





Lexington Offset Annual Report – 2021/2022

man 1997 and the

Meteor Downs South Coal Project

Sojitz Blue Pty Ltd





APPROVALS

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CONTENTS

1	Intr	roduction	1		
	1.1	Background	1		
	1.2	Purpose of document	2		
2	Pro	ject details	5		
3	Cur	rent conditions	6		
4	Act	ivities undertaken during the management period	8		
5	Sun	nmary of offset monitoring	12		
	5.1	General offset monitoring	12		
	5.2	Habitat condition assessments	12		
	5.3 Weed monitoring				
	5.4	Photo monitoring	16		
	5.5	Biomass monitoring	18		
	5.6	Pest animal monitoring	21		
6	Adł	nerence to management objectives	23		
7	Pro	gress toward completion criteria	27		
8	Thr	eats to offset matters	33		
9	Am	endments to OMP	34		
10	Ref	erences	35		
Ар	pendi	ix A Dry Season Monitoring Report (2021/22) – CO2 Australia 2021a	A-1		
Ар	Appendix B Post-wet Season Monitoring Report (2021/22) – CO2 Australia 2022 B-				
Ар	Appendix C Annual Land Condition-Pasture Budget Assessment - 2021 C-1				

LIST OF FIGURES

Figure 1: Project site context map	. 3
Figure 2: Lexington offset site and Lexington Rail Loop offset site	. 4
Figure 3: Rainfall recorded during the 2021/2022 management period	. 6
Figure 4: Temperature recorded during the 2021/2022 management period	. 7
Figure 5: Changes in habitat quality scores for Natural Grasslands TEC and king blue-grass between	
2020 and 2022 1	14
Figure 6: Grass cover in Harry's and Contours Paddocks 1	17
Figure 7: Grass cover in North Promenade Paddock 1	17
Figure 8: Graphical representation of the change in biomass at the Lexington offset site between Ma	ау
2018 and March 20221	18
Figure 9: Graphical representation of the change in biomass at the Lexington Rail Loop offset sites	
between May 2018 and March 2022 2	21
Figure 10: Graphical representation of the change in Catling Index between April 2018 and March	
2022	22
Figure 11: Location of overlap (blue ellipse) erroneously established between Lexington offset area	
(EPBC 2013/6799) and Lexington Rail Loop offset area (EPBC 2019/8482)	34



LIST OF TABLES

Table 1: Project details for the Lexington offset site	5
Table 2: Management and monitoring measures undertaken within the 2021/2022 management	
period for the Lexington offset area	9
Table 3: Management and monitoring measures undertaken within the 2021/2022 management	
period for the Lexington Rail Loop offset area	10
Table 4: Site condition and site context scores calculated at each habitat monitoring site	13
Table 5: Lexington Rail Loop offset site monitoring sites showing their habitat condition scores	
contributing to MNES1	13
Table 6: Condition classes for the Natural Grasslands TEC at the Lexington Rail Loop offset site 1	14
Table 7: Comparison of weed survey results since April 2018 1	15
Table 8: Comparison of weed survey results since June 2020 1	16
Table 9: Comparison of biomass monitoring results in the Lexington offset area since May 2018 1	19
Table 10: Biomass monitoring baseline results at the Lexington Rail Loop offset site	20
Table 11: Catling Index for pest animals at the Lexington offset site April 2018 – March 2022	21
Table 12: Percentage of plots from which the pest animal was detected and rabbit impact results 2	22
Table 13: Lexington offset area management objectives for offset matters, outlining management	
actions, management targets and triggers for corrective action	24
Table 14: Adherence to interim performance targets and performance criteria for each offset matter	r
in the Lexington offset area	28
Table 15: Adherence to interim performance targets and performance criteria for each offset matter	r
in the Lexington Rail Loop offset area	31



ABBREVIATIONS AND ACRONYMS

BVG	Broad Vegetation Group
°C	Degrees Celsius
DAF	Queensland Department of Agriculture and Fisheries
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DEHP	Queensland Department of Environment and Heritage Protection
EA	Environmental Authority (EPML00559513) for the Meteor Downs South Coal Mine
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
ha	Hectare
kg	Kilogram
km	Kilometre
MDS Project	Meteor Downs South Coal Project
MDS Rail Loop	Meteor Downs South Mine Rail Loop
m	Metre
mm	Millimetre
MNES	Matters of National Environmental Significance
MNESMP	Matters of National Environmental Significance Management Plan
MSES	Matters of State Environmental Significance
ОМР	Offset Management Plan
%	Percent
RE	Regional Ecosystem
Sojitz Blue	Sojitz Blue Pty Ltd
TEC	Threatened Ecological Community
TSSC	Threatened Species Scientific Committee
U&D	U&D Mining Industry (Australia) Pty Ltd



1 INTRODUCTION

1.1 BACKGROUND

U&D Mining Industry (Australia) Pty Ltd (U&D) has approval under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth; EPBC Act) to develop and operate the Meteor Downs South Coal Project (MDS Project) (Figure 1). U&D is in a joint venture with Sojitz Blue Pty Ltd (Sojitz Blue) to develop and operate the MDS Project.

The MDS Project was granted Commonwealth Government approval under EPBC Act on 25 November 2014 (EPBC 2013/6799). State Government environmental approval was granted by the Queensland Department of Environment and Resource Management in July 2013 (Environmental Authority [EA] EPML00559513). In December 2019, Sojitz Blue received approval under the EPBC Act (EPBC 2019/8482) to develop and operate the Meteor Downs South Mine Rail Loop (MDS Rail Loop).

This annual report has been prepared to satisfy Conditions 5 and 6 of the EPBC Act approval (EPBC 2013/6799) and relevant requirements for offset delivery under the Queensland *Environmental Offset Framework* in accordance with the EA for the MDS Project at the Lexington offset site. This annual report has also been prepared to satisfy Conditions 2, 3, 4 and 5 of the EPBC Act approval (EPBC 2019/8482) with respect to environmental offsets at the Lexington Rail Loop offset site for significant residual impacts associated with the MDS Rail Loop.

Environmental offsets are required for significant residual impacts of the MDS Project and MDS Rail Loop on the matters of national environmental significant (MNES) and matters of state environmental significance (MSES), namely:

- Natural Grasslands of the Queensland Central Highlands and Fitzroy Basin Threatened Ecological Community (Natural Grasslands TEC) (MNES) – MDS Project and MDS Rail Loop
- Habitat for king blue-grass (Dichanthium queenslandicum) (MNES/MSES) MDS Project and MDS Rail Loop
- ▶ Habitat for bluegrass (Dichanthium setosum) (MNES/MSES) MDS Project only
- ▶ Habitat for squatter pigeon (southern) (Geophaps scripta scripta) (MNES/MSES) MDS Project only
- Endangered Regional Ecosystem (RE) 11.8.15 MDS Project only
- Of concern RE 11.8.11 (MSES) (offset as part of Natural Grasslands TEC)
- Of concern RE 11.8.11a (Broad Vegetation Group [BVG] 21b) (MSES) MDS Project only
- Watercourse RE 11.8.5 (BVG 11a) (MSES) MDS Project only
- ▶ Watercourse RE 11.8.11 (BVG 30b) (MSES) MDS Project only
- ▶ Watercourse RE 11.8.11a (BVG 21b) (MSES) MDS Project only.

Note that RE 11.8.11a is no longer a recognised RE since the release of version 12 of the *Regional Ecosystem Description Database* in March 2021 (Queensland Herbarium 2021). Instead, all areas of RE 11.8.11a are now recognised as RE 11.3.25d. This constitutes not only a change in RE, but also a change in land zone. Notwithstanding, all mention of RE 11.8.11a will continue given historical approval incorporating this RE.

The Lexington property (Figure 2), owned by Sojitz Minerva Mining, is being used to acquit all of the MDS Project's and MDS Rail Loop offset requirements, with the exception of RE 11.8.15 (MDS Project) for which a financial settlement offset has been provided under the Queensland *Environmental Offset Framework*.



In accordance with the Offset Management Plan (OMP), the following activities are required to be completed in Year 5 (31 October 2021 to 31 October 2022) in the Lexington offset area:

- weed surveys in the dry season and post-wet season
- pest animal surveys in the dry season and post-wet season
- biomass assessments in the dry season and post-wet season
- general offset site monitoring
- submission of the annual report by 30 June 2022.

The OMP also outlined the following activities are required to be completed in Year 3 (31 October 2021 to 31 October 2022) in the Lexington Rail Loop site:

- habitat condition assessments in the post-wet season
- photo monitoring in the post-wet season
- weed surveys in the dry season and post-wet season
- biomass assessments in the dry season and post-wet season
- submission of the annual report by 30 June 2022.

1.2 PURPOSE OF DOCUMENT

The annual report will be submitted to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) and Queensland Government documenting the implementation of and adherence to the OMP. To satisfy this requirement, this annual report has been prepared by CO2 Australia on behalf of Sojitz Blue for the period July 2021 to June 2022. This annual report presents the following:

- project details
- > a general description of climatic conditions for the management period
- activities undertaken within the management period
- results of monitoring events within the management period so far
- an indication of any risks or potential threats that have become apparent since the development of the OMP, and activities to be undertaken to manage these threats and risks
- progress towards achieving the management objectives and performance criteria and any adaptive management triggers and/or corrective actions that have been implemented
- recommendations for revising the OMP including changes to management and monitoring activities to improve management and/or monitoring performance and attained performance targets and/or completion criteria.



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2 PROJECT DETAILS

The departmental reference details for the Lexington offset site and the Lexington Rail Loop offset site are outlined in Table 1.

Table 1: Project details for the Lexington offset site

Commonwealth offset trigger				
Relevant legislation	EPBC Act			
EPBC Act approval	EPBC 2013/6799 and EPBC 2019/8482			
MNES required to be offset	Listed threatened species and communities			
Queensland Government offset trigger				
Relevant legislation	Environmental Offsets Act 2014			
EA	EPML00559513			
MSES required to be offset	Regulated vegetation, protected wildlife habitat, wetlands and watercourses, connectivity areas			
Offset property real property description	(Primary Lot on Plan/s) and address:			
Lot 10 and Lot 11 DN40126, Lot 14 DN40170 and Lot 13 DN40170				
593-607 Wurba Road, Minerva, QLD 4722				
Tenure: Freehold Primary Local Government Area: Central Highlands Regional Council				



3 CURRENT CONDITIONS

During the 2021/2022 management period, a total of 645.2 millimetres (mm) of rain was recorded at the nearest weather station (Comet Street, Springsure #35065, approximately 45 kilometres [km] north of the Lexington property) which was 99.7 percent (%) of the long-term annual average of 646.7 mm. Unusually, rainfall was above average for the late 2021 dry season (October to December) and well below average over the wet season (January to March) (Figure 3). The start of the 2022 dry season (April to May) has also been wetter than average.

The temperature data also followed a similar trend, with mean maximum and minimum temperatures generally above average over the dry season months and below average over the wet season months (Figure 4). Overall, the mean maximum and minimum temperatures during the management period were approximately 0.87 degrees Celsius (°C) and 0.85°C above the long-term average, respectively.

In summary, the climate conditions during the 2021/2022 management period could be characterised as being wetter and warmer than average over the dry season months and drier and cooler than average over the wet season months.



Figure 3: Rainfall recorded during the 2021/2022 management period¹

¹ June 2022 rainfall data was not available at the time of writing.





Figure 4: Temperature recorded during the 2021/2022 management period²

² May 2022 and June 2022 temperature data was not available at the time of writing.



4 ACTIVITIES UNDERTAKEN DURING THE MANAGEMENT PERIOD

Management of the offset management area is being undertaken in accordance with the OMP. The offset area is being managed in order to improve the condition and connectivity of habitat and vegetation communities for MNES and MSES, in order to attain and maintain completion criteria for the length of implementation of the OMP. Management objectives presented in Section 5 of the OMP for the Lexington offset area and Lexington Rail Loop offset area aim to:

- minimise predation risk by wild dogs, foxes and cats to threatened fauna species within the offset area (Lexington offset area)
- minimise habitat degradation caused by pest animals (pigs and rabbits) within the offset area to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC (Lexington offset area)
- control invasive weed species to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC (Lexington offset area and Lexington Rail Loop offset area)
- minimise impact of livestock grazing on the condition of habitat for threatened species and vegetation communities including those that are representative of TEC (Lexington offset area and Lexington Rail Loop offset area)
- reduce the risk of adverse impacts by unplanned fire through fire management, and improve the condition of habitat for threatened species and vegetation communities including those that are representative of TEC within offset areas (Lexington offset area and Lexington Rail Loop offset area).

An outline of the management and monitoring activities that have been undertaken to address the management objectives of the corresponding offset areas are presented in Table 2 for the Year 5 management period (31 October 2021 to 31 October 2022) in the Lexington offset area and in Table 3 for the Year 3 management period (31 October 2021 to 31 October 2022) in the Lexington Rail Loop offset area. These activities and timings are drawn from the *Offset Management Plan for Lexington – Meteor Downs South Project* (Sojitz 2019).

Activity		Timing	Management activities undertak
General restrictions	 Install locks on gates. Erect signs on access points into offset site. Annually inspect fence, gates and locks to ensure maintained in a serviceable condition. 	At the start of management and maintained at all times.	Access to offset area locked in the fence is accessible to vehicles via No signage is yet installed identify
Access tracks	Maintain unsealed access tracks to no more than 5 metres (m) width and in safe condition.	At all times.	All access tracks in passable cond undertaken during the current ma Refer to Figure 5 and Figure 6 in A access tracks and fences.
Fencing	Map location of additional fencing and install by July 2019.	In Year 1 existing and required additional fencing will be mapped and additional fencing will be constructed within the first three years of management to assist with livestock management.	No additional fences or gates inst and access tracks maintenance is agreement. Refer to Figure 5 and Figure 6 in A access tracks and fences.
Pest animal management	Complete baseline assessment of pest animals to determine control measures, location and timing for management.	As required based on results of Year 1 baseline assessment	No pest animal control measures period.
Weed management	 Implement weed hygiene measures as part of access requirements applicable to the offset areas. Complete baseline assessment to determine distribution and abundance of invasive and other weed infestations and determine control measures, location and timing for management including: A strategic grazing regime to reduce the presence of exotic pasture grasses to less than 25% of the total groundcover in the offset areas. Spraying of exotic grasses following strategic grazing events. 	Weed control activities in addition to fire management and livestock management to be undertaken as required following Year 1 baseline assessment	No weed control measures were
Fire management	 Maintain existing firebreaks, access tracks and roads annually. Implement strategic grazing regime to maintain fuel loads. Undertake a mosaic low intensity burns to maintain ecological functioning. 	As required, with frequency determined by biomass monitoring and fire management guidelines for each of the component RE contributing to the offset management zones. Burns should only be undertaken in the late wet to early dry season when there is adequate soil moisture, burning less than 30% in any year.	Firebreaks mapped and defined. No maintenance of firebreaks wa period.
	Strategic grazing regime in offset management zones A and B – light grazing.	At all times.	A Land Condition-Pasture Budget
Livestock management	Reduced or restricted livestock grazing within offset management zone C for of concern RE 11.8.11a and watercourse RE 11.8.11a if rainfall events cause inundated or waterlogged soils.	Excluded when inundated or waterlogged.	(Appendix C). No land condition-p the current 2021/2022 managem There was evidence of cattle in th Lexington offset area during the c
Erosion management	Restrict grazing within offset management zone C if rainfall events cause inundated or waterlogged soils.	At all times. Erosion will be managed throughout the offset site by livestock management and general access	There was evidence of cattle in th Lexington offset area during the o



en within the management period

- e north-east corner, although an open, unlocked Wurba Road to the west.
- ying site as an offset area.
- dition. No maintenance of access tracks was nanagement period.
- Appendix B for maps showing monitoring sites,
- talled during current management period. Fencing s ongoing and managed as part of the share-farming
- Appendix B for maps showing monitoring sites,
- were undertaken during the current management

undertaken during the current management period.

as undertaken during the current management

t Assessment was completed on 7 May 2021 to zing regimes both inside and outside of offset areas pasture budget assessment was completed during nent period.

ne natural grassland areas in the west of the dry season monitoring.

ne natural grassland areas in the west of the dry season monitoring.

Activity		Timing	Management activities undertake
	General offset site monitoring.	Annually.	General offset site monitoring und and post-wet season monitoring.
	Establishment of monitoring points.	Year 1 to establish monitoring points.	Monitoring points established in A season monitoring, with baseline A time. No habitat condition assessments undertaken during the Year 5 (202
	Habitat condition assessments and photo monitoring.	Calculate baseline condition at established monitoring points, with habitat condition assessments and photo monitoring undertaken every two years for the first ten years and then a minimum of every five years thereafter up to 31 October 2039. Monitoring frequency to be reviewed at Year 10 and frequency based on attainment of interim performance target.	
	Squatter pigeon (southern) surveys.		Baseline targeted surveys underta
Monitoring	King blue-grass surveys.	Baseline assessment in Year 1, with follow-up surveys every five years (up to 31 October 2039).	No targeted threatened grass or s
	Bluegrass surveys.		be undertaken until the 2022/23 r
	Baseline weed survey.	To inform requirements for ongoing weed control a baseline survey is required in Year 1.	Baseline weed survey undertaken season monitoring.
	Weed monitoring.	Every two years following baseline survey event.	Weed surveys were undertaken as December 2021 and the post-wet
	Pacolino post animal survov	To inform requirements for ongoing pest animal management a baseline survey is required in Year 1.	Baseline pest animal surveys unde
	basenne pest anniai survey.	Two events to be completed in Year 1 – one dry season survey and one post-wet survey.	post-wet season monitoring.
	Dest series las sites in a	Every two years following baseline survey event.	Pest animal surveys were underta
	Pest animal monitoring.	Two events to be completed in each survey year – one dry season survey and one post-wet survey.	December 2021 and the post-wet
	Monitoring biomass for grazing and fire	At least annually, including at the end of the wet season.	Biomass monitoring was undertak
	management.	Prior to and during grazing events.	December 2021 and the post-wet
Reporting	Annual report.	By 30 June each management year.	The current annual report represe undertaken during the Year 5 (202
	Review and update OMP.	By 30 July each management year.	Recommended changes to the ON report.

Table 3: Management and monitoring measures undertaken within the 2021/2022 management period for the Lexington Rail Loop offset area.

Activity		Timing	Management activities undertake
General restrictions	 Install locks on gates. Erect signs on access points into offset site, Annually inspect fence, gates and locks to ensure maintained in a serviceable condition. 	At the start of management and maintained at all times.	Fences, gates and locks were obse
Access tracks	Maintain unsealed access tracks to no more than 5 m width and in safe condition.	At all times.	Access to offset area via all existin
Fencing	Map location of additional fencing and install by July 2021.	In Year 1 existing and required additional fencing will be mapped and additional fencing will be constructed within the first three years of management to assist with livestock management.	No additional fences or gates insta
Pest animal management	Complete baseline assessment of pest animals to determine control measures, location and timing for management.	As required based on results of Year 1 baseline assessment.	No pest fauna monitoring is requir offset area.



en within the management period

dertaken at least twice a year as part of dry season

April 2018 as part of Year 1 (2017/18) post-wet habitat condition assessments undertaken at that

and photo monitoring are required to be 21/2022) monitoring period.

aken April 2018 as part of Year 1 (2017/18) surveys. squatter pigeon (southern) surveys are required to monitoring period (Year 6).

in April 2018 as part of Year 1 (2017/18) post-wet

s part of the dry season monitoring in season monitoring in March 2022.

ertaken in April 2018 as part of Year 1 (2017/18)

aken as part of the dry season monitoring in season monitoring in March 2022.

ken as part of the dry season monitoring in season monitoring in March 2022.

ents the summary of activities and management 21/2022) monitoring period.

MP are outlined in Section 9 of the current annual

en within the management period

erved to be in good condition.

ng access tracks or public roads (e.g. Wurba Road).

alled during current management period.

red to be undertaken within the Lexington Rail Loop

Activity		Timing	Management activities undertak
Weed management	 Implement weed hygiene measures as part of access requirements applicable to the offset areas. Complete baseline assessment to determine distribution and abundance of invasive and other weed infestations and determine control measures, location and timing for management including: A strategic grazing regime to reduce the presence of exotic pasture grasses to less than 25% of the total groundcover in the offset areas. Spraying of exotic grasses following strategic grazing events. 	Weed control activities in addition to fire management and livestock management to be undertaken as required following Year 1 baseline assessment.	No weed control measures were
Fire management	Maintain existing firebreaks, access tracks and roads annually. Implement strategic grazing regime to maintain fuel loads. Undertake a mosaic low intensity burns to maintain ecological functioning.	As required, with frequency determined by biomass monitoring and fire management guidelines for each of the component RE contributing to the offset management zones. Burns should only be undertaken in the late wet to early dry season when there is adequate soil moisture, burning less than 30% in any year.	No maintenance of firebreaks wa period.
Livestock management	Strategic grazing regime in offset management zone B – light grazing.	At all times.	A herd of six horses was encounter throughout the paddock of horse was observed within Contours Pa of North Promenade Paddock. A Land Condition-Pasture Budget define appropriate potential grazi (Appendix C). No Land Condition- the current 2021/2022 managem
	General offset site monitoring.	Annually.	General offset site monitoring un and post-wet season monitoring.
	Establishment of monitoring points.	Year 1 to establish monitoring points.	Monitoring points established in
	Habitat condition assessments and photo monitoring.	Calculate baseline condition at established monitoring points, with habitat condition assessments and photo monitoring undertaken every two years for the first ten years and then a minimum of every five years thereafter up to 31 October 2039. Monitoring frequency to be reviewed at Year 10 and frequency based on attainment of interim performance target.	season monitoring, with baseline time. Habitat condition assessments an Year 3 (2021/2022) post-wet seas
Monitoring	King blue-grass surveys.	Baseline assessment in Year 1, with follow-up surveys every five years until end of management period.	Baseline surveys for king blue-gra (2019/2020) post-wet season mo No targeted surveys for king-blue (2021/2022) monitoring period.
	Baseline weed survey.	To inform requirements for ongoing weed control a baseline survey is required in Year 1.	Baseline weed survey undertaken season monitoring.
	Weed monitoring.	Every two years following baseline survey event.	Weed surveys were undertaken a December 2021 and post-wet sea
	Monitoring biomass for grazing and fire management.	At least annually, including at the end of the wet season. Prior to and during grazing events.	Biomass monitoring undertaken in the post-wet season surveys in M
	Annual report.	By 30 June each management year.	The current annual report represe
Reporting	Review and update OMP.	By 30 July each management year.	undertaken during the 2021/2022



en within the management period

undertaken during the current management period.

as undertaken during the current management

tered within Harry's Paddock, with evidence e manure and grazing. Likewise, evidence of cattle addock and in the vicinity of the southern boundary

t Assessment was completed on 7 May 2021 to zing regimes both inside and outside of offset areas -Pasture Budget Assessment was completed during nent period.

ndertaken at least twice a year as part of dry season

June 2020 as part of Year 1 (2019/2020) post-wet habitat condition assessments undertaken at that

nd photo monitoring were undertaken as part of the ison monitoring in March 2022.

ass undertaken in June 2020 as part of Year 1 pointoring.

e-grass were undertaken as part of the Year 3

n in June 2020 as part of Year 1 (2019/20) post-wet

as part of the Year 3 dry season surveys in ason surveys in March 2022.

in Year 3 dry season surveys in December 2021 and Aarch 2022.

sents the summary of activities and management 22 monitoring period.



5 SUMMARY OF OFFSET MONITORING

5.1 GENERAL OFFSET MONITORING

5.1.1 Lexington offset site

General site inspections were undertaken within the Lexington offset area as part of the dry season and post-wet season surveys. No additional fencing or access tracks were installed during the 2021/2022 management period.

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. However, there was evidence of cattle in the natural grassland areas in the west of the Lexington offset area during the dry season monitoring.

As previously reported, a number of areas away from surveyed weed monitoring and habitat condition plots were seen supporting considerable weed infestations. Most noticeably was the extent and density of weeds within and adjacent to the ephemeral drainage line and bore on Prickle Farm Road that flanks the western edge of the mining lease (ML 70376). As noted in previous years' monitoring reports, the ephemeral drainage line continues to be densely infested by Noogoora burr (*Xanthium occidentale*), with areas away from the drainage line characterised by dense, monospecific stands of *Parthenium hysterophorus* and a sunflower (indeterminate). *P. hysterophorus* has also formed dense stands along the rest of the main track on the western edge of ML70376. Several of the RE 11.8.11a patches in the south of the property (outside of the weed monitoring plots) have become densely infested with *Megathyrsus maximus* and *P. hysterophorus* following the intense rainfall throughout October to December 2021. Furthermore, there is considerable coverage of *Vachellia farnesiana* throughout the western natural grassland (RE 11.8.11) areas.

5.1.2 Lexington Rail Loop offset site

A site inspection of the Lexington Rail Loop offset site was undertaken during the dry season and post-wet season surveys. A herd of six horses was encountered within Harry's Paddock, with evidence throughout the paddock of horse manure and grazing. Likewise, there evidence of cattle within Contours Paddock and in the vicinity of the southern boundary of North Promenade Paddock.

All fences bounding the paddocks were in good condition. Access to many of the monitoring sites in Contours Paddock was via an access track outside of and adjacent to the western boundary of the paddock, whereas access to monitoring sites in Harry's Paddock was via Wurba Road and access to the North Promenade Paddock monitoring sites was via existing access tracks into Lexington.

5.2 HABITAT CONDITION ASSESSMENTS

5.2.1 Lexington offset site

No habitat condition assessments were required to be undertaken within the Lexington offset area during the 2021/2022 management period.

5.2.2 Lexington Rail Loop offset site

Habitat condition assessments

Habitat condition assessments were conducted in March 2022 at each of the seven permanent habitat monitoring sites identified in the OMP.

Table 4 summarises the site condition and site context scores for each of the seven habitat monitoring sites. A detailed description of the habitat condition assessments is provided in the *Post-wet Season Monitoring Report (2021/22)* (CO2 Australia 2022).



Results of habitat condition assessments identified an average site condition score of 8.12 out of 10 across all seven habitat monitoring sites, with scores ranging between 6.33 (Site LEXRL01) and 8.67 (Sites LEXRL02, LEXRL05, LEXRL07). Site context scores varied from 6.54 out of 10 (LEXRL03) up to 10 out of 10 (LEXRL01 and LEXRL02).

Offset paddock	Site	RE	Easting	Northing	Site condition score (/10)	Site context score (/10)
North Promonado	LEXRL01	11.8.11	604390	7355247	6.33	10
North Promenade	LEXRL02	11.8.11	604758	7354797	8.67	10
Hornés	LEXRL03	11.8.11	608595	7355228	8.00	6.54
Harry S	LEXRL04	11.8.11	609262	7355036	8.00	7.31
	LEXRL05	11.8.11	612011	7354575	8.67	7.31
Contours	LEXRL06	11.8.11	611834	7354280	8.50	7.31
	LEXRL07	11.8.11	611215	7353711	8.67	7.31
Average score				8.12	7.97	

Table 4: Site condition and site context scores calculated at each habitat monitoring site

MNES habitat condition assessments

Habitat quality scores for Natural Grasslands TEC and king blue-grass were calculated using a combination of the site condition and site context scores from the habitat condition assessments as well as species habitat indices. Table 6 presents the habitat quality scores for the 2021/2022 reporting period for Natural Grasslands TEC and king blue-grass.

Based on the results of the site condition and context assessments, habitat condition scores for the MNES averaged 8.05 out of 10 for Natural Grasslands TEC and 6.44 out of 10 for king blue-grass (Table 5).

Figure 5 shows the change in the habitat quality scores for each MNES between 2020 and 2022. Habitat quality has increased slightly for Natural Grasslands TEC and decreased slightly for king blue-grass since the last surveys undertaken in 2020. This is due to no king blue-grass specimens being positively identified during these surveys, resulting in a lower MNES habitat condition score compared with the Natural Grasslands TEC score.

Table 5: Lexington Rail Loop	offset site monitoring sites	showing their habitat	condition scores	contributing to MNES
------------------------------	------------------------------	-----------------------	------------------	----------------------

Offset paddock	Site	RE	Natural Grasslands TEC	King blue-grass
North Promonado	LEXRL01	11.8.11	8.04	6.43
North Promenade	LEXRL02	11.8.11	9.29	7.43
Hornya	LEXRL03	11.8.11	7.32	5.86
narry s	LEXRLO4	11.8.11	7.68	6.14
	LEXRL05	11.8.11	8.04	6.43
Contours	LEXRL06	11.8.11	7.95	6.36
	LEXRL07	11.8.11	8.04	6.43



Offset paddock	Site	RE	Natural Grasslands TEC	King blue-grass
Average score		8.05	6.44	



Figure 5: Changes in habitat quality scores for Natural Grasslands TEC and king blue-grass between 2020 and 2022

Natural grasslands habitat

Natural grassland quality assessments were conducted at each of the seven habitat condition sites. This included an assessment of the species richness of Natural Grasslands TEC indicator species, density of grass tussocks, shrub cover and non-native plant cover as per the approved Commonwealth Listing Advice (Threatened Species Scientific Committee [TSSC] 2009) (Table 6).

The results of this assessment (Table 6) indicated that only one of the condition sites (LEXRL02) was in 'best' condition, with four sites (LEXRL03, LEXRL04, LEXRL05 and LEXRL07) being in 'good' condition. The remaining two sites (LEXRL01 and LEXRL06) did not meet the criteria for 'good' or 'best' condition classes according to the approved Commonwealth Listing Advice (TSSC 2009). This was due to the high weed cover at LEXRL01 (>30%) and the low number of perennial indicator grass species at LEXRL06 (<3).

Table 6: Condition classes for the Natural Grasslands TEC at the Lexington Rail Loop offset site

	North Promenade		Harry's		Contours		
TEC quality criteria	LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRLOS	LEXRL06	LEXRL07
Perennial indicator grass species	5	6	3	3	3	2	3
Number of native grass tussocks	>200	>200	>200	>200	>200	>200	>200
Woody shrub canopy cover (%)	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Perennial non-native plant cover (%)	40%	1%	3%	2%	0%	0%	0%



	North Promenade		Harry's		Contours		
TEC quality criteria	LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRLO5	LEXRL06	LEXRL07
Condition class	Not TEC	Best	Good	Good	Good	Not TEC	Good

King blue-grass habitat

King blue-grass habitat condition scores for the four habitat monitoring sites ranged between 5.86 and 7.43 (Table 5). No king-blue grass were positively identified from the seven habitat condition assessment plots at the time of surveying, accounting for the lower MNES habitat condition score compared with Natural Grasslands TEC scores.

5.3 WEED MONITORING

5.3.1 Lexington offset site

Weed monitoring was done as part of dry season (December 2021) and post-wet season (March 2022) monitoring surveys at the Lexington offset site. The results of these surveys identified 24 species of weeds (averaging 6.45 species/plot) in the dry season surveys and 16 species of weeds (averaging 3.95 species/plot) in the post-wet season surveys. Weed cover averaged 24.7% in the dry season and 18% in the post-wet season surveys.

A comparison of weed monitoring results to date can be found in Table 7. The full results of weed monitoring surveys are presented in the *Dry Season Monitoring Report (2021/2022)* (CO2 Australia 2021a) and the *Post-wet Season Monitoring Report (2021/2022)* (CO2 Australia 2022) in Appendix A and Appendix B, respectively.

The results of the weed monitoring for the 2021/2022 monitoring period indicate that the number of weed species and weed cover was atypically high for the dry season and low for the post-wet season compared to previous monitoring events (Table 7). The high levels of weed species and weed cover during the dry season can be attributed to unusually high rainfall from October to December resulting from strong La Niña weather patterns. These weeds however would have died back in response to the low rainfall over the summer wet season months (December to March), resulting in the low observed numbers of weed species and weed cover during the 2022 post-wet season surveys. This is not to say that these species are not still in the soil seed bank, and they may reappear after sufficient rain.

Results	Year 1 post-wet	Year 3 dry	Year 3 post-wet	Year 5 dry	Year 5 post-
	season - April	season -	season - June	season -	wet season -
	2018	December 2019	2020	December 2021	March 2022
Number of weed species	22	22	30	24	16
Average weed species per plot (range)	5 (1 – 10)	6.1 (2 – 10)	9.3	6.45 (3 – 13)	3.95 (2 – 9)
Average weed cover per plot (range)	23.7%	22.2%	31.3%	24.7%	18%
	(4.9 – 70.7%)	(0.6 – 67.4%)	(2.7 – 69.3%)	(2% – 69.8%)	(1.8% – 48.9%)

Table	7.	Com	narison	of	wood	curvov	roculte	sinco	April	201	Q
lable	1:	Com	parison	υ	weed	survey	results	since	Aprii	201	ō



5.3.2 Lexington Rail Loop offset site

Weed monitoring was undertaken as part of dry season (December 2021) and post-wet season (March 2022) monitoring surveys at the Lexington Rail Loop offset site. The results of these surveys identified ten species of weeds (averaging 3.7 species/plot) in the dry season surveys and seven species of weeds (averaging 3.25 species/plot) in the post-wet season surveys. Weed cover averaged 7.2% in the dry season and 4.9% in the post-wet season surveys.

A comparison of weed monitoring results to date can be found in Table 8. The full results of weed monitoring surveys are presented in the *Dry Season Monitoring Report (2021/2022)* (CO2 Australia 2021a) and the *Post-wet Season Monitoring Report (2021/2022)* (CO2 Australia 2022) in Appendix A and Appendix B, respectively.

The average number of weed species recorded was significantly lower than previous monitoring events in 2020 (Table 8). The most commonly encountered weed was *Melinis repens* which was recorded at 11 of the 12 sites during both the dry and post-wet season surveys. Similarly, weed coverage was also lower than the previous monitoring events in 2020 (Table 8). *Parthenium hysterophorus* had the highest average cover of 4.4% and 5.9% in the dry and post-wet season surveys, respectively.

Results	Year 1 post-wet season - June 2020	Year 1 dry season - October 2020*	Year 3 dry season - December 2021	Year 3 post-wet season - March 2022
Number of weed species	15	18	10	7
Average weed species per plot (range)	4.8 (1 – 10)	6.5 (2 – 12)	3.7 (1 – 6)	3.25 (2 – 5)
Average weed cover per plot (range)	11.5% (0.1 – 39.1%)	10.2% (1.2 – 29.2%)	7.2% (0.6% – 18.4%)	4.9% (0.2% – 10%)

Table 8: Comparison of weed survey results since June 2020

* While it is acknowledged that October 2020 falls within the Year 2 of management of the Lexington Rail Loop offset monitoring period, this represented the first dry season following project approval so is considered as contributing to the baseline (Year 1) survey.

5.4 PHOTO MONITORING

5.4.1 Lexington offset site

No photo monitoring was required to be undertaken within the Lexington offset area during the 2021/2022 management period.

5.4.2 Lexington Rail Loop offset site

Photo monitoring of the Lexington Rail Loop offset sites was undertaken as part of the post-wet season monitoring surveys in March 2022.

The photo monitoring showed consistent levels of high grass cover across the Contours Paddock (Figure 6), with reduced ground cover in Harry's Paddock and very little grass cover in the North Promenade Paddock (Figure 7). Variability in the ground cover within the North Promenade and Harry's Paddocks is likely a consequence of cattle grazing and horse grazing/trampling, respectively. North Promenade Paddock has largely been overtaken by non-palatable shrubs and other forbs (e.g. *Salsola australis*).

The results of the photo monitoring for the Lexington Rail Loop offset site are presented in the *Post-wet Season Monitoring Report (2021/2022)* (CO2 Australia 2022) in Appendix B.





Figure 6: Grass cover in Harry's and Contours Paddocks



Figure 7: Grass cover in North Promenade Paddock



5.5 **BIOMASS MONITORING**

5.5.1 Lexington offset site

Biomass monitoring was undertaken as part of the dry season (December 2021) and post-wet season (March 2022) monitoring surveys at the Lexington offset site. Table 9 shows a comparison of biomass monitoring results between the baseline surveys conducted by CO2 Australia in May 2018 and the latest assessments. The results of these surveys are also presented in Figure 8, shown as the average biomass of each RE (+/- standard error).

These results demonstrate the fluctuations in biomass as a function of season. Overall, the offset site has maintained high biomass levels across both the dry and post-wet seasons, with a biomass consistently reaching up to 5,040 kilograms (kg)/hectare (ha). Biomass levels from the most recent surveys undertaken during the current management period demonstrate that the unusually high level of rainfall in the dry season resulted in a marked increase in biomass, particularly in RE 11.8.4 and RE 11.8.5. These levels decreased slightly following a drier than normal wet season.

Results of the biomass monitoring assessments during the 2021/2022 monitoring period in the Lexington offset area are presented in the *Dry Season Monitoring Report (2021/2022)* (CO2 Australia 2021a) and the *Post-wet Season Monitoring Report (2021/2022)* (CO2 Australia 2022) in Appendix A and Appendix B, respectively.



Figure 8: Graphical representation of the change in biomass at the Lexington offset site between May 2018 and March 2022



Site	RE type	Biomass (kg/ha)								
		May 2018	Sep 2018	Apr 2019	Dec 2019	Jun 2020	Oct 2020	May 2021	Dec 2021	March 2022
H01	11.8.11	5,040	3,015	5,040	2,140	3,850	4,445	3,015	3,850	5,040
H02	11.8.4	5,000	1,750	1,200	310	1,750	1,475	1,475	1,750	1,750
H03	11.8.11	3,850	3,015	5,040	3,015	3,015	2,578	2,140	4,445	3,015
H04	11.8.5	5,000	2,250	1,750	1,750	2,000	2,000	2,000	1,750	2,000
H05	11.8.4	1,750	1,750	1,750	720	3,625	1,750	5,000	2,250	3,625
H06	11.8.11	5,040	3,015	3,015	2,140	3,015	2,578	2,578	1,080	3,015
H07	11.8.4	2,250	2,250	2,250	1,750	1,750	1,750	1,750	720	1,200
H08	11.8.11a	5,040	3,850	5,040	3,850	3,015	2,578	3,015	5,040	5,040
H09	11.8.11a	5,040	3,015	5,040	3,850	3,850	3,850	3,850	5,040	5,040
H10	11.8.11a	5,040	3,015	5,040	3,850	4,445	3,015	2,578	4,445	3,015
H11	11.8.5	5,000	2,250	1,750	1,750	5,000	5,000	3,625	3,625	1,750
H12	11.8.11	3,850	3,850	3,850	3,015	4,445	3,850	3,850	5,040	3,015
H13	11.8.11	5,040	3,850	3,850	3,015	3,850	3,850	3,015	4,445	3,433
W14	11.8.5	2,250	2,250	2,250	1,750	3,625	3,625	3,625	5,000	5,000
W15	11.8.4	5,000	2,250	2,250	1,750	2,000	2,000	2,000	5,000	2,000
W16	11.8.11	3,850	2,140	3,015	1,080	2,578	3,015	2,578	3,015	2,578
W17	11.8.11	3,850	3,850	3,850	2,140	2,578	3,015	2,578	5,040	3,850
W18	11.8.5	5,000	2,250	5,000	1,750	2,250	3,625	2,250	5,000	5,000
W19	11.8.4	1,750	2,250	2,250	720	2,000	2,000	2,000	2,250	2,250
W20	11.8.11	3,850	3,850	5,040	3,015	5,040	4,445	5,040	4,445	3,850

 Table 9: Comparison of biomass monitoring results in the Lexington offset area since May 2018



5.5.2 Lexington Rail Loop offset site

Biomass monitoring was undertaken as part of the dry season (December 2021) and post-wet season (March 2022) monitoring surveys at the Lexington Rail Loop offset site. Results of the biomass monitoring assessments during the 2021/2022 monitoring period in the Lexington offset area are presented in the *Dry Season Monitoring Report (2021/2022)* (CO2 Australia 2021a) and the *Post-wet Season Monitoring Report (2021/2022)* in Appendix A and Appendix B, respectively.

Table 10 shows a comparison of biomass monitoring results between the baseline surveys conducted by CO2 Australia in June 2020 and the latest assessments. The results of these surveys are also presented in Figure 9, shown as the average biomass of each RE (+/- standard error) for each of the three offset paddocks (North Promenade, Harry's and Contours).

Overall, there is high biomass for the grassland vegetation type, with a biomass consistently reaching up to 5,040 kg/ha across several sites in both the dry and post-wet season surveys. Average biomass did not vary considerably between the between the offset paddocks in the dry season surveys. There was however some variation in the post-wet season surveys, with the average biomass at Contours (4,564 kg/ha) greater than at Harry's (3,968 kg/ha) and greater again than at North Promenade (3,433 kg/ha). This is likely attributable to different grazing pressures, as well as historical trampling from horses in some areas.

Results of the biomass monitoring assessments during the 2021/2022 monitoring period in the Lexington offset area are presented in the *Dry Season Monitoring Report (2021/2022)* (CO2 Australia 2021a) and the *Post-wet Season Monitoring Report (2021/2022)* (CO2 Australia 2022) in Appendix A and Appendix B, respectively.

Sito	RE type	Biomass kg/ha					
Site		Jun 2020	Oct 2020	May 2021	Dec 2021	Mar 2022	
LEXRL01 – North Promenade Paddock	11.8.11	4,445	3,015	3,850	3,850	3,015	
LEXRL02 – North Promenade Paddock	11.8.11	3,850	3,850	3,850	5,040	3,850	
LEXRL03 – Harry's Paddock	11.8.11	3,015	2,578	3,015	2,578	3,015	
LEXRL04 – Harry's Paddock	11.8.11	5,040	3,015	5,040	5,040	3,850	
LEXRL05 – Contours Paddock	11.8.11	5,040	4,445	5,040	3,850	4,445	
LEXRL06 – Contours Paddock	11.8.11	4,445	4,445	5,040	3,850	4,445	
LEXRL07 – Contours Paddock	11.8.11	5,040	4,445	5,040	5,040	4,445	
LEXRL08 – North Promenade Paddock	11.8.11	3,850	3,850	3,850	4,445	3,850	
LEXRL09 – North Promenade Paddock	11.8.11	2,578	1,610	2,578	2,578	3,015	
LEXRL10 – Harry's Paddock	11.8.11	5,040	4,445	5,040	5,040	5,040	
LEXRL11 – Contours Paddock	11.8.11	5,040	4,445	5,040	3,850	4,445	
LEXRL12 – Contours Paddock	11.8.11	5,040	5,040	5,040	3,850	5,040	

Table 10: Biomass monitoring baseline results at the Lexington Rail Loop offset site





Figure 9: Graphical representation of the change in biomass at the Lexington Rail Loop offset sites between May 2018 and March 2022

5.6 PEST ANIMAL MONITORING

5.6.1 Lexington offset site

Results of pest animal monitoring from the 2021/2022 monitoring period indicate an overall decline in presence of a number of pest animals (measured in the form of Catling Index), with the exception of the brown hare (Table 11). This is best illustrated by Figure 10 which shows a marked decrease in the Catling Index scores for all pest animals, except the brown hare, between the 2019/20 monitoring period and the 2021/2022 monitoring period. The Catling Index scores for the brown hare increased during the 2021 dry season surveys however fell to the lowest levels recorded in the following 2022 post-wet season surveys.

