

Technical memorandum

To: Port Hedland Green Steel Pty Ltd

CC: Preston Consulting Pty Ltd

Date: 07/09/2023

Subject: Summary of interim flora and vegetation survey results



1 BACKGROUND

Phoenix Environmental Sciences (Phoenix) was engaged by Port Hedland Green Steel Pty Ltd to undertake a detailed two season flora and vegetation survey for the Port Hedland Green Steel Project (Project). The survey area is outlined in Figure 1. The primary survey was undertaken 17- 22 April 2023 with the supplementary survey planned September 2023. The results of the survey will be used to inform the Environmental Impact Assessment as part of the approvals process under Part IV of the *Environmental Protection Act 1986*. Reporting on the results of the detailed survey is expected to be finalised in March 2024 following the supplementary survey in September 2023.

In addition, a Native Vegetation Clearing Permit (NVCP) was granted for the Project to undertake geotechnical investigations (CPS10103/1). The conditions of the NVCP required targeted pre-clearance surveys over areas proposed to be cleared for the geotechnical investigations (Figure 2 and Figure 3).

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Preston Consulting
 Boodarie Industrial Estate

Project No. 1558
 Date 07/09/2023
 Drawn by BK
 Map author AS



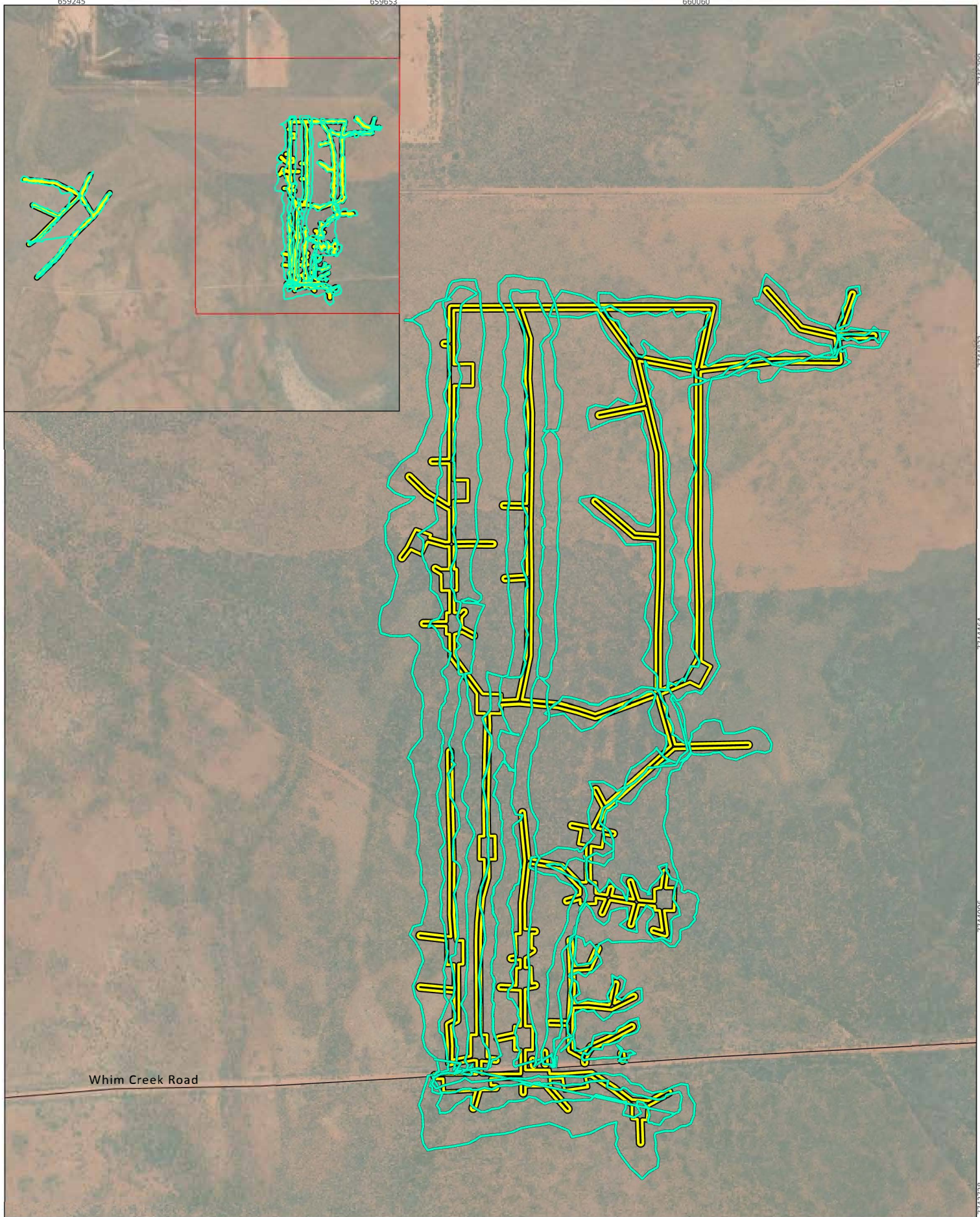
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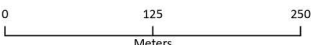
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Study Area

