TRANSITIONAL PROGRESSIVE REHABILITATION AND CLOSURE PLAN

KOGAN CREEK MINE

PROGRESSIVE REHABILITATION AND CLOSURE PLAN

PREPARED FOR: CS ENERGY LTD

04 MARCH 2022

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Cover Page

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Table of Abbreviations

ABA	Acid base accounting
Aberdare	Aberdare Collieries Pty Ltd
AEP	Annual exceedance probability
AHD	Australian Height Datum
AMD	Acid and metalliferous drainage
ANC	Acid neutralising capacity
ARI	Average recurrence interval
BOM	Bureau of Meteorology
CS Energy	CS Energy Limited
DES	Department of Environment and Science
DME	Department of Minerals and Energy
EA	Environmental Authority
EBC	Eastern Branch Creek
EC	Electrical conductivity
EMOS	Environmental Management Overview Strategy
ERA	Environmentally relevant activity
ESP	Exchangeable sodium percentage
GAI	Geochemical abundance index
GARD	Global Acid Rock Drainage
HCS	High concentrate slurry
IADA	Initial ash disposal area
INAP	International Network on Acid Prevention
IPAC	In-pit ash cell
LOD	Land outcome document
MIA	Mine industrial area
ML	Mining Lease
MPA	Maximum potential acidity
NAF	Non-acid forming
NAPP	Net acid producing potential
NEPC	National Environment Protection Council
NUMA	Non-use management area
OPAC	Out-of-pit ash cell
PMLU	Post-mining land use
PRC	Progressive rehabilitation and closure
PRCP	Progressive Rehabilitation and Closure Plan
RE	Regional Ecosystems
ROM	Run of mine
RPEQ	Registered Professional Engineer Queensland
SEP	Stakeholder engagement plan
WRD	Waste rock dump

1 Introduction

AARC Environmental Solutions Pty Ltd (AARC) has been commissioned by CS Energy Limited (CS Energy) to develop a transitional Progressive Rehabilitation and Closure Plan (PRCP) in accordance with the requirements of the *Environmental Protection Act 1994* (EP Act) for the Kogan Creek Mine (the Project). The Project is owned by Aberdare Collieries Pty Ltd (Aberdare), a subsidiary of CS Energy.

This transitional PRCP is applicable to Mining Lease (ML) ML50074 and the Project's Environmental Authority (EA) (EPML00417213) issued on 10 August 2018; referred to throughout this document as the resource activity EA. The resource activity EA authorises the environmentally relevant activity (ERA) of mining black coal under Schedule 3 of the Environmental Protection Regulation 2019.

2 Scope and objective

The purpose of this PRCP is to describe how progressive rehabilitation will be carried for the resource activity at the Project. The PRCP has been developed in accordance with the requirements of the 'Guideline - Progressive Rehabilitation and Closure Plan' (the PRCP Guideline; DES 2019a), which states that the PRCP must include the following parts:

1) Rehabilitation Planning Part:

The purpose of the rehabilitation planning part of the PRCP is to support and justify the development of the proposed PRCP schedule. This part must detail how progressive rehabilitation and closure will be carried out over the entire Project site and on a rehabilitation area and improvement area basis as applicable. The key components of the planning part for the Project are:

- post-mining land use (PMLU) and/or non-use management area (NUMA) determination (refer section 3.3 and section 3.4);
- community consultation information (refer section 3.2);
- the rehabilitation and management methodology being implemented (refer section 3.5);
- a rehabilitation risk assessment (refer section 1.1); and
- a monitoring and maintenance plan (refer section 3.7).

2) Rehabilitation Schedule Part:

The development and implementation of the schedule part is an essential element of a PRCP. Once approved, the schedule part becomes a legally binding and enforceable instrument with which the Project must comply. The schedule part must include:

- Nomination of either a PMLU or NUMA for all land within the relevant resource tenures, including undisturbed land;
- identification of when land becomes available for rehabilitation or improvement;
- rehabilitation or management milestones to achieve the PMLU or NUMA outcomes;
- milestone criteria that demonstrate when each milestone has been completed;
- completion dates for each milestone to be achieved; and
- any conditions considered necessary or desirable.

The administering authority may impose a condition on a draft PRCP schedule or a PRCP schedule if it considers the condition is necessary or desirable (section 4.2 of the Guideline). Two deemed conditions are to be included in all PRCP schedules in accordance with section 206A of the EP Act. The first condition states that when carrying out a relevant activity under the PRCP schedule, the holder must comply with a requirement stated in the EA relevant to carrying out the activity.

The second condition states that the holder must comply with the following matters stated in the schedule:

- each rehabilitation milestone and management milestone, and
- when each rehabilitation milestone and management milestone is to be achieved.

The rehabilitation schedule part has been submitted as a native Excel file as part of the PRCP application and is also included at Appendix A of this PRCP.

3 Rehabilitation planning part

3.1 Project planning

3.1.1 Project description

The Project is an open-cut coal mining operation located in the Surat Basin, in the central Darling Downs region of south-east Queensland, approximately 9 km south of Brigalow - a small town approximately 20 km east of Chinchilla and 280 km west northwest of Brisbane (refer Figure 1).

The Project supplies up to 2.9 million tonnes per annum (Mtpa) of thermal coal to the adjacent 750 MW Kogan Creek Power Station, owned and operated by CS Energy. The coal required for Kogan Creek Power Station is sourced from the Project as a run of mine (ROM) product and transported approximately 4 km to the power station by a covered overland conveyor.

3.1.1.1 Mining tenements, site layout and life-of-mine

The Project is comprised of one ML (ML50074) being 2,374 ha in size, with surface rights to 2,046 ha. The ML boundaries are shown Figure 2 along with nearby resource tenements. Aberdare holds freehold title to the area of the ML and adjacent buffer areas. The existing tenure extinguishes Native Title under the *Native Title Act 1993*. The resource activity EA authorises the ERA of mining black coal under Schedule 3 of the Environmental Protection Regulation 2019.

The Project commenced operations in 2006 and the current expected remaining mine life is 22 years. There are sufficient reserves of low strip ratio coal to satisfy the power station and mine in excess of the anticipated economic life of the Kogan Creek Power Station (36 years from commissioning). The coal reserve is known to extend to the east and south of the current mining area.

The current Plan of Operations covers the period from 14 September 2017 until 30 June 2022 (Golding 2017). The maximum amount of coal proposed to be extracted during this period is 2.9 Mtpa of ROM coal. A review of the Project's life-of-mine plan was undertaken in 2020. Five-year mine stage plans developed as part of the life-of-mine plan review have been used to identify the expected status of rehabilitation milestones including the point at which land becomes available for rehabilitation. Stage plans and rehabilitation milestones are shown for the years 2022, 2027, 2032, 2037, 2042 and 2057. An additional stage plan (2057) has also been developed to highlight the progression of rehabilitation to a point in time 15 years post-mine closure.

A site layout of the Project area and existing infrastructure is shown in Figure 3.

