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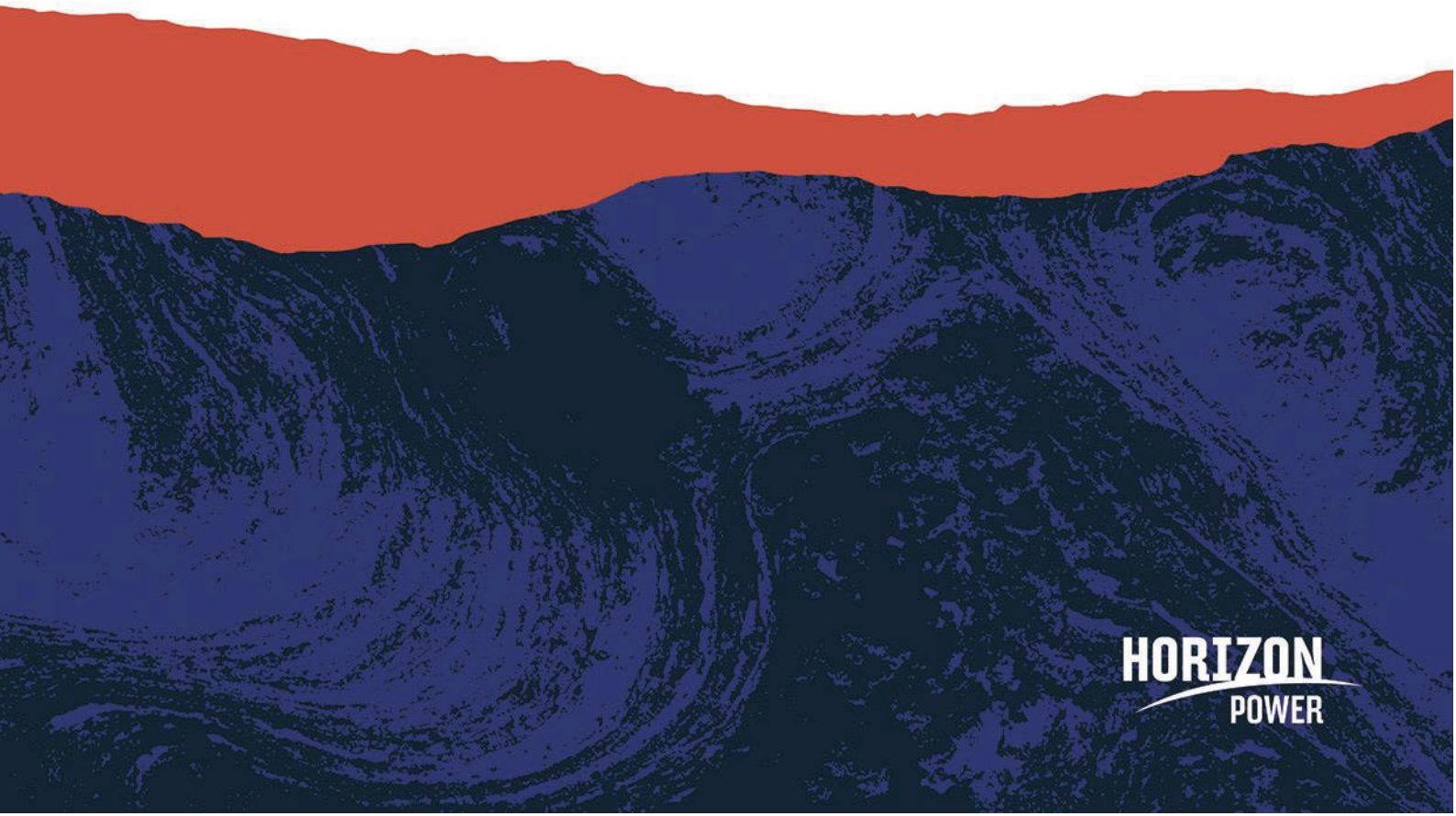
Onslow Power Station - Native Vegetation Clearing Permit

Supporting Document

January 2024



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1 Introduction

1.1 Project Context

Horizon Power is a Western Australian (WA) Government Trading Enterprise (GTE) and the state's regional and remote energy utility. Horizon Power operates under the *Electricity Corporations Act 2005* and is governed by a Board of Directors accountable to the Minister for Energy. Horizon Power is an experienced asset manager undertaking active management of vast electricity networks and generation assets across WA, utilising mature and robust operational, health and safety, and environmental systems.

The current Onslow network requires a generation capacity expansion to serve an increase in customer loads. Therefore, Horizon Power is proposing expansion options for the existing hybrid power station site near the town of Onslow, WA (the Project). The proposed clearing footprint will be utilised for renewables (solar), augmentation of the existing thermal energy generation and supporting infrastructure.

The Project is located within Crown Reserve 51948, being Lot 555 on DP 74894 (Figure 1), on which the existing Onslow hybrid power station is located. The total area of the reserve is 14.6 ha however approximately 3.4 ha is currently cleared for the existing solar infrastructure. Additionally, an area of 2.4 ha on the southern section of the site houses existing underground infrastructure and a portion will be utilised by Main Roads WA to develop access to Onslow Road. Therefore, the total available surplus land area for renewables is 8.8 ha (the Development Envelope (DE)). The final design and location of infrastructure required for the Project is yet to be determined. It is proposed that up to 8.8 ha of native vegetation will be cleared for the solar farm and associated infrastructure and a Native Vegetation Clearing Permit (NVCP) will be required from DWER.

1.2 Scope and Purpose

This document has been prepared to support a NVCP application for the Project. Specifically, this document provides further detail regarding the proposed activities (Section 2) and related clearing (Section 3).

To support environmental approvals for the Project, a flora and vegetation survey has been undertaken by Vicki Long & Associates (VLA) (2023) (Appendix A) and a fauna survey has been undertaken by GHD (2023) (Appendix B). The results of these surveys, as relevant to the proposed clearing, are summarised in Section 4 of this document and have been taken into account when avoiding and mitigating project environmental impacts (Section 6).

An assessment of the 10 Clearing Principles as outlined in '*A guide to the assessment of applications to clear native vegetation*' (DER, 2014) has also been undertaken and is presented in Section 8.

A Construction Environment Management Plan (CEMP) has also been prepared in support of the NVCP Application and is provided in Appendix C.

2 Description of the Activity

2.1 Project Location

The DE is located at the corner of Warrirda Rd and Onslow Rd in the Ashburton North Strategic Industrial Area (ANSIA). The DE is located within Crown reserve 51948 being Lot 555 on DP 74894 in LR3163/982 with a management order to Horizon Power for the purpose of electricity generation and supply (Figure 1).

The current Onslow hybrid power station site is connected to the Onslow zone substation by 2 x 33kV underground cables. The zone substation is located approximately 13 km away, on Lot 880 Onslow Ring Road (Reserve 51992) near the Onslow townsite. Reserve 51992 has a management order to Horizon Power for the purpose of 'Power Substation'.

2.2 Activity Overview and Timelines

The expansion of the Onslow Solar Site will require clearing of the DE for site investigations, construction of renewables and augmentation of existing thermal energy generation, battery, laydown areas, cable installation and associated supporting infrastructure.

Construction is expected to commence in 2024 at the earliest. Horizon Power requires a 5 year clearing permit for these works, to allow time to source renewables technology and a suitable contractor in a constrained market.

2.3 Land Access

Horizon Power has a management order for reserve 51948 for the purpose of electricity generation and supply within the DE. Therefore, Horizon Power has care, control and management of the site as it is subject to a management order under *the Land Administration Act 1997*.

Figure | Project Location and Development Envelope

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0 25 50 100 Meters

Scale: 1:3,000

⚠ For reference only

Last updated on 17/10/2023 by H089661

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3 Description of Proposed Clearing

3.1 Proposed Clearing Area

The entire DE, which is 8.8 ha (Figure 1) is proposed to be cleared. The final design and location of infrastructure within the DE will be informed by engineering site investigations and an Aboriginal cultural heritage survey.

3.2 Proposed Clearing Method

Mechanical clearing will be undertaken for the site investigations, construction of renewables and thermal energy generation, battery, laydown and construction areas, access tracks and associated supporting infrastructure. The clearing of vegetation will be permanent and maintained to allow for safe and effective operation and maintenance of the assets.

4 Ecological Surveys

To inform the Project, a flora and vegetation survey has been undertaken by VLA (2023) and a fauna survey has been undertaken by GHD (2023). Both of these surveys covered the DE plus the existing infrastructure footprint (totalling approximately 14.6 ha), referred to as the Survey Area and shown in Figure 2.

The flora, vegetation and fauna surveys have been appended to this document (Appendix A and Appendix B, respectively) and are summarised in Table 1.

Figure | Survey Area

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Scale: 1:3,000

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Table 1 Summary of Ecological Surveys Relevant to the Survey Area

Survey	Summary of Findings
Targeted flora survey and verification of vegetation types Technical Memorandum – Targeted Flora Survey and Verification of Vegetation Types – Horizon Power Lot 555 Onslow (Appendix A) IBSA Number: IBSA-2023-0435	**Survey Date:** 3rd July 2023 **Survey Area:** The DE plus the existing infrastructure footprint (totalling approximately 14.6 ha). Referred to as the Survey Area and shown in Figure 2. **Flora / Vegetation Findings (across the entire Survey Area):** – Four vegetation types were recorded. Two of these covered the majority of the site, the other two were minor occurrences: • GsTzgTe: *Grevillea stenobotrya* tall open shrubland over *Trichodesma zeylanicum* var. *grandiflorum*, *Crotalaria cunninghamii* shrubland over *Triodia epactia* hummock grassland with patchy **Cenchrus ciliaris* grassland • GsSsTs/Te: *Grevillea stenobotrya* tall open shrubland with *Trichodesma zeylanicum* var. *grandiflorum*, *Crotalaria cunninghamii*, over *Scaevola sericophylla* low shrubland with *Grevillea eriostachya* over *Triodia schinzii* hummock grassland with *Triodia epactia*. Scattered to open **Cenchrus ciliaris* associated with disturbed areas • AsTe*Cc: *Acacia stellaticeps* shrubland over *Triodia epactia* /**Cenchrus ciliaris* mixed grassland, very patchy *Triodia schinzii*. Scattered *Grevillea stenobotyra* tall shrubs • *Cc: *Cenchrus ciliaris tussock grassland. – Vegetation condition ranged from Very Good to Degraded based on percentage of buffel grass cover and old fire history. – No TECs or PECs were present but one vegetation type (GsSsTs/Te) is considered to have high conservation value due to presence of *Triodia epactia* hummock grassland (where *Triodia schinzii* usually dominates), presence of several Priority species and the susceptibility of the dune landform to erosion and weed invasion. – Forty-seven taxa were recorded representing 19 families and 35 genera. – Three Priority flora species were recorded within the eastern portion of the survey area: • *Triumfetta echinata* (Priority 3) - c.38 individuals • *Eremophila forrestii* subsp *viridis* (Priority 3) - 6 individuals • *Abutilon* sp Pritzelianum (S. van Leeuwen 5095) (Priority 3) - 4 individuals – One weed recorded **Cenchrus ciliaris* (buffel grass).