Figure 1
Survey Area





Preston Consulting Boodarie Industrial Estate		
Project No	1558	
Date	22/06/2023	
Map author	GW	
		
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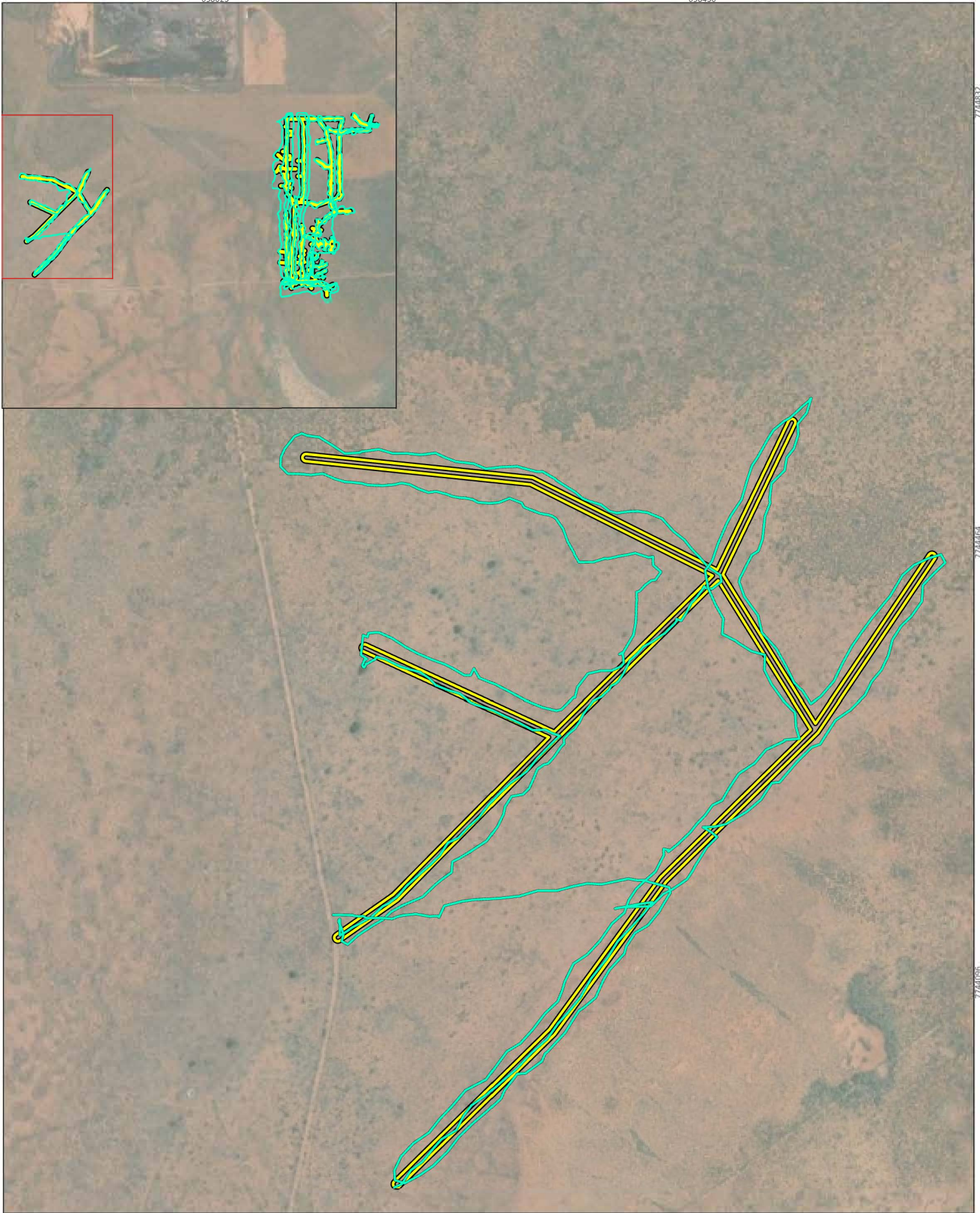
-  Study area
-  Tracks

Figure 2
Targeted Survey Area (1/2)



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Project No	1558	
Date	22/06/2023	
Drawn by	BK	
Map author	GW	
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Study area
 Tracks

Figure 3
Targeted Survey Area (2/2)



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2 METHODOLOGY

2.1 DETAILED FLORA AND VEGETATION SURVEY

Phoenix has been commissioned to undertake a detailed flora and vegetation survey in accordance with EPA's *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016). The detailed survey includes a desktop study and field surveys.