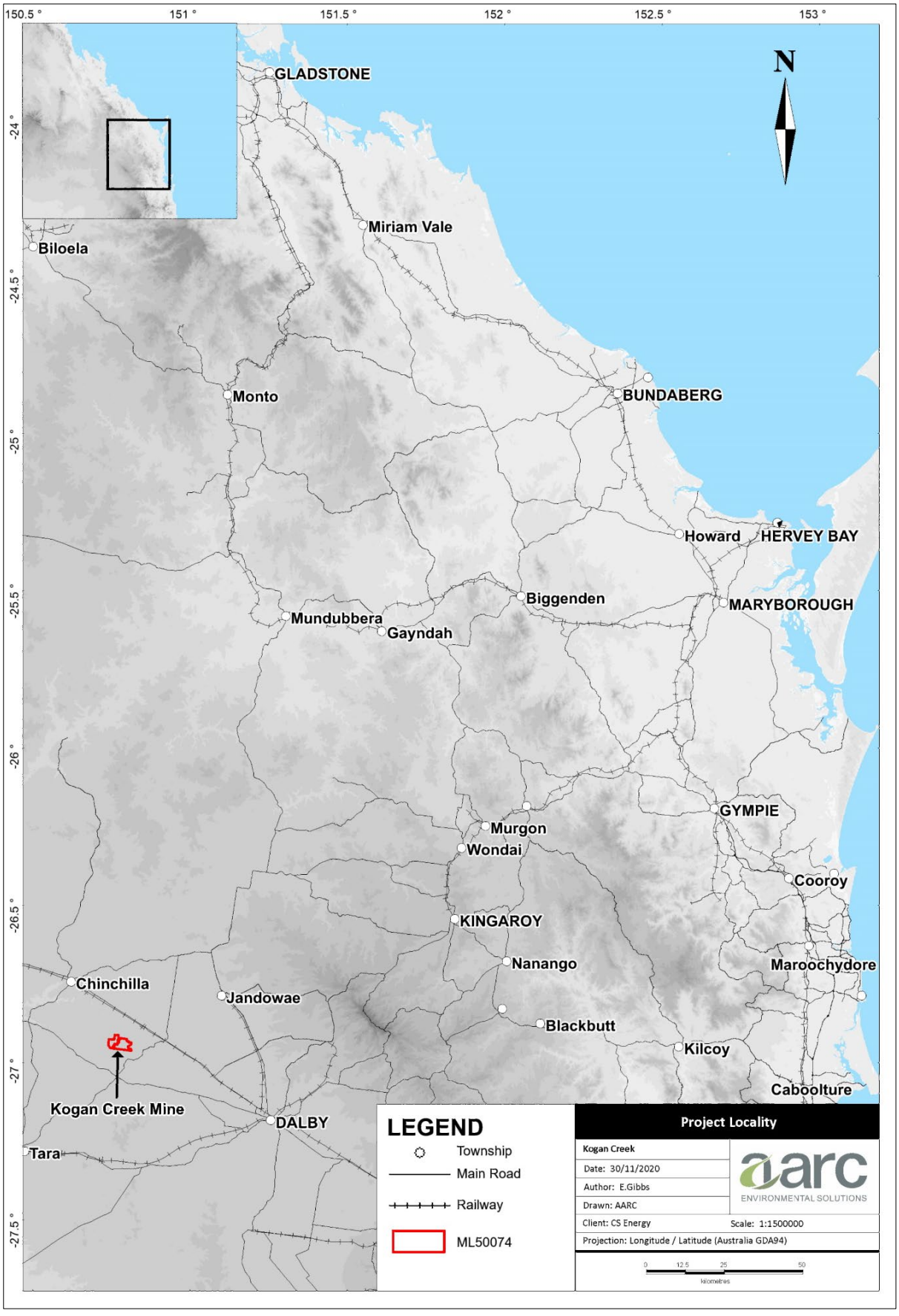

Figure 1 *Kogan Creek Mine Locality Map*

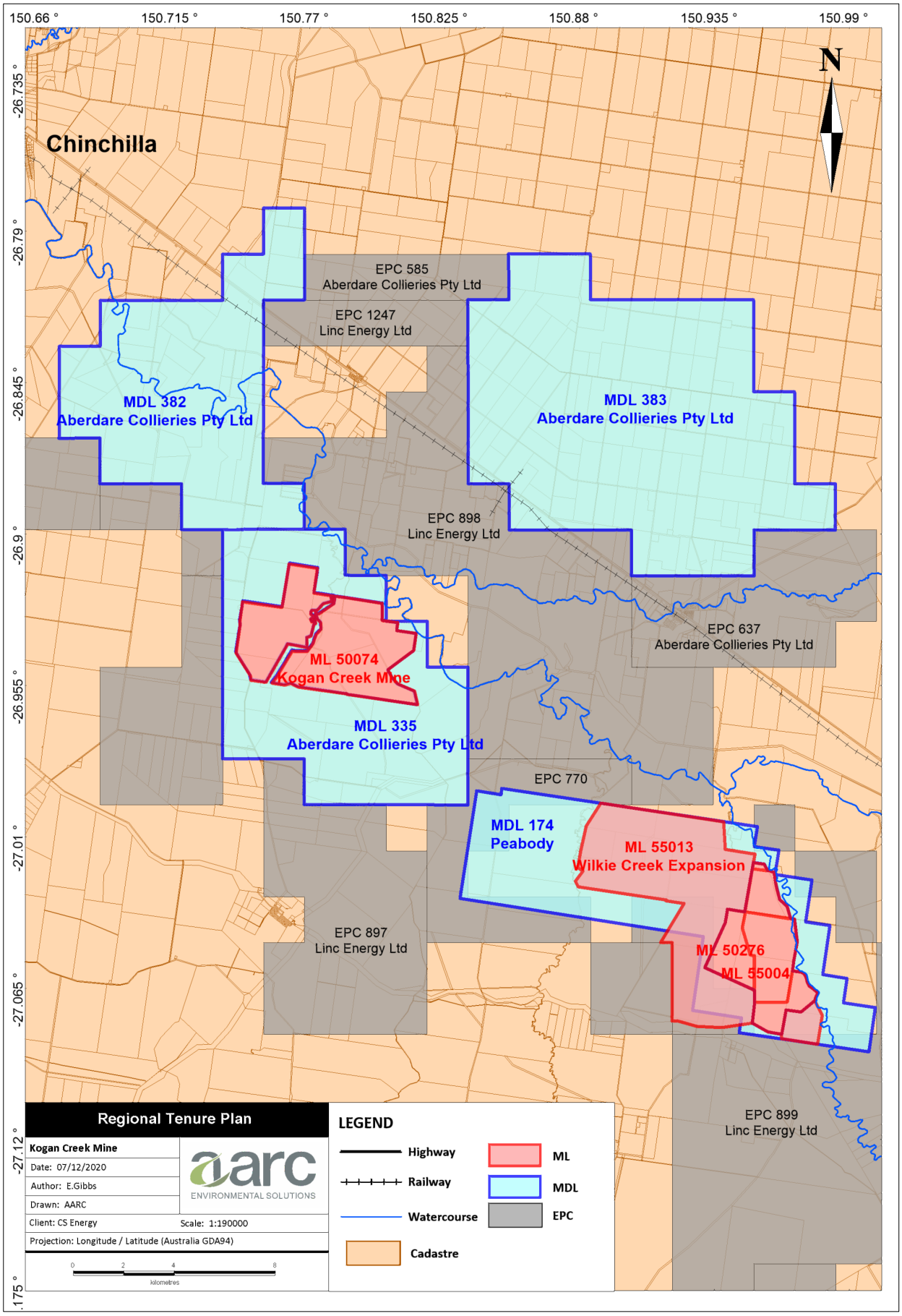

Figure 2 *Kogan Creek Mine and surrounding tenements*

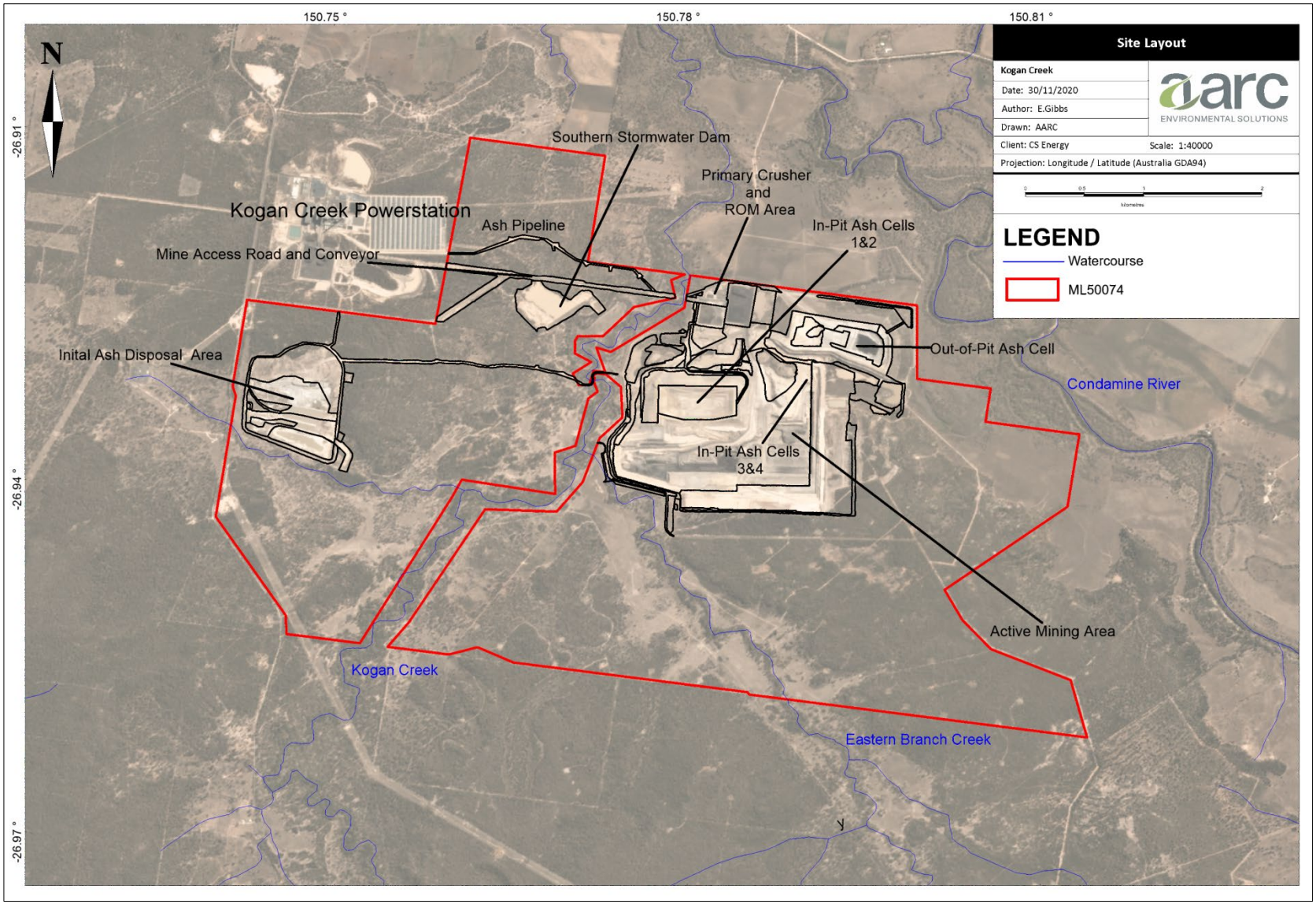

Figure 3 *Kogan Creek Mine layout*

3.1.1.2 Mining operations

Mining at the Project site utilises conventional open-cut drill, blast, load and haul techniques. The fleet for the coal mining operation includes excavators and loaders, rear dump trucks, dozers, graders and water trucks. The main elements or activities undertaken at the Project site include:

- Vegetation clearing in advance of imminent mining, exploration or other areas requiring disturbance, subject to appropriate survey and mining control.
- Identification and clearing of artefacts, relics and culturally significant sites in accordance with the Cultural Heritage Management Agreement.
- Selective stripping of available topsoil and either direct re-use or stockpiling for use in rehabilitation.
- Overburden removal using a combination of truck/shovel and dozer push operations. All overburden is now dumped in-pit. A small quantity of suitable material is crushed and used for construction of roads, drains and levees.
- As part of overburden removal and dumping, in-pit ash cells are constructed for future placement of ash from the Kogan Creek Power Station.
- Blasting is undertaken where the material strength increases beyond the capability of the overburden fleet to efficiently free dig the overburden.
- Placement of waste or otherwise unsuitable coal and carbonaceous shales in the overburden dumps prior to covering by advancing overburden dumping.
- Selective mining of coal seams and coal plies within the coal formation utilising loaders, excavators, dozers and rubber tyred equipment with haul trucks hauling to the ROM pad. Due to the variability of the coal quality, blending of coal occurs both in-pit and at the ROM pad using available equipment.
- Haul road construction as required for mining operations.
- Watering of haul roads using water trucks to maintain a safe trafficable surface and to minimise dust generation.
- Reshaping, replacement of topsoil and revegetation of spoil dumps.

Supporting infrastructure facilities have been established at the mine industrial area (MIA) in close proximity to the ROM area and include offices, workshops and power and water services.

Downstream processes include primary and secondary crushing and screening of ROM coal. The Project site stores and disposes of old tyres from the mining activity on the mine site in accordance with the resource activity EA conditions relevant to this activity. Table 1 details EP Act Schedule 3 notifiable activities carried out to support the mining activities under the resource activity EA.

Table 1 Notifiable activities (Schedule 3 EP Act)

Schedule 3 Notifiable activity	Site activity
29. Petroleum product or oil storage	Diesel Storage: 220,000 L (3 x 60,000 L, 1 x 40,000 L) Oil Store: 51,100 L Grease: 5 x 1.25 t pods
37. Waste storage, treatment or disposal	Tyre storage in site services area. Tyres are disposed within spoil as per condition E4 of the current resource activity EA, with the location recorded by survey

3.1.1.3 Related precedent activities

As outlined in section 3.1.1, the Project supplies up to 2.9 million tonnes per annum (Mtpa) of thermal coal to the adjacent 750 MW Kogan Creek Power Station, owned and operated by CS Energy. Coal is sourced from the Project as a ROM product and transported approximately 4 km to the power station by a covered overland conveyor.

As a consequence, a number of power station-related activities and/or disturbances occur or have occurred on the ML which are not subject to the resource activity EA, and therefore the PRCP regulatory provisions. Such activities include:

- the transport of ROM coal to the power station by either enclosed conveyor or truck;
- operation and management of certain water management structure;
- installation and operation of the power station water supply pipeline; and
- power station ash management activities (refer below).

Power station operational activities are authorised under EPPR00918113 and power station ash is disposed of within engineered containment structures located within the ML under a separate EA, EA BRID0003; referred to in this PRCP as the waste disposal EA.

Power station ash management

The Kogan Creek Power Station produces ash from the coal combustion process. The ash consists of:

- bottom ash, typically a sandy and gravelly mixture;
- fly ash, a fine-grained fluid type of ash (including cenospheres); and,
- fine mill rejects, which are coal particles rejected from the coal pulverisers as being either too hard or oversize.

The bottom ash is crushed to assist in subsequent slurry pumping. The various ash sources are collected and transported by conveyors to holding silos with a maximum storage capacity of approximately 12 hours. Ash is then fed from the silos to the ash mixing system where it is mixed (or conditioned) with water (normally recycled water) to form a dense slurry, known as high concentrate slurry (HCS).

HCS is pumped to one of three ash disposal facilities within the ML; referred to as the initial ash disposal area (IADA), the out-of-pit ash cell (OPAC) and to specific designated areas within the in-pit spoil dump area; referred collectively to as the in-pit ash cells. There are currently two existing in-pit ash cells; in-pit ash cell west 1 and in-pit ash cell west 2 referred to as IPAC 1 and IPAC 2 respectively. A further two in-pit ash cells are planned as an extension of, and to the immediate south of the OPAC (refer Figure 4). Ash management operations to the point of placement in one of the available ash disposal cells is an operational activity of the power station.

Ash management at the mine site is subject to EA BRID0033 issued on 18 September 2017 to Aberdare, and which authorises the prescribed ERA of *waste disposal – operating a facility for disposing of, in a year, more than 200 000t of regulated waste or regulated waste in combination with general waste*. The waste disposal EA (BRID0033), among other conditions, requires:

- a financial assurance to be lodged (condition A1);
- the preparation and submission of an Ash Disposal Management Plan (condition E2);
- the development of a rehabilitation plan (condition E11);
- progressive rehabilitation for ash cells not required for ongoing ash disposal activities (condition F2); and
- landform criteria including a post-mine land description (condition F1).

PRCP implications

As ash transport, placement, cover and rehabilitation activities are subject to a separate, non-resource activity EA, they are not subject to the PRCP provisions of the EP Act. However, both the location and rate of ash placement are integral to mine progression and planning and therefore have potential to impact the progression of rehabilitation activities and the PRCP milestone schedule. For this PRCP, while the locations of ash placement (ash cells) are largely fixed (refer Figure 4), **the rate of completion of ash cells and their subsequent capping and rehabilitation is not subject to PRCP planning and scheduling requirements**. The expected scheduling of these areas is therefore **not** included within the PRCP Schedule.