Survey	Summary of Findings
Basic and targeted fauna survey Fauna Survey for Onslow Project (GHD, 2023) (Appendix B) IBSA Number: IBSA-2023-0434	**Survey Dates:** 31st May 2023 to 2nd June 2023 **Survey Area:** The DE plus the existing infrastructure footprint (approximately 14.6 ha). Referred to as the Survey Area and shown in Figure 2. **Fauna / Fauna Habitat Findings (across the entire Survey Area):** – One broad fauna habitat type (not including cleared areas) was identified covering 9.3 ha: undulating orange sand dune system, dominated by *Acacia* shrubs over *Triodia* hummock grass, sparsely occupied by the occasional *Eucalyptus camaldulensis* on lower elevations. – The remaining habitat type was cleared areas covering 5.3 ha. – 18 fauna species were identified, which included 8 birds, 4 reptiles and 6 mammals. Three of the species are introduced (house mouse, cat, and rabbit). – No *Biodiversity Conservation Act 2016* (BC Act) listed Threatened fauna or Priority listed fauna by the DBCA were recorded during the survey – Six conservation significant fauna species are considered likely to occur due to potentially suitable foraging and/or breeding habitat in the survey area and close proximity of previous records: • The Grey Falcon (*Falco hypoleucos*) (Vulnerable) • Peregrine Falcon (Falco peregrinus) (Other specially protected species) • Oriental Pratincole (*Glareola maldivarum*) (Migratory) • Oriental Plover (*Charadrius veredus*) (Migratory) • Lakeland Downs Mouse (*Leggadina lakedownensis*) (Priority 4) • Maryan's Keeled Slider (*Lerista planiventralis maryani*) (Priority 1).

5 Existing Environment

The existing environment is summarised in Table 2.

Table 2 Existing environment

<table>
<tr><th>Environmental value</th><th>Assessment</th></tr>
<tr><td>Vegetation associations and condition</td><td>The Project is located within Pre-European Vegetation Association 670. More than 99% of this vegetation association remains, with almost 11% in DBCA managed lands, except for at the local government authority (LGA) scale.
<table>
<tr><th>Vegetation association</th><th>Scale</th><th>Pre-European extent (ha)</th><th>Current extent (ha)</th><th>% Remaining</th><th>% of current extent in all DBCA managed land (proportion of current extent)</th></tr>
<tr><td rowspan="4">670</td><td>State: WA</td><td>147,897.10</td><td>147,794.60</td><td>99.93</td><td>11.66</td></tr>
<tr><td>IBRA Bioregion: Carnarvon</td><td>147,808.61</td><td>147,792.05</td><td>99.98</td><td>11.66</td></tr>
<tr><td>IBRA Subregion: Cape Range</td><td>147,808.61</td><td>147,792.05</td><td>99.99</td><td>11.66</td></tr>
<tr><td>LGA: Shire of Ashburton</td><td>130,267.09</td><td>130,164.59</td><td>99.92</td><td>1.99</td></tr>
</table>
Four vegetation types were recorded. Two of these covered the majority of the site, the other two were minor occurrences (VLA, 2023):
– GsTzgTe: Grevillea stenobotrya tall open shrubland over Trichodesma zeylanicum var. grandiflorum, Crotalaria cunninghamii shrubland over Triodia epactia hummock grassland with patchy *Cenchrus ciliaris grassland – 3.34 ha
– GsSsTs/Te: Grevillea stenobotrya tall open shrubland with Trichodesma zeylanicum var. grandiflorum, Crotalaria cunninghamii, over Scaevola sericophylla low shrubland with Grevillea eriostachya over Triodia schinzii hummock grassland with Triodia epactia. Scattered to open *Cenchrus ciliaris associated with disturbed areas – 6.22 ha
– AsTe*Cc: Acacia stellaticeps shrubland over Triodia epactia /*Cenchrus ciliaris mixed grassland, very patchy Triodia schinzii. Scattered Grevillea stenobotyra tall shrubs – 0.59 ha
– *Cc: *Cenchrus ciliaris tussock grassland – 0.49 ha
– Cleared – 3.95 ha
The VLA (2023) survey report identified vegetation condition ranging from Very Good to Degraded based on percentage of buffel grass cover and old fire history. The vegetation condition within the Survey Area is classed as follows:
– Cleared - 3.95 ha
– Degraded - 0.49 ha
– Good – 3.93 ha
– Very Good - 6.22 ha.</td></tr>
<tr><td>Fauna habitat</td><td>As detailed in Section 4, GHD (2023) identified one broad fauna habitat type (not including cleared areas) covering 9.3 ha: undulating orange sand dune system, dominated by Acacia shrubs over Triodia hummock grass, sparsely occupied by the occasional Eucalyptus camaldulensis on lower elevations (Figure 4).
The survey area is part of a larger continuous area of coastal and sub coastal plains, consisting of grass savanna dominated by Triodia pungens hummock grass, and Acacia translucens forming the dwarf shrub steppe. This habitat type occurs throughout the surrounding area, and, due to limited natural barriers, displays a high degree of habitat connectivity with surrounding vegetation with similar or better condition vegetation (GHD, 2023).</td></tr>
</table>

Environmental value	Assessment
Significant fauna	No BC Act listed Threatened fauna or Priority listed fauna by the DBCA were recorded during the GHD (2023) survey. Six conservation significant fauna species are considered likely to occur due to potentially suitable foraging and/or breeding habitat in the survey area and close proximity of previous records: – Grey Falcon (*Falco hypoleucos*) (Vulnerable) – Peregrine Falcon (*Falco peregrinus*) (Other specially protected species) – Oriental Pratincole (*Glareola maldivarum*) (Migratory) – Oriental Plover (*Charadrius veredus*) (Migratory) – Lakeland Downs Mouse (*Leggadina lakedownensis*) (Priority 4) – Maryan's Keeled Slider (*Lerista planiventralis maryani*) (Priority 1).
Significant ecological linkage	The proposed area is not part of a significant ecological linkage.
Ecological communities	No State or Federally listed PECs or TECs were recorded within the Survey Area by VLA (2023).
Significant flora	Three Priority flora species were recorded within the eastern portion of the survey area by VLA (2023): – *Triumfetta echinata* (Priority 3) – 38 individuals – *Eremophila forrestii* subsp *viridis* (Priority 3) – 6 individuals – *Abutilon* sp Pritzelianum (S. van Leeuwen 5095) (Priority 3) – 4 individuals *Triumfetta echinata* and *Abutilon* sp Pritzelium (S. van Leeuwen 5095) are relatively widespread and abundant in the Onslow dune area (VLA, 2023). *Eremophila forrestii* subsp *viridis* shrubs in the Survey Area were all sterile and as such a positive determination could not be provided by the WA Herbarium. As the non-sterile parts of the plant match the feature which distinguishes it from E. *forrestii* subsp *hastieana*, VLA (2023) has chosen to report these plants as the Priority 3 subspecies. Biota (2013) recorded two *Eremophila forrestii* subsp *viridis* further north of Lot 555 (in Lot 524) and an additional seven plants in the broader locality. 117 individuals were recorded from 4 locations in the Wheatstone addendum area by Outback Ecology in 2010.
Wetlands and/or waterways	The Project is located within the Pilbara Surface Water Area (proclaimed under the RIWI Act) (GoWA, 2022). No impacts to waterways and no water extraction from a waterway is proposed for the works. No significant wetlands intersect the DE. No permanent or semi-permanent watercourses or wetlands overlap the DE.
Water resources	The DE overlaps the Pilbara Groundwater Area and the Pilbara Surface Water Area (GoWA, 2022), both of which are proclaimed under the RIWI Act. No permanent or semi-permanent watercourses or wetlands overlap the DE. The Australian Groundwater Explorer (BoM, 2023a) does not have any bores near to the DE that have depth to water information. No extraction of groundwater is expected for the Project and solar infrastructure footings will be a depth of less than 4 m.
Conservation Reserves	The DE does not overlap any conservation reserves. The closest DBCA managed area is Thevenard, located approximately 38 km northwest of the DE (GoWA, 2022).
Land and soil quality	The DE does not overlap an area of high or moderate risk of acid sulphate soils (GoWA, 2022) or contaminated sites (GoWA, 2022). No off-site impacts are anticipated in association with the Project.
Heritage-related values and native title matters	A search of the Aboriginal Cultural Heritage Inquiry System showed that there are no listed Aboriginal Heritage Sites within or immediately adjacent to the DE. There are no National Heritage Area or World Heritage Areas mapped as overlapping the DE. No municipal or State heritage sites are within or adjacent to the DE (GoWA 2021).
Air quality	The proposed works are unlikely to contribute significantly to dust. Dust will be managed during construction in accordance with the CEMP. No significant receptors are directly adjacent to the project and no significant air emissions are expected that would impact the airshed.

Environmental value	Assessment
Amenity values	The proposed construction is expected to generate typical construction noise, no sensitive receptors are directly adjacent to the DE, therefore no significant noise or vibration impacts are expected. No heritage buildings are present that may be impacted by vibration. Visual amenity will be impacted by the solar arrays; however, the Project is appropriate for the land use zoning and no sensitive receptors are adjacent.

6 Avoidance, Mitigation and Management Measures

6.1 Avoidance

Initial avoidance and minimisation was undertaken during site selection. This included placement of the Project adjacent to the existing Onslow solar site so that it can connect with the existing infrastructure. Utilisation of, and potential upgrades (such as upgrading generators) to, the existing power station will reduce clearing associated with new infrastructure and connection to the substation.

