

Biannual Offset BioCondition Report

Wotonga Station, Coppabella, Central Queensland

24001042

08 December 2023



B12, Harbour City Central, Mackay,
QLD 4740

Phone +61 7 4957 5036



Biannual Offset BioCondition Report

Wotonga Station, Coppabella, Central Queensland

Kleinfelder Project: 24001042

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Prepared for:
Millennium Mine

Peak Downs Highway
Moranbah QLD 4744

Prepared by:
Kleinfelder Australia Pty Ltd

B12, Harbour City Central, Mackay, QLD 4740
Phone +61 7 4957 5036
ABN: 23 146 082 500

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Jason Mark	Kevin Wormington	Kevin Wormington

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EXECUTIVE SUMMARY

Kleinfelder was commissioned by Millennium Coal Mine to conduct a BioCondition Assessment in the Wotonga Station Offset Area (Offset Area) associated with offsets for the Wotonga Offset Area Management Plan (WOAMP). The assessment will be used to measure compliance of the Offset Area with the WOAMP.

Kleinfelder undertook a field assessment in May 2023 to quantify the habitat quality and conservation gain, and to identify any potential threatening processes to the target biodiversity values of the offset.

The Offset Area is characterised by *Acacia harpophylla* (Brigalow) regrowth over fine grained sediments and cracking clay soils. It is considered a suitable offset for:

- Regional Ecosystem 11.9.5 (*Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on fine-grained sedimentary rocks)– Endangered (Queensland).
- Brigalow Threatened Ecological Community – Endangered (Commonwealth).

The BioCondition indices across the Offset Area are reflective of the regenerating ecosystem and shows an increase in condition and return to Benchmark conditions. Active management has been occurring throughout the active management area and is generally in conformance with the requirements and recommendations in the WOAMP.

This report details the results of the BioCondition Assessment and includes general observations on potential threatening processes and additional significant observations. Recommendations have been included to mitigate potential threats and to support long term improvement of the Offset Area.

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1 INTRODUCTION

1.1 BACKGROUND

Kleinfelder Australia Pty Ltd (Kleinfelder) have been engaged by M Mining Pty Ltd (M Mining) to complete the Year 10 BioCondition monitoring of their environmental offset area. The offset area has been established on the Wotonga Pastoral Holding property, north-east of Moranbah in Central Queensland. The offset area was established to comply with conditions of approval under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC 2009/4821) (**Appendix 1**). This report demonstrates compliance with the monitoring requirements for Year 10 as described in the Wotonga Offset Area Management Plan (WOAMP) (Kleinfelder 2023). Offset property details are provided in **Appendix 2**.

1.2 SITE DESCRIPTION

The Offset Area, on the Wotonga Station, is centred at latitude -21.79109° S and longitude 148.20554° E, northeast of Moranbah (**Figure 1**). The Offset Area is in the Isaac Regional Council jurisdiction of Central Queensland on Lot 13 SP178466. The Offset Area is managed in two sections, the active management area and the passive management area which surrounds the active management area. The active management area contains the target regional ecosystem 11.9.5 *Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks.

There are two distinct landforms within the Offset Area. The low, gentle gradient Cainozoic plains associated with Brook Creek and the rocky sandstone hill a feature of the Carborough Range.

Runoff from the Offset Area flows from Brook Creek via Teviot Brook into the Isaac River (Fitzroy River Catchment).

1.3 LEGISLATION

This project was undertaken in accordance with, and/or consideration of, the following Acts and Regulations:

Commonwealth:

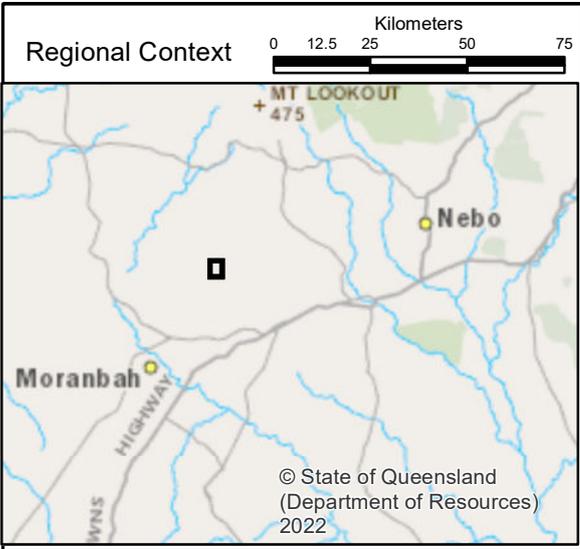
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- *EPBC Act Environmental Offsets Policy 2012*.