Pest animal	April 2018	September 2018	December 2019	June 2020	December 2021	March 2022
Wild dog	3.3	2.0	16.7	7.1	5.1	7.5
Feral cat	15.0	12.2	19.0	21.4	5.1	2.5
European rabbit	16.6	4.1	4.8	11.9	2.6	5
Brown hare	6.6	10.2	19.0	11.9	18	2.5
Pig	3.3	2.0	0	0	0	0
Red fox	1.6	0	0	0	0	0

Table 11: Catling	Index for pe	st animals at the I	exington offset site	April 2018 – March 2022
Table LLI Gating	S mach lot pe	of animals at the	ichington onoctone	





Figure 10: Graphical representation of the change in Catling Index between April 2018 and March 2022

The results of pig and rabbit monitoring in the 2021/2022 monitoring period (refer to Appendix A and Appendix B) indicated an increase in pig and rabbit activity in the offset area. Most notably, evidence of pigs was observed in every plot during the dry season surveys in December 2021 (Table 12). Similarly, there was evidence of rabbits in 80% and 90% of the plots in the 2021 dry season and 2022 post-wet season surveys, respectively (Table 12). This represents an increase in pig and rabbit activity in the offset area since the baseline surveys were undertaken in 2018.

Pest animal	April 2018	September 2018	December 2019	June 2020	December 2021	March 2022
Pigs	25%	63%	88%	75%	100%	63%
Rabbits	0%	70%	100%	90%	80%	90%
	3 x	0 x	0 x	2 x	2 x	3 x
	Acceptable*	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
	7 x Monitor	8 x Monitor	3 x Monitor	5 x Monitor	5 x Monitor	4 x Monitor
	closely*	closely	closely	closely	closely	closely
	0 x	0 x	7 x	3 x	3 x	3 x
	Unacceptable*	Unacceptable	Unacceptable	Unacceptable	Unacceptable	Unacceptable

Table 12: Percentage of plots from which the pest animal was detected and rabbit impact results

* Corrected baseline (April 2018) rabbit impact results based on stricter interpretation of Cooke et al. (2008).

5.6.2 Lexington Rail Loop offset site

No pest fauna monitoring is required to be undertaken within the Lexington Rail Loop offset area.



6 ADHERENCE TO MANAGEMENT OBJECTIVES

Table 13 presents details of management actions undertaken in the Lexington offset area and Lexington Rail Loop offset area to date, and an assessment of whether the offset is demonstrating adherence to the management objectives outlined in the OMP.

			Offse	t mana	gement	area a	nd relev	vant of	fset ma	tter		
Management objectives		Management actions	Vatural Grasslands TEC	king blue-grass	Sluegrass	Squatter pigeon (southern)	Of concern RE 11.8.11a	Watercourse RE 11.8.5	Watercourse RE 11.8.11	Watercourse RE 11.8.11a	Adaptive management trigger	Progress towards meeting manager objectives and any adaptive manager triggers
Minimise predation risk by pest animals to threatened fauna species within the offset area.	Dogs Foxes Cat			-		✓ ✓ ✓					 An increase in Catling Index from baseline and/or previous monitoring event, or An observed increase in the abundance or signs of predator pest species in the offset area, or Interim performance target for the squatter pigeon (southern) is not attained or a completion criteria is not attained and/or maintained. 	Lexington offset area Catling Index scores for all predator animal species were lower than base and the scores from the previous monitoring event. No corrective action triggered. Lexington Rail Loop offset area No pest animal monitoring required.
Minimise habitat degradation caused by pest animals in the offset site.	Pigs	Pest animal management will be undertaken across the offset site in accordance with Section 6.5 of the OMP.	~	~	~	~	~	~	*	×	 An increase in mean pig abundance score from baseline and/or previous monitoring event, or An observed increase in the abundance of (or signs of) pigs in the offset area, or Interim performance target for an offset matter is not attained or a completion criteria is not attained and/or maintained. 	 Lexington offset area Pig abundance scores from the dry sisurvey event were above baseline lewith evidence of pig activity being of in every plot. Pig abundance scores declined slightly in the post-wet sease surveys however was still above baselevels. Corrective action triggered. Lexington Rail Loop offset area No pest animal monitoring required.
	Rabbits		~	~	~	~	✓	~	1	*	 Rabbit impact category measured as 'monitor closely', or 'unacceptable', or An observed increase in the abundance of (or signs of) rabbits in the offset area, or Interim performance target for an offset matter is not attained or a completion criteria is not attained and/or maintained. 	Lexington offset area Three sites in both the dry and post- season surveys were categorised as 'unacceptable', which was an increase above baseline levels. Additionally, t was an increase in rabbit activity above baseline levels with evidence of rabbe being observed in 80% and 90% of the in the dry season post-wet season successed respectively. Corrective action triggered. Lexington Rail Loop offset area No pest animal monitoring required.



nent ement	Contingency response/corrective action required
pest	Lexington offset area N/A
line	
	<i>Lexington Rail Loop offset area</i> N/A
eason vels oserved on eline	Lexington offset area Undertake pig control in accordance with Section 6.5 of the OMP and Department of Agriculture and Fisheries (DAF) guidelines (Queensland Department of Agriculture and Fisheries 2020). Methods to be used could
	 IORUGE: 1080 baiting Trapping Pig proof fencing.
	Lexington Rail Loop offset area
	N/A
wet	Lexington offset area Implement an integrated rabbit control program in accordance with Section 6.5 of the OMP. Rabbit control to be
nere ive its ie plots	to October) using one or more control methods outlined in the DAF guidelines. Methods to be used could include:
rveys,	 Destroying (ripping) rabbit warrens
	 1080 baiting (outside of breeding periods – during the dry season) Eumigation
	 Trapping and/or Shooting.
	Lexington Rail Loop offset area

		Offse	t mana	gement	area a	nd relev	vant off	ⁱ set ma	tter			
Management objectives	Management actions	Natural Grasslands TEC	King blue-grass	Bluegrass	Squatter pigeon (southern)	Of concern RE 11.8.11a	Watercourse RE 11.8.5	Watercourse RE 11.8.11	Watercourse RE 11.8.11a	Adaptive management trigger	Progress towards meeting management objectives and any adaptive management triggers	Contingency response/corrective action required
												N/A
Control invasive weed species to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC.	Weed control will be undertaken in accordance with Section 6.6 of the OMP and weed hygiene restrictions will be implemented in accordance with Section 6.2 of the OMP.	×	✓	✓	*	*	✓	*	*	 An increase in the mean cover score of weed species from baseline and/or previous monitoring events, (refer to Section 7.4 of the OMP). An increase in weed cover and density from baseline and/or previous monitoring events as derived from photo monitoring results. New outbreaks of invasive weed species. Interim performance target for an offset matter is not attained or a completion criteria is not attained and/or maintained. 	Lexington offset area The average number of weed species and weed coverage during the dry season surveys was higher than that previously recorded during the dry season surveys in 2019. This is most likely attributed to unusually high rainfall received in the months from October to December 2021. Conversely, the average number of weed species and weed coverage during the post- wet season surveys was lower than the baseline surveys in 2018 and the previous post-wet surveys in 2020. This can be attributed to low rainfall over the summer wet season months (December to March) which most likely caused many the annual weeds to dieback. This is not to say that these species are not still in the soil seed bank, and they may reappear after sufficient rain. No corrective action triggered at this stage. Lexington Rail Loop offset area The average number of weed species recorded and weed coverage was significantly lower than previous monitoring events in 2020. No corrective action triggered.	Lexington offset area N/A Lexington Rail Loop offset area N/A
Minimise impact of livestock grazing on the condition of habitat for threatened species and vegetation communities including those that are representative of TEC.	Implementation of a strategic grazing regime in accordance with Section 6.8 of the OMP.	V	~	~	V	V	~	V	×	 Rainfall events cause inundation or waterlogging of soils. Photo monitoring standards indicate greater than 1,500 kg/ha of dry matter is present at the end of the dry season. There is less than 20% of the plant material present as when cattle entered. Cattle are observed within an offset area outside of strategic grazing event. Damaged fencing is observed permitting cattle to enter offset area outside of strategic grazing event. 	 Lexington offset area Average biomass levels during both the dry and post-wet season surveys exceed 1,500 kg/ha. Corrective action triggered. Lexington Rail Loop offset area Average biomass levels during both the dry and post-wet season surveys exceed 1,500 kg/ha. Corrective action triggered. 	Lexington offset area and Lexington Rail Loop offset area Amend stocking rates throughout offset site in accordance with Section 6.8 of the OMP. Focus of any grazing should be restricted to paddocks identified as containing highest biomass.



		Offset management area and relevant offset matter									
Management objectives	Management actions	Natural Grasslands TEC	King blue-grass	Bluegrass	Squatter pigeon (southern)	Of concern RE 11.8.11a	Watercourse RE 11.8.5	Watercourse RE 11.8.11	Watercourse RE 11.8.11a	Adaptive management trigger	Progress towards meeting manager objectives and any adaptive manag triggers
										Interim performance target for an offset matter is not attained or a completion criteria is not attained and/or maintained.	
Reduce the risk of adverse impacts by unplanned fire through fire management.		~	~	~	~	~	~	~	~	 An unplanned fire in the offset area. Photo monitoring standards indicate greater than 1,500 kg/ha of dry 	Unplanned fire or controlled burns a known to have occurred within the Lexington offset area nor the Lexing
										 matter is present at the end of the dry season. Controlled burns contrary to fire management guidelines for offset matters (refer to OMP). 	Loop offset area. Firebreaks were completed in July 2019. No mainten the firebreaks was undertaken durin 2021/2022 management period.
Improve the condition of habitat for threatened species and vegetation communities including those that are representative of TEC within offset areas through fire	Fire management across the offset site will be undertaken in accordance with Section 6.7 of the OMP.	✓	~	~	✓	~	~	~	✓	Interim performance target for an offset matter is not attained or a completion criteria is not attained and/or maintained.	Lexington offset area Average biomass levels during both and post-wet season surveys exceed 1,500 kg/ha. Corrective action triggered.
management.											Lexington Rail Loop offset area Average biomass levels during both and post-wet season surveys exceed 1,500 kg/ha. Corrective action triggered.



gement agement	Contingency response/corrective action required
s are not e ngton Rail enance of ring the	Lexington offset area and Lexington Rail Loop offset area Amend stocking rates throughout offset site in accordance with Section 6.8 of the OMP. Focus of any grazing should be restricted to paddocks identified as containing highest biomass.
th the dry eed	
th the dry eed	



7 PROGRESS TOWARD COMPLETION CRITERIA

Table 14 and Table 15 details progress of the Lexington offset area and Lexington Rail Loop offset area (respectively) in achieving the interim performance targets and performance criteria outlined in the OMP.

Offset matter	Relevant management objective	Interim performance target	Completion criteria	Progress to achieving criteria (Year 5)
Natural Grasslands TEC	 Minimise habitat degradation caused by pest animals (pigs and rabbits) within the offset area to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC. Control invasive weed species to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC. Minimise impact of livestock grazing on the condition of habitat and vegetation communities for the offset values. Reduce the risk of adverse impacts on habitat condition of the offset matters caused by unplanned fire and improve the condition of habitat and vegetation communities for the offset areas through fire management. 	 By 2027, increase condition of offset area to achieve 'good quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 of TSSC 2009), within a 0.1 ha quadrat with: at least three native perennial grass species from the list of perennial native grass indicator species, at least 200 native grass tussocks, total project canopy cover of shrubs is less than 50%, and perennial non-woody introduced species are less than 30% of the total project perennial plant cover. 	 Increase habitat quality score to 9 in accordance with the <i>Guide to Determining Terrestrial Habitat Quality</i> (Department of Environment and Heritage Protection [DEHP] 2017) by achieving the following scores for each ecological attribute including: Native plant species richness (grass) >90% of benchmark score of 11. Native plant species richness (forbs and other) >90% of benchmark score of 17. Native perennial grass cover (%)>90% of benchmark score of 43%. Organic litter cover (%) >50%-<200% of benchmark score of 13%. Non-native plant cover <5%. Attain and maintain 'best quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 of TSSC 2009), within a 0.1 ha quadrat with: at least four native perennial grass species from the list of perennial native grass indicator species, at least 200 native grass tussocks, total projected canopy cover of shrubs is less than 30%, and perennial non-woody introduced species are less than 5% of the total projected perennial plant cover. 	 Habitat condition assepart of 2021/2022 mains and the second secon
King blue-grass			 Increase habitat quality score to 9 in accordance with the <i>Guide to Determining Terrestrial Habitat Quality</i> (DEHP 2017) by achieving the following scores for each ecological attribute including: Native plant species richness (grass) >90% of benchmark score of 11. Native plant species richness (forbs and other) >90% of benchmark score of 17. Native perennial grass cover (%)>90% of benchmark score of 43%. Organic litter cover (%) >50%-<200% of benchmark score of 13%. Non-native plant cover <5%. And/or: Observed presence of king blue-grass species and/or population from >50% targeted flora survey sites (Section 7.3 of the OMP) 	 Habitat condition asserver not required to period (Year 5) monit INTERIM PERFORMAN Based on infor <i>Report – 2020</i>, Grasslands TEC status, with two neither 'best quotal projected >30%. COMPLETION CRITER Based on infor <i>Report – 2020</i>, score was only grass surveys (CO2 Australia)



g interim performance targets and completion

sessments were not required to be undertaken as nanagement period (Year 5) monitoring.

ANCE TARGET NOT MET

Armation presented in the *Lexington Offset Annual* D/21 (CO2 Australia 2021b), only two of the Natural EC plots achieved 'best quality' habitat condition wo achieving 'good quality' status, and one site quality' nor 'good quality' on account of it having a ed perennial non-woody introduced plant species

RIA NOT MET

ormation presented in the *Lexington Offset Annual* 0/21 (CO2 Australia 2021b), completion criteria not of the Natural Grasslands TEC plots have achieved condition class and the average habitat quality han 9.

sessments and targeted surveys for king blue-grass be undertaken as part of 2021/2022 management toring.

ANCE TARGET NOT MET

Armation presented in the *Lexington Offset Annual* D/21 (CO2 Australia 2021b), only two of the Natural EC plots achieved 'best quality' habitat condition wo achieving 'good quality' status, and one site quality' nor 'good quality' on account of it having a ed perennial non-woody introduced species cover

RIA NOT MET

Based on information presented in the *Lexington Offset Annual Report – 2020/21* (CO2 Australia 2021b), average habitat quality score was only 6, with results of the latest targeted king bluegrass surveys (undertaken as part of baseline surveys in 2018; CO2 Australia 2018), confirming only three of the 20 targeted flora survey sites supported king blue-grass.

Offset matter	Relevant management objective	Interim performance target	Completion criteria	Progress to achievin criteria (Year 5)
Bluegrass Squatter pigeon (southern)	 Minimise predation risk by wild dogs, foxes and cats to threatened fauna species within the offset area. Minimise habitat degradation caused by pest animals (pigs and rabbits) within the offset area to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC. Manage invasive weed species to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC. Manage invasive weed species to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC. Minimise impact of livestock grazing on the condition of habitat and vegetation communities for the offset values reduce the risk of adverse impacts on habitat condition of the offset matters caused by unplanned fire and improve the condition of habitat and vegetation communities for the offset matters within offset areas through fire management. 	By 2027, average perennial non-woody introduced species is less than 25% of the total projected perennial plant cover (i.e. BioCondition score for non-native plant cover ≥5).	 Increase habitat quality score to 9 in accordance with the <i>Guide to Determining Terrestrial Habitat Quality</i> (DEHP 2017) by achieving the following scores for each ecological attribute including: Native plant species richness (grass) >90% of benchmark score of 11. Native plant species richness (forbs and other) >90% of benchmark score of 17. Native perennial grass cover (%)>90% of benchmark score of 43%. Organic litter cover (%) >50%-<200% of benchmark score of 13%. Non-native plant cover <5%. And/or: Observed presence of bluegrass species and/or population from >50% of targeted flora survey sites (Section 7.3 of the OMP). Increase habitat quality score to 9 in accordance with the <i>Guide to Determining Terrestrial Habitat Quality</i> (DEHP 2017) based on RE 11.8.11, 11.8.4, 11.8.5, 11.8.11a and 11.4.9, including non-native plant cover <5%. Maintenance of a ground layer cover (native, perennial tussock grasses or a mix of perennial tussock grasses and low shrubs or forbs) <33% (Department of the Environment and Energy 2015). 	 Habitat condition ass not required to be un period (Year 5) monit INTERIM PERFORMA Based on inform Report – 2020 Grasslands TE status, with two neither 'best of total projecter 30%. COMPLETION CRITER Based on inform Report – 2020 score was only surveys (under Australia 2018 any of the 20 Habitat condition ass part of 2021/2022 merican INTERIM PERFORMA Based on inform Report – 2020 species occup sites. COMPLETION CRITER Based on inform Report – 2020 species occup sites.
Of concern RE 11.8.11a (BVG 21b)	Minimise habitat degradation caused by pest animals (pigs and rabbits) within the offset area to reduce impacts on habitat for threatened species and vegetation communities including those that are	By 2027, achieve habitat quality score of 8.	Achieve and maintain habitat quality score of 9 by 2037.	INTERIM PERFORMA Based on info Report – 2020 score for of co
Watercourse RE 11.8.5 (BVG 11a)	 representative of TEC. Manage invasive weed species to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of 	By 2027, achieve habitat quality score of 9.	Achieve and maintain habitat quality score of 10 by 2037.	INTERIM PERFORMA Based on info Report – 2020 score for wate
Watercourse RE 11.8.11 (BVG 30b)	 TEC. Minimise impact of livestock grazing on the condition of habitat and vegetation communities for the offset values. 	By 2027, achieve habitat quality score of 9.	Achieve and maintain habitat quality score of 10 by 2037.	INTERIM PERFORMA Based on info Report – 2020 score for wate



g interim performance targets and completion

sessments and targeted surveys for bluegrass were ndertaken as part of 2021/2022 management itoring.

ANCE TARGET NOT MET

ormation presented in the *Lexington Offset Annual* 0/21 (CO2 Australia 2021b), only two of the Natural EC plots achieved 'best quality' habitat condition wo achieving 'good quality' status, and one site quality' nor 'good quality' on account of it having a ed perennial non-woody introduced species cover >

RIA NOT MET

ormation presented in the *Lexington Offset Annual* 0/21 (CO2 Australia 2021b), average habitat quality ly 6, with results of the latest targeted bluegrass ertaken as part of baseline surveys in 2018; CO2 8), not confirming any bluegrass populations from targeted flora survey sites.

sessments were not required to be undertaken as nanagement period (Year 5) monitoring.

ANCE TARGET NOT MET

ormation presented in the *Lexington Offset Annual* 0/21 (CO2 Australia 2021b), non-woody introduced pied more than 25% of projected plant cover at all

RIA NOT MET

ormation presented in the *Lexington Offset Annual* 0/21 (CO2 Australia 2021b), average habitat quality atter pigeon (southern) was only 7.

ANCE TARGET NOT MET

ormation presented in the *Lexington Offset Annual* 0/21 (CO2 Australia 2021b), average habitat quality oncern RE 11.8.11a offset management area is 6.

ANCE TARGET NOT MET

ormation presented in the *Lexington Offset Annual* 0/21 (CO2 Australia 2021b), average habitat quality sercourse RE 11.8.5 offset management area is 8.

ANCE TARGET NOT MET

ormation presented in the *Lexington Offset Annual* 0/21 (CO2 Australia 2021b), average habitat quality rercourse RE 11.8.11 offset management area is 7.

Offset matter	Relevant management objective	Interim performance target	Completion criteria	Progress to achieving criteria (Year 5)
Watercourse RE 11.8.11a (BVG 21b)	Reduce the risk of adverse impacts on habitat condition of the offset matters caused by unplanned fire and improve the condition of habitat and vegetation communities for the offset matters within offset areas through fire management.	By 2027, achieve habitat quality score of 8.	Achieve and maintain habitat quality score of 9 by 2037.	INTERIM PERFORMAN Based on infor average habita management a



g interim performance targets and completion

ANCE TARGET NOT MET

rmation presented in this current annual report, at quality score for watercourse RE 11.8.11a offset area is 6.

Offset			Completion criteria			Pro
matter	Relevant management objective	Interim performance target	North Promenade Paddock	Harry's Paddock	Contours Paddock	and
matter Natural Grasslands TEC	 Relevant management objective Minimise habitat degradation caused by pest animals (pigs and rabbits) within the offset area to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC. Control invasive weed species to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC. Minimise impact of livestock grazing on the condition of habitat and vegetation communities for the offset values. Reduce the risk of adverse impacts on habitat condition of the offset matters caused by unplanned fire and improve the condition of habitat and vegetation communities for the offset matters within offset areas through fire management. 	 At Contours and North Promenade Paddocks, by 2029, increase condition of offset area to achieve 'best quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 of TSSC 2009). At Harry's Paddock, by 2029, increase condition of offset area to achieve 'good quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 of TSSC 2009). 	 North Promenade Paddock By 2039, increase habitat quality score to 9 in accordance with the <i>Guide to Determining Terrestrial Habitat Quality</i> (DEHP 2014) by achieving the following scores for each ecological attribute including: Native plant species richness (grass) >90% of benchmark score of 11. Native plant species richness (forbs and other) >90% of benchmark score of 17. Native perennial grass cover (%)>90% of benchmark score of 43%. Organic litter cover (%) >50%-<200% of benchmark score of 13%. Non-native plant cover <5%. Attain and maintain 'best quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 of TSSC 2009), within a 0.1 ha quadrat with: at least four native perennial grass species from the list of perennial native grass indicator species, at least 200 native grass tussocks, total projected canopy cover of shrubs is less than 30%, and 	 Harry's Paddock By 2039, increase habitat quality score to 8 in accordance with the <i>Guide to Determining Terrestrial Habitat Quality</i> (DEHP 2014) by achieving the following scores for each ecological attribute including: Native plant species richness (grass) >80% of benchmark score of 11. Native plant species richness (forbs and other) >80% of benchmark score of 17. Native perennial grass cover (%) >80% of benchmark score of 43%. Organic litter cover (%) >50%-<200% of benchmark score of 13%. Non-native plant cover <5%. Attain and maintain 'best quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 of TSSC 2009), within a 0.1 ha quadrat with: at least four native perennial grass species from the list of perennial native grass indicator species, at least 200 native grass tussocks, total projected canopy cover of shrubs is less than 30%, and 	Contours Paddock By 2039, increase habitat quality score to 9 in accordance with the <i>Guide to Determining Terrestrial</i> <i>Habitat Quality</i> (DEHP 2014) by achieving the following scores for each ecological attribute including: Native plant species richness (grass) >90% of benchmark score of 11. Native plant species richness (forbs and other) >90% of benchmark score of 17. Native perennial grass cover (%)>90% of benchmark score of 43%. Organic litter cover (%) >50%-<200% of benchmark score of 13%. Non-native plant cover <5%. Attain and maintain 'best quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 TSSC 2009), within a 0.1 ha quadrat with: at least four native perennial grass species from the list of perennial native grass indicator species, at least 200 native grass tussocks, total projected canopy cover of shrubs is less than 30%, and perennial non-woody introduced canopy	апо <i>No.</i> INT CO <i>Ha.</i> INT CO <i>Co</i> INT
			introduced species are less than 5% of the total projected perennial plant cover.	introduced species are less than 5% of the total projected perennial plant cover.	introduced species are less than 5% of the total projected perennial plant cover.	со
King blue- grass			By 2039, increase habitat quality score to 9 in accordance with the <i>Guide to Determining Terrestrial</i> <i>Habitat Quality</i> (DEHP 2014) by achieving the following scores for	By 2039, increase habitat quality score to 8 in accordance with the <i>Guide to Determining Terrestrial</i> <i>Habitat Quality</i> (DEHP 2014) by achieving the following scores for	By 2039, increase habitat quality score to 9 in accordance with the <i>Guide to Determining Terrestrial</i> <i>Habitat Quality</i> (DEHP 2014) by achieving the following scores for	No INT



ogress to achieving interim performance targets ad completion criteria (year 3)

orth Promenade Paddock

TERIM PERFORMANCE TARGET NOT MET

Based on information presented in the current annual report, one Natural Grasslands TEC plot in the North Promenade Paddock achieved 'best' condition while the other did not meet the criteria for 'good' or 'best' condition classes according to the approved Commonwealth Listing Advice (TSSC 2009). This was due to the high weed cover (weed cover <30%).</p>

OMPLETION CRITERIA NOT MET

Based on information presented in the current annual report, the average habitat quality score for Natural Grasslands TEC in the North Promenade Paddock plots was 8.7.

arry's Paddock

TERIM PERFORMANCE TARGET MET

Based on information presented in the current annual report, both Natural Grasslands TEC plots in Harry's Paddock achieved 'good quality' habitat condition status.

OMPLETION CRITERIA NOT MET

Based on information presented in the current annual report, the average habitat quality score for Natural Grasslands TEC in the Harry's Paddock plots was 7.5.

ontours Paddock

TERIM PERFORMANCE TARGET NOT MET

Based on information presented in the current annual report, two Natural Grasslands TEC plots in the Contours Paddock achieved 'good' condition while one plot did not meet the criteria for 'good' or 'best' condition classes according to the approved Commonwealth Listing Advice (TSSC 2009). This was due to the low number of perennial indicator grass species (>3 perennial indicator grass species).

OMPLETION CRITERIA NOT MET

Based on information presented in the current annual report, the average habitat quality score for Natural Grasslands TEC in the Contours Paddock plots was 8.01.

orth Promenade Paddock

ITERIM PERFORMANCE TARGET NOT MET

 Based on information presented in the current annual report, one Natural Grasslands TEC plot
Offset	Polovant management objective	Interim performance target	Completion criteria			Pro
matter	Relevant management objective		North Promenade Paddock	Harry's Paddock	Contours Paddock	an
			 each ecological attribute including: Native plant species richness (grass) >90% of benchmark score of 11. Native plant species richness (forbs and other) >90% of benchmark score of 17. Native perennial grass cover (%)>90% of benchmark score of 43%. Organic litter cover (%) >50%-<200% of benchmark score of 13%. Non-native plant cover <5%. And/or: Observed presence of king blue-grass species and/or population from >50% targeted flora survey sites. 	 each ecological attribute including: Native plant species richness (grass) >80% of benchmark score of 11. Native plant species richness (forbs and other) >80% of benchmark score of 17. Native perennial grass cover (%)>80% of benchmark score of 43%. Organic litter cover (%) >50%-<200% of benchmark score of 13%. Non-native plant cover <5%. And/or: Observed presence of king blue-grass species and/or population from >50% targeted flora survey sites. 	 each ecological attribute including: Native plant species richness (grass) >90% of benchmark score of 11. Native plant species richness (forbs and other) >90% of benchmark score of 17. Native perennial grass cover (%)>90% of benchmark score of 43%. Organic litter cover (%) >50%-<200% of benchmark score of 13%. Non-native plant cover <5%. And/or: Observed presence of king blue-grass species and/or population from >50% targeted flora survey sites. 	



ogress to achieving interim performance targets Id completion criteria (year 3)

in the North Promenade Paddock achieved 'best' condition while the other did not meet the criteria for 'good' or 'best' condition classes according to the approved Commonwealth listing advice (TSSC 2009). This was due to the high weed cover (weed cover <30%).

OMPLETION CRITERIA NOT MET

Based on information presented in the current annual report, the average habitat quality score for king blue-grass in the North Promenade Paddock plots was only 6.93.

arry's Paddock

ITERIM PERFORMANCE TARGET MET

Based on information presented in the current annual report, both Natural Grasslands TEC plots in Harry's Paddock achieved 'good quality' habitat condition status.

DMPLETION CRITERIA NOT MET

Based on information presented in the current annual report, the average habitat quality score for king blue-grass in the Harry's Paddock plots was 6.

ontours Paddock

ITERIM PERFORMANCE TARGET NOT MET

Based on information presented in the current annual report, two Natural Grasslands TEC plots in the Contours Paddock achieved 'good' condition while one plot did not meet the criteria for 'good' or 'best' condition classes according to the approved Commonwealth Listing Advice (TSSC 2009). This was due to the low number of perennial indicator grass species (>3 perennial indicator grass species).

OMPLETION CRITERIA NOT MET

Based on information presented in the current annual report, the average habitat quality score for king blue-grass in the Contours Paddock plots was 6.4.



8 THREATS TO OFFSET MATTERS

Threats to offset matters at the Lexington offset area have not changed since the development of the original OMP in 2018, with similar comparable threats to offset matters in the Lexington Rail Loop offset area.

Results of the dry season and post-wet season pest animal surveys during the 2021/2022 management period indicate the continuing threat of pest animals to the offset matters. This includes the confirmed presence of feral pigs, European rabbits and brown hares, which are known to have the potential to impact all MNES (Lexington offset area and Lexington Rail Loop offset area) and MSES (Lexington offset area) through habitat degradation. Ongoing management activities will include control of these pest animal species.

While the most recent post-wet season weed surveys undertaken in March 2022 recorded the lowest levels of weed species and weed coverage to date, this is most likely due to the low rainfall over the summer wet season months resulting in a dieback of weed species. This is not to say that these species are not still in the soil seed bank, and they may reappear after sufficient rain. As such there is a continued threat of weeds throughout the offset area.

Fire continues to be a recognised threat to the offset management area; however, as there has been no unplanned fire within the offset management period to date, fire management activities will continue to be implemented in accordance with the OMP to minimise risk of unplanned fire.

Ongoing management and monitoring activities will provide an indication of the efficacy of management towards meeting interim performance targets, with the intention to progress toward meeting the completion criteria for all MSES and MNES as stipulated in the OMP.



9 AMENDMENTS TO OMP

In accordance with the principles of adaptive management, the OMP is reviewed annually based on outcomes of monitoring and amended (if required) to incorporate changes identified through management activities, regular site visits and monitoring activities. This may include the revision of current management actions, identification of additional activities (including monitoring activities) and responses to adaptive management triggers, other environmental threats to the offset site, or information obtained through research programs. This approach facilitates an ongoing cycle of implementation, learning and review.

The following amendments are to be made to the OMP:

- Amend Table 21 to exclude requirement for baseline pest animal survey and ongoing pest animal monitoring associated with the Rail Loop offset area, given Section 7.5 of the OMP states "Pest animal monitoring plots are not required at the three offset sites established for the Rail Loop project."
- The North Promenade Paddock boundary contributing to the Lexington Rail Loop offset area currently overlaps with the existing Lexington offset area (refer to Figure 11). It is recommended that the proponent confirms there are sufficient offsets secured for the two projects approved by EPBC 2013/6799 and EPBC 2019/8482.
- Update all maps with updated fencing and access tracks presented in post-wet season monitoring report (CO2 Australia 2022; Appendix B).



Figure 11: Location of overlap (blue ellipse) erroneously established between Lexington offset area (EPBC 2013/6799) and Lexington Rail Loop offset area (EPBC 2019/8482).



10 REFERENCES

CO2 Australia (2018). *Lexington Offset Area Initial Baseline Monitoring*. A report prepared for Sojitz Mining Pty Ltd. CO2 Australia Limited, Brisbane.

CO2 Australia (2021a). *Dry Season Monitoring Report (2021/22)*. A report prepared for Sojitz Mining Pty Ltd. CO2 Australia Limited, Brisbane.

CO2 Australia (2021b). *Lexington Offset Annual Report – 2020/21*. A report prepared for Sojitz Mining Pty Ltd. CO2 Australia Limited, Brisbane.

CO2 Australia (2022). *Post-wet Season Monitoring Report (2021/22)*. A report prepared for Sojitz Mining Pty Ltd. CO2 Australia Limited, Brisbane.

Cooke, B., McPhee, S., and Hart, Q. (2008). *Rabbits: A threat to conservation and natural resources management. How to rapidly assess a rabbit problem and take action*. Bureau of Rural Sciences, Canberra. Available from: <u>https://www.wool.com/globalassets/wool/sheep/pest-animals/rabbits/rabbits booklet lr final.pdf</u>

Department of Environment and Heritage Protection (DEHP). (2017). *Guide to determining terrestrial habitat quality – version 1.2.* Department of Environment and Heritage Protection (State of Queensland), Brisbane.

Queensland Department of Agriculture and Fisheries (2020) Feral Pig Factsheet. Available from: https://www.daf.qld.gov.au/ data/assets/pdf_file/0005/70925/feral-pig.pdf

Queensland Herbarium (2021). *Regional Ecosystem Description Database (REDD). Version 12 (March 2021)*. Queensland Government (Department of Environment and Science), Brisbane.

Sojitz Coal Mining Pty Ltd (Sojitz) (2019). *Offset Management Plan for Lexington – Meteor Downs South Project*. Report prepared for Sojitz Coal Mining Pty Ltd.

Threatened Species Scientific Committee (TSSC) (2009). *Commonwealth Listing Advice on Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin*. Department of the Environment, Water, Heritage and the Arts.



APPENDIX A DRY SEASON MONITORING REPORT (2021/22) – CO2 AUSTRALIA 2021A





Dry Season Monitoring Report (2021/22)

Australian Carbon Industry **Code of Conduct**

Year 5

- MDS Project site
- Lexington offset site
- Year 3
 - MDS Rail Loop site
 - Lexington Rail Loop offset site

Meteor Downs South Coal Mine Project

Sojitz Blue Pty Ltd





APPROVALS

Rev	Date	Description
0	3 February 2022	Draft report issued to client

	Name	Position	Date
ORIGINATORS	Dean Orrick Briana Clifton	Ecologist Environmental Scientist	3 February 2022
APPROVER	Dr Jarrad Cousin	Head of Ecosystem Markets and Innovation	3 February 2022

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CONTENTS

1	Intr	oduct	ion	1	
	1.1	MDS	Project and corresponding offsets	1	
	1.2	MDS	Rail Loop and corresponding offsets	2	
2	Me	thodo	logy	5	
	2.1	Moni	toring locations	5	
	2.2	Habit	at condition assessment (MDS Project Site only)	18	
	2.3	Photo	monitoring (MDS Project site only)	18	
	2.4	Pest a	nimal monitoring (MDS Project site and Lexington offset site)	18	
	2.5	Weed	monitoring (all sites)	21	
	2.6	Bioma	ass monitoring for fire management (All sites)	22	
	2.7	Gene	ral site inspections (All sites)	22	
3	Res	ults: N	ADS Project site	23	
	3.1	Habit	at condition assessment	23	
	3.2	Photo	monitoring	25	
	3.3	Pest a	inimal monitoring	25	
	3.4	Weed	monitoring	33	
	3.5	Bioma	ass monitoring	36	
	3.6	Gene	ral site inspection	36	
4	Res	ults: N	MDS Rail Loop Site	38	
	4.1	Weed	monitoring	38	
	4.2	Bioma	ass monitoring	41	
	4.3	Gene	ral site inspection	41	
5	Res	ults: L	exington offset site	42	
	5.1	Pest a	inimal monitoring	42	
	5.2	Weed	monitoring	49	
	5.3	Bioma	ass monitoring	52	
	5.4	Gene	ral site inspection	53	
6	Res	ults: L	exington Rail Loop offset site	54	
	6.1	Weed	monitoring	54	
	6.2	Bioma	ass monitoring	58	
	6.3	Gene	ral site inspection	58	
7	Ref	erenc	es	60	
Ар	pendi	хА	Monitoring site locations	A-1	
Ар	pendi	хВ	MDS Project site Year 5 habitat condition assessment	B-1	
Ар	pendi	хC	MDS Project site photo monitoring	C-1	
Ар	pendi	хD	MDS Project rail loop site photo monitoring	D-1	
Ар	Appendix E Lexington offset site photo monitoring E-11				
Ар	pendi	хF	Lexington rail loop offset site photo monitoring	F-45	

TABLES

Table 1: Summary of MDS Project and offset site biodiversity monitoring requirements.

1



Table 2: Summary of MDS Rail Loop site and Lexington Rail Loop offset site biodiversity monitoring requirements.	2
Table 3: Monitoring locations at the MDS Project site, surveyed as part of the 2021/22 dry season surveys	7
Table 4: Monitoring locations at the MDS Rail Loop site, surveyed as part of the 2021/22 dry season survey	/S.
	10
Table 5: Monitoring locations at the Lexington offset site, surveyed as part of the 2021/22 dry season	
surveys.	12
Table 6: Monitoring locations at the Lexington Rail Loop offset site, surveyed as part of the 2021/22 dry	
season surveys.	15
Table 7: Calculation of corrected regeneration score.	19
Table 8: MDS Project site habitat monitoring sites: site condition and site context scores calculated in	
accordance with the Guide to determining terrestrial habitat quality (DEHP 2017).	23
Table 9: MDS Project site monitoring sites showing their habitat condition scores contributing to MNES.	23
Table 10: Natural Grasslands TEC indicator species.	24
Table 11: Assessment of overall rabbit impact at the MDS Project site	25
Table 12: Assessment of overall feral pig presence and activity at the MDS Project site*	28
Table 13: Pest animal results for the Project site	30
Table 14: MDS Project site weed monitoring results	34
Table 15: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture	
photo standards.	36
Table 16: MDS Rail Loop weed assessment results	39
Table 17: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture	
photo standards.	41
Table 18: Assessment of overall rabbit impact at the Lexington offset site	42
Table 19: Assessment of overall feral pig presence and activity at the Lexington offset site*	44
Table 20: Pest animal results from the Lexington offset site	46
Table 21: Lexington offset site weed assessment results	50
Table 22: Results of biomass monitoring on the Lexington offset site using Brigalow Belt Future Beef pastu	re
photo standards.	52
Table 23: Lexington Rail Loop weed assessment results	55
Table 24: Results of biomass monitoring on the Lexington Rail Loop offset site using Brigalow Belt Future	
Beef pasture photo standards.	58

FIGURES

Figure 1: Location of MDS Project, MDS Rail Loop, Lexington offset and Lexington Rail Loop offset sites	4
Figure 2: MDS Project monitoring sites – north	8
Figure 3: MDS Project monitoring sites – south	9
Figure 4: MDS Rail Loop monitoring sites	11
Figure 5: Lexington offset monitoring sites – west	13
Figure 6: Lexington offset monitoring sites – east	14
Figure 7: Lexington Rail Loop offset monitoring sites - west	16
Figure 8: Lexington Rail Loop offset monitoring sites – east	17
Figure 9: Calculation of overall rabbit impact based on rabbit abundance score and corrected regeneration	on
score.	20
Figure 10: MDS evidence of rabbits/hares	27
Figure 11: MDS evidence of feral pigs	29
Figure 12: Feral dog (Canis familiaris/lupus) captured at fauna camera 05 at the MDS Project site	31
Figure 13: European rabbit (Oryctolagus cuniculus) captured at fauna camera 11 at the MDS Project site	31
Figure 14: MDS pest animal results	32
Figure 15: MDS weed monitoring results	35
Figure 16: MDS Rail Loop weed monitoring results	40



Figure 17: Lexington evidence of rabbits/hares	43
Figure 18: Lexington offset site evidence of feral pigs	45
Figure 19: Feral cat (<i>Felis catus</i>) captured at fauna camera C06 at the Lexington offset site	47
Figure 20: Brown hare (Lepus europaeus) captured at fauna camera C08 at the Lexington offset site	47
Figure 21: Lexington offset site pest animal results	48
Figure 22: Lexington offset site weed monitoring results	51
Figure 23: Lexington Rail Loop weed monitoring results – west	56
Figure 24: Lexington Rail Loop weed monitoring results – east	57



1 INTRODUCTION

U&D Mining Industry (Australia) Pty (U&D) has approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to develop and operate the Meteor Downs South (MDS) Coal Mine Project (the MDS Project) (Figure 1). U&D is in a joint venture with Sojitz Blue Pty Ltd (Sojitz Blue) to develop and operate the MDS Project.

1.1 MDS PROJECT AND CORRESPONDING OFFSETS

Under the Project EPBC Act approval (EPBC 2013/6779), the MDS Project has prepared the following documents:

- Matters of National Environmental Significance Management Plan (MNESMP)
 - to address EPBC 2013/6779 conditions 2, 3 and 4 with respect to the direct and indirect impacts of the MDS Project on matters of national environmental significance (MNES) at the MDS Project site
- Offset Management Plan (OMP)
 - to address EPBC 2013/6779 conditions 5 and 6 with respect to environmental offsets at the Lexington offset site (Figure 1) for significant residual impacts of the MDS Project on MNES and matters of state environmental significance (MSES)

The MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 1. The baseline (Year 1) management periods for the MDS Project site and the Lexington offset site are considered to be June 2017 – June 2018 (Project site) and October 2017 – October 2018 (Lexington offset site).

The current report incorporates the Year 5 (2021/2022) dry season monitoring report for both the MDS Project site and the Lexington offset site.

	Site	Monitoring activity	Management plan	Frequency	Timing
		General site inspection	MNESMP Section 13.2	Biannually	End of the dry season and end of the wet season
		Habitat condition assessment	MNESMP Section 13.3	Annually	Dry season
		Photo monitoring	MNESMP Section 13.4	Annually	
	MDS Project	Targeted surveys for king blue-grass and bluegrass	MNESMP Section 13.5	Annually	End of the wet season and/or when most detectable
sit	Site	Habitat availability assessment for Australian painted snipe	MNESMP Section 13.6	Every 2 years	Wet season or following inundation event
		Pest animal monitoring	MNESMP Section 13.7	Every 2 years	Dry season and post-wet
		Weed monitoring	MNESMP Section 13.8	Every 2 years	Season
		Biomass monitoring	MNESMP Section 13.9	Biannually	Post wet and dry season



Site	Monitoring activity	Management plan	Frequency	Timing
	General offset site monitoring	OMP Section 7.1	Annual	Post-wet season
	Habitat condition assessment and photo monitoring	OMP Section 7.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2037	Post-wet season
Lexington offset site	Weed monitoring	OMP Section 7.4	Every 2 years	Dry season and post-wet season
	Pest animal monitoring	OMP Section 7.5	Every 2 years (dry season and post wet season surveys)	Dry season and post-wet season
	Biomass monitoring	OMP Section 7.6	Biannually	Post wet season prior to and during grazing events

1.2 MDS RAIL LOOP AND CORRESPONDING OFFSETS

In December 2019, Sojitz Blue received approval under the EPBC Act to develop and operate the Meteor Downs South Mine Rail Loop (MDS Rail Loop). Under the Project EPBC Act approval (EPBC 2019/8482), Sojitz Blue has prepared the following documents:

- Matters of National Environmental Significance Management Plan (Rail Loop MNESMP)
 - to address EPBC 2019/8482 condition 6 with respect to the direct and indirect impacts of the MDS Rail Loop project on matters of national environmental significance (MNES) at the MDS Rail Loop site
- Offset Management Plan (amendment to the OMP to incorporate the Rail Loop offsets)
 - to address EPBC 2019/8482 conditions 2, 3, 4 and 5 with respect to environmental offsets at the Lexington Rail Loop offset site (Figure 1) for significant residual impacts of the MDS Rail Loop on MNES.