The final design and location of infrastructure within the DE will be informed by engineering site investigations and an Aboriginal cultural heritage survey. Sensitive environmental features will be considered prior to construction, in accordance with the CEMP to prevent impacts.

6.2 Mitigation and Management

A CEMP has been developed for the Project which lists the specific mitigation and management measures to be applied during construction of the Project (see Appendix C). Key management measures include:

- No clearing is permitted outside the DE.
- Clearing will be minimised where possible through placement of assets in existing cleared locations where possible.
- The clearing locations are to be demarcated prior to clearing activities.
- Clearing areas are to be checked by an Environmental Specialist or Site Supervisor prior to clearing to ensure no more than 8.8 ha of clearing is undertaken.
- A pre-clearing environmental toolbox will be held so all staff are aware of their responsibilities under the permit.
- Clearing of native vegetation will be undertaken in a slow, progressive manner in one direction to allow fauna to move away from the clearing area.

Figure | Fauna Habitat

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0 25 50 100 Meters

Scale: 1:3,000

⚠ For reference only

Last updated on 17/10/2023 by H089661

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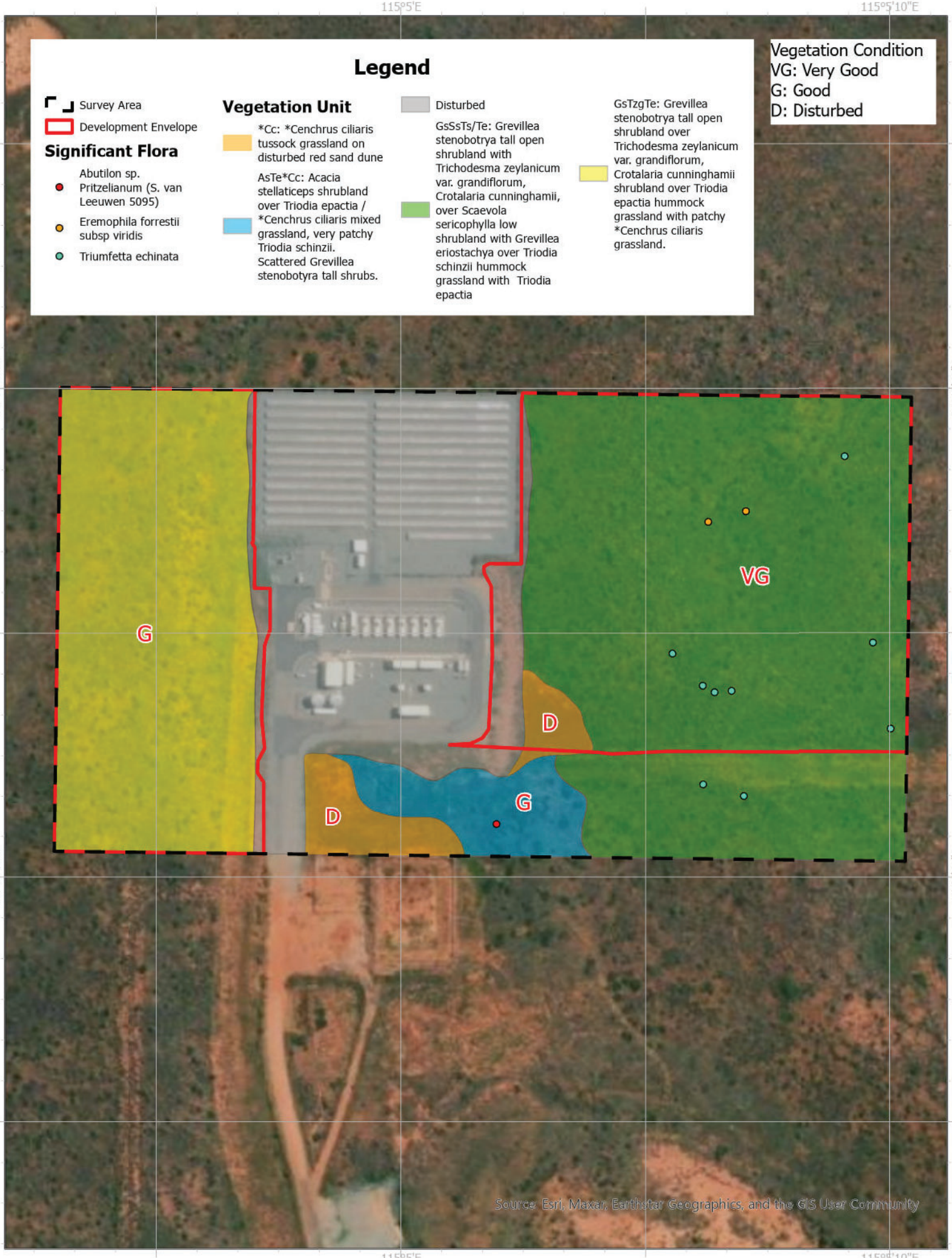

Figure | Flora and Vegetation

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Scale: 1:3,000

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Last updated on 17/10/2023 by H089661

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7 Stakeholder Engagement

Initial engagement with the Buurabalayji Thalanyji Aboriginal Corporation has commenced and an Aboriginal heritage survey is to be conducted. Horizon Power will also engage with the Shire of Ashburton and local stakeholders.

8 Assessment Against the 10 Clearing Principles

An assessment against the 10 Clearing Principles has been undertaken to support the NVCP application for the Project, as presented in Table 3. The assessment found that the proposed clearing of native vegetation for the Project is unlikely to be at variance to any of the Clearing Principles.

Table 3 Assessment Against the 10 Clearing Principles

Principle	Assessment	Outcome
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	As reported by VLA (2023) and shown in Figure 3, vegetation condition within the Survey Area varied from Cleared to Very Good as follows: – Cleared - 3.95 ha – Degraded - 0.49 ha – Good – 3.93 ha – Very Good - 6.22 ha. Four vegetation types were recorded within the Survey Area, as shown in Figure 3. Two of these covered the majority of the site, the other two were minor occurrences (VLA, 2023): – GsTzgTe: *Grevillea stenobotrya* tall open shrubland over *Trichodesma zeylanicum* var. *grandiflorum, Crotalaria cunninghamii* shrubland over *Triodia epactia* hummock grassland with patchy **Cenchrus ciliaris* grassland – 3.34 ha – GsSsTs/Te: *Grevillea stenobotrya* tall open shrubland with *Trichodesma zeylanicum* var. *grandiflorum*, *Crotalaria cunninghamii*, over *Scaevola sericophylla* low shrubland with *Grevillea eriostachya* over *Triodia schinzii* hummock grassland with *Triodia epactia*. Scattered to open **Cenchrus ciliaris* associated with disturbed areas – 6.22 ha – AsTe*Cc: *Acacia stellaticeps* shrubland over *Triodia epactia* /**Cenchrus ciliaris* mixed grassland, very patchy *Triodia schinzii*. Scattered *Grevillea stenobotyra* tall shrubs – 0.59 ha – *Cc: **Cenchrus ciliaris* tussock grassland – 0.49 ha – Cleared – 3.95 ha The DBCA PEC database did not identify any PECs within 40 km of the Survey Area and no PECs were recorded in the Survey Area during the VLA (2023) survey. The Peedamulla Marsh Vegetation assemblages PEC is the closest PEC to the Survey Area, located approximately 50 km to the east. A desktop review of the DBCA WA Herbarium database identified seven flora taxa comprising five families and six genera within 40 km of the Survey Area. Three Priority flora species were recorded within the eastern portion of the Survey Area by VLA (2023): – *Triumfetta echinata* (Priority 3) – 38 individuals – *Abutilon* sp *Pritzelianum* (S. van Leeuwen 5095) (Priority 3) – 4 individuals – *Eremophila forrestii* subsp *viridis* (Priority 3) – 6 individuals A further four species potentially occur but were not recorded: – *Abutilon uncinatum* (Priority 1) – *Carpobrotus* sp Thevenard Island (M White 050) (Priority 2) – *Atriplex flabelliformis* (Priority 3) – *Eleocharis papillosa* (Priority 3). Within 40 km of the Survey Area, the WA Herbarium database has six records of *Triumfetta echinate*. The records do not state the number of individuals recorded, however one of the records notes that the abundance is common. The WA Herbarium database also identified one record of *Abutilon* sp *Pritzelianum* (S. van Leeuwen 5095) within 40 km of the Survey Area. The record did not	Unlikely to be at variance.