State:

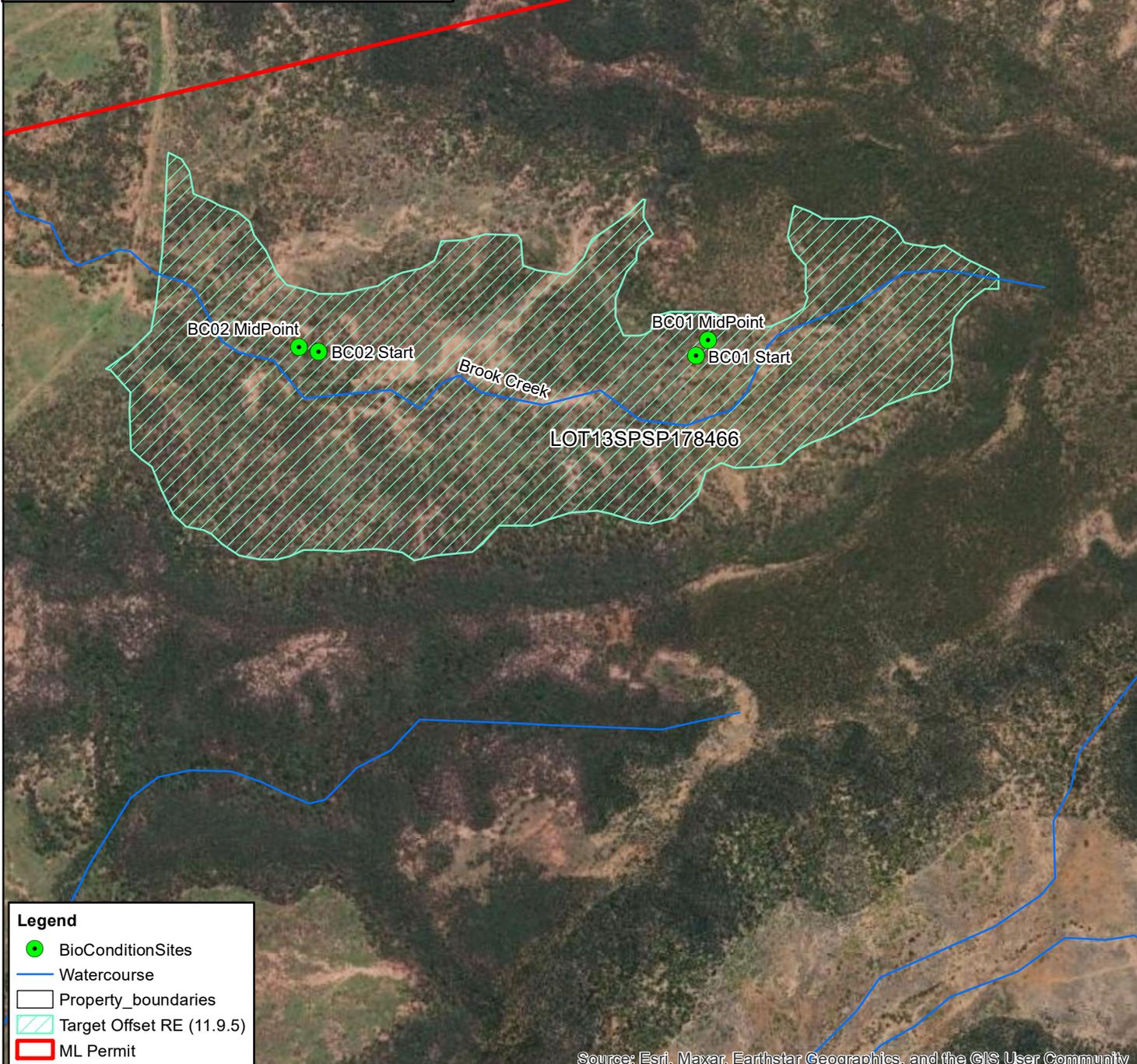
- *Nature Conservation Act 1992* (NC Act)
 - *Nature Conservation (Plants) Regulation 2020* (NC(P)R)
 - *Nature Conservation (Animals) Regulation 2020* (NC(A)R)
- *Biosecurity Act 2014* (Biosecurity Act)
- *Vegetation Management Act 1999* (VM Act)
- *Environmental Offsets Act 2014* (EO Act)
 - *Environmental Offsets Regulation 2014* (EOR).