The Rail Loop MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 2. The baseline management periods for the MDS Rail Loop site and the corresponding Lexington Rail Loop offset site are considered to be December 2019 - June 2020, with the current report incorporating the Year 3 (2021/2022) dry season monitoring report for both the MDS Rail Loop site and the Lexington Rail Loop offset site.

Site	Monitoring activity	Management plan	Frequency	Timing
	General site inspection	Rail Loop MNESMP Section 7.2	Biannually	End of the dry season and end of the wet season
MDS Rail Loop site	Habitat quality assessments and photo monitoring	Rail Loop MNESMP Section 7.3	Annually	Death und anotae
	Targeted surveys for king blue-grass	Rail Loop MNESMP Section 7.4	Annually	Post-wet season

Table 2: Summary of MDS Rail Loop site and Lexington Rail Loop offset site biodiversity monitoring requirements.



Site	Monitoring activity	Management plan	Frequency	Timing
	Weed monitoring	Rail Loop MNESMP Section 7.5	Biannually within habitat quality assessment plots Every 2 years at each of the weed monitoring plots	End of the dry season and post- wet season
	Biomass monitoring for fire management	Rail Loop MNESMP Section 7.6	Biannually	End of the dry season and end of the wet season
	General offset site monitoring	OMP Section 7.1	Annually	Post-wet season
	Habitat condition assessment and photo monitoring	OMP Section 7.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2039	Post-wet season
Lexington Rail Loop offset site	King blue-grass surveys	OMP Section 7.3	Every 5 years from baseline (2019)	End of the wet season and/or when most detectable
	Weed monitoring	OMP Section 7.4	Baseline in 2020 (Year 1), then every 2 years	Dry season and post-wet season
	Biomass monitoring	OMP Section 7.6	Biannually	Post wet season prior to and during grazing events





2 METHODOLOGY

Field surveys were undertaken by two tertiary-qualified ecologists (Dean Orrick and Simon Danielsen) between 7 – 16 December 2021. Permanent monitoring sites were established at the MDS Project site and Lexington offset site as part of the baseline surveys carried out between December 2017 and April 2018, detailed in the following:

- MNESMP Baseline Monitoring Report Meteor Downs South Coal Mine Project. A report prepared by CO2 Australia in 2017 (CO2 Australia 2017) – baseline monitoring sites established in December 2017
- Lexington Offset Area Initial Baseline Monitoring Report Meteor Downs South. A report prepared by CO2 Australia in 2018 (CO2 Australia 2018) – baseline monitoring sites established in April 2018.

Permanent monitoring sites for the MDS Rail Loop site and the Lexington Rail Loop offset site were established as part of baseline surveys carried out during post-wet season field surveys in June/July 2020, and detailed in the following report:

Post-wet Season Monitoring Report – Year 3 (2019/20). A report prepared by CO2 Australia in 2020 (CO2 Australia 2020) – baseline monitoring sites established in June/July 2020.

2.1 MONITORING LOCATIONS

2.1.1 MDS Project site

Dry season monitoring activities at the MDS Project site comprised:

- Habitat condition assessments
- Photo monitoring
- Pest animal monitoring
- Weed monitoring
- Biomass monitoring
- General site inspection

Table 3 shows activities at each monitoring location at the MDS Project site. A total of 43 permanent sites/plots were monitored across the balance of ML70452 outside of the MDS project site (refer to Figure 2 and Figure 3). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 3), according to the following:

- 10 x habitat monitoring sites (100 m x 50 m)
 - collocated with weed and rabbit monitoring plots (Sites 01 10)
- 30 x photo monitoring sites
 - established at 0 m and 50 m points along 100 m habitat monitoring transect (Sites 01 10) and at SW corner of weed monitoring plots (Sites 11 – 20)
- pest animal monitoring
 - 10 x rabbit monitoring plots (2 ha)
 - collocated with habitat monitoring sites and weed monitoring plots (Sites R01 R10)
 - 8 x pig monitoring plots (15 ha) (Sites P01 P08)



- 15 x pest animal fauna camera stations (Sites C01 C15)
 - Located throughout the site adjacent to existing access tracks
 - Replaced the 20 x sand track stations employed previously
- 20 x weed monitoring plots (1 ha)
 - partly collocated with weed and rabbit monitoring plots (Sites 01 10), with remaining 10 sites
 (Sites 11 20) standalone weed monitoring plots
- 20 x biomass monitoring sites
 - Established at 0 m point along 100 m habitat monitoring transect (Sites 01 10) and at SW corner of weed monitoring plots (Sites 11 – 20)

At each of the 10 habitat monitoring sites (Sites 01 - 10), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At each of the remaining 10 standalone weed monitoring plots (Sites 11 - 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-1 in Appendix A for detailed locations of each of the monitoring sites at the MDS Project site.



				Habitat mo	Habitat monitoring					Pest anir	nal monit	nitoring			
Site	Photo monitoring	Biomass monitoring	Weed monitoring	Brigalow TEC	Natural Grasslands TEC	King blue- grass	Bluegrass	Squatter pigeon	Australian painted snipe	Rabbit plot	Feral pig plot	Fauna camera			
01	✓	✓	✓					~		✓					
02	✓	✓	\checkmark		✓	~	✓			~					
03	~	~	\checkmark					✓		~					
04	✓	✓	✓		✓	~	✓			~					
05	✓	✓	✓					✓		~					
06	✓	✓	✓		✓	~	✓			~					
07	✓	✓	✓	✓						~					
08	✓	✓	✓		✓	~	✓			~					
09	✓	✓	✓						✓	~					
10	✓	✓	✓					✓		~					
11 – 20	✓		~												
P01															
– P08											~				
C01															
_ C15												v			

Table 3: Monitoring locations at the MDS Project site, surveyed as part of the 2021/22 dry season surveys.







2.1.2 MDS Rail Loop site

Dry season monitoring activities at the MDS Rail Loop site comprised:

- Weed monitoring
- Biomass monitoring
- General site inspection

Table 4 shows activities at each monitoring location established at the MDS Rail Loop site. A total of five permanent monitoring sites/plots were monitored (refer to Figure 4). While the Rail Loop MNESMP (SLR 2019) stipulated one of the weed monitoring plots to be established in the *Leucaena* plantation, consultation with Sojitz Blue indicated the safety issues related to monitoring sites within the centre of the rail loop requiring crossing of the rail line. Instead, all plots were established on the outside of the rail loop (refer to Figure 4). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 4), according to the following:

- 5 x weed monitoring plots (1 ha)
 - collocated with the habitat monitoring sites (Sites MDSRL01 MDSRL04), with a single standalone weed monitoring plot (Site MDSRL05)
- 4 x biomass monitoring sites
 - assessed from the 50 m point of the habitat monitoring transect at each of the four habitat monitoring sites (Sites MDSRL01 – MDSRL04),

At each of the 4 biomass monitoring sites (Sites MDSRL01 – MDSRL04), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m habitat monitoring transect. At the single standalone weed monitoring plot (Site MDSRL05), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-2 in Appendix A for detailed locations of each of the monitoring locations at the MDS Rail Loop site.

Table 4: Monitoring locations at the MDS Rail Loop site, surveyed as part of the 2021/22 dry season surveys.

Site	Weed monitoring	Biomass monitoring
MDSRL01 – MDSRL04	\checkmark	~
MDSRL05	\checkmark	





2.1.3 Lexington offset site

Dry season monitoring activities at the offset site comprised:

- Pest animal monitoring
- Weed monitoring
- Biomass monitoring
- General offset site monitoring

Table 5 shows activities at each monitoring location at the offset site. A total of 43 permanent monitoring sites/plots were monitored across the offset site. Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 5, Figure 5 and Figure 6), according to the following:

- Pest animal monitoring
 - 10 x rabbit monitoring plots (2 ha)
 - collocated with 10 of the habitat monitoring sites (Sites 01-05, 07-08, 10-11 and 13) and weed monitoring plots
 - 8 x pig monitoring plots (15 ha) (Sites P01 P08)
 - 15 x pest animal fauna camera stations (Sites C01 C15)
 - fauna camera stations were established along pest animal survey tracks
- 20 x weed monitoring plots (1 ha)
 - 13 sites collocated at all habitat monitoring sites (Sites 01 13),
 - 7 sites (Sites 14 20) standalone weed monitoring plots
- 20 x biomass monitoring sites
 - 13 established at the 0 m point along the 100 m habitat monitoring transects (Sites 01 13)
 - 7 at SW corner of weed monitoring plots (Sites 14 20)

At each of the 13 habitat monitoring sites (Sites 01 - 13), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At each of the standalone weed monitoring plots (Sites 14 - 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-3 in Appendix A for detailed locations of each of the monitoring sites at the Lexington offset site.

Table 5: Monitoring locations at the Lexington offset site, surveyed as part of the 2021/22 dry season surveys.

			Pest animal monitoring				
Site	Biomass monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna cameras		
01 - 20	\checkmark	~	√*				
P01 - P08				✓			
C01 – C15					~		

* includes Sites 01-05, 07-08, 10-11 and 13







2.1.4 Lexington Rail Loop offset site

Dry season monitoring activities at the Lexington Rail Loop offset site comprised monitoring of the following:

- General offset site monitoring
- Weed monitoring
- Biomass monitoring

Table 6 shows activities at each monitoring location established at the Lexington Rail Loop offset site; divided into three 'paddocks' across the north of Lexington – 'North Promenade', 'Harry's' and 'Contours'. A total of 12 permanent monitoring sites/plots are monitored across the three paddocks (refer to Figure 7 and Figure 8). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 6), according to the following:

- 12 x weed monitoring plots (1 ha)
 - collocated with the seven habitat monitoring sites (Sites LEXRL01 LEXRL07)
 - five additional, standalone weed monitoring plots (Sites LEXRL08 LEXRL12)
- 12 x biomass monitoring plots
 - seven established at the 0 m point along the 100 m habitat monitoring transects (Sites LEXRL01 LEXRL07)
 - five at SW corner of standalone weed monitoring plots (Sites LEXRL08 LEXRL12).

At each of the seven habitat monitoring sites (Sites LEXRL01 – LEXRL07), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At each of the standalone weed monitoring plots (Sites LEXRL08 – LEXRL12), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-4 in Appendix A for detailed locations of each of the monitoring sites at the Lexington Rail Loop offset site.

Table 6: Monitoring locations at the Lexington Rail Loop offset site, surveyed as part of the 2021/22 dry seas	on
surveys.	

Site	Weed monitoring	Biomass monitoring					
North Promenade paddock							
LEXRL01 – LEXRL02	×	~					
LEXRL08 – LEXRL09	~	\checkmark					
Harry's paddock							
LEXRL03 – LEXRL04	~	\checkmark					
LEXRL10	\checkmark	\checkmark					
Contours paddock							
LEXRL05 – LEXRL07	~	\checkmark					
LEXRL11 – LEXRL12	\checkmark	\checkmark					



Soliitz Blue Bty Ltd					The function of the second secon
Figure 7 Lexington Rail Loop offset	Lexington existing fences	Lexington offset area	Habitat monitoring sites		No.
monitoring sites - west	Access tracks	Mining leases (MI 70376 and MI 70145	i) Habitat monitoring plots		T. MAR
202_202	North Promenade paddock				
stSojitzv	Observed vegetation				
DATA SOURCE: The following datasets are © State of Qld:	RE 11.8.11				Brisbane
 Mining leases The following datasets provided by Sojitz Lexington Rail Loop offset areas 	RE 11.8.5		0 50 100 150 200		
Date: 2/2/2022 Coordinate System: GDA 1994 MGA Zone 55 Pro	jection: Transverse Mercator Datum: GDA 1994	Scale: 1:6,000@A3	Metres	Australia	- Carles





2.2 HABITAT CONDITION ASSESSMENT (MDS PROJECT SITE ONLY)

Habitat monitoring sites were established at the MDS Project site in December 2017 based on the requirements of the *Guide to determining terrestrial habitat quality* (Version 1.2; DEHP 2017). A total of 10 habitat monitoring sites (comprising N_S running 100 m x 50 m transect) were established (Sites 01 - 10), with the start and central points marked with a 1.8 m galvanised steel picket with plastic safety cap (refer to Figure 2 and Figure 3).

Habitat condition assessments for Brigalow TEC, Natural Grasslands TEC, bluegrass, king blue-grass, squatter pigeon and Australian painted snipe were undertaken at the habitat monitoring sites generally in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017). Through the application of the guide, a habitat quality score was calculated for each MNES based on the following key indicators:

- site condition: a general condition assessment of vegetation compared to a benchmark
- site context: an analysis of the site in relation to the surrounding environment

In the absence of the *Guide to determining terrestrial habitat quality* (DEHP 2017) including a species habitat index for flora species, the habitat condition scores for the two MNES flora species (king blue-grass and bluegrass) included a species presence index out of three, whereby: 0 = absent/not confirmed, 2 = up to five tussocks confirmed, 2.5 = up to 20 tussocks confirmed, 3 = more than 20 tussocks confirmed. The habitat condition score for the two MNES flora species was then calculated as a combination of site condition and site context for the RE assessment unit (representing 80% of the score), with species stocking rate converted to a score out of 10 and contributing 20%.

2.3 PHOTO MONITORING (MDS PROJECT SITE ONLY)

Photo monitoring was undertaken at permanent sites established as part of baseline surveys on the MDS Project site, to give a representative indication of cover and species composition (including weeds) for the general area and enable visual assessment of habitat changes over time. Photo monitoring sites were established with a 1.8 m galvanised steel picket with plastic safety cap.

At each of the photo monitoring points, five photos were taken from 1.5 m height above ground level looking north, east, south and west with a ground photo taken looking down at an angle of 45° to the northwest of the star picket.

At the MDS Project site, photo monitoring was undertaken at 30 sites, including two at each of the 10 habitat condition assessment sites (0 m and 50 m points: Site 01 - 10), with single photo monitoring points at the SW corner of the remaining 10 weed monitoring plots (Site 11 - 20) identified in Table 3 and shown in Figure 2 and Figure 3.

A record of the photographs for the MDS Project site is shown in Appendix C. While not required to be collected as part of the 2021 dry season surveys, photo monitoring was also undertaken at the MDS Rail Loop site, Lexington offset site and Lexington Rail Loop offset site (Appendix D - Appendix F) primarily as reference material for the condition of each site across each year.

2.4 PEST ANIMAL MONITORING (MDS PROJECT SITE AND LEXINGTON OFFSET SITE)

For the purposes of this assessment, pest animals are defined as any species of fauna not native to Queensland, nor protected under the *Nature Conservation Act 1992* (Qld; NC Act).

Pest animal monitoring was undertaken through a combination of:



- plot based monitoring, searching for direct presence (e.g. visual confirmation) or indirect evidence (e.g. tracks, diggings, scats, rubbings etc)
- infra-red, motion-detector fauna cameras, representing opportunities to visually confirm the presence of pest animals.

2.4.1 Rabbits

An assessment of the presence and impact of rabbits was undertaken generally in accordance with Cooke *et al.* (1990). Rabbit monitoring plots were established at the same location as habitat monitoring sites and weed monitoring plots (refer to Figure 2 and Figure 3 for locations at project sites and Figure 5 and Figure 6 for locations at the offset site).

Each rabbit monitoring plot consisted of a 2 ha plot which was traversed for 15 to 20 minutes, assessing the following (refer to Cooke *et al.* 1990):

- Rabbit abundance a measure of the presence and number of rabbit warrens and the abundance of any faecal pellets (including 'buck-heaps' or latrines) – measured on a scale of 0 – 5.
- Seedling abundance a measure of the presence and abundance of native vegetation seedlings encountered during the 15-20-minute traverse – measured on a scale of 0 – 5.
- Rabbit damage a measure of seedlings (< 0.5 m height) with evidence of rabbit damage, identified as 45° 'secateurs-like' cuts through smaller stems, defoliation and gnawing of bark measured on a scale of 0 5.</p>

From this assessment, a 'corrected regeneration score' was calculated from the seedling abundance and rabbit damage score in accordance with Table 7. This measure corrects for seedling regeneration as a function of observed rabbit damage and is subsequently used to calculate overall rabbit impact with the rabbit abundance score.

	Seedling abundance						
Rabbit damage	0	1	2	3	4	5	
0	0.20	1.00	2.00	3.00	4.00	5.00	
1	0.20	0.50	1.00	1.50	2.00	2.50	
2	0.20	0.34	0.70	1.00	1.30	1.70	
3	0.20	0.28	0.50	0.80	1.00	1.30	
4	0.20	0.20	0.40	0.60	0.80	1.00	
5	0.20	0.20	0.30	0.50	0.70	0.80	

Table 7: Calculation of corrected regeneration score.

As illustrated in Figure 9, overall rabbit impact was assigned as one of three categories – 'acceptable', 'monitor closely' or 'unacceptable', as determined from a combination of the score for rabbit abundance and the corrected regeneration score. Note that it was assumed that any site with a rabbit abundance score of '0' was assumed to be 'acceptable', irrespective of corrected regeneration score. This is to avoid the situation where, with an absence of rabbits, and a corrected regeneration score of ≤ 2 (attributable to no rabbit damage and less than 20 seedlings), a given site may be identified as one to 'monitor closely' only by virtue of the fact that the few seedlings are attributable to the site being a grassland, rather than it reflecting rabbit grazing.







2.4.2 Fauna camera stations

An assessment of pest animal presence and activity was conducted using infra-red cameras. Infra-red fauna cameras were placed approximately 1.3 m above the ground at 15 fauna camera stations at the MDS Project site, and 15 fauna camera stations at the offset site. Once established, the fauna cameras were left unattended for 3 days/nights to be able to intercept any active fauna using trails in the survey area.

Cameras were represented by 12 Browning Dark Ops 940 HD 16 mega-pixel digital cameras (BTC-6HD-940), one Browning Dark Ops MAX HD 18 mega-pixel digital camera (BTC-6HD-MAX) and two LTL-6310 Acorn 12 mega-pixel digital cameras (LTL-6310M). All camera models were supported by 940nm infra-red night vision and motion sensor capabilities to allow for capture of fauna during the day and night.

The camera settings were set to capture a series of images in succession following a motion trigger. If motion continued after this series of images were captured, then the camera would continue to capture images (in sets of four), followed by at least a one-minute pause, after which any new the camera could be triggered again. Secure Digital (SD) memory cards of 32 gigabyte capacity were used in the cameras for storing captured images.

For each pest animal species, a measure of pest animal presence/activity (Catling Index value) was calculated for the site by summing the number of operable fauna camera stations with evidence of the targeted pest animal by the sum of all operable station days/nights (refer to Mitchell and Balogh 2007a).

Refer to Figure 2 and Figure 3 for locations at project sites and Figure 5 and Figure 6 for locations at the offset site.

2.4.3 Feral pigs

An assessment of the presence of feral pig signs (as a measure of feral pig presence or activity) was undertaken generally in accordance with (Mitchell & Balogh 2007b) and (Hone 1988).



Randomly stratified, 500 m x 300 m (15 ha) plots were established in environments that are more regularly impacted included plots within and traversing ephemeral watercourses. A total of eight pig monitoring plots were established at the project site (Figure 2 and Figure 3) including plots within the immediate vicinity of Naroo Dam in the east of the site. Eight pig monitoring plots were also established at the offset site (Figure 5 and Figure 6).

Each 15-ha plot comprised 3 x 500 m transects spaced 100 m apart. At each plot, the following method was used for each of the transects:

- traversing in an east-west direction, surveying for the presence of any feral pig signs (rooting, wallows, dung, footprints, travel pads, plant damage and tree rubs, as well as the physical presence of feral pigs) 1 m either side of the transect in 50 m sections
- calculating an abundance score for each transect as the percentage of 'present' feral pig signs from the 10 sections along the 500 m transect
- calculating the mean abundance score (and variance) across all transects.

2.5 WEED MONITORING (ALL SITES)

For the purposes of this assessment, weeds were taken as any species of plant not considered by the Queensland Herbarium as being native to Queensland (i.e. not listed as either least concern, special least concern, near threatened, vulnerable, endangered, critically endangered or presumed extinct in the wild under the *Nature Conservation Act 1992* (Qld); NC Act), as well as species of plant not considered locally endemic to the region.

Weed monitoring was undertaken at five permanent plots established at the MDS Rail Loop site and 12 permanent plots established at the Lexington Rail Loop offset site. Weed monitoring plots were located to incorporate natural variability such as aspect (e.g. a mix of north-, east-, south- and west-facing monitoring sites) and community type, while also targeting trafficable areas (e.g. entry gates, creek crossings, stock watering points) to monitor potential introduction and/or irruptions of prohibited and restricted weed species. At each weed monitoring plot, 3 x 100 m transects (traversing in an east-west direction) were traversed, keeping them parallel to one another, 50 m apart.

Figure 4 shows the MDS Rail Loop site weed monitoring plots and Figure 7 and Figure 8 shows the Lexington Rail Loop offset site weed monitoring plots.

At each of the permanent weed monitoring plots, monitoring of weeds was undertaken in accordance with the following method:

- At 10 m intervals along each of the three transects, a 2 m x 2 m plot frame was used to record the presence, species and cover of weeds
- Weed cover at each 2 m x 2 m survey site was recorded as one of five cover classes: 1 = 0%; 2 = 0-5%; 3 = 6-25%; 4 = 26-50%; 5 = 51-100% (Auld 2009)
- > An average cover score for each weed species for each 1 ha site was calculated
- The average cover score was then calculated as the average percentage from the 30 plots surveyed from the three 100 m transects
- > The mean cover score across all weed monitoring sites was then calculated.



For the purposes of the calculation of average percentage cover of weeds, each of the five weed cover classes (0-5) were converted to a quantitative weed cover value based on the average value of the range corresponding to that weed cover class, as outlined below:

- Weed cover class 1 (0%) retained a value of 0%
- Weed cover class 2 (0-5%) was converted to a value of 2.5%
- Weed cover class 3 (6-25%) was converted to a value of 15%
- Weed cover class 4 (26-50%) was converted to a value of 37.5%
- Weed cover class 5 (51-100%) was converted to a value of 75%.

In addition to permanent weed monitoring plots, where relevant, incidental observations were collated as part of general site monitoring, recording details of weeds (including location, species and extent) and areas of significant weed cover.

2.6 **BIOMASS MONITORING FOR FIRE MANAGEMENT (ALL SITES)**

Biomass monitoring for fire management is undertaken annually to determine the risk of fire and to inform fire management strategies. Biomass is at its greatest at the end of the wet season (around April) with fire risk greatest towards the end of the dry season (September/October). Biomass is monitored using appropriate photo standards¹ to determine dry matter yields and subsequently fuel loads. Biomass monitoring is undertaken at permanent habitat condition assessment sites and weed monitoring sites at the MDS Project site, MDS Rail Loop site, Lexington offset site and Lexington Rail Loop offset site. Photos used for biomass monitoring at all sites can be found in Appendix C – Appendix F.

2.7 GENERAL SITE INSPECTIONS (ALL SITES)

General site inspections across all project and offset sites was undertaken, to assess:

- Observations of fencing condition, including any repair/upgrades
- > Access track conditions, including location of watercourse crossings, grids, erosion, etc
- Fire management, including assessment of existing firebreaks, access tracks and roads, fuel loads, and any recent burning activities
- Livestock management including assessment of signs of land degradation and over-grazing
- Erosion management, including assessment of the incidence of erosion, especially around permanent and semi-permanent water bodies or areas subject to inundation or waterlogging
- Incidental fauna observations, including presence, traces and/or abundance of pest animals
- Signs of dust deposition on vegetation located adjacent to the MDS Project and MDS Rail Loop footprints
- Locations of known king blue-grass and bluegrass specimens throughout all sites
- > Any additional risks to fauna (i.e. evidence of vehicle strike)

¹ See https://futurebeef.com.au/knowledge-centre/pastures-forage-crops/pasture-photo-standards/



3 RESULTS: MDS PROJECT SITE

3.1 HABITAT CONDITION ASSESSMENT

Results of the habitat condition assessments identified an average site condition score of 8.00 out of 10 across all ten habitat monitoring sites, with scores ranging between 4.75 (Site 09) and 10 (Sites 02 and 08). Table B-1 and Table B-2 of Appendix B outline details of the site condition assessments, summarised below in Table 8.

Table 8: MDS Project site habitat monitoring sites: site condition and site context scores calculated in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017).

Site	RE	Site condition score (/10)	Site context score (/10)
01	11.8.5	7.69	7.69
02	11.8.11	10.00	6.92
03	11.8.5	8.25	7.69
04	11.8.11	9.33	7.69
05	11.8.5	6.75	7.69
06	11.8.11	9.33	7.31
07	11.4.3	6.00	7.69
08	11.8.11	10.00	7.31
09	11.3.3a	4.75	7.69
10	11.8.5	7.94	7.69
Average score		8.00	7.54

MNES habitat condition assessments

Based on the results of the site condition, site context and relevant species habitat assessments, average habitat condition scores for the six MNES ranged between 4.74 (Australian painted snipe) and 8.57 (Natural Grasslands TEC) out of 10 (Table 9). The comparatively low score for Australian painted snipe habitat is in part attributable to the low site condition for RE 11.3.3a habitat (4.75), but also the low fauna species habitat index (3.2), reflecting an absence of appropriate foraging and shelter habitat for the species at the time of surveying. In contrast, Natural Grasslands TEC had the highest habitat condition score, attributable mostly to an unusually wet dry season contributing to lush vegetation resulting in high detectability of grass species combined with a low weed presence at each of the contributing RE 11.8.11 sites.

Refer to Table B-1 of Appendix B for site condition raw data contributing to site condition score in Table B-2.

IES.
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Site	RE	Brigalow TEC	Natural Grasslands TEC	King blue- grass	Bluegrass	Squatter pigeon	Australian painted snipe
01	11.8.5					7.15	-
02	11.8.11		8.57	6.86	6.86		-



Site	RE	Brigalow TEC	Natural Grasslands TEC	King blue- grass	Bluegrass	Squatter pigeon	Australian painted snipe
03	11.8.5					7.76	-
04	11.8.11		8.57	6.86	6.86		-
05	11.8.5					6.67	-
06	11.8.11		8.39	6.71	6.71		-
07	11.4.3	6.420					-
08	11.8.11		8.75	7.00	7.00		-
09	11.3.3a						4.74
10	11.8.5					7.28	-
Av	erage score	6.420	8.57	6.86	6.86	7.22	4.74

Natural Grasslands, king blue-grass and bluegrass habitat

As discussed above, areas of Natural Grasslands TEC, represented by RE 11.8.11, were all in very good condition due to unusually high rainfall from October to December resulting from strong La Niña weather patterns. Habitat condition scores for the four assessment sites ranged between 8.39 and 8.75. The four assessment sites supported eight TEC indicator grass species (Table 10), ranging between six and eight species per site. This is more than is usually recorded during dry season surveys. Fewer TEC indicator species have been recorded during previous dry season surveys because some individuals could not be identified to species level due to a lack of fertile material.

Colombific norma	6	Site			
Scientific name	Common name	02	04	06	08
Aristida latifolia	Feather-top wiregrass	✓	✓	✓	
Aristida leptopoda	White speargrass	✓	✓	~	✓
Astrebla elymoides	Hoop mitchell grass				
Astrebla lappacea	Curly mitchell grass				
Astrebla squarrosa	Bull mitchell grass				
Bothriochloa erianthoides	Satin-top grass	~	✓	~	✓
Dichanthium queenslandicum	King blue-grass				
Dichanthium sericeum	Queensland bluegrass	~	✓	~	✓
Eriochloa crebra	Cup grass				
Panicum decompositum	Native millet	✓	✓	~	✓
Panicum queenslandicum	Yabila grass	~	✓	~	✓
Paspalidium globoideum	Shot grass	✓	✓	~	✓
Thellungia advena	Coolibah grass			✓	
	TOTAL	7	7	8	6



Squatter pigeon

Incidental searches for the squatter pigeon were conducted opportunistically from over 92 km of driving during the four days of field surveys on the MDS project site, during which no squatter pigeons were recorded. Further targeted surveys will be undertaken during the post-wet season survey when birds are more likely to be actively foraging for grass seed.

Australian painted snipe

No surveying was undertaken for Australian painted snipe during the dry season survey monitoring. Surveys will be next be undertaken during the wet season (defined as between 1 November in one year to 31 May in the following year), following a significant inundation event during the Year 5 (2021/2022) monitoring period.

3.2 PHOTO MONITORING

Photo monitoring on the MDS Project site showed a variety of levels of cover ranging from dense understorey (Site 05: Photo C-50 in Appendix C) through to relatively open areas with evidence of grazing (Site 17: Photo C-135 in Appendix C). Overall, the condition of habitat at photo monitoring sites was good, with appreciable grass cover in most sites, likely due to higher than average rainfall in October and November. The results of the photo monitoring are presented in Appendix C.

3.3 PEST ANIMAL MONITORING

3.3.1 Rabbits

Results of rabbit monitoring confirmed the presence of rabbit/hare scats from five of the ten rabbit monitoring plots (R02, R07-10). Across these plots, pellet abundance ranged from isolated pellets and small clumps greater than 10 m apart, to clumps and small buck heaps less than 10 m apart. Brown hares (*Lepus europaeus*) and European rabbits (*Oryctolagus cuniculus*) were also visually confirmed by fauna camera stations (see Section 3.3.3).

Table 11 shows the results of the assessment of overall rabbit impact. The results indicate that five sites displayed evidence of rabbit abundance. The assessment of overall rabbit impact was denoted as acceptable at sites R01 and R02 – R06, 'monitor closely' at site R02, R07 and R09 and 'unacceptable' at sites R02, R07 and R09 due to high rabbit abundance.

Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact*
R01	0	1	0	1	Acceptable
R02	2	0	0	0.2	Unacceptable
R03	0	2	0	2	Acceptable
R04	0	0	0	0.2	Acceptable
R05	0	1	0	1	Acceptable
R06	0	0	0	0.2	Acceptable
R07	2	3	1	1.5	Unacceptable

Table 11: Assessment of overall rabbit impact at the MDS Project site.



Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact*
R08	1	1	0	1	Monitor closely
R09	3	1	0	1	Unacceptable
R10	1	1	0	1	Monitor closely

* Sites with a rabbit abundance and damage score of 0 have been adjusted to be 'acceptable'.




3.3.2 Feral pigs

Across all eight pig monitoring plots, represented by a total of 12 km of transects, there was confirmed evidence for the presence of feral pigs in seven plots (Figure 11). Evidence of feral pig presence within plots ranged from 0% (Site P02) to 47% (Site P01) and, on average, was observed across 13.75% of the available transect sections within each plot (Table 12). Furthermore, opportunistic surveying through ephemeral watercourses, including observation efforts during weed and rabbit monitoring, revealed additional evidence of feral pigs.

				Monit	oring	plot su	rvey s	ection	(50 m)			1
Plot	Transect	1	2	3	4	5	6	7	8	9	10	Cover (%)	Plot % (record/30)
	1	R	RT	R	R	TRP	R		R	RD	R	90%	
P01	2	R		R						R		30%	47%
	3								R		R	20%	
	1											0%	
P02	2											0%	0%
	3											0%	
	1							R	F			20%	
P03	2	FP										10%	13%
	3		W									10%	
	1						D					10%	
P04	2											0%	7%
	3									DR		10%	
	1	D			D							20%	
P05	2									R		10%	13%
	3						R					10%	
	1											0%	
P06	2			FT					R			20%	10%
	3									R		10%	
	1										R	10%	
P07	2											0%	16.7%
	3			R	RP	RP			W			40%	
	1				DR							10%	
P08	2											0%	3%
	3											0%	
												Total	13.8%

Table 12: Assessment o	f overall feral pig presen	ce and activity at the	MDS Project site*.

*Denoted as: R = Rooting, W = Wallows, D = Dung, T = Tree rubbing/tusking, F = Footprints, P = Travel pads



148°22'E

148°24'E



3.3.3 Fauna camera stations

Of the 15 fauna camera stations, 13 cameras were considered operable over all three camera trap nights. One camera (C01) was considered compromised across all three nights due to a failed camera flash, leaving photos taken at night (which would constitute the majority of pest animal activity) indiscernible. Another camera (C13) was considered compromised on day 3 as it was knocked over by a bird. For the purposes of calculating Catling Index values for pest animal species, the resulting total number operable station nights was 41 across each of the three consecutive nights. As indicated in Table 13, the fauna cameras confirmed the presence of three pest animal species, namely feral dogs (*Canis familiaris/lupus*), European rabbits (*Oryctolagus cuniculus*) and brown hares (*Lepus europaeus*) (Figure 12 and Figure 13). All three pest animal species detected had a score of 7.32 (Table 13). Feral pigs were not detected by fauna cameras. A pack of three feral dogs were observed while undertaking surveys at BioCondition site 10 on Wednesday 8 December. Additionally, cane toads (*Rhinella marina*) were detected on several cameras over the three nights. Non-pest animals were also detected from the fauna camera stations, including a common brush-tail possum (*Trichosurus vulpecula*) and cattle (*Bos taurus*).

Overall, there were nine individual pest animal detections, recorded from five of the 15 fauna camera stations. These records originated from cameras located in a variety of locations across the site (C04, C05, C06, C11, C14), some of which occurred on the eastern portion of the property within 1.5 km of the main site office, and some of which occurred in the far southwestern portion of the property up to 4.5 km from the main site office (Figure 14). In previous years, pest animals have generally been recorded at camera traps near permanent or ephemeral water sources. However, due to an exceedingly wet dry season, it is likely that pest animals have been able to disperse further from these water sources due to an abundance of lush vegetation and food. Generally, pest animals were recorded within the vicinity of patches of RE 11.8.5 (*Eucalyptus orgadophila* open woodland) and RE 11.8.11a (*Melaleuca bracteata* woodland to open forest), which may afford more suitable shelter compared to surrounding RE 11.8.11 grasslands.

Pest Confirmed incidence of pest animal species from given site Car										Catling						
animal species	C01	C02	С03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	Index
Dog																
Day 1											✓					
Day 2																7.3
Day 3					✓	✓										
Cat																
Day 1																
Day 2																0
Day 3																
Europea	n rabbi	it														
Day 1											✓			\checkmark		
Day 2																7.3
Day 3														\checkmark		
Brown h	are															
Day 1				✓												
Day 2																7.3
Day 3											✓			\checkmark		

Table 13: Pest animal r	esults for the Project site.	Greyed-out cells refer t	o inoperable nights
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Pest	Confirmed incidence of pest animal species from given site													Catling		
animal species	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	Index
Feral pig																
Day 1																
Day 2																0
Day 3																



Figure 12: Feral dog (Canis familiaris/lupus) captured at fauna camera 05 at the MDS Project site



Figure 13: European rabbit (Oryctolagus cuniculus) captured at fauna camera 11 at the MDS Project site





3.4 WEED MONITORING

A total of 21 weed species were identified from the weed monitoring plots. No additional species of weeds were observed on the MDS Project site outside of those identified within the weed monitoring plots. Across the 20 weed monitoring plots, the average number of weed species observed per plot was 4.9 species, ranging between two (Sites 03, 12 and 14) and eight species (Sites 09, 17, 18 and 20). Weed cover across the 20 weed monitoring plots averaged 13.6%; ranging between 1% (Site 02) and 59% (Site 20) (Table 14, Figure 15).

The most commonly encountered weeds were *Melinis repens* (red natal grass) and *Parthenium hysterophorus* (parthenium weed), recorded at 17 and 15 out of 20 sites, respectively (Table 14). *Phyla nodiflora* (Condamine couch) was the weed species with the highest average cover, averaging 23.2% cover at the one site it was recorded at (Site 09; Table 14). Because it was only recorded at one site, *Phyla nodiflora* is not considered to be a concern despite being prevalent at that site. In comparison, other weeds such as *Cenchrus ciliaris* (buffel grass) and *Parthenium hysterophorus* had greater cover than *Phyla nodiflora* at some individual sites, reaching up to 32.1% and 24.9% cover, respectively.

Sites 17 and 20 showed an infestation of *Parthenium hysterophorus* (Table 14, Photo D-133 and D-150). *P. hysterophorus* is toxic to cattle and rapidly colonises areas of disturbed land. As such, overgrazing can lead to severe *P. hysterophorus* infestation and cause it to outcompete native grasses.

		- ··	Perc	entag	e cove	r of we	ed spec	cies fro	m giver	n site														
Scientific name	Common name	Family name	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	Number of sites	Average cover (%) ^a
Alternanthera pungens	Khaki Weed	Amaranthaceae				0.1																	1	0.1
Verbesina encelioides	Goldweed	Asteraceae		0.1		0.1					0.2												3	0.1
Parthenium hysterophorus	Parthenium Weed	Asteraceae		0.1		2.0	2.3	0.9	0.1	1.1	6.1	0.1			7.7		0.5	0.1	20.2	6.1	0.2	24.9	15	4.8
Helianthus sp.	a Sunflower	Asteraceae			0.1			0.2												0.2		0.6	4	0.3
Bidens pilosa	Cobbler's Pegs	Asteraceae								0.1	0.2											9.4	3	3.2
Vachellia farnesiana	Mimosa Bush	Fabaceae	0.5								2.3								3.4	0.5	1.8		5	1.7
Clitoria ternatea	Butterfly Pea	Fabaceae																				0.1	1	0.1
Stylosanthes scabra	Shrubby Stylo	Fabaceae							0.7									1.3			1.1		3	1.0
Malvastrum americanum	Malvastrum	Malvaceae							0.6		1.1								2.8	2.0	1.7	0.7	6	1.5
Sida acuta	Spinyhead sida	Malvaceae																			0.1		1	0.1
Cenchrus ciliaris	Buffel Grass	Poaceae						3.5	4.5	0.1	1.8	0.5	1.9		0.5		0.5		2.6	0.5		14.5	11	2.8
Megathyrsus maximus	Guinea Grass	Poaceae							0.6														1	0.6
Melinis repens	Red Natal Grass	Poaceae	0.8	0.2	8.9		8.4	0.7	6.4	1.5	0.1	5.0	3.3	8.7	0.1	3.9	2.5	0.8		0.6	1.4		17	3.1
Bothrichloa pertusa	Indian Bluegrass	Poaceae		0.1								2.3	1.0	0.1	1.5				1.3		1.3		7	1.1
Urochloa mosambicensis	Sabi Grass	Poaceae																	32.1	0.5		6.8	3	13.1
Physalis minima	Wild Gooseberry	Solanaceae						0.1											5.1			2.1	3	2.4
Verbena officinalis	Common Verbena	Verbenaceae	0.2	0.5		0.6	0.5	0.1		0.3		0.3				0.9	0.7			1.0			10	0.5
Phyla canescens	Lippia	Verbenaceae																	0.1				1	0.1
Verbena sp.	a Verbena	Verbenaceae	0.1																				1	0.1
Verbena rigida	Veined Verbena	Verbenaceae																0.2					1	0.2
Phyla nodiflora	Condamine couch	Verbenaceae									23.2												1	23.2
		Number of species	4	5	2	4	3	6	6	5	8	5	3	2	4	2	4	4	8	8	7	8		
		Weed cover (%) ^b	1.6	1.0	9.0	2.8	11.1	5.5	12.9	3.1	34.9	8.1	6.2	8.8	9.8	4.8	4.2	2.4	67.5	11.4	7.5	59.0		

Table 14: MDS Project site weed monitoring results.

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.







3.5 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring sites comprising RE 11.8.11, whilst photo monitoring results from areas of RE 11.8.5 were assessed against 'Eucalypt woodlands', RE 11.4.3 was assessed against 'Blue grass, wire grass' and RE 11.3.3a was assessed against 'Alluvial' photo standards (Table 15). The photo standards used to calculate biomass are different to previous years' assessments, although these photo standards are considered more representative of the actual vegetation communities observed on the MDS Project site. Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (e.g. observed biomass between 1,800 kg/ha and 2,500 kg/ha 'Eucalypt woodlands' photo standards was reported as 2,150 kg/ha).

Most sites had very high biomass throughout the MDS Project site due to the exceedingly high rainfall from October to December, with the highest being Sites 02, 04, 08, 14 and 15 containing approximately 5,400 kg/ha each. As such, it is expected that most sites at MDS may become fire hazards during the next dry season. Some sites had lower biomass than expected (Sites 12 and 17) due to heavy grazing. This was evidenced by extensive *Parthenium hysterophorus* establishment across the site, which readily colonises areas of high disturbance and outcompetes native species (as the cattle eat surrounding grass, but not the *P. hysterophorus* due to its toxicity).

Ground photos used to assign biomass at the MDS Project site are shown in Appendix C.

		Brigalow Belt				
Photo monitoring site*	RE type	Eucalypt woodlands	Blue grass, wire grass	Alluvial	Downs country	Biomass kg/ha
01	11.8.5	✓				2,500
02	11.8.11				✓	5,040
03	11.8.5	✓				3,600
04	11.8.11				✓	5,040
05	11.8.5	✓				3,600
06	11.8.11				✓	3,850
07	11.4.3		✓			2,710
08	11.8.11				✓	5,040
09	11.3.3a			✓		3,405
10	11.8.5	✓				3,600

Table 15: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture photo standards.

3.6 GENERAL SITE INSPECTION

The condition of all fencing and access gates across the MDS Project site was good, with no requirement for repair at the time of surveying. A number of existing access tracks and firebreaks had clearly been subject to minor rutting as a consequence of rainfall, and will require re-grading.



