Project: **Robe Mesa Iron Ore Project**

Document: ***Triodia pisoliticola* PEC - additional information to support NVCP and Mining Proposal applications.**

Reference: **M-YLL-RobeMesa-2000-RPT-0004**

Date: **21 October 2024**

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1. SCOPE

In June 2023, CZR Resources submitted a Native Vegetation Clearing Permit for the Robe Mesa Project (CPS 10248/1) to the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS).

A request for further information was provided by DEMIRS on 27 August 2024. A follow-up meeting between DEMIRS and EPA Services Unit was held on 11 September 2024 to discuss their key concerns, including the P3 PEC *Triodia pisoliticola* assemblages of mesas of the West Pilbara (*Triodia pisoliticola* PEC).

Further to the recent request for information and follow-up meeting, CZR provided a summary of the topics covered in regard to *Triodia pisoliticola* PEC and the Robe Mesa Project.

Requested information about the *Triodia pisoliticola* PEC is provided below (email, T Daley 27 August 2024):

> *Based on my assessment of the habitat, landform, and vegetation, the application area constitutes as a new location of the PEC. DBCA concurred with this determination, and have provided advice that the majority of species listed in the quadrats and releves of the RPS (2021) report for the vegetation unit El.Aa.TwTp are known to occur within the PEC. RPS (2021) also states that the vegetation unit El.Aa.TwTp "likely represents a new record of the P3 PEC Triodia pisoliticola assemblages of mesas of the West Pilbara, based on the presence of key species Triodia pisoliticola and Acacia citrinoviridis, proximity of known records of the PEC (<2.5 km away), and presence of defining habitat (mesa slopes and peaks)."*
>
> *Could you please provide further information in relation to the extent of the PEC within Mesa F, so that the impact to the PEC can be assessed appropriately. The location of this new occurrence is considered an important occurrence as it is currently the most western extent of the mapped occurrences for this PEC, extending its current mapped range by approximately 5km.*

2. VEGETATION AND FLORA OF THE ROBE MESA PROJECT

2.1 Conservation Significant Flora

Vegetation and flora surveys at the Robe Mesa Project area identified a total of 422 native flora species from 161 genera. The most common families recorded included Fabaceae, Malvaceae, Poaceae, Asteraceae, Amaranthaceae, Chenopodiaceae, Convolvulaceae, Cyperaceae.

No Threatened flora species were recorded from the survey area based on their preferred habitats.

Three Priority species were confirmed from the surveys, *Eragrostis crateriformis* (P3) *Goodenia nuda* (P4) and *Triodia pisoliticola* (P3).

The three recorded Priority Flora are described below and their distribution across the survey area is presented in Figure 2.1 and Figure 2.2.

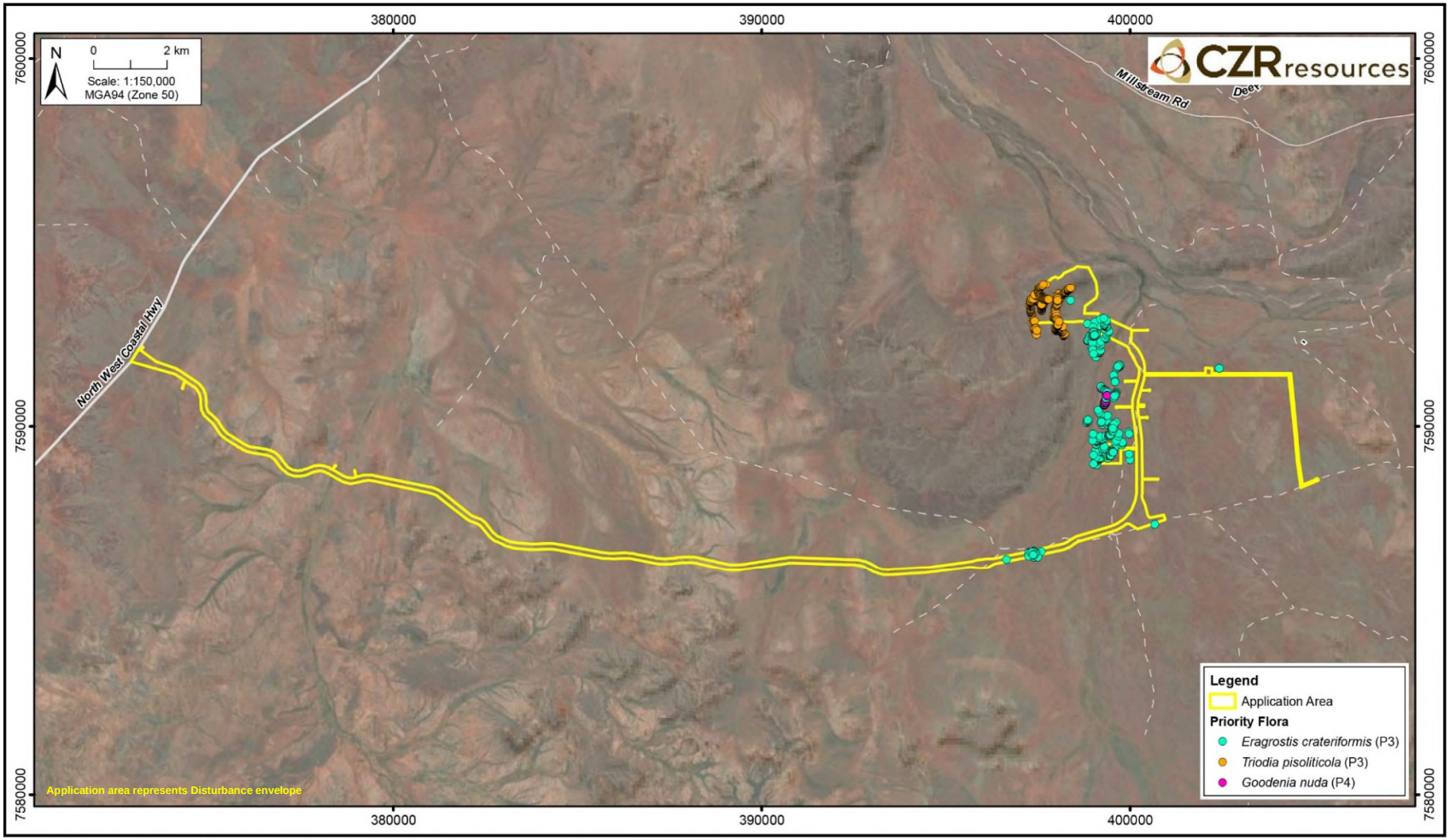
2.1.1 *Triodia pisoliticola (P3)*

Triodia pisoliticola is a 'soft' spinifex grass growing to 1 m high with sprawling pale green foliage (Figure 2.3). The species occurs on the slopes and crests of ironstone hills and mesas, on red-brown sandy loams with ironstone pebbles, stones, and outcropping rock (WAH 2021; Barrett and Trudgen 2018). Most of the known records are on the edges and tops of mesas capped with Robe Pisolite (Barrett and Trudgen 2018).

The species occurs in the west Pilbara region, with a range of about 200 km in the Robe River Valley (Figure 2.4).

More than 12,000 individuals were recorded from 412 locations within the survey area within two vegetation units, E3 and E4. Of the 412 recorded locations, only 21 of these (5.1%) are within the Disturbance footprint.

