-3_P06	2020-05-20	Very good		<2%	30-70%	
BW-S-PI-3_P06	2020-10-28	Very good	4	2-10%	30-70%	
BW-S-PI-3_P06	2021-10-13	Very good	4	2-10%	30-70%	
BW-S-PI-3_P06	2022-05-25	Very good	4	2-10%	30-70%	
BW-S-PI-3_P07	2019-11-21	Good		2-10%		
BW-S-PI-3_P07	2020-05-20	Good		2-10%	30-70%	
BW-S-PI-3_P07	2020-10-28	Good	5	10-30%	30-70%	Weed cover increased.
BW-S-PI-3_P07	2021-10-13	Good	5	10-30%	30-70%	
BW-S-PI-3_P07	2022-05-25	Good	5	10-30%	30-70%	
BW-S-PI-4_P01	2020-05-26	Very good		<2%	30-70%	
BW-S-PI-4_P01	2020-10-28	Very good	5	2-10%	30-70%	Weed cover increased.
BW-S-PI-4_P01	2021-10-13	Very good	5	2-10%	30-70%	
BW-S-PI-4_P01	2022-05-25	Very good	5	2-10%	30-70%	
BW-S-PI-4_P02	2020-05-26	Excellent		<2%	30-70%	
BW-S-PI-4_P02	2020-10-28	Excellent	5	2-10%	30-70%	Weed cover increased.
BW-S-PI-4_P02	2021-10-13	Excellent	5	2-10%	30-70%	
BW-S-PI-4_P02	2022-05-25	Excellent	5	2-10%	30-70%	
BW-S-PI-4_P03	2020-05-26	Excellent		<2%	>70%	
BW-S-PI-4_P03	2020-10-28	Excellent	5	<2%	>70%	
BW-S-PI-4_P03	2021-10-13	Excellent	5	<2%	>70%	
BW-S-PI-4_P03	2022-05-25	Excellent	5	<2%	>70%	
BW-S-PI-4_P04	2020-05-26	Excellent		<2%	30-70%	
BW-S-PI-4_P05	2020-05-26	Very good		<2%	30-70%	
BW-S-PI-4_P05	2020-10-28	Very good	4	<2%	30-70%	
BW-S-PI-4_P05	2021-10-13	Very good	4	2-10%	30-70%	Weed cover increased.
BW-S-PI-4_P05	2022-05-25	Very good	4	2-10%	30-70%	
BW-S-PI-5_P01	2019-11-20	Good		<2%		
BW-S-PI-5_P01	2020-05-22	Good		<2%	10-30%	
BW-S-PI-5_P01	2020-10-23	Good	4	<2%	10-30%	
BW-S-PI-5_P01	2021-10-14	Good	4	<2%	10-30%	
BW-S-PI-5_P01	2022-05-25	Good	4	<2%	10-30%	
BW-S-PI-5_P02	2019-11-20	Good		<2%		
BW-S-PI-5_P02	2020-05-22	Good		<2%	10-30%	
BW-S-PI-5_P02	2020-10-23	Good	5	2-10%	10-30%	Weed cover increased.
BW-S-PI-5_P02	2021-10-14	Good	5	10-30%	10-30%	Weed cover increased.
BW-S-PI-5_P02	2022-05-25	Good	5	30-70%	10-30%	Weed cover increased.
BW-S-PI-5_P03	2019-11-20	Very good		<2%		
BW-S-PI-5_P03	2020-05-22	Very good		<2%	30-70%	
BW-S-PI-5_P03	2020-10-23	Very good	4	10-30%	30-70%	Weed cover increased.
BW-S-PI-5_P03	2021-10-14	Very good	4	10-30%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P03	2022-05-25	Very good	4	10-30%	30-70%	
BW-S-PI-5_P04	2020-07-30	Excellent		<2%	30-70%	
BW-S-PI-5_P04	2020-09-09	Excellent		<2%	30-70%	
BW-S-PI-5_P04	2021-10-14	Excellent	5	<2%	30-70%	
BW-S-PI-5_P04	2022-05-25	Excellent	5	<2%	30-70%	
BW-S-PI-5_P05	2020-07-30	Very good		2-10%	30-70%	Weed cover increased.
BW-S-PI-5_P05	2020-10-23	Very good	3	2-10%	30-70%	
BW-S-PI-5_P05	2021-10-14	Very good	3	2-10%	30-70%	
BW-S-PI-5_P05	2022-05-25	Very good	4	2-10%	30-70%	
BW-S-PI-5_P06	2020-07-30	Good		30-70%	30-70%	
BW-S-PI-5_P06	2020-10-23	Good	4	30-70%	30-70%	
BW-S-PI-5_P06	2021-10-14	Good	4	30-70%	30-70%	
BW-S-PI-5_P06	2022-05-25	Good	4	30-70%	30-70%	
BW-S-PI-5_P07	2019-11-20	Good		30-70%		
BW-S-PI-5_P07	2020-05-22	Good		30-70%		
BW-S-PI-5_P07	2020-10-23	Good	4	30-70%	30-70%	
BW-S-PI-5_P07	2021-10-14	Good	5	30-70%	30-70%	Crown extent density increased to 5
BW-S-PI-5_P07	2022-05-25	Good	5	30-70%	30-70%	
BW-S-PI-5_P08	2019-11-20	Good		2-10%		
BW-S-PI-5_P08	2020-05-22	Good		2-10%	30-70%	Weed cover increased.
BW-S-PI-5_P08	2020-10-23	Good	4	10-30%	30-70%	Weed cover increased.
BW-S-PI-5_P08	2021-10-14	Good	4	30-70%	30-70%	
BW-S-PI-5_P08	2022-05-25	Good	4	30-70%	30-70%	