Principle	Assessment	Outcome
	state the number of individuals. Despite the lack of available data, VLA (2023) notes that *Triumfetta 17chinate* and *Abutilon* sp *Pritzelium* (S. van Leeuwen 5095) are relatively widespread and abundant in the Onslow dune area. Therefore, clearing of 38 *Triumfetta echinate* individuals and four *Abutilon* sp *Pritzelianum* (S. van Leeuwen 5095) individuals for the Project is unlikely to have a significant impact on the populations. *Eremophila forrestii* subsp *viridis* shrubs in the Survey Area were all sterile and as such a positive determination could not be provided by the WA Herbarium. As the non-sterile parts of the plant match the feature which distinguishes it from E. *forrestii* subsp *hastieana*, VLA (2023) has chosen to report these plants as the Priority 3 subspecies. The WA Herbarium database has three records of the species within 40 km of the Survey Area, with one of the records stating there were 6-20 plants recorded. Biota (2013) recorded two *Eremophila forrestii* subsp *viridis* further north of Lot 555 (in Lot 524) and an additional seven plants in the broader locality. A survey conducted by Outback Ecology in 2010 recorded 117 individuals of the species in the Wheatstone Addendum area, which is less than 1 km from the Survey Area. It is unknown whether these plants were cleared for the Wheatstone project. The recordings of *Eremophila forrestii* subsp *viridis* by Biota and Outback Ecology indicate that the species is relatively common in the Onslow area, however none of these recordings have been lodged in the WA Herbarium database. Clearing of 6 individuals of this species for the Project is unlikely to have a significant impact on the population locally or regionally. One weed was recorded in the Survey Area by VLA (2023): **Cenchrus ciliaris* (buffel grass). This species is not listed as a Declared Pest under the *Biosecurity and Management Act 2007* or a Weed of National Significance. GHD (2023) identified one broad fauna habitat type (not including cleared areas) covering 9.3 ha within the Survey Area: undulating orange sand dune system, dominated by *Acacia* shrubs over *Triodia* hummock grass, sparsely occupied by the occasional *Eucalyptus camaldulensis* on lower elevations (Figure 4). The GHD (2023) desktop review identified records of 390 terrestrial vertebrate and avian marine/migratory fauna species previously recorded within 40 km of the Survey Area. This total comprised 253 birds, 93 reptiles, 37 mammals and 7 amphibians. The GHD (2023) desktop review also identified the presence/potential presence of 49 conservation significance fauna within the Survey Area. This total comprised 43 birds, 1 reptile and 5 mammals. A total of 18 fauna species were recorded in the Survey Area during the GHD (2023) survey, including eight birds, four reptiles and six mammals. Three of these species are introduced (house mouse, cat and rabbit). No BC Act or EPBC Act listed Threatened fauna or Priority listed fauna by the DBCA were recorded during the GHD (2023) survey. The following conservation significant fauna species were assessed as likely to occur within the Survey Area: – Grey Falcon (*Falco hypoleucos*) – Vulnerable (BC Act and EPBC Act) – Peregrine Falcon (*Falco peregrinus*) – Other Specially Protected (OS) – Oriental Pratincole (*Glareola maldivarum*) – Migratory (BC Act and EPBC Act) – Oriental Plover (*Charadrius veredus*) – Migratory (BC Act and EPBC Act) – Lakeland Downs Mouse (*Leggadina lakedownensis*) – Priority 4 – Maryan's Keeled Slider (*Lerista planiventralis maryani*) – Priority 1. The *Triodia* and *Acacia* over Orange Sand Dune System habitat type is part of a larger continuous area of coastal and sub coastal plains, consisting of grass savanna dominated by *Triodia pungens* hummock grass, and *Acacia translucens* forming the dwarf shrub steppe. This habitat type occurs throughout the surrounding area, and, due to limited natural barriers, displays a high degree of habitat connectivity with surrounding vegetation displaying similar or better condition vegetation (GHD, 2023). Therefore, the	

Principle	Assessment	Outcome
	habitat within the DE is not considered critical to the survival of the conservation significant fauna and clearing of up to 8.8 ha of native vegetation is unlikely to significantly impact the species. Overall, the flora, vegetation and fauna values of the DE are highly represented outside the DE and surrounding vegetation typically has similar or better condition vegetation. The native vegetation within the DE is not considered to comprise high levels of biological diversity compared to the surrounding region, and as such, the proposed clearing is not considered to be at variance with this principle.	
(b) Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous Western Australia.	GHD (2023) identified one broad fauna habitat type (not including cleared areas) covering 9.3 ha within the Survey Area: undulating orange sand dune system, dominated by Acacia shrubs over Triodia hummock grass, sparsely occupied by the occasional Eucalyptus camaldulensis on lower elevations (Figure 4). The vegetation condition of the fauna habitat is mostly in Good or Very Good condition. The GHD (2023) desktop review identified records of 390 terrestrial vertebrate and avian marine/migratory fauna species previously recorded within 40 km of the Survey Area. This total comprised 253 birds, 93 reptiles, 37 mammals and 7 amphibians. The GHD (2023) desktop review also identified the presence/potential presence of 49 conservation significance fauna within the Survey Area. This total comprised 43 birds, 1 reptile and 5 mammals. A total of 18 fauna species were recorded in the Survey Area during the GHD (2023) survey, including eight birds, four reptiles and six mammals. Three of these species are introduced (house mouse, cat and rabbit). No BC Act or EPBC Act listed Threatened fauna or Priority listed fauna by the DBCA were recorded during the GHD (2023) survey. The following conservation significant fauna species were assessed as likely to occur within the Survey Area: – Grey Falcon (*Falco hypoleucos*) – Vulnerable (BC Act and EPBC Act) – Peregrine Falcon (*Falco peregrinus*) – Other Specially Protected (OS) – Oriental Pratincole (*Glareola maldivarum*) – Migratory (BC Act and EPBC Act) – Oriental Plover (*Charadrius veredus*) – Migratory (BC Act and EPBC Act) – Lakeland Downs Mouse (*Leggadina lakedownensis*) – Priority 4 – Maryan's Keeled Slider (*Lerista planiventralis maryani*) – Priority 1. These conservation significant species are discussed below. **Grey Falcon** The Grey Falcon is an Australian endemic, usually confined to the arid inland. It inhabits *Triodia* grassland, *Acacia* shrubland, and lightly timbered arid woodland especially stony, inland plains, gibber deserts, sandridges, pastoral lands, and timbered watercourses, but seldom in driest deserts (Morcombe, 2004). The DE is within the known distribution of the Grey Falcon and the species has the potential to utilise the DE on an infrequent or sporadic basis as it contains suitable foraging opportunity (GHD, 2023). The closest record of the Grey Falcon to the DE is approximately 60 km south. Based on aerial imagery and the Soil Landscape Mapping (spatial dataset DPIRD-027, GoWA 2022) and Pre-European Vegetation (spatial dataset DPIRD-006, GoWA 2022) datasets, habitat for the Grey Falcon is widespread within a 10 km radius of the DE. Clearing of up to 8.8 ha within the DE, represents approximately 0.03% of potential habitat available within 10 km of the DE. Therefore, due to the widespread availability of habitat and the Grey Falcon's infrequent use of the DE, no significant impact is expected.	Unlikely to be at variance.

Principle	Assessment	Outcome
	Peregrine Falcon Peregrine falcons live in a wide variety of landscapes and vegetation types, occurring over much of the world. They are found in a variety of habitats, including mountains, forests, cities, valleys, deserts, and coastlines (Queensland Government, 2022). The species is found everywhere from woodlands to open grasslands and coastal cliffs, though less frequently in desert regions, and it feeds almost entirely on other birds. It also eats rabbits and other moderate sized mammals, bats and reptiles. The Peregrine Falcon is very territorial during breeding season (Morcombe 2004). The Peregrine Falcon known to occur locally around the DE and is likely to utilise habitat in the DE on an infrequent or sporadic basis for foraging (GHD, 2023). There are five records of the Peregrine Falcon within 13 km of the DE, with the closest record being approximately 2.5 km south of the DE. Based on aerial imagery and the Soil Landscape Mapping (spatial dataset DPIRD-027, GoWA 2022) and Pre-European Vegetation (spatial dataset DPIRD-006, GoWA 2022) datasets, habitat for the Peregrine Falcon is widespread within a 10 km radius of the DE. Clearing of up to 8.8 ha within the DE, represents approximately 0.025% of potential habitat available within 10 km of the DE. Therefore, due to the widespread availability of habitat and the Peregrine Falcon's infrequent use of the DE, no significant impact is expected. **Oriental Pratincole** In non-breeding grounds in Australia, the Oriental Pratincole usually inhabits open plains, floodplains or short grassland (including farmland or airstrips), often with extensive bare areas. They often occur near terrestrial wetlands, such as billabongs, lakes or creeks, and artificial wetlands such as reservoirs, saltworks and sewage farms, especially around the margins. The species also occurs along the coast, inhabiting beaches, mudflats and islands, or around coastal lagoons (Lloyd and Lloyd 1991). The habitat within the DE is likely to support this species at least on an intermittent basis (GHD, 2023). There are four records of the Oriental Pratincole within 12 km of the DE, with the closest record being approximately 0.5 km southeast of the DE. Based on aerial imagery and the Soil Landscape Mapping (spatial dataset DPIRD-027, GoWA 2022) and Pre-European Vegetation (spatial dataset DPIRD-006, GoWA 2022) datasets, habitat for the Oriental Pratincole is widespread within a 10 km radius of the DE. Clearing of up to 8.8 ha within the DE, represents approximately 0.025% of potential habitat available within 10 km of the DE. Therefore, due to the widespread availability of habitat and the Oriental Pratincole's intermittent use of the DE, no significant impact is expected. **Oriental Plover** Immediately after arriving in non-breeding grounds in northern Australia, Oriental Plovers spend a few weeks in coastal habitats such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches or nearby reefs, or in near-coastal grasslands, before dispersing further inland. Then they usually inhabit flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle camps or open areas that have been recently burnt (Storr, 1980). The habitat within the DE is likely to support this species at least on an intermittent basis (GHD, 2023). There are three records of the Oriental Plover within 17 km of the DE, with the closest record being approximately 3.7 km west of the DE. Based on aerial imagery and the Soil Landscape Mapping (spatial dataset DPIRD-027, GoWA 2022) and Pre-European Vegetation (spatial dataset DPIRD-006, GoWA 2022) datasets, habitat for the Oriental Plover is widespread within a 10 km radius of the DE. Clearing of up to 8.8 ha within the DE, represents approximately 0.025% of potential habitat available within 10 km of the DE. Therefore, due to the widespread availability of habitat and the Oriental Plover's intermittent use of the DE, no significant impact is expected.	