Figure 2.1. Priority Flora records from the Robe Mesa Project



Drawn: CAD Resources (08 9246 3242), Date: Jun 2023, CAD Ref: a2967_F001_14, Rev: A ~ Imagery: ESRI, Maxar (Oct 2021), Flora: Biota

Figure 2.2. Priority Flora records from the Robe Mesa Project, Inset Map

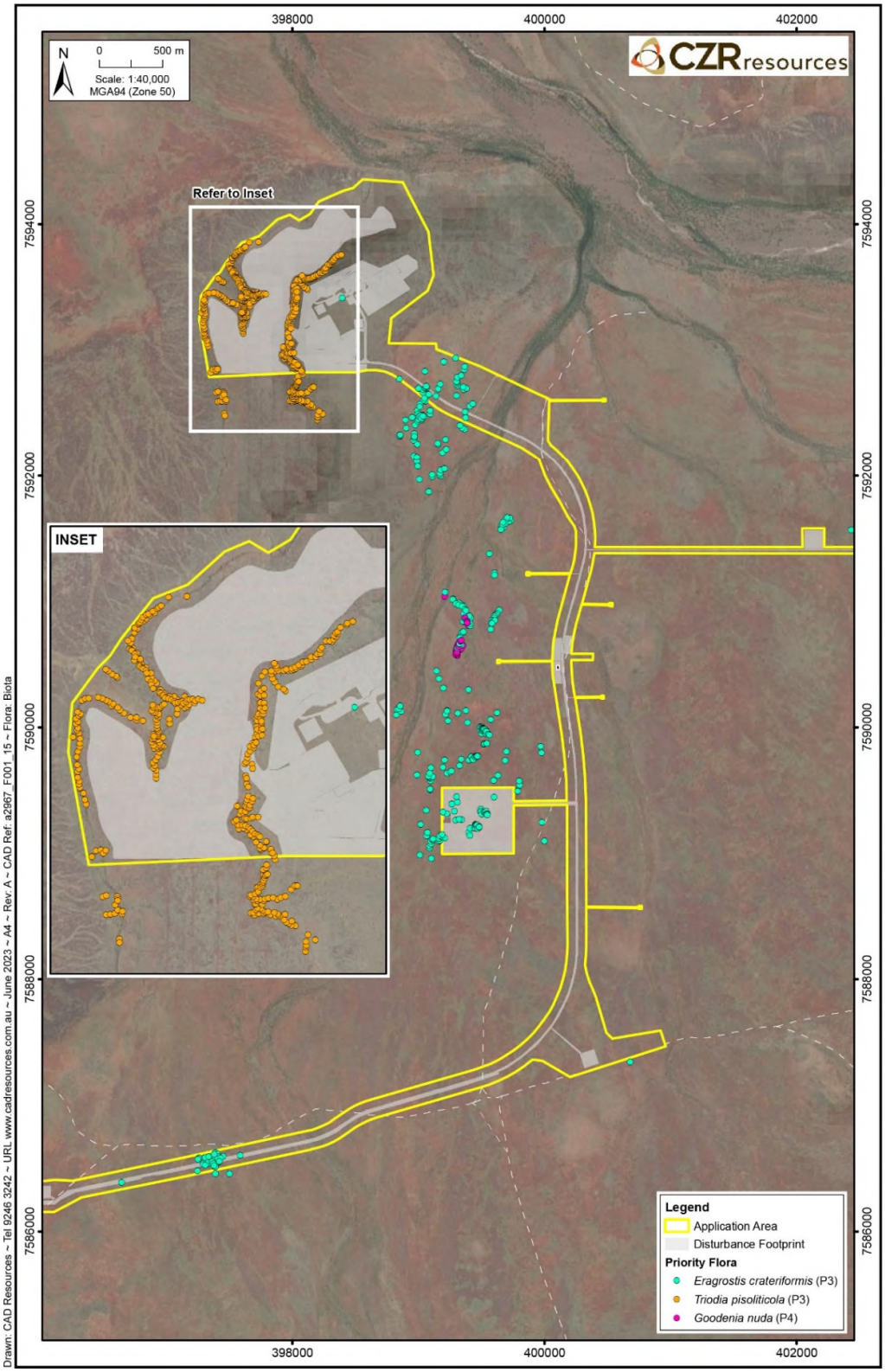
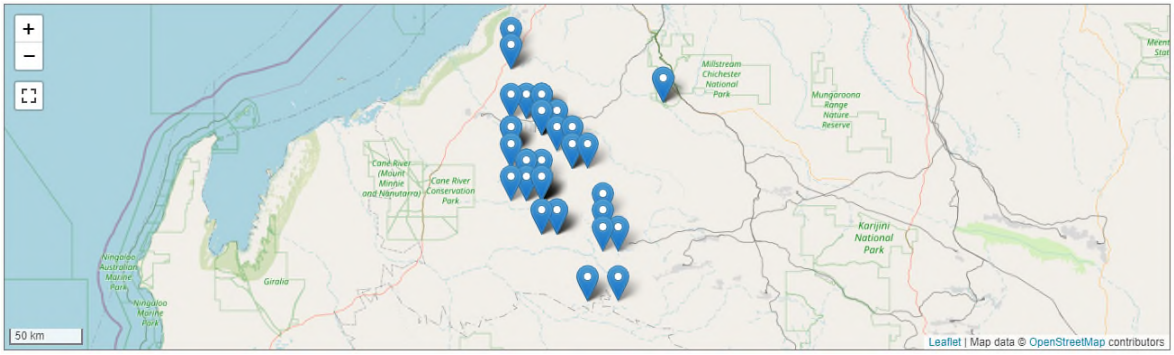


Figure 2.3. Photograph of *Triodia pisoliticola* (Source: Barrett and Trudgen 2018)

Figure 2.4. *Triodia pisoliticola* (P3) Florabase distribution



2.2 Vegetation

Information in this section is primarily based on the following supporting studies:

- RPS (2021). Detailed Flora and Vegetation Assessment. Robe Mesa and Robe East extension deposits
- Biota (2023a) Robe Mesa Project Detailed Flora and Vegetation Survey
- Biota (2023b). Robe Mesa Project: Haul Road Realignment and Associated Vegetation Extrapolation and Consolidation

The primary landforms found throughout the survey area comprised:

- Drainage lines, ranging in scale from major drainages supporting riparian Eucalyptus, Acacia and Melaleuca open forests and woodlands, through to minor drainages of scattered *Corymbia hamersleyana* over mixed Acacia shrubs and *Triodia epactia*;
- Hills and slopes with stony substrates supporting spinifex hummock grasslands; these usually had an overstorey of Acacia spp. and Senna spp. shrubs over a hummock grassland typically dominated by *Triodia wiseana*;
- Stony or gravelly plains, sometimes with clay soils, supporting Snakewood (*Acacia xiphophylla*) shrublands over tussock/annual grasses; and
- Stony or gravelly plains higher in the landscape supporting spinifex hummock grasslands with a sparse to open cover of shrubs and occasional Corymbia trees.

