BHP

# Orebody 32 Below Water Table and Creek Discharge - MS1105

# Flora and Vegetation Environmental Management Plan

**15 December 2025**

## Version Control

| Version | Description | Key changes | Date |
|---|---|---|---|
| Version 0 | EMP submitted to EPA as requirement of OB32 BWT Derived Proposal Section 45B Notice: Statement 1105 – No 1, MS1105 Condition 7 | New document | 24/01/2024 |
| Version 1 | EMP submitted to EPA as requirement of OB32 BWT Creek Discharge Derived Proposal Section 45B Notice: Statement 1105 – No 1, MS1105 Condition 7 | Amended to include management of impacts to flora and vegetation from the proposed Orebody 32 Below Water Table Creek Discharge Derived Proposal | 15/12/2025 |

# Abbreviations and Definitions

| Term | Meaning |
|---|---|
| BAM Act | *Biosecurity and Agriculture Management Act* |
| BC Act | *Biodiversity Conservation Act 2016* (WA) |
| BHP | BHP Iron Ore Pty Ltd |
| CAR | Compliance Assessment Report |
| CEO | Chief Executive Officer |
| Clearing | As defined in section 51A of the *Environmental Protection Act 1986 (WA)* |
| DBCA | Department of Biodiversity, Conservation and Attractions |
| DWER | Department of Water and Environmental Regulation |
| EMP | Environmental Management Plan |
| EPA | Environmental Protection Authority |
| EP Act | *Environmental Protection Act 1986 (WA)* |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* |
| FVEMP | Flora and Vegetation Management Plan |
| GIS | Geographic Information System |
| KNAC | Karlka Nyiyaparli Aboriginal Corporation |
| MS | Ministerial Statement |
| WA | Western Australia |
| WAIO | Western Australia Iron Ore |

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## Appendices



## Tables



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# Executive Summary

| Orebody 32 Below Water Table Flora and Vegetation Environmental Management Plan | |
|---|---|
| **Proposal names** | Newman Hub (Orebody 32 Below Water Table) Iron Ore Mining Operations<br>Newman Hub (Orebody 32 Below Water Table Creek Discharge) |
| **Proponent name** | BHP Iron Ore Pty Ltd |
| **Ministerial Statements** | Derived Proposal – Ministerial Statement 1105 – Orebody 32 BWT<br>Derived Proposal Request – Ministerial Statement 1105 – Orebody 32 BWT Creek Discharge |
| **Purpose of the EMP** | To meet the requirements of MS1105 Condition 7 (Flora and Vegetation Environmental Management Plan) |
| **Key environmental factors and EMP objectives or outcomes** | **Flora and Vegetation**<br>**Objectives**<br>Minimise direct impacts on native vegetation in Good to Excellent condition in the Orebody 32 Below Water Table Development Envelope – Pipeline and OB32 Below Water Table Creek Discharge Development Envelope<br>Minimise the introduction of new weed species and the spread of existing weeds at Homestead Creek from surplus water discharge<br>**Outcomes**<br>No significant decline to the health of riparian tree species along Homestead Creek and the upper reaches of Fortescue River due to the controlled discharge of surplus water into Homestead Creek |
| **Condition clauses** | Condition 6 Condition Environmental Management Plans (6-2)<br>Condition 7 Flora and Vegetation Environmental Management Plan |
| **Key components of the plan** | Objective-based components: to minimise direct impacts on native vegetation in Good to Excellent condition<br>Outcomes-based components, including trigger and threshold criteria: to manage the potential indirect impacts to the health of riparian vegetation along Homestead Creek and the upper reaches of the Fortescue River |
| **Proposed construction date** | Newman Hub (Orebody 32 Below Water Table) Not applicable – approved proposal is in operation<br>Newman Hub (Orebody 32 BWT Creek Discharge): FY 2027 |
| **EMP required pre-construction?** | Not applicable. Version 0 of this Orebody 32 Below Water Table Flora and Vegetation Environmental Management Plan submitted to support Orebody 32 BWT.<br>Amended version (Version 1) of this management plan submitted to support Orebody 32 BWT Creek Discharge request for Derived Proposal. |

# 1 Context, scope and rationale

BHP Iron Ore Pty Ltd (BHP) has prepared this Orebody 32 Below Water Table (OB32 BWT) Flora and Vegetation Environmental Management Plan (FVEMP) to meet the requirements under Part IV of the *Environmental Protection Act 1986* (EP Act). The intent for the FVEMP is to meet the requirements of Strategic Proposal MS1105 Condition 7 Flora and Vegetation Environmental Management Plan.

BHP has prepared this FVEMP to be consistent with the *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (the Instructions) (EPA 2024).

## 1.1 Proposal

The scope of the FVEMP is the management of significant vegetation values at the Newman Hub (Orebody 32 Below Water Table) Derived Proposal (OB32 BWT Proposal) authorised under MS1105 and EP Act Section 45B Notice: Statement 1105 – No 1, and for the prospective Newman Hub (Orebody 32 BWT Creek Discharge) Derived Proposal.

**OB32 BWT**

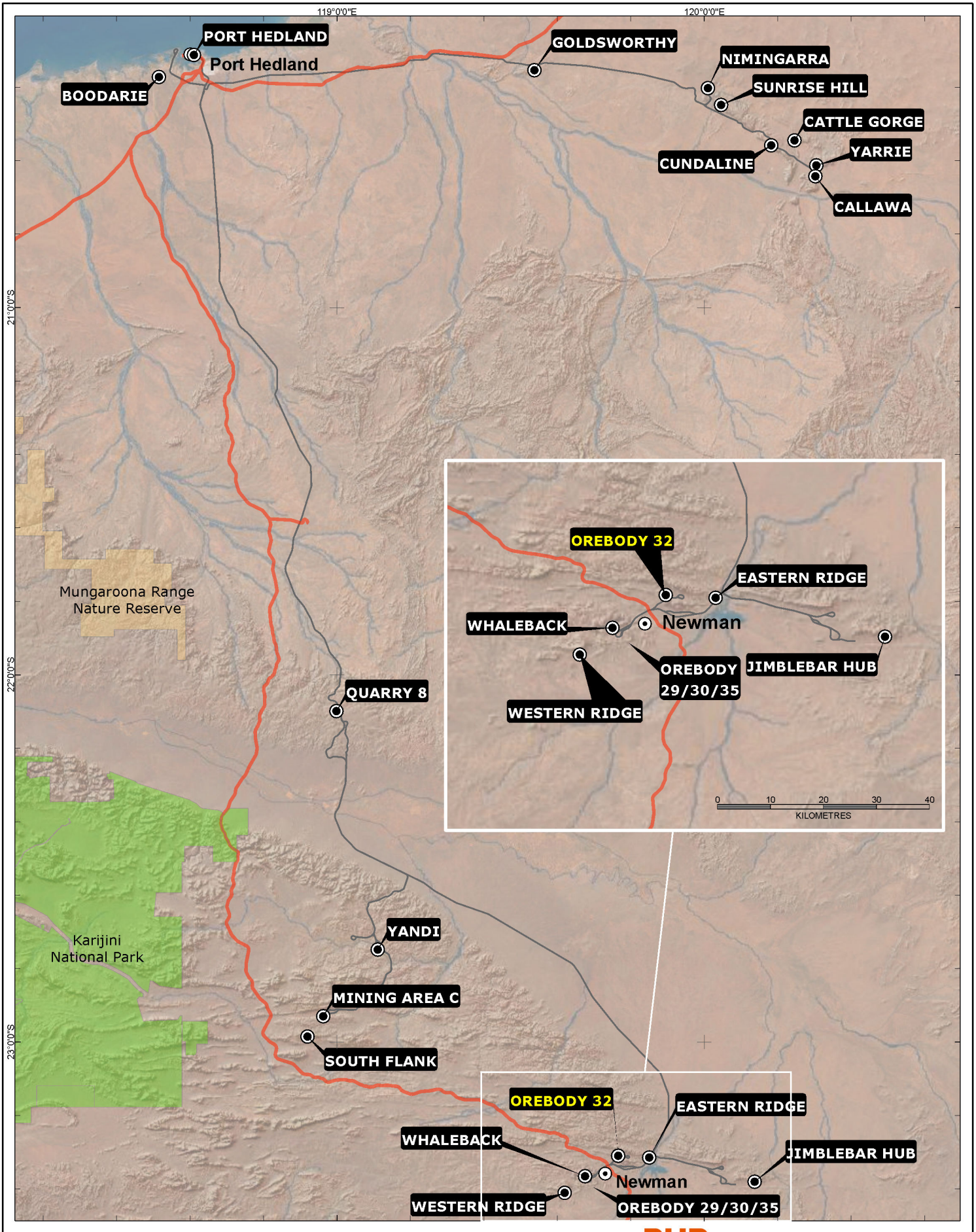
The OB32 BWT Proposal was approved in September 2023 and includes below water table mining of the previous OB32 above water table (AWT) mine approved in 2016 under Ministerial Statement 1037. OB32 is located approximately 3 kilometres (km) north-east of Newman (Figure 1-1) and includes groundwater abstraction and discharge of surplus water via a new pipeline to Ophthalmia Dam, and associated clearing (Figure 1-2).

**OB32 BWT Creek Discharge**

The OB32 BWT Creek Discharge Proposal (Figure 1-2) includes the controlled discharge of up to 60 ML/day of surplus water from OB32 BWT operation to Homestead Creek for up to 9 months per year.

Physical elements include:

- an offtake from the approved OB32 BWT surplus water disposal pipeline
- surplus water aeration ponds
- associated pipes and pumps required to store water in the aeration ponds and discharge water to Homestead Creek.

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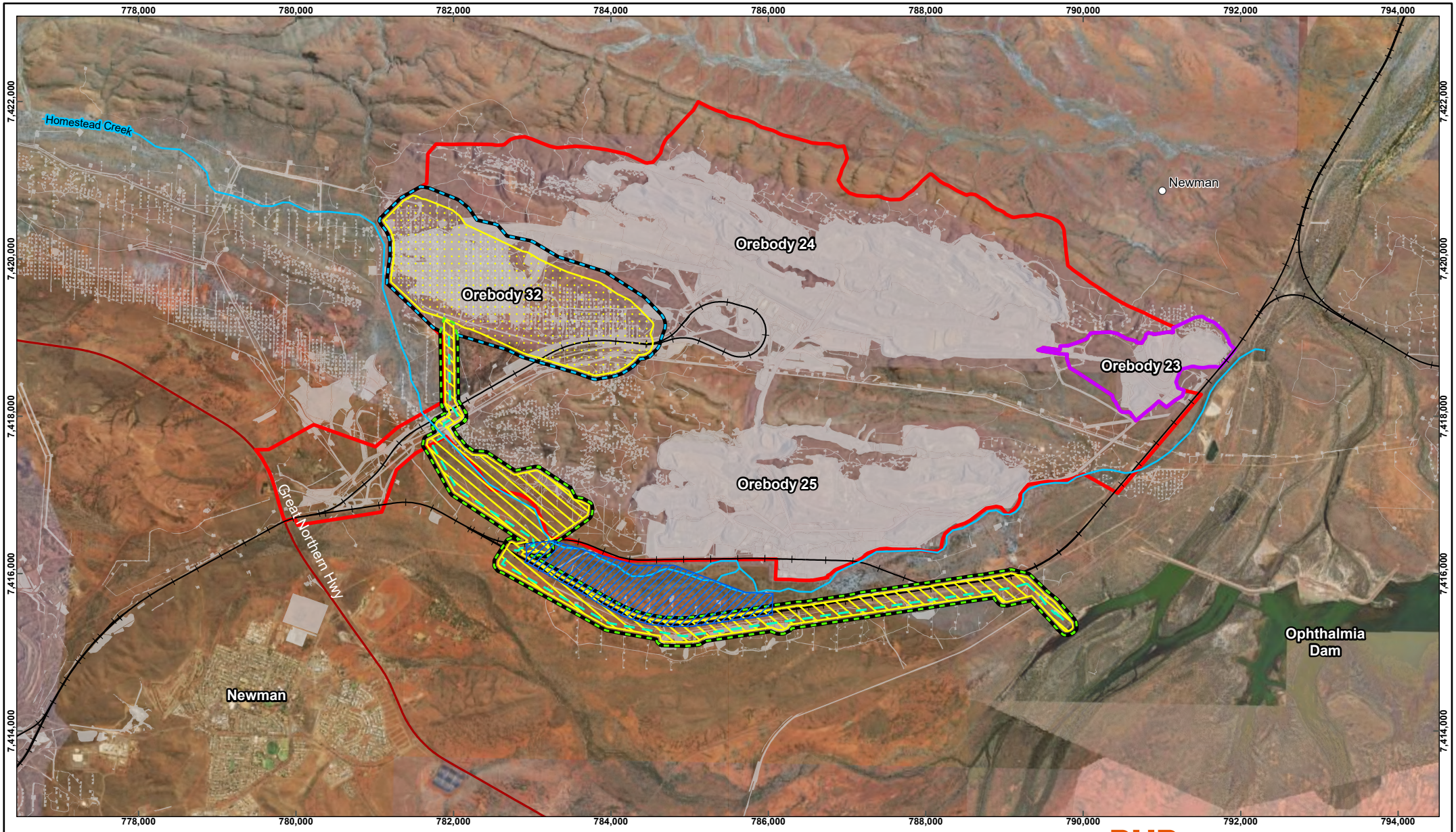
**OB32 BWT CREEK DISCHARGE**
**FLORA AND VEGETATION**
**ENVIRONMENTAL MANAGEMENT PLAN**
Regional Location

