MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE MANAGEMENT PLAN

Meteor Downs South Rail Loop Project
Sojitz Coal Mining

Prepared for:

Sojitz Coal Mining Pty Ltd
PO Box 126,
Brisbane
Qld, 40011

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PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
12 Cannan Street
South Townsville QLD 4810 Australia
(PO Box 1012 Townsville QLD 4810 Australia)
T: 07 4772 6500
E: townsville@slrconsulting.com www.slrconsulting.com

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DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
623.17200-R01-v0.5	3 October 2019	Neil Collier & Greg Calvert	Scott Harte	Dave Hall

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1 Introduction

1.1 Background

Sojitz MDS Mining Pty Ltd (**Sojitz**) operates the Meteor Downs South project (**MDS**) in central Queensland on behalf of its joint venture partner U & D Mining Industry (Australia) Pty Ltd (**U&D**).

MDS was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**) (referral # 2013/6799) and determined to be a controlled action which was approved on 25 November 2014 subject to a number of conditions.

MDS currently hauls product 85 km north to the Minerva rail load out facility under approvals from the Queensland Department of Transport and Main Roads (**DTMR**) and the Central Highlands Regional Council (**Council**). The conditions of the DTMR approval require Sojitz to prioritise development of an alternate rail network connection in order to reduce the number of truck movements on the State controlled road.

Over the past three years Sojitz and U&D have been investigating alternate haulage options including engaging directly with nearby mine operators to secure access to their rail facilities. The current location and design is the culmination of that work and has been determined to be the most suitable location to enable connection to the existing Bauhinia rail network. Aurizon has also committed to a rail line expansion by creating a passing loop at the existing Starlee siding, about 5 km from the proposed Sojitz rail loop.

On 11 July 2019 Sojitz referred the rail loop project to the Department of the Environment and Energy (**DEE**) for a decision on whether it was a controlled action (Ref # 2019/8482).

On 24 September 2019 DEE confirmed the project was a controlled action on the basis of the potential impact on listed threatened species and communities, and that the impact could be assessed based on the preliminary documentation. On 30 September 2019 DEE provided a request for further information (RFI).

This report has been prepared specifically to address components relating to managing direct and indirect impacts to matters of national environmental significance (MNES) associated with the rail loop project.

1.2 Requirements of the Matters of National Environmental Significance Management plan

In accordance with the EPBC approval, the Commonwealth Department of Environment and Energy (DEE) requires Sojitz to submit a Matters of National Environmental Significance Management Plan (MNESMP) for the management of direct and indirect impacts on the following MNES:

- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin threatened ecological community (Natural Grasslands TEC);
- King Bluegrass (*Dicanthium queenslandicum*).

Project construction and operation will not begin until the MNESMP has been approved. The MNESMP will be implemented once the project has final approval and will remain effective during the period stated in the approval.

The management plan outlined in the following sections will purposefully align with the management strategy outlined for the Meteor Downs South (MDS) coal mine (CO2 Australia, 2018).