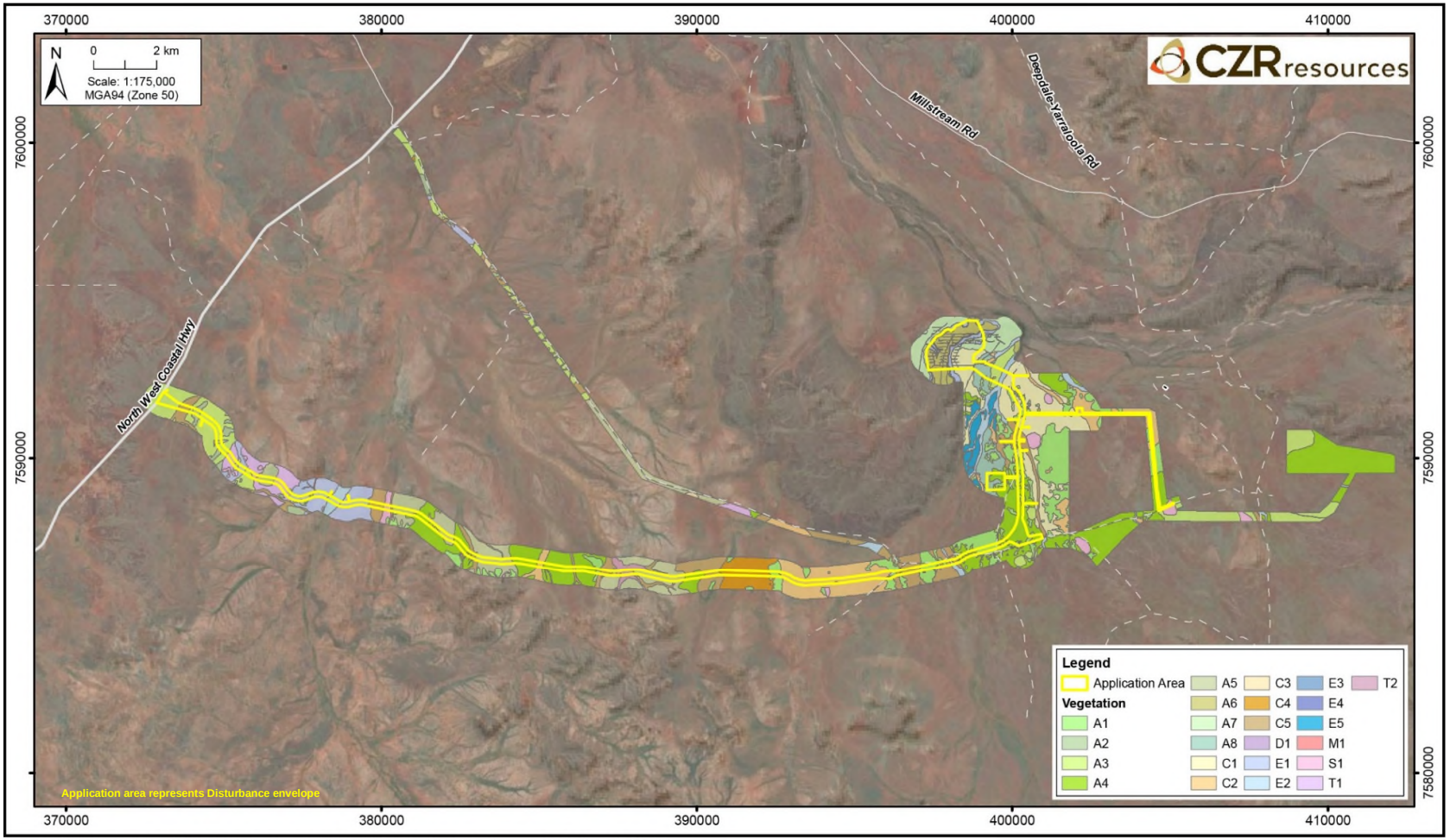
Based on the broad landforms, twenty-two (22) native vegetation units were mapped across the ~6,800 ha survey area, of which 18 were mapped within the Disturbance envelope (NVCP Application Area) and proposed Disturbance footprint. A summary of each mapped vegetation unit and any local significance is presented in Table 2.1 and Figure 2.5. Photographs of the vegetation units of the Application area are provided in Figure 2.6 to Figure 2.10.

Table 2.1. Vegetation mapping of the Robe Mesa Project

Unit ID	Description	Significance - species associated with the vegetation unit	Survey extent (ha)	Disturbance envelope and proportion of survey extent		Disturbance footprint and proportion of survey extent	
				ha	%	ha	%
A1	*Acacia xiphophylla* tall shrubland over *Triodia epactia* open hummock grassland.	*Eragrostis crateriformis* (P3).	790.1	86.6	11.0	18.5	2.3
A2	*Acacia xiphophylla* tall shrubland over *Triodia wiseana* very open hummock grassland.	N/A	83.8	5.9	7.0	1.9	2.3
A3	Mixed *Acacia* spp. over *Triodia wiseana*.	N/A	686.0	60.1	8.8	8.9	1.3
A4	Mixed *Acacia* spp. over *Triodia epactia*.	*Eragrostis crateriformis* (P3).	1,388.3	155.9	11.2	37.8	2.7
A5	Mixed *Acacia* spp. over *Triodia longiceps*.	N/A	564.5	76.2	13.5	15.3	2.7
A6	*Acacia arida* over *Triodia wiseana.*	N/A	139.0	92.3	66.4	65.0	46.8
A7	*Acacia bivenosa* over *Triodia wiseana*.	N/A	209.5	23.8	11.4	13.8	6.6
A8	Asy.EcrTe - *Acacia synchronicia* Mid Open Shrubland over *Triodia epactia* Open Hummock Grassland (with intermittent clay pans with ephemeral Open Forbland and Open Tussock Grassland)	N/A	140.6	31.0	22.0	12.3	8.8
C1	*Corymbia hamersleyana* over mixed *Acacia* spp. over *Triodia epactia*.	*Eragrostis crateriformis* (P3).	548.8	78.5	14.3	30.1	5.5
C2	*Corymbia candida* subsp. *candida* over mixed *Acacia* spp. over *Triodia epactia*.	*Eragrostis crateriformis* (P3) and *Goodenia nuda* (P4)	593.3	78.8	13.3	20.7	3.5
C3	*Corymbia deserticola* subsp. *deserticola* over mixed *Acacia* spp. over *Triodia epactia*.	N/A	11.3	-	-	-	-
C4	*Corymbia zygophylla* over mixed *Acacia* spp. over *Triodia* spp.	N/A	162.4	23.7	14.6	7.0	4.3
C5	*Corymbia hamersleyana* over mixed *Acacia* spp. over *Triodia epactia*.	*Eragrostis crateriformis* (P3).	597.3	55.8	9.3	11.7	2.0
E1	*Eucalyptus leucophloia* subsp. *leucophloia* over mixed *Acacia* spp. over *Triodia wiseana*.	N/A	332.1	65.6	19.8	13.3	4.0
E2	*Eucalyptus victrix* (*Eucalyptus camaldulensis* subsp. *refulgens*) and *Melaleuca* spp. over mixed *Acacia* spp. over **Cenchrus* spp.	*Eragrostis crateriformis* (P3); and species associated with GDV.	179.2	13.9	7.8	1.5	0.8
E3	El.Aa.TwTp - *Eucalyptus leucophloia* Low Isolated Clumps of Trees over *Acacia arida* Isolated Clumps of Shrubs over *Triodia wiseana* and *T. pisoliticola* Sparse Hummock Grassland	*Triodia pisolitico*la (P3);	16.8	13.1	77.8	0.5	2.7

Table 2.1. Vegetation mapping of the Robe Mesa Project							
Unit ID	**Description**	**Significance - species associated with the vegetation unit**	**Survey extent (ha)**	**Disturbance envelope and proportion of survey extent**		**Disturbance footprint and proportion of survey extent**	
				ha	**%**	**ha**	**%**
E4	El.AtuGr - *Eucalyptus leucophloia* Low Open Woodland over *Gossypium robinsonii* and *Acacia tumida* var. *pilbarensis* Tall Open Shrubland over *Acacia arida* Mid Open Shrubland Over *Triodia wiseana*, (*Triodia pisoliticola*) Open Hummock Grassland	*Triodia pisoliticola* (P3)	1.8	1.4	75.1	-	-
E5	AsyAsc.Te - *Eucalyptus victrix* and *Corymbia hamersleyana* Low Isolated Trees over *Acacia synchronicia* and *A. sclerosperma* subsp. *sclerosperma* Tall Sparse Shrubland over a mixed Low Open Shrubland / Forbland over *Triodia epactia* Sparse Hummock Grassland	Species associated with GDV	94.1	-	-	-	-
M1	MaEc.Mg.Cv - *Melaleuca argentea* and *Eucalyptus camaldulensis* subsp. *refulgens* Mid Open Forest over *Melaleuca glomerata* Tall Open Shrubland over *Cyperus vaginatus* Open Sedgeland	Species associated with GDV	0.3	-	-	-	-
S1	*Senna* spp. and *Acacia bivenosa* over *Triodia wiseana*.	N/A	100.6	5.3	5.3	1.1	1.1
T1	*Triodia longiceps* open hummock grassland.	N/A	159.2	19.3	12.1	2.6	1.6
T2	*Triodia epactia* hummock grassland.	N/A	44.0	8.0	18.2	2.6	6.0
D1	Cleared areas.	N/A	30.5	7.3	23.9	4.8	15.8

Figure 2.5. Vegetation mapping of the Robe Mesa Project



Drawn: CAD Resources (08 9246 3242), Date: Jun 2023, CAD Ref: a2967_F001_11, Rev: A ~ Imagery: ESRI, Maxar (Oct 2021)

Figure 2.6. Photographs of drainage line vegetation (units E2 and C5)

Figure 2.7. Photographs of hills and slopes vegetation (units E1 and A6)

Figure 2.8. Photographs of snakewood on plains vegetation (units A1 and A2)

Figure 2.9. Photographs of stony plains vegetation (units T1 and T2)

Figure 2.10. Photographs stony plains vegetation (units C2 and C3)

2.3 Vegetation Condition

The condition of the vegetation ranged from 'Excellent' to 'Completely Degraded', with most (over 95%) ranked from 'Very Good' or better condition. Poor condition sites are generally associated with existing tracks and other pastoral infrastructure.