Consequent potential impacts to resource activity EA planning and scheduling include:

- final landform impacts: refer section 3.5.8; and
- milestone scheduling impacts.

To account for these potential impacts, resource activity scheduling has taken a conservative approach such that any variance to ash management activities can be accommodated with no greater potential environmental impact, or duration of impact, than the resource activity EA (when amended to incorporate the PRCP schedule) permits.

In relation to final closure and surrender, it is CS Energy's view that the waste disposal EA, as evidenced by conditions A1 and A2 (financial assurance provisions), E11 (decommissioning provisions) and F1 to F4 (rehabilitation provisions), addresses waste disposal within the ash cells from placement through to capping, rehabilitation and decommissioning. It is expected therefore, that surrender of the waste disposal EA would occur either prior to, or co-incident with surrender of the resource activity EA.

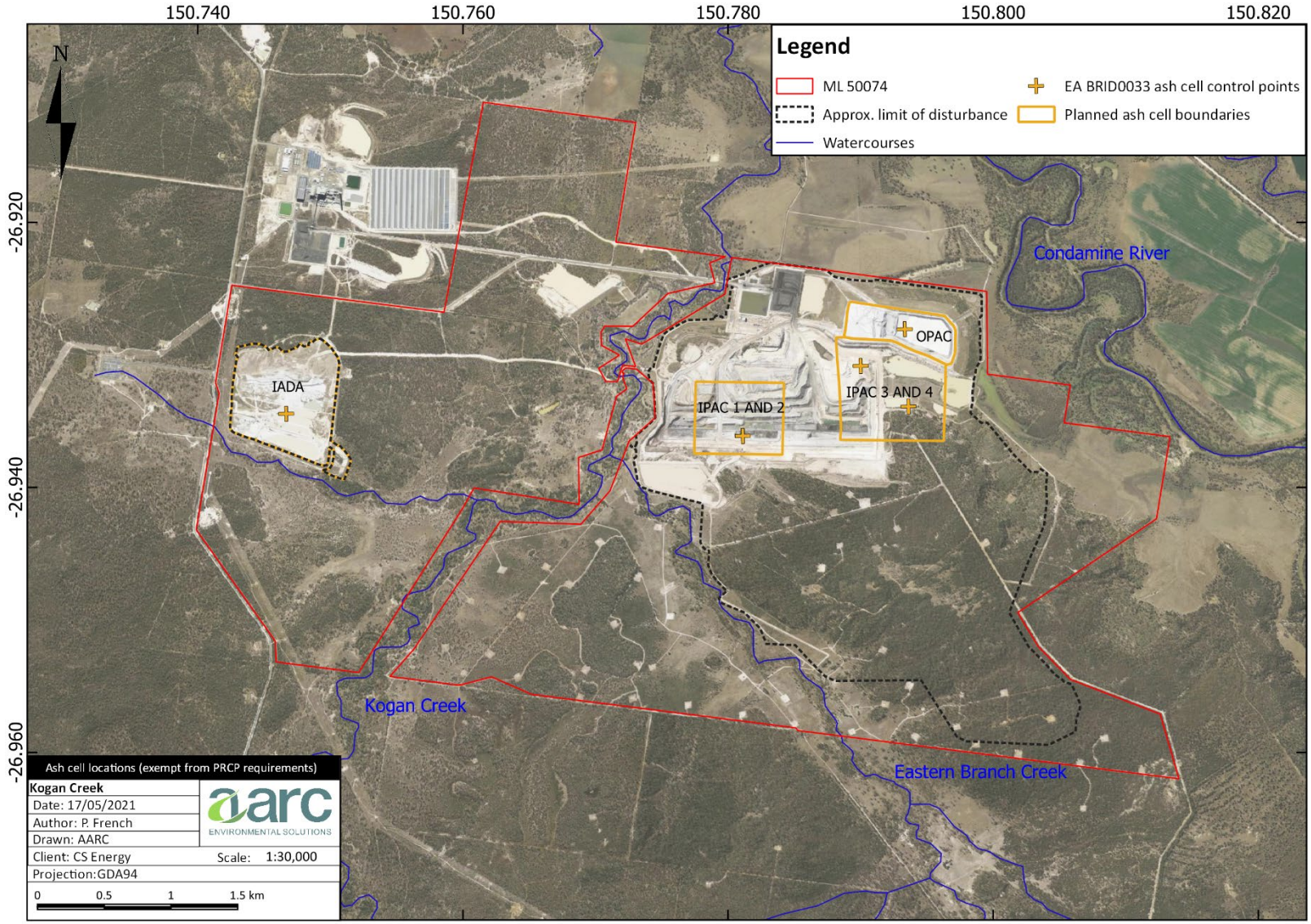

Figure 4 *Locations of ash cells (exempt from PRCP requirements)*

3.1.2 Existing rehabilitation activity

Rehabilitation of mine disturbance areas has been undertaken as areas have become available, with a current total of approximately 49 ha having been revegetated as at December 2020. Current rehabilitation areas are shown in Figure 5. To date, rehabilitation has been limited to the outer engineered batters of the OPAC and IPAC facilities, as well as some minor areas associated with levee construction works.

The initial rehabilitation works undertaken for the Project comprise a contiguous area of approximately 29.3 ha of the west, north and east constructed batters of the OPAC. Records indicate the lower northern and eastern batters were shaped and topsoiled in late 2008, with the remainder of the area reshaped, topsoiled and seeded by April 2009. By mid-2011, imagery (Google Earth 2011), indicates that a good vegetative cover had established, but the originally topsoiled lower northern and eastern batter slopes had volunteered relatively dense patches of *Acacia* species, most likely introduced with the topsoil used. Occasional minor erosion gullies were visible.

In 2018, the mid-storey *Acacia* vegetation covering the OPAC rehabilitation area was mulched *in situ*, and in 2019 the whole of the area subjected to repair and maintenance works including deep ripping and repair of erosion gullies, and fertiliser and seed application. Follow up fertiliser and gypsum applications were undertaken within 12 months of the physical works having been completed.

In 2011, an area equal to approximately 17 ha in the northernmost area of the IADA was reshaped, topsoiled and seeded. The area was not capped and the works were therefore considered as a trial of rehabilitation methodology. This area has not been subject to rehabilitation monitoring but visibly shows some re-established woodland species likely to have volunteered from the adjacent woodland area. Given that the IADA is being retained for emergency ash storage, and that this area may be subject to future ash disposal, this area has not been recorded as being completed rehabilitation.

In mid-2017, four trial plots were established at the Project site to assess the viability of bottom ash - a non-regulated waste sourced from the power station - as a physical soil ameliorant. The trial plots contained varying proportions of bottom ash mixed with topsoil from ratios varying between 0% to 50% bottom ash. The plots were seeded by hand with Rhodes grass. Couch lawn clippings were subsequently added as a mulch. Germination and growth in all plots were limited by poor rainfall. The research work concluded that the addition of bottom ash decreased the density of the soil and improved the calcium:magnesium ratio thereby lowering sodicity, but alone did not improve nutrient levels or fertility.

Construction of the western and northern batters of the first IPAC facility, comprising an area of approximately 14.7 ha was completed in late 2017 with surface preparation limited to dozer track-rolling. This area was utilised as a large-scale trial to test various rates of composted feedlot manure, bottom ash and topsoil to identify the optimum topdressing material for rehabilitation. Consistent rates of fertiliser and seed were used. Topdressing and seeding were completed by May 2018.

Other rehabilitation works undertaken have been confined to various discrete construction projects including the levee structures and topsoil stockpiles on-site; most recently in 2019 with the Eastern Branch Creek levee lift works. These rehabilitation works total approximately 4.7 ha.

All rehabilitation works carried out to date have been informed by soils testing, and consequent agronomic interpretation and recommendations, as well as recommendations relating to revegetation species to be utilised. As yet no formal rehabilitation monitoring of rehabilitated areas has been undertaken, however, field observations are routinely taken and fed into subsequent rehabilitation planning.

No rehabilitation areas are certified as having been progressively rehabilitated as per section 318Z(3) of the EP Act. The Project has demonstrated that where areas have become available for rehabilitation, these have been prepared and seeded within a 24-month period.

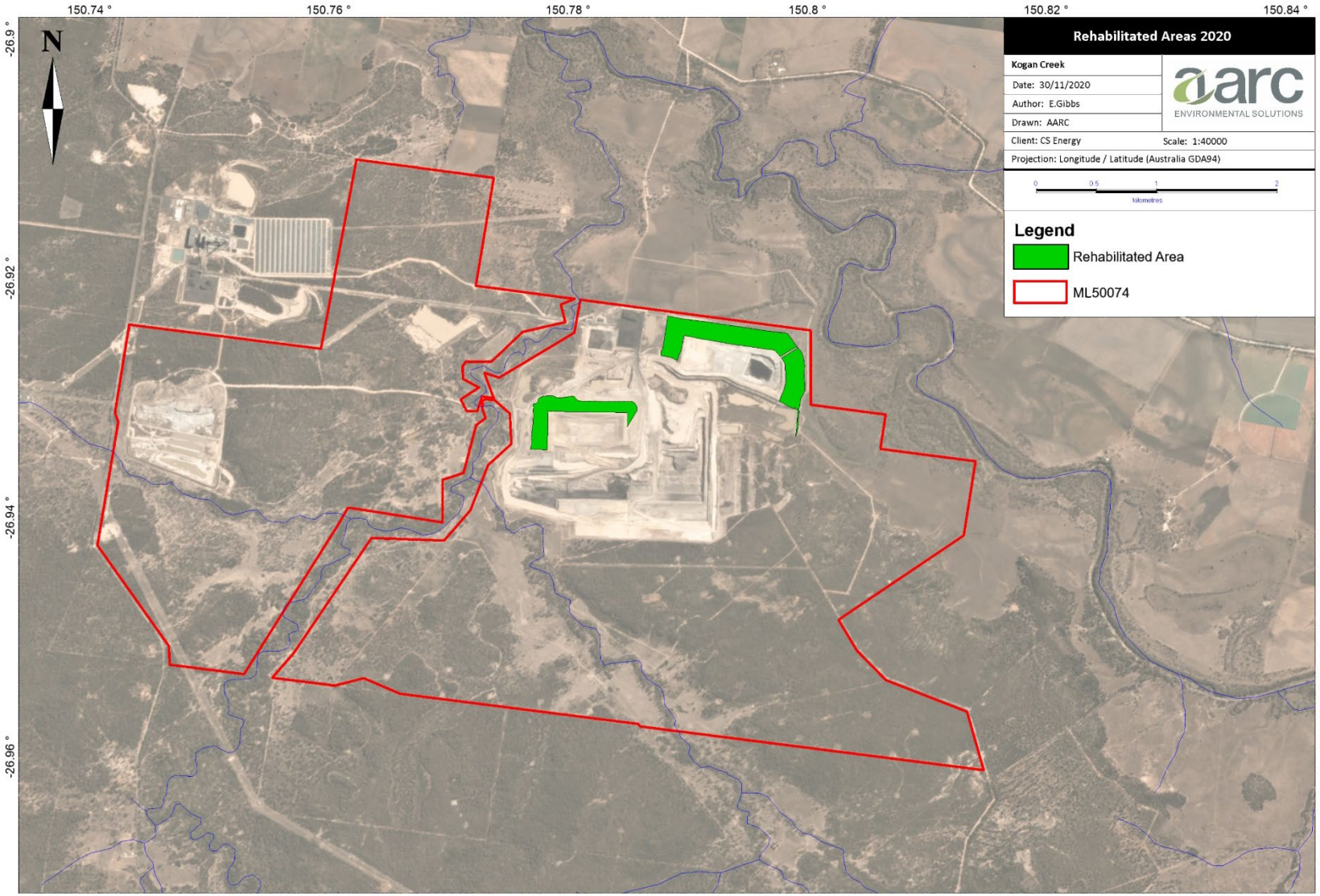

Figure 5 Rehabilitated areas to December 2020

3.1.3 Climate

The climate of the region is sub-tropical, with a distinct dry season during the winter months. Average temperatures for the region range between 6°C – 34°C. The average annual rainfall for the area ranges between 500mm to 700mm per annum. Rainfall occurs predominantly in the summer months with approximately two-thirds of total rainfall occurring between October to March. Figure 6 highlights the significant variation of wet year average rainfall that can occur; extreme years and approximate Project rehabilitation years have been labelled (refer also section 3.1.2). Prevailing winds are from the south-east although north-west winds can occur in spring and early summer.