Figure 1 Project location

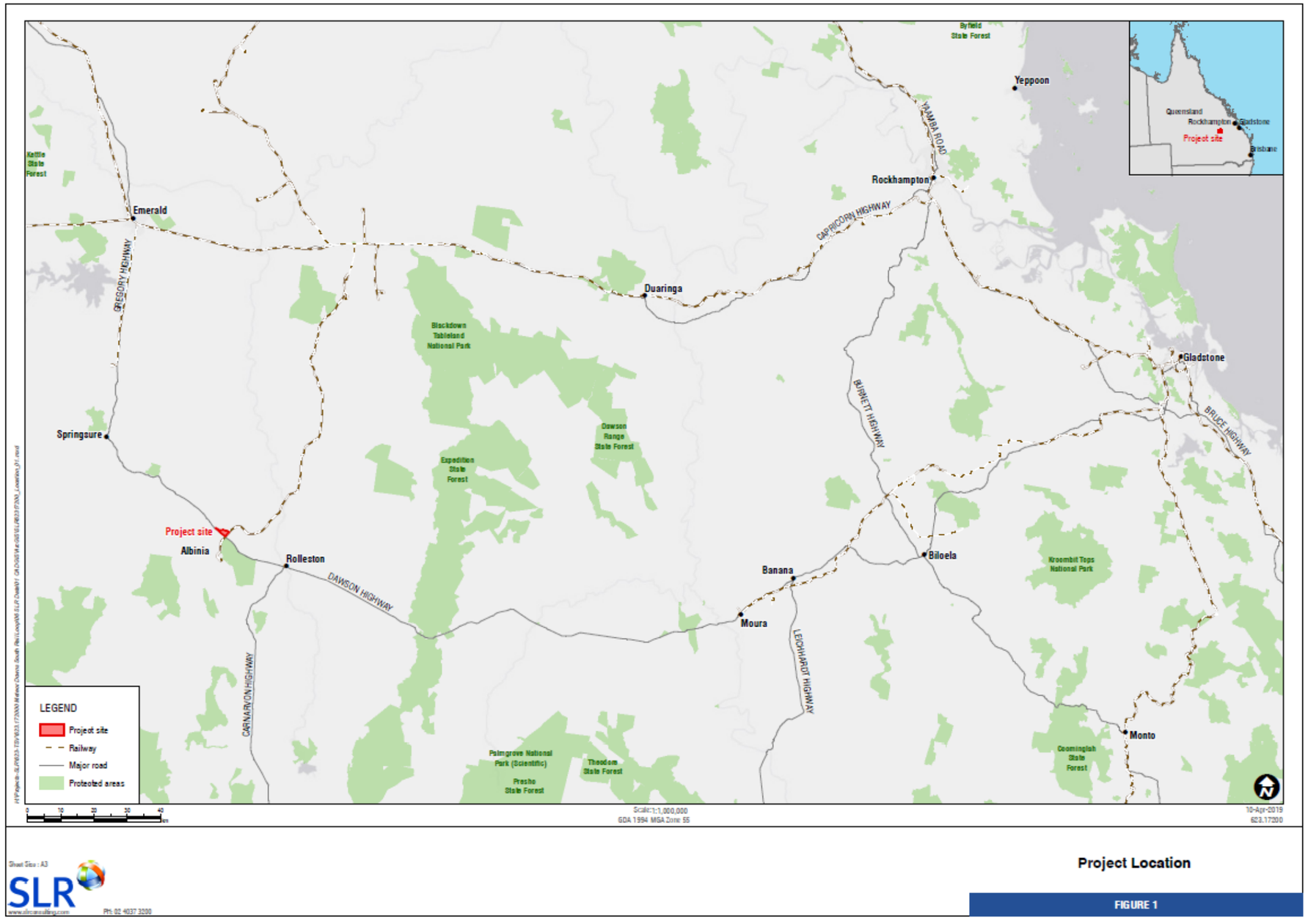


Figure 2 Project overview

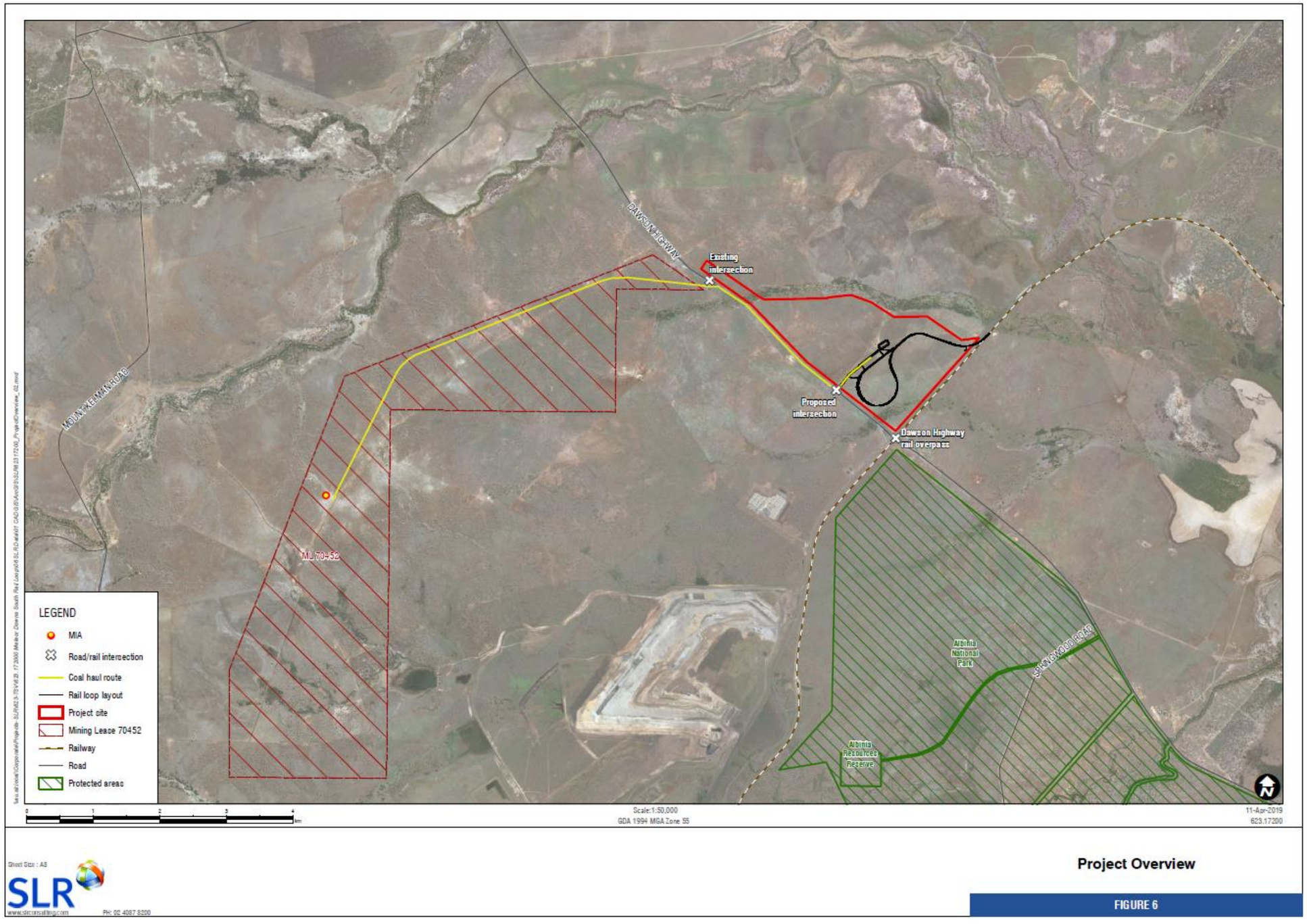


Figure 3 Project area with proposed infrastructure

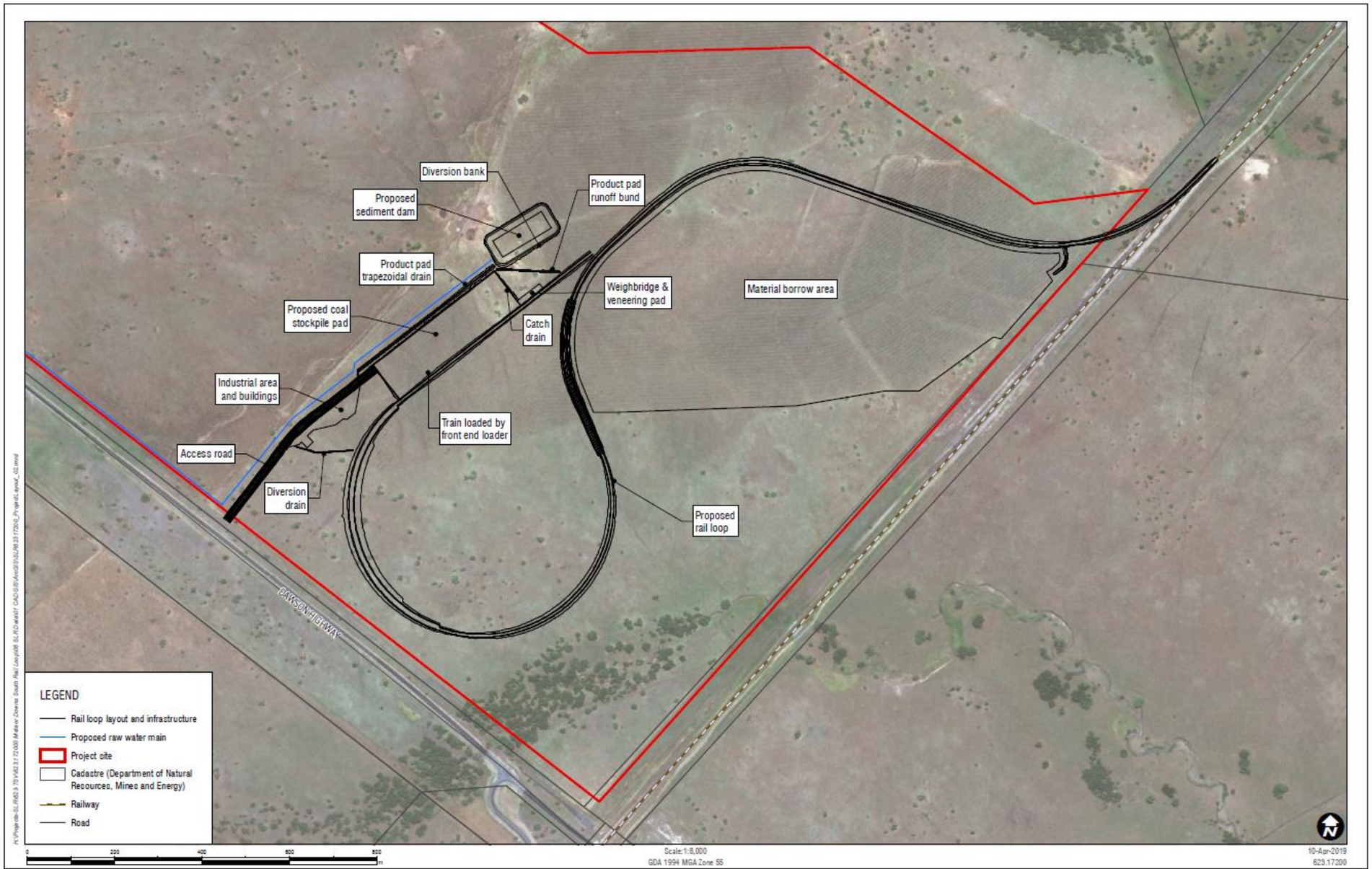
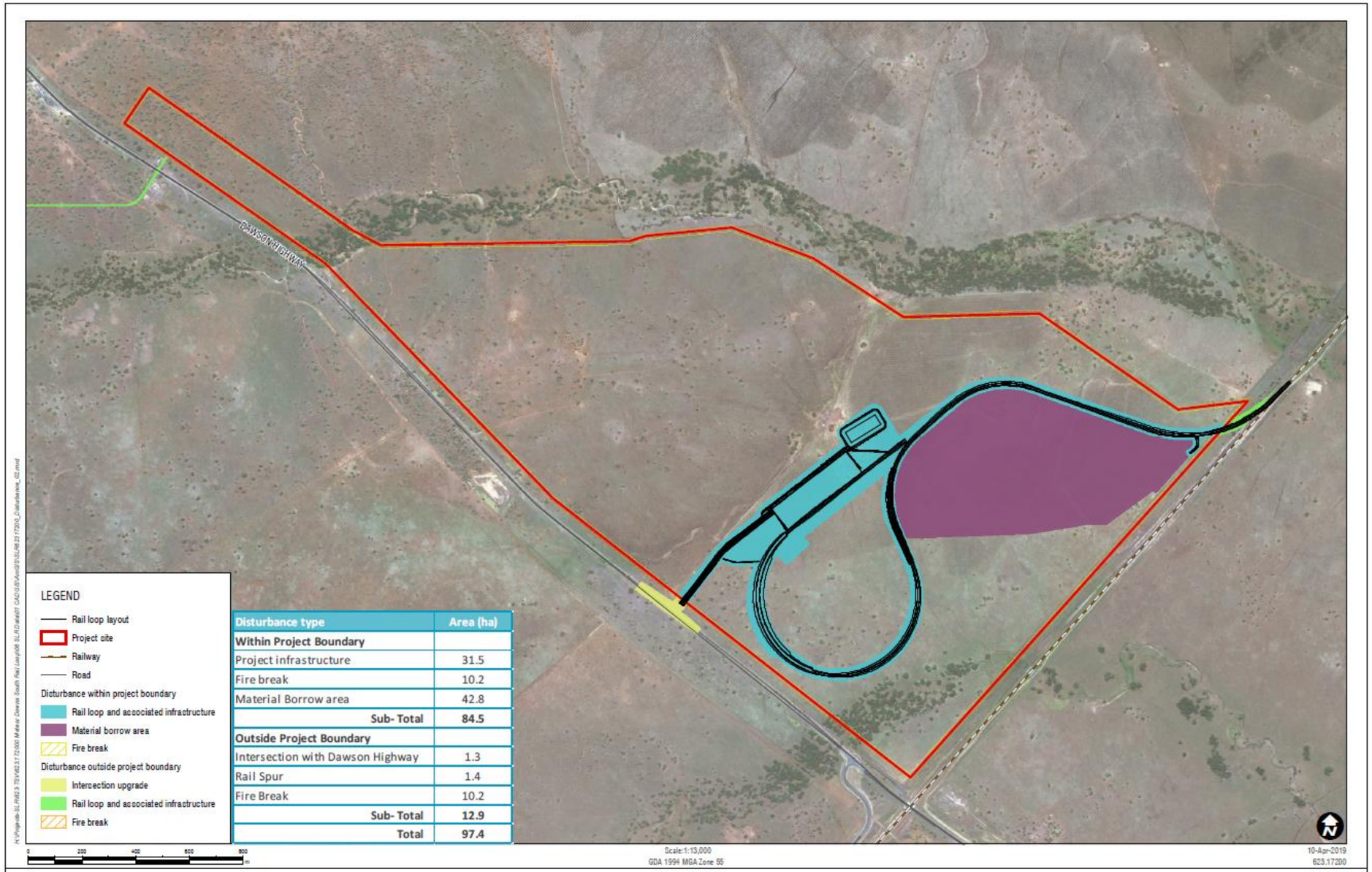


Figure 4 Project with proposed disturbance



2 Legislative and Regulatory Framework

2.1 Commonwealth Legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act* (1999) is administered by the Australian Government Department of the Environment and Energy (DEE) and broadly legislates on:

- Impacts on MNES; and
- impacts on the environment involving the Commonwealth or Commonwealth land.

Under the EPBC Act, the proponent is required to refer the action of the proposed Rail Loop Project to the DEE for determination as a controlled action. The referral for the Rail Loop Project will be assessed under the provisions of the EPBC Act to determine whether the project is likely to have a significant impact upon a MNES and the Minister responsible will determine whether the project should be given conditional approval.

2.1.2 *EPBC Act* Environmental Offsets Policy

The EPBC Environmental Offsets Policy (DSEWPC, 2012) manages impacts to MNES through a system of compensation. It aims to improve environmental outcomes through the consistent application of best practice offset principles, provide more certainty and transparency, and encourage advanced planning of offsets. The policy is supported by the 'offsets assessment guide' balance sheet used to quantify impacts and offset requirements.

2.2 EPBC Act approval conditions relevant to MNESMP

2.3 Relevant plans and guidelines

Table 2 below outlines the relevant conservation plans, policies and guidelines for the two MNES present within the rail loop project area. These documents were reviewed and assessed as part of the process of preparing this MNESMP to ensure consistency and compliance.

Table 1 Relevant conservation advice, recovery plans and threat abatement plans

MNES	Relevant conservation advice and plans
Natural Grasslands of the Queensland Central Highlands and Fitzroy Basin Threatened Ecological Community	Advice to the Minister for the Environment, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on an Amendment to the list of Threatened Ecological Communities under the EPBC Act (TSSC 2009a) Approved Conservation Advice for Natural Grassland of the Central Highlands and North Fitzroy Basin (DOEE, 2008) Draft National Recovery Plan for the "Bluegrass (*Dicanthium* spp.) dominant grasslands in the Brigalow Belt Bioregions (north and south)" endangered ecological community

MNES	Relevant conservation advice and plans
King Blue- Grass (*Dichanthium queenslandicum*)	Advice to the Minister for SEWPaC from the TSSC on Amendment to the list of Threatened Species under the EPBC Act: *Dichanthium queenslandicum* (king blue- grass). Approved Conservation Advice for *Dichanthium queenslandicum* (King Bluegrass) (DEE, 2013).

3 Management Approach

3.1 Avoiding and minimising environmental impacts

The proponent adheres to the environmental management hierarchy—*avoid, minimise and manage*—as their overall approach to managing environmental issues and potential impacts on site. In adopting this approach, the proponent commits to:

- *Avoiding* impacts to MNES through design and positioning of infrastructure, by placing the majority of the project footprint within the Leucaena plantation to avoid impacts to King Bluegrass.
- *Avoiding* unplanned negative impacts on MNES;
- *Minimising* negative impacts associated with planned activities on MNES by restricting clearing and disturbance to the minimum area necessary for the project construction and operation in accordance with permits and approvals;
- *Minimising* loss of MNES by revegetating or facilitating rehabilitation of construction disturbance areas no longer necessary for the operational phase of the project;
- *Managing* the effects of planned and unplanned activities on MNES by implementing a monitoring program to identify necessary management and intervention tasks required;
- *Managing* the ongoing health and viability of MNES on site by adopting principles of adaptive management based on monitoring effectiveness of management actions, as described below.

This MNSEMP has been developed to align with the MNES Impact Assessment Report (SLR 2019c), including the identification of impacts, and commitments made to address those impacts. Measures outlined within this plan to avoid, minimise and mitigate impacts are in compliance with the proposed mitigation measures outlined in EPBC referral 2019/8482.

3.2 Rehabilitation measures

A pivotal mitigation measure will be to minimise unnecessary land disturbance during construction, however, it is unavoidable that the construction disturbance footprint will exceed the operational footprint in size and that there will be disturbed areas surplus to operational requirement. Sojitz is committed to rehabilitating areas of disturbance at the Project site that are not required for operation of the rail facility.

The post rehabilitation land use for these disturbed areas will be as natural areas that are compatible with the Natural Grasslands TEC. Through the on-site rehabilitation research program at the nearby MDS Mine, Sojitz will continue to research the most appropriate species mix of grasses, revegetation methods and rehabilitation success criteria for natural grassland communities. Rehabilitation methods may include, but not necessarily be limited to the following:

- Grass seed collection from the disturbance footprint prior to disturbance, using best practice seed harvesting, processing and storage methods;
- Topsoil recovery prior to disturbance, with topsoil either stockpiled or relocated immediately to a rehabilitation site following the necessary landform construction;
- Site preparation including ripping, weed control and application of ameliorants;
- Direct seeding and applications of fertiliser, or potential use of hydroseeding / hydromulching;
- Site maintenance, including watering, selective weed management and additional applications of fertiliser or soil ameliorants.

Topsoil containing a seedbank shall be stripped separately from subsoil and stockpiled in shallow rills/ windrows within the project footprint (Max height 0.8m) to maximise retention of existing seed stock. The use of a sterile annual grass (e.g. Japanese Millet) may be applied to the stockpiles to improve their stability and organic content if they are not expected to be used for more than six months.

The reuse of existing topsoil and seed bank is preferential to importing perennial grass seed that may not be suitable species composition or local provenance. Use of the existing seedbank will match suitable grassland species with the appropriate soil type without the challenge of sourcing commercial quantities of many difficult to find species. However, the topsoil will also contain seeds of weed species, including the declared parthenium, and it should be anticipated that weed regrowth will occur during the revegetation process. The use of a broad-leaved selective herbicide will effectively manage most non-grass weeds on site while not impacting desirable grass species.

Following site preparation (e.g. ripping), topsoil should be spread over a desired rehabilitation area to a depth of 120 mm, with fertiliser and ameliorants applied simultaneously. Application of any additional perennial grass seed should be undertaken only after due consideration of species composition, provenance and necessary application rates to ensure that the potential future status as the Natural Grasslands TEC is not compromised.