BW-S-PI-5_P09	2019-11-20	Good		2-10%		
BW-S-PI-5_P09	2020-05-22	Good		2-10%	30-70%	
BW-S-PI-5_P09	2020-10-23	Good	4	10-30%	30-70%	Weed cover increased.
BW-S-PI-5_P09	2021-10-14	Good	4	30-70%	30-70%	
BW-S-PI-5_P09	2022-05-25	Good	4	30-70%	30-70%	
BW-S-PI-5_P10	2019-11-20	Good		<2%		
BW-S-PI-5_P10	2020-05-22	Good		<2%	30-70%	
BW-S-PI-5_P10	2020-10-23	Good	4	2-10%	30-70%	Weed cover increased.
BW-S-PI-5_P10	2021-10-14	Good	4	2-10%	30-70%	
BW-S-PI-5_P10	2022-05-25	Good	4	10-30%	30-70%	Weed cover increased.
BW-S-PI-5_P11	2019-11-20	Good		30-70%		
BW-S-PI-5_P11	2020-05-22	Good		30-70%	30-70%	
BW-S-PI-5_P11	2020-10-23	Good	4	30-70%	30-70%	
BW-S-PI-5_P11	2021-10-14	Good	4	30-70%	30-70%	
BW-S-PI-5_P11	2022-05-25	Good	4	30-70%	30-70%	
BW-S-PI-5_P12	2019-11-20	Good		2-10%		
BW-S-PI-5_P12	2020-05-22	Good		2-10%	30-70%	
BW-S-PI-5_P12	2020-10-23	Good	4	2-10%	30-70%	
BW-S-PI-5_P12	2021-10-14	Good	4	2-10%	30-70%	Vegetation condition upgraded to Very Good
BW-S-PI-5_P12	2022-05-25	Good	4	2-10%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P13	2020-07-30	Excellent		<2%	30-70%	
BW-S-PI-5_P13	2020-10-23	Excellent	3	<2%	30-70%	
BW-S-PI-5_P13	2021-10-14	Excellent	3	<2%	30-70%	
BW-S-PI-5_P13	2022-05-25	Excellent	3	<2%	30-70%	
BW-S-PI-5_P14	2020-07-30	Excellent		<2%	30-70%	
BW-S-PI-5_P14	2020-10-23	Excellent	4	<2%	30-70%	
BW-S-PI-5_P14	2021-10-14	Excellent	4	<2%	30-70%	
BW-S-PI-5_P14	2022-05-25	Excellent	4	<2%	30-70%	
BW-S-PI-5_P15	2019-11-20	Good		10-30%		
BW-S-PI-5_P15	2020-05-22	Good		10-30%	10-30%	
BW-S-PI-5_P15	2020-10-23	Good	4	10-30%	10-30%	
BW-S-PI-5_P15	2021-10-14	Good	5	10-30%	10-30%	Crown extent density increased to 5
BW-S-PI-5_P15	2022-05-25	Good	5	10-30%	10-30%	
BW-S-PI-5_P16	2019-11-20	Very good		30-70%		
BW-S-PI-5_P16	2020-09-09	Very good		30-70%	30-70%	
BW-S-PI-5_P16	2021-10-14	Very good	4	30-70%	30-70%	
BW-S-PI-5_P16	2022-05-25	Very good	4	30-70%	30-70%	
BW-S-PI-5_P17	2019-11-20	Very good		10-30%		
BW-S-PI-5_P17	2020-05-22	Very good		10-30%	30-70%	
BW-S-PI-5_P17	2020-10-23	Very good	4	10-30%	30-70%	
BW-S-PI-5_P17	2021-10-14	Very good	4	10-30%	30-70%	
BW-S-PI-5_P17	2022-05-25	Very good	4	10-30%	30-70%	
BW-S-PI-5_P18	2019-11-20	Very good		10-30%		
BW-S-PI-5_P18	2020-05-22	Very good		10-30%	30-70%	
BW-S-PI-5_P18	2020-10-23	Very good	3	10-30%	30-70%	
BW-S-PI-5_P18	2021-10-14	Very good	4	10-30%	30-70%	Crown extent density increased to 4
BW-S-PI-5_P18	2022-05-25	Very good	4	10-30%	30-70%	
BW-S-PI-5_P19	2019-11-20	Very good		2-10%		
BW-S-PI-5_P19	2020-05-22	Very good		2-10%	30-70%	
BW-S-PI-5_P19	2020-10-23	Very good	3	10-30%	30-70%	Weed cover increased.
BW-S-PI-5_P19	2021-10-14	Very good	3	10-30%	30-70%	
BW-S-PI-5_P19	2022-05-25	Very good	4	10-30%	30-70%	Crown extent density increased to 4
BW-S-PI-5_P20	2019-11-20	Very good		2-10%		
BW-S-PI-5_P20	2020-05-22	Very good		2-10%	30-70%	
BW-S-PI-5_P20	2020-10-23	Very good	3	2-10%	30-70%	
BW-S-PI-5_P20	2021-10-14	Very good	3	2-10%	30-70%	
BW-S-PI-5_P20	2022-05-25	Very good	3	2-10%	30-70%	
BW-S-PI-5_P21	2019-11-20	Very good		<2%		
BW-S-PI-5_P21	2020-05-22	Very good		<2%	30-70%	
BW-S-PI-5_P21	2020-10-23	Very good	3	<2%	30-70%	
BW-S-PI-5_P21	2021-10-14	Very good	3	<2%	30-70%	
BW-S-PI-5_P21	2022-05-25	Very good	3	<2%	30-70%	
BW-S-PI-5_P22	2019-11-20	Excellent		<2%		