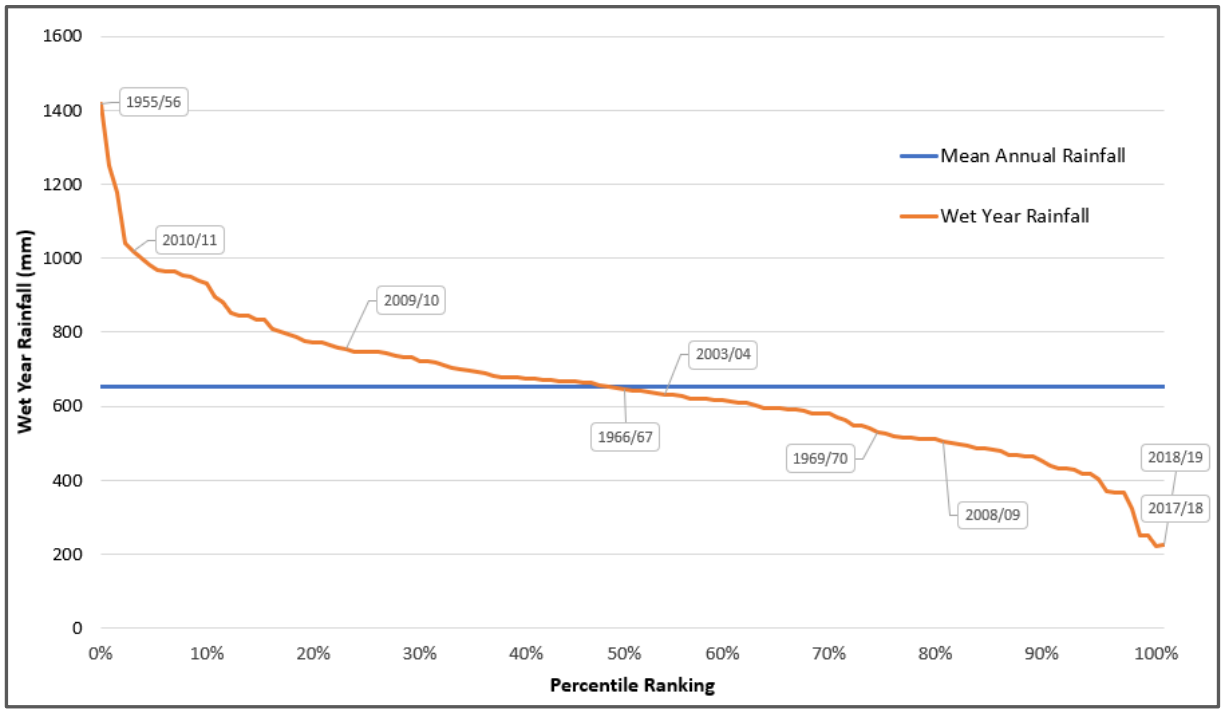

Figure 6 Percentile ranking of wet year data for Chinchilla Station 41017 BOM 2020)

3.1.4 Geological setting

The Kogan Creek coal deposit forms part of the Walloon Coal Measures, which were deposited in the Surat Basin during mid-Jurassic times. The Walloon Coal Measures were formed in freshwater swamps, lakes and low velocity streams. They comprise medium to very fine sandstones, siltstones, mudstones, claystones and banded coal seams. The total coal resource is approximately 400 million tonnes. The coal is an excellent thermal coal for power generation, with a nominal ROM ash percentage of 25% and low levels of impurities such as sulphur (CS Energy 2019).

The general surface geology of the Project site as drawn from the Queensland Geological Survey is summarised in Table 2. The Walloon Coal Measures outcrop in the Project area and may directly subcrop beneath Condamine River alluvium to the east of the Project.

Table 2 Regional geology

Geological feature	Description
Alluvium	Associated with Condamine River, Kogan and Eastern Branch Creeks
Kumbarilla Beds	Sandstones, siltstones and mudstones
Springbok Sandstone	Cross bedded clayey lithic to very lithic sandstone, some porous; siltstone, mudstone
Walloon Coal Measures	Carbonaceous mudstone and siltstone; some sandstone and coal

Mining development is principally based on three seams, namely the M, N and O seams, with potential for extraction of the lower R, S and T seams (Figure 7). These seams vary in thickness and are separated by layers of silty mudstones and sandstones. The average combined seam thickness is 15 m. The coal within these seams is classed as high volatile bituminous and is rich in liptinite and vitrinite. The banding of coal and partings within the deposit is high and a selective mining approach is therefore undertaken (CS Energy 2019).

3.1.5 Topography and surface hydrology

The ML is located on relatively low-lying ground associated with valley floor alluvium and shallow weathered sedimentary strata; dominated by Kogan Creek which bisects the ML flowing from the southwest to the north-east to the Condamine River. The topography of the eastern portion of the ML steadily rises to the southeast between Eastern Branch Creek and the Condamine River. The western portion of the ML generally drains east towards Kogan Creek. The area comprises infertile sandstone plateaus, the alluvial flats of the creeks that dissect the sandstone plateaus and the southern margin of the Condamine River alluvial plain.

Kogan Creek drains elevated Surat Basin sediments to the south. The Condamine River, which drains in a north-westerly direction, is located immediately to the east of the Project. Kogan Creek, a fifth (Strahler) stream order watercourse, effectively bisects the Project ML, while its tributary, Eastern Branch Creek, joins Kogan Creek immediately to the west of the mining operation.

The mine and power station are located within the Condamine River catchment which forms part of the Murray-Darling Basin; originating in the Great Dividing Range to the east of Warwick. It flows in a north-westerly direction from Warwick to Chinchilla collecting run-off from several watercourses draining the range including Glengallan Creek, Dalrymple Creek, Hodgson Creek, Oakey Creek, Myall Creek and Jimbour Creek. The total catchment area of the Condamine River to the Chinchilla Weir is approximately 19,200 km^2.

Kogan Creek drains in a north-easterly direction towards the Condamine River, located to the west of the Project, as shown in Figure 3. Kogan Creek has a catchment of approximately 295 km^2, equivalent to 1.5% of the Condamine River catchment to Chinchilla Weir. There are no permanent bodies of water within the ML, with the exception of a number of small farm dams.

Floodwaters from both the Condamine River and Kogan Creek have the potential to affect the Project area. To address this, earthen levees have been progressively constructed around the mine as mining operations have progressed to the south. Flood susceptibility and management are discussed further in section 3.5.6. In addition, a small creek diversion of Eastern Branch Creek has been constructed to the west of the mining operation. The levees and diversion were proposed in the Environmental Management Overview Strategy (EMOS) for the Project (Ison 2004) to be retained as permanent structures after Project closure and decommissioning.

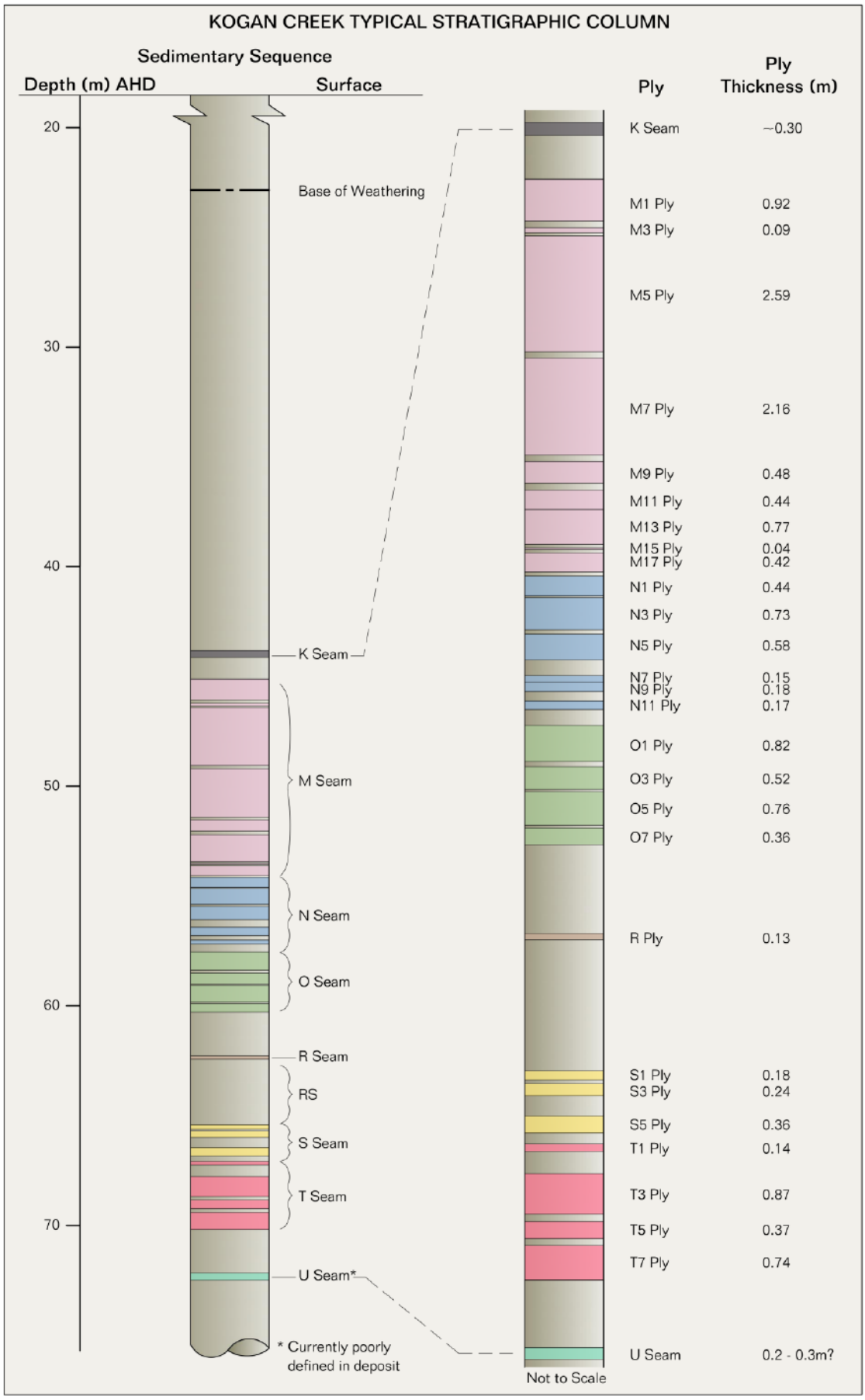

Figure 7 *Typical stratigraphic section of the Kogan Creek deposit (CS Energy 2019)*