3.3 Adaptive management

This MNESMP is based on adaptive management procedures that include implementing management actions while identifying which management actions are most effective at achieving particular environmental outcomes.

A key feature of adaptive management is the feedback process between learning and decision-making. There are two keys phases in implementing an adaptive management system. The first phase involves establishing the key components of a management framework, including:

1. Set clear objectives and measurable performance indicators.
2. Identify the threats and processes that may impact on the objective.
3. Describe how management actions will meet the objectives.
4. Plan which management actions will be trialled and implemented.
5. Plan monitoring protocols to determine the effectiveness of these actions in progressing towards objectives.
6. Implement the management action and subsequent monitoring.
7. Analyse and evaluate the monitoring data.
8. Use the information from the monitoring to update and refine the management decisions.

The last phases are a learning process which involves analysis of monitoring data to learn about the ecosystem being managed to allow adaptation and improvement of management strategies and approaches.

In the following sections of this management plan, the adaptive management processes that apply to the points listed above are described as they apply to the management strategy for this project. Iterative learning in the second phase of the adaptive management approach will be communicated to the Department through annual reporting requirements of the approval.

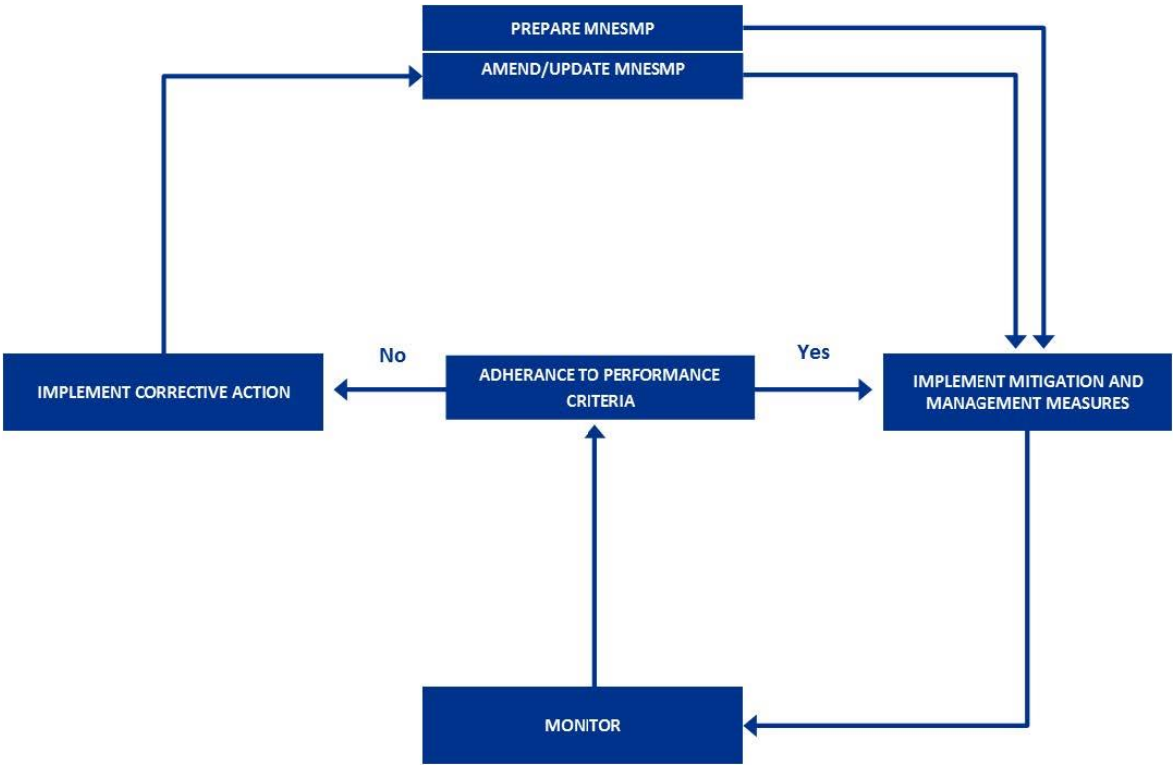
3.3.1 Management process for this MNESMP

Figure 5 illustrates how an adaptive management approach will be implemented to help drive the management process for this MNESMP. The process will involve ongoing and dynamic phases of implementation, learning, and review, and will include:

- Implementation of mitigation and management measures to minimise the impact of the Project on MNES;
- Monitoring to:
    - Evaluate performance of the MNESMP against measurable performance criteria;
    - Identify triggers for further action;
    - Develop contingency plans and corrective actions if required;
    - Capture learnings from plan implementation and assess the effectiveness of the management framework;
    - Inform subsequent reviews and amendments to the MNESMP;
- Implementation of contingency plans and corrective actions;
- Review of the MNESMP and management framework; and
- Amendment of the MNESMP as required to ensure continuous improvement of the management framework based on learnings obtained.

Regular reviews of the MNESMP will occur alongside amendments made through the adaptive management approach. New data and information will be incorporated into the plan. This data may be obtained as a result of implementing the plan, or from new information derived from external sources (CO2 Australia, 2018).

Figure 5 Management flowchart



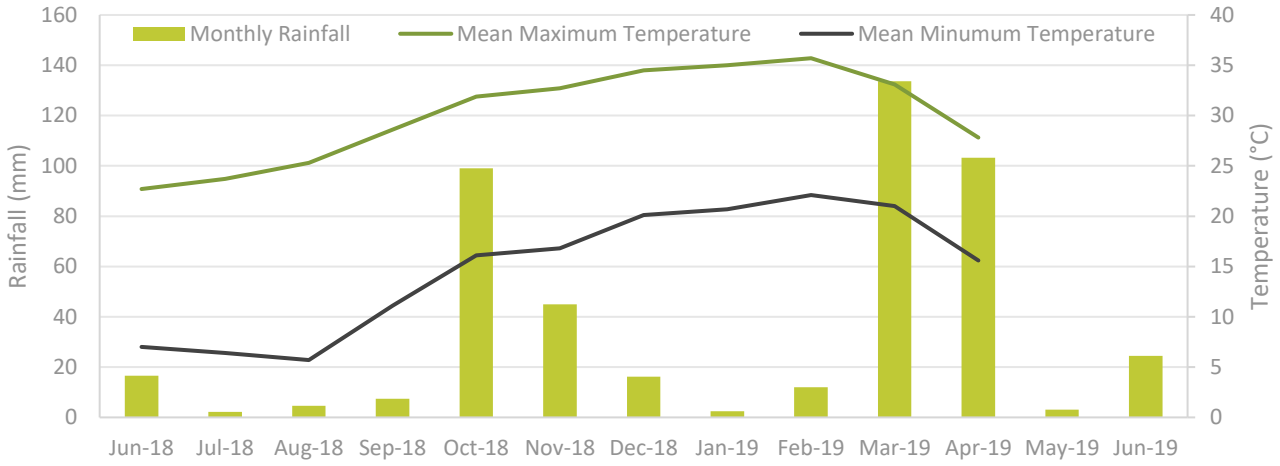
(From Co2, 2019)

4 Existing Site Environment

4.1 Climate and meteorology

The Rail Loop Project is located within a sub-tropical climate with hot, moist summers and warm, dry winters, with occasional frost in the southern reaches. Rainfall within the Central Queensland regions is highly seasonal, with most rain occurring during from October to March (Figure 6). The project area is within the boundaries of the Central Highlands Regional Council, which was partially drought declared in May 2019 and fully drought declared in June 2019 (Central Highlands Council, 2019).

Figure 6 Rainfall, mean maximum and minimum temperatures (Station 35065) (BOM, 2019)



4.2 Land use

The project site and lands surrounding have been extensively grazed since 1850. Much of the area experienced extensive clearing in the 1960s and in recent decades has been used for grazing on native vegetation, with some dryland cropping and minor forestry. Current land uses are pastoral, open cut coal mining and a number of conservation tenures (Albina National Park, Conservation Park and Resources Reserve; Mount Hope, Mount Pleasant and Cairdbeign State Forests; Carnavon National Park—Refer to Figure 1).

The northern portion of the study area has been planted with the fodder crop *Leucaena leucocephala* (Leucaena). Aerial Raster imagery accessed via QImagery identified that this area was initially cultivated prior to January 1962 (57 years before present), with evidence of Leucaena cultivation on site as early as June 1969 and development of swales prior to July 1983. Aerial imagery indicates ongoing management of the Leucaena planting area until April 1993; no further evidence of cultivation in the last 26 years was obtained.

4.3 Geology and topography

The Rail Loop project lies near the boundary of the Carboniferous-Devionian Drummond Basin which is the structural remnant of a large intermontane area filled by deposited fluvalite sediments (Olgers, 1972). The local geology at the Project site is situated within Tertiary aged basaltic flows, minor pyroclastics and sediments.

The soil type for the project area is mapped by Northcote *et al* (1968) and Queensland Globe as unit 'Kb10', defined as '*Gentle or moderately undulating plains with occasional higher stony ridges or broad low hill crests: dominant soils are shallow to moderately deep dark clays, often with linear gilgai on slopes. In lower sites small level plains occur, often as narrow stream flood-plains; on these areas soils are deep. On the higher stony ridges shallow uniform clays occur*'. The Project site is located outside of the extent of the acid sulphate soil mapping layer (State of Qld, 2019); therefore, Acid Sulphate Soils are not considered to be of concern in the area of the proposed development.

Queensland Globe mapping (State of Qld, 2019) identifies the following agricultural and geoscientific layers over the site:

- Land resource area – Undulating Downs;
- Land systems of the Isaac Comet Area – ZDK3 (Downs and cracking clay soils on slightly weathered or unweathered basalt widespread throughout the area);
- Agricultural Land Class, A1 – Crop Land – Broadacre and horticulture;
- Current agriculture – sown pasture, pasture production;
- Potential agriculture – suitable for annual horticulture, broadacre cropping, intensive livestock, and pasture production;
- Strategic cropping land (SCL) – the Leucaena plantation is mapped as SCL for the western cropping sub zone, and is shown on the SCL trigger map.

The topography is flat to gently undulating and is generally in the order of 2 % relief in the east of the site and between 2.5 % and 6.5 % relief associated with a low ridge in the west of the site.

4.4 Terrestrial ecology

The Project site is located within Province 6 (Northern Bowen Basin) in the Brigalow Belt Bioregion. Soils of the Project area are described as being associated with Land Zones 3 and 8. These land zones are:

- Land Zone 3—Quaternary alluvial systems, including floodplains, alluvial plains, alluvial fans, terraces, levees, swamps, channels, closed depressions and fine textured palaeoestuarine deposits; and
- Land Zone 8—Cainozoic igneous rocks, predominantly flood basalts forming extensive plains and occasional low scarps. Also includes hills, cones, plugs and trachytes and rhyolites, and associated interbedded sediments and talus.

Native grassland habitat identified as RE 11.8.11 occurs in the west, south and northeast of the study area. This regional ecosystem is one of seven REs considered analogous to the EPBC-listed TEC '*Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin*'. Native perennial tussock grasses dominate the grassland habitat. These include White Speargrass *Aristida leptopoda*, Purple Wire-grass *A. personata*, Queensland Bluegrass (*Dichanthium sericeum*), Native Panic (*Panicum queenslandicum*) and Coolibah Grass (*Thellungia advena*). Other species present include Black Speargrass (*Heteropogon contortus*), which was locally dominant in some areas in the western portion of the study area. Non-native grasses were most prolific along the disturbed margins of the Dawson Highway.

Grassland was noted as occurring within the area mapped as 'non-remnant'. This area is planted with rows of the introduced fodder crop Leucaena*, however assessments within this area showed the grassland to meet the condition threshold for the Natural Grassland TEC. The remnant status of grasslands under the Queensland *Vegetation Management Act* was determined using the criteria provided by Neldner *et al*. (2017), while determination of the grassland TEC was undertaken using key diagnostic criteria and condition thresholds for 'Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin' as defined in the Listing Advice by the Threatened Species Scientific Committee (TSSC, 2009).