1.4 OFFSET AREA

The MNES significant residual impacts for the Disturbance Areas at the Project, are 22.8 ha of Brigalow Threatened Ecological Community (TEC). The offset requirements calculated for this disturbance was 112.5 ha.



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Legend

- BioConditionSites
- Watercourse
- Property boundaries
- Target Offset RE (11.9.5)
- ML Permit

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Metres
0 50 100 200 300 400 500

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DATE DRAWN: 11/17/2023 Version 1
DRAWN BY: JMark
DATA SOURCE:
Queensland Spatial Catalogue

Wotonga Offset BioCondition Monitoring Locations

M Mining
Wotonga Offset BioCondition Monitoring
Wotonga Offset

FIGURE:
1



2 METHODOLOGY

2.1 LITERATURE REVIEW

Literature reviewed as part of this project included:

- Wotonga Offset Area Management Plan (WOAMP) (Kleinfelder 2023).
- Ecological Equivalence Methodology Guideline Policy for Vegetation Management Offsets Queensland Biodiversity Offset Policy (Queensland Government 2011).
- Brigalow Region BioCondition Benchmarks for Regional Ecosystem Condition Assessment (Queensland Government 2013).
- EPBC Act 1999 Environmental Offsets Policy (DSEQPC 2012).

2.2 FIELD SURVEY

2.2.1 Overview

All field survey methods (outlined below) were consistent with the methods outlined in the Ecological Equivalence Methodology Guideline document, as required under the WOAMP.

BioCondition field assessments were undertaken at two locations previously established. BioCondition plot locations were recorded at the start and centre points in GDA94 Zone 55 projection. The assessment locations and details are provided in **Figure 1** and **Appendix A**. The assessment locations were used to undertake observations of significance including any potential threats. Field observations of relevance to the Scope were also collected throughout the local area.

2.2.2 BioCondition assessments

2.2.2.1 Habitat Quality Assessment

The key indicators used to determine habitat quality included:

- Site condition: a general condition assessment of vegetation compared to a benchmark.
- Landscape-scale Attributes: an analysis of the site in relation to the surrounding environment.

Each of the key indicator attributes were assessed and scored against BioCondition Benchmarks in conjunction with the Landscape-scale Attributes to determine a BioCondition Score. The Site-based Attributes and Landscape-scale Attributes assessed, and their highest possible scores, are detailed in **Table 1** below.

Table 1 Key indicator attributes and their highest possible scores

Site-based Attributes		Landscape-scale Attributes	
Large trees	15	Size of patch	10
Tree canopy median height	5	Connectedness	5
Recruitment of woody perennial species	5	Context	5
Tree canopy cover	5	Distance to permanent watering point	NA
Shrub canopy cover	5	Subtotal	20
Coarse woody debris length	5		
Trees—species richness	5		
Shrubs—species richness	5		
Grasses—species richness	5		



Site-based Attributes		Landscape-scale Attributes	
Forbs—species richness	5		
Non-native plant cover	10		
Native perennial grass cover	5		
Litter Cover	5		
Subtotal (woodland/forest)	80		

NA – Not applicable for the Offset Area region.

2.2.3 Plant Identification

Most species were identified on site, where possible, but if required, other specimens were photographed or collected for confirmation in the laboratory using several plant identification references, including:

- Plants of Central Queensland (Anderson 2003).
- Plants of Capricornia (Melzer and Plumb 2007).
- Australian Tropical Rainforest Plants (Zitch, F. A. *et al.* 2020).
- Euclid: Eucalypts of Australia (Slee, A. V. *et al.* 2019).
- WATTLE, Interactive Identification of Australian Acacia (Maslin, B. R. 2018).
- Weeds of Central and Northern Queensland (WSQ 2019)

2.3 MAPPING

Assessments of available imagery and associated vegetation mapping were undertaken using ArcGIS Pro V3.0. ESRI World Imagery were used for the assessment.