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P22	2020-05-22	Excellent		<2%	30-70%	
BW-S-PI-5_P22	2020-10-23	Excellent	4	<2%	30-70%	
BW-S-PI-5_P22	2021-10-14	Excellent	4	<2%	30-70%	
BW-S-PI-5_P22	2022-05-25	Excellent	4	<2%	30-70%	
BW-S-PI-5_P23	2019-11-20	Excellent		<2%		
BW-S-PI-5_P23	2020-05-22	Excellent		<2%	30-70%	
BW-S-PI-5_P23	2020-10-23	Excellent	4	<2%	30-70%	
BW-S-PI-5_P23	2021-10-14	Excellent	4	<2%	30-70%	
BW-S-PI-5_P23		Excellent	4	<2%	30-70%	
BW-S-PI-5_P24	2019-11-20	Excellent		<2%		
BW-S-PI-5_P24	2020-05-22	Excellent		<2%	30-70%	
BW-S-PI-5_P24	2020-10-23	Excellent	4	<2%	30-70%	
BW-S-PI-5_P24	2021-10-14	Excellent	4	<2%	30-70%	
BW-S-PI-5_P24	2022-05-25	Excellent	4	<2%	30-70%	
BW-S-PI-5_P25	2019-11-20	Excellent		<2%		
BW-S-PI-5_P25	2020-05-22	Excellent		<2%	30-70%	
BW-S-PI-5_P25	2020-10-23	Excellent	3	<2%	30-70%	
BW-S-PI-5_P25	2021-10-14	Excellent	3	<2%	30-70%	
BW-S-PI-5_P25	2022-05-25	Excellent	3	<2%	30-70%	
BW-S-PI-5_P26	2019-11-20	Excellent		<2%		
BW-S-PI-5_P26	2020-05-22	Excellent		<2%	30-70%	
BW-S-PI-5_P26	2020-10-23	Excellent	3	2-10%	30-70%	
BW-S-PI-5_P26	2021-10-14	Excellent	3	2-10%	30-70%	
BW-S-PI-5_P26	2022-05-25	Excellent	4	2-10%	30-70%	Crown extent density increased to 4
BW-S-PI-5_P27	2019-11-20	Excellent		<2%		
BW-S-PI-5_P27	2020-05-22	Excellent		<2%	30-70%	
BW-S-PI-5_P27	2020-10-23	Excellent	3	2-10%	30-70%	Weed cover increased.
BW-S-PI-5_P27	2021-10-14	Excellent	3	2-10%	30-70%	
BW-S-PI-5_P27	2022-05-25	Excellent	3	2-10%	30-70%	
BW-S-PI-5_P28	2019-11-20	Excellent		<2%		
BW-S-PI-5_P28	2020-06-25	Excellent		<2%		
BW-S-PI-5_P28	2020-09-09	Excellent		<2%		
BW-S-PI-5_P28	2021-10-14	Excellent	4	<2%	30-70%	
BW-S-PI-5_P28	2022-05-25	Excellent	4	<2%	30-70%	
BW-S-PI-5_P29	2019-11-20	Excellent		<2%		
BW-S-PI-5_P29	2020-05-22	Excellent		<2%	30-70%	
BW-S-PI-5_P29	2020-10-23	Excellent	4	<2%	30-70%	
BW-S-PI-5_P29	2021-10-14	Excellent	4	<2%	30-70%	
BW-S-PI-5_P29	2022-05-25	Excellent	4	<2%	30-70%	
BW-S-PI-5_P30	2019-11-20	Very good		<2%		
BW-S-PI-5_P30	2020-05-22	Very good		<2%	30-70%	
BW-S-PI-5_P30	2020-10-23	Very good	4	<2%	30-70%	
BW-S-PI-5_P30	2021-10-14	Very good	4	<2%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P30	2022-05-25	Very good	4	<2%	30-70%	
BW-S-PI-5_P31	2019-11-20	Very good		2-10%		
BW-S-PI-5_P31	2020-05-22	Very good		<2%	30-70%	Weed cover decreased
BW-S-PI-5_P31	2020-10-23	Very good	4	<2%	30-70%	
BW-S-PI-5_P31	2021-10-14	Very good	4	<2%	30-70%	
BW-S-PI-5_P31	2022-05-25	Very good	4	<2%	30-70%	
BW-S-PI-5_P32	2019-11-20	Very good		2-10%		Vegetation condition originally assessed as Good. This was retrospectively reassessed to be Very Good based on a cumulative assessment of the site in autumn 2020.
BW-S-PI-5_P32	2020-05-22	Very good		<2%	30-70%	Weed cover decreased
BW-S-PI-5_P32	2020-10-23	Very good	4	2-10%	30-70%	Weed cover increased
BW-S-PI-5_P32	2021-10-14	Very good	4	2-10%	30-70%	
BW-S-PI-5_P32	2022-05-25	Very good	4	2-10%	30-70%	
BW-S-PI-5_P33	2019-11-20	Very good		2-10%		
BW-S-PI-5_P33	2020-05-22	Very good		<2%	30-70%	Weed cover decreased
BW-S-PI-5_P33	2020-10-23	Very good	3	2-10%	30-70%	Weed cover increased
BW-S-PI-5_P33	2021-10-14	Very good	3	2-10%	30-70%	
BW-S-PI-5_P33	2022-05-25	Very good	3	2-10%	30-70%	
BW-S-PI-5_P34	2019-11-20	Excellent		2-10%		
BW-S-PI-5_P34	2020-05-22	Excellent		<2%	30-70%	Weed cover decreased
BW-S-PI-5_P34	2020-10-23	Excellent	3	<2%	30-70%	
BW-S-PI-5_P34	2021-10-14	Excellent	3	<2%	30-70%	
BW-S-PI-5_P34	2022-05-25	Excellent	4	<2%	30-70%	
BW-S-PI-6_P01	2020-05-22	Degraded		>70%	30-70%	
BW-S-PI-6_P01	2020-10-23	Degraded	4	>70%	30-70%	
BW-S-PI-6_P01	2021-10-15	Degraded	4	>70%	30-70%	
BW-S-PI-6_P01	2022-05-25	Degraded	4	>70%	30-70%	
BW-S-PI-6_P02	2020-05-22	Degraded		10-30%	30-70%	
BW-S-PI-6_P02	2020-10-23	Degraded	4	10-30%	30-70%	
BW-S-PI-6_P02	2021-10-15	Degraded	4	10-30%	30-70%	
BW-S-PI-6_P02	2022-05-25	Degraded	4	10-30%	30-70%	
BW-S-PI-6_P03	2020-05-22	Degraded		30-70%	30-70%	
BW-S-PI-6_P03	2020-10-23	Degraded	5	30-70%	30-70%	
BW-S-PI-6_P03	2021-10-15	Degraded	5	30-70%	30-70%	
BW-S-PI-6_P03	2022-05-25	Degraded	5	30-70%	30-70%	
BW-S-PI-6_P04	2020-05-22	Degraded		30-70%	30-70%	
BW-S-PI-6_P04	2020-10-23	Degraded	4	30-70%	30-70%	
BW-S-PI-6_P04	2021-10-15	Degraded	4	30-70%	30-70%	
BW-S-PI-6_P04	2022-05-25	Degraded	4	30-70%	30-70%	
BW-S-PI-7_P01	2020-05-26	Degraded		>70%	10-30%	Site only monitored once due to access issues
BW-S-PI-7_P02	2020-05-26	Degraded		>70%	10-30%	Site only monitored once due to access issues
BW-S-PI-7_P03	2020-05-26	Degraded		30-70%	30-70%	Site only monitored once due to access issues
BW-S-PI-7_P04	2020-05-26	Degraded		>70%	30-70%	Site only monitored once due to access issues
BW-S-PI-8_P01	20/6/2022	Very good	5	2-10%	30-70%	New site in June 2022