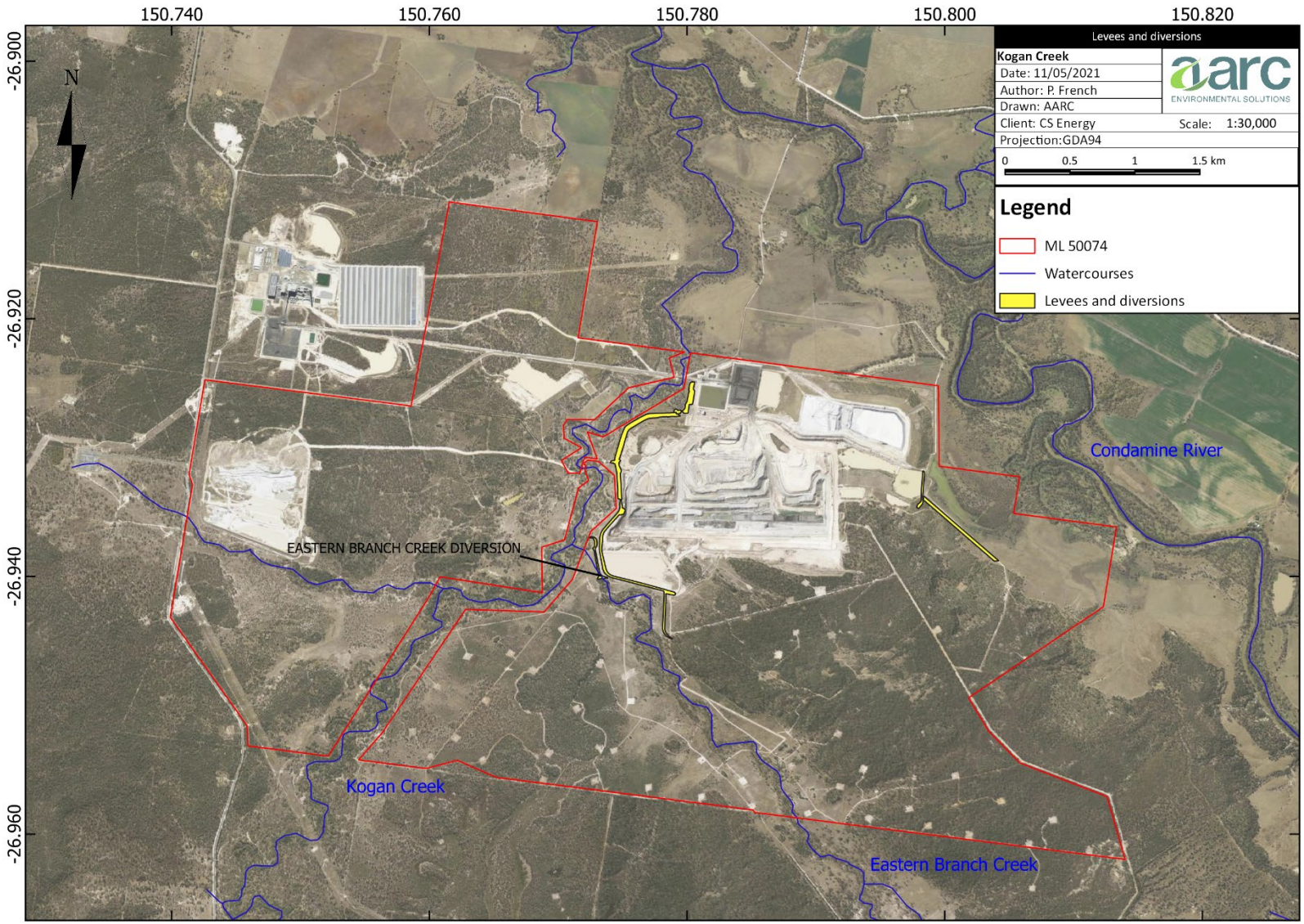

Figure 8 *Locations of existing and proposed levees of the Project*

3.1.6 Groundwater

Groundwater within the region of the Project is present in:

- unconsolidated alluvial sediments of the Condamine River and Kogan Creek;
- sediments associated with bedrock weathering;
- higher permeability zones within underlying sandstone bedrock (referred to as the Springbok Formation) between depths of 15-75 m;
- the coal seams and sandstones of the Walloon Coal Measures, associated with coal seams and bedding plane partings and most likely associated with any fractures, joints and open faults in the sandstones; and
- deep aquifers underlying the Project site such as the Hutton Sandstone.

Geologically, the Project overlies sedimentary rock strata that act as recharge beds for aquifers of the Surat Basin, which is part of the Great Artesian Basin. The Springbok Sandstone and Walloon Coal Measures are not considered to be major aquifers of the Great Artesian Basin. Major aquifer units of the eastern Darling Downs are the Gubberamunda Sandstone (not present beneath the Project) and the deeper Hutton and Precipice Sandstones. Both the Hutton and the Precipice Sandstones are too deep to be affected by the Project. Inferred groundwater flow directions are:

- Condamine Creek alluvium: north and east towards the river (depending on bore location);
- Kogan and Eastern Branch Creeks: to the north (in the direction of creek flow); and
- Springbok Sandstone and Walloon Coal Measures: towards the southwest – being the down-dip direction.

Groundwater usage in the vicinity of the Project is understood to be limited to domestic and stock watering from the Condamine River alluvium, and stock watering only from the underlying Springbok Sandstone/Walloon Coal Measures given water quality constraints. There are 32 registered groundwater bores within 5 km of the ML boundary, with the majority of these located within the Condamine River alluvials.

Associated groundwater take related to the Project area is confined to the surface alluvial aquifers that are principally controlled by the Condamine River and Kogan Creek alluvials. The Project does not use water from these aquifers. However, some localised drainage occurs as seepage into the Project workings in areas where the alluvials are encountered. Groundwater associated with the Walloon Coal Measures also drains to the mine workings where coal seam permeability allows. The mine is relatively shallow in comparison with other coal mines with the pit floor occurring at approximately 30-60 m below natural surface. Inflows of groundwater to the pit are minimal equating to a volume of associated water being less than 20 ML per year as per 2020 associated groundwater reporting.

An initial groundwater monitoring network was established in 2007 and a number of bore construction programs have been undertaken since. A groundwater monitoring review was conducted in 2019 (Environmental Management Strategies 2019, Appendix F) and a review of groundwater aspects associated with the Project was undertaken in 2021 (Environmental Management Strategies 2021, Appendix F). These studies provide a summary of groundwater quality on the basis of available salinity data as per Table 3. Current Project bore locations are shown in Figure 9.

Table 3 Groundwater quality characterised by salinity data

Strata	Salinity
Condamine River alluvial sediments	Low salinity (<2,000 mg/L TDS)
Shallow bedrock (<20 m) Springbok Sandstone	High salinity (> 8,000 mg/L TDS)
Walloon Coal Measures weathered surficial strata mine area	Very high salinity (> 30,000 mg/L TDS) in surficial clays overlying sandstone in bore MB4 to east of Kogan Creek
Deep bedrock (>40 m)	Walloon Coal Measures mine area
Moderate salinity (1,000 – 9,000 mg/L TDS)	Deep bedrock (>50 m)
Walloon Coal Measures mine and power station area	High salinity (9,000 – 15,000 mg/L TDS)

Source: (Environmental Management Strategies 2021)

3.1.7 Surface water quality

Being an operational mining site, surface water quality data has been collected at a number of monitoring sites including operational water management storages and surrounding sites used to monitor any potential receiving water impacts. Water quality data since 2012 collected from water storages within the ML and receiving stormwater runoff from areas associated with mining disturbance has been assessed on the basis that these storages best represent the worst-case quality for water storages to be retained post-mining within or downstream of rehabilitated areas. The assessment found that relevant surface waters can be described as:

- mildly alkaline with an average pH of 8.6 and a range from 6.8 to 10.1 which is likely a consequence of the alkaline waste rock materials (refer section 3.5.9.3) rather than the topsoils and/or growth media that will be used for rehabilitation works;
- variable total dissolved solids (TDS) values with an average of 309 mg/L and a range from 5 mg/L to 9,410 mg/L; and
- variable electrical conductivity (EC) values averaging 2,361 µS/cm and ranging 97 µS/cm to 6,330 µS/cm.

Values for these parameters are within those considered acceptable for livestock drinking water use, which is the relevant PMLU.

3.1.8 Land and soil

3.1.8.1 Pre-mining land use and underlying landholders

The pre-mining land use of the Project area is largely restricted to the grazing of cattle on a mixture of native and introduced pasture grasses, with limited cash and fodder crops grown on areas of better quality soils.

The land use of areas surrounding the ML is generally similar to that within the ML, although the floodplain of the Condamine River to the north and northeast of the ML contains better quality soils used for irrigated cropping.

Landholdings within the ML, with the exception of road easements are wholly owned by Aberdare, along with additional buffer lands surrounding the ML.

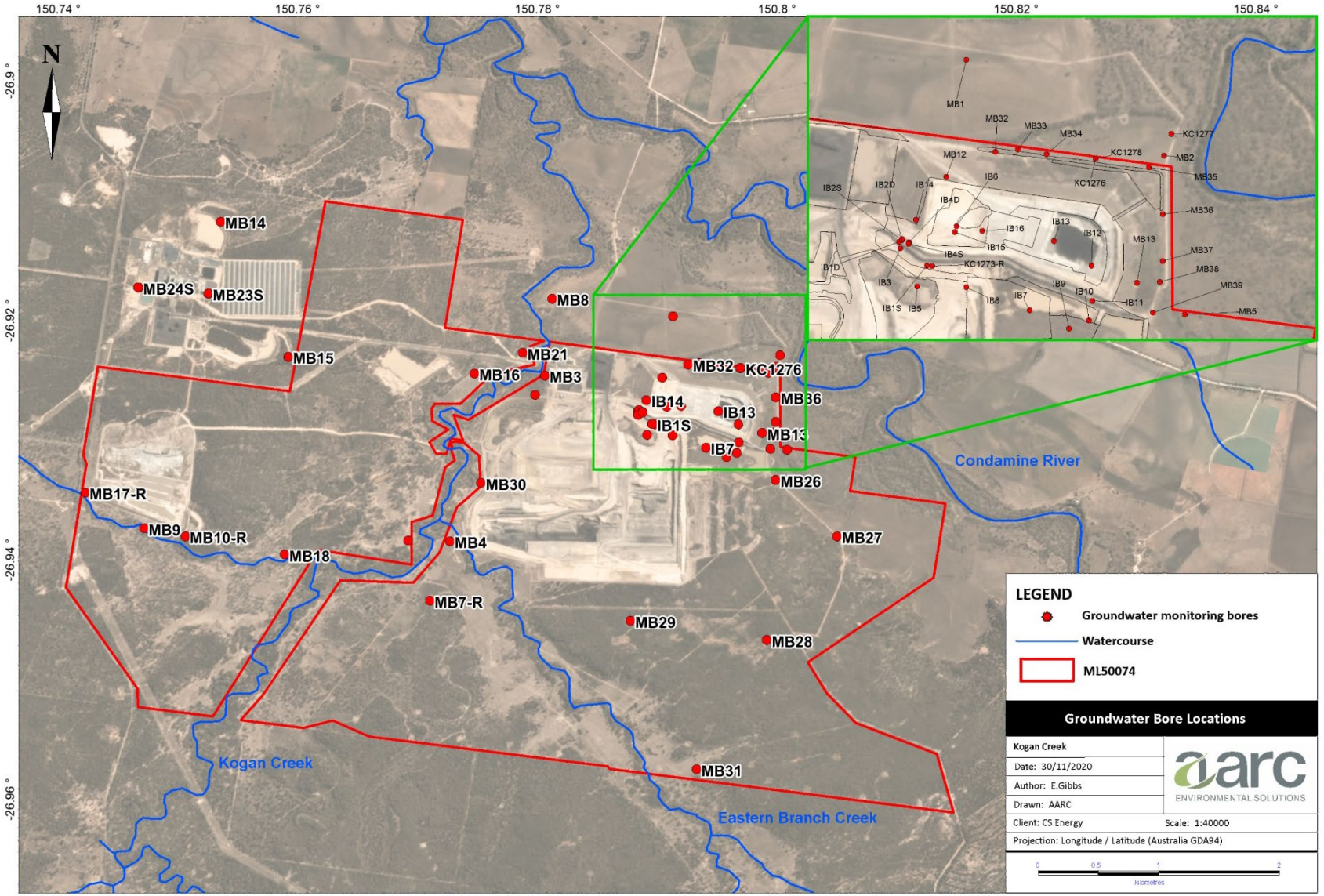

Figure 9 *Groundwater monitoring bores in the vicinity of the Project*

3.1.8.2 Land capability assessment

The lands of the Project area comprise infertile sandstone plateaus, alluvial flats of the creeks that dissect the sandstone plateaus and the southern margin of the Condamine alluvial plain. The Project area is generally unsuitable for agricultural cropping activities, however, native and introduced pasture grasses can make the land suitable for grazing.

A pre-mining land capability study was carried out by Ison Environmental Planners in 1993 (Ison 1993) with findings summarised in Table 4. The land capability classifications used were based on Rosser *et al.* (1974).