Field traverses in the south-west of the MDS Project site in June 2020 noted areas of RE 11.8.11a under stress, with the majority of *Melaleuca bracteata* in these areas showing signs of dieback. At the time of the November 2020 dry season surveys, there was additional evidence of epicormic regrowth, further lending weight to the suggestion that the vegetation community is in a state of recovery following the drought prior to the 2019/2020 wet season. In December 2021, the epicormic regrowth was noted to be more extensive than the November 2020 dry season surveys, likely associated with high rainfall over the previous months. Some stands of *Melaleuca bracteata* were observed to still have no epicormic growth. The condition of these communities will need to continue to be monitored to exclude alternative reasons for the dieback (e.g. whether a consequence of hydrological changes).

Site traverses as part of all monitoring activities on the MDS Project site showed no obvious evidence of any dust deposition, nor any impacts attributable to dust deposition on king blue-grass, bluegrass or other vegetation communities.

3.6.1 Significant species

No significant species were observed at MDS during BioCondition surveys nor incidentally while traversing the survey sites. The undescribed *Dichanthium sp. affine sericeum* was noted to still be present at Site 03, as has previously been recorded, however this species is not listed at the time of this monitoring period.

Detailed surveys for king blue-grass and blue grass are scheduled to be undertaken along pre-determined survey transects as part of the post-wet season surveys in April 2021.



4 RESULTS: MDS RAIL LOOP SITE

4.1 WEED MONITORING

A total of eight weed species were identified from the five weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the plots, the average number of weed species observed per plot was 4.4 species, ranging between one species (Site MDSRL03) and six species (Sites MDSRL01 and MDSRL02), with *Alternanthera pungens* (khaki weed), *Stylosanthes scabra* (shrubby stylo) and *Malvastrum americanum* (malvastrum) encountered only at single sites, separately. Weed cover across the five weed monitoring plots averaged 32.4%; ranging between 16.8% (Site MDSRL05) and 50.1% (Site MDSRL03)(Table 16 and Figure 16). The most commonly encountered weed was *Setaria incrassata* (purple pigeon grass), recorded from each of the five sites with an average cover of 22.2% (Table 16). *Melinis repens* (red natal grass) was encountered at four of the five sites and had the second highest average cover, averaging 8.2% cover across the sites it was recorded from (Table 16).



			Percentage	cover of we	ed species f	rom given si	te	Number of	Avoraga covor
Scientific name	Common name	Family name	MDSRL01	MDSRL02	MDSRL03	MDSRL04	MDSRL05	sites	(%) ^a
Alternanthera pungens	Khaki weed	Amaranthaceae				0.1		1	0.1
Parthenium hysterophorus	Parthenium weed	Asteraceae	0.1	0.1		0.2	0.1	4	0.1
Stylosanthes scabra	Shrubby Stylo	Fabaceae		0.1				1	0.1
Malvastrum americanum	Malvastrum	Malvaceae	0.1					1	0.1
Cenchrus ciliaris	Buffel grass	Poaceae	5.5	11.4		0.1		3	5.7
Melinis repens	Red natal grass	Poaceae	26.2	0.6		5.5	0.5	4	8.2
Setaria incrassata	Purple pigeon grass	Poaceae	7.6	17.3	50.1	19.9	16.1	5	22.2
Verbena officinalis	Common verbena	Verbenaceae	0.2	0.1			0.1	3	0.1
	N	umber of species	6	6	1	5	4		<u> </u>
		Weed cover (%) ^b	39.7	29.5	50.1	25.8	16.8		

Table 16: MDS Rail Loop weed assessment results.

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.





4.2 **BIOMASS MONITORING**

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all four of the sites comprising RE 11.8.11 (Table 17). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 3,850 kg/ha and 5,040 kg/ha 'Downs country' photo standards was reported as 4,445 kg/ha).

Photo monitoring showed limited variability in biomass of ground cover across the monitoring sites. Overall, there was very high biomass throughout the MDSRL due to the exceedingly high rainfall from October to December, with the lowest being sites MDSRL01 and MDSRL02 at 4,445 kg/ha and the highest being Sites MDSRL03 and MDSRL04 at 5,400 kg/ha.

Ground photos used to assign biomass at the MDS Rail Loop site are shown in Appendix D.

Table 17: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture photo standards.

		Brigalow Belt Future Beef pasture photo standard type	
Photo monitoring site*	RE type	Downs country	Biomass kg/ha
MDSRL01	11.8.11	\checkmark	4,445
MDSRL02	11.8.11	\checkmark	4,445
MDSRL03	11.8.11	\checkmark	5,040
MDSRL04	11.8.11	\checkmark	5,040

* taken from the 50 m point of the permanent habitat monitoring transect.

4.3 GENERAL SITE INSPECTION

A fire was reported to have occurred adjacent to the RE 11.8.11 at the MDSRL in mid-2021, however did not appear to have affected the areas surveyed as part of the dry season surveys. Consequently, a fire break has been constructed through the middle of the RE 11.8.11 at the MDSRL (Figure 4). No rubbish or other matters likely to impact on the monitoring area was observed. This included no evidence of dust or other particulate material on the vegetation within the MDS Rail Loop monitoring area.



5 RESULTS: LEXINGTON OFFSET SITE

5.1 PEST ANIMAL MONITORING

5.1.1 Rabbits

Results of rabbit monitoring confirmed the presence of rabbit/hare scats from eight out of 10 rabbit monitoring plots (R01– R08) (Table 18, Figure 17). Across these plots, pellet abundance ranged from isolated pellets and small clumps up to 10 pellets, to abundant pellets, often in large clumps and buck heaps. These results generally show less rabbit abundance than surveys undertaken in the 2019 dry season. Brown hares (*Lepus europaeus*) and European rabbits (*Oryctolagus cuniculus*) were also visually confirmed by six separate fauna camera stations (Sites C03, C06, C08, C11, C13, C15), which were spread evenly across the whole site. Brown hares were found to be more abundant, with seven captures recorded across five cameras on five separate nights, as opposed to only one European rabbit sightings on one night.

At most sites, minimal seedlings were encountered except for R02, R05 and R06. No sites were observed to have sustained damage from rabbits. This was likely due to high rainfall between October and December which produced lush and extensive grass cover, reducing the need for rabbits to graze on seedlings. As such, it is possible that overall rabbit impact results at some sites may be understated due to a moderate seedling abundance and no damage, despite a high abundance of rabbits (e.g. site R05). The assessment of overall rabbit impact was denoted as 'monitor closely' for most sites, 'acceptable' at sites R09 and R10 and 'unacceptable' for R02 – R04.

Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact*
R01	1	0	0	0.2	Monitor closely
R02	2	2	0	2	
R03	2	0	0	0.2	
R04	2	1	0	1	
R05	3	3	0	3	Monitor closely
R06	1	2	0	2	Monitor closely
R07	1	0	0	0.2	Monitor closely
R08	1	1	0	1	Monitor closely
R09	0	1	0	1	Acceptable
R10	0	0	0	0.2	Acceptable

Table 18: Assessment of overall rabbit impact at the Lexington offset site.

* Sites with a rabbit abundance and damage score of 0 have been adjusted to be 'acceptable'.





5.1.2 Feral pigs

Evidence for the presence of feral pigs was confirmed in all eight pig monitoring plots at the Lexington offset site. However, there was no evidence for feral pigs either through direct observation or via the fauna cameras. Evidence of feral pig presence within plots ranged from 3% (Sites PO4 and PO6) to 63% (Site PO1) and, on average, was observed across 22.08% of the available transect sections within each plot (Table 19). Opportunistic surveying through ephemeral watercourses, including observation efforts during weed and rabbit monitoring, also revealed additional evidence of feral pigs.

			N	Aonito	oring p	olot su	irvey s	ection	n (50 r	n)			· · · · · · · · · · · · · · · · · · ·
Plot	Transect	1	2	3	4	5	6	7	8	9	10	Transect cover (%)	Plot % (record/30)
	1	R	R									20%	
P01	2	R	R		R	R	RP	R	RD	R	R	90%	63%
	3			R	R	R	RP	R	RP	R	R	80%	
	1	F			F		R					30%	4201
P02	2											0%	13%
	3	R										10%	
	1		R			R		R				30%	2221
P03	2			R				R				20%	30%
	3		R		RP		Ρ		R			40%	
	1											0%	201
P04	2											0%	3%
	3			D								10%	
	1	D							R		R	30%	
P05	2									R		10%	20%
	3								DR	R		20%	
	1											0%	20/
P06	2											0%	3%
	3				R							10%	
	1				D				D			20%	6.70/
P07	2											0%	6.7%
	3											0%	
	1	R		R							R	30%	
P08	2	R					R	DR				30%	37%
	3	R	R	R	DR			R				50%	
												Total	22.1%

Table 1	9: Assessment o	f overall feral	pig presence	and activity	at the Lexing	ton offset site*.
	J. AJJCJJIICIIC U		pig presence	and activity	at the seams	ston onset site .

*Denoted as: R = Rooting, D = Dung, F = Footprints





5.1.3 Fauna camera station

Of the 15 fauna camera stations, 12 cameras were considered operable stations across each of the three consecutive nights. One camera (C01) was considered compromised across all three nights due to a failed camera flash, leaving photos taken at night (which would constitute the majority of pest animal activity) indiscernible. Additionally, one camera (C14) was considered compromised on days 2 and 3 and another (C15) was considered compromised on day 3, both because they were knocked over by cattle. As such, there was a total of 39 operable station nights for the purposes of calculating Catling Index values for pest animal species. The fauna cameras confirmed the presence of four pest animal species, namely feral dogs (*Canis familiaris/lupus*), feral cats (*Felis catus*), European rabbits (*Oryctolagus cuniculus*) and brown hares (*Lepus europaeus*) (Figure 19 and Figure 20). Scores from all four pest animal species detected ranged from 2.6 (European rabbit) to 18 (brown hare) (Table 20). Feral pigs were not detected by fauna cameras. Additionally, cane toads (Rhinella marina) were detected on several cameras over the three nights. Non-pest animals were also detected from the fauna camera stations, including a common brush-tail possum (*Trichosurus vulpecula*), rufous bettong (*Aepyprymnus rufescens*), a wallaby (Macropodidae indet.) and cattle (*Bos taurus*).

Overall, there were 12 individual pest animal detections, recorded from nine of the 15 fauna camera stations (Table 20). These detections were made throughout the site (Figure 21), with a concentration of records around the centre of the property represented largely by RE 11.8.11 natural grasslands habitat.

Pest	Confi	irmed	incide	nce of	pest ai	nimal s	species	from	given s	site						
animal species	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	Catling Index
Dog			1			1	1				1	1	1		1	
Day 1																
Day 2		✓		✓												5.1
Day 3																
Cat																
Day 1																
Day 2							~									5.1
Day 3						✓										
Europear	rabbi	t														
Day 1																
Day 2			✓													2.6
Day 3																
Brown ha	are															
Day 1						~		~								
Day 2						~					✓		✓		✓	18.0
Day 3						✓										
Feral pig																
Day 1																0

Table 20: Pest animal results from the Lexington offset site.



Pest animal species	Conf	Confirmed incidence of pest animal species from given site														
	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	Catling Index
Day 2																
Day 3																



Figure 19: Feral cat (Felis catus) captured at fauna camera CO6 at the Lexington offset site



Figure 20: Brown hare (Lepus europaeus) captured at fauna camera CO8 at the Lexington offset site





5.2 WEED MONITORING

A total of 24 weed species were identified from the 20 weed monitoring plots at the Lexington offset site. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the 20 weed monitoring plots, the average number of weed species observed per plot was 6.45 species, ranging between 3 species (Sites 06 and 19) and 13 species (Sites 09 and 10), with eight weed species only encountered at single sites. Weed cover across the 20 weed monitoring plots averaged 24.7%; ranging between 2% (Site 06) and 69.8% (Site 09) (Table 21, Figure 22). The most common weed was *Melinis repens*, recorded in 17 of the 20 sites (Table 21). *Megathyrsus maximus* (Guinea grass) was the weed species with the highest average cover, averaging 29.5% cover across the sites it was recorded within, and singly covering approximately half the area of Site 09. It should be noted that *M. maximus* only occurred in two of 20 weed plots, occurring in RE 11.8.11a along drainage channels.

Table 21: Lexington offset site weed assessment results.																								
Scientific name	Common name	Family name	Perce	entage o	over o	of weed	specie	s from	given s	ite													Number of sites	Average cover (%) ^a
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20		
Cryptostegia grandiflora	Rubber vine	Apocynaceae									0.8												1	0.8
Verbesina encelioides	Goldweed	Asteraceae									3.0	0.2					0.6						3	1.3
Parthenium hysterophorus	Parthenium weed	Asteraceae	17.1	0.7	1.8	0.5		0.2	1.3	14.5		8.2	15.0	4.6	2.8	4.0	23.9	14.1	5.3			12.6	16	7.9
Bidens pilosa	Cobbler's pegs	Asteraceae	0.1								5.7	1.0									0.1		4	1.7
Zinnia sp.	A sunflower	Asteraceae									0.1													0.1
Opuntia tomentosa	Velvety tree pear	Cactaceae															0.1						1	0.1
Vachellia farnesiana	Mimosa bush	Fabaceae	1.3		0.8					1.9	1.3	0.2	0.1			3.0	1.5	4.3	10.9	0.5			11	2.3
Stylosanthes viscosa	Sticky stylo	Fabaceae		0.5		1.7	0.9		2.7			0.1								0.1	0.8	0.1	8	0.9
Clitoria ternatea	Butterfly pea	Fabaceae								10.6	1.0	4.5											3	5.3
Macroptilium atropurpureum	Siratro	Fabaceae									0.1												1	0.1
Sida spinosa	Sida	Malvaceae		0.1							0.5												2	0.3
Waltheria indica	Sleepy morning	Malvaceae								0.1													1	0.1
Sida cordifolia	Flannel weed	Malvaceae									0.5												1	0.5
Malvastrum americanum	Malvastrum	Malvaceae			0.1	0.2	0.1		4.0	1.5		6.0	0.1				0.6	1.0	0.2				10	1.4
Sida acuta	Spinyhead Sida	Malvaceae										0.1											1	0.1
Cenchrus ciliaris	Buffel grass	Poaceae	0.1		1.1	8.9	21.5	1.3	9.4	1.8	3.0	8.9	5.8	0.5	0.5		0.7	1.9	13.6	0.1		0.1	17	4.6
Sorghum halepense	Johnson grass	Poaceae								0.6													1	0.6
Megathyrsus maximus	Guinea grass	Poaceae									47.8	11.2											2	29.5
Melinis repens	Red natal grass	Poaceae	21.7	8.2	0.1	12.6	39.0	0.5	1.0			0.7	2.9	0.2	2.5	0.2	0.6	0.2	0.5	8.4	11.2		17	6.5
Bothrichloa pertusa	Indian bluegrass	Poaceae	22.3	1.0		1.0					0.5	1.3					0.5		2.3				7	4.1
Capsicum sp.	Chilli	Solanaceae								1.0	5.6												2	3.3
Physalis minima	Wild gooseberry	Solanaceae	0.1		0.1					2.3							0.1	0.1	0.1				6	0.5
Solanum sp.	A nightshade	Solanaceae								0.5													1	0.5
Verbena officinalis	Common Verbena	Verbenaceae	1.1	0.1		0.2						0.3	0.1	0.8	0.3	0.4	0.1	0.3		0.1		0.9	12	0.4
	mber of species	8	6	6	7	4	3	5	10	13	13	6	4	4	4	10	7	7	5	3	4			
	,	Weed cover (%) ^b	63.7	10.6	4.0	25.0	61.5	2.0	18.3	34.5	69.8	42.5	24.0	6.1	6.0	7.6	28.7	21.8	32.8	9.2	12.1	13.7		

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.







5.3 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for offset areas comprising of RE 11.8.11 and RE 11.8.11a, whilst photo monitoring results from areas of RE 11.8.4 and RE 11.8.5 were assessed against 'Narrow-leaved Ironbark' photo standards (Table 22).

Photo monitoring showed some variability in the biomass of ground cover. Most sites in RE 11.8.11 and 11.8.11a (except site 06) were at least 3,015 kg/ha (Site 16) and up to 5,040 kg/ha (Sites 08-09, 12, 17). Site 06 had very low biomass compared to other 11.8.11 and 11.8.11a sites with a biomass of 1,080kg/ha, indicating potential overgrazing. Biomass in RE 11.8.4 and RE 11.8.5 ranged between 720 kg/ha in wooded areas with high canopy cover (Site 07) and 5,000 kg/ha (Sites 14, 15 and 18) associated with more open grassy woodland areas (Table 22). Evidence of heavy grazing was not observed at site 07, and as such it is assumed that the low biomass is a result of natural processes (e.g. a canopy dense enough to shade-out most grasses). Most other sites had high biomass throughout the MDS Project site due to the exceedingly high rainfall from October to December.

Ground photos used to assign biomass at the Lexington offset site are shown in Appendix E.

Table 22: Results of biomass monitoring on the Lexington offset site using Brigalow Belt Future Beef pasture photo)
standards.	

		Brigalow Belt pasture pho		
Photo monitoring site*	RE type	Narrow-leaved ironbark	Downs country	Biomass kg/ha
01	11.8.11		✓	3,850
02	11.8.4	✓		1,750
03	11.8.11		~	4,445
04	11.8.5	✓		1,750
05	11.8.4	✓		2,250
06	11.8.11		✓	1,080
07	11.8.4	✓		720
08	11.8.11a		✓	5,040
09	11.8.11a		✓	5,040
10	11.8.11a		✓	4,445
11	11.8.5	✓		3,625
12	11.8.11		✓	5,040
13	11.8.11		✓	4,445
14	11.8.5	✓		5,000
15	11.8.4	✓		5,000
16	11.8.11		\checkmark	3,015
17	11.8.11		~	5,040
18	11.8.5	~		5,000
19	11.8.4	✓		2,250



		Brigalow Belt pasture pho	Brigalow Belt pasture photo standard type							
Photo monitoring site*	RE type	Narrow-leaved ironbark	Downs country	Biomass kg/ha						
20	11.8.11		\checkmark	4,445						

* taken from the 0 m point of the permanent habitat monitoring transects (Sites 01 - 12) and the SW corner of the standalone weed monitoring plots (Sites 13 - 20).

5.4 GENERAL SITE INSPECTION

No additional fencing or access tracks were noted within of the extent of traversed areas in December 2021.

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. However, evidence of cattle has previously been observed in the natural grassland areas in the west and east of the Lexington offset area during surveys.

Outside of the weed monitoring plots assessed as part of the dry season surveys, there were a number of areas of notable weed infestation. Most noticeably was the extent and density of weeds within and adjacent to the ephemeral drainage line and bore on Prickle Farm Road that flanks the western edge of the mining lease (ML 70376). As noted in previous years' monitoring reports, the ephemeral drainage line continues to be densely infested by Noogoora burr (*Xanthium occidentale*), with areas away from the drainage line characterised by dense, monospecific stands of *Parthenium hysterophorus* and a sunflower (indet.). *P. hysterophorus* has also formed dense stands along the rest of the main track on the western edge of the mining lease (ML70376). Furthermore, there is considerable coverage of *Vachellia farnesiana* throughout the western Natural Grassland (RE 11.8.11) areas.

5.4.1 Significant species

While targeted surveys for *Dichanthium queenslandicum* (king blue-grass) and *D. setosum* were not scheduled to be undertaken at the Lexington offset site, *D. queenslandicum* was confirmed from near the vicinity of Sites 01 and 12 in Natural Grassland habitat (RE 11.8.11) in the east and west of the Lexington offset area. While flowering of *D. queenslandicum* is more typical during and after the wet season, the October and November rainfall is likely to have promoted the earlier than expected flush of growth and flowering of the species.

The presence of non-flowering *D. setosum*² has previously been confirmed in areas of RE 11.8.5 and RE 11.8.4 in the west of the offset area. However, *D. setosum* was not observed during the December 2021 dry season surveys. *D. setosum* is difficult to identify without fertile material and is more likely to produce inflorescences during and after the wet season.

² Prior surveying by CO2 Australia ecologists in March 2018 confirmed the presence of a previously undescribed species of *Dichanthium* from the Lexington offset area. This species was given the interim name *Dichanthium sp. affine. sericeum* until such time as it is formally described. Since this initial 2018 survey, CO2 Australia ecologist Dr Jarrad Cousin has confirmed additional populations of this undescribed species from other properties in the greater Springsure - Rolleston area. While investigations into this undescribed species are continuing by botanists from the Queensland Herbarium, with assistance from CO2 Australia, discerning the two species in the field is difficult, especially when there is limited flowering material.



6 RESULTS: LEXINGTON RAIL LOOP OFFSET SITE

6.1 WEED MONITORING

A total of 10 weed species were identified from the 12 weed monitoring plots. No additional species of weeds were observed in the offset area outside of those identified within the weed monitoring plots. Across the 12 weed monitoring plots, the average number of weed species observed per plot was 3.7, ranging between one species (LEXRL07 and LEXRL12) and six species (LEXRL03), with two weed species only encountered at single sites (*Senecio madagascariensis* and *Malvastrum americanum*). Weed cover across the 12 weed monitoring plots averaged 7.2%; ranging between 0.6% (LEXRL07) and 18.4% (LEXRL01)(Table 23, Figure 23 and Figure 24). The number of weed species differed by offset paddock, with the North Promenade paddock having a higher weed species richness and average cover (4.5 species and 13.2% cover) than Harry's paddock (5 species and 4.6% cover), with Contours paddock having the lowest weed species richness and average cover of all three paddocks (2.2 species and 3.9% cover). The most commonly encountered weed was *Melinis repens* which was recorded from 11 sites (Table 23). *Parthenium hysterophorus* had the highest average cover of 5.9% across the eight sites it was encountered at. Only three species had a greater average weed cover >1%.

Table 23: Lexington Rail Loop weed assessment results																
Colontific nome	Common nome	Fomily name	Percenta	ge cover of	weed spec	ies from gi	ven site								Number of	Average
Scientific name	Common name	ramity name	LEXRL01	LEXRI02	LEXRL03	LEXRL04	LEXRL05	LEXRL06	LEXRL07	LEXRL08	LEXRL09	LEXRL10	LEXRL11	LEXRL12	sites c	cover (%)ª
Parthenium hysterophorus	Parthenium weed	Asteraceae	13.2	5.1	4.9	1.6				6.1	4.0	0.2	12.4		8	5.9
Tridax procumbens	Tridax daisy	Asteraceae			0.1							0.5			2	0.3
Senecio madagascariensis	Fireweed	Asteraceae				0.1									1	0.1
Vachellia farnesiana	Mimosa bush	Fabaceae	2.5	3.8						3.8	1.0				4	2.8
Clitoria ternatea	Butterfly pea	Fabaceae			0.1	0.1									2	0.1
Malvastrum americanum	Malvastrum	Malvaceae				0.1									1	0.1
Cenchrus ciliaris	Buffel grass	Poaceae	0.5							1.3	0.5		0.1		4	0.6
Sorghum halepense	Johnson grass	Poaceae			1.0			0.1					0.1		3	0.4
Melinis repens	Red Natal grass	Poaceae	0.8	5.5	0.3	0.9	2.5	1.2	0.6	1.0		2.4	1.1	1.1	11	1.6
Verbena officinalis	Common Verbena	Verbenaceae	1.4	0.3	0.5		0.2			1.5	0.7	0.9	0.2		8	0.7
		Number of species	5	4	6	5	2	2	1	5	4	4	5	1		
		Weed cover (%) ^b	18.4	14.6	6.9	2.8	2.7	1.3	0.6	13.6	6.2	4.0	13.9	1.1		

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.









6.2 **BIOMASS MONITORING**

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all twelve of the sites comprising RE 11.8.11 (Table 24). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 2,140 kg/ha and 3,015 kg/ha 'Downs country' photo standards was reported as 2578 kg/ha).

Photo monitoring showed some variability in biomass of ground cover across all 12 photo monitoring sites. Overall, there was a high biomass for the grassland vegetation type. Aside from two sites supporting an estimated 2,578 kg/ha (Sites LEXRL03 and LEXRL09), all sites supported at least 3,850 kg/ha, up to 5,040 kg/ha (Sites LEXRL02, LEXRL04, LEXRL07 and LEXRL10). The average biomass was similar between the offset paddocks, with the average biomass at North Promenade, Harry's and Contours at an average of 3,978 kg/ha, 4,219 kg/ha and 4,088 kg/ha, respectively. Biomass between sites within the same paddocks was varied, with the most pronounced differences occurring at Harry's ranging between 2,578 kg/ha and 5,040 kg/ha. This is likely attributable to different grazing pressures, as well as historical trampling from horses in some areas.

Ground photos used to assign biomass at the Lexington Rail Loop offset site are shown in Appendix F.

		Brigalow Belt Future Beef pasture photo standard type	
Photo monitoring site*	RE type	Downs country	Biomass kg/ha
LEXRL01 – North Promenade paddock	11.8.11	\checkmark	3,850
LEXRL02 – North Promenade paddock	11.8.11	✓	5,040
LEXRLO3 – Harry's paddock	11.8.11	✓	2,578
LEXRLO4 – Harry's paddock	11.8.11	✓	5,040
LEXRL05 – Contours paddock	11.8.11	\checkmark	3,850
LEXRLO6 – Contours paddock	11.8.11	\checkmark	3,850
LEXRL07 – Contours paddock	11.8.11	\checkmark	5,040
LEXRL08 – North Promenade paddock	11.8.11	\checkmark	4,445
LEXRL09 – North Promenade paddock	11.8.11	✓	2,578
LEXRL10 – Harry's paddock	11.8.11	✓	5,040
LEXRL11 – Contours paddock	11.8.11	√	3,850
LEXRL12 – Contours paddock	11.8.11	✓	3,850

 Table 24: Results of biomass monitoring on the Lexington Rail Loop offset site using Brigalow Belt Future Beef pasture photo standards.

* taken from the 0 m point of the permanent habitat monitoring transects (LEXRL01 – LEXRL07) and the SW corner of the standalone weed monitoring plots (LEXRL08 – LEXRL12).

6.3 GENERAL SITE INSPECTION

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. A herd of 5-6 horses has previously been encountered within Harry's Paddock, with evidence throughout the paddock of horse manure. Horses were not observed during the December 2021 dry season surveys.



Likewise, evidence of cattle was observed within Contours paddock and in the vicinity of the southern boundary of North Promenade paddock.

All fences bounding the paddocks were in good condition. Access to many of the monitoring sites in the Contours paddock was via an access track outside of and adjacent to the western boundary of the paddock, whereas access to monitoring sites in Harry's paddock was via Wurba Road and access to the North Promenade monitoring sites was via existing access tracks into Lexington.

6.3.1 Significant species

While targeted survey for *Dichanthium queenslandicum* (king blue-grass) were not scheduled to be undertaken at the Lexington Rail Loop offset site, numerous populations of the species was confirmed. Most notably, a significant population of *D. queenslandicum* was noted throughout the LEXRL12 weed monitoring plot in the Contours paddock, with a population estimate of >250 tussocks. Further populations of *D. queenslandicum* were also confirmed from multiple locations within the LEXRL05 weed monitoring plot in the same paddock.



7 REFERENCES

Auld, B. (2009). *Guidelines for Monitoring Weed Control and Recovery of Native Vegetation*. NSW Department of Primary Industries. Bureau of Rural Sciences, Orange NSW.

CO2 Australia (2017). *MNESMP Baseline Monitoring Report – Meteor Downs South Coal Mine Project*. CO2 Australia, Brisbane, QLD.

CO2 Australia (2018). *Lexington Offset Area Initial Baseline Monitoring Report – Meteor Downs South Project*. CO2 Australia, Brisbane, QLD.

CO2 Australia (2020). Post-wet Season Monitoring Report – Year 3 (2019/20). CO2 Australia, Brisbane, QLD.

Cooke, B., McPhee, S., & Hart, Q. (1990). *Rabbits: a threat to conservation & natural resource management, how to rapidly assess a rabbit problem and take action*. Australia Bureau of Rural Sciences, Canberra.

Department of Environment and Heritage Protection (DEHP). (2017). *Guide to determining terrestrial habitat quality – version 1.2.* Department of Environment and Heritage Protection (State of Queensland), Brisbane.

Hone, J. (1988). Feral pig rooting in a mountain forest and woodland: Distribution, abundance and relationships with environmental variables. *Australian Journal of Ecology* **13**: 393-400

Mitchell, B., & Balogh, S. (2007a). *Monitoring Techniques for Vertebrate Pests: Wild Dogs.* NSW Department of Primary Industries. Bureau of Rural Sciences, Orange NSW.

Mitchell, B., & Balogh, S. (2007b). *Monitoring Techniques for Vertebrate Pests: Feral Pigs.* NSW Department of Primary Industries. Bureau of Rural Sciences, Orange NSW.

SLR Consulting (SLR) (2019). *Matters of National Environmental Significance Management Plan – Meteor Downs South Rail Loop Project*. A report prepared for Sojitz Coal Mining Pty Ltd. SLR Consulting, Townsville.



APPENDIX A MONITORING SITE LOCATIONS

MDS PROJECT SITE

Table A-1: Dry-season monitoring site locations and purpose on the MDS Project site.

									Pest animal monitoring		
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Habitat conditic assessment	Photo monitoring	Biomass monitoring	Rabbit plot	Feral pig plot	Fauna camera
	H01_0m	641462	7304249	~		~	~	~			
	H01_50m	641462	7304301	~	Squatter pigeon	~	✓				
01	W01_01	641462	7304249	✓			✓				
01	W01_02	641462	7304301	✓							
	W01_03	641462	7304348								
	R01	641462	7304249	~					~		
	H02_0m	640199	7303572	~	Natural Grasslands TEC, King blue-grass,	~	✓	✓			
	H02_50m	640203	7303621	✓	bluegrass	~	✓				
	W02_01	640199	7303572	~			✓				
02	W02_02	640203	7303621	~							
	W02_03	640210	7303627								
	R02	640199	7303572	~					~		
	H03_0m	638418	7303259	~		~	~	✓			
03	H03_50m	638425	7303308	~	Squatter pigeon	✓	\checkmark				
	W03_01	638418	7303259	✓			✓				



						E			Pest anir	nal monito	ring
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Habitat conditi assessment	Photo monitoring	Biomass monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W03_02	638425	7303308	✓							
	W03_03	638430	7303358								
	R03	638418	7303259	✓					✓		
	H04_0m	637945	7300236	✓	Natural Grasslands TEC, King blue-grass,	✓	✓	✓			
	H04_50m	637951	7300287	✓	bluegrass	✓	✓				
04	W04_01	637945	7300236	✓			✓				
	W04_02	637951	7300287	✓							
	W04_03	637950	7300338								
	R04	637945	7300236	✓					~		
	H05_0m	638426	7299836	✓	Squatter pigeon	✓	✓	✓			
	H05_50m	638420	7299885	\checkmark		✓	\checkmark				
OF	W05_01	638426	7299836	✓			✓				
05	W05_02	638420	7299885	✓							
	W05_03	638416	7299937								
	R05	638426	7299836	~					~		
	H06_0m	637445	7299566	~	Natural Grasslands TEC, King blue-grass,	~	~	~			
	H06_50m	637447	7299615	~	bluegrass	~	~				
06	W06_01	637445	7299566	~			~				
	W06_02	637447	7299615	~							
	W06_03	637443	7299668								


						۲.			Pest anir	nal monito	ring
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Habitat conditio assessment	Photo monitoring	Biomass monitoring	Rabbit plot	Feral pig plot	Fauna camera
	R06	637445	7299566	\checkmark					✓		
	H07_0m	638426	7298876	✓	Brigglow TEC	~	✓	~			
	H07_50m	638419	7298926	✓		~	✓				
07	W07_01	638426	7298876	\checkmark			✓				
07	W07_02	638419	7298926	\checkmark							
	W07_03	638423	7298974								
	R07	638426	7298876	\checkmark					✓		
	H08_0m	637032	7298735	\checkmark	Natural Grasslands TEC, King blue-grass,	~	✓	~			
08	H08_50m	637034	7298785	\checkmark	bluegrass	~	✓				
	W08_01	637032	7298735	~			~				
08	W08_02	637034	7298785	~							
	W08_03	637039	7298835								
	R08	637032	7298735	~					✓		
	H09_0m	638387	7298599	✓		~	~	~			
	H09_50m	638380	7298648	✓	Australian painted snipe	~	~				
00	W09_01	638387	7298599	✓			~				
09	W09_02	638380	7298648	✓							
	W09_03	638372	7298699								
	R09	638387	7298599	✓					✓		
10	H10_0m	636412	7297523	✓	Squatter pigeon	✓	~	~			



						E			Pest anir	nal monito	ring
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Habitat conditio assessment	Photo monitoring	Biomass monitoring	Rabbit plot	Feral pig plot	Fauna camera
	H10_50m	636415	7297571	✓		✓	✓				
	W10_01	636412	7297523	\checkmark			✓				
	W10_02	636415	7297571	✓							
	W10_03	636413	7297617								
	R10	636412	7297523	\checkmark					~		
	W11_01	642941	7304772	\checkmark			✓				
11	W11_02	642937	7304825								
	W11_03	642938	7304876								
	W12_01	641428	7303597	✓			✓				
12	W12_02	641426	7303646								
	W12_03	641429	7303696								
	W13_01	641896	7303196	✓			✓				
13	W13_02	641899	7303247								
	W13_03	641900	7303297								
	W14_01	638991	7303038	✓			✓				
14	W14_02	638987	7303090								
	W14_03	638988	7303140								
	W15_01	637797	7302245	\checkmark			~				
15	W15_02	637796	7302296								
	W15_03	637796	7302347								



						u			Pest anin	nal monito	ring
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Habitat conditio assessment	Photo monitoring	Biomass monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W16_01	638556	7300785	✓			✓				
16	W16_02	638560	7300832								
	W16_03	638566	7300882								
	W17_01	637029	7300184	✓			✓				
17	W17_02	637028	7300231								
	W17_03	637024	7300282								
	W18_01	637401	7300321	✓			✓				
18	W18_02	637401	7300368								
	W18_03	637398	7300421								
	W19_01	638301	7301720	✓			✓				
19	W19_02	638295	7301771								
	W19_03	638290	7301821								
	W20_01	636740	7298674	✓			✓				
20	W20_02	636746	7298723								
	W20_03	636752	7298771								
	P01_01	636412	7297523							✓	
21	P01_02	636412	7297423							✓	
	P01_03	636412	7297323							✓	
22	P02_01	636397	7298627							✓	
22	P02_02	636397	7298527							~	



					E			Pest animal monitoring			
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Habitat conditio assessment	Photo monitoring	Biomass monitoring	Rabbit plot	Feral pig plot	Fauna camera
	P02_03	636397	7298427							\checkmark	
	P03_01	637232	7298835							\checkmark	
23	P03_02	637232	7298735							\checkmark	
	P03_03	637232	7298635							\checkmark	
	P04_01	638126	7299076							\checkmark	
24	P04_02	638126	7298976							\checkmark	
	P04_03	638126	7298876							\checkmark	
	P05_01	638126	7299836							\checkmark	
25	P05_02	638126	7299736							\checkmark	
	P05_03	638126	7299637							\checkmark	
	P06_01	638156	7300985							\checkmark	
26	P06_02	638156	7300885							\checkmark	
	P06_03	638156	7300785							\checkmark	
	P07_01	638992	7303366							\checkmark	
27	P07_02	638992	7303266							\checkmark	
	P07_03	638992	7303166							\checkmark	
	P08_01	641150	7303945							\checkmark	
28	P08_02	641150	7303845							\checkmark	
	P08_03	641150	7303745							\checkmark	
29	C01	642072	7303376								\checkmark



						E			Pest anin	nal monito	oring
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Habitat conditio assessment	Photo monitoring	Biomass monitoring	Rabbit plot	Feral pig plot	Fauna camera
30	C02	641090	7303799								✓
31	C03	639787	7303069								✓
32	C04	638310	7301921								~
33	C05	638696	7301071								~
34	C06	638688	7300283								✓
35	C07	638680	7299504								✓
36	C08	638449	7298889								✓
37	C09	637509	7300705								✓
38	C10	637531	7300057								✓
39	C11	637071	7299149								~
40	C12	636869	7298600								✓
41	C13	636439	7297829								~
42	C14	636321	7297317								~
43	C15	637054	7297306								✓

^a Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3). R = start point (south-west) of 2 ha rabbit monitoring plot, P = start point (west) of each site's pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), C = fauna camera station. Start points for habitat assessment, weed monitoring and rabbit monitoring plots are the same for sites 01 – 10, with sites 11 – 20 only corresponding to weed monitoring plots.



MDS RAIL LOOP SITE

Table A-2: Dry-season monitoring site locations and purpose on the MDS Rail Loop site.

Site	Start point name ^a	Easting	Northing	Star picket?	Weed monitoring	Biomass monitoring
	W01_01	645575	7303101	✓	✓	
MDSRL01	W01_02	645575	7303151	✓	\checkmark	\checkmark
	W01_03	645575	7303201		\checkmark	
	W02_01	646410	7303007	\checkmark	\checkmark	
MDSRL02	W02_02	646410	7303057	\checkmark	\checkmark	\checkmark
	W02_03	646410	7303107		\checkmark	
	W03_01	646666	7303114	✓	\checkmark	
MDSRL03	W03_02	646666	7303164	✓	\checkmark	\checkmark
	W03_03	646666	7303214		\checkmark	
	W04_01	646834	7303291	✓	\checkmark	
MDSRL04	W04_02	646834	7303341	✓	✓	\checkmark
	W04_03	646834	7303391		\checkmark	
	W05_01	646409	7303255	✓	\checkmark	
MDSRL05	W05_02	646409	7303305		\checkmark	
	W05_03	646409	7303355		\checkmark	

^a Start points with prefix W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3).



LEXINGTON OFFSET SITE

Table A-3: Dry-season monitoring site locations and purpose on the Lexington offset site.

							Pest animal mo	onitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Biomass monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W01_01	604331	7354000	✓	✓	✓			
01	W01_02	604331	7353950	✓		✓			
01	W01_03	604331	7353900			✓			
	R01	604331	7353900	✓			~		
	W02_01	603925	7353100	✓	✓	✓			
00	W02_02	603908	7353053	✓		✓			
02	W02_03	603892	7353005			✓			
	R02	603892	7353005	✓			✓		
	W03_01	604380	7352577	✓	✓	✓			
02	W03_02	604380	7352527	✓		✓			
03	W03_03	604380	7352477			✓			
	R03	604380	7352477	✓			✓		
	W04_01	603904	7351791	✓	✓	~			
0.4	W04_02	603904	7351741	✓		✓			
04	W04_03	603904	7351691			✓			
	R04	603904	7351691	✓			✓		
05	W05_01	603360	7351127	✓	✓	~			
05	W05_02	603345	7351079	~		✓			



							Pest animal mo	onitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Biomass monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W05_03	603330	7351031			\checkmark			
	R05	603426	7351001	\checkmark			\checkmark		
	W06_01	604790	7351295	✓	✓	✓			
06	W06_02	604790	7351245	✓		✓			
	W06_03	604790	7351195			✓			
	W07_01	604649	7350850	\checkmark	\checkmark	\checkmark			
07	W07_02	604649	7350800	\checkmark		\checkmark			
07	W07_03	604649	7350750			\checkmark			
	R06	604649	7350750	✓			✓		
	W08_01	606488	7350461	\checkmark	\checkmark	\checkmark			
09	W08_02	606488	7350411	\checkmark		✓			
08	W08_03	606488	7350361			\checkmark			
	R07	606488	7350361	✓			✓		
	W09_01	607401	7351233	\checkmark	\checkmark	\checkmark			
09	W09_02	607401	7351183	✓		\checkmark			
	W09_03	607401	7351133			\checkmark			
	W10_01	607175	7351671	✓	✓	\checkmark			
10	W10_02	607175	7351621	✓		✓			
10	W10_03	607175	7351571			✓			
	R08	607175	7351571	✓			✓		
11	W11_01	609631	7353204	✓	~	✓			



							Pest animal mo	onitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Biomass monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W11_02	609631	7353154	✓		✓			
	W11_03	609631	7353104			\checkmark			
	R09	609631	7353104	✓			✓		
	W12_01	610371	7353217	✓	✓	✓			
12	W12_02	610371	7353167	✓		✓			
	W12_03	610371	7353117			\checkmark			
	W13_01	610237	7352615	\checkmark	\checkmark	\checkmark			
10	W13_02	610237	7352565	\checkmark		\checkmark			
12	W13_03	610237	7352515			✓			
	R10	610237	7352515	\checkmark			\checkmark		
	W14_01	604883	7354051	\checkmark	\checkmark	\checkmark			
14	W14_02	604883	7354001			\checkmark			
	W14_03	604883	7353951			✓			
	W15_01	604543	7352984	✓	✓	\checkmark			
15	W15_02	604543	7352934			\checkmark			
	W15_03	604543	7352884			\checkmark			
	W16_01	604604	7352289	✓	✓	\checkmark			
16	W16_02	604604	7352239			✓			
	W16_03	604604	7352189			✓			
17	W17_01	604503	7351656	✓	✓	✓			
1/	W17_02	604503	7351606			✓			



							Pest animal mo	onitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Biomass monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W17_03	604503	7351556			✓			
	W18_01	604074	7350714	✓	✓	✓			
18	W18_02	604074	7350664			~			
	W18_03	604074	7350614			~			
	W19_01	603812	7352530	✓	✓	~			
19	W19_02	603798	7352482			~			
	W19_03	603784	7352434			~			
	W20_01	610453	7352923	✓	✓	✓			
20	W20_02	610453	7352873			✓			
	W20_03	610453	7352823			✓			
21	P01_01	604442	7353084					✓	
	P01_02	604442	7352984					✓	
	P01_03	604442	7352884					✓	
22	P02_01	603879	7351891					✓	
	P02_02	603879	7351791					✓	
	P02_03	603879	7351691					✓	
23	P03_01	604513	7354397					✓	
	P03_02	604513	7354297					✓	
	P03_03	604513	7354197					~	
24	P04_01	604624	7350950					~	
	P04_02	604624	7350850					✓	



							Pest animal mo	onitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Biomass monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	P04_03	604624	7350750					✓	
25	P05_01	606463	7350561					✓	
	P05_02	606463	7350461					✓	
	P05_03	606463	7350361					~	
26	P06_01	607101	7351233					✓	
	P06_02	607101	7351133					✓	
	P06_03	607101	7351033					✓	
27	P07_01	607092	7351771					~	
	P07_02	607092	7351671					✓	
	P07_03	607092	7351571					✓	
28	P08_01	609840	7353261					✓	
	P08_02	609840	7353161					✓	
	P08_03	609840	7353061					✓	
29	C01	604003	7354128						✓
30	C02	604006	7353171						✓
31	C03	603871	7352215						✓
32	C04	603885	7351500						\checkmark
33	C05	605051	7354267						\checkmark
34	C06	604978	7353531						\checkmark
35	C07	604885	7352747						\checkmark
36	C08	604776	7352174						\checkmark



Site					Piomoss		Pest animal monitoring				
Site	Start point name ^a	Easting	Northing	Star picket?	Biomass monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera		
37	C09	604705	7351408						✓		
38	C10	604402	7350811						\checkmark		
39	C11	604107	7350032						\checkmark		
40	C12	610612	7353100						\checkmark		
41	C13	610156	7352282						\checkmark		
42	C14	606580	7350889						\checkmark		
43	C15	605496	7350889						✓		

^a Start points with prefix W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3), R = start point (south-west) of 2 ha European rabbit monitoring plot, P = start point (west) of each site's feral pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), C = fauna camera station. Start points for weed monitoring and European rabbit monitoring plots are the same for sites 01 – 10, with sites 11 – 20 only corresponding to weed monitoring plots.