2.4 Conservation Significant Vegetation

Only two Threatened Ecological Communities (TECs) are listed for the Pilbara: the "Themeda grasslands on cracking clays (Hamersley Station, Pilbara)" and the "Ethel Gorge aquifer stygobiont community". Neither of these occur within the locality and do not occur within the Disturbance envelope.

Forty-three Priority Ecological Communities (PECs) are listed for the Pilbara bioregion (DBCA 2022), with the management buffer of one vegetation-related PEC intersecting the Disturbance envelope: The Priority 3 "*Triodia pisoliticola* (previously *Triodia* sp. Robe River) assemblages of mesas of the West Pilbara" PEC.

3. *TRIODIA PISOLITICOLA* PEC

Forty-three Priority Ecological Communities (PECs) are listed for the Pilbara bioregion (DBCA 2022), with the management buffer of one vegetation-related PEC intersecting the Disturbance envelope (Figure 3.1):

> *The Priority 3 "Triodia pisoliticola (previously Triodia sp. Robe River) assemblages of mesas of the West Pilbara" PEC intersects the EAA. "This community is typically restricted to mesas and cordillo landforms where the plant assemblages are dominated by or contain Triodia pisoliticola and are indicative of inverted landscapes; that is, where Triodia pisoliticola occurs in combination with species that are considered 'out-of-context' from their normal habitat. The community is a combination of Triodia pisoliticola with Acacia pruinocarpa, A. citrinoviridis on slopes or peaks of mesas. These two Acacias are generally found associated with Pilbara creeklines and their occurrence is probably indicative of the genesis of the mesa surfaces in wetlands, then erosion of the landscape and 'inversion of the landscape' such that the mesa slopes and peaks that were previously low in the landscape become high points" (DBCA 2022).*

3.1 Previous regional surveys

CZR would like to acknowledge the contribution by API Management (APIM) to the understanding of the *Triodia pisoliticola* PEC. The surveys and investigations that has been undertaken and commissioned by APIM on the *Triodia pisoliticola* PEC since 2010 have been instrumental in defining the PEC and understanding its ecology and distribution (in particular, work undertaken with Newland Environmental and Western Botanical).

CZR consulted APIM, who manage the West Pilabra Iron Ore Project and has worked extensively on the *Triodia pisoliticola* PEC since 2010. APIM has undertaken a series of regional surveys to refine and map the *Triodia pisoliticola* PEC across the west Pilbara, as a requirement of APIMs Ministerial Statement 881 and 1027.

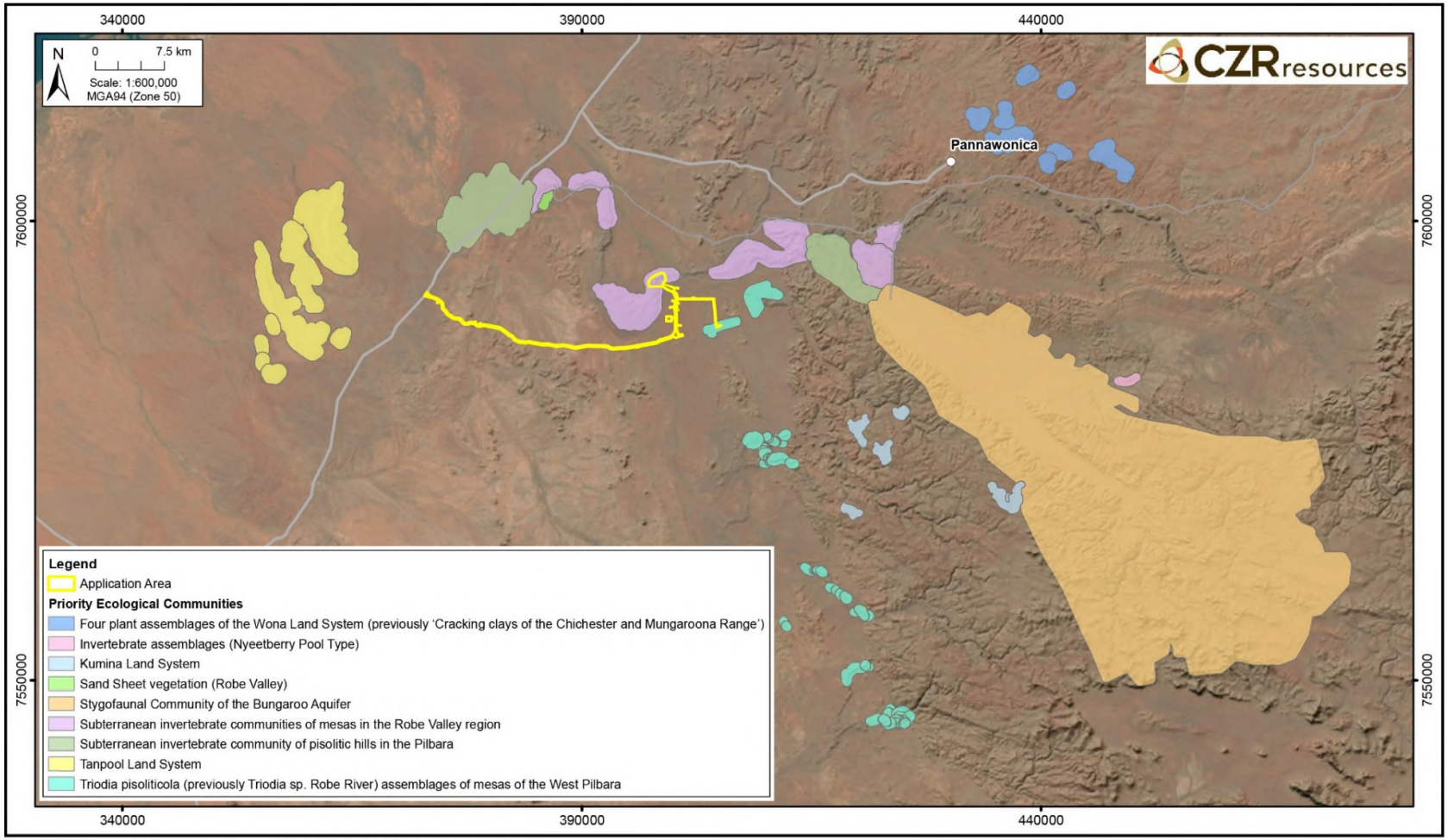
APIM regional mapping of *Triodia pisoliticola* PEC (using aerial and foot traversed surveys) included Mesa F, the landform associated with the Robe Mesa Project. APIMs regional mapping recorded no *Triodia pisoliticola* PEC within the Robe Mesa Project area. The closest confirmed *Triodia pisoliticola* PEC mapped during regional surveys was recorded approximately 3-4km south of the mine area (Newland Environmental 2021; Western Botanical 2015).

Regional surveys identified and mapped many *Triodia pisoliticola* PEC populations in the west Pilbara, all of which were associated with mesa edges and gorges, generally from the Hamersley Range.

The location of the *Triodia pisoliticola* PEC (DBCA created) polygon, which intersects the Robe Mesa Project Disturbance envelope (associated with the PB13-3 bore location), is located on the Urandy (296Uy) Landsystem (Figure 3.2). The Urandy (296Uy) landsystem is described as stony plains, alluvial plains and drainage lines supporting shrubby soft spinifex grasslands and is not associated with the *Triodia pisoliticola* PEC.