3 RESULTS

3.1 FIELD ASSESSMENT

3.1.1 Survey Effort

The field survey was conducted at the end of the wet season on 16th of May 2023, by Jason Mark (Ecologist) and Caleb Bush (Junior Ecologist) of Kleinfelder. The survey effort included assessment of 2 BioCondition sites and opportunistic observations (**Figure 1**).

This section includes the findings from the BioCondition monitoring.

3.2 WEATHER CONDITIONS

The field survey was completed on 16th May 2023. Weather conditions during the survey period are provided in **Table 2**. The region had experienced near average rainfall for the two months prior to the survey before regular rainfall stopped on the 18th of April.

Table 2 Weather conditions during the survey period.

Date	Temps		Rain (mm)
	Min (°C)	Max (°C)	
16 th May-2023	14.8	30.4	0
Mean May	8.9	26.8	0* / 34.1

Source: Bureau of Meteorology 2023 Station 34035 (Moranbah). *denotes total monthly rainfall, # denotes May Average.

3.2.1 BioCondition Results

The Offset Area had one Assessment Unit (AU) type within the Active Management Area which were based on Regional Ecosystem (RE) 11.9.5 (Error! Reference source not found. and **Figure 1**). RE 11.9.5 is described as “*Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on fine-grained sedimentary rocks’. The AU contained remnant but degraded Brigalow Community with a canopy and shrub layer dominated by native species, and a ground layer dominated by native grasses with *Cenchrus ciliaris* (Buffel Grass) and *Melinis repens* (Red Natal) sub-dominant.

The BioCondition scores are between 0 and 1, where a score of 0 means that the vegetation does not resemble the condition of the undisturbed vegetation used as a benchmark, and a score of 1 means that the vegetation meets the benchmark vegetation condition. The vegetation in AU1 had a Bio-condition Score of 0.68 and 0.66 compared with 0.535 and 0.535 in the 2015 monitoring event (Error! Reference source not found.). The high scores are reflective of the vegetation within the offset area and progress towards benchmark community condition over the past 8 years.

Table 3 Vegetation types available for Offsets

BioCondition Site	Easting ¹	Northing	2015 Score	2023 Score
1	624056	7589662	0.535	0.88
2	625036	7589915	0.535	0.86

¹ Coordinates presented in GDA94 Zone 55



3.2.2 Bushfire

There was no evidence of bushfire, such as blackened tree stems or charred logs, observed on site during the survey. Historical imagery was interrogated back to 2002 and no evidence or fire scars were detected over that time (Queensland Globe imagery).

3.2.3 Grazing and Fencing

Evidence of grazing was recorded within the Offset Area in the general vicinity of the monitoring sites. Cattle are excluded from the offset through a steep rocky hill which borders three quarters of the offset and the use of fencing through the low lying areas. A section of fencing was missing from a saddle in the ridgeline along the northern edge. Fencing is required to be installed to effectively manage stocking rate and duration as required to meet the offset objectives. Buffel Grass, a preferred pasture grass of cattle, dominates the open areas through the site.



4 DISCUSSION

4.1.1 Brigalow TEC / RE 11.9.5

Vegetation that was assessed across the Offset Area (AU1), appears to be consistent with RE 11.9.5 (*Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on fine-grained sedimentary rocks). This ecosystem is classified as endangered under the VMA Act and is recognised as an ecosystem that comprises the Brigalow TEC which is listed as endangered under the EPBC Act.

Brigalow community is healthy in the Offset Area and supported by sub canopy species including *Atalaya hemiglauca*. The ground storey contained a high richness of native grass species including *Aristida* spp. and *Chloris* spp.. Although native species richness was high cover was low when compared with benchmarks which could be attributed to competition with exotic grass species and or climatic conditions onsite.

The Brigalow Offset produced positive scores for recruitment, organic litter, trees, shrubs and grasses with organic litter scoring poorly and native grass cover scoring poorly in site 1. The impact of Buffel Grass was evident through low scores in native ground cover and organic litter. However, assessment suggests that the threat is manageable and does not present an unacceptable level of risk in terms of the offset being able to demonstrate an ecological benefit with management actions.