Principle	Assessment	Outcome
	Lakeland Downs Mouse The Lakeland Downs Mouse occupies a diverse range of habitats from the monsoon tropical coast to semiarid climates, including spinifex and tussock grasslands, samphire and sedgelands, *Acacia* shrublands, tropical Eucalyptus and Melaleuca woodlands and stony ranges. Most habitats, however, are seasonally inundated on red or white sandy-clay soils. They are nocturnal, largely solitary, and individuals spend the day in simple, single-chambered burrows (Van Dyck and Strahan 2008). The habitat within the DE is suitable for this species (GHD, 2023). There are 30 records of the Lakeland Downs Mouse within 12 km of the DE, with the closest record being approximately 4.3 km west of the DE. Based on aerial imagery and the Soil Landscape Mapping (spatial dataset DPIRD-027, GoWA 2022) and Pre-European Vegetation (spatial dataset DPIRD-006, GoWA 2022) datasets, habitat for the Lakeland Downs Mouse is widespread within a 10 km radius of the DE. Clearing of up to 8.8 ha within the DE, represents approximately 0.025% of potential habitat available within 10 km of the DE. Therefore, due to the widespread availability of habitat, no significant impact is expected. **Maryan's Keeled Slider** There is little documented about the habitat and ecology of the Maryan's keeled slider however it is known to occupy orange dune systems and sandplains around the Onslow area, south to Barradale. The habitat within the DE is highly suitable for this species (GHD, 2023). There is 1 record of the Maryan's Keeled Slider 16 km north of the DE and there are no other records in close proximity to the DE. Based on aerial imagery and the Soil Landscape Mapping (spatial dataset DPIRD-027, GoWA 2022) and Pre-European Vegetation (spatial dataset DPIRD-006, GoWA 2022) datasets, habitat for the Maryan's Keeled Slider is widespread within a 10 km radius of the DE. Clearing of up to 8.8 ha within the DE, represents approximately 0.04% of potential habitat available within 10 km of the DE. Therefore, due to the widespread availability of habitat, no significant impact is expected. The *Triodia* and *Acacia* over Orange Sand Dune System habitat type is part of a larger continuous area of coastal and sub coastal plains, consisting of grass savanna dominated by *Triodia pungens* hummock grass, and *Acacia translucens* forming the dwarf shrub steppe. This habitat type occurs throughout the surrounding area, and, due to limited natural barriers, displays a high degree of habitat connectivity with surrounding vegetation displaying similar or better condition vegetation (GHD, 2023). Therefore, the habitat within the DE is not considered critical to the survival of the conservation significant fauna and clearing of up to 8.8 ha of native vegetation is not anticipated to significantly impact on a significant habitat for fauna indigenous to Western Australia. The proposed clearing of native vegetation for the Project is therefore not considered to be at variance with this principle.	
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No Threatened flora were identified in the Survey Area during the VLA (2023) survey and none were considered likely to occur based on habitat preference and past records. The proposed clearing of native vegetation for the Project is therefore unlikely to be at variance with this principle.	Unlikely to be at variance.
(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	The DBCA TEC database did not identify any TECs within 40 km of the Survey Area. Additionally, no TEC's were identified within the Survey Area during the VLA (2023) field survey. The proposed clearing of native vegetation for the Project is therefore unlikely to be at variance with this principle.	Unlikely to be at variance.

Principle	Assessment	Outcome
(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	Four vegetation types were recorded within the Survey Area, as shown in Figure 3. Two of these covered the majority of the site, the other two were minor occurrences (VLA, 2023): – GsTzgTe: *Grevillea stenobotrya* tall open shrubland over *Trichodesma zeylanicum* var. *grandiflorum, Crotalaria cunninghamii* shrubland over *Triodia epactia* hummock grassland with patchy **Cenchrus ciliaris* grassland – 3.34 ha – GsSsTs/Te: *Grevillea stenobotrya* tall open shrubland with *Trichodesma zeylanicum* var. *grandiflorum*, *Crotalaria cunninghamii*, over *Scaevola sericophylla* low shrubland with *Grevillea eriostachya* over *Triodia schinzii* hummock grassland with *Triodia epactia*. Scattered to open **Cenchrus ciliaris* associated with disturbed areas – 6.22 ha – AsTe*Cc: *Acacia stellaticeps* shrubland over *Triodia epactia* /**Cenchrus ciliaris* mixed grassland, very patchy *Triodia schinzii*. Scattered *Grevillea stenobotyra* tall shrubs – 0.59 ha – *Cc: **Cenchrus ciliaris* tussock grassland – 0.49 ha – Cleared – 3.95 ha The pre-European vegetation association 670, Hummock grassland with scattered shrubs or mallee *Triodia* spp. *Acacia* spp., *Grevillea* spp., and *Eucalyptus* spp. overlaps the Survey Area. The vegetation types recorded within the Survey Area represent this vegetation association, which covers 147,897 ha across the state and the current extent remaining is greater than 99% of its calculated pre-European extent at all scales (i.e., State, IBRA bioregion, IBRA subregion and Local Government Area (LGA)). The vegetation association is classed as 'least concern'. Vegetation type GsSsTs/Te is in Very Good condition and is ranked as having high conservation significance by VLA (2023) due to presence of *Triodia epactia* hummock grassland (where *Triodia schinzii* usually dominates), presence of several Priority species and the susceptibility of the dune landform to erosion and weed invasion. However, the vegetation in Survey Area is part of a larger continuous area of coastal and sub coastal plains, with surrounding vegetation in similar or better condition (GHD, 2023). It is considered that the 8.8 ha of native vegetation proposed to be cleared for the Project is not significant as a remnant of native vegetation within an area that has been extensively cleared. The proposed clearing of native vegetation for the Project is therefore unlikely to be at variance with this principle.	Unlikely to be at variance.
(f) Native vegetation should not be cleared if it is growing in or in association with a watercourse or wetland.	The DE overlaps the Pilbara Groundwater Area and the Pilbara Surface Water Area, both of which are proclaimed under the RIWI Act. No permanent or semi-permanent watercourses or wetlands overlap the DE. No impacts to waterways and no water extraction from a waterway or groundwater is proposed for the works. The proposed clearing of native vegetation for the Project is therefore not considered to be at variance with this principle.	Unlikely to be at variance.
(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The majority of the DE is comprised of the Dune land system. This system is characterised by dune fields supporting soft spinifex and minor hard spinifex grasslands and sandy fields with spinifex grasslands. The western portion of the DE overlaps the Onslow land system, which is characterised by undulating sandplains, dunes and level clay plains supporting soft spinifex grasslands and minor tussock grasslands. The sandplains and dunes and are considered likely to produce dust during construction, which will be managed through the implementation of a CEMP. Therefore, it is not likely that the clearing will cause appreciable land degradation that will affect the present or future use of the land. The soil landscape land quality mapping (spatial dataset DPIRD-017, GoWA 2022) indicates that the DE is within the Onslow Plain Zone, which is described as coastal mudflats (with some sandplains and coastal dunes) on coastal deposits over sedimentary rocks of the Carnarvon Basin with Tidal soils, Calcareous deeps sands and some Red deeps sands, Red/brown non-cracking clays and Salt lake soils.	Unlikely to be at variance.

Principle	Assessment	Outcome
	A search of the ASS Risk Map (DWER-048) showed that the DE does not overlap any areas at risk of ASS. Additionally, a search of the contaminated sites database (DWER-059) showed that the DE does not overlap any contaminated sites. Topographic maps indicate the degree of slope is small and not likely to have a large amount of soil or water movement that would cause or exacerbate erosion. There may be risk of flooding at the site. The Project will incorporate standard construction management measures to reduce the risk of soil erosion and sedimentation as a result of ground disturbance and clearing (Appendix C). The clearing is not expected to cause appreciable land degradation and based on the above, the proposed clearing of native vegetation for the Project is not considered to be at variance with this principle.	
(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	The DE does not overlap any conservation areas. The closest DBCA managed area is Thevenard, located approximately 38 km northwest. There are no State, National or World Heritage Areas mapped as overlapping the DE. The DE does not overlap any important wetlands or any RIWI Act Rivers. No off-site impacts are anticipated as a result of the proposed clearing of native vegetation within the DE. It is noted that management measures regarding weeds and disease will be implemented as part of the standard CEMP to ensure that weeds are not spread as a result of clearing activities (Appendix C). The proposed clearing is not expected to impact any conservation areas. Based on the above, the proposed clearing of native vegetation for the Project is not considered to be at variance with this principle.	Unlikely to be at variance.
(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	No rivers, wetlands, waterways management areas, Public Drinking Water Source areas, irrigation districts or major drainage lines are present within the DE. The closest significant wetland is Exmouth Gulf East, which is located approximately 29 km east and is listed on the Directory of Important Wetlands in Australia. The DE overlaps the Pilbara Groundwater Area and the Pilbara Surface Water Area, both of which are proclaimed under the RIWI Act. The Australian Groundwater Explorer (BoM, 2023a) does not have any bores near to the DE that have depth to water information. No extraction of groundwater is expected for the Project and solar infrastructure footings will be a depth of less than 4 m A search of the ASS Risk Map (DWER-048) showed that the DE does not overlap any areas at risk of ASS. No significant impacts to quality of surface or underground water are expected in the DE. Given the abundance of vegetation within the surrounding region, with over 99% pre-European vegetation remaining, the proposed clearing is not expected to impact surface or groundwater quality. Therefore, the proposed clearing of native vegetation for the Project is not considered to be at variance with this principle.	Unlikely to be at variance.
(j) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the intensity of flooding.	The nearest Bureau of Meteorology (BoM) weather station with comprehensive data collection and recent historic climate data is Onslow Airport (site number 005017). Median annual rainfall is 306.4 mm, with approximately 16.9 rain days a year (BoM 2023b). Rainfall in the DE is generally received during the summer as a result of unpredictable tropical downpours and cyclonic low-pressure systems and the DE is prone to flooding. Given the abundance of vegetation within the surrounding region, with over 99% pre-European vegetation remaining, the proposed clearing is not expected to increase the risk of flooding. Standard management measures for construction will be in place to mitigate against / manage erosion and associated environmental aspects. Therefore, the proposed clearing of native vegetation for the Project is not considered to be at variance with this principle.	Unlikely to be at variance.

9 Other Matters

9.1 Land Planning

The project will be considered Public Works and is expected to be exempt from development approval under Section 6 of the *Planning and Development Act 2005*, however, due regard is required with respect to:

- The purpose and intent of any planning scheme that has effect in the locality where, and at the time when, the right is exercised;
- The orderly and proper planning, and the preservation of the amenity, of that locality at that time; and
- Any advice provided by the responsible authority in the course of the consultation required.

9.2 Other Approvals

In considering a clearing matter under section 51O of the *Environmental Protection Act 1986* (EP Act), the DWER CEO shall have regard to any planning instrument and other relevant matters when making decisions as to clearing permits. 'Other matters' are not defined in the EP Act, and consequently are any matters the CEO considers relevant. Other matters are generally environmental issues not directly within the scope of the clearing principles, but within the object and principles of the Act. Other approvals that may apply to this Project are detailed in Table 4.