WAIO PLANNING, TECHNICAL & ENVIRONMENT

| | | | | | |
|---|---|---|---|---|---|
| SCALE @A4: | 1:1,500,000 | PREPARED: | GEOMATICS | FIGURE: | 1-1 |
| DATE: | 29/05/2025 | REQUESTOR: | ENV. APPROVALS | NO: | A1079_104_RevB |

Document Path: \\wgisfileprdwaio\premiumafs\2depts\Heritage_Data\Jobs\A1001_A1500\A1079\3Project\A1079_104_OB32_DP_RegionalLocation_RevA.aprx




- Orebody 32 BWT MS1105 No 1 Development Envelope
- Orebody 32 BWT Creek Discharge Development Envelope
- Surplus Water Pipeline alignment
- Development Envelope - Mine
- Development Envelope - Pipeline
- Indicative Footprint - Mine
- Indicative Footprint - Pipeline
- Eastern Ridge MS1037 Development Envelope
- Orebody 23 MS478 Development Envelope
- Indicative Cleared Area as at 30 June 2023

N

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KILOMETRES

GDA 1994 MGA ZONE 50

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# OREBODY 32 BELOW WATER TABLE FLORA AND VEGETATION ENVIRONMENTAL MANAGEMENT PLAN

## PROPOSAL OVERVIEW

**PLANNING & STANDARDS - IRON ORE**

| | | | | | |
|---|---|---|---|---|---|
| SCALE @ A3: | 1:65,000 | PREPARED: | Spatial Data | FIGURE: | 1-2 |
| DATE: | 24/11/2025 | REQUESTOR: | Env Approvals | NO: | A1079-082 RevB |
| | | REVIEWED: | | | |

Document Path: Y:\Jobs\A1001_A1500\A1079\3Project\A1079_082_OB32_BWT_FVEMP_ProposalOverview.aprx

## 1.2 Key environmental factors

The key environmental factor relevant to this FVEMP is Flora and Vegetation. Table 1-1 describes the environmental values, proposal activities and actual or potential impacts on Flora and Vegetation addressed in this FVEMP.

**Table 1-1: Key environmental values, activities and impacts**

| Key environmental factor | Environmental values | Proposal activities | Actual/Potential impacts |
|---|---|---|---|
| Flora and Vegetation | Native vegetation in Good to Excellent condition within the OB32 BWT Development Envelope - Pipeline | Direct clearing of native vegetation for surplus water discharge infrastructure within the OB32 BWT Development Envelope - Pipeline | **Direct impacts**<br>Direct clearing of up to 224 ha of native vegetation, of which up to 156 ha is in Good to Excellent condition |
| | Riparian vegetation along Homestead Creek and the upper reaches of Fortescue River | Discharge of surplus mine water from OB32 BWT to Homestead Creek | **Indirect impacts**<br>Potential decline in health of riparian tree species along Homestead Creek and Fortescue River from surplus water discharge |
| | Homestead Creek | Discharge of surplus mine water from OB32 BWT to Homestead Creek | **Indirect impacts**<br>Increased spread or introduction of weeds (introduced species) from surplus water discharge |

## 1.3 Condition requirements

BHP has provided the condition requirements of MS1105 Conditions 6 and 7 relating to the FVEMP in the components table (Section 2), which the Instructions allow for, where there are multiple conditions and/or condition clauses.

The sub-clauses of MS1105 Condition 7 applicable to the relevant environmental values and objectives (7-1(1)) and relevant impacts (7-3) for the OB32 BWT Proposal and the OB32 BWT Creek Discharge Proposal are outlined in Table 1-2 below.

**Table 1-2: MS1105 Condition 7 relevant environmental values and impacts**

| Flora and Vegetation Environmental Management Plan Condition sub-clause | Applicable to this EMP | Environmental value/s |
|---|---|---|
| 7-1 The proponent shall manage the implementation of the Proposal to meet the following environmental objective:<br>(1) protect flora and vegetation so that biological diversity and ecological integrity are maintained, and in particular: | Yes | Native vegetation in Good to Excellent condition in the OB32 BWT Development Envelope – Pipeline<br>Riparian vegetation along Homestead Creek and the Upper Fortescue River |

| Flora and Vegetation Environmental Management Plan Condition sub-clause | Applicable to this EMP | Environmental value/s |
|---|---|---|
| (a) maintain the local and regional populations of flora taxa declared as threatened under the relevant legislation; | No | N/A |
| (b) avoid and minimise direct and indirect impacts on flora taxa that is specially protected under the relevant legislation; | No | N/A |
| (c) avoid and minimise direct and indirect impacts on flora taxa listed as priority flora; and | No | N/A |
| (d) avoid and minimise direct and indirect impacts on the occurrences of threatened and priority ecological communities, and their habitat. | No | N/A |
| **Flora and Vegetation Environmental Management Plan Condition sub-clause** | **Applicable to this EMP** | **Impacts** |
| 7-3 The Flora and Vegetation Management Plan required by condition 6-1 shall include provisions required by condition 6-2 to address impacts on conservation significant flora and vegetation, where relevant, including from, but not limited to changes to groundwater levels and groundwater quality; changes to surface water flows and quality; dust; fire regimes; and weeds. | Yes | Loss of vegetation from clearing (direct)<br>Changes to riparian vegetation from changes to surface water regimes (indirect) |

Condition 5 of MS1105 requires BHP to make this FVEMP publicly available. BHP will publish the endorsed FVEMP on the BHP website and provide to the Department of Water and Environmental Regulations (DWER) in a suitable electronic form for online publication, to meet the condition requirements.

## 1.4 Rationale and approach

As required by the Instructions, this section provides a description of the rationale and approach for the components (referred to as provisions in previous versions of the Instructions) in this FVEMP.

### 1.4.1 Management approach

BHP applied a risk-based approach to identify and prioritise the components of this FVEMP. The purpose of the components is to protect the environmental values identified in Table 1-1. In developing the components, BHP has used available scientific information and results from recent targeted surveys or investigations and has applied learnings from the management of flora and vegetation at other BHP and third party mine sites in the Pilbara.

At the site level and prior to any disturbance activities, BHP implements an internal ground disturbance permit process to ensure that any legislative and regulatory requirements associated with the environment, Aboriginal heritage and land tenure relevant to the area, are met.

BHP shall continue to implement the current version of the FVEMP (Version 0) until implementation of the Orebody 32 BWT Creek Discharge proposal commences. Submission of this updated FVEMP (Version 1) is intended to satisfy the requirements of MS1105 Condition 7.

### 1.4.2 Rationale

Table 1-3 describes the rationale for the FVEMP components identified in Section 2, including:

- management objectives or environmental outcomes
- survey and study findings
- key assumptions and uncertainties
- rationale for choice of indicators and management actions.

**OB32 BWT**

No threatened flora, specially protected flora, Priority flora or Threatened or Priority ecological communities have been recorded in the OB32 BWT Development Envelope - Pipeline (or other significant flora or vegetation values requiring targeted management). However, the Section 45B Notice: Statement 1105 – No 1 for the OB32 BWT Proposal requires the implementation of Condition 7 (Flora and Vegetation Environmental Management Plan). BHP has therefore focused the management on minimising the impacts of clearing of native vegetation in Good to Excellent condition, as this contributes to cumulative clearing in the Pilbara bioregion which the EPA has identified as a significant residual impact.

**OB32 BWT Creek Discharge**

BHP identified the potential residual impact to riparian vegetation health along Homestead Creek and the upper reaches of the Fortescue River, and riparian vegetation condition (weeds) along Homestead Creek from the proposed discharge of surplus water associated with the OB32 BWT Creek Discharge Proposal. As such, BHP proposes to implement the management actions in this FVEMP to achieve the outcome and to satisfy Condition 6 (Condition Environmental Management Plans) and Condition 7 (Flora and Vegetation Management Plan) of Ministerial Statement 1105.

**Table 1-3: Rationale for native vegetation (OB32 BWT) components**

| Surveys and studies | Survey and study findings | Key assumptions and uncertainties | Risk-based approach and rationale for choice of indicators/management actions |
|---|---|---|---|
| **Environmental value:** Native vegetation in Good to Excellent condition<br>**EMP proposed objective:** Minimise direct impacts on native vegetation in Good to Excellent condition in the OB32 BWT Development Envelope – Pipeline | | | |
| The specific surveys and studies used to develop the EMP components are listed below:<br>• *OB32 Surplus Water and Homestead Creek Wetting Front Detailed Flora and Vegetation Assessment* (Spectrum 2022) | **Flora**<br>• No Threatened flora, specially protected flora or Priority flora were identified in the OB32 BWT Development Envelope - Pipeline<br>**Vegetation**<br>• No Threatened or Priority Ecological Communities were identified within the OB32 BWT Development Envelope - Pipeline<br>• Total of six vegetation associations recorded within the OB32 BWT Development Envelope - Pipeline<br>• Dominant vegetation associations are *Triodia* hummock and *Cenchrus* tussock grasslands with *Acacia* trees<br>• Approximately 38% of the vegetation in the OB32 BWT Development Envelope - Pipeline is rated as being in Good condition, with approximately 4.7% and 8.6% in Excellent and Very Good condition, respectively (Figure 1-4).<br>• Approximately 76.5% of the vegetation in the OB32 BWT Creek Discharge Development Envelope has been mapped as being in Good | **Assumptions**<br>• Given the survey effort, it is assumed any Threatened or Priority flora species (if present), and any Threatened or Priority ecological communities would have been identified<br>• Given the survey effort, it is assumed all vegetation communities present have been mapped (along with their condition). | **Type of components**<br>BHP has chosen objective-based components to address the requirements of Condition 6-2 of MS1105 and meet the objective specified in Condition 7-1, as the direct impacts to native vegetation in Good to Excellent condition can be minimised through appropriate management actions and targets to satisfy the objectives of Condition 7-1<br>**Rationale for choice of components**<br>• The key impact to Flora and Vegetation requiring management is loss of native vegetation in Good to Excellent condition<br>• The management actions and targets (Table 4) focus on minimising disturbance<br>• BHP considers that its internal ground disturbance permit process is an appropriate tool to manage clearing, in order to minimise impacts to flora and vegetation<br>• Maintenance of current Geographic Information System (GIS) spatial layers is key to ensuring that clearing remains within defined limits and extents. |

| Surveys and studies | Survey and study findings | Key assumptions and uncertainties | Risk-based approach and rationale for choice of indicators/management actions |
|---|---|---|---|
| | to Very Good Condition. No areas of Excellent condition vegetation are present within the Development Envelope (Figure 1-5) | | |

**Table 1-4: Rationale for riparian vegetation health and riparian vegetation condition (weeds) components (OB32 BWT Creek Discharge)**