Table 4 Summary of the land capability assessment of the Project

Class	Description	Area (ha)	% of total area
I	Land suited to a wide range of agricultural crops and is highly productive. It presents no limitations to the use of machinery or choice of implements. Both wind and water erosion hazard are low	0	0%
II	Land suitable for agricultural use with moderate to severe restrictions	24	1%
III		117	6%
IV	Land primarily suited to pastoral use but which may be safely used for occasional cultivation with careful management	315	15%
V	Land which has limitations that, unless removed, make cultivation impractical and/or uneconomic. Such limitations include rocks or stones, gilgai (melon hole) microrelief, wetness or waterlogging or subject to regular flooding	61	3%
VI	Land which is not suitable for cultivation but is well suited to pastoral use and on which pasture improvement involving the use of machinery is practicable	429	21%
VII	Land which is not suitable for cultivation but on which pastoral use is possible only with careful management; pasture improvement involving the use of machinery is not practicable	936	46%
VIII	Land with limitations that would preclude its use for any form of agriculture	164	8%
Total		2,046	100%

3.1.8.3 Soil types and properties

Ison (1993) conducted a pre-mining soil survey of the Project site which obtained sufficient information to characterise the soils, identify the properties of the various soil horizons and identify approximate recoverable resources of topsoil. Standard soil survey procedures were adopted. Descriptions of the four principal soil landscapes found at the Project site by Ison (1993) are provided below. The distribution of soil types is presented in Figure 10.

Lithosols

These soils are shallow and stony with rock outcrops common. A number of other soils are present including sands and shallow solodic soils.

These soils are generally unsuitable for topsoil recovery. Land capability for this soil landscape is class VII, indicating they are limited for pastoral and non-arable uses. The major limitations to plant growth are shallow soil depth, stoniness, rockiness, low fertility and high erodibility.

Geochemical analytical results show a pH of 4.2, salinity level of 1,030 ppm, exchangeable sodium percentage (ESP) of 40% and a calcium:magnesium (Ca:Mg) ratio of 1.5 for a surface sample with clayey fine sand (0-300 mm); and pH of 4.6, salinity level of 2,160 ppm, ESP of 41.2% and Ca:Mg ratio of 0.3 for a sample from 300-650 mm depth comprising sandy/light clay.

The pH of these soils is considered extremely low and is sufficiently acidic for potential direct detrimental effects on plant growth to occur as well as more common indirect effects of modifying the availability of some soil elements and creating an induced deficiency or toxicity for plant growth. Lime or dolomite is needed to increase soil pH to an acceptable level. Salinity is at a satisfactory level but both the ESP and Ca:Mg ratio suggest that the samples are strongly sodic.

Dark solodic soils

These soils have seasonally hardsetting surfaces and a texture contrast profile. Surface soils have 30–250 mm of fine sandy loam, silty loam or clay loam texture overlying black neutral to alkaline sodic clay subsoils. Carbonate accumulations are common at depth. Bleached horizons are common where surface soils are deeper. These soils are highly variable in their suitability for topsoil recovery depending on the soil depth across the Project site.

Land capability for this soil landscape is mainly class IV – primarily pastoral, and occasional cultivation and class V – pastoral, non-arable.

The major limitations to plant growth are poor drainage, low fertility, low effective soil depth, hardsetting surfaces and sodic subsoils highly susceptible to erosion.

Geochemical analytical results show a pH of 6.3, salinity level of 680 ppm, ESP of 13% and a Ca:Mg ratio of 1.4 for a surface sample of sandy clay loam (0–230 mm); a pH of 7.8, salinity level of 5,980 ppm, ESP of 32.1% and Ca:Mg of 1 for a sample from 230-450 mm depth comprising a clay loam; and pH of 8.1, salinity level of 2,360 ppm, ESP of 9.9% and Ca:Mg ratio of 3.3 for a sample from 450-900 mm depth of medium-heavy clay.

The pH and salinity of these soils are at a satisfactory level but both the ESP and Ca:Mg ratio suggest that all the samples are moderate to strongly sodic.

Yellow and brown solodic soils

These soils have seasonally hardsetting surfaces and a texture contrast profile. Surface soils have 150-200 mm of sandy loam to fine sandy clay loam texture overlying brown or grey brown columnar or blocky clay subsoil. The surface 150-200 mm is suitable as topsoil.

Land capability for this soil landscape is class V – pastoral, non-arable.

The major limitations to plant growth are hardsetting surfaces, poor drainage, low fertility, shallow soil depth and sodic subsoils highly susceptible to erosion.

Geochemical analyses were conducted on five samples taken at depths between 0-350 mm to 2,300–3,900 mm at the Project site. The results show a pH range of 4.6-5, salinity level range between 90-840 ppm, an ESP range of 4.4-29% and Ca:Mg ratio between 0.2-11 for a surface sample of loamy/clayey sand (0-350 mm). The medium clay/sandy clay loam at a depth of 350-2,300 mm recorded a pH range between 7.2-8, salinity levels ranging between 1,040-1,330 ppm, ESP of 26.4-33.2% and a Ca:Mg ratio between 1.2-2.4. The sandy clay at a depth of 2,400-3,900 mm recorded a pH of 6.5, salinity level of 940 ppm, ESP of 56% and a Ca:Mg ratio of 0.2.

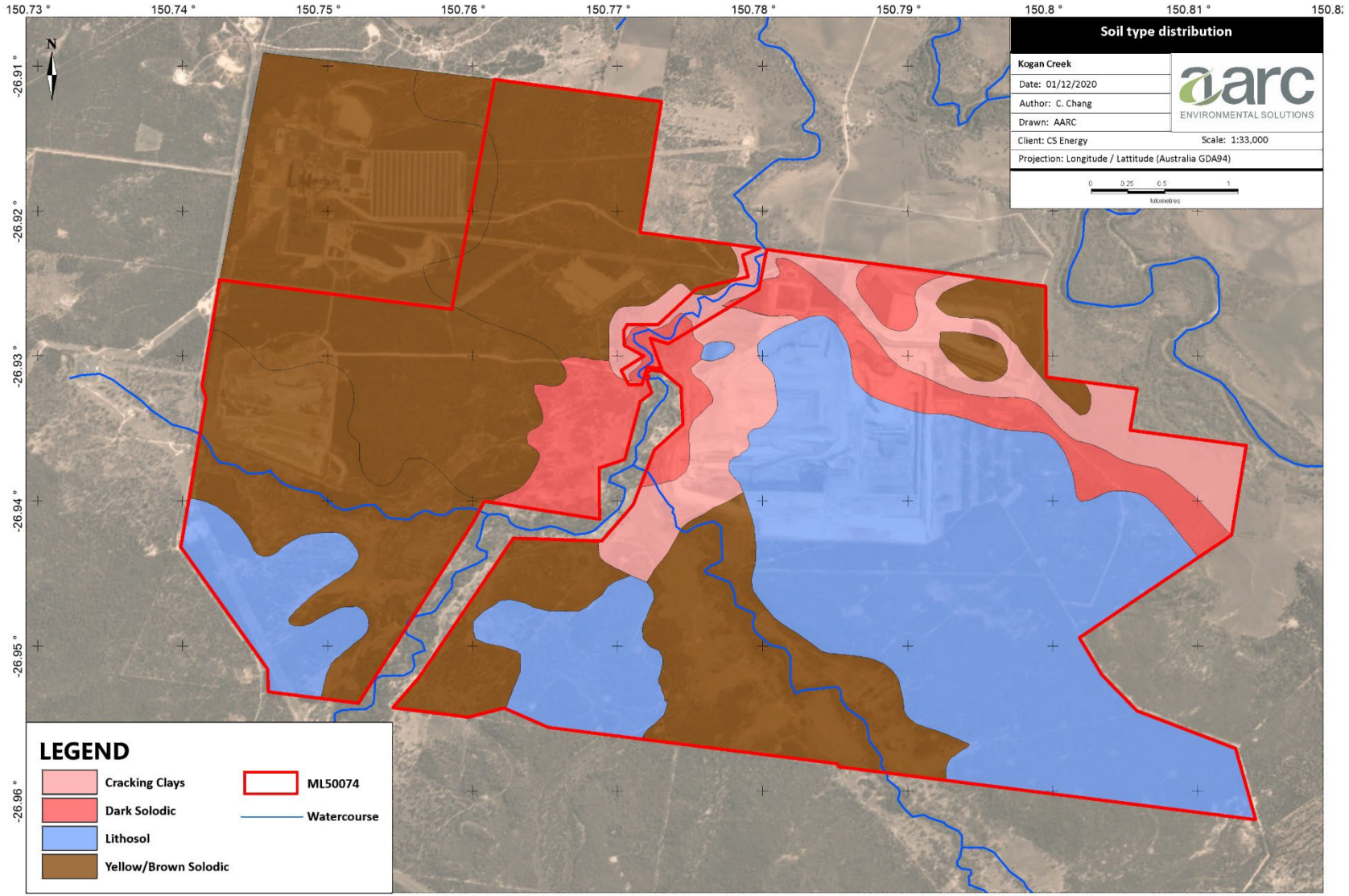

Figure 10 Soil distribution at the Project site area

The pH and salinity of these soils are at a satisfactory level but both the ESP and Ca:Mg ratio suggest that most of the samples are moderate to strongly sodic, except for the A horizon (at a depth of 0-350 mm) which is non-sodic.

Grey – dark cracking clays

These soils are deep cracking clay soils with dark or dark grey subsoils. These soils have crusting surfaces which form a coarse self-mulch under cultivation. Topsoils 80 – 120 mm deep are suitable as a topsoil resource and for stockpiling.

Land capability for this soil landscape is class IV – primarily pastoral with occasional cultivation.

Major limitations to plant growth are crusting surfaces and sodic subsoils highly susceptible to erosion.

The geochemical analytical results show a pH of 7.4, salinity level of 2,440 ppm, ESP of 20.4% and a Ca:Mg ratio of 1.1 for the surface sample of heavy clay (200–1,600 mm); and a pH of 7.7, salinity level of 1,210 ppm, ESP of 29.6% and Ca:Mg ratio of 1.0 for a sample from 1,600-4,000 mm depth comprising sandy clay.

The pH and salinity of these soils are at a satisfactory level but both the ESP and Ca:Mg ratio suggest that all the samples are moderate to strongly sodic.

3.1.9 Flora and fauna

3.1.9.1 Pre-mining vegetation survey

A pre-mining flora and fauna survey was conducted in 1993 following a standard ecological survey approach (Ison 1993). A total of 175 species from 128 genera representing 56 families were identified. Of these, 27 species were introduced. The pre-mining vegetation of the Project area was predominantly open *Eucalypt* woodland. Five vegetation communities were recognised as follows:

- community 1 – *Eucalyptus tereticornis* dominant forest along drainage lines;
- community 2 – *Eucalyptus populnea* (Poplar Box) Woodland;
- community 3 – *Eucalyptus pilligaensis* (Narrow-leaved Box/Gum-topped Box);
- community 4 – *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Callitris columellaris* (White Cypress Pine); and
- community 5 – Mixed *Eucalyptus* Open Forest.

The dominant species identified within each community and the corresponding regional ecosystems (REs) are described in Table 5 and depicted in Figure 11. Note that in Figure 11, 'E1' to 'E5' represent the five dominant vegetation communities described in Table 5, 'B' represents an *Acacia harpophylla* (Brigalow) community with softwood association, 'C' represents *Allocasuarina lluehmannii* (Bull Oak) regrowth areas – both of which are present only in small patches, and 'D' represents areas that were disturbed prior to mining.

3.1.9.2 Remnant vegetation

The following REs of remnant vegetation cover, based on the 2015-2017 Queensland State government mapping (DES 2018a) are present at the Project site:

- RE 11.7.4 – *Eucalyptus decorticans* and/or *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp., *Lysicarpus angustifolius* woodland on Cainozoic lateritic duricrust;
- RE 11.7.7 – *Eucalyptus fibrosa subsp. Nubilis* +/- *Corymbia spp*. +/- *Eucalyptus spp*. Woodland on Cainozoic lateritic duricrust;
- RE 11.5.20 – *Eucalyptus moluccana* and/or *E. luehmannii* and/or *E. woollsiana* +/- *E. crebra* woodland on Cainozoic sand plains;

- RE 11.5.1a – *Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces; and
- RE 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains.