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-8_P02	20/6/2022	Excellent	5	<2%	>70%	New site in June 2022
BW-S-PI-8_P03	20/6/2022	Good	5	10-30%	30-70%	New site in June 2022
BW-S-PI-8_P04	20/6/2022	Very good	5	2-10%	30-70%	New site in June 2022
BW-S-PI-8_P05	20/6/2022	Good	5	30-70%	10-30%	New site in June 2022
BW-S-PI-8_P06	20/6/2022	Good	5	30-70%	30-70%	New site in June 2022
BW-S-PI-8_P07	20/6/2022	Good	5	30-70%	30-70%	New site in June 2022
BW-S-PI-8_P08	20/6/2022	Good	5	30-70%	30-70%	New site in June 2022
CP-S-PI-1_P01	2019-11-19	Degraded		10-30%		
CP-S-PI-1_P01	2020-05-20	Degraded		10-30%	10-30%	
CP-S-PI-1_P01	2020-10-28	Degraded	5	30-70%	10-30%	
CP-S-PI-1_P01	2021-10-15	Degraded	5	30-70%	10-30%	
CP-S-PI-1_P01	2022-05-26	Degraded	5	30-70%	10-30%	
CP-S-PI-1_P02	2019-11-19	Good		2-10%		
CP-S-PI-1_P02	2020-05-20	Good		2-10%	10-30%	
CP-S-PI-1_P02	2020-10-28	Good	5	10-30%	10-30%	Weed cover increased
CP-S-PI-1_P02	2021-10-15	Good	5	10-30%	10-30%	
CP-S-PI-1_P02	2022-05-26	Good	5	10-30%	10-30%	
CP-S-PI-1_P03	2019-11-19	Very good		2-10%		
CP-S-PI-1_P03	2020-05-20	Very good		2-10%	30-70%	
CP-S-PI-1_P03	2020-10-28	Very good	5	2-10%	30-70%	
CP-S-PI-1_P03	2021-10-15	Very good	5	2-10%	30-70%	
CP-S-PI-1_P03	2022-05-26	Very good	5	2-10%	30-70%	
TW-S-PI-1_P01	2019-11-21	Degraded		<2%		
TW-S-PI-1_P01	2020-05-26	Degraded		<2%	10-30%	
TW-S-PI-1_P01	2020-10-28	Degraded	5	<2%	10-30%	
TW-S-PI-1_P01	2021-10-14	Degraded	5	<2%	10-30%	
TW-S-PI-1_P01	2022-05-26	Degraded	5	<2%	10-30%	
TW-S-PI-1_P02	2019-11-21	Good		<2%		
TW-S-PI-1_P02	2020-05-26	Good		<2%	10-30%	
TW-S-PI-1_P02	2020-10-28	Good	4	<2%	10-30%	
TW-S-PI-1_P02	2021-10-14	Good	4	<2%	10-30%	
TW-S-PI-1_P02	2022-05-26	Good	4	<2%	10-30%	
TW-S-PI-1_P03	2019-11-21	Degraded		2-10%		
TW-S-PI-1_P03	2020-05-26	Degraded		2-10%	30-70%	
TW-S-PI-1_P03	2020-10-28	Degraded	5	2-10%	30-70%	
TW-S-PI-1_P03	2021-10-15	Degraded	5	<2%	30-70%	Weed cover decreased
TW-S-PI-1_P03	2022-05-26	Degraded	5	<2%	30-70%	Weed cover decreased
TW-S-PI-2_P01	2020-07-31	Very good		10-30%	30-70%	
TW-S-PI-2_P01	2020-10-28	Very good	5	30-70%	30-70%	
TW-S-PI-2_P01	2021-10-14	Very good	5	30-70%	30-70%	
TW-S-PI-2_P01	2022-05-26	Very good	5	30-70%	30-70%	
TW-S-PI-2_P02	2020-07-31	Good		10-30%	30-70%	
TW-S-PI-2_P02	2020-10-28	Good	5	30-70%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-2_P02	2021-10-14	Good	5	30-70%	30-70%	
TW-S-PI-2_P02	2022-05-26	Good	5	30-70%	30-70%	
TW-S-PI-2_P03	2020-07-31	Good		10-30%	30-70%	
TW-S-PI-2_P03	2020-10-28	Good	5	10-30%	30-70%	
TW-S-PI-2_P03	2021-10-14	Good	5	10-30%	30-70%	
TW-S-PI-2_P03	2022-05-26	Good	5	10-30%	30-70%	
TW-S-PI-2_P04	2020-07-31	Good		10-30%	30-70%	
TW-S-PI-2_P04	2020-10-28	Good	4	30-70%	30-70%	
TW-S-PI-2_P04	2021-10-14	Good	4	30-70%	30-70%	
TW-S-PI-2_P04	2022-05-26	Good	4	30-70%	30-70%	
TW-S-PI-2_P05	2020-07-31	Degraded		10-30%	30-70%	
TW-S-PI-2_P05	2020-09-09	Degraded		10-30%	30-70%	
TW-S-PI-2_P05	2021-10-14	Degraded	4	10-30%	30-70%	
TW-S-PI-2_P05	2022-05-26	Degraded	4	10-30%	30-70%	
TW-S-PI-2_P06	2020-07-31	Degraded		10-30%	30-70%	
TW-S-PI-2_P06	2020-10-28	Degraded	5	>70%	30-70%	Weed cover increased
TW-S-PI-2_P06	2021-10-14	Degraded	5	>70%	30-70%	
TW-S-PI-2_P06	2022-05-26	Degraded	5	>70%	30-70%	
TW-S-PI-2_P07	2020-07-31	Degraded		10-30%	30-70%	
TW-S-PI-2_P07	2020-10-28	Degraded	5	>70%	30-70%	
TW-S-PI-2_P07	2021-10-14	Degraded	5	>70%	30-70%	
TW-S-PI-2_P07	2022-05-26	Degraded	5	>70%	30-70%	
TW-S-PI-2_P08	2020-07-31	Completely degraded		>70%	2-10%	
TW-S-PI-2_P08	2020-10-28	Completely degraded	4	>70%	2-10%	
TW-S-PI-2_P08	2021-10-14	Completely degraded	4	>70%	2-10%	
TW-S-PI-2_P08	2022-05-26	Completely degraded	4	>70%	2-10%	
TW-S-PI-2_P09	2020-07-31	Good		10-30%	30-70%	
TW-S-PI-2_P09	2020-10-28	Good	4	>70%	30-70%	Weed cover increased
TW-S-PI-2_P09	2021-10-14	Good	4	>70%	30-70%	
TW-S-PI-2_P09	2022-05-26	Good	4	>70%	30-70%	
TW-S-PI-3_P01	2020-05-26	Degraded		30-70%	10-30%	
TW-S-PI-3_P01	2020-10-28	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P01	2021-10-14	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P01	2022-05-26	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P02	2020-05-26	Degraded		30-70%	30-70%	
TW-S-PI-3_P02	2020-10-28	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	2021-10-14	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	2022-05-26	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	2020-05-26	Degraded		30-70%	30-70%	
TW-S-PI-3_P03	2020-10-28	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	2021-10-14	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	2022-05-26	Degraded	5	30-70%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-3_P04	2020-05-26	Degraded		30-70%	30-70%	
TW-S-PI-3_P04	2020-10-28	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	2021-10-14	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	2022-05-26	Degraded	5	30-70%	30-70%	
TW-S-PI-4_P01	2020-05-26	Degraded		30-70%	30-70%	
TW-S-PI-4_P01	2020-10-19	Degraded	5	>70%	30-70%	
TW-S-PI-4_P01	2021-10-13	Degraded	5	>70%	<2%	
TW-S-PI-4_P01	2022-05-25	Degraded	5	>70%	<2%	
TW-S-PI-4_P02	2021-10-13	Degraded	5	>70%	30-70%	
TW-S-PI-4_P02	2022-05-25	Degraded	5	>70%	30-70%	
TW-S-PI-4_P03	2020-10-19	Degraded	5	>70%	30-70%	
TW-S-PI-4_P03	2021-10-13	Degraded	5	>70%	30-70%	
TW-S-PI-4_P03	2022-05-25	Degraded	5	>70%	30-70%	