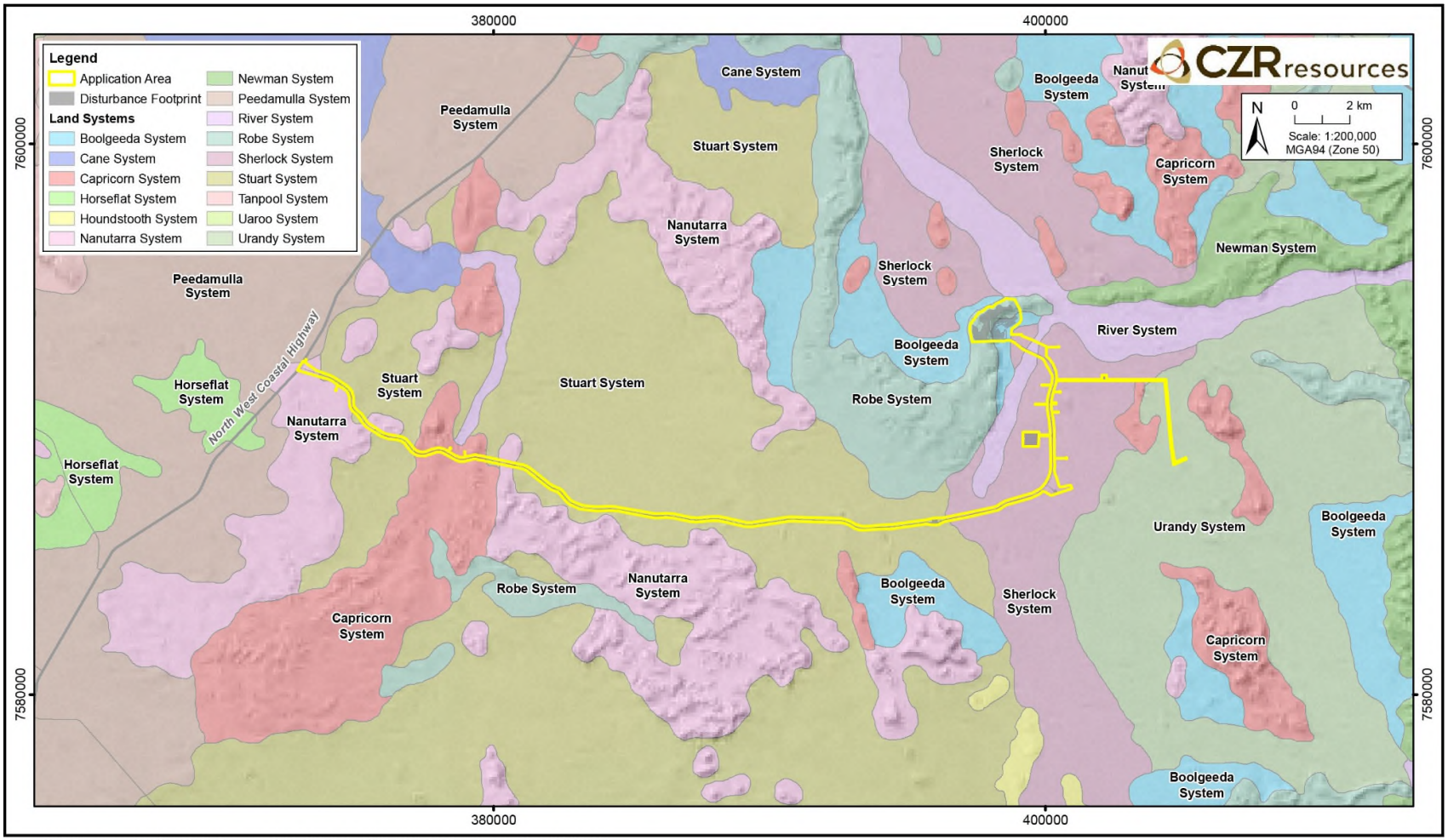
DBCA (2022) describe the *Triodia pisoliticola* PEC as restricted to mesas and cordillo landforms. Such landforms are not present in the *Triodia pisoliticola* PEC (DBCA created) polygon, which intersects the Robe Mesa Project Disturbance envelope.

Figure 3.1. Ecological Communities of the Robe Mesa Project



Drawn: CAD Resources (08 9246 3242), Date: Jun 2023, CAD Ref: a2967_F001_12, Rev: A ~ PEC: DBCA

Figure 3.2. Land systems of the Robe Mesa Project



Drawn: CAD Resources (08 9246 3242), Date: Jun 2023, CAD Ref: a2967_F001_04, Rev: A ~ Land Sys: DPIRD-064

3.2 Identifying Triodia pisoliticola and/ or the Triodia pisoliticola PEC

The presence of *Triodia pisoliticola* does not necessary signify the presence of the *Triodia pisoliticola* PEC.

The *Triodia pisoliticola* plant is easily identifiable during field assessments and even fly-over inspections (Western Botanical 2016, Newland Environmental 2015 and 2021, Biota 2023). Mature flowering hummocks of *Triodia wiseana* and *Triodia pisoliticola* are easily differentiated from a distance, as the 'soft' (floppy) form of *Triodia pisoliticola* is distinctly different to the pungent and erect forms of other *Triodia* species that share similar habitats (Figure 3.3).

Following confirmation of *Triodia pisoliticola*, the presence of other species with *Triodia pisoliticola*, will determine if the vegetation type constitutes *Triodia pisoliticola* PEC.

Pilbara regional surveys by Western Botanical (2015) and Newland Environmental (2015 and 2021) both found that *Triodia pisoliticola* PEC communities were easily identifiable visually with *Acacia* groves (*Acacia pruinocarpa* and/or *Acacia citrinoviridis*) on the edge of mesas and associated with soil loss and rocky substrates. These species and landforms are discussed further in relation to the Robe Mesa Project in Section 4.

Figure 3.3. Photograph of *Triodia pisoliticola* in the foreground, with *Triodia wiseana* in the background (Source: Newland Environmental 2015)

3.3 Defining the *Triodia pisoliticola* PEC

The description of the *Triodia pisoliticola* PEC has been revised and refined by DBCA, in consultation with APIM, since 2011. In general, the following components potentially represent the *Triodia pisoliticola* PEC (Western Botanical 2015; and Newland Environmental 2021):

Species composition and abundance elements:

- *Triodia pisoliticola* – must be dominant. It is not automatically considered PEC just because *Triodia pisoliticola* is present.
- *Acacia citrinoviridis* and/or *Acacia pruinocarpa* – must be present (not required to be dominant). Ideal to have both species present with *Triodia pisoliticola*.
- Other species considered within the PEC include *Gossypium robinsonii*, *Petalostylis labicheoides* and *Stylobasium spathulatum* – but must also be present with *Acacia citrinoviridis* or *Acacia pruinocarpa*).
- It is not considered PEC if *Eucalyptus leucophloia* is dominant, although this species may be scattered (in very low abundance) within the PEC.

Landform elements

- Mesa and cordillo landforms.
- Robe pisolite mesas and breakaway slopes.