An area of approximately 56 ha in the western portion of the study area, and 2.4 ha in the north east of the site conformed to RE 11.8.5 due to the presence of rocky, granitic soil and a comparatively dense tree layer dominated by Mountain Coolibah (*Eucalyptus orgadophila*). The ground layer in this habitat was dominated by Black Speargrass (*Heteropogon contortus*) and Wiregrasses (*Aristida* spp.), with other native grasses including Queensland Bluegrass (*Dichanthium sericeum*) and invasive grasses including Buffel Grass* (*Cenchrus ciliaris*) and Red Natal Grass* (*Melinis repens*). This habitat occurred on the higher elevation of a very gradual slope, and composition shifted along the downhill slope to the east with RE 11.8.11 becoming progressively more dominant. Lower slopes were associated with vertosol (dark cracking black clay soils) throughout the site and generally contained lower tree densities.

The north of the site was bordered by riparian vegetation classified as RE 11.3.3 in DNRME state mapping (DNRME 2018). A small (10 ha) patch of this habitat is also present in the southern corner of the site. RE 11.3.3 is described as '*Eucalyptus coolabah* open woodland'; however, Coolibah (*E. coolabah*) was not identified within the habitat or anywhere else on the site more broadly. The riparian vegetation was consistent with RE 11.3.3a: '*Melaleuca bracteata* woodland on alluvial plains; riverine or fringing riverine wetland'. Black Tea Tree (*M. bracteata*), was the dominant tree species throughout the areas of riparian vegetation, however much of this has recently been poisoned.

Table 2 Regional ecosystems within the Project site

Vegetation community description	Regional Ecosystem	Status under the Qld VMA	Area (ha) in Project Site
Dichanthium sericeum grassland on Cainozoic igneous rocks.	11.8.11	Of Concern	77.02ha within project footprint
Eucalyptus orgadophila open woodland on Cainozoic igneous rocks	11.8.5	Least Concern	58.5ha across study area, 0ha within project footprint
Melaleuca bracteata woodland on alluvial plains; riverine or fringing riverine wetland	11.3.3a	Of Concern	0ha within project footprint

4.4.1 Fauna

A total of ninety-eight (98) terrestrial vertebrate species were identified during the initial two seasonal field surveys (November 2018 and February-March 2019) at the Rail Loop Project. The species list is as follows:

- Six amphibian species;
- Ten reptile species;
- 60 bird species;
- 22 mammal species;
- Five pest species.

Of the animals identified during the two field surveys, no EPBC listed species were noted.

During baseline monitoring surveys undertaken from 14–19 May 2018, 5–10 November 2018 and 25 February–2 March 2019. Additional surveys of the grassland communities were undertaken from 4–7 June and 3–4 July 2019. These surveys failed to detect the presence of any EPBC listed fauna.

4.4.2 MNES baseline habitat and species condition

4.4.3 Weed and pest animals

The ecological surveys undertaken in 2018 and 2019 revealed a moderate diversity of weed species at the Project location. Of the 60 plant species identified, 16 (26.67%) are noted as being introduced in the Census of the Queensland Flora 2018 (DES, 2018).

The surveys identified scattered but dense populations of Red Natal Grass (*Melinis repens*), Buffel Grass (*Cenchrus cilaris*) and Parthenium (*Parthenium hysterophorus*) throughout the study area. Significant weed species including Parthenium and Prickly Pear (*Opuntia tomentosa*) which are classified as restricted invasive plants under the *Biosecurity Act 2014.* Parthenium was found to be most prevalent in low-lying areas and along watercourses. A small but increasingly dense thicket of Mimosa Bush (*Vachellia farnesiana*) was identified near the railway line on the eastern boundary. The identified weed species are shown in Table 3.

Feral populations of Leucaena (*Leucaena leucocephala*) are listed as a restricted plant under local laws as described in the Central Highlands Regional Council Biosecurity Plan 2017-2020 (Central Highlands Regional Council, 2017). However, the Leucaena within the study are does not seem to have expanded beyond the planted rows and would not constitute being classified as feral. As grazing pressure on the Leucaena is removed, monitoring will be required to ensure that a feral population does not develop.

Table 3 Weed species identified at the Project site

Species	Common name	Prohibited or restricted under *Biosecurity Act 2014*
Bidens bipinnata	Spanish Needles	
Bothriochloa pertusa	Indian Couch	
Cenchrus ciliaris	Buffel Grass	
Cirsium vulgare	Spear Thistle	
Clitoria ternatea	Blue Butterfly Pea	
Erigeron bonariensis	Fleabane	
Heliotropium amplexicaule	Clasping Heliotrope	
Leucaena leucocephala	Leucaena	
Melinis repens	Red Natal Grass	
Opuntia tomentosa	Prickly Pear	Restricted (category 3)
Panicum coloratum	Kleingrass	
Parthenium hysterophorus	Parthenium	Restricted (category 3)
Setaria incrassata	Purple Pigeon Grass	
Sisymbrium irio	London Rocket	
Vachellia farnesiana	Mimosa Bush	

Species	Common name	Prohibited or restricted under *Biosecurity Act 2014*
Verbesina encelioides	Golden Crownbeard	

Five invasive fauna species were identified during the fauna surveys, all of which commonly occur in disturbed habitats throughout Queensland. The following species were observed within the study area:

- Cane Toad (*Rhinella marinus*);
- Wild Pig (*Sus scrofa*);
- House Mouse (*Mus musculus*);
- Black Rat (*Rattus rattus*);
- Feral Cat (*Felis catus*).

Domestic Cattle (*Bos x indicus*) were also recorded within the study area and, in addition to impacts on vegetation, are likely to impact native fauna though competition and destruction or modification of habitat. The most intensive pressure was around the watering points in the centre of the study areas. This created a visible piosphere, (a concentric arrangement of zones of increasing grazing intensities) around water holes. Although gradients of ever-decreasing grazing pressure occur from 1-2 km from water (Landsberg *et al.* 1997), no parts of the study area are more than 2 km from these watering points, so the entire study area can be assumed to be a regularly subjected to heavy grazing pressure. Cattle are ubiquitous across the site, and no locations within the study area are unaffected by cattle.

The condition of the TEC grassland and individual tussocks of King Bluegrass and other perennial tussock grasses are strongly influenced by seasonal conditions and cattle grazing. Surveys undertaken in February-March 2019 coincided with an unusually dry period, where no rain had fallen for 14 days prior to the survey, and there had only been 17.4 mm rain since the previous survey in December 2018. Conditions on site were very dry, and there was no new growth of fresh reproductive material on any of the grasses. The tussock grasses on site had been extensively grazed, with a high percentage of bare ground evident across most of the site. Most grasses were unidentifiable, including King Bluegrass, however enough grass inflorescences could be identified to assign good and best quality TEC to numerous areas of grassland.

By contrast, 118.4 mm rain was recorded in March, which was significantly higher than the months average rainfall of 80.18 mm. This high rainfall, and subsequent rainfall in April-June, resulted in obvious changes to the grassland condition on site. The June and July surveys noted abundant new growth of perennial tussock grasses, higher percentage groundcover, higher abundance of annual weeds (e.g. Parthenium) and a higher percentage of grass tussocks that could be readily identified to species, including King Bluegrass. Cattle grazing was still widespread during the later survey and despite the high rainfall in March the site is within an area that was fully drought declared in June 2019 (Central Highlands Council, 2019). The seasonal variation in grassland TEC condition is a feature of this community and grazing sensitive species may disappear from sites that are intensively grazed (DSEWPaC 2013). Seasonal variation in the grassland community is demonstrated in Table 5 below.

Table 4 Seasonal variation in grassland condition

Site condition Feb 2019	Site condition July 2019
	

4.5 Aquatic ecology and hydrology

The project area is bordered to the north by an unnamed tributary of Aldebaran Creek, forming part of a 404 km^2 catchment area. The watercourse is ephemeral and is dry for most of the year, during which time the only sources of permanent water on site are artificial water troughs to the west of the proposed impact area.

A flood study and stormwater management plan has been undertaken for the proposed development (SLR, 2019b). This assessment has determined that the proposed development has small localised impacts on flood levels for the surrounding locality, with very limited impact propagating past the property boundary. Surface water runoff from the proposed development is proposed to be captured in two sedimentation basins (A and B), to prevent any increase in discharge and to manage water quality leaving the site. The basin capacities are sufficient to capture the 1 % 24 hr AEP flood event without overtopping, however, the 1 % AEP flood extent associated with these creeks do not impact the development area. Eight culverts placed in existing drainage lines have been designed into the infrastructure plan and sized to minimise flooding in a 1 % AEP event.

The proposed development has limited interference with overland flow. The proposed Sedimentation Basin A has a capacity of 32 ML and Sedimentation Basin B a capacity of 20 ML. The Flood Impact Assessment and Stormwater Management Plan both showed no impact, actionable nuisance, or worsening of stormwater, flooding or drainage to the state-controlled road (Dawson Highway), railway corridor and/or conveyance through existing drainage lines. A more significant impact to flow within the watercourse is likely to occur as a result of the widespread tree poisoning along the watercourse to the north, which is not associated with this project. It is likely that the trees that have been poisoned will soon die and fall, which will decrease fauna habitat quality, connectivity and stream bank stability and cause impediments to stream flow.

Groundwater is likely present on the site, though registered bores within 2km of the project range in depth from 25m to 98.1m. Considering excavation on site will not exceed 5m, no groundwater resources are likely to be intersected. No groundwater extraction is required for the project.

5 Natural Grasslands Threatened Ecological Community

5.1 Status and distribution

The Natural Grassland TEC is listed as endangered under the EPBC Act. It is endemic to Queensland and occurs within the Brigalow Belt North (BBN) and Brigalow Belt South (BBS) IBRA bioregions (DEWHA, 2008) which extend from Collinsville through to the Carnarvon National Park. The Natural Grasslands TEC occurs within eight IBRA subregions: BBN 6 Northern Bowen Basin, BBN 9 Anakie Inlier, BBN 10 Basalt Downs, BBN 11 Isaac-Comet Downs, BBN 12 Nebo-Connors Range, BBN 13 South Drummond Basin, BBS 1 Claude River Downs and BBS 9 Buckland Basalts.

The Natural Grasslands TEC are native grasslands characteristically comprising perennial native grasses. They occur on flat or gently undulating rises, on fine textured soils (often cracking clays) derived from either basalt or fine-grained sedimentary rocks. Soils have either formed *in situ* or have been transported to form extensive alluvial plains along watercourses (DSEWPaC 2013a). The Natural Grasslands TEC occurs in areas with relatively high summer rainfall.

5.2 Community ecology

5.2.1 Description

Natural Grasslands TEC are dominated by *Dicanthium* spp. (Bluegrass), with tropical *Aristida* spp. and *Panicum* spp. (panic grasses) (TSSC 2009b). They lack temperate grasses (e.g. *Austrostipa* spp. and *Austrodanthonia* spp.), which are a more dominant feature of grasslands in the south. Native grasses are the primary indicator of the TEC, however, a range of forbs are also typically present, including scurvy grass (*Commelina ensifolia*), Native Jute (*Corchorus trilocularis*), Cow Vine (*Ipomoea lonchophylla*), Pencil Yam (*Vigna lanceolata*), Native Mung Bean (*Vigna radiata*), Creeping Tick Trefoil (*Desmodium campylocaulon*), Native Sensitive Plant (*Neptunia gracilis*), Emu Foot (*Psoralea tenax*), Rhyncho (*Rhynchosia minima*), Grey Rattlepod (*Crotalaria dissitiflora*), Clover-leaf Glycine (*Glycine latifolia*) and Bladder Ketmia (*Hibiscus trionum* var. *vesicarius*).

A shrub layer is generally a minor component of Natural Grasslands TEC, however, in some areas there can be a more extensive shrub cover including species such as Sally Wattle (*Acacia salicina*) and Mimosa (*Acacia farnesiana**) (TSSC 2009).