Overall, the RE averages a BioCondition score of 0.87 which is considered as moderate to highly functional. The current functionality of this ecosystem and when compared with previous results (65% improvement) can be viewed positively given the age and maturity of the system, and this view further supports the likelihood of compliance gains in the future. Importantly, the Offset Area is also inside a regional biodiversity corridor as described under Queensland's regional biodiversity network mapping.

4.2 RISKS OR POTENTIAL THREATS

4.2.1 Weeds

4.2.1.1 Cacti

Harrisia martinii (Harrisia Cactus) and *Opuntia tomentosa* (Velvety-tree Pear) was observed scattered throughout the Offset Area. *Harrisia* Cactus forms dense clumps in the understorey and produces large amounts of viable seed in a succulent fruit. These are eaten by frugivorous birds and non-volant mammals, and the seeds are subsequently spread through their droppings. *Harrisia* Cactus can also reproduce vegetatively if it is displaced as broken pieces. It is a common weed of Brigalow communities and notably develops under roost sites from bird droppings. Large populations could displace the natural understorey through competition/shading and have a negative impact on terrestrial fauna movement. *Harrisia* Cactus are biologically controlled by two species a stem-boring longicorn beetle (*Alcidion cereicola*) and a mealy bug (*Hypogeococcus festerianus*). There was no evidence of these in the *Harrisia* Cactus.

Opuntia spp. were observed sporadically throughout the Offset Area. *Opuntia* also produce a large amount of seed which is dispersed by birds and water courses. The *Opuntia* species observed were not affected by *Cactoblastis cactorum* (Cactoblastis Moth). *Opuntia* species are classified as Restricted Matter and WoNS.

Millennium Mine has engaged contractors to undertake weed control within the offset area and evidence of this control was observed during the site survey with dead individuals observed controlled through manual removal and herbicide control. Ongoing weed control and monitoring will ensure Cacti species do not become a significant threat in the Offset Area.

4.2.1.2 Buffel Grass

Buffel Grass was observed throughout the Offset Area particularly in the Box Community to the north of the Active Management Area. This is reflective of the sites grazing history and ongoing access by cattle. It was less abundant within the Brigalow Communities. However, it was the dominant understorey species in other parts of the Offset Area. Buffel Grass is a highly adaptive plant producing large numbers of seeds which are dispersed by fauna, wind and water.

A suitable mechanism for the control of Buffel Grass in this situation would involve an Integrated Management Program. Control should involve two primary control techniques. The first being strategic and combined



distribution of different herbicides to reduce Buffel Grass populations and encourage the expansion of the native ecosystem, without providing long term residual impacts to native grass species. The second control technique involves erection of fencing to effectively exclude cattle as required. Cattle should be used to crash graze Buffel Grass during select times of the year reducing biomass and seeding of Buffel Grass while removing the grazing pressure during germination times to allow for native groundcover species to germinate and mature.

4.2.2 Feral Animals

4.2.2.1 Rabbits

Scratching's and droppings of *Oryctolagus cuniculus* (European Rabbit) were observed within the Offset Area. High density populations of rabbits can impact on the recruitment of native plant species through selective grazing, which can also have long term effects on biodiversity and ecosystem development if key indicator species are excluded by their grazing. Selective grazing may also impact threatened flora within Brigalow communities. Extensive burrowing by rabbits may also lead to erosion concerns, however this threat is mitigated by the occurrence of clay soils which are not considered suitable for warrens.

Rabbits are classified as Restricted Matter in Queensland. However, they are not considered to be a significant threat as widespread plant species known to be impacted by rabbit occurrence are not present within the ecosystems. Future monitoring should continue to consider the presence of this animal and any notable increase in density may require a thorough abundance and impact assessment.

4.2.2.2 Wild Dogs

Wild Dogs were observed within the Offset Area. Wild dogs could be responsible for predation on threatened fauna known to occur within Brigalow e.g. Ornamental Snake if numbers are high. Wild Dogs are unlikely to impact on the condition of the vegetation within the TEC but could reduce the ecological function of the TEC through impacts to faunal groups with habitat in the TEC. If signs of predation on native wildlife is observed in the Offset Area, a management Program would be recommended.