Table 4 Assessment of other approvals relevant to the Project

Other approvals	Assessment
Referral to Environmental Protection Authority	Due to the small scale of the project in a remote location, it is considered that all environmental impacts can be managed under Part V of the *Environmental Protection Act 1986* (EP Act) and referral to the EPA is not considered necessary.
Referral to Department of Climate Change, Energy, the Environment and Water (DCCEEW)	*Threatened flora, fauna and ecological communities* 32 Threatened fauna species were identified within 20 km of the DE. Habitat for the Grey Falcon (*Falco hypoleucos*) is present in the DE. No TECs were recorded in the DE or within 20 km. Given the abundance of alternative habitat outside of the DE, no significant impacts are expected to Threatened fauna, and referral to DCCEEW is not considered to be required. *Migratory fauna* 47 Migratory species were recorded within 20 km of the DE. Habitat for the Oriental Pratincole (*Glareola maldivarum*) and Oriental Plover (*Charadrius veredus*) was recorded in the DE. These species have a wide-ranging habitat and no significant habitat for Migratory species is likely to be removed. *National and World heritage* No National or World Heritage places overlap the DE or are within 20 km of the DE. Engagement with the Buurabalayji Thalanyji Aboriginal Corporation has commenced and an Aboriginal heritage survey is to be conducted. *Wetlands of international importance* No Ramsar Wetlands overlap the DE or are within 20 km of the DE.
Works Approval or Licence under EP Act	No works approvals or licences are required for the Project.
Groundwater or surface water licence under the *Rights in Water and Irrigation Act 1914*	No abstraction is proposed, however, Horizon Power is permitted to access water under Section 42 and 49 of the *Electricity Operator (Powers) Act 1979*. No approvals under the RIWI Act will be required for the project.
Notice of Intent to Clear system under the *Soil and Land Conservation Act 1945*	Not Applicable.

Other approvals	Assessment
State and municipal heritage	A search of the inHerit database and the DPLH-006 dataset shows the DE does not overlap any State or municipal heritage.
Native title	The DE is not within a native title determination area as it has been previously excised.
Aboriginal Sites of Significance under the *Aboriginal Heritage Act 1972*	A search of the Aboriginal Cultural Heritage Inquiry System shows that no Aboriginal Sites of Significance overlap the DE. Engagement with the Buurabalayji Thalanyji Aboriginal Corporation has commenced and an Aboriginal heritage survey is to be conducted.

10 References

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Contaminated Sites Database (DWER-059)

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Soil Landscape Mapping - Best Available (DPIRD-027)

RIWI Act, Groundwater Areas (DWER-034)

Public Drinking Water Source Areas (DWER-033)

RIWI Act, Rivers (DWER-036)

RIWI Act Surface Water and Irrigation District (DWER-037)

DBCA Legislated Lands and Waters (DBCA-011)

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Appendix A: Technical Memorandum - Targeted Flora Survey and Verification of Vegetation Types – Horizon Power Lot 555 Onslow (VLA, 2023)

Horizon Power

TECHNICAL MEMORANDUM – TARGETED FLORA SURVEY AND VERIFICATION OF VEGETATION TYPES – HORIZON POWER LOT 555 ONSLOW

Background

Horizon Power is committed to supply of solar power in Onslow and therefore requires an extension to their existing solar farm which is located on Lot 555 some 15.5 kilometres south of Onslow. Clearing Permit 7253/1 (DER2016001752-1) for Lot 555 on Deposited Plan 74894, Thalandji was granted by the Department of Environment Regulation (DER) in 2016. Part of the approval for this Clearing Permit required a targeted flora survey to be conducted. This survey was conducted by GHD in January 2017 (GHD 2017) and stage one of the solar farm was completed. The area had previously been surveyed as part of the larger Wheatstone Project by Biota in 2013 (Biota 2013) and it was on this that GHD based their vegetation types.

Horizon Power commissioned Vicki Long & Associates (VLA) to conduct a reconnaissance survey, targeting Priority flora over the extended area around the existing facility on Lot 555 (the survey area). This survey was to verify vegetation types previously mapped there, locate any species of conservation significance and to update any taxa nomenclature which may have changed since 2017.

Methods

The survey was conducted in accordance with the criteria set out for a targeted survey by the EPA (2016). An aerial image was used in the field which identified the survey area boundary, along which GPS points had been marked in a grid prior to the survey. In the field, traverses were made across the relatively small area between these GPS points in order to search for species of conservation significance. Two releves were conducted within each vegetation type in order to verify previously described vegetation types. Species of conservation significance were recorded with GPS and marked on the aerial. Photos were taken.

In each vegetation releve the following was recorded:

- Vegetation description
- Vegetation condition
- All species present
- Percent cover of key species present
- Any species of conservation significance
- Any vegetation of conservation significance
- Weed species and abundance
- Photograph from north-west corner of releve.

Limitations

Conditions were dry for the survey. Below average rainfall has been recorded in the Onslow area with a total of 127.2 mm being recorded between the 1st of January and 1st of July 2023. The mean average rainfall for this period is 271.5mm (BOM 2023 Onslow Airport (station 005017). The red pindan sands found on the inland linear dunes in the survey area tend not to retain moisture but do usually have a great diversity of small annuals and ephemerals that emerge and then rapidly die off as the sands dry.

Dry conditions meant that ephemeral and many annual species may not have been present during this survey. Some were senesced but the field botanist was able to identify many of these from persistent material. Some species, too dry and sterile, could only be identified to genus level. It is estimated that 75% of potential species were identified during the survey. However, it is considered that the Priority species listed for the area would be represented if they were present.

There were no other limitations to the survey. Contextual and DBCA database information was available, the area has been surveyed and documented previously, field resources and aerial photographs were of high resolution, time in the field was adequate and field botanist, Vicki Long, has 37 years of experience in the Pilbara, particularly coastal and near coastal areas. Vicki has been working as a botanist in the Onslow area since 1987.

Results

Desktop Review

The survey area is located on the Dune Land System (Van Vreeswyk et al 2004), comprised of narrow dunes and swales depositional quaternary eolian deep red sands with no organised drainage. These generally run north-south, are up to 15 m high and 2.5 km long, and have hummocky crests. The swales are between 50 to 400 m wide. Both are vegetated with *Triodia schinzii* and/ or *Triodia epactia* with some mid height shrubs. Swales sometimes house low *Acacia stellaticeps* (Van Vreeswyk et al 2004).

Two vegetation types occur in the survey area (GHD 2017) and are described as being equivalent to that mapped by Biota (2013). Descriptions use Biota map codes.

Table 1 Vegetation and vegetation codes as descripbed by Biota (2013) and GHD (2017)

Map Code	Description	Conservation Significance
CS1	*Acacia tetragonaphylla* scattered shrubs over *Triodia epactia* hummock grassland occurring on interdunal swales	Low
ID1	*Grevillea stenobotrya* tall open shrubland over *Crotalaria cunninghamii, Trichodesma zeylanicum* var *grandiflorum* open shrubland over *Triodia epactia* open hummock grassland occurring on red sandy dunes.	High

Vegetation type ID1 has high conservation significance according to Biota (2013) due to the fact that it is dominated by *Triodia epactia* hummock grassland, where consistently, *Triodia schinzii* hummock grassland dominates other dunes in the vicinity (Validus 2008, Biota 2010a), it houses Priority species and the landform is subject to weed invasion.

A search of the DBCA's database of Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) found no occurrences of either within or in close proximity to the survey area. The closest PEC (Priority 1) is the Peedamulla Marsh Vegetation assemblages PEC which occurs near the mouth of the Cane River some 50 km away, and no TECs or PECs were expected by the author to be found on the survey area.

The desktop information indicates that one Priority 3 species *Triumfetta echinata* occurs in the survey area (GHD 2017).

A further five Priority species are known to occur within 20 km of the survey area. These include:

- *Abutilon uncinatum* (Priority 1)
- *Carpobrotus* sp Thevenard Island (M White 050) (Priority 2)
- *Atriplex flabelliformis* (Priority 3)
- *Eremophila forrestii* subsp *viridis* (Priority 3)
- *Eleocharis papillosa* (Priority 3).

Other taxa recognised by Biota (2013) as having conservation significance include:

- *Abutilon* aff *dioicum*
- *Aenictophyton* aff *reconditum*
- *Vigna* sp Hamersley clay (AA Mtichell RPR 113)

These three species represent undescribed taxa and potentially new species.

Seven weeds species have been described in the area in the vicinity of the survey area.

Field Results

The field survey was conducted on the 3rd of July 2023, by Vicki Long. As discussed above, conditions were dry, but it is estimated that 75% of the species expected to potentially be present were recorded and the dry conditions did not impede describing of vegetation.

Vegetation

Four vegetation types were recorded by VLA as occurring in the survey area. Two of these covered the majority of the site, the other two were minor occurrences. The vegetation types reflect different micro-habitats. Running north-south along the western side of the survey area, and immediately west of the current track and infrastructure runs a simple, unbranched very narrow linear red sand dune with shrubland over *Triodia epactia* hummock grassland which has been infested by buffel grass in varying degrees adjacent to existing infrastructure. The eastern side of the survey area consists of an irregular shaped red sand swale, and a series of broken, hummocky dunes. Immediately below (south of) the south-east corner of the existing infrastructure is a low area in the swale which differs from the vegetation over the remainder of the eastern portion and has been historically semi-disturbed. There are also two small areas of **Cenchrus ciliaris* grassland resultant of previous disturbance. The vegetation types described by VLA are presented in Table 2 below and shown on Figure 1.

Table 2 Vegetation Types described on the survey area by VLA

VLA Code	Vegetation Description and Condition	Micro Habitat
GsTzgTe	*Grevillea stenobotrya* tall open shrubland over *Trichodesma zeylanicum* var. *grandiflorum, Crotalaria cunninghamii* shrubland over *Triodia epactia* hummock grassland with patchy **Cenchrus ciliaris* grassland. (Plate 1) **Vegetation Condition: Good**	Narrow linear north-south red sand dune on west side of survey area.

VLA Code	Vegetation Description and Condition	Micro Habitat
GsSsTs/Te	*Grevillea stenobotrya* tall open shrubland with *Trichodesma zeylanicum* var. *grandiflorum, Crotalaria cunninghamii,* over *Scaevola sericophylla* low shrubland with *Grevillea eriostachya* over *Triodia schinzii* hummock grassland with *Triodia epactia.* Scattered to open **Cenchrus ciliaris* associated with disturbed areas. (Plate 2) **Vegetation Condition: Very Good**	Irregular red sandy swale with broken hummocky red sand dunes, eastern side of survey area.
AsTe*Cc	*Acacia stellaticeps* shrubland over *Triodia epactia /*Cenchrus ciliaris* mixed grassland, very patchy *Triodia schinzii.* Scattered *Grevillea stenobotyra* tall shrubs. (Plate 3) **Vegetation Condition: Good**	Low swale area, probably historically disturbed.
*Cc	**Cenchrus ciliaris* tussock grassland. (Plate 4) **Vegetation Condition: Degraded**	Disturbed sand swale.