A tree canopy is usually absent but, when present, projective crown cover is no more than 10% (TSSC 2009b). Species present may include Gum-topped Bloodwood (*Corymbia erythrophloia*), Coolibah (*Eucalyptus coolabah*), Narrow-Leaved Ironbark (*E. crebra*), Silver-Leaved Ironbark (*E. melanophloia*), Mountain Coolibah (*E. orgadophila*), Poplar Box (*E. populnea*), and Black Tea-tree (*Melaleuca bracteata*).

There can be seasonal variation in the appearance of Natural Grasslands TEC as many native wildflowers are more visible during spring (DSEWPaC 2013). In addition, some wildflowers do not appear every year and some species that are sensitive to disturbance may decline or disappear from disturbed sites (e.g. grazing sensitive species may disappear from sites that are intensively grazed) (DSEWPaC 2013). (DSEWPaC, 2013)

5.2.2 Condition thresholds

Conditions thresholds determine when an area of vegetation (patch) should be described as a specific ecological community. Conditions thresholds aim to focus on the protection of vegetation remnants in relatively good to excellent condition (DSEWPaC, 2013).

Natural Grasslands TEC is present and of the *best quality* if:

- The patch occurs within any of the subregions of the Brigalow Belt North and Brigalow Belt South bioregions outlined in Status and distribution 5.1;
- Trees are absent or sparse, considered when the vertical projection of foliage is 10% or less;
- There are at least 200 native grass tussocks in the patch;
- The patch size is at least 1 hectare;
- There are at least four perennial native grass indicator species present;
- The total projective foliage cover of shrubs is less than 30%; and
- Perennial non-woody introduced species make up less than 5% of the total perennial projective foliage cover.

Natural Grasslands TEC is present and of *good quality* if:

- The patch occurs within any of the subregions of the Brigalow Belt North and Brigalow Belt South bioregions outlined in Status and distribution 5.1;
- Trees are absent or sparse, considered when the vertical projection of foliage is 10% or less;
- There are at least 200 native grass tussocks in the patch;
- The patch size is at least 5 hectares; and
- There are at least three perennial native grass indicators.

5.3 Threats

Natural Grasslands TEC, and other native grasslands and grassy woodlands, were once present in large areas throughout Australia, however they are now one of the most threatened ecosystems in the country (TSSC 2009b). This is largely due to the conversion of native pastures to improved pastures and cropping and overgrazing by stock. The key known threats to the Natural Grasslands TEC, as listed in the conservation and listing advice, are described below (**Table 5**).

Table 5 Potential threats to the natural grassland threatened ecological community

Threat	Description
Grazing, cropping and pasture improvement	Remnant areas of Natural Grasslands TEC are usually subject to grazing (TSSC 2009b). Persistent heavy grazing of dominant perennial plants promotes the growth and spread of annual species – particularly weeds (TSSC 2009b). Grazing compacts soils and reduces ground cover used as habitat by grassland fauna. The expansion of exotic pastures and tree crops impacts natural grassland TEC by replacing the native grassland with introduced species (e.g. buffel grass) or altering the structure of the community through the introduction of a woody over-storey (e.g. leucaena) (TSSC 2009b). Some techniques used to develop and improve pastures exacerbate impacts to the TEC more than other techniques. For example, more intensive preparation of the seedbed and greater soil disturbance increases the impacts on Natural Grasslands TEC and its constituent species (TSSC 2009b).
Invasive species (plants and animals)	The impacts of pest animals on Natural Grasslands TEC include predation and competition with native animals, grazing of native plants and soil disturbance through burrowing and digging (TSSC 2009b). Pest animals which occur in this community include rabbits, feral cats, European foxes, and the house mouse, which is the most abundant pest animal in Natural Grasslands TEC. The House Mouse competes with native mammals, reptiles and birds and may also negatively impact seed production and recruitment of native plants. This species is also an important food resource for common grassland predators such as snakes (TSSC 2009b). The invasion of intact grasslands by weeds is typically caused by natural or human induced disturbance. Weeds can affect the integrity of the Natural Grasslands TEC by altering the vegetation structure through development of a woody shrub layer, affecting the appearance of the community and impacting threatened species (TSSC 2009b). Weeds impacting this community include Parthenium (*Parthenium hysterophorus*), Parkinsonia (*Parkinsonia aculeata*), Prickly Acacia (*Acacia nilotica* subsp. *indica*), Buffel Grass, Columbus grass (*Sorghum* x *almum*), Rhodes Grass, and Green Panic (*Megathyrsus maximus*).
Mining activities	Mining activities can result in the permanent destruction of Natural Grasslands TEC. Successful re-establishment of the community after mining is difficult (TSSC 2009b).
Construction and maintenance of infrastructure	Natural Grasslands TEC occurring along road and rail corridors is often of high conservation value due to the low levels of grazing in these areas and the importance of the habitat for flora and fauna. The construction of roads and other infrastructure can directly destroy grasslands, increase weed invasion and increase erosion of sites which further exacerbates weed dispersal (TSSC 2009b).
Climate change	Climate change is a potential long-term threat to this community as it has the potential to change the ecology of these environments (TSSC 2009b). Climate change threatens species that cannot adapt to rapidly changing ecological conditions and it exacerbates existing threats such as invasive species. Climate change may also affect species composition and the extent and distribution of the community (TSSC 2009b).

5.4 Project impacts

Table 6 outlines the potential impacts to Natural Grasslands TEC that may occur as a result of construction or operation of the project.

Table 6 Potential impacts of the project on the natural grassland

Impacts	Potential impacts from the project
Invasive species (weeds and pest animals)	Spread of existing, and/or introduction of, invasive plant species through the movement of vehicles and machinery. Disturbance associated with Project activities may result in invasion of intact Natural Grasslands TEC by weeds. Increase in pest animal numbers and/or introduction of new invasive animal species through Project construction and operation (e.g. poor mine site waste management practices, increased transmission via roads) has the potential to impact on Natural Grasslands TEC through increased grazing of native plants and soil disturbance.
Mining activities	Activities within the Project site will result in the removal of 77.02 ha of Natural Grasslands TEC. 78.1ha of Natural Grasslands TEC will be retained and managed on the 176ha project site.
Construction and maintenance of infrastructure	Access tracks and roads associated with the Project have been designed to avoid Natural Grasslands TEC as much as practicable. Only a small area of the TEC will be impacted by the road alignment, this impact area is included in the total disturbance of 79.70 ha.
Dust	Dust emissions from the construction and operation of the Project may smother plant species int Natural Grasslands TEC on the site.
Fire	The construction and operation of the Project has the potential to increase fire risk and fire events (e.g. storage of fuel, waste laydown areas and scrap tyre storage areas). Unplanned fires may degrade Natural Grasslands TEC if they are too frequent or occur when soil moisture is low and may reduce the competitive cover of grass and stimulate germination of weeds (Vogler *et al*. 2006).

6 King Bluegrass (*Dicanthium queenslandicum*)

6.1 Status and distribution

King Bluegrass (*Dicanthium queenslandicum*) is listed as endangered under the *Environment Protection and Biodiversity Conservation Act* (1999) and vulnerable under the *Queensland Nature Conservation Act* (1992). It is endemic to central and southern Queensland. It occurs in three disjunct populations (DSEWPaC 2013c):

- Hughenden (one record);
- Nebo to Monto and west to Clermont and Rolleston;
- Dalby district, Darling Downs.

King Bluegrass occurs within the following IBRA bioregions: South Eastern Queensland, Brigalow Belt South, Brigalow Belt North, Central Mackay Coast, Desert Uplands, Mitchell Grass Downs and Einasleigh Uplands.

6.2 Species ecology

King Bluegrass is a perennial grass growing to 0.8m tall. It has erect, solitary or rarely branched culms. Culms are smooth with a single groove, 4–5-noded with nodes prominently hairy. Leaf sheaths are hairy with the hairs arising from wart-like projections. Leaf blades are 9 to 18 cm long, and 3 to 5 cm wide with the leaf-blade surface covered in fine hairs or scales (indumented) (AusGrass2 2017a). Inflorescences are single racemes of paired spikelets to 10 cm long. Spikelets are sessile, bisexual, dorsally compressed, and straw-coloured to pale mauve (DSEWPaC 2013c). Companion spikelets are pedicelled with one in the cluster, male, 6 mm long and straw-coloured to pale mauve. King Bluegrass flowers from November to January after enough rain.

King Bluegrass occurs on black cracking clay in tussock grasslands (TSSC 2013c). The species is mainly associated with other *Dichanthium* spp. and *Bothriochloa* spp., but also with other grasses restricted to this soil type. King Bluegrass is mostly confined to natural grassland on the heavy black clay soils (basalt downs, basalt cracking clay, open downs) on undulating plains, although it can also be found in *Acacia salicina* thickets in grassland, or in eucalypt woodlands comprising *Corymbia dallachiana*, *C. erythrophloia* and *Eucalyptus orgadophila*.

6.3 Threats

The distribution of endangered Blue-grass grassland has been significantly reduced from previous known distributions, with a 64.8 % reduction in extent (TSSC 2013c). Only small remnants of Blue-grass grasslands remain. The key threats to King Bluegrass, as detailed in the listing (TSSC 2013c) and conservation advice (DSEWPaC 2013c) and the draft national recovery plan for the Bluegrass endangered ecological community (Butler 2008b), are described below in (**Table 7**).

Table 7 Likely existing threats to King Bluegrass (*Dicanthium queenslandicum*) on the project site

Threat	Description
Invasive species (weeds)	Invasion from weeds such as a parthenium (*Parthenium hysterophorus*) and Parkinsonia (*Parkinsonia aculeata*) is a known threat to King Bluegrass and their habitat in bluegrass grassland (DSEWPaC 2013c). Some weeds, including exotic grasses, are disturbance dependent for establishment but aggressively dominate sites following invasion (TSSC 2013c).
Grazing and heavy stocking regimes	King Bluegrass is highly palatable, and sensitive to grazing, so does not tolerate continual heavy stocking regimes (TSSC 2013c). With persistent heavy grazing of bluegrass grasslands, dominant perennial plants, such as King Bluegrass, are eliminated in favour of annual species, particularly weeds (TSSC 2009b).
Cultivation and crop production	Cultivation and crop production is an ongoing threat to the extent of both blue-grass grasslands and its constituent species, including King Bluegrass, as it results in the conversion of native grasslands to cropping land (Butler 2008b).
Habitat destruction	Agricultural and mining activities, road construction and other infrastructure development result in the direct loss of individuals and habitat for King Bluegrass (DSEWPaC 2013c).

6.4 Project impacts

Table 9 below outlines predicted impacts to King Bluegrass as a consequence of the proposed construction and operation of the rail loop facility.

Table 8 Potential impact of the project on King Bluegrass (*Dicanthium queenslandicum*)

Impact	Potential impacts form the project
Loss of habitat through mining activities and road construction	Within the 79.7ha footprint, the Project will result in the removal of 19.5ha of potential habitat for the King Bluegrass. A total of 68.23 ha of potential habitat for King Bluegrass will be retained in the 175 ha Project site.
Invasive flora	Increased movements of vehicles, machinery and people could result in the introduction and/or spread of weeds throughout the Project site. Disturbance associated with Project activities may promote weed establishment and invasion into areas of intact Natural Grasslands. If weeds are not appropriately controlled and managed, the habitat of King Bluegrass could be degraded.
Fire	Activities associated with project could increase the risk of fire. Exclusion of cattle grazing would likely increase biomass in the grassland habitat which could result in more frequent and higher intensity fires and pose a threat to King Bluegrass. The construction and operation of the Project has the potential to increase ignition sources. Unplanned fires may degrade Natural Grasslands TEC if they are too frequent or occur when soil moisture is low and may reduce the competitive cover of grass and stimulate germination of weeds.
Dust	Dust emissions from the construction and/or operation of the Project could reduce the photosynthetic capacity of King Bluegrass and degrade its habitat adjacent to the Project site.

7 Mitigation, Management and Monitoring

Within the 175 ha Project site approximately 79.7ha will be developed, with the remaining area subject to management. The habitat management objectives relevant to the project site activities have been developed with consideration of empirical information gathered from field surveys and available knowledge regarding key threats and recommended priority actions for King Bluegrass and the Natural Grasslands TEC, including the published conservation advice and recovery plans listed previously in Table 2, and relevant published literature.