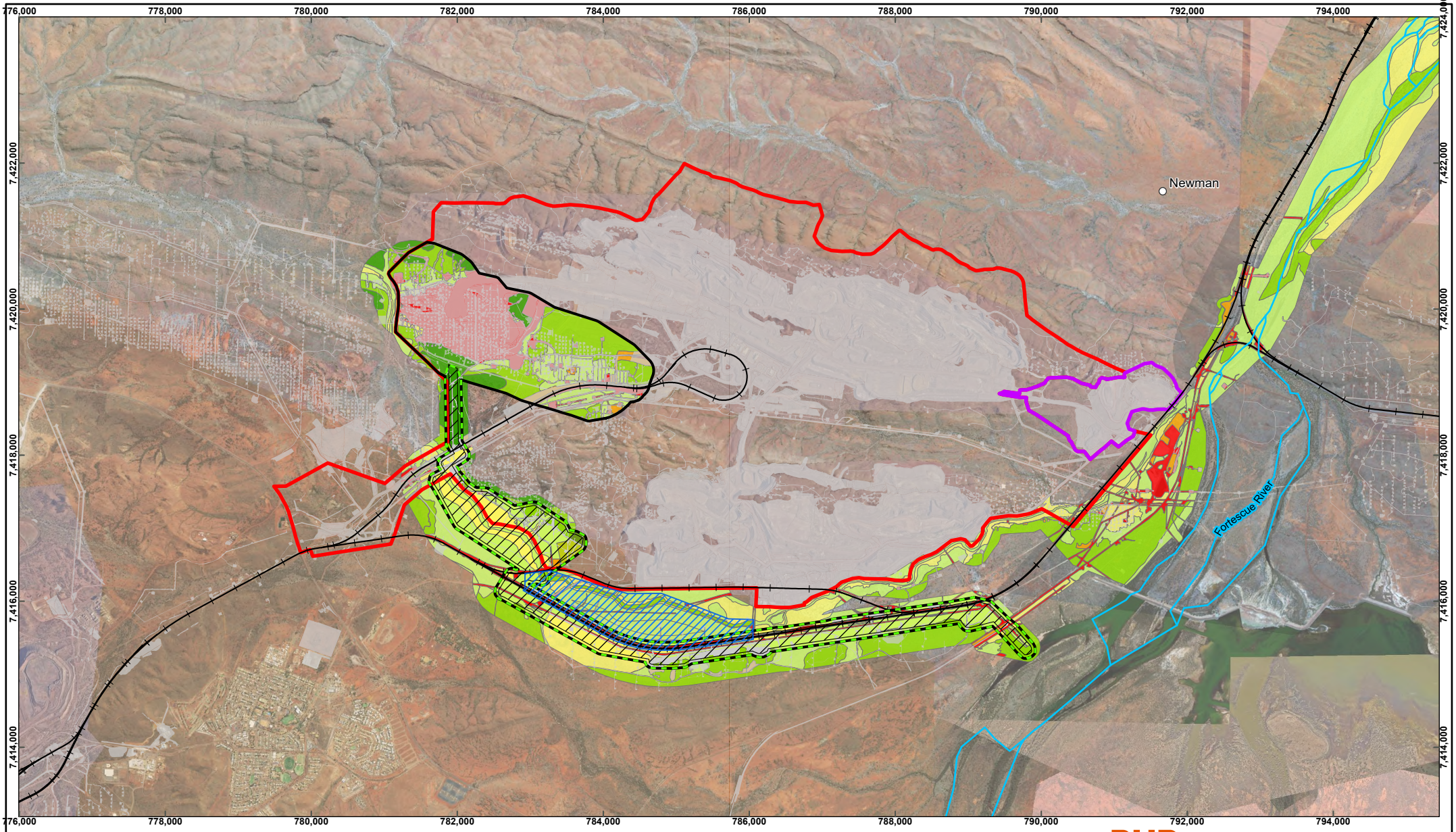
| Surveys and studies | Survey and study findings | Key assumptions and uncertainties | Risk-based approach and rationale for choice of indicators |
|---|---|---|---|
| **Environmental value:** Riparian vegetation along Homestead Creek and the upper reaches of Fortescue River<br>**EMP proposed outcome:** No significant decline to the health of riparian tree species along Homestead Creek and the upper reaches of Fortescue River (up to Kalgan Creek confluence) due to the controlled discharge of surplus water into Homestead Creek, and;<br>Manage the introduction and extent of weeds attributable to surplus water discharge to Homestead Creek. | | | |
| The specific surveys and studies used to develop the EMP components are listed below:<br>**Homestead Creek surveys/studies**<br>• *OB32 Surplus Water and Homestead Creek Wetting Front Detailed Flora and Vegetation Assessment* (Spectrum 2022)<br>• *OB32 Surplus Water Riparian Vegetation Monitoring Program* (Astron 2024)<br>• *OB32 Surplus Water Riparian Vegetation Monitoring Program 2022* (Astron 2023)<br>• *OB32 Surplus Water Vegetation Riparian* | **Homestead Creek and Fortescue River system**<br>• Homestead Creek is an ephemeral tributary to the Fortescue River. The main channel is approximately 50 km long from its source in the Homestead Creek catchment, to the confluence with the upper reaches of the Fortescue River<br>• The Fortescue River is a main drainage channel which receives controlled release from, and is impeded by Ophthalmia Dam<br>• The Fortescue River drains to the Fortescue Marsh, located approximately 50 km downstream of Ophthalmia Dam<br>• Kalgan Creek confers with the Fortescue River approximately 17 km north of Ophthalmia Dam. Surplus water is discharged into the Kalgan Creek tributary by a third-party iron ore mining operation upstream of its confluence with the Fortescue River<br>• The Fortescue River is a modified drainage system, impeded by Ophthalmia Dam and subject to releases from Ophthalmia Dam, and is a downstream receptor of third party proponent discharges released to adjoining tributaries (Kalgan Creek)<br>• BHP is proposing a controlled discharge of surplus water (from below water table mining of Orebody 32) into Homestead Creek. The distance from the proposed discharge point to the confluence with the upper reaches of the Fortescue River is approximately 10 km | **Assumptions**<br>• The main potential impact of surplus water discharge is waterlogging, which affects riparian species needing 'air' in the root zone.<br>• *Acacia citrinoviridis, Acacia coriacea, Eucalyptus camaldulensis* and *Eucalyptus victrix* are the riparian indicator species identified as having the potential to be impacted by ongoing saturation of the root zone.<br>**Uncertainties**<br>• The Fortescue River is a modified drainage system, impeded by and subject to controlled releases from Ophthalmia Dam, and subject to discharges released by third party proponents from adjoining tributaries (i.e. Kalgan Creek). Baseline conditions referred to with respect to the proposed OB32 discharge reflect conditions of Homestead Creek and the Fortescue River prior to the | **Type of components**<br>BHP has chosen outcome-based components to address the requirements of Condition 6 (Condition Environmental Management Plans) and Condition 7 (Flora and Vegetation Management Plan) of MS1105, as BHP has developed methodologies that can measure the health of riparian vegetation along Homestead Creek and the upper reaches of Fortescue River (up to Kalgan Creek confluence).<br>**Choice of indicators**<br>*Acacia citrinoviridis, Acacia coriacea, Eucalyptus victrix* and *Eucalyptus camaldulensis* have been chosen as indicator riparian vegetation (tree) species as they are the dominant riparian tree species of Homestead Creek and Fortescue River that have the potential to be impacted by ongoing saturation of the root zone.<br>Baseline data (Astron 2022, 2023 and 2024, and Spectrum 2022) has been reviewed to understand the potential inherent natural variability in the health of riparian vegetation of Homestead Creek and the upper reaches of Fortescue River, to inform the trigger and threshold criteria.<br>Criteria are based on i) projected foliage cover (PFC) measured with a 5 band (red, red-edge, green, blue, near-infrared) camera mounted on an unmanned aerial vehicle (UAV) and ii) qualitative visual scoring of tree crown condition score (CCS) measured concurrently.<br><u>Projected foliage cover</u><br>PFC, the area of foliage projected onto the ground as a percentage, is used as a quantitative parameter to inform the trigger and threshold criteria. The trigger criterion is defined by |

| Surveys and studies | Survey and study findings | Key assumptions and uncertainties | Risk-based approach and rationale for choice of indicators |
|---|---|---|---|
| *Monitoring Program 2021* (Astron 2022)<br><br>**General riparian vegetation surveys/studies**<br>• *Flooding responses of riparian eucalypts in the Pilbara region of Western Australia* (Argus 2018)<br>• *Evaluation of a visual assessment method for tree condition of eucalypt floodplain forests* (Souter *et al.* 2010)<br>• *Method manual for the visual assessment of lower River Murray floodplain trees River Red Gum (Eucalyptus camaldulensis)* (Souter *et al.* 2009) | • The 2024 modelling for the OB32 BWT Creek Discharge Proposal predicted a maximum wetting front of 76 km from the Homestead Creek discharge point to the wetting front extent at Jigalong Road.<br>• The Kalgan Creek confluence with the Fortescue River occurs within the modelled wetting front, approximately 23 km from the Homestead Creek discharge point, which receives releases from third party proponents.<br><br>**Homestead Creek and Fortescue River riparian vegetation**<br>• Vegetation community mapping of communities identified the key riparian tree species *Acacia citrinoviridis, Acacia coriacea, Eucalyptus camaldulensis* and *Eucalyptus victrix* (Astron 2023).<br>• The vegetation of the main channel of Homestead Creek and the upper reaches of Fortescue River is described as (Spectrum 2022):<br>○ Woodland of *Eucalyptus camaldulensis* and *Eucalyptus victrix* with Low Woodland of *Acacia citrinoviridis* and High Open Shrubland of *Melaleuca glomerata* with Low Scattered Shrubs of *Corchorus crozophorifolius* over Scattered Hummock Grass of *Triodia pungens* with Open Tussock Grassland of **Cenchrus ciliaris* and *Eulalia aurea* with Scattered Sedges of *Cyperus vaginatus* on orange sandy clay in major creek lines<br>• Vegetation of the main channel of Fortescue River further downstream is described as (Spectrum 2022):<br>Woodland of *Eucalyptus camaldulensis* with Low Open Woodland of *Acacia citrinoviridis* with High Open Shrubland of *Melaleuca glomerata* and Low Scattered Shrubs of *Acacia pyrifolia* var. *morrisonii*, and *Acacia pyrifolia* var. *pyrifolia* over | proposed controlled discharge and may not reflect natural baseline conditions.<br>• Impact from third party water releases to Kalgan Creek, which confers with Fortescue River downstream of the Homestead Creek confluence. | a significant declining trend in PFC of overstorey species (> 2m height) from baseline, which may be an earlier indicator of decline in tree health due to discharge.<br><br>A declining trend in foliage cover alone may not be ecologically significant if the magnitude of change is small; therefore, the threshold criterion has been chosen to represent a level of decline that may be greater than what was predicted and that could indicate the environmental outcome is at risk. The proposed criterion incorporates a greater degree of decline in foliage cover over a wider extent, for two or more years, to detect a persistent change, allowing for the high level of inherent natural variability seen in Pilbara riparian ecosystems.<br><br>Crown condition score<br><br>CCS has also been selected as an indicator of tree health (derived from Souter *et al.* 2009). This semi-quantitative methodology is considered appropriate as it has been shown to provide an accurate estimate of tree condition and can be adapted as required to use for trees experiencing both water deficit and water logging (Souter *et al.* 2010).<br><br>The trigger criterion for sites within the predicted maximum wetting front extent (potential impact sites) incorporates the CCS falling below the tenth percentile of what was recorded during the baseline monitoring for each site (Error! Reference s ource not found.). The tenth percentile of CCS measured between 2021 and 2024 ranged between 5 and 7, which is considered relatively healthy; therefore, the trigger criterion is a conservative indicator of a potential decline in vegetation health. The baseline data will continue to be updated until dewatering discharge into Homestead Creek commences.<br><br>A lower CCS (below 3) is incorporated in the threshold criterion, which would be more representative of poor health.<br><br>The impact monitoring sites along Homestead Creek and the upper reaches of the Fortescue River have been sited within the maximum wetting front extent. The trigger criterion applies when four or more monitoring sites show evidence of a decline in tree health (20% of potential impact sites) and threshold |

| Surveys and studies | Survey and study findings | Key assumptions and uncertainties | Risk-based approach and rationale for choice of indicators |
|---|---|---|---|
| | Scattered Sedges of *Cyperus vaginatus* on orange sandy clay in major creek lines.<br>• The condition of vegetation along the main channel of Homestead Creek ranges from Good to Very Good, with the adjacent banks being in Poor condition (due to the presence of Buffel grass) (Spectrum 2022).<br>• The majority of vegetation in the main channel of the Fortescue River is in Very Good condition, with the vegetation on the banks predominantly assessed as being in Good condition (Spectrum 2022) (Figure 5).<br>**Riparian vegetation potential impacts**<br>• The discharge of surplus water into Homestead Creek during natural, no-flow conditions will extend the periods of inundation and may result in sustained shallow sub-surface moisture levels.<br>• The 2024 wetting front assessment indicated there is the potential for inundation from surface water discharge to extend 76 km north from the Homestead Creek discharge point.<br>• Deep rooted tree species such as *Eucalyptus victrix* and *Eucalyptus camaldulensis* can show increased productivity in response to higher sustained soil moisture levels, and a potentially shallower groundwater resource.<br>• Extended periods of inundation can result in a waterlogged and anaerobic root zone, which can result in tree health decline or death as most trees require a period of seasonal drying of the soil profile.<br>• Research findings on the flooding responses of riparian eucalypts in the Pilbara (Argus 2018) found:<br>o impacts of water discharge on mature trees is confined to the main channel beds of intermittent streams<br>o mature eucalypts, regardless of species, can also be affected by flooding if the entire root | | criterion applies when 10 or more sites show evidence of decline in tree health (50% of potential impact sites).<br><u>Ancillary data</u><br>In addition to using CCS and PFC, remotely sensed satellite imagery will be used to measure vegetation health indices throughout the maximum wetting front extent in Homestead Creek and the upper reaches of Fortescue River and at reference sites outside of the maximum predicted wetting front, as supporting monitoring to aid in the analysis and interpretation of regional and historical trends in vegetation health qualitative metrics of site condition assessment will also be recorded,<br><u>Location and frequency</u><br>Monitoring will continue to be undertaken biannually, at the end of the dry season and post wet season. These timings usually correspond to when vegetation is subject to the highest and lowest degree of drought stress under natural conditions. This will aid investigations, if required, to understand if tree health decline is in fact due to surplus water discharge or due to natural changes.<br>Third party operators discharge surplus water into Kalgan Creek. Any potential impacts downstream of the Kalgan Creek confluence within the Fortescue River will represent cumulative impacts from both the third party and BHP operations.<br>Selection for the potential impact sites and reference sites considered:<br>• site access<br>• distribution and coverage of riparian vegetation (specifically, indicator riparian tree species)<br>• areas considered at risk from surplus water discharge (i.e. within the wetting front)<br>• areas which are outside of the maximum predicted wetting front. |