Appendix 10. Transect boundary photopoint comparative data for vegetation condition, crown extent density, weed cover and native cover spring 2019 to Autumn 2022.

Current site name	Current photocode	Date	Condition	Crown extent density	Weed cover	Native cover	Comments
BTW-S-R-1	BTW-S-R-1_T1E	2019-12-03	Very good				
BTW-S-R-1	BTW-S-R-1_T1E	2020-05-22	Very good		<2%	30-70%	
BTW-S-R-1	BTW-S-R-1_T1E	2020-10-26	Very good	4	<2%	30-70%	
BTW-S-R-1	BTW-S-R-1_T1E	2021-10-12	Very good	4	2-10%	30-70%	Weed cover increased
BTW-S-R-1	BTW-S-R-1_T1E	2022-05-25	Very good	4	2-10%	30-70%	
BTW-S-R-1	BTW-S-R-1_T1W	2019-12-03	Very good				
BTW-S-R-1	BTW-S-R-1_T1W	2020-05-22	Very good		<2%	30-70%	
BTW-S-R-1	BTW-S-R-1_T1W	2020-10-26	Very good	4	<2%	30-70%	
BTW-S-R-1	BTW-S-R-1_T1W	2021-10-12	Very good	4	2-10%	30-70%	Weed cover increased
BTW-S-R-1	BTW-S-R-1_T1W	2022-05-25	Very good	4	2-10%	30-70%	
BTW-S-R-2	BTW-S-R-2_T1N	2019-11-22	Excellent				
BTW-S-R-2	BTW-S-R-2_T1N	2020-05-22	Excellent		<2%	30-70%	
BTW-S-R-2	BTW-S-R-2_T1N	2020-10-26	Excellent	4	10-30%	30-70%	Weed cover increased
BTW-S-R-2	BTW-S-R-2_T1N	2021-10-20	Excellent	4	10-30%	30-70%	
BTW-S-R-2	BTW-S-R-2_T1N	2022-05-26	Excellent	4	10-30%	30-70%	
BTW-S-R-2	BTW-S-R-2_T1S	2019-11-22	Very good				
BTW-S-R-2	BTW-S-R-2_T1S	2020-05-22	Very good		2-10%	30-70%	
BTW-S-R-2	BTW-S-R-2_T1S	2020-10-26	Very good	4	10-30%	30-70%	Weed cover increased
BTW-S-R-2	BTW-S-R-2_T1S	2021-10-20	Very good	4	10-30%	30-70%	
BTW-S-R-2	BTW-S-R-2_T1S	2022-05-26	Very good	4	10-30%	30-70%	
BW-S-PI-1	BW-S-PI-1_T1E	2019-11-19	Very good				
BW-S-PI-1	BW-S-PI-1_T1E	2020-05-26	Very good		<2%	30-70%	
BW-S-PI-1	BW-S-PI-1_T1E	2021-02-08	Very good	3	<2%	30-70%	
BW-S-PI-1	BW-S-PI-1_T1E	2021-10-14	Very good	4	2-10%	30-70%	Weed cover increased
BW-S-PI-1	BW-S-PI-1_T1E	2022-05-26	Very good	4	2-10%	30-70%	
BW-S-PI-1	BW-S-PI-1_T1W	2019-11-19	Very good				
BW-S-PI-1	BW-S-PI-1_T1W	2020-05-26	Very good		<2%	30-70%	
BW-S-PI-1	BW-S-PI-1_T1W	2020-10-26	Very good	4	2-10%	30-70%	Weed cover increased
BW-S-PI-1	BW-S-PI-1_T1W	2021-10-14	Very good	4	10-30%	30-70%	Weed cover increased
BW-S-PI-1	BW-S-PI-1_T1W	2022-05-26	Very good	4	10-30%	30-70%	
BW-S-PI-5	BW-S-PI-5_T1N	2019-11-20	Very good				
BW-S-PI-5	BW-S-PI-5_T1N	2020-05-22	Very good		<2%	30-70%	
BW-S-PI-5	BW-S-PI-5_T1N	2020-10-14	Very good	3	30-70%	30-70%	Weed cover increased
BW-S-PI-5	BW-S-PI-5_T1N	2021-10-14	Very good	4	10-30%	30-70%	Weed cover decreased
BW-S-PI-5	BW-S-PI-5_T1N	2022-05-25	Very good	4	10-30%	30-70%	
BW-S-PI-5	BW-S-PI-5_T1S	2019-11-20	Very good				
BW-S-PI-5	BW-S-PI-5_T1S	2020-05-22	Excellent		<2%	30-70%	
BW-S-PI-5	BW-S-PI-5_T1S	2020-10-14	Excellent	4	<2%	30-70%	