7.1 Monitoring Methodology

Through implementation of the monitoring program, Sojitz will be able to detect environmental changes through a system of 'early warning' and 'early control' functions, that monitors and demonstrates the effectiveness of current management practices and allows input into an adaptive management framework to make timely decisions on corrective actions and thus ensure management objectives are achieved. The monitoring methods to be implemented are:

- Specific to the performance criteria being assessed. The results of the monitoring program will determine whether the management objectives have been met or will provide thresholds to determine when interventions are required or changes to management methods need to be considered.
- Quantitative and repeatable. By undertaking baseline monitoring prior to the commencement of the Project, and then using the same methodologies and locations in subsequent monitoring, the temporal data collected will allow detection of any positive or negative changes.

7.1.1 Monitoring objectives

The overarching monitoring objectives are to:

- Evaluate performance of the relevant management and mitigation measures outlined in this MNESMP against individual management objectives;
- Identify thresholds and triggers for when intervention is required;
- Provide contingency plans and recommend corrective actions;
- Use analysis of monitoring results to assess the effectiveness of the management measures;
- Provide detailed information for future reviews and amendments to the MNESMP.

The objectives of this management plan and the performance criteria used to measure the effectiveness of the management plan are presented in Table 9. Table 10 outlines the success metrics, the activities and the monitoring required to achieve the management objectives. Table 10 also identifies the thresholds for action and the action that should be initiated if the threshold(s) is exceeded.

Table 9 Management objectives and performance criteria of the Matters of National Environmental Significance Management Plan (MNES MP) for the Meteor Downs South rail loop project.

Management objectives	Performance criteria
Avoid and **minimise** loss of Natural Grasslands on and around the project site.	Clearing of grassland TEC and habitat containing MNES (i.e. King Bluegrass) does not occur outside of the project footprint and does not exceed the disturbance limits specified in the Environmental Authority. King Bluegrass located outside of the project disturbance footprint will not be cleared.
Avoid and **minimise** the loss of habitat quality in the TEC.	Maintain or improve habitat quality in areas of retained MNES and habitat for MNES.
Avoid and **minimise** the loss of King Bluegrass within the project site.	Stable or increasing densities of King Bluegrass.
Avoid and **minimise** the risk of weed introductions at the site and avoid the spread of existing weeds to new areas of MNES and habitat for MNES.	No new weed species will be established in areas of MNES and habitat for MNES. No expansion or increased density of existing weed populations in MNES or habitat for MNES.
Minimise negative impacts of dust on MNES and habitat for MNES.	Two dust deposition will be monitored monthly during the construction phase and quarterly during the operational phase in conjunction with visual observations to nearby sensitive receptors to ensure no negative impacts arise from dust generation.

Management objectives	Performance criteria
Avoid and **Minimise** the negative impact of fire on MNES and habitat for MNES.	No uncontrolled fire within the project site. If required, controlled burns in RE 11.8.11 (Natural Grasslands TEC, potential blue grass and King Bluegrass habitat) occur at an interval greater than 5 years when soil moisture is high.

Table 10 Management objectives for the mitigation of potential impacts of the project on natural grasslands and King Bluegrass.

Management objective	Success metric	Management and Mitigation Measures	Monitoring	Threshold for further action	Response and corrective action

Avoid and minimise loss of natural grasslands on and King Bluegrass habitat around the project site.	Grassland habitat outside the proposed disturbance footprint is maintained, with no clearing occurring as a result of the project.	Effectively manage site works and ongoing project activities so that clearing outside of the Project footprint will not occur.
		• The extent of the project footprint will be clearly marked out prior to clearing.
		• All site clearing can only be undertaken in accordance with the authorised permit to disturb.
		• Environmental awareness training will be provided to all workers as part of site induction, including specific topics on MNES, risks and protective measures.
			• Weekly monitoring of the initial clearing works by contractor's environmental representative
			• Sojitz Environmental Representative will monitor and record the total area of MNES habitat cleared by the Project every quarter and assess compliance with the actual disturbance limits detailed in the EA.
				Clearing occurs outside marked limits of footprint clearing and exceeds disturbance limits provided in the EA.	• Works will cease in the vicinity of the clearing, and DEE will be notified of the incident within five business days.
					• The incident will be recorded in the Project's environmental and incident reporting system.
					• Following clearing, the area will be assessed by a suitably qualified ecologist/expert within 15 business days, and appropriate corrective actions will be outlined in a contingency plan and provided to the DEE.
					• All corrective actions are to be approved by DEE, scheduled, implemented, and recorded.
					• Potential corrective actions may include:
					  • rehabilitation of habitat for MNES;
					  • provision of an offset.

Avoid and minimise loss of natural grasslands on and King Bluegrass habitat around the project site.	Rehabilitation of disturbed areas in the project site no longer required for operation of the rail facility.	• Rehabilitation will establish self-sustaining natural grassland habitat.	• Monitoring will be incorporated into the MDS Rehabilitation MP.	Rehabilitation fails to meet the rehabilitation indicators and completion criteria provided in MDS Rehabilitation MP.	Within 20 business days of identification of rehab failure, a suitably qualified ecologist will: • Investigate reasons for revegetation failure; • Prepare a contingency plan identifying appropriate corrective actions.

Management objective	Success metric	Management and Mitigation Measures	Monitoring	Threshold for further action	Response and corrective action

					• Provide an implementation schedule for the corrective actions dependent on the corrective actions proposed.
					• Corrective actions may include, but necessarily limited to:
					  • Repair of erosion areas;
					  • Supplementary addition of fertiliser or soil ameliorants;
					  • Additional seeding of key native flora species if required or spreading topsoil with native seedbank;
					  • Repair of drainage structures.

Prevent the decline of TEC and King Bluegrass habitat quality in the Project management area.	Habitat quality is maintained or increased according to diagnostic conditions for natural grasslands (TSSC 2009).	• Manage weeds in accordance with the Meteor Downs South Weed and Pest Management Plan (Sojitz, 2018). • Erect suitable fencing to exclude unauthorised vehicles or grazing stock from management area. • Early installation of Erosion & sediment controls (ESCs) as works progress, and permanent ESC around fill and coal stockpiles. • Implementation of dust suppression techniques. • Manage fire regimes	• Monitoring of ESC effectiveness after runoff-producing rainfall. • Annual monitoring of permanent plots containing TEC in accordance with the methodology outlined in Section 8.3.	Decline of habitat scores in more than 20% of permanent plots relative to ground truthed baselines.	Within 20 business days of identification of habitat decline, a suitably qualified ecologist will: • Investigate reasons for habitat decline; • Prepare a contingency plan identifying appropriate corrective actions if project impacts are the likely cause of decline; • provide an implementation schedule for the corrective actions dependent on the corrective actions proposed.

Management objective	Success metric	Management and Mitigation Measures	Monitoring	Threshold for further action	Response and corrective action
					The corrective actions will be implemented, which may include, but necessarily be limited to: • Rehabilitation of MNES or provision of an offset; • Provision of further environmental awareness training to workers regarding access restrictions in areas of MNES; • Increasing the frequency and intensity weed control measures or revising the type of measures to be implemented; • Increasing the frequency of dust suppression techniques, particularly during dry and windy conditions; • Repair of damaged fences, or installation of new fencing.
Minimise the impacts of weeds on TEC and King Bluegrass conditions	No new weed species are established in the project area. No increase in extent or cover of existing weed infestations (particularly species declared under the *Biosecurity Act 2014*, or Leucaena, Mimosa, and perennial exotic grasses).	• Manage weeds in accordance with the Meteor Downs South Weed and Pest Management Plan (Sojitz, 2018). • Environmental awareness training will be provided to all workers as part of site induction, including weed hygiene and awareness.	Any new weed species are to be reported to the Environmental Representative. Annual monitoring of permanent plots containing TEC will include weed cover and diversity (Section 8.3).	Outbreak of a weed species that has not been previously recorded in the Project site, respective to baseline surveys. An increase in the mean cover score of weed species from baseline and/or previous grassland monitoring event.	Within 20 business days of identification of increased weed spread, a suitably qualified ecologist will: • Investigate reasons for weed spread.

Management objective	Success metric	Management and Mitigation Measures	Monitoring	Threshold for further action	Response and corrective action

		• Undertake targeted weed control measures in accordance with the weed management plan, using an integrated program including selective herbicides, fire management and stock exclusion to maintain competitive natural grasslands.	Weed surveys will be undertaken within the Project site every two years, including a dry season and post wet season surveys using the methodology detailed in Section 8.5, with results compared to baseline and subsequent surveys.		• Develop a contingency plan with corrective actions.
					• provide an implementation schedule for the corrective actions dependent on the corrective actions proposed.
					The corrective actions will be implemented, which may include, but necessarily be limited to:
					  • Revising weed hygiene requirements;
					  • Modifying the intensity and frequency of weed control efforts;
					  • Investigating and implementing different weed management actions;
					  • Updating the weed management plan.

Avoid and minimise the loss of King Bluegrass within the management area of the project site.	Population size/density/ of King Bluegrass is stable or increased.	• Manage weeds. • Erect suitable fencing to exclude grazing stock and unauthorised vehicles from project area. • Manage fire regimes.	Annual monitoring of King Bluegrass density along permanent transects or plots (see Section 8.4).	Decline of King Bluegrass population by more than 20%.	If King Bluegrass declines by more than 20% on average across survey sites, the cause of decline will be investigated, and a suitable corrective action taken.
Minimise the impact of dust on surrounding natural grasslands and King Bluegrass.	Population size/density of King Bluegrass and natural grasslands is stable or increased.	• Water truck will be on site during construction for dust suppression. • Ground and vegetation disturbance to be limited to the necessary project footprint.	Visual monitoring of dust and prevailing weather conditions to direct dust suppression activities and modify work practices.	No negative impacts from dust to King Bluegrass or natural grasslands. Potential impacts will be identified as per monitoring in sections 8.3 and 8.4.	Review dust suppression procedures and implement new procedures if necessary. The corrective actions may include the use of dust suppression polymers which will reduce the amount of water required for dust suppression.

Management objective	Success metric	Management and Mitigation Measures	Monitoring	Threshold for further action	Response and corrective action
		• Stockpiles of topsoil, subsoil and parent material will be kept in a tidy condition and reused or stabilised as soon as practical. • Speed limits on internal roads will be limited to a maximum 40 km/hr.	Monitor dust deposition in the area immediately surrounding the project site monthly during construction phase and quarterly during operation phase (see Section 8.7).		

Avoid and Minimise the negative impact of fire on the grassland TEC and habitat for King Bluegrass.	• No unplanned fires on the site.
	• If required, planned controlled burns in Natural Grasslands TEC and King Bluegrass habitat) occur:
	  ◦ In no more than 30% of the area;
	  ◦ at an interval greater than 5 years;
	  ◦ at a time of year when soil moisture is high (Late wet to early dry season or following good spring rains).
		• Build and maintain fire breaks for asset protection.
		• Fire management of the site will consider:
		  ◦ Protection and operation of the rail facility through risk assessment;
		  ◦ appropriate fire management regimes (frequency, timing, extent) for the grasslands;
		  ◦ management impacts and implications (positive or negative) on weed management.
			• Biomass / fuel load monitoring within permanent plots (see Section 8.6).
			• If a fire occurs, undertake post fire monitoring of grassland TEC condition and King Bluegrass populations in permanent plots and transects (after sufficient regeneration occurs).
				• If a fire occurs in the grassland management area.
				• Biomass monitoring indicates unacceptable risk due to elevated fuel loads (note that biomass accumulation in grasslands will reach a plateau over time).
					• If an unplanned fire occurs:
					  ◦ The Emergency Response Plan will be enacted, and contingency actions undertaken will be recorded.
					• A suitably qualified ecologist will:
					  ◦ assess impacts to MNES as a result of the incident and post-fire monitoring;

7.2 General site inspections

A general site inspection will be conducted biannually—once at the end of the wet season and once at the end of the dry season. The general site inspection will examine and record the following attributes, including details and GPS position where relevant:

- The extent and condition of retained TEC vegetation;
- The condition of the fencing around the MNES;
- The incidence of erosion on the project site and the area occupied by the MNES;
- The condition of all designated firebreaks;
- Indicators of land degradation other than erosion, such as grazing or feral animals;
- Signs of dust deposition on vegetation located adjacent to the project site;
- New weed species not previously recorded on the project area;
- Any additional risk to MNES.