Remnant REs present are shown in Figure 12 (DES 2018a).

Table 5 Pre-mining vegetation communities (Ison 1993)

	Community name	**Description**	**Dominant species**
Community 1 (E1)	*Eucalyptus tereticornis* dominant forest along drainage lines	Generally indicators of alluvium soils and availability of underground water. Commonly seen along the Condamine River, Kogan Creek and also Eastern Branch Creek; as well as occurring in shallow depressions.	Queensland Blue Gum riverine, *Angophora floribunda* (Rough-barked Apple), *Eucalyptus coolabah* (Coolibah), *Acacia deanei* (Green Wattle) with *Lomandra longifolia* (Spiny-headed Mat Rush)
Community 2 (E2)	*Eucalyptus populnea* (Poplar Box) woodland	In the majority of cases, Poplar Box woodland areas have been cleared for pastures because of the slightly deeper loams.	Poplar Box, *Acacia melvillei* (Yarran), Brigalow, *Acacia excelsa* (Ironwood), *Pittosporum philliraeoides* (Weeping Pittosporum), *Geijera parviflora* (Wilga), *Santalum lanceolatum* (Sandalwood) and *Eremocitrus glauca* (Limebush)
Community 3 (E3)	*Eucalyptus pilligaensis* (Narrow-leaved Box/Gum-topped Box)	This species (*Eucalyptus pilligaensis*) reaches heights of 20 m and is usually the dominant tree in the area growing on a loamy topsoil. Often with an overlap with Community 2 (Poplar Box woodland) except for less diversity in the shrub and herbaceous layers.	*Eucalyptus pilligaensis*, Cypress, Black Wattle, *Acacia spectabilis* (Glory Wattle), Ironwood, Ironbark, *Dianella brevipedunculata* (Blue Flax Lily), *Gahnia aspecra* Rough Saw-sedge) and *Eragrostis*, *Aristida* and *Chloris* species of grasses.
Community 4 (E4)	*Eucalyptus creba* (Narrow-leaved Ironbark) and *Callitris columellaris* (White Cypress Pine), *Eucalyptus creba* (Narrow-leaved Ironbark), *Callitris columellaris* (White Cypress Pine)	Noted considerable variation in these vertically layered forests with only the commonly occurring species listed.	*Eucalyptus crebra* and *Callitris columellaris*, *Angophora leiocarpa* (Smooth-barked Apple/Rusty Gum), Black Wattle, *Acacia julifera, Acacia burrowii* (Currawong), *Alphitonia excelsa* (Red Ash/Soap Tree), *Petalogstigma pubescens* (Quinine Berry), and *Hakea fraseri* (Corkwood Oak)
Community 5 (E5)	Mixed *Eucalyptus* open forest	This community features similar shrub and herbaceous layers to Community 4. Both communities occur on shallow soils often of sandstone origin and frequently on gravelly and stony ridges.	Narrow-leaved Ironbark, *Eucalyptus dolichocarpa* (Long-fruited Bloodwood), *Eucalyptus umbellate* (Queensland Peppermint), Poplar Box, Gum-topped Box and *Eucalyptus tessellaris* (Carbeen/Moreton Bay Ash)

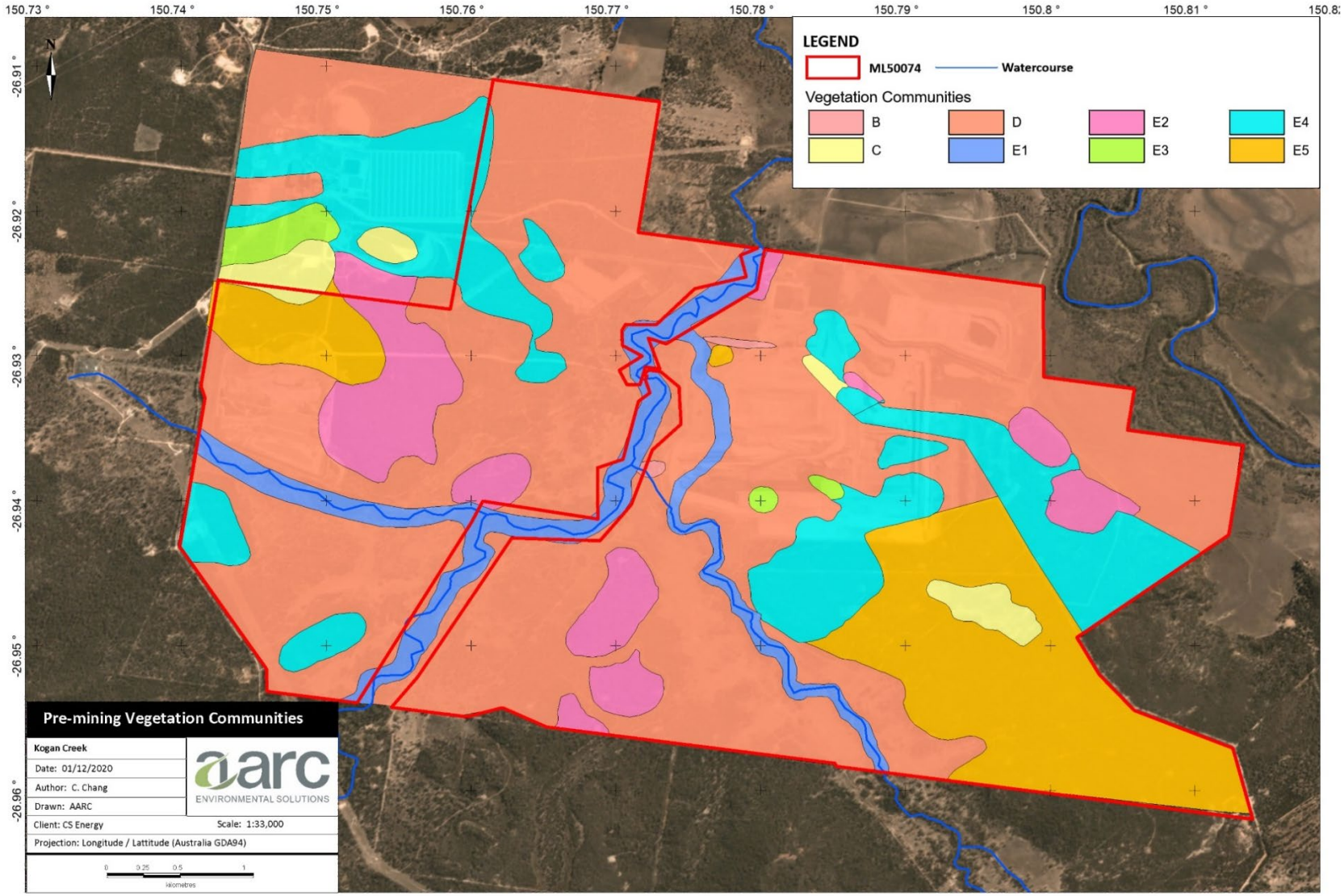

Figure 11 Pre-mining vegetation communities (Ison 1993)

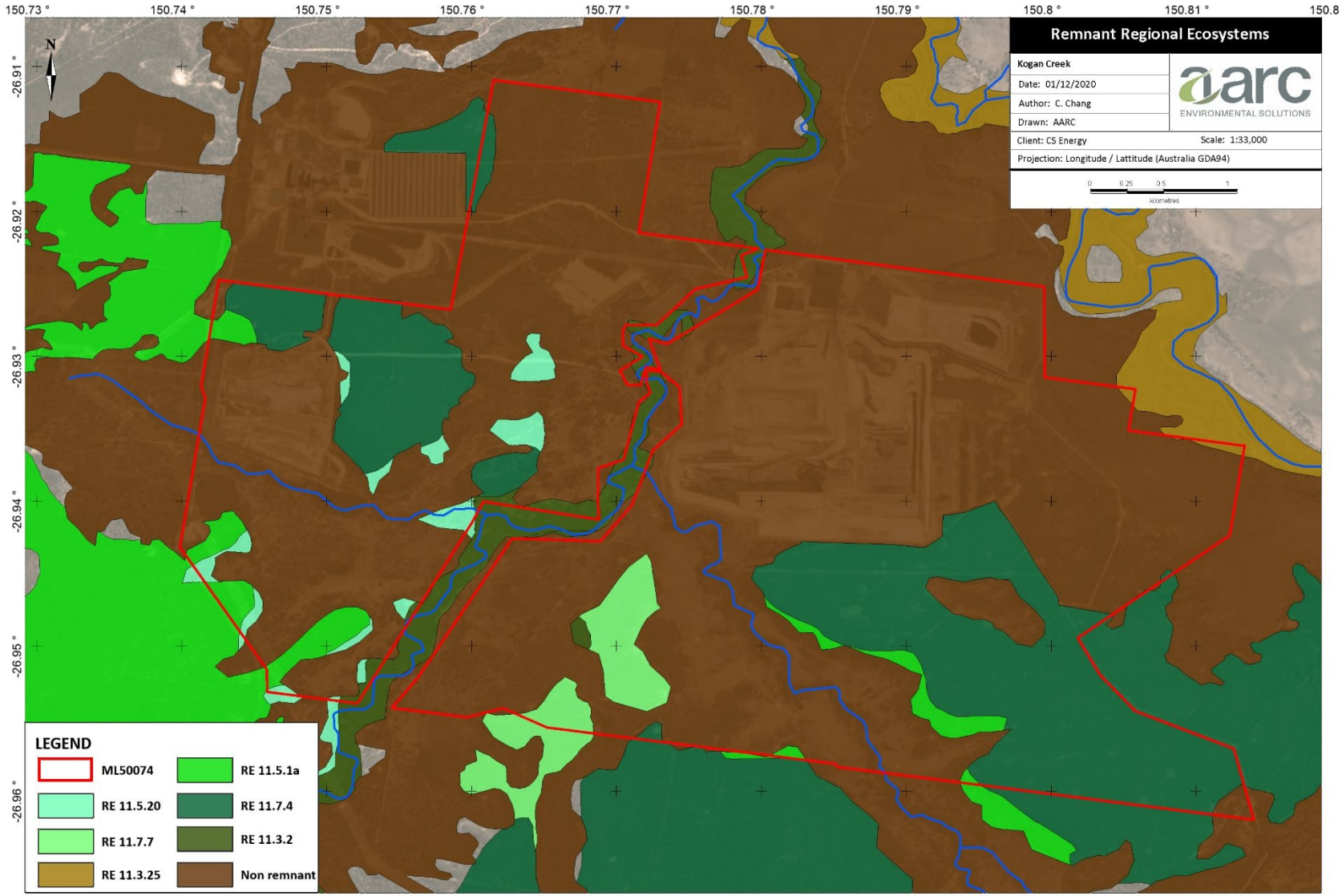

Figure 12 Remnant and non-remnant vegetation communities at the Project site (DES 2018a)

3.1.9.3 Fauna observations

The pre-mining fauna assessment (Ison 1993) concludes the occurrence of restricted habitats is unlikely. Observations recorded during the course of normal exploration and survey works as well as from vegetation surveys are summarised in Table 6. Some of the most prominent fauna included Emu, Grey Kangaroo, Swamp Wallaby, hares and mixed flocks of birds such as Double-barred Finch, Cockatoo, Apostle Bird, Cockatiel and Crested Pigeon.

Waterholes and the infringing vegetation support a range of animals and birds, although numbers and species diversity are considerably lower than on the nearby Condamine River where Water Dragons and Long-necked Tortoise have been commonly observed.

Local landowners report that sightings of Koalas and/or their scats (three sightings in 24 years) are rare. All sightings were associated with *Eucalyptus populnea* (Poplar Box). This species is widespread in the region but covers only a small proportion of the Project area.