4.2.3 Other Potential Threats

Bushfires possibility is increased due to the presence of Buffel Grass in the locality (along with other grass species). Buffel Grass can develop considerable biomass and burn with more heat intensity than native communities with a comparable fuel biomass, therefore exacerbating the spread and intensity of destructive bushfire. Regional ecosystem 11.4.9 is fire sensitive and fuel loads in and surrounding the Offset Area should be monitored and managed to mitigate the impacts of bushfire on the Offset Area. The fuel loads in the AU were 2,850 and 1,650 kg/ha (Wotonga Offset 2023 We-season Biennial photo monitoring). A fuel load of below 1,300kg/ha is the level required in the OMP. A reduction may be required in wet periods to prevent the fuel load building up to a level that could become a fire hazard.



5 CONCLUSIONS

The results of the 2023 assessment identified that the Wotonga Offset Area is moderate to highly functional for Brigalow TEC (specifically RE 11.9.5). Importantly, opportunity exists to increase the value of the offset through appropriate management measures.

There are sufficient observations to support the conclusion that the site is a suitable and viable offset for Brigalow TEC and is tracking well towards reaching benchmark status.

Recommendations to increase the value of the area include:

- The general exclusion of cattle and grazing except for control of Buffel Grass if required.
- The management of Buffel Grass and Cacti species to support the sites biodiversity values and manage the risk of bushfire.
- Pest control as required to reduce populations of Feral Dog and Rabbit populations.



6 LIMITATIONS

6.1 STATEMENT OF LIMITATIONS

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Kleinfelder has used a professional standard of skill and care ordinarily exercised by reputable members of the same profession practicing in the same or similar locality.

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APPENDIX A: RAW DATA

BioCondition Sites

Site ID	Site ID	Status	BC01	BC02
Date			16/05/2023	16/05/2023
Observer			JM/KB	JM/KB
Location				
Bioregion			11	11
Datum			GDA94	GDA94
Zone			Z55	Z55
Easting (add from GIS)	Plot Origin (100x50m)		624001	625033
Northing			7589932	7589907
Easting	Plot Centre (100x50m)		624001	625066
Northing			7589931	7589949
Plot Bearing	Degrees		40	290
Plot Alignment Description				
Locality Description	Lot/Plan or Lease		13SP178466	13SP178466
RE / Tree heights				
Regional Ecosystem			11.9.5	11.9.5
Tree Canopy Hgt (EDL)	m median		10	10.2
50x20m Area				
Coarse Woody Debris	m		35.12	34
100x50m Area				



Site ID		Status	BC01	BC02
EDL spp recruitment	100%		33	100
Native Species Richness			2	3
Plant Species Richness	Common name		3	2
<u>Native Trees</u>				
<i>Acacia harpophylla</i>	Brigalow		x	x
<i>Eucalyptus cambageana</i>	Blackbutt		x	
<i>Eucalyptus persistens</i>			x	
<i>Lysiphyllum carronii</i>	Red Bauhinia			x
50x10m Area				
Shrub spp. richness			3	5
<u>Plant Species</u>	<u>Common name</u>			
<i>Atalaya hemiglauca</i>	Whitewood		x	x
<i>Capparis lasiantha</i>	Nipan			x
<i>Carissa ovata</i>	Currant Bush		x	x
<i>Eremophila mitchellii</i>	False Sandalwood		x	x
<i>Terminalia oblongata</i>	Yellowwood			x
<u>Grass spp. richness</u>			6	7
<i>Aristida calycina</i> var. <i>holathera</i>	Dark Wiregrass		x	x
<i>Aristida latifolia</i>	Feathertop Wiregrass			x
<i>Chloris pectinata</i>	Comb Chloris		x	
<i>Chloris ventricosa</i>	Tall Chloris		x	
<i>Dicanthium sericeum</i>			x	x