Current site name	Current photocode	Date	Condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5	BW-S-PI-5_T1S	2021-10-14	Excellent	4	<2%	30-70%	
BW-S-PI-5	BW-S-PI-5_T1S	2022-05-25	Excellent	4	<2%	30-70%	
BW-S-R-1	BW-S-R-1_T1E	2019-11-22	Very good				
BW-S-R-1	BW-S-R-1_T1E	2020-05-22	Very good		<2%	30-70%	
BW-S-R-1	BW-S-R-1_T1E	2020-10-22	Very good	5	<2%	30-70%	
BW-S-R-1	BW-S-R-1_T1E	2021-10-12	Very good	5	<2%	30-70%	
BW-S-R-1	BW-S-R-1_T1E	2022-05-26	Very good	4	<2%	30-70%	
BW-S-R-1	BW-S-R-1_T1W	2019-11-22	Very good				
BW-S-R-1	BW-S-R-1_T1W	2020-05-22	Very good		<2%	30-70%	
BW-S-R-1	BW-S-R-1_T1W	2020-10-22	Very good	4	<2%	30-70%	
BW-S-R-1	BW-S-R-1_T1W	2021-10-12	Very good	4	<2%	30-70%	
BW-S-R-1	BW-S-R-1_T1W	2022-05-26	Very good	4	<2%	30-70%	
BW-S-R-1	BW-S-R-1_T2N	2019-12-03	Excellent				
BW-S-R-1	BW-S-R-1_T2N	2020-05-22	Excellent		<2%	30-70%	
BW-S-R-1	BW-S-R-1_T2N	2020-10-22	Excellent	3	<2%	30-70%	
BW-S-R-1	BW-S-R-1_T2N	2021-10-12	Excellent	3	<2%	30-70%	
BW-S-R-1	BW-S-R-1_T2N	2022-05-26	Excellent	4	<2%	30-70%	
BW-S-R-1	BW-S-R-1_T2S	2019-12-03	Excellent				
BW-S-R-1	BW-S-R-1_T2S	2020-05-22	Excellent		<2%	>70%	
BW-S-R-1	BW-S-R-1_T2S	2020-10-22	Excellent		<2%	>70%	
BW-S-R-1	BW-S-R-1_T2S	2021-10-12	Excellent		<2%	>70%	
BW-S-R-1	BW-S-R-1_T2S	2022-05-26	Excellent	4	<2%	>70%	
TW-S-PI-2	TW-S-PI-2_T1E	2019-11-19	Very good				
TW-S-PI-2	TW-S-PI-2_T1E	2020-05-26	Very good		<2%	30-70%	
TW-S-PI-2	TW-S-PI-2_T1E	2020-10-26	Very good	5	2-10%	30-70%	Weed cover increased
TW-S-PI-2	TW-S-PI-2_T1E	2021-10-14	Very good	5	10-30%	30-70%	Weed cover increased
TW-S-PI-2	TW-S-PI-2_T1E	2022-05-26	Very good	5	10-30%	30-70%	
TW-S-PI-2	TW-S-PI-2_T1W	2019-11-19	Very good				
TW-S-PI-2	TW-S-PI-2_T1W	2020-05-26	Very good		<2%	30-70%	Weed cover increased
TW-S-PI-2	TW-S-PI-2_T1W	2020-10-26	Very good	5	2-10%	30-70%	
TW-S-PI-2	TW-S-PI-2_T1W	2021-10-14	Very good	5	2-10%	30-70%	
TW-S-PI-2	TW-S-PI-2_T1W	2022-05-26	Very good	5	2-10%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1E	2019-11-06	Very good				
CP-NS-R-1	CP-NS-R-1_T1E	2020-05-20	Very good		2-10%		
CP-NS-R-1	CP-NS-R-1_T1E	2020-10-12	Very good	5	10-30%	30-70%	Weed cover increased
CP-NS-R-1	CP-NS-R-1_T1E	2021-11-09	Very good	5	10-30%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1E	24/5/2022	Very good	5	10-30%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1W	2019-11-06	Excellent				
CP-NS-R-1	CP-NS-R-1_T1W	2020-05-20	Excellent		<2%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1W	2020-10-12	Excellent	5	<2%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1W	2021-11-09	Excellent	5	<2%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1W	24/5/2022	Excellent	5	<2%	30-70%	
CP-NS-R-2	CP-NS-R-2_T1N	2020-09-26	Degraded	5	10-30%	30-70%	