| Surveys and studies | Survey and study findings | Key assumptions and uncertainties | Risk-based approach and rationale for choice of indicators |
|---|---|---|---|
| | system is subject to prolonged saturation and hypoxic conditions.<br>○ Root damage may impair the ability of plants to take up water and nutrients, leading to leaf shedding and decline in foliage cover<br>• Souter *et al.* (2009 and 2010) discusses the use of a visual tree health assessment tool which uses a conceptual model of the symptoms of decline from water stress, and indicators of recovery as conditions improve; with several factors of tree health used to develop the 'crown condition rating' score.<br>• Kalgan Creek facilitates third party surplus water management. Any potential impacts downstream of the Kalgan Creek confluence within the Fortescue River will represent cumulative impacts from both the third party and BHP operations.<br>**Riparian vegetation monitoring program**<br>• Riparian vegetation monitoring along Homestead Creek and Fortescue River has been undertaken biannually (wet and dry season) since April 2021 by Astron (2021, 2022, 2023) | | |
| **Environmental value:** Vegetation condition (weeds)<br>**Proposed objective:** Minimise the introduction of new weed species and the spread of existing weeds at Homestead Creek due to the surplus water discharge | | | |
| The key surveys and studies used to develop the provisions related to vegetation condition (weeds) include the following:<br>• *OB32 Surplus Water and Homestead Creek Wetting Front Detailed Flora and Vegetation* | • Three introduced flora (weed) species were recorded in Homestead Creek downstream of the creek discharge location, including Kapok Bush (**Aerva javanica*), Buffel Grass (**Cenchrus ciliaris*) and Spiked Malvastrum (**Malvastrum americanum*). | **Assumptions**<br>Given the survey effort, it is assumed all introduced flora species present have been mapped | **Type of Provisions**<br>BHP has chosen management-based provisions which are focused on Homestead Creek and the discharge of surplus water.<br>As the Fortescue River is open to the public and pastoral activities, it is difficult to set measurable provisions for weeds as it will be challenging to attribute the cause of new weeds or spread of weeds along the Fortescue River to the discharge of surplus water at Homestead Creek. |

| Surveys and studies | Survey and study findings | Key assumptions and uncertainties | Risk-based approach and rationale for choice of indicators |
|---|---|---|---|
| *Assessment* (Spectrum 2022)<br>• *OB32 Surplus Water Riparian Vegetation Monitoring Program* (Astron 2024)<br>• *OB32 Surplus Water Riparian Vegetation Monitoring Program 2022* (Astron 2023)<br>• *OB32 Surplus Water Vegetation Riparian Monitoring Program 2021* (Astron 2022) | | | **Choice of Provisions**<br>Provisions are based on understanding the locations of weeds and minimising the spread of weeds and avoiding the introduction of new weeds.<br>BHP proposes to monitor and manage the introduction and extent of weeds at Homestead Creek which can be attributed to the discharge of surplus water. |




- Orebody 32 BWT MS1105 No 1 Development Envelope
- Orebody 32 BWT Creek Discharge Development Envelope
- Development Envelope - Pipeline
- Indicative Footprint - Pipeline
- Eastern Ridge MS1037 Development Envelope
- Orebody 23 MS478 Development Envelope
- Indicative Cleared Area as at 30 June 2023

**Vegetation Condition**

- Excellent
- Very Good
- Good
- Poor
- Degraded
- Completely Degraded

N

0 0.5 1 1.5 2

KILOMETRES

GDA 1994 MGA ZONE 50

BHP

PUBLIC

# OREBODY 32 BELOW WATER TABLE FLORA AND VEGETATION ENVIRONMENTAL MANAGEMENT PLAN

## VEGETATION IN GOOD TO EXCELLENT CONDITION IN THE DEVELOPMENT ENVELOPE – PIPELINE

**PLANNING & STANDARDS - IRON ORE**

| | | | | | |
|---|---|---|---|---|---|
| SCALE @ A3: | 1:70,000 | PREPARED: | Spatial Data | FIGURE: | 1-3 |
| DATE: | 3/06/2025 | REQUESTOR: | Env Approvals | NO: | A1079-083 RevC |
| | | REVIEWED: | | | |

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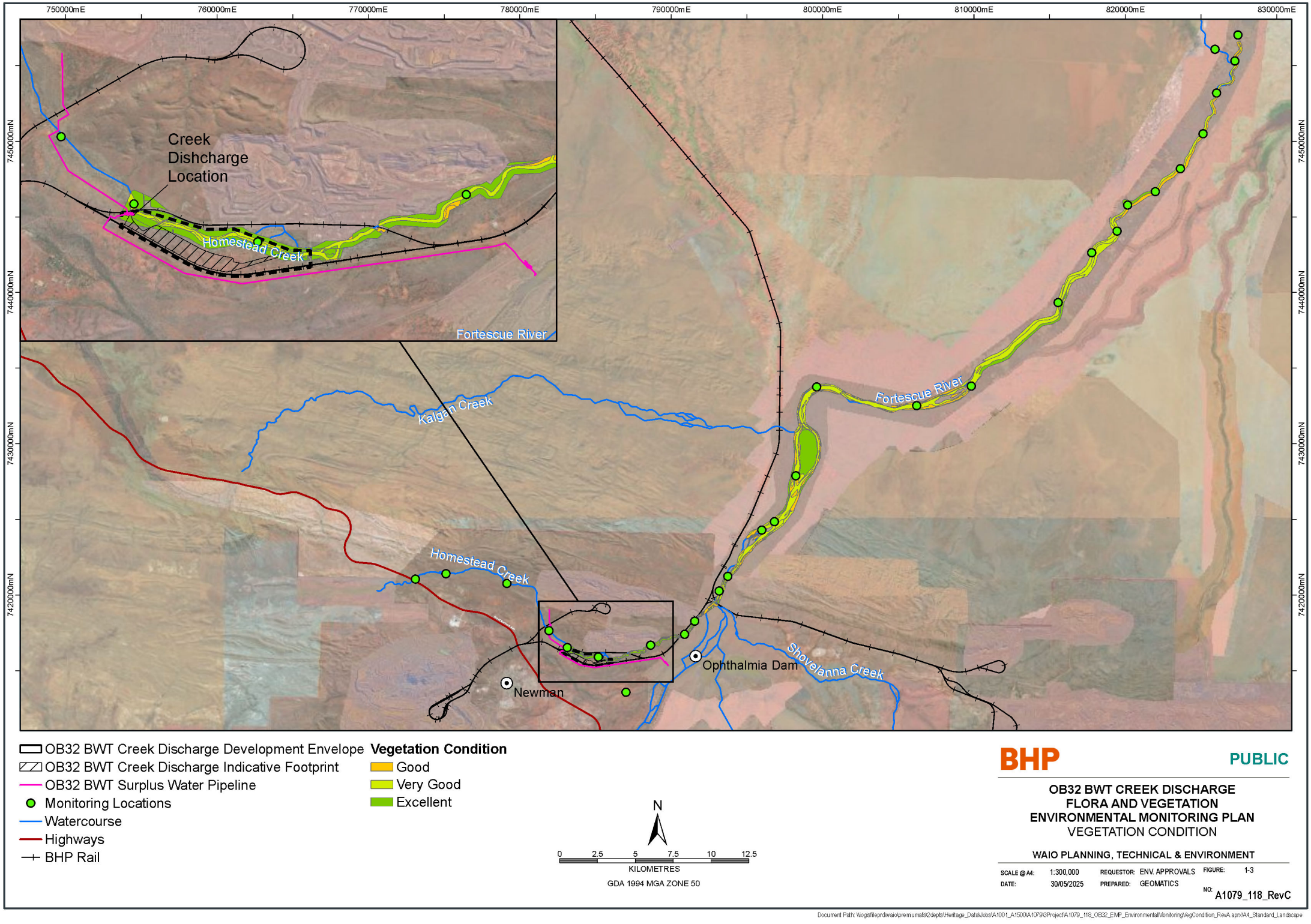



BHP

PUBLIC

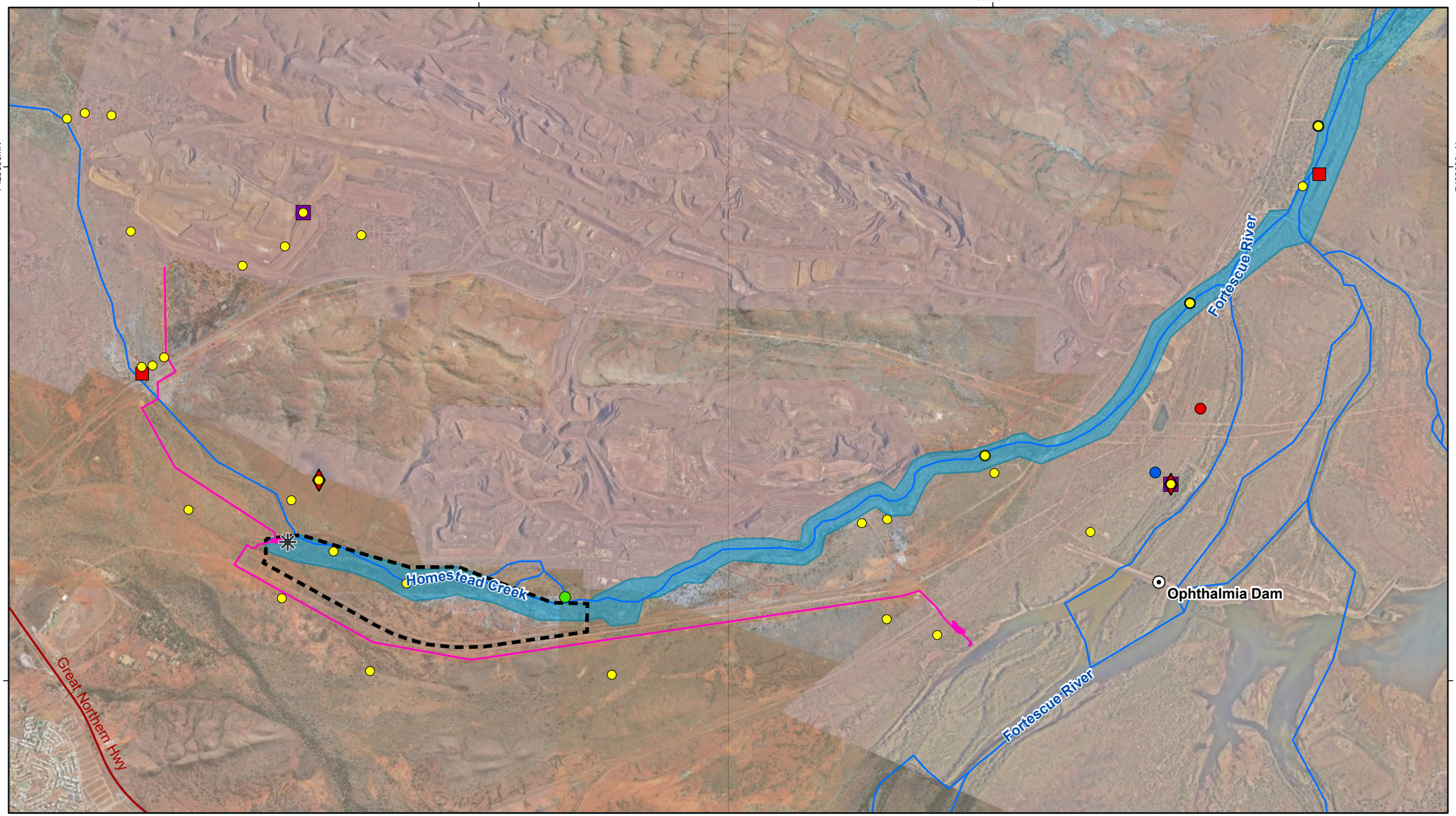
# OB32 BWT CREEK DISCHARGE FLORA AND VEGETATION ENVIRONMENTAL MONITORING PLAN

VEGETATION CONDITION

WAIO PLANNING, TECHNICAL & ENVIRONMENT

| | | | | | |
|---|---|---|---|---|---|
| SCALE @ A4: | 1:300,000 | REQUESTOR: | ENV. APPROVALS | FIGURE: | 1-3 |
| DATE: | 30/05/2025 | PREPARED: | GEOMATICS | NO: | A1079_118_RevC |

Document Path: \\ogisfileprdwaio\premiumals2depts\Heritage_Data\Jobs\A1001_A1500\A1079\3Project\A1079_118_OB32_EMP_EnvironmentalMonitoring\VegCondition_RevA.aprx\A4_Standard_Landscape




OB32 BWT Creek Discharge Development Envelope
OB32 BWT Creek Discharge Wetting Front
Homestead Creek discharge location
OB32 BWT Surplus Water Pipeline
Highways
Watercourse

**Introduced Flora**

- Aerva javanica
- Bidens bipinnata
- Bidens subalternans
- Cenchrus ciliaris
- Cenchrus setiger
- Echinochloa colona
- Malvastrum americanum
- Vachellia farnesiana

N

0 200 400 600 800 1,000
METERS

GDA 1994 MGA ZONE 50

BHP

PUBLIC

# OB32 BWT CREEK DISCHARGE FLORA AND VEGETATION ENVIRONMENTAL MONITORING PLAN

## INTRODUCED FLORA AT HOMESTEAD CREEK

**WAIO PLANNING, TECHNICAL & ENVIRONMENT**

| | | | | | |
|---|---|---|---|---|---|
| SCALE @ A4: | 1:50,000 | REQUESTOR: | ENV. APPROVALS | FIGURE: | 1-5 |
| DATE: | 9/12/2025 | PREPARED: | GEOMATICS | NO: | A1079_132_RevA |

Document Path: Y:\Jobs\A1001_A1500\A1079\3Project\A1079_132_OB32_DP_IntroducedFlora_HomesteadCreek_RevA.aprx\A1079_132_OB32_EMP_IntroducedFlora_RevA

# 2 EMP Components

BHP has provided outcome based and objective based FVEMP components in Table 2-1 and Table 2-2, as per the preferred approach outlined in the Instructions. BHP has not used the 'Schedule' approach (which the Instructions state may be used), as this FVEMP only applies to activities associated with one operation (OB32)) and one Ministerial Statement (MS1105). BHP may adopt the 'Schedule' approach in future for this FVEMP, should additional activities, operations or Ministerial Statements apply.