As part of the desktop study, searches of relevant technical databases were undertaken to update records and habitat of significant flora and vegetation. Utilising the databases, a list of species potentially occurring in the survey area and a list of vegetation types recorded in previous surveys was compiled to inform the field survey.

The field component of the detailed flora and vegetation survey will be conducted over two survey phases in accordance with EPA guidance on survey timing for the Eremaean Botanical Province:

- Primary survey in Autumn (March to June; post wet season) – Completed in April 2023; and
- Supplementary survey in Spring (dry season) after winter rains if possible – Scheduled for September 2023.

The survey methods used for the Primary survey include:

- Quadrat and relevé sampling, with 50m x 50m quadrats in accordance with EPA Guidance (EPA, 2016);
- Searches for significant flora;
- Mapping of vegetation type and condition boundaries; and
- Assessment for presence of any Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC).

The Survey Area, as shown in Figure 1, covers an area of 600 hectares (ha) and includes the Plant Development Envelope and the External Infrastructure Corridor Development Envelope.

2.2 TARGETED PRE-CLEARANCE SURVEY

A field survey was conducted of the Targeted Survey Area (Figure 1) during 19-20 June 2023 by Phoenix (Phoenix, 2023). Searches were conducted by foot within, adjacent to, and for a 20 to 50 m buffer of each of the drill lines and pads for the target species. Tracks of the search were recorded by each individual carrying a hand-held GPS unit. Targeted searches were undertaken for six significant flora species as part of the conditions of CPS 10103/1. The six species include:

- *Tephrosia rosea* var. Port Hedland (A.S. George 1114) (Priority 1);
- *Abuliton* sp. Pritzelianum (S. van Leeuwen 5095) (Priority 3);
- *Gomphrena leptophylla* (Priority 3);
- *Gymnanthera cunninghamii* (Priority 3);
- *Euploca mutica* (Priority 3); and

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- *Goodenia nuda* (Priority 4).

Prior to conducting searches, known locations of significant flora identified from the database searches, that occurred in close proximity to the Targeted Survey Area, were visited to determine the phenological status of plants to facilitate their detection during the survey. Searches were undertaken for the significant flora identified in the desktop assessment. For each population of significant flora encountered, the following information was documented:

- GPS location (as points for individual plants or as polygons for populations);
- Description of the vegetation type and condition in which the species was located with a relevè survey;
- Estimation of population size; and
- Representative photographs of the species.

In addition, a voucher specimen of the species was collected from each population encountered for lodgement of at the state herbarium.

To ensure accurate taxonomic identification of flora species recorded for relevés, collections were made of each specimen at least once and each collection was pressed and documented for identification using the WA Herbarium resources.

The following information was recorded for each relevè:

- Location – the geographic coordinates of a central point within the vegetation in WGS84 projection;
- Description of vegetation – a broad description utilising the structural formation and height classes based on National Vegetation Information System (ESCAVI, 2003) and in accordance with EPA (2016);
- Habitat – a brief description of landform and habitat;
- Disturbance history – a description of any observed disturbance including an estimate of time since last fire, weed invasions, soil disturbance, human activity, and fauna activity;
- Vegetation condition – using the condition scale in EPA (2016) for the South-western interzone Botanical Province;
- Photograph – a colour photograph of the vegetation

3 RESULTS

3.1 DETAILED FLORA AND VEGETATION SURVEY

3.1.1.1 Flora

A list of the flora species recorded during the primary field survey is included in Attachment 1.

No Threatened or Priority flora species have previously been recorded in the survey area and none were recorded during the primary field survey in April. A small number of specimens were collected

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which have the potential to be identified as Priority flora. These specimens were dried and sent to the Western Australian Herbarium for identification. None of the specimens were determined to be a Priority flora.

3.1.1.2 Vegetation

The desktop study did not identify any TEC or PEC occurring within the survey area. Additionally, no TECs or PECs were identified during the primary field survey.