Current site name	Current photocode	Date	Condition	Crown extent density	Weed cover	Native cover	Comments
CP-NS-R-2	CP-NS-R-2_T1N	2021-10-15	Degraded	5	10-30%	30-70%	
CP-NS-R-2	CP-NS-R-2_T1N	26/5/2022	Degraded	5	10-30%	30-70%	
CP-NS-R-2	CP-NS-R-2_T1S	2020-10-20	Good	5	10-30%	30-70%	
CP-NS-R-2	CP-NS-R-2_T1S	2021-10-15	Good	5			
CP-NS-R-2	CP-NS-R-2_T1S	26/5/2022	Good	5	30-70%	2-10%	Weed cover increased, native cover decreased native annuals not germinated.
CP-S-PI-1	CP-S-PI-1_T1N	2019-11-05	Degraded				
CP-S-PI-1	CP-S-PI-1_T1N	2020-05-20	Degraded		30-70%	10-30%	
CP-S-PI-1	CP-S-PI-1_T1N	2020-10-20	Degraded		30-70%	10-30%	
CP-S-PI-1	CP-S-PI-1_T1N	2021-10-15	Degraded	5	30-70%	10-30%	
CP-S-PI-1	CP-S-PI-1_T1N	26/5/2022	Degraded	5	30-70%	10-30%	
CP-S-PI-1	CP-S-PI-1_T1S	2019-11-05	Good				
CP-S-PI-1	CP-S-PI-1_T1S	2020-05-20	Good		10-30%	30-70%	
CP-S-PI-1	CP-S-PI-1_T1S	2020-10-20	Good	5	10-30%	30-70%	
CP-S-PI-1	CP-S-PI-1_T1S	2021-10-15	Good	5	10-30%	30-70%	
CP-S-PI-1	CP-S-PI-1_T1S	26/5/2022	Good	5	10-30%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1E	2019-11-06	Very good				
CP-NS-R-1	CP-NS-R-1_T1E	2020-05-20	Very good		2-10%		
CP-NS-R-1	CP-NS-R-1_T1E	2020-10-12	Very good	5	10-30%	30-70%	Weed cover increased
CP-NS-R-1	CP-NS-R-1_T1E	2021-11-09	Very good	5	10-30%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1E	24/5/2022	Very good	5	10-30%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1W	2019-11-06	Excellent				
CP-NS-R-1	CP-NS-R-1_T1W	2020-05-20	Excellent		<2%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1W	2020-10-12	Excellent	5	<2%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1W	2021-11-09	Excellent	5	<2%	30-70%	
CP-NS-R-1	CP-NS-R-1_T1W	24/5/2022	Excellent	5	<2%	30-70%	
CP-NS-R-2	CP-NS-R-2_T1N	2020-09-26	Degraded	5	10-30%	30-70%	
CP-NS-R-3	CP-NS-R-2_T1N	2021-10-15	Degraded	5	10-30%	30-70%	
CP-NS-R-3	CP-NS-R-2_T1N	26/5/2022	Degraded	5	10-30%	30-70%	
CP-NS-R-2	CP-NS-R-2_T1S	2020-10-20	Good	5	10-30%	30-70%	

Appendix 11: Comparative Photomon photographs Spring 2019 – Autumn/Winter 2022.

These photographs are provided as examples of sites that have increased in weed cover over the monitoring period.

1 BW-S-PI-5_P09

20/11/19 Good, 2-10% weeds

22/05/20 Good, 2-10% weeds

23/10/20 Good, 10-30% weeds

25/05/22 Good, 30-70% weeds

2 BW-S-PI-5_P10

20/11/19 Good, <2 weeds

22/05/20 Good, <2% weeds

23/10/20 Good, 2-10% weeds weeds

14/10/2021 Good, 2-10% weeds

25/05/2022 Good, 10 – 30% weeds

3 CP-S-PI-1_P01

6/11/19 Degraded, 10-30% weeds

20/05/20 Degraded, 10-30% weeds

21/10/20 Degraded, 30-70% weeds

15/10/21 Degraded, 30-70% weeds

26/05/22 Degraded, 30-70% weeds

4 BTW-S-R-2_T1S

22/11/19 Very Good

22/05/20 Very Good, 2-10% weeds

26/10/20 Very Good, 10-30% weeds

23/10/21 Very Good, 10-30% weeds

Appendix 12. Drainage monitoring results autumn 2022 site reports.

BTW-S-R-2_D1(w20)

Created	2021-08-31 01:57:44 UTC by Colin Spencer
Updated	2022-06-21 01:16:25 UTC by Debbie Brace
Location	-33.38482406, 115.628727
Site name	BTW-S-R-2
Point name	BTW-S-R-2_D1(w20)
Recorder	Colin Spencer
Date	2022-05-26
Issue Y/N	No
Photos	
Photo direction	Northeast
General comments	Site appears generally healthy, no abnormal drying effects observed.