Objective based components for the OB32 BWT proposal and OB32 BWT Creek Discharge proposal are provided in Table 2-1 and discuss how impacts associated with the clearing of native vegetation and vegetation condition (weeds) will be managed. Outcome based objectives for the OB32 BWT Creek Discharge Proposal are provided in Table 2-2 and discuss how the potential impacts to riparian vegetation from the discharge of surplus water to Homestead Creek will be managed.

**Table 2-1: Objective-based components: OB32 BWT Proposal and OB32 BWT Creek Discharge Proposal (Statement 1105 – No 1)**

**Purpose**: To meet the requirements of MS1105 Condition 7-2

**Rationale**: Objective-based components to meet the intent of MS1105 Condition 7-1

| | |
|---|---|
| **EPA Factor and objective:** | **Flora and Vegetation** – to protect flora and vegetation so that biological diversity and ecological integrity are maintained |
| **Key environments values:** | Native vegetation in Good to Excellent condition |
| **EMP objectives:** | Minimise direct impacts on native vegetation in Good to Excellent condition in the OB32 BWT Development Envelope – Pipeline and OB32 BWT Creek Discharge Development Envelope, and<br>Minimise the introduction of new weed species and extent of existing weeds attributable to the discharge of surplus water to Homestead Creek |
| **Key impacts and risks:** | Direct clearing of native vegetation in Good to Excellent condition, and<br>Increase in weed presence within the OB32 BWT Creek Discharge Development Envelope attributed to the discharge of surplus water to Homestead Creek |

| **MS1105 Condition clauses - Objective-based components** | | | |
|---|---|---|---|
| **Management Target** | **Management Actions** | **Monitoring and timing / frequency of actions** | **Reporting** |
| **Condition 6-2**<br>(11) specify measurable management target(s) to determine the effectiveness of the risk-based management actions; | **Condition 6-2**<br>(10) specify risk-based management actions that will be implemented to demonstrate compliance with the environmental objectives specified in the relevant conditions referred to in the Section 45A Notice for the proposal.<br>(13) specify a process for revision of management actions and changes to proposal activities, in the event that the management targets are not achieved. The process shall include an investigation to determine the cause of the management target(s) not being achieved; | **Condition 6-2**<br>(12) specify monitoring to measure the effectiveness of management actions against management targets, including but not limited to, parameters to be measured, baseline data, monitoring locations, and frequency and timing of monitoring; | **Condition 4-5**<br>The proponent shall advise the CEO in writing of any potential non-compliance including exceedance of threshold criteria and/or failure to implement management actions in an Environmental Management Plan within seven (7) days of that potential non-compliance being known.<br>**Condition 4-6**<br>The proponent shall submit to the CEO a Compliance Assessment Report annually by 1 October each year addressing compliance in the previous financial year, or as otherwise agreed in writing by the CEO.<br>**Condition 4-7**<br>The Compliance Assessment Report shall:<br>(1) be endorsed by the proponent's CEO or a person delegated to sign on the CEO's behalf.<br>(2) include a statement as to whether the proponent has complied with the conditions.<br>(3) identify all potential non-compliances and describe corrective and preventative actions taken.<br>(4) be made publicly available in accordance with the approved Compliance Assessment Plan; and<br>(5) indicate any proposed changes to the Compliance Assessment Plan required by condition 4-1.<br>**Condition 6-2**<br>(14) Provide the format and timing to demonstrate that the relevant conditions referred to in the Section 45A Notice for the proposal have been met for the reporting period in the Compliance Assessment Report required by condition 4-6 including but not limited to:<br>(a) verification of the implementation of management actions; and<br>(b) reporting on the effectiveness of management actions against management target(s).<br>**Condition 6-5**<br>If monitoring, tests, surveys or investigations indicate non-achievement of management target(s) specified in a Condition Environmental Management Plan(s), the proponent shall:<br>(1) report the non-achievement in writing to the CEO within twenty-one (21) days of the non-achievement being identified.<br>(2) investigate to determine the cause of the management target(s) not being achieved.<br>(3) provide a report to the CEO within ninety (90) days of the non-achievement being reported as required by condition 6-5(1). The report shall include:<br>(a) the cause(s) of the management targets not being achieved.<br>(b) the findings of the investigation required by conditions 6-5(2).<br>(c) details of revised and/or additional management actions to be implemented to prevent non-achievement of the management target(s); and<br>(d) relevant changes to proposal activities.<br>**Condition 6-6**<br>If monitoring, tests, surveys or investigations indicate that one or more management actions specified in a Condition Environmental Management Plan(s) has not been implemented, the proponent shall:<br>(1) report the failure to implement the management action(s) in writing to the CEO within seven (7) days of identification.<br>(2) investigate to determine the cause of the management action(s) not being implemented.<br>(3) investigate to determine the potential environmental harm or alteration of the environment that occurred due to the failure to implement the management action(s).<br>(4) provide a report to the CEO within twenty-one (21) days of the reporting required by condition 6-6(1). The report shall include:<br>(a) the cause of the failure to implement the management actions<br>(b) the findings of the investigations required by conditions 6-6(2) and 6-6(3) |

| MS1105 Condition clauses - Objective-based components | | | |
|---|---|---|---|
| **Management Target** | **Management Actions** | **Monitoring and timing / frequency of actions** | **Reporting** |
| | | | (c) relevant changes to proposal activities<br>(d) measures to prevent, control or abate the environmental harm which may have occurred. |

| Objective-based components | | | |
|---|---|---|---|
| **Management Target** | **Management Actions** | **Monitoring and timing / frequency of actions** | **Reporting** |
| Clearing of no more than 156 ha of native vegetation in Good to Excellent condition in the OB32 BWT Development Envelope - Pipeline | • Maintain up to date land clearing data to ensure native vegetation clearing limit is not exceeded<br>• Implement the *Impact Reconciliation Procedure Orebody 32 Below Water Table* (BHP 2022)<br>• Disturbance activities to be managed internally through BHP's Project Environmental and Aboriginal Heritage Review (PEAHR) system to ensure proposed design and disturbance limits align with approved design and disturbance limits | • Annual review of land clearing within the Development Envelope via GIS spatial layers<br>• Annual Impact Reconciliation Reporting (as per MS1105 Condition 16-9) | **Regular reporting**<br>In accordance with Condition 4-6, submit an annual Compliance Assessment Report (CAR) as part of the Annual Environment Report to the DWER by 1 October each year. The CAR will include but not be limited to the requirements of Condition 4-7 and 6-2(14).<br>**Exception reporting**<br><u>Non-achievement of management targets</u><br>• Notify the CEO of DWER in writing within 21 days of identifying the non-achievement of management target(s)<br>• Provide a report to the CEO within 90 days of the non-achievement being reported to DWER, including the requirements of Condition 6-5(3)<br><u>Failure to implement management actions</u><br>• Notify the CEO of DWER in writing within 7 days of identifying a failure to implement management actions (potential non-compliance)<br>• Provide a report to the CEO within 21 days of the failure to implement a management action being reported to DWER, including the requirements of Condition 6-6(4) |
| Clearing of no more than 38.86 ha of native vegetation in Good to Excellent condition in the OB32 BWT Creek Discharge Development Envelope. | • Maintain up to date land clearing data to ensure native vegetation clearing limit is not exceeded<br>• Implement the *Impact Reconciliation Procedure Orebody 32 Below Water Table Creek Discharge* (BHP 2025)<br>Disturbance activities to be managed internally through BHP's Project Environmental and Aboriginal Heritage Review (PEAHR) system to ensure proposed design and disturbance limits align with approved design and disturbance limits | • Annual review of land clearing within the Development Envelope via GIS spatial layers<br>Annual Impact Reconciliation Reporting (as per MS1105 Condition 16-9) | |
| No significant increase in weed presence within the OB32 BWT Creek Discharge Development Envelope | Undertake annual weed mapping and control in the Development Envelope, which includes the Homestead Creek discharge location in accordance with the BHP Environmental Weed Management in Western Australia Procedure | Annual weed mapping<br>Annual weed control | |

**Table 2-2: Outcome-based components: OB32 BWT Creek Discharge Proposal (Statement 1105 – No X)**

**Purpose**: To meet the requirements of MS1105 Condition 7-2

**Rationale**: Outcome-based components to meet the intent of MS1105 Condition 7-1

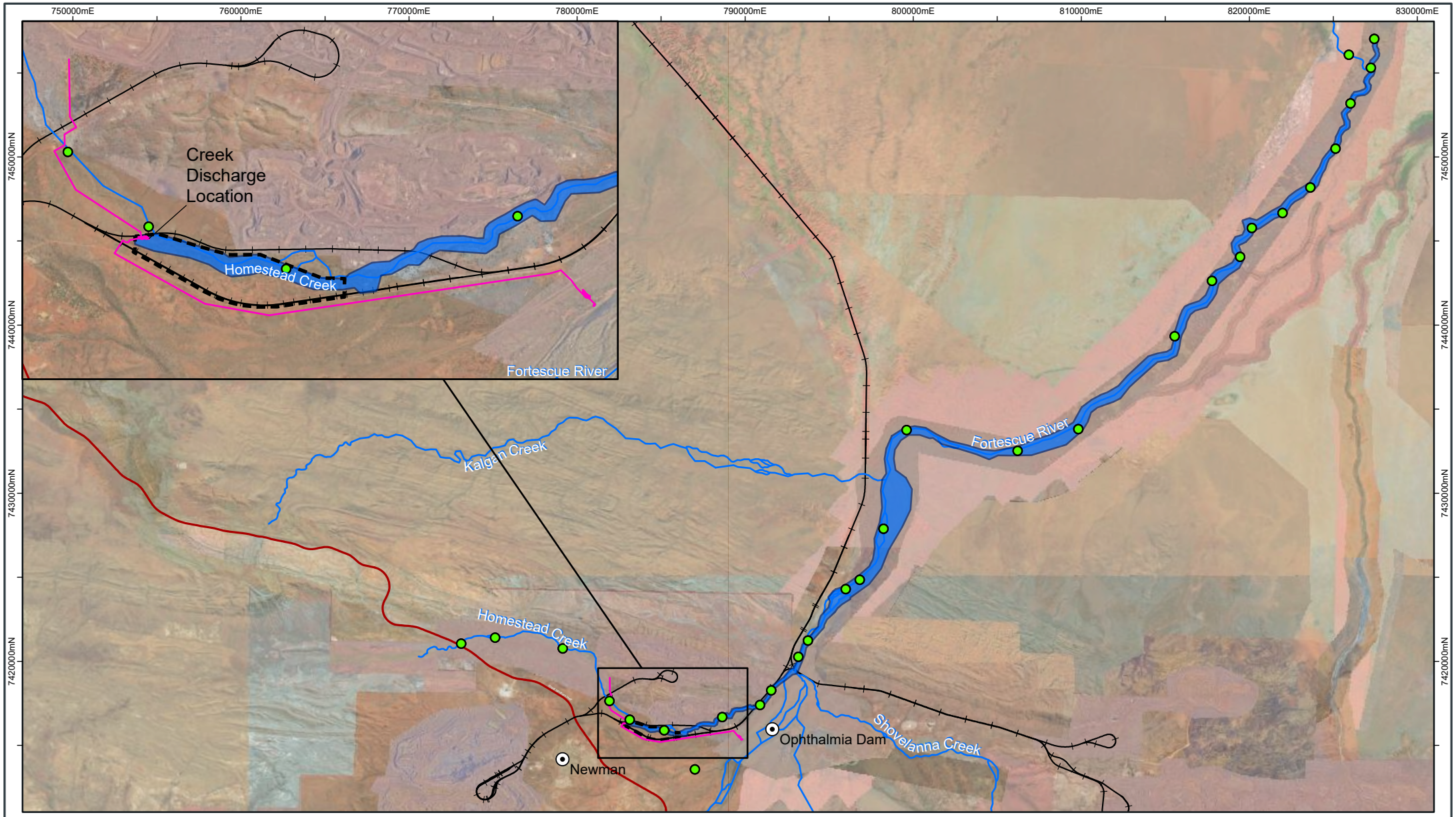
| | |
|---|---|
| **EPA Factor and objective:** | **Flora and Vegetation** – to protect flora and vegetation so that biological diversity and ecological integrity are maintained |
| **Key environments values:** | Riparian vegetation along Homestead Creek and the upper reaches of Fortescue River |
| **EMP outcomes:** | No significant decline to the health of riparian tree species along Homestead Creek and the upper reaches of Fortescue River due to the controlled discharge of surplus water from OB32 BWT into Homestead Creek |
| **Key impacts and risks:** | Potential decline in health of riparian vegetation along Homestead Creek and the upper reaches of Fortescue River (up to Kalgan Creek confluence) due to the controlled discharge of surplus water from OB32 BWT into Homestead Creek |