3.4 Growth and distribution of the key species

3.4.1 *Triodia pisoliticola*

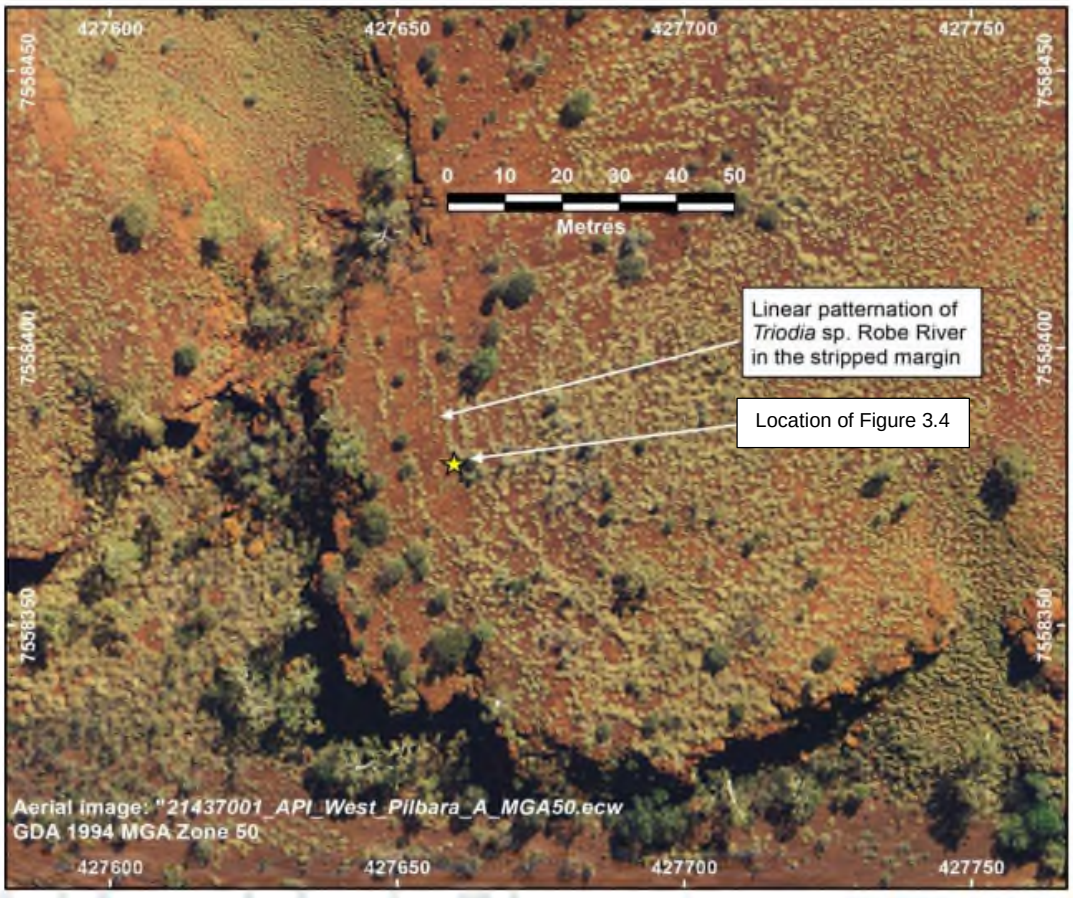
Following a review of *Triodia pisoliticola* PEC, Newland Environmental (2021) described *Triodia pisoliticola* as commonly found on the edge of mesas in a specialised habitat known in geomorphological terms as the 'stripped margin'. This stripped margin is part of the mesa top and may be 5m to 20m wide or absent, depending on the local topography. The mesa top adjacent to the vertical face suffers increased soil loss as runoff accelerates over the edge.

The stripped margin typically consists of bare rock, loose plates, and boulders with minimal soil retention. In the case of the *Triodia pisoliticola* PEC stripped margin, the exposed surface consists of platy rock with fissures and cracks.

Triodia pisoliticola forms lines that are perpendicular to the direction of water flow on the stripped margins, suggesting that it is water harvesting from the bare rock (refer to Figure 3.4 and Figure 3.5). It appears that the stripped margin may favour *Triodia pisoliticola* over *Triodia wiseana*. The stripped margin will water harvest following rainfall and runoff (Newland Environmental 2021).

Figure 3.4. Photograph of stripped margin at Figure 3.5 location showing *Triodia pisoliticola* and *Acacia citrinoviridis* PEC community (Source: Newland Environmental 2021)

Figure 3.5. Overhead image of a CID mesa showing the stripped margin (Source: Newland Environmental 2021)



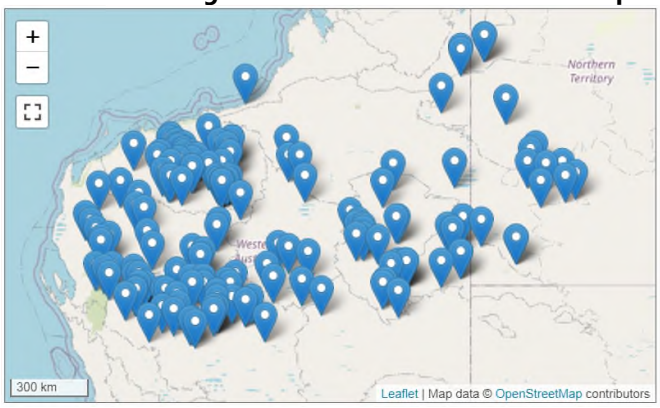
3.4.2 *Acacia pruinocarpa*

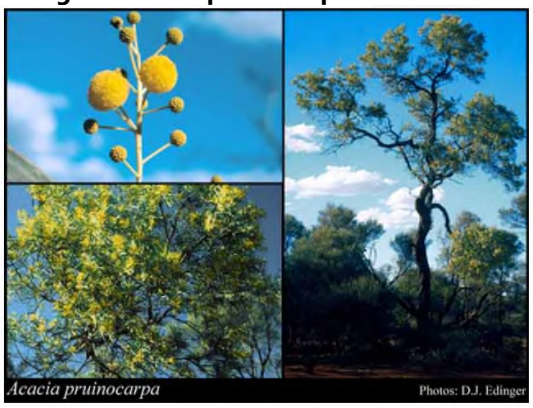
Acacia pruinocarpa is a long lived tree that grows on rocky hills and on hardpan mulga plains with shallow rocky soil (Mitchell and Wilcox 1994 in Newland Environmental 2021). It has a wide distribution from Mt Magnet in the south to the southern Pilbara, and inland to the Northern Territory and South Australia (AVH 2015, in Newland Environmental 2021). It can grow up to 15m tall and flowers in summer. It is a tree that is fire sensitive and in spinifex dominated areas it is usually found in fire refuges (Newland Environmental 2015). The FloraBase distribution map is displayed in Figure 3.6.

Acacia pruinocarpa is found from the hardpan plains to the hills and has no particular affinity with creeklines (Newland Environmental 2015).

When *Acacia pruinocarpa* is found as part of the *Triodia pisoliticola* PEC, it usually occurs as a tall shrub and rarely exceeds 3m tall, which reflects the harsh conditions of this environment. It is likely that relatively frequent fires also stop this species from attaining a greater height, as per the southern shrublands where fires are rare and where gidgees are often the biggest trees in their environment. *Acacia pruinocarpa* may also be at the limit of their distribution in the north as the optimal temperature for their germination is 9 to 22 degrees C (Newland Environmental 2015).

Figure 3.6. FloraBase distribution map and image of Acacia pruinocarpa





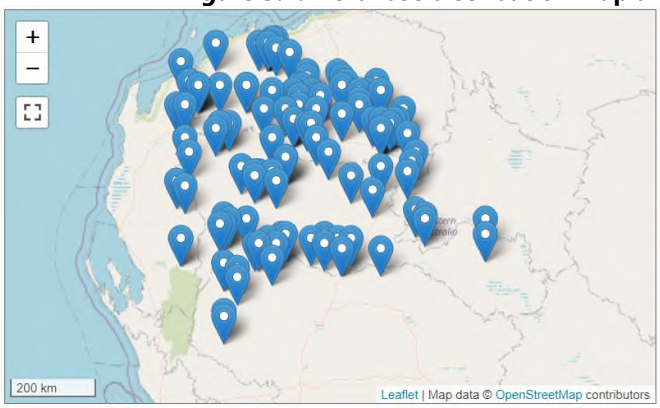
3.4.3 *Acacia citrinoviridis*

Acacia citrinoviridis is a tree that can grow up to 8m tall. Its main habitats are the margins of the creeks and rivers, from the Murchison and north into the Pilbara (Mitchell and Wilcox 1994 in Newland Environmental 2021). These habitats are infrequently burnt, and they support grasslands that are grazed by cattle. The FloraBase distribution map is displayed in Figure 3.7.