Vegetation Condition

Vegetation condition on the site was assessed using Trudgen (1988) as approved by EPA (2016) (Appendix A). Vegetation ranged from Very Good to Degraded based on percentage of buffel grass cover and old fire history. Vegetation condition is indicated in Table 2.

Vegetation Types VLA vs Biota (2013)

Vegetation type GsTzgTe was only found on the narrow linear dune west of the current facility and was distinct in having *Triodia epactia* hummock grassland with <1% *Triodia schinzii.* The *T. epactia* hummock grassland had been invaded by patchy buffel grass (**Cenchrus ciliaris)* which became less abundant further from existing disturbed areas. This vegetation type equates to that mapped by Biota (2013) as ID1.

Vegetation on the eastern side was dominated by *Triodia schinzii* hummock grassland with *Triodia epactia* and a more diverse range of component shrub species. Medium to low shrubs, including *Scaevola sericophylla, Grevillea eriostachya, Olearia dampierii* subsp *damperii, Hakea stenophylla* subsp *stenophylla* were present, particularly in the swale area. This vegetation type broadly equates to the inland sand dune vegetation type ID2 (Biota 2013)– which was mapped for the wider area but not the immediate survey area.

Vegetation types GsTzgTe and GsSsTs/Te dominate the survey area. Two smaller vegetation types were recorded.

Vegetation type AsTe*Cc in the low semi-disturbed swale area dominated by *Acacia stellaticeps* only represented a very small area within the survey area, as did two small areas of **Cenchrus ciliaris* grassland (*Cc). Vegetation type AsTe*Cc equates to Biota (2013) ID3 mapped for dune areas in the wider area but on the survey area, however, Biota did not record **Cenchrus ciliaris* in this vegetation

type in 2013. **Cenchrus ciliaris* grassland was not mapped at all by Biota (2013). Comparisons are presented in Table 3.

Table 3 Comparison VLA and Biota (2013) Vegetation Descriptions and Conservation Significance (Biota 2013)

VLA Code	VLA Vegetation Description and Conservation value at time of survey.	Biota (2013) Code	Biota (2013) Vegetation Description and Conservation value at time of survey.
GsTzgTe	*Grevillea stenobotrya* tall shrubland over *Trichodesma zeylanicum* var. *grandiflorum, Crotalaria cunninghamii* shrubland over *Triodia epactia* hummock grassland with patchy **Cenchrus ciliaris* grassland. **Conservation Significance: Moderate**	ID1	*Grevillea stenobotyra* tall open shrubland over *Crotalaria cunninghamii, Trichodesma zeylanicum* var *grandiflorum* open shrubland over *Triodia epactia* open hummock grassland. Mapped by Biota(2013) / GHD (2017) as present on the survey area. **Conservation Significance: High**
GsSsTs/Te	*Grevillea stenobotrya* tall shrubland with *Trichodesma zeylanicum* var. *grandiflorum, Crotalaria cunninghamii,* over *Scaevola sericophylla* low shrubland with *Grevillea eriostachya* over *Triodia schinzii* hummock grassland, patchy *Triodia epactia.* **Conservation Significance: High**	ID2	*Grevillea stenobotrya* tall open shrubland over *Crotalaria cunninghamii, Hibiscus brachychlaenus* open shrubland over *Triodia schinzii* (*T. epactia*) open hummock grassland. Not mapped by Biota(2013) / GHD (2017) as present on the survey area. **Conservation Significance: High**
AsTe*Cc	*Acacia stellaticeps* shrubland over *Triodia epactia/*Cenchrus ciliaris* mixed grassland, very patchy *Triodia schinzii.* Scattered *Grevillea stenobotrya* tall shrubs. **Conservation Significance: Low**	ID3	*Acacia stellaticeps* shrubland over *Triodia epactia* hummock grassland. Not mapped by Biota(2013) / GHD (2017) as present on the survey area. **Conservation Significance: Low**
*Cc	**Cenchrus ciliaris* tussock grassland. **Conservation Significance: Low**		Not mapped by Biota(2013) / GHD (2017) as being present in the wider area or on the survey area.

The vegetation type CS1, *Acacia tetragonaphylla* scattered shrubs over *Triodia epactia* hummock grassland on coastal sand plains, reported to occur on the site (GHD 2017) following the Biota vegetation mapping (2013) does not occur on the survey area.

Conservation Value of Vegetation Types on survey area

Biota (2013) ranked ID1 (GsTzgTe) and ID2 (GsSsTs/Te) as having high conservation significance based presence of *Triodia epactia* hummock grassland (where *Triodia schinzii* usually dominates), presence of several Priority species and the susceptibility of the dune landform to erosion and weed invasion. The high value of ID1 (GsTzgTe) in the immediate survey area has been reduced by the invasion of buffel grass from the existing facility and therefore ranked by VLA as being of Moderate significance. VLA rank GsSsTs/Te has having high conservation significance at present (this was also ranked as high

conservation significance by Biota 2013). However, it was noted that buffel grass was already invading from the edges of the existing facility and from the disturbed corridor leading off towards the east through the survey area.

Vegetation AsTe*Cc is of low conservation significance as it has been infested by buffel grass, however, it does house a Priority 3 species (*Abutilon* sp *Pritzelianum*). Vegetation significance is presented in Table 3.

Plate 1: Vegetation type GsTzgTe.

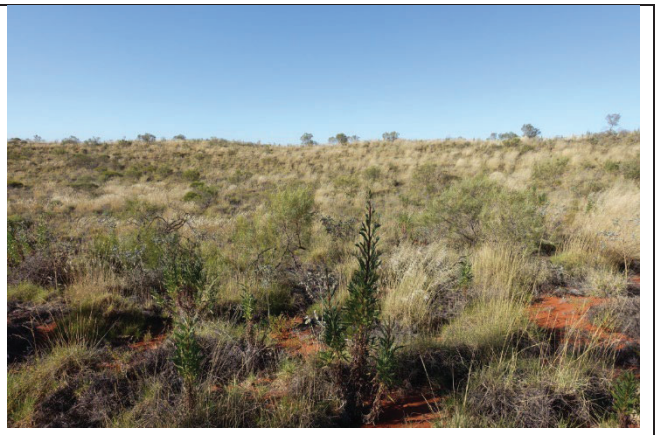

Plate 2: Vegetation type GsSsTs/Te

Plate 4: Vegetation type AsTeCc

Plate 4: Vegetation type *Cc

Flora

Forty-seven taxa were recorded during the field survey representing 19 familes and 35 genera. The flora recorded are all considered typical of what is expected to occur on the sandy inland dune substrate and accord with those reported in Biota (2013). Flora recorded are presented in Appendix B.

Priority Flora

Three Priority flora species were recorded by VLA. These were all located within the eastern portion of the survey area. Their locations are shown on Figure 1.

- *Triumfetta echinata* (Priority 3) c.38 off (in GsSsTs/Te)
- *Eremophila forrestii* subsp *viridis* (Priority 3) 6 off (3 x 2 locations) (in GsSsTs/Te)
- *Abutilon* sp Pritzelianum (S. van Leeuwen 5095) (Priority 3) 4 off (in AsTe*Cc)

It should be noted that all P3 *Eremophila forrestii* subsp *viridis* shrubs occurring were sterile and a determination was made only on the lack of tomentum on the leaf surface as described by Chinnock (2007). A specimen was sent to the West Australian Herbarium and they agreed that the specimen appeared to be *E. forrestii* subsp *viridis* but without flowering material it was difficult to make a positive confirmation. Both *Eremophila forrestii* subsp *hastieana* (not Priority) and *Eremophila forrestii* subsp *viridis* were recorded on the survey area. The former was found to be regenerating well in the mowed along the northern boundary of the current facility. These plants were obviously tomentose. The Priority species, not tomentose, were found in two groups of 3 each in the swale on the eastern side of the survey area.

Triumfetta echinata shrubs were found on west facing sand dune slopes on the eastern side of the survey area, usually in groups of 2-6 within a radius of 5 m.

Abutilon sp Pritzelianum (S. van Leeuwen 5095) was only found in the low semi-disturbed swale area with *Acacia stellaticeps* midway along the southern boundary.

Priority flora are shown in Plates 5-8 below.

Plate 5: *Triumfetta echinata* flower

Plate 6: *Triumfetta echinata* low shrub.

Plate 7: Hairless leaves *Eremophila forrestii* subsp *viridis*

Plate 8: *Abutilon* sp Pritzelianum (S.van Leeuwen 5095)

Weeds

The only weed recorded was **Cenchrus ciliaris* (buffel grass). It was abundant on the edges of disturbed areas, occurs occasionally along a previously cleared (now revegetating) track in GsSsTs/Te, (south-east portion or survey area) and has invaded the surrounding native vegetation on the dune systems. It was recorded in all vegetation types.

Discussion

The results of the survey indicate the survey area houses four vegetation types, two of which have minor representation only. No TECs or PECs were present but one vegetation type (GsSsTs/Te) is considered to have high conservation value. Biota (2013) ranked two of the inland dune vegetation types as having high conservation significance based partially on the fact that this vegetation/landform houses Priority flora and is highly susceptible to erosion and weed invasion. Weed invasion is exactly what has occurred, resulting in one vegetation type in the survey area (GsTzgTe / ID1), previously ranked by Biota (2013) as having high conservation value being downgraded in the VLA survey to moderate.

Two vegetation types (ID1 and CS1) were mapped as present on the survey area by Biota (2013) and reported on by GHD (2017). VLA found ID1 was present but CS1 did not occur in the survey area. The survey area is wholly located on inland sand dunes and swales and the vegetation found there is appropriate to that landform. The vegetation types described and mapped by VLA do equate to the those described by Biota (2013) as occurring on inland sand dunes in the wider area. The vegetation type CS1 (*Acacia tetragonaphylla* scattered shrubs over *Triodia epactia* hummock grassland) belongs to coastal sand plains which are not part of the survey area, and this vegetation type was not present.