| **MS1105 Condition clauses - Outcome-based components** | | | |
|---|---|---|---|
| **Indicators:**<br>• **Trigger criteria**<br>• **Threshold criteria** | **Response actions:**<br>• **Tigger level actions**<br>• **Threshold contingency actions** | **Monitoring**<br>**(including timing / frequency of monitoring)** | **Reporting** |
| **Condition 6-2**<br>(2) specify trigger criteria that will provide early warning for the implementation of trigger level actions if exceeded;<br>(3) specify threshold criteria that provides a limit beyond which the environmental outcome is not achieved | **Condition 6-2**<br>(5) specify trigger level actions to be implemented in the event that trigger criteria have been exceeded;<br>(6) specify threshold contingency actions to be implemented in the event that threshold criteria are exceeded | **Condition 6-2**<br>(4) specify monitoring to determine if trigger criteria and threshold criteria are exceeded | **Condition 4-5**<br>The proponent shall advise the CEO in writing of any potential non-compliance including exceedance of threshold criteria and/or failure to implement management actions in an Environmental Management Plan within seven (7) days of that potential non-compliance being known.<br>**Condition 4-6**<br>The proponent shall submit to the CEO a Compliance Assessment Report annually by 1 October each year addressing compliance in the previous financial year, or as otherwise agreed in writing by the CEO.<br>**Condition 4-7**<br>The Compliance Assessment Report shall:<br>(1) be endorsed by the proponent's CEO or a person delegated to sign on the CEO's behalf.<br>(2) include a statement as to whether the proponent has complied with the conditions.<br>(3) identify all potential non-compliances and describe corrective and preventative actions taken.<br>(4) be made publicly available in accordance with the approved Compliance Assessment Plan; and<br>(5) indicate any proposed changes to the Compliance Assessment Plan required by condition 4-1.<br>**Condition 6-2**<br>(7) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that the relevant conditions referred to in the Section 45 Notice for the proposal have been met over the reporting period in the Compliance Assessment Report required by condition 4-6; and<br>(8) provide for reporting of exceedances of the trigger and threshold criteria.<br>**Condition 6-5**<br>If monitoring, tests, surveys or investigations indicate non-achievement of management target(s) specified in a Condition Environmental Management Plan(s), the proponent shall:<br>(4) report the non-achievement in writing to the CEO within twenty-one (21) days of the non-achievement being identified.<br>(5) investigate to determine the cause of the management target(s) not being achieved.<br>(6) provide a report to the CEO within ninety (90) days of the non-achievement being reported as required by condition 6-5(1). The report shall include:<br>(a) the cause(s) of the management targets not being achieved.<br>(b) the findings of the investigation required by conditions 6-5(2).<br>(c) details of revised and/or additional management actions to be implemented to prevent non-achievement of the management target(s); and<br>(d) relevant changes to proposal activities.<br>**Condition 6-6**<br>If monitoring, tests, surveys or investigations indicate that one or more management actions specified in a Condition Environmental Management Plan(s) has not been implemented, the proponent shall:<br>(6) report the failure to implement the management action(s) in writing to the CEO within seven (7) days of identification.<br>(7) investigate to determine the cause of the management action(s) not being implemented.<br>(8) investigate to determine the potential environmental harm or alteration of the environment that occurred due to the failure to |

| MS1105 Condition clauses - Outcome-based components | | | |
|---|---|---|---|
| **Indicators:**<br>• **Trigger criteria**<br>• **Threshold criteria** | **Response actions:**<br>• **Tigger level actions**<br>• **Threshold contingency actions** | **Monitoring**<br>**(including timing / frequency of monitoring)** | **Reporting** |
| | | | implement the management action(s).<br>(9) provide a report to the CEO within twenty-one (21) days of the reporting required by condition 6-6(1). The report shall include:<br>(a) the cause of the failure to implement the management actions<br>(b) the findings of the investigations required by conditions 6-6(2) and 6-6(3)<br>(c) relevant changes to proposal activities<br>(d) measures to prevent, control or abate the environmental harm which may have occurred. |

| Outcome-based components | | | |
|---|---|---|---|
| **Indicators:**<br>• **Trigger criteria**<br>• **Threshold criteria** | **Response actions:**<br>• **Tigger level actions**<br>• **Threshold contingency actions** | **Monitoring**<br>**(including timing / frequency of monitoring)** | **Reporting** |
| **Riparian vegetation health** | | | |
| **Trigger criteria**<br>Significant declining trend in projected foliage cover of overstorey from baseline or mean crown condition score below baseline 10th percentile within four or more potential impact sites<br>**Threshold criteria**<br>Projected foliage cover of overstorey less than 50% of baseline and mean crown condition score below 3 within 10 or more potential impact sites for two or more years | **Trigger level actions**<br>• determine likely factors responsible for tree health decline, including operational, environmental, and site-specific / climatic factors<br>• review available ancillary data for the previous six months at impact and reference sites<br>• review long term and regional trends in vegetation health with remote sensing data<br>• implement above actions as appropriate within 21 days of identifying the trigger exceedance<br>• if exceedance of trigger criterion is considered attributable to BHP surplus water discharge, reduce rate and/or duration of surplus water discharge during natural, no-flow conditions<br>**Threshold contingency actions**<br>• determine likely contributors to for tree health decline, including operational, environmental/climatic, and site-specific factors<br>• review available ancillary data for the previous six months at impact and reference sites<br>• review long term and regional trends in vegetation health with remote sensing data<br>• implement above actions as appropriate within 14 days of identifying the trigger exceedance | **Location**<br>• monitoring sites established at each potential impact site and at each reference site shown on Figure 2-1<br>• **Parameters**<br>• projected foliage cover of overstorey vegetation (> 2 m height) measured with UAV<br>• CCS of indicator riparian tree species (*Eucalyptus victrix, Eucalyptus camaldulensis, Acacia citrinoviridis* and *Acacia coriacea*)<br>**Timing / frequency**<br>• biannual monitoring (post-wet and post-dry season)<br>**Ancillary data**<br>• surface water extent for Homestead Creek and the upper reaches of Fortescue River<br>• remote sensing data analysed to measure vegetation cover and health indices<br>• site condition assessment<br>• local weather (rainfall) data | **Annual reporting**<br>In accordance with Condition 4-6, submit an annual Compliance Assessment Report (CAR) as part of the Annual Environment Report to the DWER by 1 October each year. The CAR will include but not be limited to the requirements of Condition 4-7 and 6-2(8).<br>**Exception reporting**<br><u>Non-achievement of management targets</u><br>• Notify the CEO of DWER in writing within 21 days of identifying the non-achievement of management target(s)<br>• Provide a report to the CEO within 90 days of the non-achievement being reported to DWER, including the requirements of Condition 6-5(3)<br><u>Failure to implement management actions</u><br>• Notify the CEO of DWER in writing within 7 days of identifying a failure to implement management actions (potential non-compliance)<br>Provide a report to the CEO within 21 days of the failure to implement a management action being reported to DWER, including the requirements of Condition 6-6(4) |

| Outcome-based components | | | |
|---|---|---|---|
| **Indicators:**<br>• **Trigger criteria**<br>• **Threshold criteria** | **Response actions:**<br>• **Tigger level actions**<br>• **Threshold contingency actions** | **Monitoring**<br>**(including timing / frequency of monitoring)** | **Reporting** |
| | • if exceedance of threshold criterion is determined to be attributable to BHP surplus water discharge:<br>– review contingency measures, including potential modification to surplus water management and creek discharge regime (e.g. reduce discharge rate or cease discharge temporarily)<br>– increase monitoring frequency and/or increase number of on-ground monitoring sites as appropriate, monitor to ensure contingency measures are successful and review procedures, if appropriate | | |




OB32 BWT Creek Discharge Development Envelope
OB32 BWT Surplus Water Pipeline
OB32 BWT Creek Discharge Wetting Front
Monitoring Locations
Watercourse
Highways
BHP Rail

N

0 2.5 5 7.5 10 12.5
KILOMETRES

GDA 1994 MGA ZONE 50

BHP

PUBLIC

# OB32 BWT CREEK DISCHARGE FLORA AND VEGETATION ENVIRONMENTAL MONITORING PLAN

## VEGETATION MONITORING LOCATIONS

**WAIO PLANNING, TECHNICAL & ENVIRONMENT**

| | | | | | |
|---|---|---|---|---|---|
| SCALE @ A4: | 1:300,000 | REQUESTOR: | ENV. APPROVALS | FIGURE: | 2-1 |
| DATE: | 8/12/2025 | PREPARED: | GEOMATICS | NO: | A1079_117_RevE |

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# 3 Adaptive management and review of the EMP

## 3.1 Adaptive management approach

BHP applies an adaptive management framework for implementing management measures identified in this FVEMP, which is consistent with the Instructions. Adaptive management is a structured, iterative process to decision making. The framework embeds a cycle of monitoring, reporting and implementing change where required. It allows an evaluation of the management and mitigation measures so that they are progressively improved and refined, or alternative solutions adopted, to ensure that environmental objectives and outcomes in the plan are achieved. The key steps of the adaptive management approach are outlined in **Error! R eference source not found.**6.

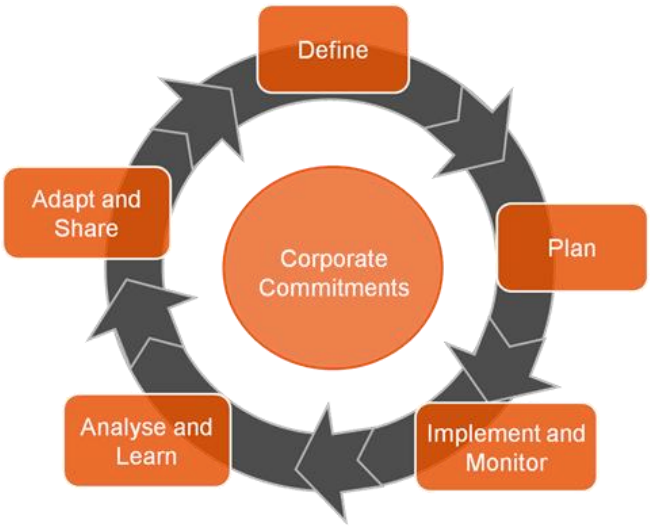


**Figure 3-1: BHP's adaptive management approach**

As this EMP is a requirement of a Ministerial Statement (MS) condition, BHP will seek formal endorsement from the DWER to amend the FVEMP based on information gained through adaptive management.

## 3.2 Review and revision of this EMP

BHP will review this FVEMP (and revise it if required), to ensure that it achieves the identified environmental objectives and meets MS conditions. A review may arise from the following:

- where required by a MS condition
- if initiated by BHP as part of the adaptive management process
- if triggered by a MS condition (e.g. for a non-achievement of management targets and/or failure to implement management actions).

Changes to the endorsed version of the EMP may arise from the following:

- BHP reviews the EMP if the EPA or relevant government agencies develop new or amend existing guidance or policy
- BHP adds components when a new operation (or change to an existing operation) is proposed

- BHP adds or amends components when there is a change to the proposal and/or MS conditions
- The CEO of DWER directs BHP to revise the EMP
- The CEO of DWER confirms by notice in writing that it has been demonstrated that the objective in the relevant condition is being and will continue to be met and therefore implementation of certain condition requirements addressed in the EMP are no longer required.

In accordance with MS1105 Condition 6-4, BHP will implement the components of the FVEMP and continue to implement the FVEMP until the CEO has confirmed by notice in writing that BHP has demonstrated the objectives specified in the relevant conditions referred to in the Section 45B Notice for the Proposal (Statement 1105 – No 1) have been met.

# 4 Stakeholder consultation

BHP discussed the OB32 BWT Proposal and the OB32 BWT Creek Discharge Proposal, including Flora and Vegetation related aspects, with the Nyiyaparli Traditional Owners, through Karlka Nyiyaparli Aboriginal Corporation (KNAC) during the preparation of the proposals. BHP considered feedback from DWER on the OB32 BWT Proposal in developing this FVEMP.

BHP will consult with DWER and other government agencies (including decision-making authorities), local authorities, groups and individuals, where relevant, in relation to the revision of this FVEMP.

# 5 Changes to the EMP

Table 5-1 summarises the key changes in this version of the FVEMP (Version 1) compared to Version 0 that BHP submitted to the DWER on {Date} for the Newman Hub (Orebody 32 Below Water Table) Derived Proposal.