Acacia citrinoviridis is a tree species whose main habitats are creeks and rivers although it is often recorded higher in the landscape in the Central Pilbara near Channar and Paraburdoo (Newland Environmental 2015).

Acacia citrinoviridis grows in creeklines, as an upright tree and forms dense stands that excludes fire to a degree. However, when found as part of the *Triodia pisoliticola* PEC on CID it occurs as an occasional tall shrub not exceeding 4m tall. It is likely that *Acacia citrinoviridis* has its roots extending deep into the rocky fissures of the CID. *Acacia citrinoviridis* is fire sensitive and is killed off in areas subject to frequent burning (Newland Environmental 2015).

Figure 3.7. FloraBase distribution map and image of Acacia citrinoviridis



4. *TRIODIA PISOLITICOLA* PEC AND THE ROBE MESA PROJECT

Following multiple detailed field inspections, the habitat and the vegetation of the Robe Mesa Project area was considered unlikely to support the *Triodia pisoliticola* PEC based on the species composition and landforms present.

Triodia pisoliticola PEC typically occurs on the edges and upper slopes of geologically distinct mesas, immediately below mesa edge breakaways. Landforms assessed as potentially containing *Triodia pisoliticola* PEC, present more as a steep rocky hills with large boulders, rather than a mesa with exposed vertical faces on the margins.

4.1 Current PEC Polygons

The section of Robe Mesa Project Disturbance envelope that intersects the buffer of the known *Triodia pisoliticola* PEC (DBCA-038) also requires very minimal clearing (1.4 ha) (Figure 4.1). This part of the Disturbance envelope accommodates an already cleared pad associated with the existing production bore PB13-3. The pipeline route running north to the Project operations area (i.e., the mine, village, processing area etc.) will also lay along an existing track within the Disturbance envelope. The proposed clearing at the water supply bore (the existing PB13-3), and pipeline has been included to allow for any clearing of regrowth for project completeness.

Within the area of Disturbance envelope that intersected the *Triodia pisoliticola* PEC polygon, no vegetation units recorded contained species that were consistent with the *Triodia pisoliticola* PEC (Table 4.1 and Figure 4.1 to Figure 4.4). It should also be noted that the area associated with PB13-3 is restricted to the plains and is not associated with topographical landforms required to constitute the *Triodia pisoliticola* PEC.

Figure 4.1. The Robe Mesa Project and the known *Triodia pisoliticola* PEC (DBCA-038)

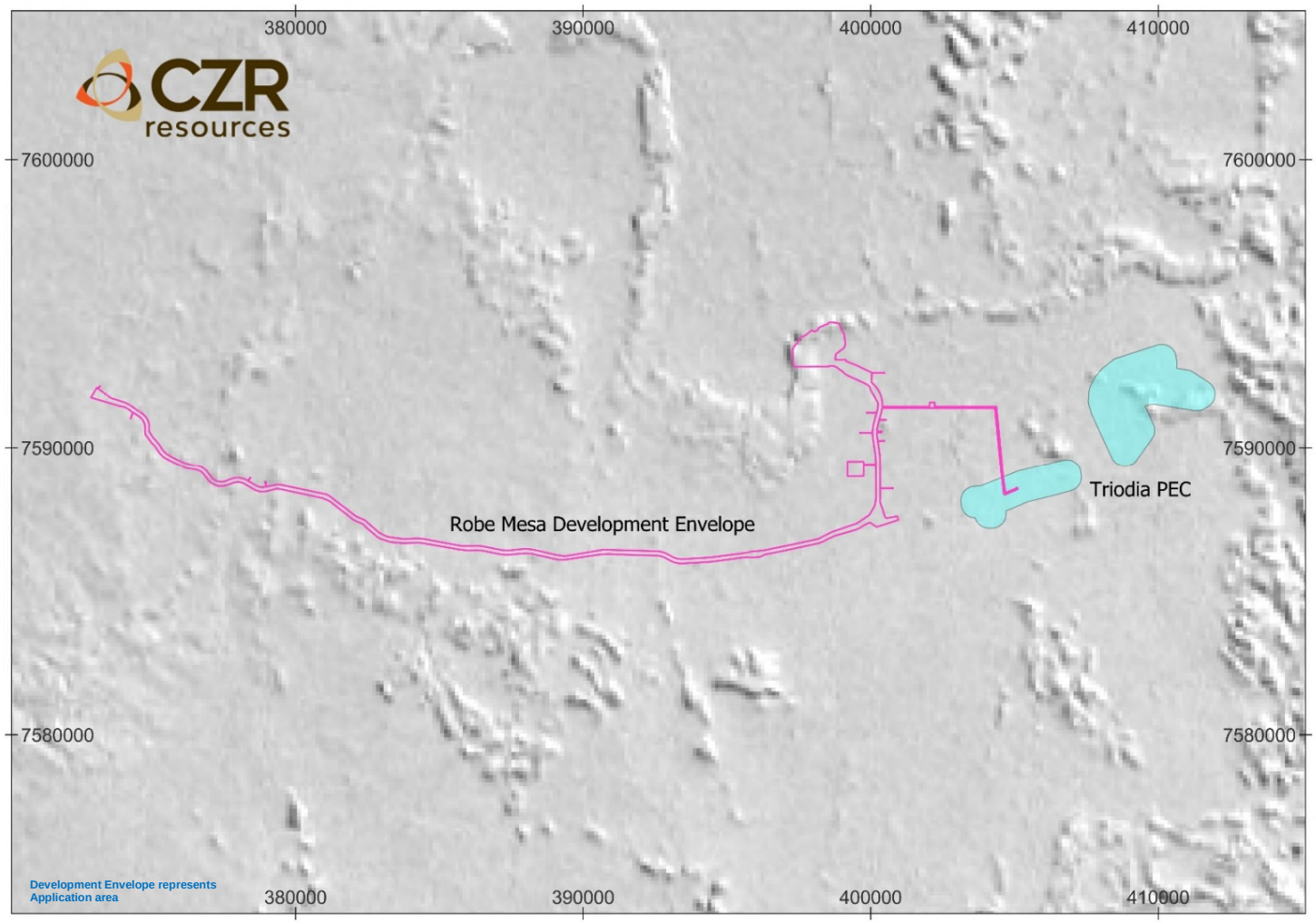


Table 4.1. Vegetation types of the Robe Mesa Project that intersect the *Triodia pisoliticola* PEC polygon (DBCA-038)		
Unit	**Vegetation Unit**	**Key Species***
A1	Acacia xiphophylla tall shrubland over *Triodia epactia* open hummock grassland.	*Acacia xiphophylla* *Acacia synchronicia* *Triodia epactia*
A3	Mixed Acacia spp. over *Triodia wiseana*.	*Acacia inaequilatera* *Acacia synchronicia* *Bonamia erecta* *Indigofera boviperda subsp. boviperda* *Ptilotus astrolasius* *Senna notabilis* *Senna glutinosa subsp. pruinosa* *Trichodesma zeylanicum var. zeylanicum* *Aristida holathera var. holathera* *Eriachne pulchella* *Paraneurachne muelleri* *Triodia epactia*
A4	Mixed Acacia spp. over *Triodia epactia*.	*Acacia inaequilatera* *Acacia synchronicia* *Acacia trachycarpa* *Bonamia erecta* *Indigofera boviperda* *Senna artemisioides subsp. oligophylla* *Gossypium australe* *Ptilotus astrolasius* *Hibiscus sturtii* *Bulbostylis barbata* *Chrysopogon fallax* *Eriachne pulchella* *Sporobolus australasicus*
C2	Corymbia candida subsp. candida over mixed Acacia spp. over *Triodia epactia*.	*Corymbia candida subsp. candida* *Acacia synchronicia,* *Acacia ancistrocarpa* *Acacia trachycarpa* *Triodia epactia*
S1 -	Senna spp. and *Acacia bivenosa* over *Triodia wiseana*.	*Corymbia hamersleyana* *Acacia ancistrocarpa* *Acacia synchronicia* *Acacia trachycarpa* *Acacia wanyu* *Gossypium australe* *Sida echinocarpa* *Triumfetta clementii* *Trichodesma zeylanicum var. zeylanicum* *Cymbopogon ambiguous* *Enneapogon caerulescens* *E. polyphyllus* *Eriachne mucronate* *Paspalidium clementii*

*key species required for *Triodia pisoliticola* PEC: *Triodia pisoliticola, Acacia citrinoviridis, Acacia pruinocarpa, Gossypium robinsonii, Petalostylis labicheoides, Stylobasium spathulatum* – none of which are listed in this Table.