Vegetation condition on the survey area varies from degraded, which is appropriate to the small area of **Cenchrus ciliaris* grassland, to good (GsTzgTe and AsTe*Cc) to very good (GsSsTs/Te). Biota (2013) had ranked the vegetation equivalent (ID1 – GsTzgTe) as being in very good condition when they conducted the survey in 2013 but subject to weed invasion. This is exactly what has occurred since 2013, demonstrating how easily this landform and vegetation is infested and the importance of the implementation of a sound weed management plan.

The flora recorded are considered typical of that expected to occur on inland red sand dunes. Conditions for the survey were relatively dry and the red sand dunes do not retain moisture. Therefore, ephemeral and some annual species would not have been present during the survey. Some annuals had senesced but the field botanist was able to identify most of them from persisting material. It is considered that 75% of the species likely to be present after good rainfall were recorded.

Three Priority flora were recorded. In their targeted survey, GHD (2017) recorded *Triumfetta echinata* which was again found this survey on the eastern side of the survey area. In addition to this, six *Eremophila forrestii* subsp *viridis* were found as small plants, three of in two locations, in more dense vegetation in a swale area in the north-eastern portion of the survey area, and four *Abutilon* sp Pritzelium were found in dense vegetation in a low area of the swale approximately midway along the southern boundary.

Triumfetta echinata and *Abutilon* sp Pritzelium (S. van Leeuwen 5095) are known by the author to be relatively widespread and abundant in the Onslow dune area. *Eremophila forrestii* subsp *viridis* is much less well known and very few collections of this species have been made. It is very similar to

Eremophila forrestii subsp *hastieana* which was also found on the site, the distinguishing factor includes the former being with very sparse hairs where the latter is quite tomentose. *Eremophila forrestii* subsp *viridis* is also easily distinguished by its brighter green colour (due to lack of hairs) (Chinnock 2007). *Eremophila forrestii* subsp *viridis* shrubs on the survey area were all sterile and as such a positive determination could not be provided by the WA Herbarium (who agreed the sterile parts of the collected specimen did match that of *E. forrestii* subsp *viridis)*. Because the non-sterile parts of the plant match the feature which distinguishes it from *E. forrestii* subsp *hastieana,* the author has chosen to report these plants as the P3 subspecies. Biota (2013) indicate two plants were recorded by them further north of Lot 555 (in Lot 524) and that a total of 117 individuals were recorded from 4 locations in the Wheatstone addendum area by Outback Ecology (2010). It is unknown if these plants were cleared for the Wheatstone project, but Biota also state the subspecies *viridis* was recorded by them seven times in the broader locality, presumably not in an intended project area This species was not ranked higher as a Priority species because it was considered at the time that it occurred in remote, generally untouched areas. The number of species recorded in the four Wheatstone locations (Outback Ecology 2010) and the 7 recorded in the broader locality by Biota indicate the subspecies *viridis* is probably more common than originally thought in the Onslow area, however it is evident that none of those specimens were lodged with the WA Herbarium and one can only assume the identification against the closely related subspecies *hastieana* is correct. The recent extensive clearing of inland dunes in the Onslow area and elsewhere could indicate this species may be at risk, but in saying this the 6 plants that will be removed for this project should not have a huge impact on the overall population.

Only one weed was recorded, buffel grass, but the fact that between 2013 and 2023, a decade, weeds have degraded a vegetation type that once was considered to have high conservation significance indicates the need for sound weed management.

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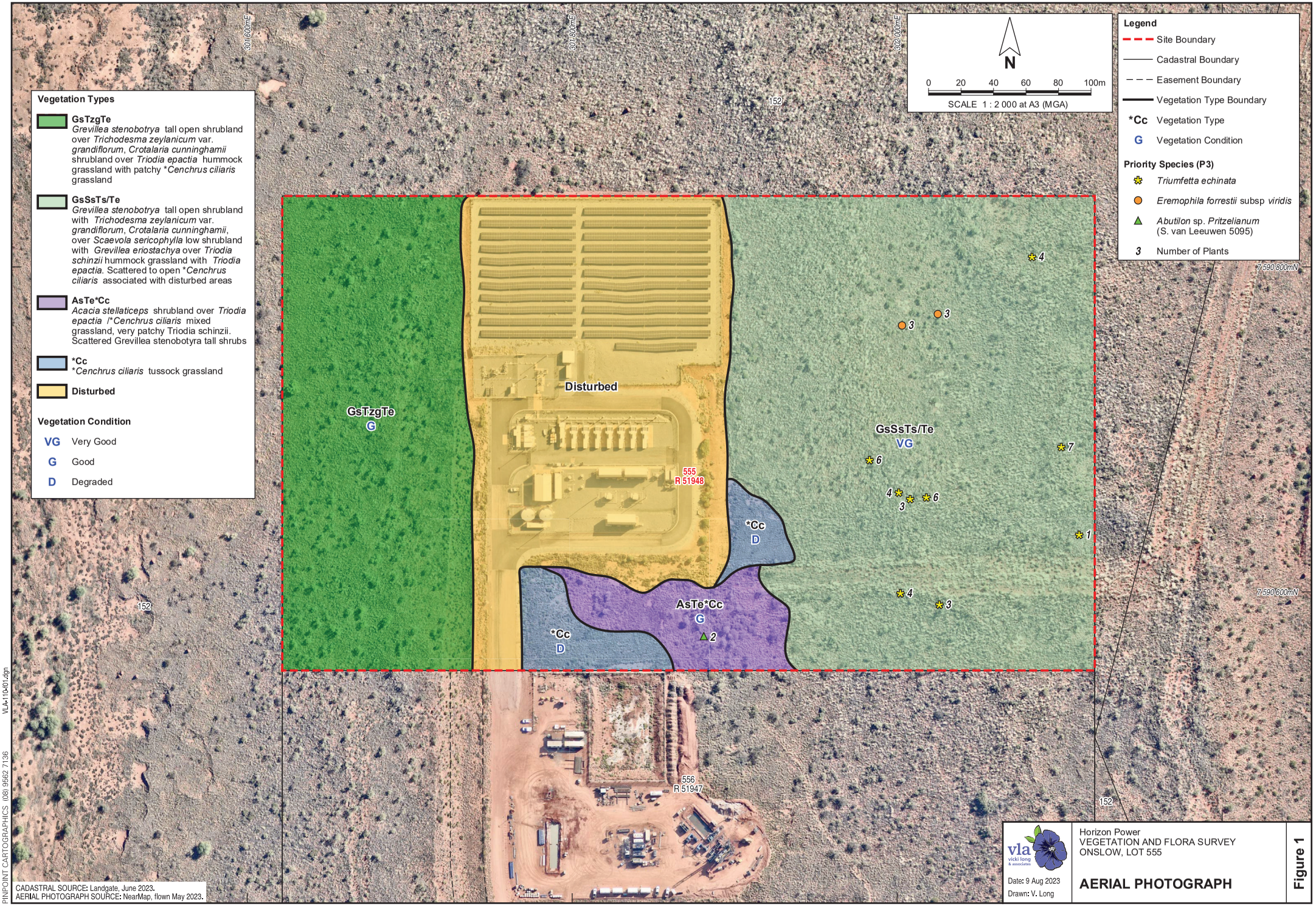
FIGURE 1



CADASTRAL SOURCE: Landgate, June 2023.
AERIAL PHOTOGRAPHY SOURCE: NearMap, flown May 2023.

PINPOINT CARTOGRAPHICS (08) 9562 7136 VLA-110401.dgn

vla vicki long & associates

Date: 9 Aug 2023
Drawn: V. Long

Horizon Power
VEGETATION AND FLORA SURVEY
ONSLOW, LOT 555

AERIAL PHOTOGRAPH

Figure 1

APPENDIX A

Appendix A
Vegetation Classification and Condition Rating Scale

Table A.1. Vegetation Condition Scale as adapted from Trudgen (1988). (Environmental Protection Authority 2016a)

Vegetation condition	Condition description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate to it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Very Poor	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

APPENDIX B

Appendix B
Flora Species Recorded in Horizon Power Lot 555 Onslow Survey Area

Family: Aizoaceae
Trianthema pilosum

Family: Asteraceae
Olearia dampieri subsp dampieri
Streptoglossa adscendens
Streptoglossa macrocephala

Family: Boraginaceae
Trichodesma zeylanicum var grandiflorum

Family: Chenopodiaceae
Salsola australis

Family: Convolvulaceae
Bonamia rosea
Evolvulus alsinoides subsp.*decumbens*

Family: Cucurbitaceae
Cucumis variabilis

Family: Euphorbiaceae
Adriana tomentosa var *tomentosa*
Euphorbia myrtoides

Family: Fabaceae
Acacia colei var *colei*
Acacia coriacea
Acacia stellaticeps
Acacia tetragonophylla
Crotalaria cunninghamii
Cullen martinii
Indigofera boviperda subsp *boviperda*
Indigofera monophylla
Tephrosia clementii

Family: Goodeniaceae
Goodenia microptera
Scaevola sericophylla
Scaevola spinescens (broad form)

Family: Gyrostemonaceae
Gyrostemon ramulosus

Family: Hemerocallidaceae
Corynotheca pungens

Family: Lamiaceae
Quoya loxocarpa

Family: Lauraceae

Cassytha capillaris

Family: Malvaceae

Abutilon sp. Dioicum (A.A. Mitchell PRP 1618)
Abutilon sp. Pritzelianum (S. van Leeuwen 5095) (P3)
Hibiscus brachychlaenus
Hibiscus sturtii var *platychlamys*
Sida clementii
Sida aff.fibulifera
Sida rohlenae
Triumfetta echinata (P3)

Family: Poaceae

Aristida holathera var *holathera*
**Cenchrus ciliaris*
Eragrostis eriopoda
Eriachne aristidea
Triodia epactia
Triodia schinzii

Family: Proteaceae

Grevillea eriostachya
Grevillea stenobotrya
Hakea stenophylla subsp *stenophylla*

Family: Sapindaceae

Diplopeltis eriocarpa

Family: Scrophulariaceae

Eremophila forrestii subsp *haestiana*
Eremophila forrestii subsp *viridis* (P3)

Family: Solanaceae

Solanum lasiophyllum