BW-S-PI-1

Created	2022-05-26 01:08:31 UTC by Debbie Brace
Updated	2022-05-26 06:51:14 UTC by Debbie Brace
Location	-33.38581398208233, 115.6514684495408
Site name	BW-S-PI-1
Point name	BW-S-PI-1
Recorder	Debbie Brace
Date	2022-05-26
Issue Y/N	No
Photos	
General comments	No issue

BW-S-PI-2

Created	2022-05-25 01:05:40 UTC by Debbie Brace
Updated	2022-06-21 01:27:33 UTC by Debbie Brace
Location	-33.416336081215285, 115.66270378971014
Site name	BW-S-PI-2
Point name	BW-S-PI-2
Recorder	Debbie Brace
Date	2022-05-25
Issue Y/N	No
Photos	
Photo direction	North
General comments	No issue

BW-S-PI-3

Created	2022-05-25 02:54:54 UTC by Debbie Brace
Updated	2022-05-26 06:56:27 UTC by Debbie Brace
Location	-33.422771479133154, 115.64726080745459
Site name	BW-S-PI-3
Point name	BW-S-PI-3
Recorder	Debbie Brace
Date	2022-05-25
Issue Y/N	No
Photos	

BW-S-PI-4

Created	2022-05-25 02:56:39 UTC by Debbie Brace
Updated	2022-06-21 01:26:04 UTC by Debbie Brace
Location	-33.42754823918287, 115.64018979287202
Site name	BW-S-PI-4
Point name	BW-S-PI-4
Recorder	Debbie Brace
Date	2022-05-25
Issue Y/N	No
Photos	
General comments	No issue

BW-S-PI-5

Created	2022-05-25 06:07:36 UTC by Debbie Brace
Updated	2022-06-21 01:39:26 UTC by Debbie Brace
Location	-33.43892043358543, 115.61399169266222
Site name	BW-S-PI-5
Point name	BW-S-PI-5
Recorder	Debbie Brace
Date	2022-05-25
Issue Y/N	No
Photos	

BW-S-PI-6

Created	2022-05-25 07:04:19 UTC by Debbie Brace
Updated	2022-06-21 01:40:35 UTC by Debbie Brace
Location	-33.45177007665466, 115.60600176025969
Site name	BW-S-PI-6
Point name	BW-S-PI-6
Recorder	Debbie Brace
Date	2022-05-25
Issue Y/N	No
Photos	
General comments	No issue

BW-S-R-1_T1

Created	2022-05-26 00:26:02 UTC by Debbie Brace
Updated	2022-05-26 07:15:02 UTC by Debbie Brace
Location	-33.374419292207726, 115.65891617695927
Site name	BW-S-R-1_T1
Point name	BW-S-R-1_T1
Recorder	Debbie Brace
Date	2022-05-26
Issue Y/N	No
Photos	
General comments	No issue

BW-S-R-1_T2

Created	2022-05-26 00:40:06 UTC by Debbie Brace
Updated	2022-05-26 07:14:08 UTC by Debbie Brace
Location	-33.37935282752947, 115.65655162572875
Site name	BW-S-R-1_T2
Point name	BW-S-R-1_T2
Recorder	Debbie Brace
Date	2022-05-26
Issue Y/N	No
Photos	
General comments	No issue

CP-NS-R-1

Created	2022-05-24 03:33:46 UTC by Debbie Brace
Updated	2022-05-26 06:30:10 UTC by Debbie Brace
Location	-33.327461892375375, 115.76989785301751
Site name	CP-NS-R-1
Point name	CP-NS-R-1
Recorder	Debbie Brace
Date	2022-05-24
Issue Y/N	No
Photos	
Photo direction	Southwest

CP-NS-R-2

Created	2022-05-26 01:52:09 UTC by Debbie Brace
Updated	2022-05-26 06:49:57 UTC by Debbie Brace
Location	-33.38476611304412, 115.66191287722035
Site name	CP-NS-R-2
Point name	CP-NS-R-2
Recorder	Debbie Brace
Date	2022-05-26
Issue Y/N	No
Photos	
General comments	No issue

CP-S-PI-1_I1(w20)

Created	2021-08-31 01:57:48 UTC by Colin Spencer
Updated	2022-06-29 09:09:39 UTC by Debbie Brace
Location	-33.38610795, 115.6615011
Site name	CP-S-PI-1
Point name	CP-S-PI-1_I1(w20)
Recorder	Debbie Brace
Date	2022-05-26
Issue Y/N	No
Issue	Inundation
Photos	
General comments	About 50 mm water in ruts, otherwise no issues

CW-S-PI-8 no issues

Created	2022-06-29 08:51:01 UTC by Debbie Brace
Updated	2022-06-29 08:58:14 UTC by Debbie Brace
Location	-33.42988169832404, 115.62949553132056
Site name	CW-S-PI-8 (new)
Point name	CW-S-PI-8 no issues
Recorder	Debbie Brace
Date	2022-06-20
Issue Y/N	No
Photos	
Photo direction	South
General comments	No issues

TW-S-PI -2

Created	2022-05-26 02:55:23 UTC by Debbie Brace
Updated	2022-05-26 06:52:00 UTC by Debbie Brace
Location	-33.38536583821613, 115.64596488151294
Site name	TW-S-PI-2
Point name	TW-S-PI -2
Recorder	Debbie Brace
Date	2022-05-26
Issue Y/N	No
Photos	
General comments	No issue

TW-S-PI-3

Created	2022-05-26 03:31:34 UTC by Debbie Brace
Updated	2022-05-26 06:53:41 UTC by Debbie Brace
Location	-33.3880097217998, 115.64355311856868
Site name	TW-S-PI-3
Point name	TW-S-PI-3
Recorder	Debbie Brace
Date	2022-05-26
Issue Y/N	No
Photos	
General comments	No issue

TW-S-PI-4

Created	2022-05-25 07:26:22 UTC by Debbie Brace
Updated	2022-05-26 06:54:33 UTC by Debbie Brace
Location	-33.39280671933769, 115.64906222149682
Site name	TW-S-PI-4
Point name	TW-S-PI-4
Recorder	Debbie Brace
Date	2022-05-25
Issue Y/N	No
Photos	
General comments	No issue

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Delivering the Bunbury Outer Ring Road