7.3 Habitat quality assessments & photo monitoring

A Habitat quality assessment will be done annually, during a post wet season time when grasses are sufficiently developed for identification, at 4 permanent locations on the site as per the Guide to determining terrestrial habitat quality (DEHP, 2017). The assessment locations will be ground-truthed during the first monitoring event (Appendix A). If a fire has occurred, monitoring should not occur for at least two months (DSEWPC, 2012). The locations were all initially assessed as 50 m x 20 m quadrats during the June-July 2019 preliminary evaluation of the site but will need to be modified to a 100 m x 50m plot. A galvanised steel picket with plastic safety cap will be installed at the start and central points of the 100 m transect.

Habitat quality assessments within these plots will examine and record:

- the GPS location of each plot;
- Tree and shrub canopy cover;
- Percentage cover of litter, native perennial grasses and exotic species;
- Percentage cover of perennial non-woody introduced species;
- Presence of perennial native grass indicator species listed in TSSC (2009a) within the sub plot of 50 X 20m;
- Whether the sub plot of 50 X 20m contains more or less than 200 native grass tussocks.

The condition of the grassland TEC within each plot will be scored using the condition thresholds provided by TSSC (2009). A Habitat quality score for each site will be calculated using the Habitat quality scoring system provided by DEHP (2017), noting that attributes relating to trees will be absent at most sites. The Habitat quality scores for grassland communities have a maximum score of 56, incorporating a maximum possible score of 30 for the site-based attributes, plus a further maximum score of 26 for the landscape scale attributes such as connectivity and distance to artificial water (DEHP, 2017).

The condition of the habitat will also be recorded using photographs taken at fixed positions within the permanent monitoring locations. Four photos—North, East, South, West aspects—will be taken at each location. A record of the photographs will be maintained, including GPS co-ordinates, date and time of each photograph, the direction in which the photograph was taken, and the height above the ground at which the photograph was taken.

7.4 Targeted surveys for King Bluegrass

Surveys targeting King Bluegrass will be conducted annually during the same time period as the Habitat quality monitoring, during a post wet season survey when site conditions favour identification of most grass species.

Under the Flora Survey Guidelines (DES, 2019b), the population extent is determined by traversing and mapping the periphery of the population, however on the project site it is assumed that the population occurs within all areas mapped as habitat. King Bluegrass density is assessed using plot surveys. This will be undertaken within a 50 X 10m subplot within each of the permanent monitoring plots that will be ground-truthed during the first monitoring event (Appendix A).

Within each plot, the following information will be recorded:

- The GPS location of each plot;
- The number of individual tussocks of King Bluegrass and any other threatened plant species, including other observations such as the age structure (if possible), reproductive state and health;
- The identities and locational data for all other threatened plants, and descriptions and locational data for all possible EVNT plants found in the plot;
- The landscape attributes including the landform type, soil type, geology, slope, aspect and altitude; and
- Any specific habitat or micro-habitat features associated with threatened plants, or possible threatened plants.

If determination of a habitat quality score for King Bluegrass is desired at a later stage, the combined results of the TEC Habitat quality assessment and the targeted King Bluegrass will be sufficient to generate that score.

7.5 Weed monitoring

As part of the biannual general site inspection, notes of any weed species not previously encountered in the Project site, new weed outbreaks and areas of significantly weed cover will be recorded. These will include location, species and extent. Although the presence and cover of weeds within the permanent Habitat quality monitoring plots will be recorded twice a year (as described in Section 8.3 above), dedicated and specific weed monitoring will be done every two years (biennially) at the end of the wet season and dry season, and be undertaken across the site.

A minimum of five 1 ha permanent weed monitoring plots will be established, with at least 1 plot within the Leucaena plantation (Map, Appendix A). Within these plots three parallel 100m transects will be marked, 50m apart. Surveys will be undertaken using the methods provided in Table 12 below.

Table 11 Biennial weed assessment methodology

Assessment type	Assessment Methodology
Weeds transects within 1ha plots	Measure weed species richness and abundance along three 100m transects per 1ha plot as follows: • Ten 2 m x 2 m quadrats will be spaced out evenly at 10m intervals along the transects Within each quadrat, record the weed presence, species and cover using cover classes: 1 = 0%, 2 = 0-5%, 3 = 6-25%, 4 = 26-50% and 5 = 51-100% (Auld 2009); • For each 1ha plot, calculate an average cover score for each weed species using the average percentage cover from the 30 quadrats surveyed from the three 100 m transects; • calculate the mean cover score across all weed monitoring sites in the Project site.
Photo Monitoring	Temporal changes in weed cover will also be assessed using photo monitoring points, undertaken as follows: • at each southern edge of the five 1 ha weed transects, establish photo-monitoring points; • at each of the photo monitoring points, take five photos from 1.5 m height above ground level, facing north, east, south, west and one facing the ground. The ground-facing photo should be representative of cover and species composition for the general area.

7.6 Biomass monitoring for fire management

Although it is likely that fuel loads in natural grasslands will only accumulate over a limited period of time before plateauing, higher rates of fine grass fuel are a perceived fire management risk. It should, however, be noted that extreme fire behaviour (i.e. fast rates of spread) will occur in low fuel load between 0.15 - 0.25kg/m^2, so low biomass does not necessarily equate to low fire risk and the state of curing represents fire risk without changes to biomass (Cruz *et al.* 2016). Developing fuel accumulation curves for these natural grassland communities on site is expected to assist understanding fire management of this threatened ecological community throughout its range.

Biomass (total standing dry matter) will be monitored biannually at the end of each wet season and dry season. Biomass will be estimated using methods outlined in GRASS check (Dept. of Primary Industries, 1997), and will be undertaken at the 50m point within the permanent Habitat quality monitoring plots.

7.7 Dust deposition monitoring

Although the general environmental inspections will include noting dust deposition on vegetation located adjacent to the project site, dust deposition monitoring will also take place in accordance with the Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited Matter – Gravimetric method. This includes the use of two dust gauges mounted on a 2 m high pole and installed in potentially affected dust-sensitive locations. Monitoring with the dust gauges will be undertaken monthly during the construction phase and quarterly during the operational phase. Visual dust monitoring will occur during the operational life of the rail facility. Dust and prevailing weather conditions will be assessed regularly and responded to with the appropriate deployment of water trucks or modification of site activities if circumstances warrant.

7.8 Rehabilitation Monitoring

A referral (2019/8482) was submitted to the Commonwealth Department of Environment and Energy (DEE) on 11 July 2019, including commitments for post-operational rehabilitation of the site. Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the proponent is required to carry out the proposed action in the manner prescribed in the referral documentation. The following commitments to rehabilitation which are in conjunction with the Rehabilitation and Exit Plan required under the Central Highlands Regional Council Decision Notice Approval (COB001.1-2019) are included in the referral unless an alternate operator continues operation of the facility:

- Decommissioning and rehabilitation would commence after the cessation of MDS Mine operations and is expected to take in the order of 6 to 9 months;
- Dismantling of all buildings and infrastructure with resulting materials and wastes managed in accordance with the waste hierarchy and waste management strategy;
- The Sediment Dams will be desilted with the material removed from site for appropriate burial in MDS Mine overburden or alternative licensed disposal;
- Remaining carboniferous material from the coal stockpile pad will be scraped and removed from site for appropriate burial in MDS Mine overburden or alternative licensed disposal;
- Imported material from roads, hardstands, stockpile, bases, and water management infrastructure will be excavated and either backfilled in cuttings and borrow areas where capacity is available or removed from site for reuse or disposal;
- Post decommissioning rehabilitation will involve re-instatement of the Project area contours similar to pre-disturbance levels via backfilling of cuts including sequential placement of materials;
- Topsoil will be replaced spread as near to its source as possible at similar depths to pre-stripping and appropriately ameliorated;
- Disturbed area rehabilitation will focus on re-establishment of the pre-existing vegetation species and communities during the medium term (during operational life of the Project) and post decommissioning;
- The rehabilitation strategy for the site is proposed to return the site to pre-Project status of grazing on agricultural class A1 land, return the potential of the areas mapped as Strategic Cropping Land and maximise the re-establishment of EPBC Act listed *Dichanthium queenslandicum* (King Blue Grass);
- A seed mix consisting of species as representative of the pre-disturbance grassland as possible will be sown to rehabilitated areas;

- Weed management will be undertaken to selectively support the growth of *Dichanthium queenslandicum* (King Blue-grass);
- Ongoing monitoring of rehabilitation success will be undertaken until the post Project landholder consents to accept the rehabilitated land.

Monitoring of vegetation re-establishment, growth and sustainability will be the highest priority. The post-rehabilitation land description and land capability classification will determine the rehabilitation success criteria. The post rehabilitation land use for these disturbed areas will be as natural areas that are compatible with the Natural Grasslands TEC. Rehabilitated areas will be compared to an undisturbed reference (analogue) site in the Natural Grasslands TEC to provide site specific criteria for attributes including:

- Native plant species richness;
- Density of grass tussocks;
- Native plant species percent cover;
- Weed species cover.

Attributes will be measured within quadrats along permanent transects established within the revegetation and analogue sites to determine success criteria. Monitoring is conducted post wet season each year to capture optimum growth and condition of vegetation.

7.9 Record keeping and data management

All data will be collected, analysed and interpreted by suitably experienced tertiary-qualified ecologists. The monitoring program will be overseen and coordinated by the project's environmental representative.

All data will be stored electronically by Meteor Downs South.

The EPBC Act approval for the Project will require Sojitz to maintain accurate records of all activities relevant to the conditions of approval, including MNES management and monitoring activities described in this MNESMP. Annual reports will be submitted to the Commonwealth the Department of the Environment and Energy (DEE), and all associated records and data will be made available to the Department upon request. Compliance with the conditions of the approval is subject to an audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act.

7.10 Monitoring Summary

All monitoring activities described in this MNESMP are summarised in Table 13 below, including the management objective, the attributes to be measured, applicable prescribed methodology, location and timing.

Table 12 Summary of Monitoring Activities

Monitoring activity	Management Goal	Attributes measures	Prescribed Methodology	Location	Timing
General site inspections	Prevent the decline of TEC and King Bluegrass habitat quality in the Project management area.	Extent & condition of TEC grassland Fencing condition Incidence of erosion Firebreak condition Grazing, feral animals or other degrading impacts Dust deposition New weed species New risk to MNES	No prescribed methodology	All areas of grassland habitat	biannually – once at the end of the wet season and once at the end of the dry season
Habitat quality assessments & photo monitoring	Prevent the decline of TEC and King Bluegrass habitat quality in the Project management area.	Habitat condition over time	DEHP (2017) Habitat quality. A Condition Assessment Framework for Terrestrial Biodiversity in Queensland - Assessment Manual	At 4 permanent locations on the site (refer to Figure 1, Appendix A)	Annually, post-wet
Targeted surveys for King Bluegrass	Avoid and minimise the loss of King Bluegrass within the management area of the project site.	Abundance of King Bluegrass and other EVNT species	DES (2019b) Flora Survey Guidelines – Protected Plants	At 4 permanent locations on the site (refer to Figure 1, Appendix A)	Annually, post-wet

Monitoring activity	Management Goal	Attributes measures	Prescribed Methodology	Location	Timing
Weed monitoring	Minimise the impacts of weeds on TEC and King Bluegrass conditions	Weed diversity, distribution and density	No prescribed methodology	Twice a year within the 4 permanent Habitat quality monitoring plots Every two years within five 1 ha permanent weed monitoring plots	Every two years (biennially) at the end of the wet season and dry season
Biomass monitoring	Avoid and Minimise the negative impact of fire on the grassland TEC and habitat for King Bluegrass.	Standing biomass	Dept. of Primary Industries, (1997) GRASS check	Within the 4 permanent Habitat quality monitoring plots	Biannually - at the end of each wet season and dry season
Dust deposition monitoring	Minimise the impact of dust on surrounding natural grasslands and King Bluegrass	Dust deposition levels	Australian Standard AS3580.10.1 (Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited Matter – Gravimetric method	Potentially affected dust sensitive locations	Monthly during construction phase and quarterly during operational phase
Rehabilitation Monitoring	Avoid and minimise the loss of grassland TEC and King Bluegrass within the management area of the project site.	Native plant and grass species richness and density, weed density	In accordance with the MDS Rehabilitation MP incorporating the Rehabilitation Exit Plan as per the Central Highlands Regional Council Decision Notice Approval (COB001.1-2019)	Along transects within revegetation and analogue grassland site	Annually, at the end of the wet season after rehabilitation works are finished

8 Reporting, Compliance and Implementation

8.1 Updating the MNESMP

It is likely that monitoring data will provide improved insights into management of MNES on the project site. Consequently, it is expected that the MNESMP will be reviewed at least annually and updated to incorporate necessary changes to recommended management activities and monitoring. Such revisions and improvements may include:

- Changes to impact mitigation and management actions;
- Additional management and monitoring activities necessary to meet management goals;
- Changes to corrective action triggers or corrective actions;
- Additional risks or revisions to the risk register.