LEXINGTON RAIL LOOP OFFSET SITE

Table A-4: Dry-season monitoring site locations and purpose on the Lexington Rail Loop offset site.

Site	Start point name ^a	Easting	Northing	Star picket?	Weed monitoring	Biomass monitoring
	W01_01	604390	7355247	✓	✓	✓
LEXRL01	W01_02	604390	7355297		✓	
	W01_03	604390	7355347		✓	
	W02_01	604758	7354797	✓	✓	✓
LEXRL02	W02_02	604758	7354847		✓	
	W02_03	604758	7354897		✓	
	W03_01	608595	7355228	✓	✓	✓
LEXRL03	W03_02	608595	7355278		✓	
	W03_03	608595	7355328		✓	
	W04_01	609262	7355036	√	✓	✓
LEXRL04	W04_02	609262	7355086		✓	
	W04_03	609262	7355136		✓	
	W05_01	612011	7354575	✓	✓	✓
LEXRL05	W05_02	612011	7354625		✓	
	W05_03	612011	7354675		✓	
	W06_01	611834	7354280	✓	✓	✓
LEXRL06	W06_02	611834	7354330		✓	
	W06_03	611834	7354380		\checkmark	
	W07_01	611215	7353711	√	\checkmark	~
LEAKLU/	W07_02	611215	7353761		~	



Site	Start point name ^a	Easting	Northing	Star picket?	Weed monitoring	Biomass monitoring
	W07_03	611215	7353811		✓	
	W08_01	604126	7354813	✓	✓	✓
LEXRL08	W08_02	604126	7354863		✓	
	W08_03	604126	7354913		✓	
	W09_01	604978	7355196	✓	✓	✓
LEXRL09	W09_02	604978	7355246		✓	
	W09_03	604978	7355296		✓	
	W010_01	609785	7355039	✓	✓	✓
LEXRL10	W010_02	609785	7355089		✓	
	W010_03	609785	7355139		✓	
	W11_01	611630	7353857	✓	✓	✓
LEXRL11	W11_02	611630	7353907		✓	
	W11_03	611630	7353957		✓	
	W12_01	612344	7354534	✓	✓	✓
LEXRL12	W12_02	612344	7354584		✓	
	W12_03	612344	7354634		✓	

^a Start points with prefix W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3).

APPENDIX B MDS PROJECT SITE YEAR 5 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 5 monitoring period at the MDS Project site (Meteor Downs South). Habitat condition scores were calculated in accordance with the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017). The data required to inform the site condition, fauna species habitat index scores and flora species stocking rates were collected as part of detailed field surveys in December 2019. The site context score was calculated based on a desktop assessment following the method prescribed in the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017), incorporating ground-truthed regional ecosystem mapping within the extent of ML70452.

Table B-1: Site condition raw data for each RE assessment unit

	Site 01 RE 11.8	3.5		Site 0 RE 11	2 .8.11		Site 0 RE 11	3 .8.5		Site 0 RE 11	4 .8.11		Site 0 RE 11	8.5		Site 0 RE 11	6 .8.11		Site 0 RE 11	7 4.3		Site 0 RE 11	8 .8.11		Site 09 RE 11	9 .3.3a		Site 10 RE 11.	0 .8.5	
Ecological condition indicators	Raw data	Benchmark (11.8.5)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.5)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.5)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.4.3)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.3.3)	Score	Raw data	Benchmark (11.8.5)	Score
Recruitment of woody perennial species	100	100	5	0	-	-	100	100	5	0	-	-	100	100	5	0	-	-	100	100	5	0	-	-	100	100	5	100	100	5
Native plant species richness - trees	2	2	5		-	-	3	2	5		-	-	1	2	3		-	-	10	2	5		-	-	1	3	3	2	2	5
Native plant species richness - shrubs	2	3	3		-	-	2	3	3		-	-	1	3	3		-	-	8	10	3		-	-	2	5	3	1	3	3
Native plant species richness - grasses	12	6	5	12	11	5	8	6	5	10	11	5	12	6	5	10	11	5	13	4	5	10	11	5	9	12	3	9	6	5
Native plant species richness - forbs	18	16	5	17	17	5	21	16	5	14	17	3	18	16	5	20	17	5	23	13	5	16	17	5	15	15	5	14	16	3
Tree canopy height	14.85	15	5		-	-	13.4	15	5		-	-	12	15	5		-	-	11	24	3		-	-	9.15	18	3	14	15	5
Tree sub canopy height	5.8	5			-		6.2	5			-		5	5			-		4				-		6	10		6	5	
Tree canopy cover	2	13	3.5		-	-	14.5	13	5		-	-	0	13	0		-	-	30	70	2		-	-	22.7	28	5	6.5	13	2.5
Tree sub canopy cover	2.6	4			-		2.4	4			-		0	4			-		8.6				-		3.6	5		0	4	
Shrub canopy cover	0	3	0		-	-	0	3	0		-	-	2	3	5		-	-	3.5	48	0		-	-	0	4	0	1.5	3	5
Native perennial grass cover	55.4	60	5	51	43	5	59	60	5	75	43	5	64	60	5	23	43	3	4.6	6	3	43	43	5	28	45	3	83	60	5
Organic litter	11	25	3	12	13	5	7	25	3	10	13	5	10	25	3	19	13	5	45.8	75	5	16	13	5	27	30	5	5.4	25	3
Large eucalypt trees	4	6	10		-	-	8	6	15		-	-	2	6	5		-	-	0	0	0		-	-	0	10	0	10	6	15
Large non-eucalypt trees	0	0			-		0	0			-		0	0			-		0	80			-		0	0		0	0	
Coarse woody debris	110	250	2		-	-	355	250	5		-	-	0	250	0		-	-	346	1752	2		-	-	0	285	0	112	250	2
Non-native plant cover	1.8	0	10	1.4	0	10	5.4	0	5	0.6	0	10	1	0	10	0.75	0	10	2.2	0	10	0.8	0	10	29.4	0	3	10	0	5
Total			61.5			30			66			28			54			28			48			30			38			63.5
/10			7.69			10.00			8.25			9.33			6.75			9.33			6.00			10.00			4.75			7.94



Table B-2: Summary of the site condition, site context and fauna species habitat index scores used to calculate the habitat condition score for each RE assessment unit

	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10
	11.8.5	11.8.11	11.8.5	11.8.11	11.8.5	11.8.11	11.4.3	11.8.11	11.3.3a	11.8.5
MNES values	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Brigalow TEC	Natural Grasslands TEC, King blue-grass, Bluegrass	Australian painted snipe	Squatter pigeon
Site condition										
Recruitment of woody perennial species	5	-	5	-	5	-	5	-	5	5
Native plant species richness - trees	5	-	5	-	3	-	5	-	3	5
Native plant species richness - shrubs	3	-	3	-	3	-	3	-	3	3
Native plant species richness - grasses	5	5	5	5	5	5	5	5	3	5
Native plant species richness - forbs	5	5	5	3	5	5	5	5	5	3
Tree canopy height	5	-	5	-	5	-	3	-	3	5
Tree canopy cover	3.5	-	5	-	0	-	2	-	5	2.5
Shrub canopy cover	0	-	0	-	5	-	0	-	0	5
Native perennial grass cover	5	5	5	5	5	3	3	5	3	5
Organic litter	3	5	3	5	3	5	5	5	5	3
Large trees	10	-	15	-	5	-	0	-	0	15
Coarse woody debris	2	-	5	-	0	-	2	-	0	2
Non-native plant cover	10	10	5	10	10	10	10	10	3	5
Total of BioCondition attributes	61.5	30	66	28	54	28	48	30	38	63.5
MAX ecological condition score	80	30	80	30	80	30	80	30	80	80
Score /10	7.69	10.00	8.25	9.33	6.75	9.33	6.00	10.00	4.75	7.94
Site context										
Size of patch (fragmented bioregions)	10	10	10	10	10	10	10	10	10	10
Connectivity (fragmented bioregions)	5	4	5	5	5	5	5	5	5	5
Context (fragmented bioregions)	5	4	5	5	5	4	5	4	5	5
Distance to permanent watering point (intact bioregions)	-	-	-	-	-	-	-	-	-	-
Ecological corridors	0	0	0	0	0	0	0	0	0	0
Total of site context attributes	20	18	20	20	20	19	20	19	20	20
MAX site condition score	26	26	26	26	26	26	26	26	26	26
Score /10	7.69	6.92	7.69	7.69	7.69	7.31	7.69	7.31	7.69	7.69
Fauna species habitat index								-		
Threats to species	7	-	7	-	7	-	-	-	1	7
Quality and availability of food and foraging habitat	5	-	10	-	5	-	-	-	5	5
Quality and availability of shelter	5	-	5	-	5	-	-	-	5	5
Species mobility capacity	10	-	10	-	10	-	-	-	1	10



	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10
	11.8.5	11.8.11	11.8.5	11.8.11	11.8.5	11.8.11	11.4.3	11.8.11	11.3.3a	11.8.5
MNES values	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Brigalow TEC	Natural Grasslands TEC, King blue-grass, Bluegrass	Australian painted snipe	Squatter pigeon
Role of site location to species overall population in the state	3	-	3	-	3	-	-	-	4	3
Total of fauna species habitat index	30	-	35	-	30	-	-	-	16	30
MAX fauna habitat index score	50	-	50	-	50	-	-	-	50	50
Score /10	6.00	-	7.00	-	6.00	-	-	-	3.20	6.00

Table B-3: Summary of the species stocking rate index for king blue-grass and bluegrass

Spacing stacking rate /28	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10
Species stocking rate / S	11.8.5	11.8.11	11.8.5	11.8.11	11.8.5	11.8.11	11.4.3	11.8.11	11.3.3a	11.8.5
King blue-grass	-	0	-	0	-	0	-	0	-	-
Bluegrass	-	0	-	0	-	0	-	0	-	-

^a species stocking rate contributes 20% toward the habitat condition score for the two MNES flora species, with the remaining 80% made up of site condition and site context.

Table B-4: Summary of the MNES habitat condition score for each RE assessment unit

	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10	FINAL MNES
Assessment unit habitat condition score /10	11.8.5	11.8.11	11.8.5	11.8.11	11.8.5	11.8.11	11.4.3	11.8.11	11.3.3a	11.8.5	habitat quality score
Brigalow TEC							6.42				6.42
Natural Grasslands TEC		8.57		8.57		8.39		8.75			8.57
King blue-grass		6.86		6.86		6.71		7.00			6.86
Bluegrass		6.86		6.86		6.71		7.00			6.86
Squatter pigeon	7.15		7.76		6.67					7.28	7.22
Australian painted snipe									4.74		4.74





APPENDIX C MDS PROJECT SITE PHOTO MONITORING



SITE 01 – H01_0M



Photo C-1 North

Photo C-2 East



Photo C-3 South

Photo C-4 West



Photo C-5 Ground



SITE 01 - H01_50M



Photo C-6 North

Photo C-7 East



Photo C-8 South

Photo C-9 West



Photo C-10 Ground



SITE 02 – H02_0 M



Photo C-11 North

Photo C-12 East



Photo C-13 South

Photo C-14 West



Photo C-15 Ground



SITE 02 – H02_50M



Photo C-16 North

Photo C-17 East



Photo C-18 South

Photo C-19 West



Photo C-20 Ground



SITE 03 – H03_0M



Photo C-21 North

Photo C-22 East



Photo C-23 South

Photo C-24 West



Photo C-25 Ground



SITE 03 - H03_50M



Photo C-26 North

Photo C-27 East



Photo C-28 South

Photo C-29 West



Photo C-30 Ground



SITE 04 - H04_0M



Photo C-31 North

Photo C-32 East



Photo C-33 South

Photo C-34 West



Photo C-35 Ground



SITE 04 - H04_50M



Photo C-36 North

Photo C-37 East



Photo C-38 South

Photo C-39 West



Photo C-40 Ground



SITE 05 – H05_0M



Photo C-41 North

Photo C-42 East



Photo C-43 South

Photo C-44 West



Photo C-45 Ground



SITE 05 - H05_50M



Photo C-46 North

Photo C-47 East



Photo C-48 South

Photo C-49 West



Photo C-50 Ground



SITE 06 - H06_0M



Photo C-51 North

Photo C-52 East



Photo C-53 South

Photo C-54 West



Photo C-55 Ground



SITE 06 - H06_50M



Photo C-56 North

Photo C-57 East



Photo C-58 South

Photo C-59 West



Photo C-60 Ground



SITE 07 – H07_0M



Photo C-61 North

Photo C-62 East



Photo C-63 South

Photo C-64 West



Photo C-65 Ground



SITE 07 – H07_50M



Photo C-66 North

Photo C-67 East



Photo C-68 South

Photo C-69 West



Photo C-70 Ground



SITE 08 - H08_0M



Photo C-71 North

Photo C-72 East



Photo C-73 South

Photo C-74 West



Photo C-75 Ground



SITE 08 – H08_50M



Photo C-76 North

Photo C-77 East



Photo C-78 South

Photo C-79 West



Photo C-80 Ground



SITE 09 – H09_0M



Photo C-81 North

Photo C-82 East



Photo C-83 South

Photo C-84 West



Photo C-85 Ground



SITE 09 - H09_50M



Photo C-86 North

Photo C-87 East



Photo C-88 South

Photo C-89 West



Photo C-90 Ground


SITE 10 - H10_0M



Photo C-91 North

Photo C-92 East



Photo C-93 South

Photo C-94 West



Photo C-95 Ground



SITE 10 - H10_50M



Photo C-96 North

Photo C-97 East



Photo C-98 South

Photo C-99 West



Photo C-100 Ground



SITE 11 - W11_0



Photo C-101 North

Photo C-102 East



Photo C-103 South

Photo C-104 West



Photo C-105 Ground



SITE 12 – W12_0



Photo C-106 North

Photo C-107 East



Photo C-108 South

Photo C-109 West



Photo C-110 Ground



SITE 13 – W13_0



Photo C-111 North

Photo C-112 East



Photo C-113 South

Photo C-114 West



Photo C-115 Ground



SITE 14 – W14_0



Photo C-116 North

Photo C-117 East



Photo C-118 South

Photo C-119 West



Photo C-120 Ground



SITE 15 – W15_0



Photo C-121 North

Photo C-122 East



Photo C-123 South

Photo C-124 West



Photo C-125 Ground



SITE 16 - W16_0



Photo C-126 North

Photo C-127 East



Photo C-128 South

Photo C-129 West



Photo C-130 Ground



SITE 17 – W17_0



Photo C-131 North

Photo C-132 East



Photo C-133 South

Photo C-134 West



Photo C-135 Ground



SITE 18 - W18_0



Photo C-136 North

Photo C-137 East



Photo C-138 South

Photo C-139 West



Photo C-140 Ground



SITE 19 – W19_0



Photo C-141 North

Photo C-142 East



Photo C-143 South

Photo C-144 West



Photo C-145 Ground



SITE 20 - W20_0



Photo C-146 North

Photo C-147 East



Photo C-148 South

Photo C-149 West



Photo C-150 Ground



APPENDIX D MDS PROJECT RAIL LOOP SITE PHOTO MONITORING



SITE MDSRL01 – H01_0M



Photo D-1 North

Photo D-2 East



<image>

Photo D-5 Ground



SITE MDSRL01 - H01_50M



Photo D-6 North

Photo D-7 East



Photo D-8 South

Photo D-9 West



Photo D-10 Ground



SITE MDSRL02 – H02_0 M



Photo D-11 North

Photo D-12 East



Photo D-13 South

Photo D-14 West



Photo D-15 Ground



SITE MDSRL02 – H02_50M



Photo D-16 North

Photo D-17 East



Photo D-18 South

Photo D-19 West



Photo D-20 Ground



SITE MDSRL03 – H03_0M



Photo D-21 North

Photo D-22 East



Photo D-23 South

Photo D-24 West



Photo D-25 Ground



SITE MDSRL03 – H03_50M



Photo D-26 North

Photo D-27 East



Photo D-28 South

Photo D-29 West



Photo D-30 Ground



SITE MDSRL04 – H04_0M



Photo D-31 North

Photo D-32 East



Photo D-33 South

Photo D-34 West



Photo D-35 Ground



SITE MDSRL04 – H04_50M



Photo D-36 North

Photo D-37 East



Photo D-38 South

Photo D-39 West



Photo D-40 Ground



SITE MDSRL05 – W05_0



Photo D-41 North

Photo D-42 East



Photo D-43 South

Photo D-44 West



Photo D-45 Ground



APPENDIX E LEXINGTON OFFSET SITE PHOTO MONITORING



SITE 01 - H01_0M



Photo E-1 North

Photo E-2 East



Photo E-3 South

Photo E-4 West



Photo E-5 Ground



SITE 01 - H01_50M





North

Photo E-7 East



Photo E-8 South

Photo E-9 West



Photo E-10 Ground



SITE 02 – H02_0M



Photo E-11 North

Photo E-12 East



Photo E-13 South

Photo E-14 West



Photo E-15 Ground



SITE 02 - H02_50M



Photo E-16 North

Photo E-17 East



Photo E-18 South

Photo E-19 West



Photo E-20 Ground



SITE 03 – H03_0M



Photo E-21 North

Photo E-22 East



Photo E-23 South

Photo E-24 West



Photo E-25 Ground



SITE 03 – H03_50M



Photo E-26 North

Photo E-27 East



Photo E-28 South

Photo E-29 West



Photo E-30 Ground



SITE 04 - H04_0M



Photo E-31 North

Photo E-32 East



Photo E-33 South

Photo E-34 West



Photo E-35 Ground



SITE 04 - H04_50M



Photo E-36 North

Photo E-37 East



Photo E-38 South

Photo E-39 West



Photo E-40 Ground



SITE 05 - H05_0M



Photo E-41 North

Photo E-42 East



Photo E-43 South

Photo E-44 West



Photo E-45 Ground



SITE 05 - H05_50M



Photo E-46 North

Photo E-47 East



Photo E-48 South

Photo E-49 West



Photo E-50 Ground



SITE 06 - H06_0M



Photo E-51 North

Photo E-52 East



Photo E-53 South

Photo E-54 West



Photo E-55 Ground



SITE 06 - H06_50M



Photo E-56 North

Photo E-57 East



Photo E-58 South

Photo E-59 West



Photo E-60 Ground



SITE 07 – H07_0M



Photo E-61 North

Photo E-62 East



Photo E-63 South

Photo E-64 West



Photo E-65 Ground


SITE 07 – H07_50M



Photo E-66 North

Photo E-67 East



Photo E-68 South

Photo E-69 West



Photo E-70 Ground



SITE 08 - H08_0M



Photo E-71 North

Photo E-72 East



Photo E-73 South

Photo E-74 West



Photo E-75 Ground



SITE 08 - H08_50M



Photo E-76 North

Photo E-77 East



Photo E-78 South

Photo E-79 West



Photo E-80 Ground



SITE 09 - H09_0M



Photo E-81 North

Photo E-82 East



Photo E-83 South

Photo E-84 West



Photo E-85 Ground



SITE 09 - H09_50M



Photo E-86 North

Photo E-87 East



Photo E-88 South

Photo E-89 West



Photo E-90 Ground



SITE 10 – H10_0M



Photo E-91 North

Photo E-92 East



Photo E-93 South

Photo E-94 West



Photo E-95 Ground



SITE 10 - H10_50M



Photo E-96 North

Photo E-97 East



Photo E-98 South

Photo E-99 West



Photo E-100 Ground



SITE 11 – H11_0M



Photo E-101 North

Photo E-102 East



Photo E-103 South

Photo E-104 West



Photo E-105 Ground



SITE 11 – H11_50M



Photo E-106 North

Photo E-107 East



Photo E-108 South

Photo E-109 West



Photo E-110 Ground



SITE 12 – H12_0M



Photo E-111 North

Photo E-112 East



Photo E-113 South

Photo E-114 West



Photo E-115 Ground



SITE 12 – H12_50M



Photo E-116 North

Photo E-117 East



Photo E-118 South

Photo E-119 West



Photo E-120 Ground



SITE 13 – H13_0M



Photo E-121 North

Photo E-122 East



Photo E-123 South

Photo E-124 West



Photo E-125 Ground



SITE 13 – H13_50M



Photo E-126 North

Photo E-127 East



Photo E-128 South

Photo E-129 West



Photo E-130 Ground



SITE 14 – W14_0



Photo E-131 North

Photo E-132 East



Photo E-133 South

Photo E-134 West



Photo E-135 Ground



SITE 15 – W15_0



Photo E-136 North

Photo E-137 East



Photo E-138 South

Photo E-139 West



Photo E-140 Ground



SITE 16 - W16_0



Photo E-141 North

Photo E-142 East



Photo E-143 South

Photo E-144 West



Photo E-145 Ground



SITE 17 – W17_0



Photo E-146 North

Photo E-147 East



Photo E-148 South

Photo E-149 West



Photo E-150 Ground



SITE 18 - W18_0



Photo E-151 North

Photo E-152 East



Photo E-153 South

Photo E-154 West



Photo E-155 Ground



SITE 19 - W19_0



Photo E-156 North

Photo E-157 East



Photo E-158 South

Photo E-159 West



Photo E-160 Ground



SITE 20 - W20_0



Photo E-161 North

Photo E-162 East



Photo E-163 South

Photo E-164 West



Photo E-165 Ground



APPENDIX F LEXINGTON RAIL LOOP OFFSET SITE PHOTO MONITORING



SITE LEXRL01 – H01_0M



Photo F-1 North

Photo F-2 East



Photo F-3 South

Photo F-4 West



Photo F-5 Ground



SITE LEXRL01 – H01_50M



Photo F-6 North

Photo F-7 East



Photo F-8 South

Photo F-9 West



Photo F-10 Ground



SITE LEXRLO2 – HO2_OM



Photo F-11 North

Photo F-12 East



Photo F-13 South

Photo F-14 West



Photo F-15 Ground



SITE LEXRLO2 – H02_50M



Photo F-16 North

Photo F-17 East



Photo F-18 South

Photo F-19 West



Photo F-20 Ground



SITE LEXRL03 – H03_0M



Photo F-21 North

Photo F-22 East



Photo F-23 South

Photo F-24 West



Photo F-25 Ground



SITE LEXRL03 – H03_50M



Photo F-26 North

Photo F-27 East



Photo F-28 South

Photo F-29 West



Photo F-30 Ground



SITE LEXRL04 – H04_0M



Photo F-31 North

Photo F-32 East



Photo F-33 South

Photo F-34 West



Photo F-35 Ground



SITE LEXRLO4 – H04_50M



Photo F-36 North

Photo F-37 East



Photo F-38 South

Photo F-39 West



Photo F-40 Ground



SITE LEXRL05 – H05_0M



Photo F-41 North

Photo F-42 East



Photo F-43 South

Photo F-44 West



Photo F-45 Ground



SITE LEXRL05 – H05_50M



Photo F-46 North

Photo F-47 East



Photo F-48 South

Photo F-49 West



Photo F-50 Ground



SITE LEXRLO6 – H06_0M



Photo F-51 North

Photo F-52 East



Photo F-53 South

Photo F-54 West



Photo F-55 Ground



SITE LEXRLO6 – H06_50M



Photo F-56 North

Photo F-57 East



Photo F-58 South

Photo F-59 West



Photo F-60 Ground



SITE LEXRL07 – H07_0M



Photo F-61 North

Photo F-62 East



Photo F-63 South

Photo F-64 West



Photo F-65 Ground



SITE LEXRL07 – H07_50M



Photo F-66 North

Photo F-67 East



Photo F-68 South

Photo F-69 West



Photo F-70 Ground



SITE LEXRL08 – W08_0



Photo F-71 North

Photo F-72 East



Photo F-73 South

Photo F-74 West



Photo F-75 Ground


SITE LEXRL09 – W09_0



Photo F-76 North

Photo F-77 East



Photo F-78 South

Photo F-79 West



Photo F-80 Ground



SITE LEXRL10 – W10_0



Photo F-81 North

Photo F-82 East



Photo F-83 South

Photo F-84 West



Photo F-85 Ground



SITE LEXRL11 – W11_0



Photo F-86 North

Photo F-87 East



Photo F-88 South

Photo F-89 West



Photo F-90 Ground



SITE LEXRL12 – W12_0



Photo F-91 North

Photo F-92 East



Photo F-93 South

Photo F-94 West



Photo F-95 Ground



APPENDIX B POST-WET SEASON MONITORING REPORT (2021/22) – CO2 AUSTRALIA 2022



Post-wet Season Monitoring Report (2021/22)

Year 5

- MDS Project site
- Lexington offset site

Year 3

- MDS Rail Loop site
- Lexington Rail Loop offset site

Meteor Downs South Coal Mine Project

Sojitz Blue Pty Ltd





Rev	Date	Description
0	11 April 2022	Draft issued to client for review

	Name	Position	Date
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CONTENTS

1	Int	r <mark>oduc</mark> t	ion	1
	1.1	MDS	Project and corresponding offsets	1
	1.2	MDS	Rail Loop and corresponding offsets	2
2	Me	thodo	logy	5
	2.1	Moni	toring locations	5
	2.2	Habit	at condition assessment (MDS Rail Loop and Lexington Rail Loop offset site)	18
	2.3	Photo	monitoring (MDS Rail Loop site and Lexington Rail Loop offset site)	19
	2.4	Habit	at availabilty assessment for Australian painted snipe (MDS PRoject site)	19
	2.5	King k	olue-grass and bluegrass surveys (MDS Project and MDS Rail Loop sites)	20
	2.6	Bioma	ass monitoring for fire management (All sites)	21
	2.7	Weed	monitoring (All sites)	22
	2.8	Pest a	nimal monitoring (MDS Project site and Lexington offset site)	23
	2.9	Gene	ral site inspections (All sites)	25
3	Res	sults: N	MDS Project site	26
	3.1	Targe	ted surveys	26
	3.2	Weed	l monitoring	30
	3.3	Pest a	inimal monitoring	33
	3.4	Bioma	ass monitoring	40
	3.5	Gene	ral site inspection	40
4	Res	sults: N	MDS Rail Loop site	42
	4.1	Habit	at monitoring	42
	4.2	Weed	I monitoring	44
	4.3	Photo	monitoring	49
	4.4	Bioma	ass monitoring	49
	4.5	Gene	ral site inspection	49
5	Res	sults: L	exington offset site	50
	5.1	Weed	Imonitoring	50
	5.2	Pest a	inimal monitoring	53
	5.3	Bioma	ass monitoring	60
	5.4	Gene	ral site inspection	61
6	Res	sults: L	exington Rail Loop offset site	62
	6.1	Habit	at monitoring	62
	6.2	Photo	monitoring	64
	6.3	Weed	monitoring	64
	6.4	Bioma	ass monitoring	68
	6.5	Gene	ral site inspection	68
7	Ref	erenc	es	70
Ар	pend	ix A	Monitoring site locations	A-1
Ар	pend	ix B	MDS Rail Loop site – Year 3 habitat condition assessment	B-4
Ар	pend	ix C	Lexington Rail Loop offset site – Year 3 habitat condition assessment	C-7
Ар	pend	ix D	MDS Project site photo monitoring	D-10
Ар	pend	ix E	MDS Rail Loop site photo monitoring	E-41



Appendix F	Lexington Offset Site photo Monitoring	F-51
Appendix G	Lexington Rail Loop Offset site photo monitoring	G-85



1 INTRODUCTION

U&D Mining Industry (Australia) Pty (U&D) has approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to develop and operate the Meteor Downs South (MDS) Coal Mine Project (the MDS Project) (Figure 1). U&D is in a joint venture with Sojitz Blue Pty Ltd (Sojitz Blue) to develop and operate the MDS Project.

1.1 MDS PROJECT AND CORRESPONDING OFFSETS

Under the Project EPBC Act approval (EPBC 2013/6779), the MDS Project has prepared the following documents:

- Matters of National Environmental Significance Management Plan (MNESMP)
 - to address EPBC 2013/6779 conditions 2, 3 and 4 with respect to the direct and indirect impacts of the MDS Project on matters of national environmental significance (MNES) at the MDS Project site
- Offset Management Plan (OMP)
 - to address EPBC 2013/6779 conditions 5 and 6 with respect to environmental offsets at the Lexington offset site (Figure 1) for significant residual impacts of the MDS Project on MNES and matters of state environmental significance (MSES)

The MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 1. The baseline (Year 1) management periods for the MDS Project site and the Lexington offset site are considered to be June 2017 – June 2018 (Project site) and October 2017 – October 2018 (Lexington offset site).

The current report includes the Year 5 (2021/2022) post-wet season monitoring report for the MDS Project site and the Lexington offset site.

Site	Monitoring activity	Management plan	Frequency	Timing
	General site inspection	MNESMP Section 13.2	Annually	Dry season and post-wet season
	Habitat condition assessment	MNESMP Section 13.3	Annually	Dry season
	Photo monitoring	MNESMP Section 13.4	Annually	
MDS Project site	Targeted surveys for king blue-grass and bluegrass	MNESMP Section 13.5	Annually	End of the wet season and/or when most detectable
	Habitat availability assessment for Australian painted snipe	MNESMP Section 13.6	Every 2 years	Wet season or following inundation event
	Targeted surveys for the squatter pigeon	MNESMP Section 13.3	Annually	Post-wet season
	Pest animal monitoring	MNESMP Section 13.7	Every 2 years	Dry season and post-wet
	Weed monitoring	MNESMP Section 13.8	Every 2 years	season
	Biomass	MNESMP Section 13.9	Annually	Post-wet season
Lexington offset site	General offset site monitoring	OMP Section 7.1	Annual	Post-wet season

Table	1: Summary	of MDS Proj	ect and offse	t site biodiversity	/ monitoring	requirements



Site	Monitoring activity	Management plan	Frequency	Timing
	Weed monitoring	OMP Section 7.4	Every 2 years	Dry season and post-wet season
	Pest animal monitoring	OMP Section 7.5	Every 2 years (dry season and post wet season surveys)	Dry season and post-wet season
	Biomass monitoring	OMP Section 7.6	Annually	Post wet season prior to and during grazing events

1.2 MDS RAIL LOOP AND CORRESPONDING OFFSETS

In December 2019, Sojitz Blue received approval under the EPBC Act to develop and operate the Meteor Downs South Mine Rail Loop (MDS Rail Loop). Under the Project EPBC Act approval (EPBC 2019/8482), Sojitz Blue has prepared the following documents:

- Matters of National Environmental Significance Management Plan (Rail Loop MNESMP)
 - to address EPBC 2019/8482 condition 6 with respect to the direct and indirect impacts of the MDS Rail Loop project on matters of national environmental significance (MNES) at the MDS Rail Loop site
- Offset Management Plan (OMP)
 - to address EPBC 2019/8482 conditions 2, 3, 4 and 5 with respect to environmental offsets at the Lexington Rail Loop offset site (Figure 1) for significant residual impacts of the MDS Rail Loop on MNES.

The Rail Loop MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 2. This report incorporates the Year 3 (2021/2022) post-wet season monitoring report for both the MDS Rail Loop and the corresponding Lexington offset site.

Site	Monitoring activity	Management plan	Frequency	Timing
	General site inspection	Rail Loop MNESMP Section 7.2	Biannually	End of the dry season and end of the wet season
	Habitat quality assessments and photo monitoring	Rail Loop MNESMP Section 7.3	Annually	Post-wet season
MDS Rail Loop site	Photo monitoring	Rail Loop MNESMP Section 7.3	Annually	
	Targeted surveys for king blue-grass	Rail Loop MNESMP Section 7.4	Annually	
	Weed monitoring	Rail Loop MNESMP Section 7.5	Biannually within habitat quality assessment plots Every 2 years at each of the weed monitoring plots	End of the dry season and post- wet season

Table 2: Summary of MDS	Project Rail Loop and	d Lexington Rail Loop	offset biodiversity	monitoring requirements
Tuble 2. Summary of MDS	i roject nan Eoop an	a revulgion wan roop	onset bloarversity	monitoring requirements



Site	Monitoring activity	Management plan	Frequency	Timing
	Biomass monitoring for fire management	Rail Loop MNESMP Section 7.6	Biannually	End of the dry season and end of the wet season
Lexington Rail Loop offset site	General offset site monitoring	OMP Section 7.1	Annually	Post-wet season
	Habitat condition assessment and photo monitoring	OMP Section 7.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2039	Post-wet season
	Photo monitoring	OMP Section 7.2.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2039	Post-wet season
	Weed monitoring	OMP Section 7.4	Baseline in 2020 (Year 1), then every 2 years	Dry season and post-wet season
	Biomass monitoring	OMP Section 7.6	Annually	Post wet season prior to and during grazing events





2 METHODOLOGY

Field surveys were undertaken by two tertiary-qualified ecologists (Dean Orrick and Simon Danielsen) between 7 and 14 April 2022.

Permanent monitoring sites were established at each site for the MDS Project and Lexington offset site as part of the baseline surveys carried out between December 2017 and April 2018, detailed in the following:

- MNESMP Baseline Monitoring Report Meteor Downs South Coal Mine Project. A report prepared by CO2 Australia in 2017 (CO2 Australia 2017) – baseline monitoring sites established in December 2017
- Lexington Offset Area Initial Baseline Monitoring Report Meteor Downs South. A report prepared by CO2 Australia in 2018 (CO2 Australia 2018) – baseline monitoring sites established in April 2018.

Permanent monitoring sites for the MDS Rail Loop and the Lexington Rail Loop offset were established as part of Year 1 surveys carried out during the post-wet season field surveys (June/July 2020), detailed in the following:

Post-wet Season Monitoring Report – Year 3 (2019/20). A report prepared by CO2 Australia in 2020 (CO2 Australia 2020) – baseline monitoring sites established in June 2020.

2.1 MONITORING LOCATIONS

2.1.1 MDS Project site

Post-wet season monitoring activities at the MDS Project site comprised:

- General site inspection
- Targeted king blue-grass and bluegrass surveys
- Targeted squatter pigeon surveys
- Habitat availability assessments for the Australian painted snipe
- Pest animal monitoring
- Weed monitoring
- Biomass monitoring

Table 3 shows activities at each monitoring location at the MDS Project site. A total of 43 permanent sites/plots were monitored across the balance of ML70452 outside of the MDS project (refer to Figure 2 and Figure 3). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 3), according to the following:

- 15 x targeted king blue-grass and bluegrass surveys
- 20 x weed monitoring plots (1 ha)
 - Partially collocated with rabbit monitoring plots (sites 01 10), with remaining 10 sites (Sites 11 20) standalone weed monitoring plots
- 10 x rabbit monitoring plots (2 ha)
 - Collocated with habitat monitoring sites and weed monitoring plots (R01 R10)
- 8 x pig monitoring plots (15 ha) (sites P01 P08)
- 15 x pest animal fauna camera stations (sites C01 C15)
 - Located throughout the site adjacent existing tracks
- 30 x photo monitoring sites



- established at 0 m and 50 m points along 100 m habitat monitoring transect (Sites 01 10) and at SW corner of weed monitoring plots (Sites 11 – 20)
- 20 x biomass monitoring sites
 - Established at 0 m point along 100 m habitat monitoring transect (Sites 01 10) and at SW corner of weed monitoring plots (Sites 11 – 20)

At the first 10 weed monitoring sites (Sites 01 - 10), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the habitat monitoring sites' 100 m transect. At the other weed monitoring plots (Sites 11 - 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-1 in Appendix A for detailed locations of each of the monitoring sites at the MDS Project site.

							Pest a	nimal mon	itoring
Site	King blue-grass and bluegrass	Australian painted snipe	Squatter pigeon	Biomass monitoring	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Camera trap
01 - 10				✓	✓	✓	~		
11-20				✓	~	✓			
P01 – P08								~	
C01 – C15									~
Established grass transects	~								
Naroo Dam		✓							
General site traverses			~						

Table 3: Monitoring locations at the MDS Project site, surveyed as part of the 2021/22 post-wet season surveys



148°22'E





2.1.2 MDS Rail Loop site

Post-wet season monitoring activities at the MDS Rail Loop site comprised monitoring of the following:

- General offset site monitoring
- Habitat condition assessments
- Photo monitoring
- Targeted king blue-grass surveys
- Weed monitoring
- Biomass monitoring

Table 4 shows activities at each monitoring location established at the MDS Rail Loop site. A total of five permanent monitoring sites/plots are monitored (refer to Figure 4). While the Rail Loop MNESMP (SLR 2019a) stipulated one of the weed monitoring plots to be established in the *Leucaena* plantation, consultation with Sojitz Blue indicated the safety issues related to monitoring sites within the centre of the rail loop requiring crossing of the rail line. Instead, all plots were established on the outside of the rail loop (refer to Figure 4). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 4), according to the following:

- 4 x habitat quality assessment sites (50 m x 10 m)
 - collocated with weed monitoring plots, grassland assessment sites and king blue-grass survey sites (sites MDSRL01 – MDSRL04)
- 4 x natural grasslands TEC monitoring sites (50 m x 20 m)
 - collocated with habitat quality assessment sites, assessing Natural Grassland indicators (sites MDSRL01 – MDSRL04)
- 4 x targeted king blue-grass surveys (50m x 10m)
 - collocated with habitat quality assessment plots and grassland assessment sites (sites MDSRL01 MDSRL04)
- 5 x weed monitoring plots (1 ha)
 - Collocated with habitat monitoring sites (sites MDSRL01 MDSRL04), with a single standalone weed monitoring plot (site MDSRL05)
- 9 x photo monitoring sites
 - established at 0 m and 50 m points along 50 m habitat monitoring transect (sites MDSRL01 MDSRL04) and at SW corner of the standalone weed monitoring plot (site MDSRL05)
- 4 x biomass monitoring sites
 - assessed from the 50 m point of the habitat monitoring transect at each of the four habitat monitoring sites (sites MDSRL01 – MDSRL04)



Table 4: Monitoring locations at the MDS Rail Loop site, surveyed as part of the 2021/22 post-wet season surveys

Site	Habitat quality assessment	Natural Grasslands TEC monitoring	King blue-grass surveys	Photo monitoring	Weed monitoring	Biomass monitoring
MDSRL01 – MDSRL04	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
MDSRL05				~	*	









2.1.3 Lexington offset site

Post-wet season monitoring activities at the offset site comprised:

- General offset site monitoring
- Pest animal monitoring
- Weed monitoring
- Biomass monitoring

Table 5 shows activities at each monitoring location at the offset site. A total of 43 permanent monitoring sites/plots were monitored across the offset site (refer to Figure 5 and Figure 6). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 5), according to the following:

- 20 x weed monitoring plots (1 ha)
 - 13 sites are collocated with habitat monitoring sites (Sites 01 13), and 7 sites (Sites 14 20) are standalone weed monitoring plots
- 20 x biomass monitoring sites
 - 13 sites established at 0 m point along 100 m habitat monitoring transect (Sites 01 13) and at SW corner of weed monitoring plots (Sites 14 20)
- 10 x rabbit monitoring plots (2 ha)
 - collocated with 10 of the weed monitoring sites (sites 01 05, 07 08, 10 11 and 13)
- 8 x pig monitoring plots (15 ha) (P01 P08)
- ▶ 15 x pest animal fauna camera stations (sites C01 C15)
 - fauna camera stations were established along pest animal survey tracks

At each of the 13 habitat monitoring sites (Sites 01 - 13), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At the other seven weed monitoring plots (Sites 14 - 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-2 in Appendix A for detailed locations of each of the monitoring sites at the Lexington offset site.

			Pest monitoring			
Site	Weed monitoring	Biomass monitoring	Rabbit monitoring	Pig monitoring	Pest animal camera stations	
01 – 20	\checkmark	✓	√*			
P01 - P08				\checkmark		
C01 – C15					\checkmark	

Table 5: Monitoring locations at the Lexington offset site, surveyed as part of the 2021/22 post-wet season surveys

* Includes sites 01 – 05, 07 – 08, 10 – 11 and 13.







2.1.4 Lexington Rail Loop offset site

Post-wet season monitoring activities at the Lexington Rail Loop offset site comprised establishment and monitoring of the following:

- General offset site monitoring
- Habitat condition assessments
- Weed monitoring
- Photo monitoring
- Biomass monitoring

Table 6 shows activities at each monitoring location established at the Lexington Rail Loop offset site; divided into three 'paddocks' across the north of Lexington – 'North Promenade', 'Harry's' and 'Contours'. A total of 12 permanent monitoring sites/plots are monitored across the three paddocks (refer to Figure 7 and Figure 8). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 6), according to the following:

- 7 x habitat monitoring sites (50 m x 10 m)
 - collocated with weed monitoring plots (sites LEXRL01 LEXRL07)
- 12 x weed monitoring plots (1 ha)
 - collocated with the seven habitat monitoring sites (sites LEXRL01 LEXRL07), with five additional, standalone weed monitoring plots (sites LEXRL08 – LEXRL12)
- 19 x photo monitoring sites
 - 14 established at 0 m and 50 m points along habitat monitoring transect (sites LEXRL01 LEXRL07), and five at SW corner of standalone weed monitoring plots (sites LEXRL08 – LEXRL12)
- 12 x biomass monitoring sites
 - seven established at the 0 m point along the 100 m habitat monitoring transects (Sites LEXRL01 LEXRL07), and five at SW corner of standalone weed monitoring plots (Sites LEXRL08 LEXRL12).

 Table 6: Monitoring locations at the Lexington Rail Loop offset site, surveyed as part of the 2021/22 post-wet season surveys.