Site ID		Status	BC01	BC02
<i>Enneapogon lindleyanus</i>	Wiry Nineawn			x
<i>Enteropogon ramosus</i>	Twirly Windmill Grass		x	
<i>Eragrostis brownii</i>	Brown's Lovegrass			x
<i>Eragrostis elongata</i>	Woodland Lovegrass		x	x
<i>Thyridolepis xerophila</i>	Small mulga Mitchell grass			x
<u>Forb & other spp richness</u>			4	4
<i>Capparis lasiantha</i>	Wait-a-while		x	x
<i>Enchylaena tomentosa</i>	Ruby Salt Bush		x	x
<i>Salsola australis</i>	Rolly-polly Tumbleweed		x	x
<i>Sida fibulifera</i>	Pin Sida		x	x
Native spp richness			16	18
Non-native Cover %	0.1--0.9 or 1--100		50.5	6
<u>Plant Species</u>	<u>Common name</u>			
<i>Achyranthes aspera</i>	Devil's Horsewhip		x	
<i>Bothriochloa decipiens</i>	Pitted Bluegrass			x
<i>Cenchrus ciliaris</i>	Buffel Grass		x	x
<i>Harrisia martinii</i>	Harrisia cactus	Restricted		x
<i>Malvastrum americanum</i>	Spiked Mallow		x	x
<i>Melinis repens</i>	Red Natal			x
<i>Panicum maximum var. trichoglume</i>	Green Panic		x	x
<i>Opuntia tomentosa</i>	Velvety-tree Pear	Restricted	x	x



Site ID		Status	BC01	BC02
<i>Stylosanthes scabra</i>	Shrubby Stylo		x	x
Five x 1m plots	%			
Groundcover				
Native perennial (decreaser) grass Cover	Total		12	29.4
1			10	55
2			35	30
3			10	60
4			3	
5			2	2
Native other grass (if relevant)	Total		0	0
1				
2				
3				
4				
5				
Native forbs and other	Total		1	1
1			5	
2				5
3				
4				
5				



Site ID		Status	BC01	BC02
Native shrubs (<1m	Total		4.4	5.8
1				2
2			2	2
3				
4			20	
5				25
Non-native grass	Total		36	3.2
1			2	
2			20	5
3			68	
4			60	1
5			30	10
Non-native forbs and shrubs	Total		2.4	1.4
1			10	
2				2
3				2
4			2	3
5				
Litter	Total		14	34
1			3	2
2			35	53



Site ID		Status	BC01	BC02
3			20	13
4			2	
5			10	10
Rock	Total		0	0.2
1				
2				
3				
4				1
5				
Bare Ground	Total		30	43.4
1	10		69	41
2	20		10	3
3	40			25
4	10		33	95
5	20		38	53
Cryptograms	Total		0.2	0
1	10		1	
2	10			
3				
4				
5	30			
<u>Total</u>			100	100



Site ID		Status	BC01	BC02
100x50m area	Benchmark			
<i>Eucalypt large tree DBH (cm)</i>				
No. large eucalypts				
<i>Non-eucalypt large tree DBH (cm)</i>			26	26
No. large non-eucalypts			8	4
<u>Total</u>			0	0
100m Transect				
Canopy	Total		17.8	40
Native Shrub	Total		16.4	12.4



APPENDIX B: BIOCONDITION SITE PHOTOGRAPHS

In order of North, East, South and West



BC01



BC02

APPENDIX C: BIOCONDITION CALCULATIONS

Site / Assessment Unit		BC0				BC02			
Attribute	Weighting	Field	Bench.	%	Score	Field	Bench.	%	Score
Large trees	15	10	8	80	10	10	4	40	5
Tree canopy median height	5	9.6	15	64	3	10.2	15	68	3
Recruitment of woody perennial species%	5	33	100	33	5	10	100	100	5
Tree canopy cover %	5	17.8	32	56	5	12.4	32	39	2
Native shrub canopy cover %	5	16.4	19	86	5	40	19	211	3
Coarse woody debris length m	5	351	688	51	5	340	688	49	2
<i>Native plant spp richness</i>									
Trees	5	3	4	75	2.5	2	4	50	2.5
Shrubs	5	3	5	60	2.5	5	5	100	5
Grasses	5	6	5	120	5	7	5	140	5
Forbs and other	5	4	10	40	2.5	4	10	40	2.5
Non-native plant cover	10	20			5	3.2	20		10
Native perennial grass cover %	5	12	30	40	1	29.4	30	98	5
Litter Cover %	5	14	49	29	3	15.6	49	32	3
<u>Sub-Score</u>	80				54.5				53
Landscape Scale Attributes									
Patch size	10	10	10	100	10	10	10	100	10
Connectivity	5	5	5	100	5	5	5	100	5
Context	5	5	5	100	5	5	5	100	5
<u>Sub-score</u>	20				20				20
Total Point Score	100				88				86
BioCondition Score Site					0.88				0.86
BioCondition Score AU					0.87				0.87