8.2 Annual reports

Sojitz will prepare an annual report to the DEE detailing the implementation of this MNESMP and associated monitoring. The report will be provided by 30 June every year and will contain (but may not be limited to) the following information:

- EPBC approval number;
- Queensland Government Environmental Authority (EA) number;
- Name and contact details of the proponent;
- Details of contracting or consulting companies engaged to undertake management and monitoring activities, including their relevant skills and expertise;
- A general description of climatic conditions for the management period;
- A summary of construction and operational activities that occurred during the reporting period;
- The measured impacts of the Project on MNES;
- A summary of the mitigation, management and monitoring activities implemented in association with this MNESMP, that occurred during the reporting period;
- Monitoring results undertaken during the reporting period, and analysis of comparison with previous monitoring data;
- Assessment of compliance with any prescriptive thresholds or performance criteria, including any where trigger levels were reached and what remediation or interventions implemented as a consequence;
- Any new potential threats or risks to MNES that have been identified since the preparation of this MNESMP, and what management measures are recommended to manage these threats and risks;
- Recommendations for future revision of the MNESMP including proposed changes to management actions and/or monitoring methods.

8.3 Roles, responsibilities and qualifications

Sojitz is responsible for implementing this MNESMP.

It will be a requirement of the proponent that persons engaged in implementing and monitoring the management actions outlined in this MNESMP be suitably qualified and experienced.

Habitat quality and King Bluegrass assessments will be overseen by suitably qualified ecologists with:

- More than 2 years' experience undertaking Habitat quality assessments (DEHP, 2017) in the Brigalow Belt Bioregion
- Appropriate plant identification skills / experience for natural grassland communities.

Where a suspected threatened species cannot be successfully identified with appropriate identification keys, a voucher specimen will be collected and sent to the Queensland Herbarium for identification.

Dedicated weed monitoring will be undertaken by suitably qualified persons with weed monitoring experience and identification skills for all potential weed species in the project area.

8.4 Implementation

Project construction and operation will not begin until the MNESMP has been approved. The MNESMP will be implemented once the project has final approval and will remain effective during the period stated in the approval.

9 Risk Assessment

A risk assessment has been undertaken to assess the risks of failure to achieve the objectives for this MNESMP. Each risk is considered with regards to consequence (rated from minor to critical; Table 14) and likelihood of occurrence (rated from very unlikely to almost certain; Table 15) to determine a risk rating (using the risk matrix in Table 16).

The consequence and likelihood of each risk was first considered without the proposed management and mitigation measures in place to provide an initial risk rating. Following the implementation of the management and mitigation measures (i.e. control measures), he consequence and likelihood of each risk occurring was reassessed to provide a residual risk rating.

Table 13 Risk Consequences

1-Minor	Minor risk of failure to achieve the plan's objectives. Short-term delays to achieving plan objectives, implementing low cost, well-characterised corrective actions.
2-Moderate	Moderate risk of failure to achieve the plan's objectives. Short-term delays to achieving plan objectives, implementing well-characterised, high cost/effort corrective actions.
3-High	High risk of failure to achieve the plan's objectives. Medium to long-term delays to achieving plan objectives, implementing uncertain, high cost/effort corrective actions.
4-Major	The plan's objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment, with no suitable mitigation strategies.
5-Critical	The plan's objectives are unable to be achieved, with no suitable mitigation strategies.

Table 14 Risk Likelihood

1-Very Unlikely	**May occur in exceptional circumstances**
2-Unlikely	Could occur but considered unlikely or doubtful
3-Possible	Might occur during the life of the project
4-Likely	Will probably occur during the life of the project
5-Very Likely	Is expected to occur in most circumstances

Table 15 Risk Matrix

Likelihood	Consequence				
	1-Minor	2-Moderate	3-High	4-Major	5-Critical
5-Very Likely	Medium	High	High	Severe	Severe
4-Likely	Low	Medium	High	High	Severe
3-Possible	Low	Medium	Medium	High	Severe
2-Unlikely	Low	Low	Medium	High	High
1-Very Unlikely	Low	Low	Low	Medium	High

Table 16 Project Risk Assessment

Management objective	Risk	Event or incident	Initial Risk			Mitigation	Residual Risk		
			Likelihood	Consequence	Combined risk level		Likelihood	Consequence	Combined risk level
Avoid and minimise loss of natural grasslands on and King Blue-grass habitat around the project site.	Grassland habitat outside the proposed disturbance footprint is cleared	Clearing extent is not properly marked or contractors unaware on the limit of clearing	3	3	M	• Clearing footprint is provided in Figure 4 • Extent of the vegetation clearing footprint will be defined using surveyed pegs and flagging tape in advance of commencing clearing activities • A permit to disturb must be initiated and signed off by the site Environmental Representative prior to any vegetation clearing. • A Permit to Disturb system will be implemented to ensure that specific clearing only occurs within allowed areas, the extent of clearing is restricted to the minimum necessary and cleared vegetation management is understood by all involved; • Areas to be cleared will be restricted to the minimum area necessary for the construction and operation of the Project. • Temporary stockpile sites for soil and equipment, access routes, laydown yards and other associated infrastructure will be located in cleared areas, where possible. • Environmental awareness training will be provided to all workers as part of site induction, including specific topics on MNES, risks and protective measures.	2	3	M

Management objective	Risk	Event or incident	Initial Risk			Mitigation	Residual Risk		
			Likelihood	Consequence	Combined risk level		Likelihood	Consequence	Combined risk level
	Rehabilitation of disturbed areas fails to meet objectives	• Grassland fails to establish in rehabilitation areas • Rehabilitation areas become dominated by weeds • Seedbank in spread topsoil fails to germinate • Non local species are used in rehabilitation	3	3	M	• Topsoil recovery prior disturbance, with topsoil containing seedbank stockpiled separately from subsoil, stockpiled in shallow rills and reused as soon as possible • Prepare rehab sites prior to topsoil spreading, such as ripping to ensure soil horizons are keyed together • Weed management will be undertaken to selectively support the growth of King Blue Grass • Increase level of site maintenance including watering, selective weed management additional applications of fertiliser or soil ameliorants • Use grass seed collected from the disturbance footprint prior to disturbance, using best practice seed harvesting, processing and storage methods • Commercial grass seed sourced from outside the project area is not to be used	2	3	M

Management objective	Risk	Event or incident	Initial Risk			Mitigation	Residual Risk		
			Likelihood	Consequence	Combined risk level		Likelihood	Consequence	Combined risk level
Minimise the impacts of weeds on TEC and King Blue-grass conditions	Weeds degrade natural grassland and King Blue-grass habitats	• Weeds are introduced and/or spread across the Project site as a result of the movement of vehicles and machinery. • Project related disturbances encourage weed growth • Natural disturbance (e.g. fire, drought, flood) provide disturbed conditions for increased weed growth • Weeds on site not adequately managed	4	3	H	• No unauthorised access into areas of grassland TEC and King Blue-grass habitat • Vehicles and other machinery to be driven on designated access tracks only. • Maintain perimeter fencing to prevent access by grazing stock • Undertake targeted weed control measures in accordance with the weed management plan and recommendations by Biosecurity Qld, using an integrated program including selective herbicides, fire management and stock exclusion to maintain competitive natural grasslands • Weed control works will primarily target new and emerging weeds, and species that pose a threat to MNES	3	3	M

Management objective	Risk	Event or incident	Initial Risk			Mitigation	Residual Risk		
			Likelihood	Consequence	Combined risk level		Likelihood	Consequence	Combined risk level
Minimise the impact of dust on surrounding natural grasslands and King Blue-grass	Dust deposition impacts the health of King Blue-grass and natural grasslands	Increased dust deposition as a result of Project activities.	3	1	L	• Visual monitoring of dust and prevailing weather conditions to direct dust suppression activities and modify work practices • Water truck will be on site during construction for dust suppression • Ground and vegetation disturbance to be limited to the necessary project footprint • Stockpiles of topsoil, subsoil and parent material will be kept in a tidy condition and reused or stabilised as soon as practical; • Speed limits on internal roads will be limited to a maximum 40 km/hr	3	1	L

Management objective	Risk	Event or incident	Initial Risk			Mitigation	Residual Risk		
			Likelihood	Consequence	Combined risk level		Likelihood	Consequence	Combined risk level
Avoid and Minimise the negative impact of fire on the grassland TEC and habitat for King Blue-grass.	Unplanned and uncontrolled fire damages grassland community	Uncontrolled fire as a result of Project activities. Uncontrolled fire enters project area from an external source	3	4	H	• Build and maintain fire breaks for asset protection and safety of site workers • Maintain an effective fire fighting capability on site, including fire suppression equipment • Develop an Emergency Response Plan for fire • No unauthorised access into areas of grassland TEC and King Blue-grass habitat • Monitor biomass levels to ensure unacceptably dangerous fuel loads do not develop • Controlled burns in natural grasslands TEC not to occur more than once every 5 years, not more than 30% per event and only when soil moisture is high (i.e. Wet or post wet season) • Maintain perimeter fencing to prevent stock grazing recently burnt grassland	2	3	M

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APPENDIX A

Habitat quality and Weed Assessment Plots

SOJITZ ENDOCOAL

METEOR DOWNS SOUTH RAIL LOOP

TEC HABITAT CONDITION AND WEED ASSESSMENT AREA

Legend

- Proposed Site Disturbance
- Area For Weed And Habitat Condition Assessment Plots To Be Determined
- Proposed RoL Boundary
- Proposed Management Zone
- Base Cadastre

Data Sources:
Digital Cadastral Database (extracted 30 July 2019) dataset: © State of Queensland (Department of Natural Resources, Mines, and Energy) 2019; Proposed Site Disturbance dataset: supplied by client (May 2019); Proposed RoL Boundary, and Proposed Management Zone, and Area For Weed And Habitat Condition Assessment Plots To Be Determined datasets: SLR Consulting (2019).
Imagery Sources: 2014 Surat Basin North 25cm resolution SISP PeriUrban Orthophoto Imagery Web Service: © State of Queensland (Department of Natural Resources, Mines, and Energy) 2019.

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994
Date: 27-Sep-2019

N

0 100 200 300 400
Metres

Scale: 1:7,500 at A3

SLR

ASIA PACIFIC OFFICES

BRISBANE
Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

DARWIN
Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

GOLD COAST
Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

MELBOURNE
Suite 2, 2 Domville Avenue
Hawthorn VIC 3122
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

PERTH
Ground Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

SYDNEY
2 Lincoln Street
Lane Cove NSW 2066
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

TOWNSVILLE
Level 1, 514 Sturt Street
Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

TOWNSVILLE SOUTH
12 Cannan Street
Townsville South QLD 4810
Australia
T: +61 7 4772 6500

WOLLONGONG
Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 404 939 922

AUCKLAND
68 Beach Road
Auckland 1010
New Zealand
T: +64 27 441 7849

NELSON
6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628