Statistical analyses to delineate vegetation types within the study area are yet to be conducted awaiting the outcomes of the second season survey but broadly the vegetation types observed during the primary field survey comprised:

- *Triodia epactia*/*T.secunda*/*T. schinzii* grasslands, single species or combinations of two or three species
- Sparse *Acacia* spp. mid to tall shrublands over *Triodia epactia* and/or *T. schinzii* grasslands
- Low *Acacia stellaticeps* shrublands over *Triodia epactia* and/or *T. schinzii* grasslands
- Open *Eucalyptus victrix* woodland over isolated tussock grasses
- Open *Eucalyptus victrix* woodland over *Triodia epactia* grassland
- Open *Eucalyptus camaldulensis* woodland over *Triodia epactia* grassland

The majority of the vegetation recorded was considered to be in Very Good to Excellent Condition.

3.2 TARGETED PRE-CLEARANCE SURVEY

None of the target species and no other species of Priority flora were recorded during the field survey.

The vegetation in the Targeted Survey Area comprised low grass steppe of *Triodia* spp. frequently with a low shrub layer of *Acacia stellaticeps* and occasionally isolated mid shrubs including *Acacia coleii*, *Dolichandrone occidentalis*, *Carissa lanceolata* and *Clerodendrum* sp. The entire area searched occurred in flat sandplain, no hills or drainage lines/creeks were encountered. The low height and frequently open nature of the vegetation coupled with the flat terrain facilitated the search providing a clear view of plants.

Fabaceae species that occurred in the Targeted Survey Area included *Acacia* spp., *Cajanus cinerea* and *Indigofera monophylla*, and no *Tephrosia* spp. were sighted. Malvaceae species that occurred in the Targeted Survey Area included *Abutilon* sp. Dioicum (A.A. Mitchell PRP 1618), *Triumfetta chaetocarpa*, *Waltheria indica*, *Sida* sp. Pilbara (A.A. Mitchell PRP 1543), *Sida rohlenae* subsp. *rohlenae* and *Gossypium australe*. *Carissa lanceolata* was the only species from the Apocynaceae family sighted in the survey area, as was *Ptilotus astrolasius* the only species from the Amaranthaceae family. No species from the Goodeniaceae and Boraginaceae families were sighted in the survey area.

No survey limitations were identified.

3.3 REFERENCES

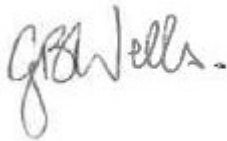
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Environmental Protection Authority (2016). *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*. Joondalup, Western Australia.

ESCAVI (2003). *Australian Vegetation Attribute Manual: National Vegetation Information System (Version 6.0)*. Department of Environment and Heritage, Canberra.

Phoenix Environmental Sciences (2023). *Targeted significant flora surveys for the Boodarie Industrial Estate Project*. Unpublished memorandum prepared for Port Hedland Green Steel Pty Ltd.

Kind Regards,

A handwritten signature in grey ink that reads "Grant Wells". The signature is written in a cursive, slightly slanted style.

Grant Wells

Director/Principal Botanist

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Attachment 1

Family	Species	Status
Aizoaceae	<i>Trianthema triquetrum</i>	
Amaranthaceae	<i>Achyranthes aspera</i>	
Amaranthaceae	<i>Alternanthera angustifolia</i>	
Amaranthaceae	<i>Amaranthus undulatus</i>	
Amaranthaceae	<i>Ptilotus astrolasius</i>	
Amaranthaceae	<i>Ptilotus fusiformis</i>	
Amaranthaceae	<i>Ptilotus polystachyus</i>	
Apocynaceae	<i>Carissa lanceolata</i>	
Asteraceae	<i>Pluchea rubelliflora</i>	
Asteraceae	<i>Pluchea tetranthera</i>	
Bignoniaceae	<i>Dolichandrone occidentalis</i>	
Boraginaceae	<i>Euploca pachyphylla</i>	
Chenopodiaceae	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	
Chenopodiaceae	<i>Salsola australis</i>	
Commelinaceae	<i>Murdannia graminea</i>	
Convolvulaceae	<i>Bonamia alatisemina</i>	
Convolvulaceae	<i>Bonamia erecta</i>	
Convolvulaceae	<i>Bonamia linearis</i>	
Convolvulaceae	<i>Distimake davenportii</i>	
Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	
Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	
Convolvulaceae	<i>Ipomoea muelleri</i>	
Convolvulaceae	<i>Ipomoea plebeia</i>	
Convolvulaceae	<i>Ipomoea polymorpha</i>	
Convolvulaceae	<i>Polymeria ambigua</i>	
Cyperaceae	<i>Bulbostylis barbata</i>	
Cyperaceae	<i>Cyperus blakeanus</i>	
Cyperaceae	<i>Fimbristylis dichotoma</i>	
Euphorbiaceae	<i>Euphorbia coghlanii</i>	
Euphorbiaceae	<i>Euphorbia vaccaria</i> var. <i>vaccaria</i>	
Fabaceae	<i>*Stylosanthes hamata</i>	Weed
Fabaceae	<i>Acacia ?coriacea</i> subsp. <i>pendens</i>	
Fabaceae	<i>Acacia ampliceps</i>	
Fabaceae	<i>Acacia colei</i> var. <i>colei</i>	
Fabaceae	<i>Acacia inaequilatera</i>	
Fabaceae	<i>Acacia melleodora</i>	