Figure 4.2. Vegetation mapping of the Robe Mesa Project within the known *Triodia pisoliticola* PEC (DBCA-038)

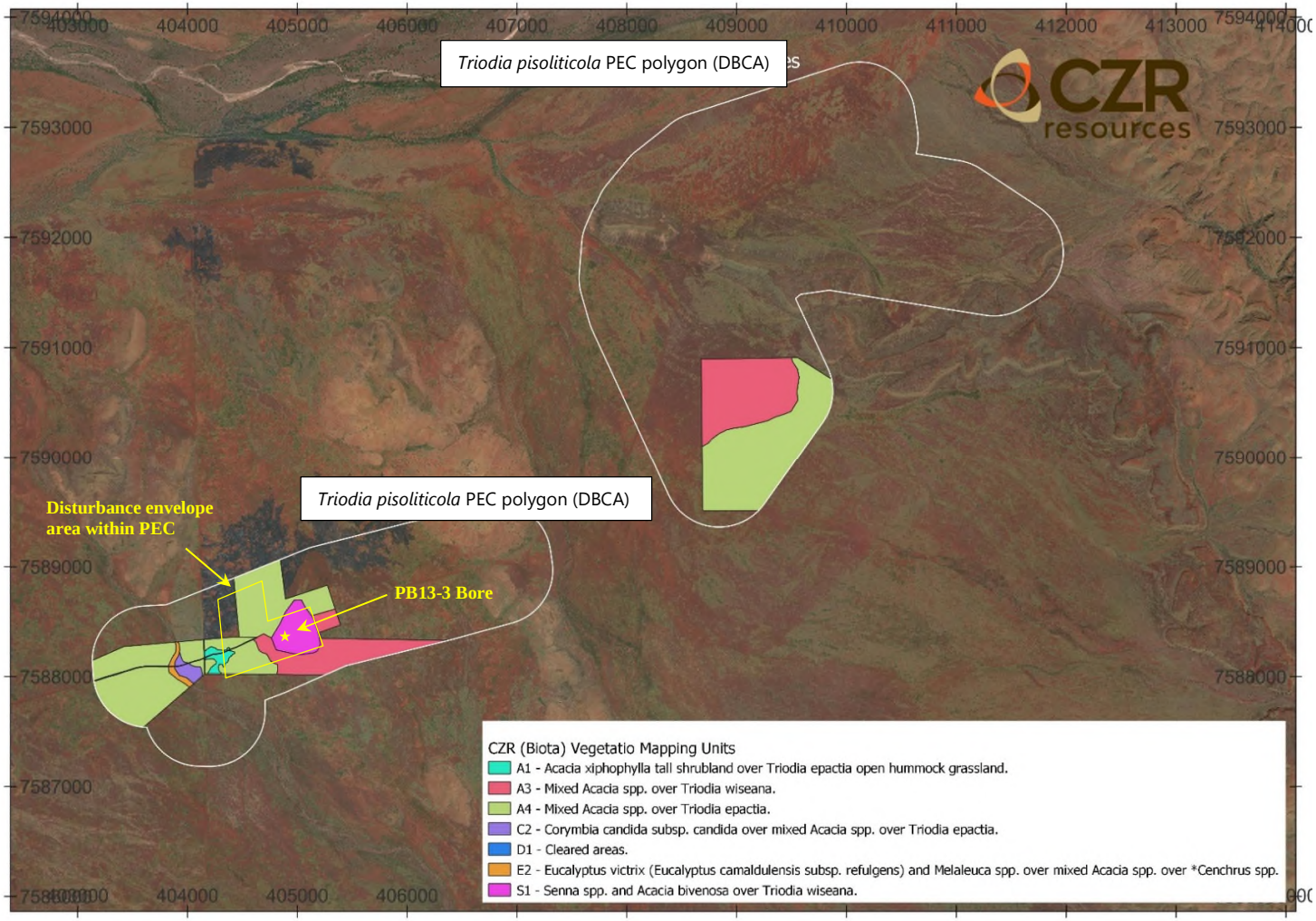


Figure 4.3. Photographs of Production Bore 13-3, surrounded by *Triodia wiseana* and Duck Creek dolomite outcropping (landform and geology not associated with *Triodia pisoliticola* PEC)

Figure 4.4. Photographs of Monitoring Bore 13-3 surrounded by *Triodia wiseana*

4.2 Potential *Triodia pisoliticola* PEC sites

Based on landforms and species composition recorded, the vegetation types of Robe Mesa Project Disturbance envelope that intersect the known *Triodia pisoliticola* polygons (DBCA-038) do not represent *Triodia pisoliticola* PEC (see Section 4.1).

Landforms:

Potential landforms of the Robe Mesa Project that most represented landforms typical of the PEC mapped as A6, and comprised *Acacia arida*, *Senna glutinosa* subsp. *pruinosa* tall open shrubland over *Triodia wiseana* open hummock grassland. Characteristic indicator species of the *Triodia pisoliticola* PEC, *Acacia pruinocarpa* and *Acacia citrinoviridis*, were also not observed or recorded. The section of Robe Mesa Project Disturbance envelope that intersects the buffer of the *Triodia pisoliticola* PEC did not record any of species typical of the *Triodia pisoliticola* PEC (Table 4.1).

Species Composition:

As noted in Section 2.1, *Triodia pisoliticola* plants are present within some vegetation types of the Robe Mesa Project Disturbance envelope. Section 3 also notes that the presence of *Triodia pisoliticola* alone does not necessarily represent the PEC.

Two vegetation types mapped with the Robe Mesa project Disturbance envelope contained *Triodia pisolitica* (Vegetation E3 and E4). Of these, only E3 was recorded within the proposed disturbance footprint, and represented 0.5 ha disturbance (Table 4.2). This vegetation type is associated with the mesa edge and the disturbance proposed is associated with the access ramp to the mesa top. A minimal disturbance footprint is required within this vegetation type.

Following field inspections, it was noted by Biota (2023) that the vegetation was considered unlikely to support the *Triodia pisoliticola* PEC. This community typically occurs on the edges and upper slopes of geologically distinct mesas immediately below the mesa edge breakaway. Potential areas of the Robe Mesa Project area presented more as steep rocky hills with large boulders, rather than a mesa with exposed vertical faces on the margins. Characteristic indicator species of the PEC, such as *Acacia pruinocarpa* and *A. citrinoviridis*, were also not observed.

Table 4.2: Vegetation mapping of the Robe Mesa Project

Unit ID*	Description (including RPS 2021 vegetation unit code)	Significant species associated vegetation unit	Survey extent (ha)	Disturbance envelope (Application area) (ha)	Disturbance footprint (ha)
E3	El.Aa.TwTp - *Eucalyptus leucophloia* Low Isolated Clumps of Trees over *Acacia arida* Isolated Clumps of Shrubs over *Triodia wiseana* and *T. pisoliticola* Sparse Hummock Grassland	*Triodia pisolitico*la (P3)	16.8	13.1	0.5
E4	El.AtuGr - *Eucalyptus leucophloia* Low Open Woodland over *Gossypium robinsonii* and *Acacia tumida* var. *pilbarensis* Tall Open Shrubland over *Acacia arida* Mid Open Shrubland Over *Triodia wiseana*, (*Triodia pisoliticola*) Open Hummock Grassland	*Triodia pisoliticola* (P3)	1.8	1.4	-

*Biota (2023b) vegetation unit codes

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