Site	Habitat monitoring	Photo monitoring	Weed monitoring	Biomass monitoring		
North Promenade paddock						
LEXRL01 – LEXRL02	\checkmark	\checkmark	\checkmark	\checkmark		
LEXRL08 – LEXRL09		\checkmark	✓	\checkmark		
Harry's paddock						
LEXRL03 – LEXRL04	\checkmark	\checkmark	✓	\checkmark		
LEXRL10		\checkmark	✓	✓		
Contours paddock						
LEXRL05 – LEXRL07	\checkmark	\checkmark	✓	\checkmark		
LEXRL11 – LEXRL12		\checkmark	✓	\checkmark		
				15		





148°5'E

23°55'S

23°56'5





2.2 HABITAT CONDITION ASSESSMENT (MDS RAIL LOOP AND LEXINGTON RAIL LOOP OFFSET SITE)

Habitat condition assessment sites were undertaken at the MDS Rail Loop site and Lexington Rail Loop offset sites based on the requirements of the *Guide to determining terrestrial habitat quality* (DEHP 2017). A total of four habitat condition assessment sites were undertaken at the MDS Rail Loop site, with seven habitat condition assessment sites undertaken at the Lexington Rail Loop offset site. Each of the habitat condition assessment sites of m ransects, with the start (0 m) and central (50 m) points marked with a 1.8 m galvanised steel picket with plastic safety cap (refer to Figure 4, Figure 5 and Figure 6).

Habitat condition assessments for Natural Grasslands TEC and king blue-grass were undertaken at the habitat condition assessment sites generally in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017). Through the application of the guide, a habitat quality score was calculated for each MNES based on the following key indicators:

- site condition: a general condition assessment of vegetation compared to a benchmark
- site context: an analysis of the site in relation to the surrounding environment

Natural Grasslands TEC habitat condition was determined according to the approved Commonwealth listing advice (TSSC 2009). As per the listing advice, five condition thresholds were used to classify a patch of Natural Grasslands TEC into 'best quality' and 'good quality', which are defined in Table 7.

In the absence of the *Guide to determining terrestrial habitat quality* (DEHP 2017) including a species habitat index for flora species, the habitat condition scores for the MNES flora species (king blue-grass) included a species presence index out of three, whereby: 0 = absent/not confirmed, 2 = up to five tussocks confirmed, 2.5 = up to 20 tussocks confirmed, 3 = more than 20 tussocks confirmed. The habitat condition score for the king blue-grass was then calculated as a combination of site condition and site context for the RE assessment unit (representing 80% of the score), with species stocking rate converted to a score out of 10 and contributing 20%.

	Best quality	Good quality		
Patch size	At least 1ha; and	At least 5ha; and		
Grasses	At least 4 native perennial grass species from the list of perennial native grass indicator species; and	At least 3 native perennial grass species from the list of perennial native grass indicator species; and		
Tussock cover	At least 200 native grass tussocks; and	At least 200 native grass tussocks; and		
Woody shrub ¹ cover	Total projected canopy cover of shrubs is less than 30%; and	Total projected canopy cover of shrubs is less than 50%; and		
Introduced species	Perennial non-woody introduced species are less than 5% of the total projected perennial plant cover.	Perennial non-woody introduced species are less than 30% of the total projected perennial plant cover.		

 Table 7: Condition Classes for the Natural Grasslands of the Queensland Central Highlands and the Northern Fitzroy

 Basin Ecological Community (TSSC 2009)

¹The shrub layer is typically absent. However, where shrubs are present, they are defined as woody plants, more than 0.5 m tall that occupy the mid vegetation layer. The upper, or tree canopy layer, also is typically absent but may comprise scattered trees to less than 10% projective crown cover.

Sampling should be based upon a quadrat size of 0.1ha (e.g. 50 m x 20 m) selected in an area with the most apparent native perennial grass species. Unless exceptional circumstances apply, to maximise the assessment of condition,



Best quality

Good quality

sites must be assessed during a good season, two months after cessation of disturbance (fire/grazing/mowing/slashing) and within two months of effective rain.

2.3 PHOTO MONITORING (MDS RAIL LOOP SITE AND LEXINGTON RAIL LOOP OFFSET SITE)

Photo monitoring was undertaken at permanent sites established as part of baseline surveys on the MDS Rail Loop site and Lexington Rail Loop offset site to give a representative indication of cover and species composition (including weeds) for the general area and enable visual assessment of habitat changes over time. Photo monitoring sites were established with a 1.8 m galvanised steel picket with plastic safety cap.

At each of the photo monitoring points, five photos were taken from 1.5 m height above ground level looking north, east, south and west with a ground photo taken looking down at an angle of 45° to the northwest of the star picket. Photo monitoring sites were delineated as follows:

- At the MDS Rail Loop site, photo monitoring was undertaken at nine sites, including two at each of the four habitat quality assessment sites (0 m and 50 m points: Site MDSRL01 MDSRL04), with a single photo monitoring point at the SW corner of the remaining one standalone weed monitoring plot (Site MDSRL05) identified in Table 4 and shown in Figure 4
- At the Lexington Rail Loop offset site, photo monitoring was undertaken at 19 sites, including 14 at each of the habitat condition assessment sites (0 m and 50 m points: sites LEXRL01 LEXRL07), with single photo monitoring points at the SW corner of the remaining five weed monitoring plots (sites LEXRL08 LEXRL12) identified in seven established at the 0 m point along the 100 m habitat monitoring transects (Sites LEXRL01 LEXRL07), and five at SW corner of standalone weed monitoring plots (Sites LEXRL08 LEXRL08 LEXRL12) identified in Table 6 and shown in Figure 7 and Figure 8.

A record of the photographs is shown in Appendix E and Appendix G for the MDS Rail Loop and the Rail Loop offset sites, respectively. While not required to be collected as part of the 2022 post-wet season surveys, photo monitoring was also undertaken at the MDS Project site and Lexington offset site (Appendix D and Appendix F) primarily as reference material for the condition of each site across each year.

2.4 HABITAT AVAILABILTY ASSESSMENT FOR AUSTRALIAN PAINTED SNIPE (MDS PROJECT SITE)

Monitoring of habitat availability for Australian painted snipe was undertaken during the post-wet season surveys, which typically includes:

- systematic surveying for Australian painted snipe by traversing habitat areas with the aim of detecting by sight or by flushing. Surveys are generally undertaken on three mornings over a five day period, totalling approximately eight hours
- > quantification of the area of Australian painted snipe habitat.

The systematic survey typically includes multiple circumnavigations of fringing habitat surrounding Naroo Dam, with access granted by Glencore via the Rolleston Mine to those parts of Naroo Dam not within the MDS lease. It should be noted that for this particular monitoring period, a lack of suitable Australian painted snipe habitat (i.e. water in the dam) meant it was redundant to complete surveys for more than one morning (see Section 3.1.3 for more detail).

The extent of Australian painted snipe habitat on the site was identified and quantified in the field in accordance with the following criteria, consistent with the known ecology of the species:



- Shallow water foraging habitat calculated as the area of open water habitat (on the lease and adjacent lease).
- Muddy substrate foraging habitat calculated as 10 m buffer adjacent open water habitat (on the lease and adjacent lease).
- Area of appropriate shelter habitat calculated as areas of rank emergent tussocks of grass, sedges, rushes or reeds, samphire, clumps of lignum (*Muehlenbeckia*), canegrass or Melaleuca within 50 m of the boundary of open water habitat.

2.5 KING BLUE-GRASS AND BLUEGRASS SURVEYS (MDS PROJECT AND MDS RAIL LOOP SITES)

2.5.1 MDS Project site

Targeted surveys were undertaken for king blue-grass and bluegrass throughout the MDS Project site. This included incidental surveys while traversing the site on foot (e.g. biomass monitoring) as well as targeted surveys along established transects established in March 2018.

Targeted transect surveys were undertaken along 15 of the 25 transects previously surveyed in March 2018, June 2020 and May 2021, including the four transects with previously confirmed king blue-grass records (Sites 12, 19, 22 and 25) and one transect with previously confirmed bluegrass records (Site 07). Sites traversed in March 2022 are listed in Table 8. Threatened grass surveys were undertaken targeting the presence, distribution and abundance of king blue-grass and bluegrass within 2 m of the centreline of the 12 transects.

Where king blue-grass or bluegrass was encountered within 2 m of the centreline of a transect, an estimate was made of the number of tussocks of each species considered to be within a contiguous population. A tussock was defined as a tuft or clump of a given species of grass growing from a common origin, whereas a population was defined as a collection of contiguous tussocks of a given species. The number of tussocks comprising a population was still estimated where populations extended beyond 2 m of the transect centreline. The number of tussocks in a population was estimated by assigning a population size to one of six abundance categories:

- 1 2 tussocks
- ≥2 5 tussocks
- ≥5 20 tussocks
- ≥20 50 tussocks
- ≥50 100 tussocks
- 100+ tussocks

An estimate of population size of a given species was calculated by summing the lower range interval of each population's tussock abundance category to represent the minimum estimate of abundance, with the upper range interval of each population's tussock abundance category summed to give an upper estimate of abundance. The resulting range represents a conservative estimate of tussock abundance across the survey area (i.e. survey area with four populations: 1-2 tussocks, 2-5 tussocks, 20-50 tussocks and 100+ tussocks equates to a survey area abundance range estimate of 123 – 157 tussocks from four populations). Based on the number of populations, a calculation was also made of the number of populations per kilometre of transect, which in combination with the estimate of total population size within the survey area allows for a comparison with monitoring events in subsequent years.



Optimal conditions for the detectability for king blue-grass and bluegrass are typically during and just after the wet season (summer months), provided there has been sufficient rain. This generally leads to abundant fertile material, which is key for accurate identification of the two grass species. Particularly dry weather leading up to a survey event often leads to an absence of lush fertile material, and as such, the two species are difficult to be confidently discerned from other grass species with similar morphology (particularly superficially-similar *Dichanthium* and *Bothriochloa* species).

-					
Transect		rt point	End	Length (m)	
manseet	Easting	Northing	Easting	Northing	Length (m)
06	638306	7303321	638238	7303185	152
07	637991	7302726	637926	7302590	151
08	637777	7302305	637857	7302105	215
10	637417	7300418	637561	7299986	456
11	637935	7300289	638196	7300219	270
12	638328	7300164	638659	7299995	372
13	638634	7300462	638640	7300700	238
15	637599	7299716	637855	7299348	448
16	638517	7299569	638623	7299261	326
17	637148	7299183	637319	7299064	208
18	636979	7299062	636876	7298806	277
19	637123	7298983	637002	7298677	329
22	636545	7298529	636783	7298451	251
24	636562	7297408	636656	7297343	114
25	637273	7297385	637498	7297339	230
				Total	4,037

Table 8: Threatened grass survey transect locations (UTM coordinates in GDA94) and lengths for the 15 transects surveyed in March 2022

2.5.2 MDS Rail Loop site

Targeted surveys for king blue-grass were undertaken within the 50 m x 10 m plot of each of the four habitat quality assessment sites (MDSRL01 – MDSRL04). As noted above, the survey period is later than the typical flowering season for king blue-grass and the species can be difficult to confidently discern from superficially-similar species. Where king blue-grass was encountered within the plot, an estimate was made of the number of tussocks considered to be within a contiguous population in accordance with the method outlined above (Section 2.2.1).

2.6 **BIOMASS MONITORING FOR FIRE MANAGEMENT (ALL SITES)**

Biomass monitoring for fire management is undertaken annually to determine the risk of fire and to inform fire management strategies. Biomass is at its greatest at the end of the wet season (around April) with fire risk greatest towards the end of the dry season (September/October). Biomass is monitored using appropriate photo standards¹ to determine dry matter yields and subsequently fuel loads. Biomass



monitoring is undertaken at permanent weed monitoring sites at the MDS Project site, MDS Rail Loop site, Lexington offset site and Lexington Rail Loop offset site.

2.7 WEED MONITORING (ALL SITES)

For the purposes of this assessment, weeds were taken as any species of plant not considered by the Queensland Herbarium as being native to Queensland (i.e. not listed as either least concern, special least concern, near threatened, vulnerable, endangered, critically endangered or presumed extinct in the wild under the *Nature Conservation Act 1992* (Qld); NC Act), as well as species of plant not considered locally endemic to the region.

Weed monitoring was undertaken at 20 permanent plots at the MDS Project site, 20 permanent plots at the Lexington offset site, five permanent plots established at the MDS Rail Loop site and 12 permanent plots established at the Lexington Rail Loop offset site. Weed monitoring plots were located to incorporate natural variability such as aspect (e.g. a mix of north-, east-, south- and west-facing monitoring sites) and community type, while also targeting trafficable areas (e.g. entry gates, creek crossings, stock watering points) to monitor potential introduction and/or irruptions of prohibited and restricted weed species. At each weed monitoring plot, 3 x 100 m transects (traversing in an east-west direction) were traversed, keeping them parallel to one another, 50 m apart.

Figure 2 and Figure 3 show the location of the MDS Project site weed monitoring plots, Figure 4 shows the MDS Rail Loop weed monitoring plots, Figure 5 and Figure 6 show the Lexington offset site weed monitoring plots and Figure 7 and Figure 8 show the Lexington Rail Loop offset site weed monitoring plots.

At each of the permanent weed monitoring plots, monitoring of weeds was undertaken in accordance with the following method:

- At 10 m intervals along each of the three transects, a 2 m x 2 m plot frame was used to record the presence, species and cover of weeds
- Weed cover at each 2 m x 2 m survey site was recorded as one of five cover classes: 1 = 0%; 2 = 0-5%; 3 = 6-25%; 4 = 26-50%; 5 = 51-100% (Auld 2009)
- An average cover score for each weed species for each 1 ha site was calculated
- The average cover score was then calculated as the average percentage from the 30 plots surveyed from the three 100 m transects
- > The mean cover score across all weed monitoring sites was then calculated.

For the purposes of the calculation of average percentage cover of weeds, each of the five weed cover classes (0-5) were converted to a quantitative weed cover value based on the average value of the range corresponding to that weed cover class, as outlined below:

- Weed cover class 1 (0%) retained a value of 0%
- Weed cover class 2 (0-5%) was converted to a value of 2.5%
- Weed cover class 3 (6-25%) was converted to a value of 15%
- Weed cover class 4 (26-50%) was converted to a value of 37.5%
- Weed cover class 5 (51-100%) was converted to a value of 75%.

In addition to permanent weed monitoring plots, where relevant, incidental observations were collated as part of general site monitoring, recording details of weeds (including location, species and extent) and areas of significant weed cover.



2.8 PEST ANIMAL MONITORING (MDS PROJECT SITE AND LEXINGTON OFFSET SITE)

For the purposes of this assessment, pest animals are defined as any species of fauna not native to Queensland, nor protected under the NC Act.

Pest animal monitoring was undertaken through a combination of:

- plot based monitoring, searching for direct presence (e.g. visual confirmation) or indirect evidence (e.g. tracks, diggings, scats, rubbings etc)
- infra-red, motion-detector fauna cameras, representing opportunities to visually confirm the presence of pest animals.

2.8.1 Rabbits

An assessment of the presence and impact of rabbits was undertaken generally in accordance with Cooke *et al.* (1990). Rabbit monitoring plots were established at the same location as habitat monitoring sites and weed monitoring plots (refer to Figure 2 and Figure 3 for locations at the MDS project site and Figure 5 and Figure 6 for locations at the Lexington offset site).

Each rabbit monitoring plot consisted of a 2 ha plot which was traversed for 15 to 20 minutes, assessing the following (refer to Cooke *et al.* 1990):

- Rabbit abundance a measure of the presence and number of rabbit warrens and the abundance of any faecal pellets (including 'buck-heaps' or latrines) – measured on a scale of 0 – 5.
- Seedling abundance a measure of the presence and abundance of native vegetation seedlings encountered during the 15-20-minute traverse – measured on a scale of 0 – 5.
- Rabbit damage a measure of seedlings (< 0.5 m height) with evidence of rabbit damage, identified as 45° 'secateurs-like' cuts through smaller stems, defoliation and gnawing of bark measured on a scale of 0 5.</p>

From this assessment, a 'corrected regeneration score' was calculated from the seedling abundance and rabbit damage score in accordance with Table 9. This measure corrects for seedling regeneration as a function of observed rabbit damage and is subsequently used to calculate overall rabbit impact with the rabbit abundance score.

	Seedling abundance						
Rabbit damage	0	1	2	3	4	5	
0	0.20	1.00	2.00	3.00	4.00	5.00	
1	0.20	0.50	1.00	1.50	2.00	2.50	
2	0.20	0.34	0.70	1.00	1.30	1.70	
3	0.20	0.28	0.50	0.80	1.00	1.30	
4	0.20	0.20	0.40	0.60	0.80	1.00	
5	0.20	0.20	0.30	0.50	0.70	0.80	

Table 9: Calculation of corrected regeneration score

As illustrated in Figure 9, overall rabbit impact was assigned as one of three categories – 'acceptable', 'monitor closely' or 'unacceptable', as determined from a combination of the score for rabbit abundance and the corrected regeneration score. Note that it was assumed that any site with a rabbit abundance score of '0' was assumed to be 'acceptable', irrespective of corrected regeneration score. This is to avoid the situation where, with an absence of rabbits, and a corrected regeneration score of ≤ 2 (attributable to no rabbit damage and less than 20 seedlings), a given site may be identified as one to 'monitor closely' only by



virtue of the fact that the few seedlings are attributable to the site being a grassland, rather than it reflecting rabbit grazing.





2.8.2 Fauna camera stations

An assessment of pest animal presence and activity was conducted using infra-red cameras. Infra-red fauna cameras were placed approximately 1.3 m above the ground at 15 fauna camera stations at the MDS Project site, and 15 fauna camera stations at the Lexington offset site. Once established, the fauna cameras were left unattended for a minimum of 3 days/nights to be able to intercept any active fauna using trails in the surveyed area.

Cameras were represented by 12 x Browning Dark Ops 940 HD 16 mega-pixel digital cameras (BTC-6HD-940), one Browning Dark Ops MAX HD 18 mega-pixel digital camera (BTC-6HD-MAX) and two x LTL-6310 Acorn 12 mega-pixel digital cameras (LTL-6310M). Both camera models were supported by 940nm infra-red night vision and motion sensor capabilities to allow for capture of fauna during the day and night.

The camera settings were set to capture a series of images in succession following a motion trigger. If motion continued after this series of images were captured, then the camera would continue to capture images (in sets of four), followed by at least a one-minute pause, after which the camera could be triggered again. Secure Digital (SD) memory cards of 32 gigabyte capacity were used in the cameras for storing captured images.

For each pest animal species, a measure of pest animal presence/activity (Catling Index value) was calculated for the site by summing the number of operable fauna camera stations with evidence of the targeted pest animal by the sum of all operable station days/nights (refer to Mitchell and Balogh 2007a).

Refer to Figure 2 and Figure 3 for locations at the MDS Project site and Figure 5 and Figure 6 for locations at the Lexington offset site.

2.8.3 Feral pigs

An assessment of the presence of feral pig signs (as a measure of feral pig presence or activity) was undertaken generally in accordance with (Mitchell & Balogh 2007b) and (Hone 1988).



Randomly stratified, 500 m x 300 m (15 ha) plots were established in environments that are more regularly impacted included plots within and traversing ephemeral watercourses. A total of eight pig monitoring plots were established at the project site (Figure 2 and Figure 3) including plots within the immediate vicinity of Naroo Dam in the east of the site. Eight pig monitoring plots were also established at the Lexington offset site (Figure 5 and Figure 6), one of which was relocated (P03) following a recommendation in the 2018/19 monitoring report (NRC 2019).

Each 15-ha plot comprised 3 x 500 m transects spaced 100 m apart. At each plot, the following method was used for each of the transects:

- traversing in an east-west direction, surveying for the presence of any feral pig signs (rooting, wallows, dung, footprints, travel pads, plant damage and tree rubs, as well as the physical presence of feral pigs) 1 m either side of the transect in 50 m sections
- calculating an abundance score for each transect as the percentage of 'present' feral pig signs from the 10 sections along the 500 m transect
- calculating the mean abundance score (and variance) across all transects.

2.9 GENERAL SITE INSPECTIONS (ALL SITES)

General site inspections across all project and offset sites was undertaken, to assess:

- Observations of fencing condition, including any repair/upgrades
- > Access track conditions, including location of watercourse crossings, grids, erosion, etc
- Fire management, including assessment of existing firebreaks, access tracks and roads, fuel loads, and any recent burning activities
- Livestock management including assessment of signs of land degradation and over-grazing
- Erosion management, including assessment of the incidence of erosion, especially around permanent and semi-permanent water bodies or areas subject to inundation or waterlogging
- Incidental fauna observations, including presence, traces and/or abundance of pest animals
- Signs of dust deposition on vegetation located adjacent to the MDS Project and MDS Rail Loop footprints
- Locations of known king blue-grass and bluegrass specimens throughout all sites
- Any additional risks to fauna (i.e. evidence of vehicle strike)



3 RESULTS: MDS PROJECT SITE

3.1 TARGETED SURVEYS

Post-wet season, targeted surveys were undertaken for king blue-grass bluegrass and squatter pigeon; the results for which are described below.

3.1.1 King blue-grass and bluegrass

Due to an unusually dry wet season (December to February), grasses at the MDS site were dry and desiccated and contained little to no fertile material which is used to identify them. As such, detectability of king blue-grass and bluegrass was reduced. Targeted surveys confirmed the presence of king blue-grass at transects in the south of the MDS Project site. Bluegrass was unable to be positively identified due to sub-optimal conditions for detection. Records of king blue-grass were confirmed from one (6.7%) of the 15 threatened grass survey transects (transect 25) (Table 10, Figure 10 and Figure 11), with no incidentally recorded populations detected outside of targeted survey transects. Five populations of king blue-grass were recorded along transect 25 (totalling 40-130 tussocks), compared with eight populations recorded in 2020. A single population was identified from transect 25, represented by 2-5 tussocks. The paucity of records during this 2022 post-wet season survey compared with previous surveys is likely a consequence of reduced detectability rather than a reduction (or otherwise) of king blue-grass and bluegrass throughout the MDS Project site.

Table 10: King blue-grass populations and their estimated size from transects at the MDS Project site in March 2022

Transect number	King blue-grass population size range				Population per transect	
25	5-20	20-50	5-20	5-20	5-20	40-130
Total survey area population (range)	40-130					
Number of populations (#/km)	5 (1.24/km)*					

* Based on a total survey area of 4,037 m.

Records of bluegrass were not able to be detected from any of the 15 threatened grass survey transects, nor incidentally throughout the site (Figure 10).



148°23'I

148°24'E

148°25'E

148°21'E

148°22'I

- Access tracks - No threatened grasses results overview Habitat for King blue-grass and bluegrass — King blue-grass C Threatened grass survey area - Bluegrass DATA SOURCE: The folowing datasets are © State of Qld: - Mining Lease The following datasets provided by Sojitz - Disturbance areas - Habitat for king blue-grass and bluegrass 0.25 0.5 0.75 Kilometres Date: 4/6/2022 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:27,500@A3

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Australia


148°21'20"E

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148°21'15"E



3.1.2 Squatter pigeon

Incidental searches for the squatter pigeon were conducted opportunistically from over 130 km of driving during the four days of field surveys on the project site, however, no squatter pigeons were recorded.

3.1.3 Australian painted snipe

Surveying was undertaken around Naroo Dam for Australian painted snipe on one morning (8 March 2022), from sunrise (~6.00am). Access was granted to Naroo Dam via the Glencore Rolleston Mine, which allowed for an on-ground inspection of the dam (as it lies outside the Sojitz Coal Mine ML). At the time of surveying, there was virtually no open body of water except for a small ~10 m x 5 m 'pond' near the dam wall in the northeast corner of the dam (Figure 12 and Figure 13). The survey involved traversing the surrounding fringing vegetation (as close to the waterline as possible) for 10 minutes and a brief scan of the surrounding banks for the Australian painted snipe. This body of water was not shallow and did not provide suitable habitat (e.g. shallow mud flats) as required by the Australian painted snipe. Vegetation surrounding the body of water was dense and consisted mostly of a *Typha* sp. and other aquatic species as well as various weed species (e.g. *Megathyrsus maximus* and *Vachellia farnesiana*). Other areas of Naroo Dam that have been inundated in the past were dry and unsuitable for the Australian painted snipe. It was deemed that, at the time of survey, Naroo Dam did not provide suitable habitat for the Australian painted snipe.



Figure 12: Naroo Dam looking west from the dam wall showing a small open waterbody and surrounding dried plains





Figure 13: Remaining waterbody at Naroo Dam

3.2 WEED MONITORING

A total of 12 weed species were identified from the weed monitoring plots. No additional species of weeds were observed on the MDS Project site outside of those identified within the weed monitoring plots. Across the 20 weed monitoring plots, the average number of weed species observed per plot was 2.9 species, ranging between one species (Sites 1-4, 12) and 6 species (Sites 07 and 09). Weed cover across the 20 weed monitoring plots averaged 8.7%; ranging between 0.1% (Site 02) and 51.2% (Site 20)(Table 11 and Figure 14).

The most commonly encountered weed was *Parthenium hysterophorus* (parthenium), recorded from 14 of the 20 sites, followed by *Melinis repens* (*red natal grass*) at 11 of the 20 sites (Table 11), with five of the 12 weed species only encountered at single sites. While encountered at a large number of sites, the average cover of *Parthenium hysterophorus* and *Melinis repens* across those encountered sites averaged 6.9% and 3.8%, respectively. For those weeds found from at least two sites, *Parthenium hysterophorus* was the weed species with the highest average cover (6.9%), and also had the highest cover at any single site (46.4% at Site 20) (Table 11).

The observed number of weed species and weed cover is atypically low for the post-wet season and can be attributed to a lack of annual weed species, which would have died back in response to low rainfall over the summer wet season months. However, this is not to say that these species are not still in the soil seed bank, and they may reappear after sufficient rain.



Table 11: Results of weed monit	oring assessments at the MDS Pr	oject site																						
Scientific name	Common name	Family							Pe	ercentag	ge covei	r of wee	d speci	es from	ı given s	ite							# sites	Avg cover (%) ^a
	common nume	. anny	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	in Silves	
Bidens pilosa	Cobbler's pegs	Asteraceae									0.6												1	0.6
Parthenium hysterophorus	Parthenium weed	Asteraceae		0.1		5.2	1.1	0.9	1.0	0.4	2.9				22.7	0.1	1.3	0.1	7.5	6.9		46.4	14	6.9
Verbesina encelioides	Goldweed	Asteraceae									0.3												1	0.3
Stylosanthes scabra	Shrubby stylo	Fabaceae							0.6								1.0	0.9			0.4		4	0.7
Vachellia farnesiana	Mimosa bush	Fabaceae									0.5		0.1					0.1	3.1	1.3	0.8		6	1.0
Malvastrum americanum	Malvastrum	Malvaceae									2.1		0.1		0.1	0.5		0.1	0.2	2.4	0.1		8	0.7
Bothrichloa pertusa	Indian bluegrass	Poaceae																				2.5	1	2.5
Cenchrus ciliaris	Buffel grass	Poaceae					0.5		4.1	0.5	0.5		0.6						1.0			2.4	7	1.4
Megathyrsus maximus	Guinea grass	Poaceae							2.5														1	2.5
Melinis repens	Red natal grass	Poaceae	0.3		2.6		22.5		0.1			0.3	3.5	4.3		0.2	0.8	0.1		11.0	0.5		12	3.8
Urochloa mosambicensis	Sabi grass	Poaceae							0.5										1.3				2	0.9
Verbena officinalis	Common verbena	Verbenaceae										0.1											1	0.1
		# species	1	1	1	1	3	1	6	2	6	2	4	1	2	3	3	5	5	4	4	3		
		Weed cover (%) ^b	0.3	0.1	2.6	5.2	24.1	0.9	8.8	0.9	6.9	0.4	4.3	4.3	22.8	0.8	3.1	1.3	13.0	21.5	1.8	51.2		

Table 11: Results of weed monitoring assessments at the MDS Project site

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites. ^b Weed cover represents the sum of the average weed cover percentages of all weed species.





3.3 PEST ANIMAL MONITORING

3.3.1 Rabbits

Results of rabbit monitoring confirmed the presence of rabbit/hare scats from four of the ten rabbit monitoring plots (R05, R07, R08, R09; Figure 15). Across these plots, pellet abundance ranged from isolated pellets and small clumps more than 10 m apart, to common, pellets in larger clumps and occasional buck heaps 10 m apart (Site R09). European rabbits (*Oryctolagus cuniculus*) were not visually confirmed during these surveys, however a brown hare (*Lepus europaeus*) was sighted while undertaking pig transects at P08 and was also confirmed at a single camera station (C11)(see Section 3.3.3; Figure 18 and Figure 19).

Table 12 shows the results of the assessment of overall rabbit impact. The assessment of overall rabbit impact was denoted as 'Acceptable' for the majority of sites, with site R05 and R08 denoted as 'monitor closely' and sites R07 and R09 denoted as 'Unacceptable' due to higher rabbit abundance.

Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact
R01	0	1	0	1	Acceptable
R02	0	1	0	1	Acceptable
R03	0	2	0	2	Acceptable
R04	0	0	0	0.2	Acceptable
R05	1	2	0	2	Monitor closely
R06	0	0	0	0.2	Acceptable
R07	2	2	0	2	Unacceptable
R08	1	0	0	0.2	Monitor closely
R09	3	1	0	1	Unacceptable
R10	0	1	0	1	Acceptable

Table 12: Assessment of overall rabbit impact at the MDS Project site





3.3.2 Feral pigs

Across all eight pig monitoring plots, represented by a total of 12 km of transects, there was confirmed evidence for the presence of feral pigs in five plots (Figure 16). No feral pigs were confirmed visually throughout the MDS Project site. Evidence of feral pig presence within plots ranged from 0% (Sites P02, P04, P07) to 10% (Sites P01 and P08) and, on average, was observed across 4.58% of the transect sections surveyed within each plot (Table 13).

			M	Ionite	oring	plot	surve	ey sec	tion (5	0 m)			
Plot	Transect	1	2	3	4	5	6	7	8	9	10	Transect	Plot % (record/30)
	1								R			10%	
P01	2					R				R		20%	10%
	3											0%	
	1											0%	
P02	2											0%	0%
	3											0%	
	1						D					10%	
P03	2											0%	3%
	3											0%	
	1											0%	
P04	2											0%	0%
	3											0%	
	1									D		10%	
P05	2						D					10%	7%
	3											0%	
	1						D					10%	
P06	2							D				10%	7%
	3											0%	
	1											0%	
P07	2											0%	0%
	3											0%	
	1								DR			10%	
P08	2						R					10%	10%
	3		D									10%	
												Total	4.58%

Table 13: Assessment of overall feral pig presence and activity at the MDS Project site, denoted as either rooting (R), footprints (F), travel pads (P), or dung (D)



148°22'E

148°24'E



3.3.3 Fauna camera stations

Of the 15 fauna camera stations, 13 cameras were considered operable stations across each of the three consecutive nights. Two cameras (C01 and C02) were considered compromised across all three nights due to failed camera flashes, leaving photos taken at night (which would constitute the majority of pest animal activity) indiscernible. Additionally, C02 was knocked over by cattle on day 1 and could not take suitable daytime photos. As such, there was a total of 39 operable station nights for the purposes of calculating Catling Index values for pest animal species. The fauna cameras confirmed the presence of two targeted pest animal species, namely feral dogs (*Canis familiaris/lupus*) (Figure 17), and a brown hare (*Lepus europaeus*) (Figure 18). Scores from all four pest animal species detected ranged from 2.6 (brown hare) to 5.1 (feral dog) (Table 14). Cats, feral pigs and European rabbits were not detected by fauna cameras. Additionally, cane toads (*Rhinella marina*) were detected on one camera (C15). Non-pest animals were also detected from the fauna camera stations, including a stubble quail (*Coturnix pectoralis*), peaceful doves (*Geopelia striata*), a common brushtail possum (*Trichosurus vulpecula*) and cattle (*Bos taurus*).

Overall, there were three individual pest animal detections, recorded from three of the 13 operable fauna camera stations (Table 14). These detections were made on the east, west and north of the mining lease (Figure 19).

Pest	Conf	irmed	incide	nce of	pest a	nimal	species	from	given	site						
animal species	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	Catling Index
Dog				1		1	1	1	1	1		1				
Day 1																
Day 2				~			~									5.1
Day 3																
Cat																1
Day 1																
Day 2																0
Day 3																
European	rabbit	:														
Day 1																
Day 2																0
Day 3																
Brown ha	re															
Day 1																
Day 2											~					2.6
Day 3																
Feral pig																
Day 1																
Day 2																0
Day 3																

Table 14: Pest animal results for the MDS Project site





Figure 17: Feral dog (Canis familiaris/lupus) captured at camera C07 at the MDS Project site



Figure 18: Brown hare (Lepus europaeus) captured at camera C11 at the MDS Project site





3.4 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring sites comprising RE 11.8.11, whilst biomass monitoring results from areas of RE 11.8.5 were assessed against 'Eucalypt woodlands', RE 11.4.3 was assessed against 'Bluegrass, wiregrass', and RE 11.3.3a was assessed against 'Alluvial' photo standards (Table 15). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 2,500 kg/ha and 3,600 kg/ha 'Eucalypt woodlands' photo standards was reported as 3,050 kg/ha).

Photo monitoring showed some variability in biomass of ground cover across all 10 photo monitoring sites, although biomass levels were generally high following plentiful rainfall in the second half of 2021. Sites in RE 11.8.11 supported the greatest biomass (averaging 4,296 kg/ha), while Site 07 (RE 11.4.3) supported the lowest biomass (1,750 kg/ha) (Table 15). Areas of RE 11.8.5 supported mostly \geq 2,500 kg/ha (except for site 03 at 1,800 kg/ha), averaging 3,086 kg/ha, the one RE 11.3.3a photo monitoring site supported 2,250 kg/ha biomass.

Ground photos used to assign biomass at the MDS Project site are shown in Appendix D.

		Brigalow Bel	Brigalow Belt Future Beef pasture photo standard type							
Photo monitoring site*	RE type	Eucalypt woodlands	Blue grass, wire grass	Alluvial	Downs country	Biomass kg/ha				
01	11.8.5	✓				2,500				
02	11.8.11				✓	3,850				
03	11.8.5	✓				1,800				
04	11.8.11				✓	5,040				
05	11.8.5	✓				3,600				
06	11.8.11				✓	3,850				
07	11.4.3		×			1,750				
08	11.8.11				✓	4,445				
09	11.3.3a			\checkmark		2,250				
10	11.8.5	✓				4,445				

Table 15: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture	e photo
standards	

* taken from the 0 m point of the permanent habitat monitoring transects.

3.5 GENERAL SITE INSPECTION

The condition of fencing and access gates across the MDS site was good, with no requirement for repair at the time of surveying. Existing access tracks including firebreaks were of a similar standard.

Field traverses in the south-west of the MDS Project site noted areas of RE 11.8.11a under stress, with the majority of *Melaleuca bracteata* in these areas showing signs of dieback. However, it was noted that much of this vegetation community was showing evidence of epicormic regrowth. It is therefore likely that this vegetation community is in a state of recovery following the drought prior to the 2019/2020 wet season. Notwithstanding, the condition of these communities will need to continue to be monitored to exclude alternative reasons for the dieback (e.g. whether a consequence of hydrological changes).



Additionally, as noted in Section 3.1.3, Naroo Dam has experienced a drying event and now harbours only a small body of water. This is despite higher-than-average rainfall in the area over the past two years. Ongoing monitoring and/or corrective actions between Sojitz and Glencore is recommended as the aquatic (lacustrine and palustrine) ecosystem is considered likely to further degrade.

Site assessments revealed that some areas in the west of the ML (near site 17) still showed evidence of grazing pressure (e.g. reduced grass height, bare soil areas). These areas will require ongoing monitoring to ensure they recover adequately. Notwithstanding, it is acknowledged that MDS is responsible for the management of activities within the MDS Project site only and does not have any responsibility for grazing regimes in the mining lease area that is outside of the MDS Project site.

Site traverses as part of all monitoring activities on the MDS Project site showed no obvious evidence of any dust deposition, nor any impacts attributable to dust deposition on king blue-grass, bluegrass or other vegetation communities. Approximately 1 ha of cleared grassland (consistent with RE 11.8.11) was observed in the east of ML70452 associated with the mine's explosives cache. The area of clearing intersects a grass survey transect (site 12) where king blue-grass has previously been recorded.

Note that RE 11.8.11a is no longer a recognised regional ecosystem since the release of version 12 of the Regional Ecosystem Description Database (REDD) in March 2021 (Queensland Herbarium 2021). Instead, all areas of RE 11.8.11a are now recognised as RE 11.3.25d. This constitutes not only a change in RE, but a change in landzone (LZ) (i.e. LZ 11 to LZ 3). Notwithstanding, all mention of RE 11.8.11a will continue given historical approval incorporating this regional ecosystem.



4 RESULTS: MDS RAIL LOOP SITE

4.1 HABITAT MONITORING

4.1.1 Site condition and context

Results of habitat condition assessments identified an average site condition score of 5.92 out of 10 across all four habitat monitoring sites, with scores ranging between 4.67 (Site MDSRL04) and 7.00 (Site MDSRL02). Site context scores varied from 8.85 out of 10 (MDSRL02, MDSRL03 and MDSRL04) up to 10 out of 10 (MDSRL01). Appendix B outline details of the site condition assessments, summarised below in Table 16.

It should be noted that high rainfall between October and November 2021 is likely to have increased weed cover (and native perennial grass cover and organic litter, to an extent). However, low rainfall between December 2021 and the March 2022 survey period left many of the grass specimens dry and lacking fertile material (which is key to their identification). As such, species richness may be reduced compared to a typical post-wet season survey.

Table 16: MDS Rail Loop site habitat monitoring sites: site condition and site context scores calculated in accordance with the Guide to determining terrestrial habitat quality (DEHP 2017)

Site	RE	Easting	Northing	Site condition score (/10)	Site context score (/10)
MDSRL01	11.8.11	645575	7303101	6.33	10.00
MDSRL02	11.8.11	646410	7303007	7.00	8.85
MDSRL03	11.8.11	646666	7303114	5.67	8.85
MDSRL04	11.8.11	646834	7303291	4.67	8.85
			Average score	5.92	9.13

4.1.2 MNES habitat condition assessments

Based on the results of the site condition and context assessments, habitat condition scores for the two MNES averaged 7.14 out of 10 for Natural Grasslands TEC and 7.41 out of 10 for king blue-grass (Table 17).

Table 17: MDS Rail Loop site monitoring sites showing their habitat condition scores contributing to MNES

Site	RE	Natural Grasslands TEC	King blue-grass
MDSRL01	11.8.11	8.04	8.43
MDSRL 02	11.8.11	7.86	8.29
MDSRL 03	11.8.11	7.14	5.71
MDSRL 04	11.8.11	6.61	5.29
	Average score	7.14	7.41

Natural Grasslands habitat

Natural Grasslands TEC habitat condition scores for the four habitat monitoring sites ranged between 6.61 and 8.04 (Table 17). The four assessment sites supported between three and five TEC indicator grass species (Table 18).



Natural Grassland quality assessments were conducted at each of the four habitat condition sites within a 50 m x 10 m plot. This included an assessment of the species richness of Natural Grassland TEC indicator species, density of grass tussocks, shrub cover and non-native plant cover as per the approved Commonwealth listing advice (TSSC 2009) (Table 7). The results of this assessment (Table 19) indicated that only one of the condition sites (MDSRL02) was in 'good' condition, with the remaining three sites (MDSRL01, MDSRL03 and MDSRL04) being less than 'good' condition. According to the approved Commonwealth listing advice (TSSC 2009), MDSRL01, MDSRL03 and MDSRL04 do not meet the criteria for 'good' or 'best' condition class on account of the sites having weed cover > 30%, and are therefore too degraded to be considered to comprise the Natural Grasslands TEC.

As mentioned in Section 4.1.1, low rainfall between December 2021 and the March 2022 post-wet season surveys had left most of the grass specimens dry and lacking fertile material. As such, some natural grasslands TEC indicator species may have been unable to be accurately identified in-field, despite being present.

Scientific name	Common name	MDSRL01 RE 11.8.11	MDSRL02 RE 11.8.11	MDSRL03 RE 11.8.11	MDSRL04 RE 11.8.11
Aristida latifolia	Feather-top wiregrass	✓		✓	✓
Aristida leptopoda	White speargrass		✓		×
Astrebla elymoides	Hoop mitchell grass				
Astrebla lappacea	Curly mitchell grass				
Astrebla squarrosa	Bull mitchell grass				
Bothriochloa erianthoides	Satin-top grass				
Dichanthium queenslandicum	King blue-grass	\checkmark	✓		
Dichanthium sericeum	Queensland bluegrass	\checkmark	\checkmark	✓	\checkmark
Eriochloa crebra	Cup grass				
Panicum decompositum	Native millet	×			
Panicum queenslandicum	Yabila grass	×	✓	✓	✓
Paspalidium globoideum	Shot grass				
Thellungia advena	Coolibah grass				
	TOTAL	5	4	3	4

Table 18: Natural grasslands TEC indicator species at the MDS Rail Loop site

Table 19: Condition classes for the Natural Grasslands TEC

TEC quality criteria	MDSRL01 RE 11.8.11	MDSRL02 RE 11.8.11	MDSRL03 RE 11.8.11	MDSRL04 RE 11.8.11
Perennial indicator grass species	5	4	3	4
Number of native grass tussocks	>200	>200	>200	>200
Woody shrub canopy cover (%)	<5	<5	<5	<5
Perennial non-native plant cover (%)	40	22	47	74
Condition class	Not TEC	Good	Not TEC	Not TEC



King blue-grass habitat

King blue-grass habitat condition scores for the four habitat monitoring sites ranged between 5.29 and 8.43 (Table 17). King blue-grass specimens were positively identified at two of the four habitat monitoring sites (MDSRL01 and MDSRL02) (Table 18) which accounts for the higher habitat condition scores at these two sites (Figure 20 and Figure 21). Incidental observations of king blue-grass were also made within proximity to sites MDSRL01, MDSRL02 and MDSRL05 (Figure 20).

4.2 WEED MONITORING

A total of six weed species were identified from the five weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the five weed monitoring plots, the average number of weed species observed per plot was 2.8 species, ranging between one species (Site MDSRL03 and MDSRL05) and six species (Site MDSRL01), with three weed species only encountered at single sites. Weed cover across the five weed monitoring plots averaged 36.9%; ranging between 15.8% (Site MDSRL05) and 55.6% (Site MDSRL02)(Table 20 and Figure 22).