**Table 5-1: Changes to the EMP**

| **Complexity of changes** | | **Minor revisions** | **Moderate revisions** ☑ | **Major revisions** |
|---|---|---|---|---|
| **Number of key environmental factors** | | **One** | **2-3** ☑ | **>3** |
| **Date revision submitted to EPA** | 15 Dec 2025 | | | |
| **Proponent's operational requirement timeframe for approval of revision** | **< One month** | **< Six months** | **>Six months** | **None** ☑ |
| **Reason for timeframe** | The revised FVEMP has been submitted to the DWER to meet the requirements of MS1105 Condition 7. | | | |

| Item no. | EMP Section no. | EMP page no. | Summary of change | Reason for change |
|---|---|---|---|---|
| **Version 1 MM 2024** | | | | |
| 1. | Multiple | Multiple | Reference to management and components associated | Additions to include management of impacts to flora and vegetation by the Orebody 32 Below Water Table Surplus Water Creek Discharge derived proposal request |
| 2. | Section 1 | Pages 2 -19 | Reference to the components associated with the Orebody 32 BWT Creek Discharge derived proposal request including the addition of rationale tables Table 1-4 and Table 1-5 | Incorporate management measures related to the Orebody 32 BWT Creek Discharge Derived Proposal and/or capture of new environmental value/s that have the potential to be impacted from operations |
| 3. | Section 2 | Pages 20 - 26 | Management components to include monitoring and management of riparian vegetation along Homestead Creek and the upper reaches of the Fortescue River which have the potential to be impacted by creek discharge and management of weeds | Incorporate objective based and outcome based components related to the Orebody 32 BWT Creek Discharge Derived Proposal |

| Item no. | EMP Section no. | EMP page no. | Summary of change | Reason for change |
|---|---|---|---|---|
| | | | attributable to creek discharge. | |

# 6 References

Argus, R. (2018) *Flooding responses of riparian eucalypts in the Pilbara region of Western Australia*. PhD Thesis, UWA.

Astron (2022). *OB32 Surplus Water Riparian Vegetation Monitoring Program 2021*. Report for BHP Western Australia Iron Ore, May 2022.

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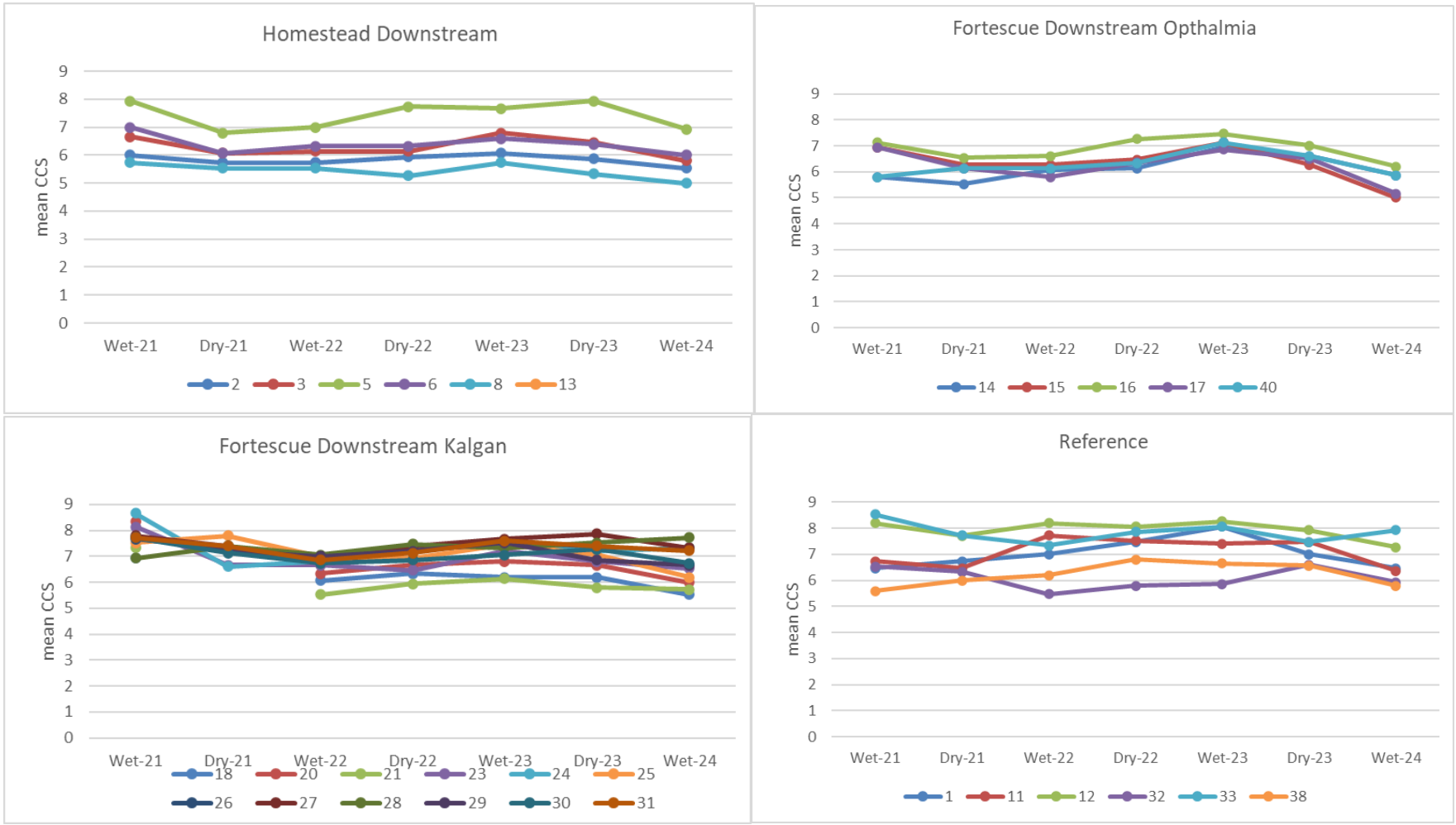
# Appendix 1 - Summary statistics for Crown Condition Score

Summary statistics for Crown Condition Score (CCS) of dominant tree species (*Eucalytpus camaldulensis*, *E. victrix*, *Acacia citrinoviridis* and *A. coriacea)* in Homestead Creek and Fortescue River between 2021 and 2024 (data from Astron 2024 in prep).

| Site Type | Creek Zone | Site number | min | 10th percentile | median | mean | count |
|---|---|---|---|---|---|---|---|
| Potential Impact | Homestead Downstream | 2 | 4 | 5.0 | 6.0 | 5.8 | 104 |
| Potential Impact | Homestead Downstream | 3 | 5 | 5.0 | 6.0 | 6.3 | 105 |
| Potential Impact | Homestead Downstream | 5 | 4 | 6.0 | 7.0 | 7.4 | 105 |
| Potential Impact | Homestead Downstream | 6 | 3 | 5.0 | 6.0 | 6.4 | 105 |
| Potential Impact | Homestead Downstream | 8 | 4 | 5.0 | 5.0 | 5.4 | 105 |
| Potential Impact | Homestead Downstream | 13 | 3 | 5.0 | 7.0 | 6.8 | 105 |
| Potential Impact | Fortescue Downstream Ophthalmia | 14 | 3 | 5.0 | 6.0 | 6.1 | 104 |
| Potential Impact | Fortescue Downstream Ophthalmia | 15 | 3 | 5.0 | 6.0 | 6.3 | 105 |
| Potential Impact | Fortescue Downstream Ophthalmia | 16 | 4 | 5.0 | 7.0 | 6.9 | 105 |
| Potential Impact | Fortescue Downstream Ophthalmia | 17 | 1 | 4.9 | 6.0 | 6.3 | 100 |
| Potential Impact | Fortescue Downstream Kalgan | 18 | 2 | 5.0 | 7.0 | 6.2 | 90 |
| Potential Impact | Fortescue Downstream Kalgan | 20 | 5 | 5.0 | 7.0 | 6.8 | 90 |
| Potential Impact | Fortescue Downstream Kalgan | 21 | 3 | 5.0 | 6.0 | 6.1 | 90 |
| Potential Impact | Fortescue Downstream Kalgan | 23 | 5 | 5.0 | 7.0 | 6.9 | 105 |
| Potential Impact | Fortescue Downstream Kalgan | 24 | 5 | 6.0 | 7.0 | 7.3 | 105 |
| Potential Impact | Fortescue Downstream Kalgan | 25 | 3 | 5.0 | 7.0 | 7.1 | 105 |
| Potential Impact | Fortescue Downstream Kalgan | 26 | 5 | 6.0 | 7.0 | 7.4 | 90 |
| Potential Impact | Fortescue Downstream Kalgan | 27 | 5 | 6.0 | 8.0 | 7.5 | 105 |
| Potential Impact | Fortescue Downstream Kalgan | 28 | 5 | 5.0 | 7.0 | 7.4 | 104 |
| Potential Impact | Fortescue Downstream Kalgan | 29 | 5 | 6.0 | 7.0 | 7.2 | 105 |
| Potential Impact | Fortescue Downstream Kalgan | 30 | 5 | 5.0 | 7.0 | 7.1 | 105 |
| Potential Impact | Fortescue Downstream Kalgan | 31 | 5 | 6.0 | 7.0 | 7.3 | 104 |
| Potential Impact | Fortescue Downstream Kalgan | 40 | 5 | **5.0** | 6.0 | 6.3 | 105 |
| Reference | Fortescue Downstream Reference | 32 | 3 | 5.0 | 6.0 | 6.1 | 105 |
| Reference | Fortescue Downstream Reference | 33 | 5 | 6.0 | 8.0 | 7.8 | 105 |
| Reference | Fortescue Tributary Reference | 38 | 1 | 5.0 | 6.5 | 6.2 | 102 |
| Reference | Homestead Reference | 1 | 4 | 5.4 | 7.0 | 7.0 | 105 |
| Reference | Homestead Reference | 11 | 2 | 5.0 | 7.0 | 7.1 | 104 |
| Reference | Homestead Reference | 12 | 6 | 7.0 | 8.0 | 8.0 | 104 |

# Appendix 2 - Time series of mean Crown Condition Score

Time series of mean Crown Condition Score (CCS) of dominant tree species (*Eucalytpus camaldulensis*, *E. victrix*, *Acacia citrinoviridis* and *A. coriacea*) in Homestead Creek and Fortescue River (data from Astron 2024 in prep.)



# Appendix 3 - UAV projected foliar cover in Homestead Creek and Fortescue River (Astron 2023)

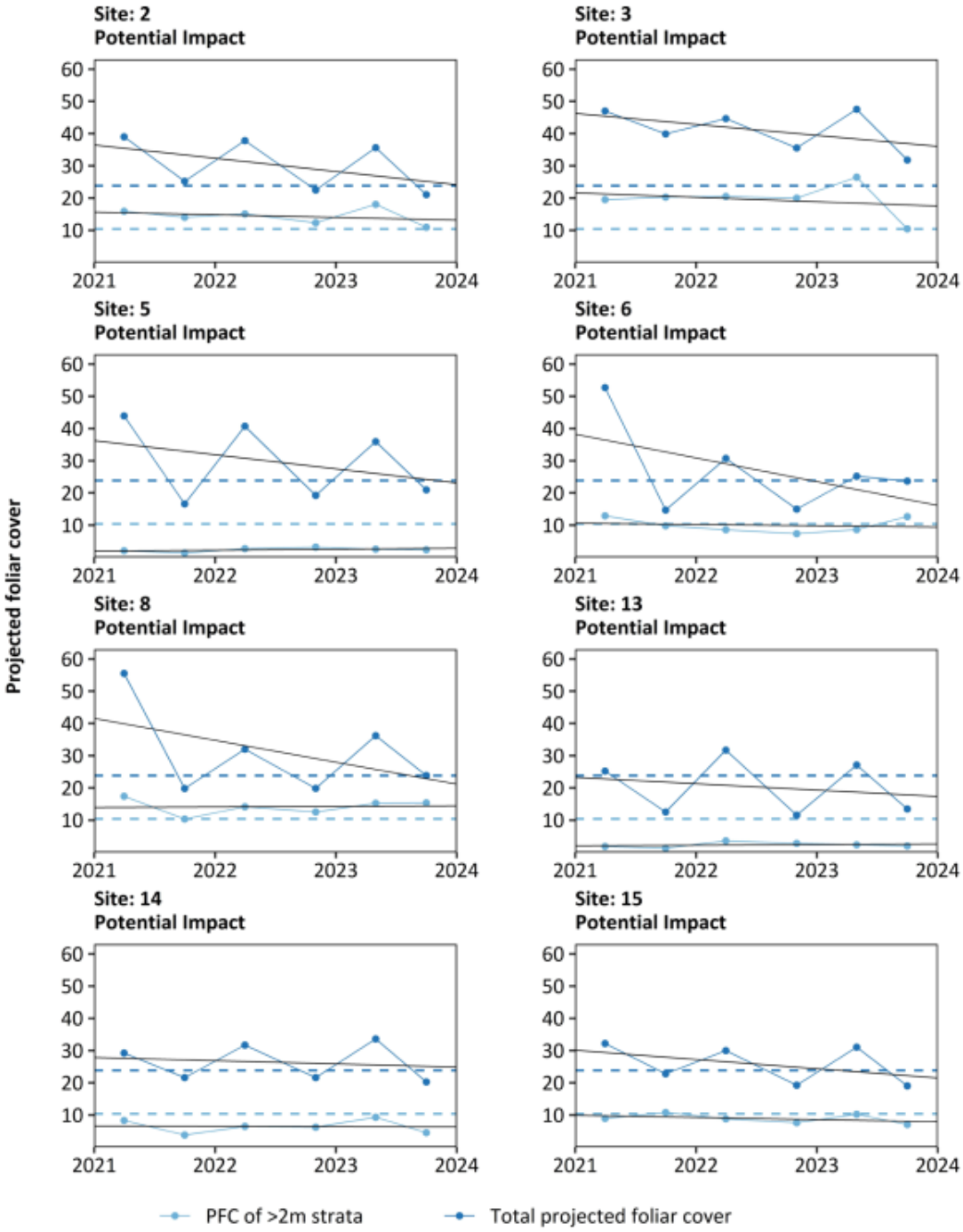



Figure E.1: Time series of projected foliar cover derived from UAV multispectral data at potential impact monitoring sites in the OB32 Surplus Water potential impact and reference zones. Dashed lines represent potential impact zone means and the solid black lines are a linear fit to the data.