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Fabaceae	<i>Acacia sericophylla</i>	
Fabaceae	<i>Acacia sphaerostachya</i>	
Fabaceae	<i>Acacia stellaticeps</i>	
Fabaceae	<i>Acacia tumida</i> var. <i>tumida</i>	
Fabaceae	<i>Grona muelleri</i>	
Fabaceae	<i>Indigofera colutea</i>	
Fabaceae	<i>Indigofera linifolia</i>	
Fabaceae	<i>Indigofera monophylla</i>	
Fabaceae	<i>Leptosema anomalum</i>	
Fabaceae	<i>Tephrosia leptoclada</i>	
Fabaceae	<i>Tephrosia simplicifolia</i>	
Goodeniaceae	<i>Goodenia forrestii</i>	
Goodeniaceae	<i>Goodenia lamprosperma</i>	
Lauraceae	<i>Cassytha capillaris</i>	
Lauraceae	<i>Cassytha filiformis</i>	
Malvaceae	<i>Abutilon otocarpum</i>	
Malvaceae	<i>Corchorus incanus</i> subsp. <i>incanus</i>	
Malvaceae	<i>Hibiscus leptocladus</i>	
Malvaceae	<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	
Malvaceae	<i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543)	
Malvaceae	<i>Sida</i> sp. Pindan (B.G. Thomson 3398)	
Malvaceae	<i>Waltheria indica</i>	
Meliaceae	<i>Owenia reticulata</i>	
Menispermaceae	<i>Tinospora smilacina</i>	
Molluginaceae	<i>Trigastrotheca molluginea</i>	
Myrtaceae	<i>Corymbia candida</i>	
Myrtaceae	<i>Corymbia</i> sp.	
Myrtaceae	<i>Eucalyptus victrix</i>	
Nyctaginaceae	<i>Boerhavia coccinea</i>	
Phyllanthaceae	<i>Nellica maderaspatensis</i>	
Poaceae	* <i>Cenchrus ciliaris</i>	Weed
Poaceae	<i>Aristida holathera</i>	
Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>	
Poaceae	<i>Aristida hygrometrica</i>	
Poaceae	<i>Chrysopogon fallax</i>	
Poaceae	<i>Digitaria brownii</i>	
Poaceae	<i>Eragrostis dielsii</i>	
Poaceae	<i>Eragrostis eriopoda</i>	

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Poaceae	<i>Eragrostis setifolia</i>	
Poaceae	<i>Eriachne aristidea</i>	
Poaceae	<i>Eriachne ciliata</i>	
Poaceae	<i>Eriachne helmsii</i>	
Poaceae	<i>Eriachne mucronata</i>	
Poaceae	<i>Eulalia aurea</i>	
Poaceae	<i>Sporobolus australasicus</i>	
Poaceae	<i>Triodia epactia</i>	
Poaceae	<i>Triodia longiceps</i>	
Poaceae	<i>Triodia schinzii</i>	
Poaceae	<i>Triodia secunda</i>	
Portulacaceae	<i>Portulaca filifolia</i>	
Proteaceae	<i>Hakea lorea</i>	
Proteaceae	<i>Hakea lorea</i> subsp. <i>lorea</i>	
Sapindaceae	<i>Dodonaea coriacea</i>	
Solanaceae	<i>Solanum cleistogamum</i>	
Solanaceae	<i>Solanum diversiflorum</i>	
Thymelaeaceae	<i>Pimelea ammocharis</i>	
Violaceae	<i>Afrohybanthus aurantiacus</i>	
Zygophyllaceae	<i>Tribulopsis angustifolia</i>	
Zygophyllaceae	<i>Tribulus hirsutus</i>	