The most commonly encountered weed was *Setaria incrassata*, which was recorded from all five sites (Table 20). *Setaria incrassata* also had the highest average cover of 28.5%. *Cenchrus ciliaris* and *Melinis repens* were encountered at three of the five sites, and had the second and third highest average cover, averaging 9.3% and 4.4% cover, respectively, across the three sites they were recorded from (Table 20).

The observed number of weed species is low for the post-wet season and can be attributed to a lack of annual weed species, which would have died back in response to low rainfall over the summer wet season months. During the survey period, most weed cover appeared to consist of perennial weed species (e.g. *Setaria incrassata*).













Table 20: Results of weed monitoring assessments at the MDS Rail Loop site

Scientific nome	Common name	Family	Perc	entage cover	n site	# citor	Avg cover (%) ^a		
Scientific name	Common name	i uniny	MDSRL01	MDSRL02	MDSRL03	MDSRL04	MDSRL05	# sites	Avg cover (%)
Parthenium hysterophorus	Parthenium weed	Asteraceae				0.1		1	0.1
Cenchrus ciliaris	Buffel grass	Poaceae	2.6	9.4		1.3		3	4.4
Melinis repens	Red natal grass	Poaceae	24.4	0.5		3.1		3	9.3
Setaria incrassata	Purple pigeon grass	Poaceae	16.7	26.6	55.6	28.1	15.8	5	28.5
Urochloa decumbens	Signal grass	Poaceae				0.2		1	0.2
Physalis lanceifolia	Gooseberry	Solanaceae				0.1		1	0.1
		# species	3	3	1	6	1		
		Weed cover (%) ^b	43.7	36.5	55.6	32.9	15.8		

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.





4.3 PHOTO MONITORING

Photo monitoring of the MDS Rail Loop site showed consistently high levels of biomass, characterised by dense non-native grass cover (e.g. *Setaria incrassata*; see Photo E-25 in Appendix E). This is likely a consequence of historical disturbance, with the current weedy condition an indication that the site is in a state of recovery. Ongoing management and concurrent photo monitoring should detect that change over time, as the grassland continues to recover. The results of the photo monitoring in the MDS Rail Loop site are presented in Appendix E.

4.4 **BIOMASS MONITORING**

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all four of the sites comprising RE 11.8.11 (Table 21).

Photo monitoring showed biomass of ground cover across all four photo monitoring sites was high, with all sites supporting a biomass of at least 5,040 kg/ha. This is likely attributable to high rainfall in the second half of 2021.

Ground photos used to assign biomass at the MDS Rail Loop site are shown in Appendix E.

Table 21: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture phot	0
standards	

		Brigalow Belt Future Beef pasture photo standard type	
Photo monitoring site*	RE type	Downs country	Biomass kg/ha
MDSRL01	11.8.11	\checkmark	5,040
MDSRL02	11.8.11	\checkmark	5,040
MDSRL03	11.8.11	\checkmark	5,040
MDSRL04	11.8.11	\checkmark	5,040

* taken from the 50 m point of the permanent habitat monitoring transect.

4.5 GENERAL SITE INSPECTION

It is understood that a fire occurred adjacent to the RE 11.8.11 at the MDSRL in mid-2021, however did not appear to have affected grass tussocks or cover the areas surveyed as part of the dry season surveys. Consequently, a fire break has been constructed through the middle of the RE 11.8.11 at the MDSRL (Figure 4). Small amounts of rubbish were observed adjacent to the railway track itself, however this is not likely to impact on the monitoring area. There was no evidence of dust or other particulate material on the vegetation within the MDS Rail Loop monitoring area. It is noted that BioCondition weed cover estimates appear to be higher than previous surveys at most sites, particularly at site 04 which is adjacent to the Dawson Highway. Non-native grass species (e.g. *Setaria incrassata, Melinis repens* and *Cenchrus ciliaris*) form the majority of weed incursion in the MDS Rail Loop site Natural Grasslands TEC.



5 RESULTS: LEXINGTON OFFSET SITE

5.1 WEED MONITORING

A total of 16 weed species were identified from the 20 weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the 20 weed monitoring plots, the average number of weed species observed per plot was 3.95 species, ranging between two species (Sites 12, 14, 19, 20) and nine species (Site 10), with six weed species only encountered at single sites. Weed cover across the 20 weed monitoring plots averaged 18%; ranging between 1.8% (Site 06) and 48.9% (Site 09; Table 22; Figure 23).

The most commonly encountered weed was *Parthenium hysterophorus*, which was recorded from 16 of the 20 sites (Table 22). While recorded from only two weed monitoring plots, *Megathyrsus maximus* had the highest average cover of all species at sites it was recorded from, averaging 25.9%.



Table 22: Results of weed monitoring assessments at the Lexington offset site

	6	Facely	Percentage cover of weed species from given site														# citoo	Aug 2000 (0/)a						
Scientific name	Common name	Family	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	# sites Avg cov	Avg cover (%)"
Cryptostegia grandiflora	Rubber vine	Apocynaceae									2.1												1	2.1
Bidens pilosa	Cobbler's pegs	Asteraceae									0.7												1	0.7
Parthenium hysterophorus	Parthenium weed	Asteraceae	5.9	1.2	1.4	1.6		0.8	3.9	9.1		10.8	3.6	3.9	0.5	10.0	25.4	21.6	4.7			3.8	16	6.7
Verbesina encelioides	Goldweed	Asteraceae									1.9	0.5											2	1.2
Zinnia sp.	A sunflower	Asteraceae									0.1												1	0.1
Clitoria ternatea	Butterfly pea	Fabaceae								1.9		2.6											2	2.2
Stylosanthes viscosa	Sticky stylo	Fabaceae		0.1		0.7	2.6		5.7											0.6	1.2		6	1.8
Vachellia farnesiana	Mimosa bush	Fabaceae	3.6		4.6	0.5		0.5		0.5		0.1				0.1	0.7	4.2	4.3	0.1			11	1.7
Malvastrum americanum	Malvastrum	Malvaceae								0.7		1.5	0.1				0.2	0.3					5	0.6
Cenchrus ciliaris	Buffel grass	Poaceae	0.5		0.5	3.8	7.1	0.5	5.9	3.8		8.3	1.1				3.9	0.6	1.6				12	3.1
Dichanthium aristatum	Angleton grass	Poaceae										2.3											1	2.3
Megathyrsus maximus	Guinea grass	Poaceae									42.4	9.5											2	25.9
Melinis repens	Red natal grass	Poaceae	4.3	4.0		12.5	46.8		0.5			1.1	0.7		1.0		0.5			31.5	12.2		11	10.5
Capsicum sp.	Chilli	Solanaceae									0.5												1	0.5
Solanum sp.	A nightshade	Solanaceae									1.3												1	1.3
Verbena officinalis	Common verbena	Verbenaceae	0.1							0.1				0.2	0.3					0.3		0.2	6	0.2
		# species	5	3	3	5	3	3	4	6	7	9	4	2	3	2	5	4	3	4	2	2		
		Weed cover (%) ^b	14.4	5.3	6.5	19.0	56.4	1.8	15.9	16.0	48.9	36.6	5.5	4.1	1.8	10.1	30.7	26.7	10.6	32.5	13.4	4.0		

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.





5.2 PEST ANIMAL MONITORING

5.2.1 Rabbits

Results of rabbit monitoring confirmed the presence of rabbit/hare scats from nine of the 10 rabbit monitoring plots (R01 – R09)(Figure 24). Across these plots, pellet abundance ranged from isolated pellets and small clumps more than 10 m apart, to common, pellets in larger clumps and occasional buck-heaps on about half the areas you scan closely during the search. Brown hares (*Lepus europaeus*) and European rabbits (*Oryctolagus cuniculus*) were also visually confirmed at two fauna camera stations (Site C02 and C05) (see Section 5.2.3; Figure 26).

Table 23 shows the results of the assessment of overall rabbit impact. The results indicate that all of the sites displayed evidence of rabbit abundance with the exception of R10. The assessment of overall rabbit impact was denoted as 'unacceptable' for three sites, due to moderate levels of rabbit abundance (identified through the presence of scats). Remaining sites were denoted as 'monitor closely'.

Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact
R01	1	0	0	0.2	Monitor closely
R02	2	3	0	3	Monitor closely
R03	2	0	0	0.2	Unacceptable
R04	2	2	0	2	Unacceptable
R05	3	3	0	3	Monitor closely
R06	2	1	0	1	Unacceptable
R07	1	1	0	1	Monitor closely
R08	1	3	0	3	Acceptable
R09	1	3	0	3	Acceptable
R10	0	0	0	0.2	Acceptable

Table 23: Assessment of overall rabbit impact at the Lexington offset site





5.2.2 Feral pigs

Across the eight pig monitoring plots, there was confirmed evidence for the presence of feral pigs in five plots. No visual confirmation of pigs was recorded observationally nor through camera traps throughout the Lexington property. Evidence of feral pig presence within plots ranged from 0% (Sites P04, P05 and P08) to 20% (Site P03) and, on average, was observed across 5.83% of the available transect sections within each plot (Table 24). Indicators of pig presence were often observed within natural grasslands (RE 11.8.11) in the west of the property (Figure 25).

Table 24: Assessment of overall feral pig presence and activity at the Lexington offset site, denoted as either rooting	
(R), footprints (F), travel pads (P) or physical presence (+)	

		Monitoring plot survey section (50 m)							1		1		
Plot	Transect	1	2	3	4	5	6	7	8	9	10	Transect	Plot % (record/30)
	1											0%	
P01	2		R									10%	10.0%
	3	D			R							20%	
	1											0%	
P02	2	R				DR						20%	6.7%
	3											0%	
	1											0%	
P03	2	D			R				R			30%	20.0%
	3	R						R	R			30%	
	1											0%	
P04	2											0%	0.0%
	3											0%	
	1											0%	
P05	2											0%	0.0%
	3											0%	
	1	D		D								20%	
P06	2											0%	6.7%
	3											0%	
	1											0%	
P07	2	D										10%	3.3%
	3											0%	
	1											0%	
P08	2											0%	0.0%
	3											0%	
												Total	5.83%





5.2.3 Fauna camera station

Of the 15 fauna camera stations, 12 cameras were considered operable stations across each of the three consecutive nights. One camera (C01) was considered compromised across all three nights due to a failed camera flash, leaving photos taken at night (which would constitute the majority of pest animal activity) indiscernible. Additionally, one camera (C02) was considered compromised on day one due to a failed camera flash, and another (C13) was considered compromised on day three because it was knocked over by cattle. As such, there was a total of 40 operable station nights for the purposes of calculating Catling Index values for pest animal species. The fauna cameras confirmed the presence of four pest animal species, namely feral dogs (*Canis familiaris/lupus*), a cat (*Felis catus*), European rabbits (*Oryctolagus cuniculus*) and a brown hare (*Lepus europaeus*) (Figure 26 and Figure 27). Scores from all four pest animal species detected ranged from 2.5 (cat and brown hare) to 7.5 (feral dog) (Table 25). Feral pigs were not detected by fauna cameras. Additionally, cane toads (*Rhinella marina*) were detected on several cameras over the three nights. Non-pest animals were also detected from the fauna camera stations, including a whiptail wallaby (*Notamacropus parryi*), rufous bettong (*Aepyprymnus rufescens*) and cattle (*Bos taurus*).

Overall, there were seven individual pest animal detections recorded from four of the 15 fauna camera stations (Table 25). These detections were made primarily in the northwest of the property (C02, C04-C06) (Figure 28), with a concentration of records around the fence line bordering the west of the Minerva Coal Mine. These sites were represented largely by RE 11.8.11 natural grasslands habitat.

Pest	Confirmed incidence of pest animal species from given site															
animal species	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	Catling Index
Dog																
Day 1						✓										
Day 2					~			~								7.5
Day 3																
Cat																
Day 1																
Day 2																2.5
Day 3		✓														
European rabbit																
Day 1																
Day 2			✓													5
Day 3			✓													
Brown ha	are															
Day 1					~											
Day 2																2.5
Day 3																
Feral pig																
Day 1																
Day 2																0
Day 3																

Table 25: Pest animal results from the Lexington offset site





Figure 26: Brown hare (Lepus europaeus) captured at fauna camera C05 on the Lexington offset site



Figure 27: Wild dog (Canis familiaris) captured at fauna camera C08 on the Lexington offset site





5.3 BIOMASS MONITORING

5.3.1 Biomass monitoring for fire management

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for offset areas comprising of RE 11.8.11 and RE 11.8.11a, whilst photo monitoring results from areas of RE 11.8.4 and RE 11.8.5 were assessed against 'Narrow-leaved Ironbark' photo standards (Table 26)

Photo monitoring showed some variability in the biomass of ground cover. Most sites in RE 11.8.11 and 11.8.11a (except site 06) were at least 2,578 kg/ha (Site 16) and up to 5,040 kg/ha (Sites 01, 08-09). Biomass in RE 11.8.4 and RE 11.8.5 ranged between 1,200 kg/ha in wooded areas with high canopy cover (Site 07) and 5,000 kg/ha (Sites 14 and 18) associated with more open grassy woodland areas (Table 26). Evidence of heavy grazing was not observed at site 07, and as such it is assumed that the low biomass is a result of natural processes (e.g. a canopy dense enough to shade-out most grasses). Most other sites had high biomass throughout the MDS Project site due to the exceedingly high rainfall from October to December.

Ground photos used to assign biomass at the Lexington offset site are shown in Appendix F.

Table 26: Results of biomass monitoring on the Lexington offset site using Brigalow Belt Future Beef pasture photo
standards

Photo monitoring		Brigalow Belt pasture	Brigalow Belt pasture photo standard type						
site*	RE type	Narrow-leaved ironbark	Downs country	Biomass (kg/ha)					
01	11.8.11		 ✓ 	5,040					
02	11.8.4	×		1,750					
03	11.8.11		✓	3,015					
04	11.8.5	×		2,000					
05	11.8.4	×		3,625					
06	11.8.11		✓	3,015					
07	11.8.4	✓		1,200					
08	11.8.11a		 ✓ 	5,040					
09	11.8.11a		✓	5,040					
10	11.8.11a		 ✓ 	3,015					
11	11.8.5	✓		1,750					
12	11.8.11		 ✓ 	3,015					
13	11.8.11		 ✓ 	3,433					
14	11.8.5	✓		5,000					
15	11.8.4	✓		2,000					
16	11.8.11		 ✓ 	2,578					
17	11.8.11		✓	3,850					
18	11.8.5	✓		5,000					
19	11.8.4	✓		2,250					
20	11.8.11		 ✓ 	3,850					



* taken from the 0 m point of the permanent habitat monitoring transects (Sites 01 - 12) and the SW corner of the standalone weed monitoring plots (Sites 13 - 20).

5.3.2 Biomass monitoring for sustainable grazing

While cattle were observed within the north-west of the offset area as part of the post-wet season survey, the results of the current biomass monitoring will be utilised as part of the Annual Land Condition-Pasture Budget Assessment, to be completed by Sojitz Blue. This will include an assessment of any proposed grazing management regimes in the offset area.

5.4 GENERAL SITE INSPECTION

No additional fencing or access tracks were noted within of the extent of traversed areas in May 2021. Any additional fencing and tracks outside of traversed areas were not able to be confirmed and will need to be supplied for updating as part of future monitoring events.

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. However, past evidence of cattle were observed in the natural grassland areas in the west and east of the Lexington offset area during the post-wet season monitoring.

Outside of the weed monitoring plots assessed as part of the dry season surveys, there were a number of areas of notable weed infestation. Most noticeably was the extent and density of weeds within and adjacent to the ephemeral drainage line and bore on Prickle Farm Road that flanks the western edge of the mining lease (ML 70376). As noted in previous years' monitoring reports, the ephemeral drainage line continues to be densely infested by Noogoora burr (*Xanthium occidentale*), with areas away from the drainage line characterised by dense, monospecific stands of *Parthenium hysterophorus* and a sunflower (indet.). Parthenium has also formed dense stands along the rest of the main track on the western edge of the mining lease (ML70376). Several of the RE 11.8.11a patches in the south of the property (outside of the weed monitoring plots) have become densely infested with *Megathyrsus maximus* and *P. hysterophorus* following the intense rainfall throughout October to December 2021. Furthermore, there is considerable coverage of *Vachellia farnesiana* throughout the western Natural Grassland (RE 11.8.11) areas.



6 RESULTS: LEXINGTON RAIL LOOP OFFSET SITE

6.1 HABITAT MONITORING

6.1.1 Site condition and context

Results of habitat condition assessments identified an average site condition score of 8.12 out of 10 across all seven habitat monitoring sites, with scores ranging between 6.33 (Site LEXRL01) and 8.67 (Sites LEXRL02, LEXRL05, LEXRL07). Site context scores varied from 6.54 out of 10 (LEXRL03) up to 10 out of 10 (LEXRL01 and LEXRL02). Appendix C outline details of the site condition assessments, summarised below in Table 27.

Table 27: Lexington Rail Loop offset site habitat monitoring sites: site condition and site context scores calculated in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017)

Offset paddock	Site	RE	Easting	Northing	Site condition score (/10)	Site context score (/10)
North	LEXRL01	11.8.11	604390	7355247	6.33	10
Promenade	LEXRL02	11.8.11	604758	7354797	8.67	10
Hornya	LEXRL03	11.8.11	608595	7355228	8.00	6.54
Harry S	LEXRL04	11.8.11	609262	7355036	8.00	7.31
	LEXRL05	11.8.11	612011	7354575	8.67	7.31
Contours	LEXRL06	11.8.11	611834	7354280	8.50	7.31
	LEXRL07	11.8.11	611215	7353711	8.67	7.31
				Average score	8.12	7.97

6.1.2 MNES habitat condition assessments

LEXRL05

LEXRL06

LEXRL07

Based on the results of the site condition and context assessments, habitat condition scores for the two MNES averaged 8.05 out of 10 for natural grasslands TEC and 6.44 out of 10 for king blue-grass (Table 28).

MNES	VINES												
Offset paddock	Site	RE	Natural grasslands TEC	King blue-grass									
North Promonodo	LEXRL01	11.8.11	8.04	6.43									
North Promenade	LEXRL02	11.8.11	9.29	7.43									
Harpic	LEXRL03	11.8.11	7.32	5.86									
ndily S	LEXRL04	11.8.11	7.68	6.14									

Average score

8.04

7.95

8.04

8.05

11.8.11

11.8.11

11.8.11

Table 28: Lexington Rail Loop offset site monitoring sites showing their habitat condition scores contributing toMNES

Contours

6.43

6.36

6.43

6.44



Natural Grasslands TEC habitat condition scores for the seven habitat monitoring sites ranged between 7.32 and 9.29 (Table 28). The seven assessment sites supported between two and six TEC indicator grass species (Table 29).

Natural Grassland quality assessments were conducted at each of the seven habitat condition sites within a 50 m x 20 m plot. This included an assessment of the species richness of Natural Grassland TEC indicator species, density of grass tussocks, shrub cover and non-native plant cover as per the approved Commonwealth listing advice (TSSC 2009) (Table 30).

The results of this assessment (Table 30) indicated that only one of the condition sites (LEXRL02) was in 'best' condition, with four sites (LEXRL03, LEXRL04 and LEXRL05) being in 'good' condition. The remaining two sites (LEXRL01 and LEXRL06) did not meet the criteria for 'good' or 'best' condition classes according to the approved Commonwealth listing advice (TSSC 2009). This was due to the high weed cover at LEXRL01 (weed cover >30%) and the low number of perennial indicator grass species at LEXRL06 (>3 perennial indicator grass species).

		No Prom	orth ienade	На	rry's		Contours			
Scientific name	Common name	LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRLOS	LEXRL06	LEXRL07		
Aristida latifolia	Feather-top wiregrass		✓							
Aristida leptopoda	White speargrass	✓	~	✓	✓	✓	✓	✓		
Astrebla elymoides	Hoop mitchell grass									
Astrebla lappacea	Curly mitchell grass									
Astrebla squarrosa	Bull mitchell grass									
Bothriochloa erianthoides	Satin-top grass	✓	~							
Dichanthium queenslandicum	King blue-grass									
Dichanthium sericeum	Queensland bluegrass	✓	~	✓	~	✓	✓	\checkmark		
Eriochloa crebra	Cup grass									
Panicum decompositum	Native millet					~				
Panicum queenslandicum	Yabila grass	✓	~	✓	~			✓		
Paspalidium globoideum	Shot grass									
Thellungia advena	Coolibah grass	✓	✓							
	TOTAL	5	6	3	3	3	2	3		


	North Promenade		Harry's		Contours		
TEC quality criteria	LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRLOS	LEXRL06	LEXRL07
Perennial indicator grass species	5	6	3	3	3	2	3
Number of native grass tussocks	>200	>200	>200	>200	>200	>200	>200
Woody shrub canopy cover (%)	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Perennial non-native plant cover (%)	40%	1%	3%	2%	0%	0%	0%
Condition class	Not TEC	Best	Good	Good	Good	Not TEC	Good

Table 30: Condition classes for the Natural Grasslands TEC at the Lexington Rail Loop offset site

King blue-grass habitat

King blue-grass habitat condition scores for the four habitat monitoring sites ranged between 5.86 and 7.43 (Table 28). No King-blue grass were positively identified from the seven habitat condition assessment plots at the time of surveying (Table 29), accounting for the lower MNES habitat condition score compared with Natural Grassland TEC scores.

6.2 PHOTO MONITORING

Photo monitoring of the Lexington Rail Loop offset sites showed consistent levels of high grass cover across the Harry's and Contours paddocks (Site LEXRL05: refer to Photo G-85 in Appendix G), with reduced ground cover in Harry's Paddock and very little grass cover in the North Promenade paddock (Site LEXRL03 and LEXRL09: refer to Photos E-25 and E-80 in Appendix G). Variability in the ground cover within the North Promenade and Harry's paddocks is likely a consequence of cattle grazing and horse grazing/trampling (respectively). North promenade has largely been overtaken by non-palatable shrubs and other forbs (e.g. *Salsola australis*). Ongoing management and concurrent photo monitoring should detect improvements in these paddocks over time (provided horses and cattle are managed appropriately), as the grassland continues to mature and recover from these disturbances. The results of the photo monitoring in the Lexington Rail Loop offset site is presented in Appendix G.

6.3 WEED MONITORING

A total of seven weed species were identified from the 12 weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the 12 weed monitoring plots, the average number of weed species observed per plot was 3.25 species, ranging between two species (Sites LEXRL04, LEXRL06 and LEXRL07) and five species (Sites LEXRL02 and LEXRL11), with two weed species only encountered at single sites. Weed cover across the 12 weed monitoring plots averaged 4.9%; ranging between 0.2% (Site LEXRL07) and 10% (Site LEXRL02 and LEXRL08)(Table 31, Figure 29 and Figure 30).

The number of weed species differed by offset paddock, with the North Promenade paddock having a higher weed species richness and average cover (3.75 species and 8.5% cover) than Harry's (3 species and 3.1% cover) and Contours (3 species and 3.2% cover).

The most commonly encountered weed was *Melinis repens* which was recorded from 11 of the 12 sites (Table 31). *Parthenium hysterophorus* had the highest average cover of 4.4%. four of the seven weed species detected (57%) had average covers <0.5%.



Table 31: Results of weed monitoring assessments at the Lexington Rail Loop offset site

Scientific nome	cientific name Common name		Perce	entage cover	of weed spec	cies from give	n site								# citor	Aug cover (9/)a
Scientific name	Common name	ramity	LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRL05	LEXRL06	LEXRL07	LEXRL08	LEXRL09	LEXRL10	LEXRL11	LEXRL12	# sites	Avg cover (%)
Parthenium hysterophorus	Parthenium weed	Asteraceae	7.4	7.1	0.3	2.6	0.1			7.8	6.1	2.4	5.9		9	4.4
Vachellia farnesiana	Mimosa bush	Fabaceae	0.2	1.7				2.5		1.1	0.1				5	1.1
Waltheria indica	Sleepy morning	Malvaceae		0.1											1	0.1
Cenchrus ciliaris	Buffel grass	Poaceae											0.1		1	0.1
Melinis repens	Red natal grass	Poaceae	0.2	1.0	0.2	0.1	0.7	0.2	0.1	1.0		2.7	0.3	5.0	11	1.0
Sorghum halepense	Johnson grass	Poaceae			0.2								0.5	0.1	3	0.3
Verbena officinalis	Common verbena	Verbenaceae		0.1	0.1		0.2		0.1	0.1	0.1	0.7	0.1	0.2	9	0.2
		# species	3	5	4	2	3	2	2	4	3	3	5	3		
		Weed cover (%) ^b	7.8	10.0	0.8	2.7	1.0	2.7	0.2	10.0	6.3	5.7	6.9	5.3		

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.



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6.4 **BIOMASS MONITORING**

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all twelve of the sites comprising RE 11.8.11 (Table 32). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 3,850 kg/ha and 5,040 kg/ha 'Downs country' photo standards was reported as 4,445 kg/ha).

Photo monitoring showed some variability in biomass of ground cover across all 12 photo monitoring sites. Overall, there was a high biomass for the grassland vegetation type, with a biomass ranging between 3,015 kg/ha and 5,040 kg/ha across all sites. The average biomass varied considerably between the offset paddocks, with the average biomass at Contours (4,564 kg/ha) greater than at Harry's (3,968 kg/ha) and greater again than at North Promenade (3,433 kg/ha). Biomass between sites within the same paddocks was varied, with the most pronounced differences occurring at Harry's ranging between 3,015 kg/ha and 5,040 kg/ha. This is likely attributable to different grazing pressures, as well as historical trampling from horses in some areas.

Ground photos used to assign biomass at the Lexington Rail Loop offset site are shown in Appendix G.

		Brigalow Belt Future Beef pasture photo standard type	
Biomass monitoring site*	RE type	Downs country	Biomass kg/ha
LEXRL01 – North Promenade paddock	11.8.11	\checkmark	3,015
LEXRL02 – North Promenade paddock	11.8.11	\checkmark	3,850
LEXRL03 – Harry's paddock	11.8.11	\checkmark	3,015
LEXRL04 – Harry's paddock	11.8.11	\checkmark	3,850
LEXRL05 – Contours paddock	11.8.11	\checkmark	4,445
LEXRL06 – Contours paddock	11.8.11	\checkmark	4,445
LEXRL07 – Contours paddock	11.8.11	\checkmark	4,445
LEXRL08 – North Promenade paddock	11.8.11	\checkmark	3,850
LEXRL09 – North Promenade paddock	11.8.11	\checkmark	3,015
LEXRL10 – Harry's paddock	11.8.11	✓	5,040
LEXRL11 – Contours paddock	11.8.11	✓	4,445
LEXRL12 – Contours paddock	11.8.11	\checkmark	5,040

 Table 32: Results of biomass monitoring on the Lexington Rail Loop offset site using Brigalow Belt Future Beef pasture photo standards

* taken from the 0 m point of the permanent habitat monitoring transects (Sites LEXRL01 – LEXRL07) and the SW corner of the standalone weed monitoring plots (Sites LEXRL08 – LEXRL12).

6.5 GENERAL SITE INSPECTION

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. A herd of six horses was encountered on a number of days within Harry's Paddock, with evidence throughout the paddock of horse manure and grazing.

All fences bounding the paddocks were in good condition. Access to many of the monitoring sites in the Contours paddock was via an access track outside of and adjacent to the western boundary of the paddock,



whereas access to monitoring sites in Harry's paddock was via Wurba Road and access to the North Promenade monitoring sites was via existing access tracks into Lexington.



7 REFERENCES

Auld, B. (2009). *Guidelines for Monitoring Weed Control and Recovery of Native Vegetation*. NSW Department of Primary Industries. Bureau of Rural Sciences, Orange NSW.

CO2 Australia (2017). *MNESMP Baseline Monitoring Report – Meteor Downs South Coal Mine Project*. CO2 Australia, Brisbane, QLD.

CO2 Australia (2018). *Lexington Offset Area Initial Baseline Monitoring Report – Meteor Downs South Project*. CO2 Australia, Brisbane, QLD.

CO2 Australia (2020). Post-wet Season Monitoring Report – Year 3 (2019/20). CO2 Australia, Brisbane, QLD.

Cooke, B., McPhee, S., & Hart, Q. (1990). *Rabbits: a threat to conservation & natural resource management, how to rapidly assess a rabbit problem and take action*. Australia Bureau of Rural Sciences, Canberra.

Department of Environment and Heritage Protection (DEHP). (2017). *Guide to determining terrestrial habitat quality – version 1.2.* Department of Environment and Heritage Protection (State of Queensland), Brisbane.

Queensland Herbarium (2021). *Regional Ecosystem Description Database (REDD). Version 12 (March 2021)*. Queensland Government (Department of Environment and Science), Brisbane.

Department of the Environment, Water, Heritage and the Arts (DEWHA). (2010). *Survey Guidelines for Australia's Threatened Birds*. Department of the Environment, Water, Heritage and the Arts (Australian Government), Canberra.

Department of Environment, Water, Heritage and the Arts (DEWHA) (2010). *Survey Guidelines for Australia's Threatened Birds*. Department of Environment, Water, Heritage and the Arts, Canberra

Hone, J. (1988). Feral pig rooting in a mountain forest and woodland: Distribution, abundance and relationships with environmental variables. *Australian Journal of Ecology* **13**: 393-400

Mitchell, B., & Balogh, S. (2007a). *Monitoring Techniques for Vertebrate Pests: Wild Dogs*. NSW Department of Primary Industries. Bureau of Rural Sciences, Orange NSW.

Mitchell, B., & Balogh, S. (2007b). *Monitoring Techniques for Vertebrate Pests: Feral Pigs.* NSW Department of Primary Industries. Bureau of Rural Sciences, Orange NSW.

Northern Resources Consultants (NRC) (2019). *Lexington Offset Area – Pest and Biomass Monitoring – February 2019*. Northern Resources Consultants, Townsville, Qld.

SLR Consulting (SLR)(2019a). *Matters of National Environmental Significance Management Plan – Meteor Downs South Rail Loop Project.* A report prepared for Sojitz Coal Mining Pty Ltd. SLR Consulting, Townsville.

SLR Consulting (SLR)(2019b). *MDS Rail Loop Offset – Ecological Assessment Report*. A report prepared for Sojitz Coal Mining Pty Ltd. SLR Consulting, Townsville.

Threatened Species Scientific Committee (TSSC)(2009). *Commonwealth Listing Advice on Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin*. Department of the Environment, Water, Heritage and the Arts.



APPENDIX A MONITORING SITE LOCATIONS

MDS PROJECT SITE

Table A-1: Post-wet-season monitoring site locations and purpose on the MDS Project site.

							Pest a	inimal moni	toring
Site	Start point name ^a	Easting	Northing	Star picket?	Weed monitoring	Biomass	Rabbit plot	Feral pig plot	Fauna camera
	W01_01	641462	7304249	✓	✓	\checkmark			
01	W01_02	641462	7304301	\checkmark	✓	~			
01	W01_03	641462	7304348		\checkmark	\checkmark			
	R01	641462	7304249	\checkmark			\checkmark		
	W02_01	640199	7303572	\checkmark	✓	✓			
02	W02_02	640203	7303621	✓	✓	\checkmark			
02	W02_03	640210	7303627		✓	\checkmark			
	R02	640199	7303572	✓			\checkmark		
	W03_01	638418	7303259	✓	✓	\checkmark			
02	W03_02	638425	7303308	✓	✓	\checkmark			
03	W03_03	638430	7303358		✓	\checkmark			
-	R03	638418	7303259	✓			\checkmark		
	W04_01	637945	7300236	~	✓	\checkmark			
04	W04_02	637951	7300287	\checkmark	✓	~			
04	W04_03	637950	7300338		✓	\checkmark			
	R04	637945	7300236	✓			\checkmark		
	W05_01	638426	7299836	✓	~	\checkmark			
05	W05_02	638420	7299885	✓	✓	\checkmark			
05	W05_03	638416	7299937		✓	\checkmark			
	R05	638426	7299836	\checkmark			\checkmark		
	W06_01	637445	7299566	✓	\checkmark	\checkmark			
06	W06_02	637447	7299615	\checkmark	✓	✓			
00	W06_03	637443	7299668						
	R06	637445	7299566	✓			\checkmark		
	W07_01	638426	7298876	\checkmark	✓	✓			
07	W07_02	638419	7298926	✓	✓	\checkmark			
07	W07_03	638423	7298974		✓	✓			
	R07	638426	7298876	✓			\checkmark		
08	W08_01	637032	7298735	✓	✓	✓			
00	W08_02	637034	7298785	✓	\checkmark	\checkmark			



							Pest a	inimal moni	toring
Site	Start point name ^a	Easting	Northing	Star picket?	Weed monitoring	Biomass	Rabbit plot	Feral pig plot	Fauna camera
	W08_03	637039	7298835		✓	~			
	R08	637032	7298735	\checkmark			\checkmark		
	W09_01	638387	7298599	✓	✓	✓			
00	W09_02	638380	7298648	✓	✓	✓			
09	W09_03	638372	7298699		✓	✓			
	R09	638387	7298599	✓			~		
	W10_01	636412	7297523	✓	~	✓			
10	W10_02	636415	7297571	✓	✓	✓			
10	W10_03	636413	7297617		✓	✓			
	R10	636412	7297523	✓			~		
	W11_01	642941	7304772	✓	✓	✓			
11	W11_02	642937	7304825		✓	\checkmark			
	W11_03	642938	7304876		✓	✓			
	W12_01	641428	7303597	✓	✓	✓			
12	W12_02	641426	7303646		✓	✓			
	W12_03	641429	7303696		✓	✓			
	W13_01	641896	7303196	✓	✓	✓			
13	W13_02	641899	7303247		✓	✓			
	W13_03	641900	7303297		✓	✓			
	W14_01	638991	7303038	\checkmark	✓	✓			
14	W14_02	638987	7303090		✓	✓			
	W14_03	638988	7303140		✓	✓			
	W15_01	637797	7302245	✓	✓	✓			
15	W15_02	637796	7302296		✓	\checkmark			
	W15_03	637796	7302347		✓	✓			
	W16_01	638556	7300785	✓	✓	✓			
16	W16_02	638560	7300832		✓	\checkmark			
	W16_03	638566	7300882		~	✓			
	W17_01	637029	7300184	✓	✓	✓			
17	W17_02	637028	7300231		~	~			
	W17_03	637024	7300282		✓	~			
	W18_01	637401	7300321	\checkmark	✓	✓			
18	W18_02	637401	7300368		✓	✓			
	W18_03	637398	7300421		\checkmark	\checkmark			



							Pest a	inimal moni	toring
Site	Start point nameª	Easting	Northing	Star picket?	Weed monitoring	Biomass	Rabbit plot	Feral pig plot	Fauna camera
	W19_01	638301	7301720	~	✓	~			
19	W19_02	638295	7301771		✓	~			
	W19_03	638290	7301821		✓	~			
	W20_01	636740	7298674	✓	✓	~			
20	W20_02	636746	7298723		✓	~			
	W20_03	636752	7298771		\checkmark	✓			
	P01_01	636412	7297523					✓	
21	P01_02	636412	7297423					~	
	P01_03	636412	7297323					~	
	P02_01	636397	7298627					~	
22	P02_02	636397	7298527					~	
	P02_03	636397	7298427					✓	
	P03_01	637232	7298835					✓	
23	P03_02	637232	7298735					\checkmark	
	P03_03	637232	7298635					✓	
	P04_01	638126	7299076					✓	
24	P04_02	638126	7298976					✓	
	P04_03	638126	7298876					✓	
	P05_01	638126	7299836					✓	
25	P05_02	638126	7299736					✓	
	P05_03	638126	7299637					✓	
	P06_01	638156	7300985					✓	
26	P06_02	638156	7300885					✓	
	P06_03	638156	7300785					✓	
	P07_01	638992	7303366					✓	
27	P07_02	638992	7303266					~	
	P07_03	638992	7303166					~	
	P08_01	641150	7303945					~	
28	P08_02	641150	7303845					~	
	P08_03	641150	7303745					~	
29	C01	642069	7303364						~
30	C02	641096	7303802						~
31	C03	639777	7303065						~
32	C04	638324	7301905						✓



							Pest a	nimal moni	toring
Site	Start point nameª	Easting	Northing	Star picket?	Weed monitoring	Biomass	Rabbit plot	Feral pig plot	Fauna camera
33	C05	638692	7301073						~
34	C06	638685	7300013						~
35	C07	638679	7299497						✓
36	C08	638419	7298830						✓
37	C09	637498	7300708						~
38	C10	637519	7300049						✓
39	C11	637050	7299119						✓
40	C12	636843	7298531						✓
41	C13	636494	7297829						✓
42	C14	636293	7297414						~
43	C15	636936	7297300						~

^a Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3), R = start point (south-west) of 2 ha rabbit monitoring plot, P = start point (west) of each site's pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), C = fauna camera station. Start points for habitat assessment, weed monitoring and rabbit monitoring plots are the same for sites 01 – 10, with sites 11 – 20 only corresponding to weed monitoring plots.



LEXINGTON OFFSET SITE

Table A-2: Post-wet season monitoring site locations and purpose on the Lexington offset site.

							Pest a	nimal moni	toring
Site	Start point name ^a	Easting	Northing	Star picket?	Weed monitoring	Biomass	Rabbit plot	Feral pig plot	Fauna camera
	W01_01	604331	7354000	\checkmark	✓	\checkmark			
01	W01_02	604331	7353950	✓	✓	✓			
01	W01_03	604331	7353900		✓	✓			
	R01	604331	7353900	✓			\checkmark		
	W02_01	603925	7353100	✓	✓	✓			
02	W02_02	603908	7353053	✓	~	✓			
02	W02_03	603892	7353005		✓	✓			
	R02	603892	7353005	✓			\checkmark		
	W03_01	604380	7352577	✓	✓	✓			
00	W03_02	604380	7352527	✓	✓	✓			
03	W03_03	604380	7352477		✓	✓			
	R03	604380	7352477	✓			✓		
	W04_01	603904	7351791	✓	✓	\checkmark			
	W04_02	603904	7351741	✓	✓	\checkmark			
04	W04_03	603904	7351691		✓	✓			
	R04	603904	7351691	✓			✓		
	W05_01	603360	7351127	✓	✓	✓			
05	W05_02	603345	7351079	✓	✓	✓			
05	W05_03	603330	7351031		✓	\checkmark			
	R05	603426	7351001	✓			\checkmark		
	W06_01	604790	7351295	✓	✓	\checkmark			
06	W06_02	604790	7351245	✓	✓	\checkmark			
	W06_03	604790	7351195		✓	\checkmark			
	W07_01	604649	7350850	✓	✓	✓			
07	W07_02	604649	7350800	✓	✓	\checkmark			
07	W07_03	604649	7350750		✓	\checkmark			
	R06	604649	7350750	✓			\checkmark		
	W08_01	606488	7350461	✓	✓	\checkmark			
00	W08_02	606488	7350411	\checkmark	✓	\checkmark			
08	W08_03	606488	7350361		\checkmark	\checkmark			
	R07	606488	7350361	✓			\checkmark		
00	W09_01	607401	7351233	\checkmark	~	\checkmark			
09	W09_02	607401	7351183	✓	~	✓			



							Pest a	nimal moni	toring
Site	Start point name ^a	Easting	Northing	Star picket?	Weed monitoring	Biomass	Rabbit plot	Feral pig plot	Fauna camera
	W09_03	607401	7351133		✓	\checkmark			
	W10_01	607175	7351671	~	✓	\checkmark			
10	W10_02	607175	7351621	✓	✓	\checkmark			
10	W10_03	607175	7351571		✓	\checkmark			
	R08	607175	7351571	✓			✓		
	W11_01	609631	7353204	✓	✓	\checkmark			
11	W11_02	609631	7353154	✓	✓	\checkmark			
	W11_03	609631	7353104		✓	\checkmark			
	R09	609631	7353104	✓			✓		
	W12_01	610371	7353217	✓	✓	\checkmark			
12	W12_02	610371	7353167	✓	\checkmark	\checkmark			
	W12_03	610371	7353117		\checkmark	\checkmark			
	W13_01	610237	7352615	✓	✓	\checkmark			
12	W13_02	610237	7352565	\checkmark	✓	\checkmark			
12	W13_03	610237	7352515		\checkmark	\checkmark			
	R10	610237	7352515	✓			\checkmark		
	W14_01	604883	7354051	✓	\checkmark	\checkmark			
14	W14_02	604883	7354001		✓	\checkmark			
	W14_03	604883	7353951		\checkmark	\checkmark			
	W15_01	604543	7352984	\checkmark	\checkmark	\checkmark			
15	W15_02	604543	7352934		✓	\checkmark			
	W15_03	604543	7352884		\checkmark	\checkmark			
	W16_01	604604	7352289	✓	✓	\checkmark			
16	W16_02	604604	7352239		\checkmark	\checkmark			
	W16_03	604604	7352189		✓	\checkmark			
	W17_01	604503	7351656	✓	✓	\checkmark			
17	W17_02	604503	7351606		✓	\checkmark			
	W17_03	604503	7351556		\checkmark	\checkmark			
	W18_01	604074	7350714	✓	\checkmark	\checkmark			
18	W18_02	604074	7350664		✓	\checkmark			
	W18_03	604074	7350614		✓	\checkmark			
	W19_01	603812	7352530	\checkmark	✓	\checkmark			
19	W19_02	603798	7352482		~	\checkmark			
	W19_03	603784	7352434		✓	\checkmark			
20	W20_01	610453	7352923	\checkmark	✓	\checkmark			



							Pest a	nimal moni	toring
Site	Start point name ^a	Easting	Northing	Star picket?	Weed monitoring	Biomass	Rabbit plot	Feral pig plot	Fauna camera
	W20_02	610453	7352873		~	✓			
	W20_03	610453	7352823		~	✓			
	P01_01	604442	7353084					✓	
21	P01_02	604442	7352984					✓	
	P01_03	604442	7352884					✓	
	P02_01	603879	7351891					✓	
22	P02_02	603879	7351791					✓	
	P02_03	603879	7351691					~	
	P03_01	604513	7354397					✓	
23	P03_02	604513	7354297					✓	
	P03_03	604513	7354197					✓	
	P04_01	604624	7350950					✓	
24	P04_02	604624	7350850					✓	
	P04_03	604624	7350750					✓	
	P05_01	606463	7350561					✓	
25	P05_02	606463	7350461					~	
	P05_03	606463	7350361					~	
	P06_01	607101	7351233					✓	
26	P06_02	607101	7351133					✓	
	P06_03	607101	7351033					~	
	P07_01	607092	7351771					~	
27	P07_02	607092	7351671					✓	
	P07_03	607092	7351571					~	
	P08_01	609840	7353261					~	
28	P08_02	609840	7353161					~	
	P08_03	609840	7353061					~	
29	C01	604003	7354128						✓
30	C02	604006	7353171						✓
31	C03	603871	7352215						✓
32	C04	603885	7351500						✓
33	C05	605051	7354267						~
34	C06	604978	7353531						~
35	C07	604885	7352747						~
36	C08	604776	7352174						~
37	C09	604705	7351408						~



							Pest a	nimal monit	toring
Site	Start point name ^a	Easting	Northing	Star picket?	Weed monitoring	Biomass	Rabbit plot	Feral pig plot	Fauna camera
38	C10	604402	7350811						\checkmark
39	C11	604107	7350032						\checkmark
40	C12	605496	7350889						\checkmark
41	C13	606580	7350889						\checkmark
42	C14	610156	7352282						\checkmark
43	C15	610612	7353100						\checkmark

^a Start points with prefix W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3), R = start point (south-west) of 2 ha European rabbit monitoring plot, P = start point (west) of each site's feral pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), C = fauna camera station. Start points for weed monitoring and European rabbit monitoring plots are the same for sites 01 – 10, with sites 11 – 20 only corresponding to weed monitoring plots.