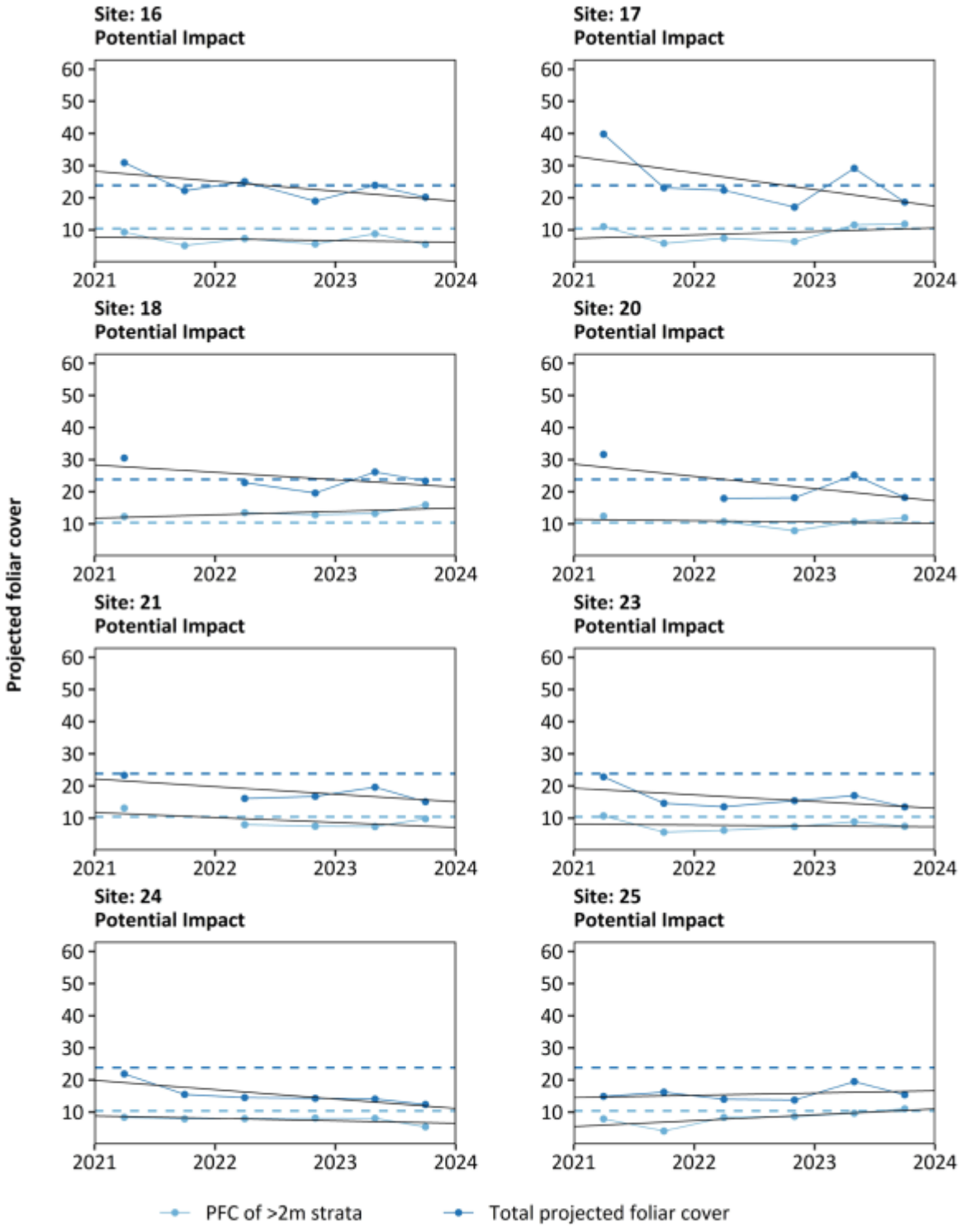



Figure E.2: Time series of projected foliar cover derived from UAV multispectral data at potential impact monitoring sites in the OB32 Surplus Water potential impact and reference zones. Dashed lines represent potential impact zone means and the solid black lines are a linear fit to the data. Note that sites 18, 20 and 21 were not monitored in October 2021 due to third party tenure access issues.

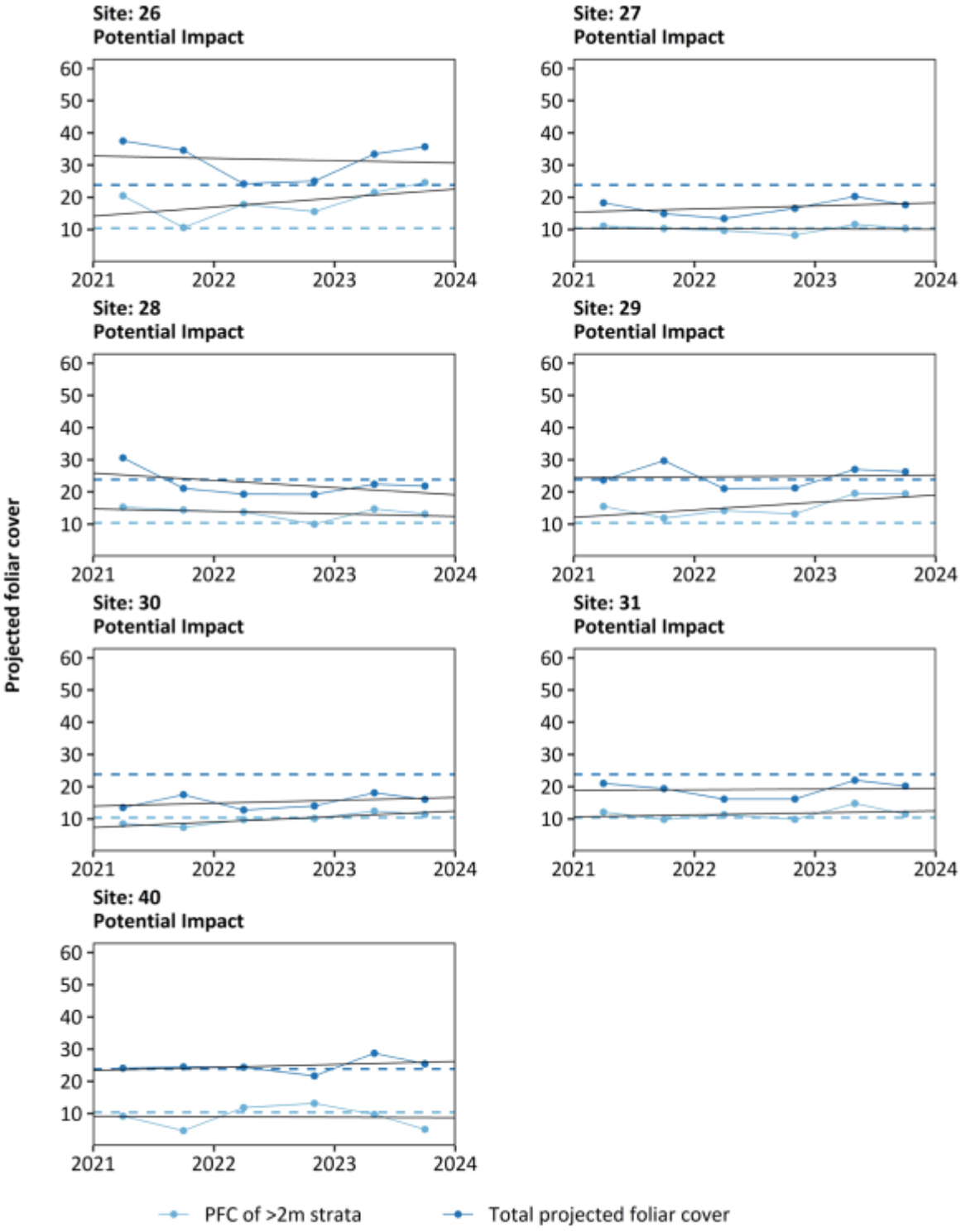



Figure E.3: Time series of projected foliar cover derived from UAV multispectral data at potential impact monitoring sites in the OB32 Surplus Water potential impact and reference zones. Dashed lines represent potential impact zone means and the solid black lines are a linear fit to the data.

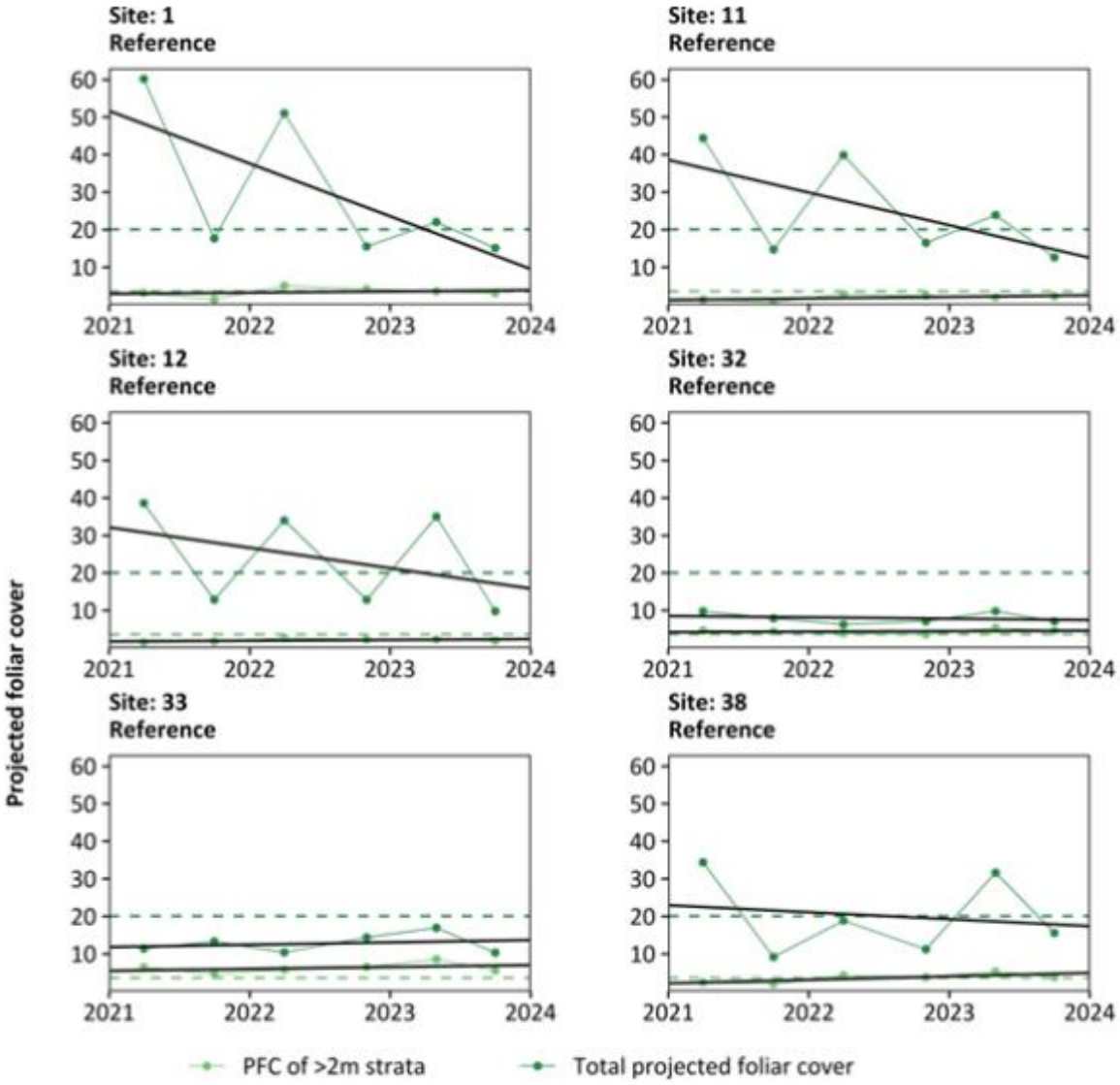



Figure E.4: Time series of projected foliar cover derived from UAV multispectral data at reference monitoring sites in the OB32 Surplus Water potential impact and reference zones. Dashed lines represent reference zone means and the solid black lines are a linear fit to the data.