MDS RAIL LOOP SITE

Table A-3: Post-wet-season monitoring site locations and purpose on the MDS Rail Loop site

Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
	H01_0m	645575	7303101	\checkmark	Natural Crasslands TEC, King blue, grass	~		
	H01_50m	645575	7303151	\checkmark		✓		✓
MDSRL01	W01_01	645575	7303101	\checkmark		✓	\checkmark	
	W01_02	645575	7303151	\checkmark			\checkmark	
	W01_03	645575	7303201				\checkmark	
	H02_0m	646410	7303007	\checkmark	Natural Grasslands TEC, King blue grass	✓		
	H02_50m	646410	7303057	\checkmark	Natural Grassianus TEC, King Diue-grass	✓		✓
MDSRL02	W02_01	646410	7303007	\checkmark		✓	✓	
	W02_02	646410	7303057	✓			✓	
	W02_03	646410	7303107				✓	
	H03_0m	646666	7303114	\checkmark				
	H03_50m	646666	7303164	\checkmark	Natural Grassianus TEC, King Diue-grass	✓		✓
MDSRL03	W03_01	646666	7303114	✓		✓	✓	
	W03_02	646666	7303164	✓			✓	
	W03_03	646666	7303214				✓	
	H04_0m	646834	7303291	\checkmark	Natural Creation de TEC, King blue, grace	✓		
	H04_50m	646834	7303341	\checkmark	Natural Grassiands TEC, King blue-grass	✓		✓
MDSRL04	W04_01	646834	7303291	✓		✓	✓	
	W04_02	646834	7303341	\checkmark			✓	
	W04_03	646834	7303391				\checkmark	
	W05_01	646409	7303255	\checkmark		✓	\checkmark	
MDSRL05	W05_02	646409	7303305				✓	
WIDSKL05	W05_03	646409	7303355				\checkmark	

^a Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3). Start points for habitat assessment and weed monitoring plots are the same for sites 01 - 04, with site 05 only corresponding to a standalone weed monitoring plot.



LEXINGTON RAIL LOOP SITE

Table A-4: Post-wet-season monitoring site locations and purpose on the MDS Rail Loop site

Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
	H01_0m	604390	7355247	✓	Network Considerate TEC, King blue and	~		
	H01_50m	604390	7355297	✓	Natural Grasslands TEC, King blue-grass	~		
LEXRL01	W01_01	604390	7355247	✓		~	✓	~
	W01_02	604390	7355297	✓			✓	
	W01_03	604390	7355347				✓	
	H02_0m	604758	7354797	✓	Natural Creation de TEC Mine Island	~		
	H02_50m	604758	7354847	✓	Natural Grasslands TEC, King blue-grass	~		
LEXRL02	W02_01	604758	7354797	✓		~	✓	~
	W02_02	604758	7354847	✓			\checkmark	
	W02_03	604758	7354897				\checkmark	
	H03_0m	608595	7355228	✓		~		
	H03_50m	608595	7355278	✓	Natural Grasslands TEC, King blue-grass	~		
LEXRLO3	W03_01	608595	7355228	✓		✓	\checkmark	~
	W03_02	608595	7355278	✓			✓	
	W03_03	608595	7355328				✓	
	H04_0m	609262	7355036	✓	Natural Creation de TEC King blue grace	✓		
	H04_50m	609262	7355086	✓	Natural Grassiands TEC, King blue-grass	✓		
LEXRL04	W04_01	609262	7355036	✓		~	✓	~
	W04_02	609262	7355086	✓			✓	
	W04_03	609262	7355136				✓	
	H05_0m	612011	7354575	✓	Natural Grasslands TEC, King blue, grass	~		
	H05_50m	612011	7354625	\checkmark	Natural Grassianus TEC, King Dide-grass	✓		
LEXRL05	W05_01	612011	7354575	~		~	✓	~
	W05_02	612011	7354625	~			✓	
	W05_03	612011	7354675				✓	
	H06_0m	611834	7354280	\checkmark	Natural Grasslands TEC, King blue, grass	✓		
	H06_50m	611834	7354330	\checkmark	Natural Grassianus TEC, King Dide-grass	\checkmark		
LEXRL06	W06_01	611834	7354280	\checkmark		✓	\checkmark	~
	W06_02	611834	7354330	✓			\checkmark	
	W06_03	611834	7354380				\checkmark	
LEXRL07	H07_0m	611215	7353711	\checkmark	Natural Grasslands TEC, King blue-grass	✓		



Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
	H07_50m	611215	7353761	\checkmark		✓		
	W07_01	611215	7353711	✓		✓	\checkmark	\checkmark
	W07_02	611215	7353761	✓			✓	
	W07_03	611215	7353811				~	
	W08_01	604126	7354813	\checkmark		✓	\checkmark	\checkmark
LEXRL08	W08_02	604126	7354863				\checkmark	
	W08_03	604126	7354913				✓	
	W09_01	604978	7355196	✓		~	✓	\checkmark
LEXRL09	W09_02	604978	7355246				✓	
	W09_03	604978	7355296				✓	
	W010_01	609785	7355039	✓		~	✓	\checkmark
LEXRL10	W010_02	609785	7355089				✓	
	W010_03	609785	7355139				✓	
	W11_01	611630	7353857	\checkmark		~	✓	\checkmark
LEXRL11	W11_02	611630	7353907				✓	
	W11_03	611630	7353957				✓	
	W12_01	612344	7354534	\checkmark		~	✓	\checkmark
LEXRL12	W12_02	612344	7354584				✓	
	W12_03	612344	7354634				\checkmark	

^a Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3). Start points for habitat assessment and weed monitoring plots are the same for sites 01 - 07, with sites 08 - 12 only corresponding to a standalone weed monitoring plot.



APPENDIX B MDS RAIL LOOP SITE – YEAR 3 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 3 monitoring period at the MDS Rail Loop site. Habitat condition scores were calculated in accordance with the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017). The data required to inform the site condition and flora species stocking rates were collected as part of detailed field surveys in March 2022. The site context score was calculated in accordance with the method prescribed in the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017), derived from ground-truthed regional ecosystem mapping within the extent of the MDS Rail Loop, as presented in the MDS Rail Loop ecological assessment (SLR 2019b).

Table B-1: Site condition raw data for each RE assessment unit

	Site R	e MDSRL0: E 11.8.11	L	Si	te MDSRL(RE 11.8.11	0 2	Sit	te MDSRL(RE 11.8.11)3	Site MDSRL04 RE 11.8.11		
Ecological condition indicators	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score
Recruitment of woody perennial species	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - trees	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - shrubs	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - grasses	9	11	3	7	11	3	7	11	3	7	11	3
Native plant species richness - forbs	5	17	3	9	17	3	8	17	3	5	17	3
Tree canopy height	-	-	-	-	-	-	-	-	-	-	-	-
Tree sub canopy height	-	-	-	-	-	-	-	-	-	-	-	-
Tree canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Tree sub canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Shrub canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Native perennial grass cover	48	43	5	50	43	5	23.8	43	3	29	43	3
Organic litter	13.2	13	5	14.5	13	5	7.6	13	5	14	13	5
Large eucalypt trees	-	-	-	-	-	-	-	-	-	-	-	-
Large non-eucalypt trees	-	-	-	-	-		-	-	-	-	-	
Coarse woody debris	-	-	-	-	-	-	-	-	-	-	-	-
Non-native plant cover	40	0	3	22	0	10	47	0	3	74	0	0
Total			19			21			17			14
/10			6.33			7.00			5.67			4.67



able B-2: Summary of the site condition and site con	text scores used to ca	culate the habitat co	ndition score for eac	h RE assessment uni
	Site MDSRL01	Site MDSRL02	Site MDSRL03	Site MDSRL04
	RE 11.8.11	RE 11.8.11	RE 11.8.11	RE 11.8.11
MNES values	Natural Grasslands TEC, King blue-grass	Natural Grasslands TEC, King blue-grass	Natural Grasslands TEC, King blue-grass	Natural Grasslands TEC, King blue-grass
Site condition				
Recruitment of woody perennial species	-	-	-	-
Native plant species richness - trees	-	-	-	-
Native plant species richness - shrubs	-	-	-	-
Native plant species richness - grasses	3	3	3	3
Native plant species richness - forbs	3	3	3	3
Tree canopy height	-	-	-	-
Tree canopy cover	-	-	-	-
Shrub canopy cover	-	-	-	-
Native perennial grass cover	5	5	3	3
Organic litter	5	5	5	5
Large trees	-	-	-	-
Coarse woody debris	-	-	-	-
Non-native plant cover	3	5	3	0
Total of BioCondition attributes	19	21	17	14
MAX ecological condition score	30	30	30	30
Score /10	6.33	7.00	5.67	4.67
Site context				
Size of patch (fragmented bioregions)	10	10	10	10
Connectivity (fragmented bioregions)	5	5	5	5
Context (fragmented bioregions)	5	4	4	4
Distance to permanent watering point (intact bioregions)	-	-	-	-
Ecological corridors	6	4	4	4
Total of site context attributes	26	23	23	23
MAX site context score	26	26	26	26
Score /10	10.00	8.85	8.85	8.85



Table B-3: Summary of the species stocking rate index for king blue-grass

Species stacking rate /28	Site MDSRL01	Site MDSRL02	Site MDSRL03	Site MDSRL04
Species Stocking rate / 5"	RE 11.8.11	RE 11.8.11	RE 11.8.11	RE 11.8.11
King blue-grass				
 Absent/not confirmed = 0 				
 up to 2 tussocks = 2 	3	3	0	0
 between 3 and 20 tussocks = 2.5 				
– 20 or more tussocks = 3				

^a species stocking rate contributes 20% toward the habitat condition score for King blue-grass, with the remaining 80% made up of site condition and site context.

Table B-4: Summary of the MNES habitat condition score for each RE assessment unit

Accessment unit habitat condition score /10	Site MDSRL01	Site MDSRL02	Site MDSRL03	Site MDSRL04	Average habitat	
Assessment unit habitat condition score / 10	RE 11.8.11	RE 11.8.11	RE 11.8.11	RE 11.8.11	condition score	
Natural Grasslands TEC – calculated based on site condition (/80) + site context (/26) converted to score out of 10	8.04	7.86	7.14	6.61	7.41	
 King blue-grass calculated based on combination of: habitat quality (site condition + site context) - 80% species stocking rate (score out of 3) - 20% 	8.43	8.29	5.71	5.29	6.93	



APPENDIX C LEXINGTON RAIL LOOP OFFSET SITE – YEAR 3 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 3 monitoring period at the Lexington Rail Loop offset site. Habitat condition scores were calculated in accordance with the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017). The data required to inform the site condition and flora species stocking rates were collected as part of detailed field surveys in March 2022. The site context score was calculated in accordance with the method prescribed in the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017), derived from ground-truthed regional ecosystem mapping within the extent of the Lexington Rail Loop offset sites, as presented in the Lexington Rail Loop ecological assessment (SLR 2019b).

Table C-1: Site condition raw data for each RE assessment unit

	Site LEXRL01 RE 11.8.11			Site LEXRLO2 RE 11.8.11		Site LEXRL03 RE 11.8.11		Site LEXRLO4 RE 11.8.11		Site LEXRL05 RE 11.8.11		Site LEXRL06 RE 11.8.11			Site LEXRL07 RE 11.8.11						
Ecological condition indicators	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score
Recruitment of woody perennial species	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Native plant species richness - trees	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Native plant species richness - shrubs	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Native plant species richness - grasses	6	11	3	8	11	3	3	11	3	3	11	3	5	11	3	2	11	2.5	3	11	3
Native plant species richness - forbs	5	17	3	5	17	3	6	17	3	5	17	3	7	17	3	8	17	3	7	17	3
Tree canopy height	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Tree sub canopy height	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Tree canopy cover	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Tree sub canopy cover	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Shrub canopy cover	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Native perennial grass cover	48	43	5	50	43	5	23.8	43	3	29	43	3	65	43	5	51	43	5	50	43	5
Organic litter	13.2	13	5	14.5	13	5	7.6	13	5	14	13	5	17.4	13	5	15	13	5	6.6	13	5
Large eucalypt trees	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Large non-eucalypt trees	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Coarse woody debris	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Non-native plant cover	40	0	3	0.6	0	10	3	0	10	2	0	10	0.2	0	10	0.4	0	10	0.4	0	10
Total			19			26			24			24			26			25.5			26
/10			6.33			8.67			8.00			8.00			8.67			8.50			8.67



	Site LEXRL01	Site LEXRL02	Site LEXRL03	Site LEXRL04	Site LEXRL05	Site LEXRL06	Site LEXRL07
	RE 11.8.11						
MNES values	Natural Grasslands TEC, King blue-grass						
Site condition	·		·	·	·		·
Recruitment of woody perennial species	-	-	-	-	-	-	-
Native plant species richness - trees	-	-	-	-	-	-	-
Native plant species richness - shrubs	-	-	-	-	-	-	-
Native plant species richness - grasses	3	3	3	3	3	2.5	3
Native plant species richness - forbs	3	3	3	3	3	3	3
Tree canopy height	-	-	-	-	-	-	-
Tree canopy cover	-	-	-	-	-	-	-
Shrub canopy cover	-	-	-	-	-	-	-
Native perennial grass cover	5	5	3	3	5	5	5
Organic litter	5	5	5	5	5	5	5
Large trees	-	-	-	-	-	-	-
Coarse woody debris	-	-	-	-	-	-	-
Non-native plant cover	3	10	10	10	10	10	10
Total of BioCondition attributes	19	26	24	24	26	25.5	26
MAX ecological condition score	30	30	30	30	30	30	30
Score /10	6.33	8.67	8.00	8.00	8.67	8.50	8.67
Site context							
Size of patch (fragmented bioregions)	10	10	10	10	10	10	10
Connectivity (fragmented bioregions)	5	5	5	5	5	5	5
Context (fragmented bioregions)	5	5	2	4	4	4	4
Distance to permanent watering point (intact bioregions)	-	-	-	-	-	-	-
Ecological corridors	6	6	0	0	0	0	0
Total of site context attributes	26	26	17	19	19	19	19
MAX site context score	26	26	26	26	26	26	26
Score /10	10.00	10.00	6.54	7.31	7.31	7.31	7.31



Table C-3: Summary of the species stocking rate index for king blue-grass

able e of summary of the species stocking rate mock for king mac grass													
Species stocking rate /2ª	Site LEXRL01	Site LEXRL02	Site LEXRL03	Site LEXRL04	Site LEXRL05	Site LEXRL06	Site LEXRL07						
Species Stocking rate / S	RE 11.8.11												
King blue-grass													
 Absent/not confirmed = 0 													
 up to 2 tussocks = 2 	0	0	0	0	0	0	0						
 between 3 and 20 tussocks = 2.5 													
– 20 or more tussocks = 3													

^a species stocking rate contributes 20% toward the habitat condition score for King blue-grass, with the remaining 80% made up of site condition and site context.

Table C-4: Summary of the MNES habitat condition score for each RE assessment unit

Accessment unit babitat condition score /10	Site LEXRL01	Site LEXRL02	Site LEXRL03	Site LEXRL04	Site LEXRL05	Site LEXRL06	Site LEXRL07	FINAL MNES habitat quality score	
Assessment unit habitat condition score / 10	RE 11.8.11								
Natural Grasslands TEC – calculated based on site condition (/80) + site context (/26) converted to score out of 10	8.04	9.29	7.32	7.68	8.04	7.95	8.04	8.05	
 King blue-grass calculated based on combination of: habitat quality (site condition + site context) – 80% species stocking rate (score out of 3) – 20% 	6.43	7.43	5.86	6.14	6.43	6.36	6.43	6.44	



APPENDIX D MDS PROJECT SITE PHOTO MONITORING



SITE 01 - H01_0M





Photo D-1 North

Photo D-2 East



Photo D-3 South

Photo D-4 West



Photo D-5 Ground



SITE 01 - H01_50M





Photo D-6 North





Photo D-8 South

Photo D-9 West



Photo D-10 Ground



SITE 02 - H02_0 M



Photo D-11 North

Photo D-12 East



Photo D-13 South

Photo D-14 West



Photo D-15 Ground



SITE 02 - H02_50M





Photo D-16 North





Photo D-18 South



Photo D-19 West



Photo D-20 Ground



SITE 03 – H03_0M





Photo D-21 North







Photo D-23 South





Photo D-25 Ground



SITE 03 - H03_50M





Photo D-27 East



Photo D-28 South



Photo D-29 West



Photo D-30 Ground



SITE 04 - H04_0M





Photo D-31 North

Photo D-32 East



Photo D-33 South



Photo D-34 West



Photo D-35 Ground



SITE 04 - H04_50M





Photo D-36 North





Photo D-38 South



Photo D-39 West



Photo D-40 Ground



SITE 05 – H05_0M





Photo D-41 North

Photo D-42 East





Photo D-43 South

Photo D-44 West



Photo D-45 Ground



SITE 05 - H05_50M





Photo D-47 East





Photo D-48 South

Photo D-49 West



Photo D-50 Ground



SITE 06 - H06_0M





Photo D-51 North

Photo D-52 East



Photo D-53 South



Photo D-54 West



Photo D-55 Ground


SITE 06 - H06_50M





Photo D-56 North







Photo D-58 South

Photo D-59 West



Photo D-60 Ground



SITE 07 – H07_0M





Photo D-61 North







Photo D-63 South

Photo D-64 West



Photo D-65 Ground



SITE 07 – H07_50M





Photo D-66 North

Photo D-67 East





Photo D-68 South

Photo D-69 West



Photo D-70 Ground



SITE 08 – H08_0M





Photo D-71 North

Photo D-72 East

Photo D-74 West



Photo D-73 South



Photo D-75 Ground



SITE 08 - H08_50M





Photo D-76 North

Photo D-77 East



Photo D-78 South





Photo D-80 Ground



SITE 09 - H09_0M





Photo D-81 North







Photo D-83 South

Photo D-84 West



Photo D-85 Ground



SITE 09 - H09_50M





Photo D-86 North







Photo D-88 South

Photo D-89 West



Photo D-90 Ground



SITE 10 - H10_0M





Photo D-91 North







Photo D-93 South

Photo D-94 West



Photo D-95 Ground



SITE 10 - H10_50M



Photo D-96 North

Photo D-97 East



Photo D-98 South

Photo D-99 West



Photo D-100 Ground



SITE 11 - W11_0



Photo D-101 North

Photo D-102 East



Photo D-103 South

Photo D-104 West



Photo D-105 Ground



SITE 12 - W12_0





Photo D-106 North

Photo D-107 East





Photo D-108 South

Photo D-109 West



Photo D-110 Ground



SITE 13 – W13_0





Photo D-111 North

Photo D-112 East



Photo D-113 South





Photo D-115 Ground



SITE 14 - W14_0



Photo D-116 North

Photo D-117 East



Photo D-118 South

Photo D-119 West



Photo D-120 Ground



SITE 15 – W15_0



Photo D-121 North

Photo D-122 East



Photo D-123 South

Photo D-124 West



Photo D-125 Ground



SITE 16 - W16_0





Photo D-126 North

Photo D-127 East



Photo D-128 South

Photo D-129 West



Photo D-130 Ground



SITE 17 – W17_0



Photo D-131 North





Photo D-133 South

Photo D-134 West



Photo D-135 Ground



SITE 18 - W18_0



Photo D-136 North

Photo D-137 East



Photo D-138 South





Photo D-140 Ground



SITE 19 – W19_0





Photo D-141 North

Photo D-142 East



Photo D-143 South

Photo D-144 West



Photo D-145 Ground



SITE 20 - W20_0





Photo D-146 North

Photo D-147 East



Photo D-148 South

Photo D-149 West



Photo D-150 Ground



APPENDIX E MDS RAIL LOOP SITE PHOTO MONITORING



SITE MDSRL01 – H01_0M





Photo E-2 East





Photo E-3 South

Photo E-4 West



Photo E-5 Ground



SITE MDSRL01 – H01_50M





Photo E-7 East



North



Photo E-8 South

Photo E-9 West



Photo E-10 Ground



SITE MDSRL02 – H02_0 M





Photo E-11 North

Photo E-12 East



Photo E-13 South

Photo E-14 West



Photo E-15 Ground



SITE MDSRL02 – H02_50M





Photo E-16 North





Photo E-18 South



Photo E-19 West



Photo E-20 Ground



SITE MDSRL03 – H03_0M





Photo E-21 North







Photo E-23 South

Photo E-24 West



Photo E-25 Ground



SITE MDSRL03 – H03_50M





Photo E-26 North





Photo E-28 South



Photo E-29 West



Photo E-30 Ground



SITE MDSRL04 – H04_0M



Photo E-31 North





Photo E-33 South





SITE MDSRL04 – H04_50M



Photo E-36 North





Photo E-38 South

Photo E-39 West



Photo E-40 Ground



SITE MDSRL05 – W05_0



Photo E-41 North

Photo E-42 East





Photo E-45 Ground



APPENDIX F LEXINGTON OFFSET SITE PHOTO MONITORING



SITE 01 - H01_0M



Photo F-1 North

Photo F-2 East



Photo F-3 South

Photo F-4 West



Photo F-5 Ground



SITE 01 - H01_50M



Photo F-6 North

Photo F-7 East



Photo F-8 South

Photo F-9 West



Photo F-10 Ground



SITE 02 – H02_0 M





Photo F-11 North

Photo F-12 East



Photo F-13 South

Photo F-14 West



Photo F-15 Ground



SITE 02 - H02_50M





Photo F-16 North

Photo F-17 East



Photo F-18 South

Photo F-19 West



Photo F-20 Ground



SITE 03 – H03_0M





Photo F-22 East





Photo F-23 South

Photo F-24 West



Photo F-25 Ground



SITE 03 - H03_50M



Photo F-26 North

Photo F-27 East



Photo F-28 South

Photo F-29 West



Photo F-30 Ground


SITE 04 - H04_0M





Photo F-31 North





Photo F-33 South

Photo F-34 West



Photo F-35 Ground



SITE 04 - H04_50M



Photo F-36 North

Photo F-37 East



Photo F-38 South

Photo F-39 West



Photo F-40 Ground



SITE 05 - H05_0M



Photo F-41 North

Photo F-42 East



Photo F-43 South

Photo F-44 West



Photo F-45 Ground



SITE 05 - H05_50M



Photo F-46 North

Photo F-47 East



Photo F-48 South





Photo F-50 Ground



SITE 06 - H06_0M





Photo F-51 North

Photo F-52 East



Photo F-53 South

Photo F-54 West



Photo F-55 Ground



SITE 06 - H06_50M





Photo F-56 North

Photo F-57 East



Photo F-58 South

Photo F-59 West



Photo F-60 Ground



SITE 07 – H07_0M





Photo F-61 North

Photo F-62 East



Photo F-63 South

Photo F-64 West



Photo F-65 Ground



SITE 07 – H07_50M





Photo F-66 North

Photo F-67 East



Photo F-68 South

Photo F-69 West



Photo F-70 Ground



SITE 08 - H08_0M



Photo F-71 North

Photo F-72 East



Photo F-73 South

Photo F-74 West



Photo F-75 West



SITE 08 - H08_50M



Photo F-76 North

Photo F-77 East



Photo F-78 South

Photo F-79 West



Photo F-80 Ground



SITE 09 - H09_0M





Photo F-81 North

Photo F-82 East



Photo F-83 South

Photo F-84 West



Photo F-85 Ground



SITE 09 – H09_50M



Photo F-86 North

Photo F-87 East



Photo F-88 South

Photo F-89 West



Photo F-90 Ground



SITE 10 - H10_0M





Photo F-91 North

Photo F-92 East



Photo F-93 South

Photo F-94 West



Photo F-95 Ground



SITE 10 - H10_50M





Photo F-96 North





Photo F-98 South

Photo F-99 West



Photo F-100 Ground



SITE 11 – H11_0M



Photo F-101 North

Photo F-102 East



Photo F-103 South

Photo F-104 West



Photo F-105 Ground



SITE 11 – H11_50M





Photo F-106 North

Photo F-107 East



Photo F-108 South

Photo F-109 West



Photo F-110 Ground



SITE 12 – H12_0M



Photo F-111 North

Photo F-112 East



Photo F-113 South

Photo F-114 West



Photo F-115 Ground



SITE 12 - H12_50M



Photo F-116 North

Photo F-117 East



Photo F-118 South

Photo F-119 West



Photo F-120 Ground



SITE 13 – H13_0M





Photo F-121 North

Photo F-122 East



Photo F-123 South

Photo F-124 West



Photo F-125 Ground



SITE 13 - H13_50M





Photo F-126 North

Photo F-127 East



Photo F-128 South

Photo F-129 West



Photo F-130 Ground



SITE 14 – W14_0





Photo F-131 North

Photo F-132 East



Photo F-133 South

Photo F-134 West



Photo F-135 Ground



SITE 15 - W15_0





Photo F-136 North

Photo F-137 East





Photo F-138 South

Photo F-139 West



Photo F-140 Ground



SITE 16 - W16_0





Photo F-141 North

Photo F-142 East



Photo F-143 South

Photo F-144 West



Photo F-145 Ground



SITE 17 – W17_0





Photo F-146 North

Photo F-147 East



Photo F-148 South

Photo F-149 West



Photo F-150 Ground



SITE 18 - W18_0



Photo F-151 North

Photo F-152 East



Photo F-153 South

Photo F-154 West



Photo F-155 Ground



SITE 19 – W19_0





Photo F-156 North

Photo F-157 East



Photo F-158 South





Photo F-160 Ground



SITE 20 – W20_0



Photo F-161 North

Photo F-162 East



Photo F-163 South

Photo F-164 West



Photo F-165 Ground



APPENDIX G LEXINGTON RAIL LOOP OFFSET SITE PHOTO MONITORING



SITE LEXRL01 – H01_0M





Photo G-1 North





Photo G-3 South



Photo G-5 Ground



SITE LEXRL01 – H01_50M



Photo G-6 North





Photo G-8 South

Photo G-9 West



Photo G-10 Ground



SITE LEXRLO2 – HO2_OM



Photo G-11 North





Photo G-13 South



Photo G-14 West



Photo G-15 Ground



SITE LEXRLO2 – H02_50M





Photo G-16 North

Photo G-17 East





Photo G-18 South

Photo G-19 West



Photo G-20 Ground



SITE LEXRLO3 – H03_0M



Photo G-21 North





Photo G-23 South

Photo G-24 West



Photo G-25 Ground



SITE LEXRL03 – H03_50M





Photo G-26 North







Photo G-28 South

Photo G-29 West



Photo G-30 Ground



SITE LEXRLO4 – H04_0M



Photo G-31 North





Photo G-33 South

Photo G-34 West



Photo G-35 Ground



SITE LEXRLO4 – H04_50M





Photo G-36 North





Photo G-38 South

Photo G-39 West



Photo G-40 Ground


SITE LEXRL05 – H05_0M





Photo G-41 North

Photo G-42 East



Photo G-43 South

Photo G-44 West



Photo G-45 Ground



SITE LEXRL05 – H05_50M



Photo G-46 North

Photo G-47 East



Photo G-48 South

Photo G-49 West



Photo G-50 Ground



SITE LEXRLO6 – H06_0M



Photo G-51 North

Photo G-52 East



Photo G-53 South

Photo G-54 West



Photo G-55 Ground



SITE LEXRLO6 – H06_50M



Photo G-56 North

Photo G-57 East



Photo G-58 South

Photo G-59 West



Photo G-60 Ground



SITE LEXRL07 – H07_0M



Photo G-61 North

Photo G-62 East



Photo G-63 South

Photo G-64 West



Photo G-65 Ground



SITE LEXRL07 – H07_50M



Photo G-66 North

Photo G-67 East



Photo G-68 South

Photo G-69 West



Photo G-70 Ground



SITE LEXRL08 – W08_0



Photo G-71 North





Photo G-73 South

Photo G-74 West



Photo G-75 Ground



SITE LEXRL09 – W09_0





Photo G-76 North





Photo G-78 South

Photo G-79 West



Photo G-80 Ground



SITE LEXRL10 – W10_0



Photo G-81 North

Photo G-82 East



Photo G-83 South

Photo G-84 West



Photo G-85 Ground



SITE LEXRL11 – W11_0



Photo G-86 North

Photo G-87 East



Photo G-88 South

Photo G-89 West



Photo G-90 Ground



SITE LEXRL12 – W12_0



Photo G-91 North

Photo G-92 East



Photo G-93 South

Photo G-94 West



Photo G-95 Ground



APPENDIX C ANNUAL LAND CONDITION-PASTURE BUDGET ASSESSMENT - 2021

Lexington 2021 Land Condition

John Chamberlain

Brennan Mayne Agribusiness

7 May 2021

Lexington 2021 Pasture Growth and Carrying Capacity

Paddock	Land Type	Land	Condition	Pasture	Land Type	Grazed	Carrying	Paddock	AE	Discounted	Discounted
		Туре		Growth	Capacity	Area ha	Capacity	AE Stock	Grazing	Grazing	AE Stock
		Area		Kg/ha	AE/year		ha/AE/yr	Numbers	Days	Days 20%	Numbers
		ha									
18 Contours	Open Downs	152	А	3150	26.20	152	5.8	26.20	9563	7650	21
9 Creek Flat	Open Downs	35	С	1417	2.70	35	13.0	2.70	986	788	2
20 Harry's	Open Downs	88	В	2363	11.40	88	7.7	11.40	4161	3329	9
21 Haul Road	Mountain Coolibah Woodland	46	С	1210	3.10	46	14.8	3.10	1132	905	2
10 Horseshoe	Open Downs	78	С	1417	6.10	78	12.8	6.10	2227	1781	5
14 Long	Mountain Coolibah Woodland	100	В	1793	9.80	100	10.2	9.80	3577	2862	8
19 Motocross	Brigalow/Blackbutt	38	С	882	2.80	253	13.6	18.64	6804	5443	15
	Mountain Coolibah Woodland	94	В	1793							
	Poplar Box	121	В	1223							
5 Mountain	Mountain Coolibah Woodland	154	В	1575	13.30	154	11.6	13.30	4855	3884	11
2 North Promenade	Open Downs	194	С	1417	15.10	194	12.8	15.10	5512	4409	12
1 Promenade Range	Mountain Coolibah Woodland	206	В	1793	20.20	206	10.2	20.20	7373	5898	16
13 Scrub	Brigalow/Blackbutt	126	С	679	7.00	126	18.0	7.00	2555	2044	6
12 Sudacs	Open Downs	108	С	1417	8.40	108	12.9	8.40	3066	2453	7
6 Telegraph Hill	Mountain Coolibah Woodland	196	В	1793	19.30	196	10.2	19.30	7045	5636	15
Total		1736				1736		161.24	58853	47083	129

· Stocking rates need to reflect seasonal pasture growth

· Grazing days discounted by 20% to accommodate up to 10 weeks growing season rest

· Pasture Dieback syndrome has become obvious

Offsets

Paddock	Land Type	Land Type Area ha	Condition	Pasture Growth Kg/ha	Land Type Capacity AE/year	Grazed Area ha	Carrying Capacity ha/AE/yr	Paddock AE Stock Numbers	AE Grazing Days	Discounted Grazing Days 20%	Discounted AE Stock Numbers
11 Creek	Open Downs	66	С	189	0.7	66	94	0.7	256	204	1
4 Horse	Mountain Coolibah Woodland	116	В	968	6.1	116	19.0	6	2227	1781	5
3 South Promenade	Mountain Coolibah Woodland	260	В	1793	25.5						
	Open Downs	129	С	1417	10	389	12.9	30	11007	8805	24
16 Supas	Mountain Coolibah Woodland	24	В	1793	2.4						
	Open Downs	192	С	1417	14.9	216	12.9	17	6118	4895	13
Total		787				787		53	19607	15686	43

Lexington Total

Paddock

18 Contours

Site	Contours 2020
Land Type	Open Downs (Emerald)
Site Area	152(ha)
Land Condition	A
Soil Condition	1
Pasture Condition	1
Tree Density (m²/ha)	0
Area covered by trees (%)	0%
Ground cover (%)	90%
Pasture Growth (kg/ha)	
Current	3150
Possible (A-Condition)	3150 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	26.2
Possible (A-Condition)	26.2 (A-Condition TBA: 0)
Observations	

N/A

Paddock

9 Creek Flat

Site	Creek Flat
Land Type	Open Downs (Emerald)
Site Area	35(ha)
Land Condition	С
Soil Condition	2
Pasture Condition	3
Tree Density (m²/ha)	0
Area covered by trees (%)	0%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	1417
Possible (A-Condition)	3150 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	2.7
Possible (A-Condition)	6.0 (A-Condition TBA: 0)
Observations	
N/A	

Paddock 11 Creek

Site	Creek 2020
Land Type	Open Downs (Emerald)
Site Area	66(ha)
Land Condition	C
Soil Condition	2
Pasture Condition	3
Tree Density (m²/ha)	10
Area covered by trees (%)	100%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	189
Possible (A-Condition)	3150 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	0.7
Possible (A-Condition)	11.4 (A-Condition TBA: 0)
Observations	

N/A

Paddock

20 Harry's

Site	Harry's 2020
Land Type	Open Downs (Emerald)
Site Area	88(ha)
Land Condition	В
Soil Condition	1
Pasture Condition	2
Tree Density (m²/ha)	0
Area covered by trees (%)	0%
Ground cover (%)	75%
Pasture Growth (kg/ha)	
Current	2363
Possible (A-Condition)	3150 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	11.4
Possible (A-Condition)	15.2 (A-Condition TBA: 0)
Observations	
Dieback in QBG esp	

Paddock 21 Haul Road

Site	Haul Road 2020
Land Type	Mountain Coolibah woodland (Emerald)
Site Area	46(ha)
Land Condition	С
Soil Condition	2
Pasture Condition	3
Tree Density (m²/ha)	0
Area covered by trees (%)	100%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	1210
Possible (A-Condition)	2690 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	3.1
Possible (A-Condition)	6.8 (A-Condition TBA: 0)
Observations	

Suckers

Paddock

4 Horse

Site	Horse 2020
Land Type	Mountain Coolibah woodland (Emerald)
Site Area	116(ha)
Land Condition	В
Soil Condition	2
Pasture Condition	2
Tree Density (m²/ha)	5
Area covered by trees (%)	100%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	968
Possible (A-Condition)	2690 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	6.1
Possible (A-Condition)	17.1 (A-Condition TBA: 0)
Observations	
N/A	

Paddock 10 Horseshoe

Site	Horseshoe 2020
Land Type	Open Downs (Emerald)
Site Area	78(ha)
Land Condition	С
Soil Condition	2
Pasture Condition	3
Tree Density (m²/ha)	0
Area covered by trees (%)	0%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	1417
Possible (A-Condition)	3150 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	6.1
Possible (A-Condition)	13.5 (A-Condition TBA: 0)
Observations	

N/A

Paddock

14 Long

Site	Long 2020
Land Type	Mountain Coolibah woodland (Emerald)
Site Area	100(ha)
Land Condition	В
Soil Condition	1
Pasture Condition	2
Tree Density (m²/ha)	1
Area covered by trees (%)	100%
Ground cover (%)	75%
Pasture Growth (kg/ha)	
Current	1793
Possible (A-Condition)	2690 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	9.8
Possible (A-Condition)	14.7 (A-Condition TBA: 0)
Observations	
N/A	

Paddock 19 Motocross

Site	Motocross BB 2020
Land Type	Brigalow Blackbutt (Emerald)
Site Area	38(ha)
Land Condition	C
Soil Condition	2
Pasture Condition	3
Tree Density (m²/ha)	5
Area covered by trees (%)	100%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	882
Possible (A-Condition)	3570 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	2.8
Possible (A-Condition)	11.2 (A-Condition TBA: 0)
Observations	

N/A

Paddock

19 Motocross

Site	Motocross MCW 2020
Land Type	Mountain Coolibah woodland (Emerald)
Site Area	94(ha)
Land Condition	В
Soil Condition	1
Pasture Condition	2
Tree Density (m²/ha)	1
Area covered by trees (%)	100%
Ground cover (%)	75%
Pasture Growth (kg/ha)	
Current	1793
Possible (A-Condition)	2690 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	9.2
Possible (A-Condition)	13.9 (A-Condition TBA: 0)
Observations	
N/A	

Paddock 19 Motocross

Site	Motocross PBI 2020
Land Type	Poplar Box with shrubby understorey (Emerald)
Site Area	121(ha)
Land Condition	В
Soil Condition	2
Pasture Condition	2
Tree Density (m²/ha)	2
Area covered by trees (%)	100%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	1223
Possible (A-Condition)	2190 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	8.1
Possible (A-Condition)	14.5 (A-Condition TBA: 0)
Observations	

N/A

Paddock

5 Mountain

Site	Mountain 2020
Land Type	Mountain Coolibah woodland (Emerald)
Site Area	154(ha)
Land Condition	В
Soil Condition	2
Pasture Condition	2
Tree Density (m²/ha)	2
Area covered by trees (%)	100%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	1575
Possible (A-Condition)	2690 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	13.3
Possible (A-Condition)	22.7 (A-Condition TBA: 0)
Observations	
N/A	

Paddock 2 North Promenade

Site	North Promenade OD 2020
Land Type	Open Downs (Emerald)
Site Area	194(ha)
Land Condition	С
Soil Condition	2
Pasture Condition	3
Tree Density (m²/ha)	0
Area covered by trees (%)	0%
Ground cover (%)	75%
Pasture Growth (kg/ha)	
Current	1417
Possible (A-Condition)	3150 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	15.1
Possible (A-Condition)	33.5 (A-Condition TBA: 0)
Observations	
Qld Bluegrass increasing	

Paddock

1 Promenade Range

Site	Promenade Range 2020
Land Type	Mountain Coolibah woodland (Emerald)
Site Area	206(ha)
Land Condition	В
Soil Condition	2
Pasture Condition	2
Tree Density (m²/ha)	1
Area covered by trees (%)	100%
Ground cover (%)	70%
Pasture Growth (kg/ha)	
Current	1793
Possible (A-Condition)	2690 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	20.2
Possible (A-Condition)	30.4 (A-Condition TBA: 0)
Observations	
N/A	

Paddock 13 Scrub

Site	Scrub 2020
Land Type	Brigalow Blackbutt (Emerald)
Site Area	126(ha)
Land Condition	C
Soil Condition	2
Pasture Condition	3
Tree Density (m²/ha)	10
Area covered by trees (%)	100%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	679
Possible (A-Condition)	3570 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	7.0
Possible (A-Condition)	37.0 (A-Condition TBA: 0)
Observations	

Suckers

Paddock

3 South Promenade

Site	South Promenade MCW 2020
Land Type	Mountain Coolibah woodland (Emerald)
Site Area	260(ha)
Land Condition	В
Soil Condition	2
Pasture Condition	2
Tree Density (m²/ha)	1
Area covered by trees (%)	100%
Ground cover (%)	70%
Pasture Growth (kg/ha)	
Current	1793
Possible (A-Condition)	2690 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	25.5
Possible (A-Condition)	38.3 (A-Condition TBA: 0)
Observations	
Indian couch, erosion	

Paddock 3 South Promenade

Site	South Promenade OD 2020
Land Type	Open Downs (Emerald)
Site Area	129(ha)
Land Condition	С
Soil Condition	2
Pasture Condition	3
Tree Density (m²/ha)	0
Area covered by trees (%)	0%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	1417
Possible (A-Condition)	3150 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	10.0
Possible (A-Condition)	22.3 (A-Condition TBA: 0)
Observations	

Gully erosion

Paddock

12 Sudacs

Site	Sudacs 2020
Land Type	Open Downs (Emerald)
Site Area	108(ha)
Land Condition	С
Soil Condition	1
Pasture Condition	4
Tree Density (m²/ha)	0
Area covered by trees (%)	0%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	1417
Possible (A-Condition)	3150 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	8.4
Possible (A-Condition)	18.6 (A-Condition TBA: 0)
Observations	
N1/A	

N/A

Paddock 16 Supas

Site	Supas MCW 2020
Land Type	Mountain Coolibah woodland (Emerald)
Site Area	24(ha)
Land Condition	В
Soil Condition	1
Pasture Condition	2
Tree Density (m²/ha)	1
Area covered by trees (%)	100%
Ground cover (%)	75%
Pasture Growth (kg/ha)	
Current	1793
Possible (A-Condition)	2690 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	2.4
Possible (A-Condition)	3.5 (A-Condition TBA: 0)
Observations	

N/A

Paddock

16 Supas

Site	Supas OD 2020
Land Type	Open Downs (Emerald)
Site Area	192(ha)
Land Condition	С
Soil Condition	1
Pasture Condition	4
Tree Density (m²/ha)	0
Area covered by trees (%)	0%
Ground cover (%)	50%
Pasture Growth (kg/ha)	
Current	1417
Possible (A-Condition)	3150 (A-Condition TBA: 0)
Carrying Capacity (AEs/year)	
Current	14.9
Possible (A-Condition)	33.1 (A-Condition TBA: 0)
Observations	
N1/A	

N/A

6 Telegraph Hill Paddock **Telegraph Hill 2020** Site Mountain Coolibah woodland (Emerald) Land Type Site Area 196(ha) Land Condition В **Soil Condition** 2 **Pasture Condition** 2 Tree Density (m²/ha) 1 Area covered by trees (%) 100% Ground cover (%) 50% Pasture Growth (kg/ha) 1793 Current Possible (A-Condition) 2690 (A-Condition TBA: 0) Carrying Capacity (AEs/year) Current 19.3 Possible (A-Condition) 28.9 (A-Condition TBA: 0) Observations

Dieback, Indian couch