Table 6 Pre-mining fauna investigation (observed and possible)

Fauna	Observed	Possible
Frogs	2	8
Reptiles	3	13
Snakes	0	8
Birds	76	145
Mammals	10	34

3.2 Community consultation

3.2.1 Project and ownership history

To provide context to community consultation associated with the Project, the following provides a summary history of the development and ownership of the Kogan Creek Mine:

1969: Kogan Creek Coal deposit discovered and defined by exploration drilling programs conducted through the 1970s and 1980s;

1990: Aberdare, then a wholly owned subsidiary of Allied Queensland Coalfields Ltd, purchased the Kogan Creek coal resources;

1992: Second trial pit excavated and subsequently rehabilitated;

1992 (Oct): Allied Queensland Coalfields Ltd submitted a tender to the Queensland Electricity Commission for the supply of coal to an existing or new power station;

1993: Aberdare commenced acquisition of land in the area of the coal resource and submitted a draft EMOS in support of a ML application;

1995: The then Department of Mines and Energy (DME) concluded the final EMOS (including an addendum) "….. to be a fair assessment of the environmental impacts of the Kogan Creek Coal Project …. and that the potential environmental impacts can be controlled to within acceptable limits";

1999 (Jun): Engineering, procurement and construction contract executed for construction of the Kogan Creek Power Station;

2000: CS Energy acquires a 40% interest in the Kogan Creek Power Station Project through acquisition of a shareholding in Cepa Holding Australia Pty Ltd (now Kogan Creek Power Pty Ltd);

2000 (Mar): DME granted ML50074 to Aberdare;

2002 (May): CS Energy acquires balance 60% of Kogan Creek Power Pty Ltd;

2002 (May): CS Energy Limited (Kogan Creek Power Pty Ltd) acquires Aberdare from Allied Queensland Coalfields Ltd (including lands and licences);

2003: Engineering, procurement and construction contract entered into for construction of the Kogan Creek Power Station;

2004: Updated EMOS (Ison 2004) submitted in support of an EA amendment application for a non-standard ML.

3.2.2 Previous engagement activities

The 2004 EMOS (Ison 2004) indicates that consultation was conducted with potentially affected landholders in the area as well as with the then Chinchilla Shire Council, as part of the approvals process for the mine, from the early 2000s through until 2004. A specific control strategy identified in response to social issues raised during early consultation activities included the development of "stable post-mining landforms through appropriate rehabilitation methods as described in the current Plan of Operations". A consultation register relating to the approvals stage of the Project is no longer available, however, the granting of approval for the Project indicates that both the proposed PMLUs and the level of community consultation undertaken at the time was deemed to be sufficient by the administering authority.

Since the approvals stage, the principal engagement activities undertaken by CS Energy have included:

- community sponsorships through initially the Chinchilla Community Benefits Trust administered jointly with the Western Downs Regional Council, and then through the CS Energy Community Sponsorship Program;
- a number of open days, although these have tended to focus more on the Kogan Creek Power Station than the mine;
- presentations to local services clubs (e.g. Rotary and Lions);
- school visits, various public meetings and workshops;
- involvement in local employment support services groups and the local chamber of commerce (Chinchilla Community, Commerce and Industry Inc.);
- consultation with the Traditional Owners group – the Barunggam People – initially to develop a cultural heritage management plan and cultural heritage investigation management agreement and currently, on at least an annual basis, formal meetings and meetings as required for cultural heritage clearance operations at the Project; and
- various *ad hoc* site tours and engagement with regulatory agencies and neighbouring landholders.

The available consultation records do not provide any specific references to engagement activities that have focused specifically on the rehabilitation and closure aspects of the Project, however, the broad range of

engagement activities undertaken have provided ample opportunity for rehabilitation and closure aspects to be raised by the community.

3.2.3 Stakeholder engagement plan

CS Energy strives to be trusted as a socially responsible business and is committed to its environmental, legal and social licence by operating in an environmentally responsible manner. CS Energy has a standing commitment, outlined in its Health, Safety and Wellbeing policy, to proactively consult and communicate with employees, contractors and stakeholders.

To meet the requirements of section 126C(1)(c)(iv) of the EP Act, and the PRCP Guideline, CS Energy has developed a stakeholder engagement plan (SEP) that aims to build on existing CS Energy engagement activities to ensure that all stakeholders are provided the opportunity to engage, among other things, on rehabilitation and closure matters relating to the Project. The SEP is provided at Appendix F.

The SEP is intended to be a practical tool for effective stakeholder engagement on rehabilitation and closure matters and addresses the following aspects of stakeholder engagement:

- engagement objectives;
- identification and analysis of stakeholders;
- stakeholder engagement planning including engagement principles, opportunities and activities; and
- management of stakeholder engagement including record keeping and management evaluation and review.

Specifically, and in relation to rehabilitation and closure matters, the following engagement objectives are relevant for the Project:

- establish and maintain engagement practices that promote an ongoing relationship with stakeholders;
- provide relevant, timely and accurate information to stakeholders;
- provide convenient avenues for feedback from stakeholders;
- record and respond to rehabilitation and closure feedback in a timely manner; and
- monitor engagement activities to enable review and improvement of engagement activities.

3.2.4 Engagement record keeping and reporting

A record of stakeholder engagement activities has been maintained as a means of monitoring and reviewing stakeholder engagement activities and issues raised by the community. Up until July 2020, records of stakeholder engagement activities have been recorded using the CS Energy Total Records and Information Management system. Records since 2020 are recorded on CS Energy's 'Darzin' stakeholder relationship management software which allows the personnel responsible for a given stakeholder engagement activity to record the activity, while providing access to the record to other accountable staff such as CS Energy's Corporate Affairs team. This system will be used to monitor future consultation activities relating to the implementation of this PRCP.

3.3 Post-mining land use

3.3.1 Land outcome documents

For this Project, Table 8 of the resource activity EA identifies various *disturbance types,* along with projected disturbance areas, post-mine land descriptions, land suitability classifications and various landform criteria for each *disturbance type*. Table 8 of the resource activity EA has been reproduced here as Table 7.

The resource activity EA, and specifically Table 8 is considered to satisfy the definition of a land outcome document (LOD) as per section 750 of the EP Act.

Table 7 Post-mining land use (from the resource activity EA Table 8 and Schedule F Table 1 of EA BRID0033)

Disturbance type	Projected disturbance area (ha)	Pre-mine land description	Post-mine land description	Pre-mine land classification	Post-mine land classification	Slope criteria
EA EPML00417213 (resource activity EA)						
Infrastructure	40	Light grazing and fauna habitat	Light grazing	2/3	3	< 6° Decompaction, erosion protection
Haul Roads	30	Light grazing and fauna habitat	Light grazing	3/5	4	< 6° decompaction, erosion protection
Un-vegetated topsoil	15	Light grazing and fauna habitat	Light grazing	3/5	3	< 6° Erosion protection
Residual void	100	Light grazing and fauna habitat	Light grazing	5	5	Competent rock walls <70°, competent clays and weathered material <45°, Spoil soils and loose rock faces <25°
Spoil areas	350	Light grazing and fauna habitat	Light grazing	4/5	4	< 10°, erosion protection
Dams	40	Light grazing and fauna habitat	Water storage and fauna habitat	3/5	5	As per accepted design plan
EA BRID003 (waste management EA)						
Initial Ash Cell	80	Light grazing and fauna habitat	Light grazing and fauna habitat/ water storage	3/5	4/5	< 10°, erosion protection, accepted design plan for water storage
Out-of-Pit Ash Cell	72	Light grazing and fauna habitat	Light grazing and fauna habitat	3/5	4/5	< 10°, erosion protection
In-Pit Ash Cells	40 each	Light grazing and fauna habitat	Light grazing and fauna habitat	3/5	4/5	< 10°, erosion protection

While Table 8 of the resource activity EA identifies *disturbance types* generally equivalent to *rehabilitation areas*, as well as *post-mine land descriptions* (interpreted as intended to be equivalent to PMLUs) it does not nominate specific locations of the *disturbance types* (refer Table 7). Given this, and that Table 8 of the resource activity EA has not been updated to align with successive updates of the Plan of Operations, it is not possible to correlate the area totals provided in Table 8 of the resource activity EA with the final PRCP schedule provided at Appendix A. This PRCP defines the locations of the *rehabilitation areas* and the PMLUs proposed for this Project, through the PRCP schedule (Appendix A).

As an aside, condition F5 of the resource activity EA requires the EA holder to complete and submit to the administering authority an investigation into final voids *prior to five (5) years before the end of mining*. If such an investigation was to be submitted to Department of Environment and Science (DES) prior to a PRCP being approved and within three years of the date of assent of the amending *Mineral and Energy Resources (Financial Provisioning) Act 2018* (i.e., prior to 30 November 2021), and then also deemed to be sufficient with respect to section 750(c)(i), this may also constitute a LOD in accordance with section 750(c) of the EP Act.

As stated earlier, the resource activity EA is considered to be the primary LOD. By virtue of the existence of a LOD, and in accordance with section 213 of the EP Reg, Schedule 8A, part 3, Table 1 *Final site design assessment* and Table 2 *Post-mining land use assessment – rehabilitation milestones* may not be applicable to the objective assessment to be undertaken for the PRCP. In relation to the *Progressive Rehabilitation* component of Table 2, this PRCP will:

- describe how rehabilitation areas are planned in a way that achieves progressive rehabilitation;
- illustrate how progressive rehabilitation has already commenced at the Project;
- identify risks and discuss their incorporation within, and impact on, the milestone schedule; and
- describe community consultation approaches appropriate for the Project.

3.3.2 Post-mining land use – resource activity EA requirements

In accordance with condition F1 of the resource activity EA:

> *All areas significantly disturbed by mining activities must be rehabilitated to the final land description as defined in 'Table 8 Final land use and rehabilitation approval schedule'.*

Also, in accordance with condition F1 of the waste disposal EA (BRID0033):

> *All areas significantly disturbed by ash disposal activities must be rehabilitated to the final land description as defined in Schedule F – Table 1: Final land use and rehabilitation approval schedule'.*

Table 8 of the resource activity EA and Schedule F – Table 1 of the waste disposal EA have been reproduced in this PRCP as Table 7.

With the exception of the *Dams* disturbance type, Table 8 of the resource activity EA nominates a *post mining land use description* of 'light grazing' for all areas, and *post-mine land classifications* ranging from '3' to '5'. The EA does not specify whether the *post-mine land classification* system being referred to is a 'land capability' classification or a 'land suitability' classification, however the use of Arabic numerals as distinct from Roman numerals and the classification of the residual void as class 5 strongly suggests that the 'land suitability' classification system is being referred to, as has been common for larger operations. The EMOS (Ison 2004) however, refers to 'land capability' classes in its drafting of EA conditions but nominates a class '5' for fauna habitat within the final void having slopes of <45% in incompetent material and <70% in competent rock, which does not appear to be feasible given these slopes. Pre-mining land capability was assessed at ranging from class IV, V and VII. It is assumed that the EA refers to land suitability classes.

A significant anomaly in Table 8 of the resource activity EA is that the *residual void* disturbance type nominates a post mining land classification of '5' which is not compatible with the 'light grazing' *post mining land description* also nominated. The class '5' nomination appears to reflect the generally accepted view that the steeper slopes commonly associated with residual void highwall slopes (for this Project, the EA allows for <70°

in competent rock walls, <45° in competent clays and weathered material and <25° in spoil soils and loose rock faces [note the conversion to degrees for slope criteria from per cent referenced in the draft EA conditions]) are not compatible with any type of grazing land use. It is also noted that condition F4 of the resource authority EA which provides a specific clause of not causing serious environmental harm, could be inferred as suggesting that no higher land use is envisaged for the void.

Condition F3 of the resource activity EA provides the following definition of the intended grazing pasture outcome:

> *Areas which are to be progressively rehabilitated to grazing pasture must comply with the following rehabilitation outcomes:*
>
> *a) Generate a self-sustaining vegetation with projective cover, species composition and species distribution planting locally occurring native species of grass and shrubs. These vegetation species must be listed in the final land use and rehabilitation report…..*

This condition suggests an intent that locally occurring native species of grasses and shrubs should be used within the 'light grazing' PMLU proposed.

The development of these earlier types of post mining land description nominations in many EAs significantly pre-dates the PMLU and LOD definitions and the vernacular introduced with the more recent introduction of the PRCP provisions of the EP Act. As such, it is considered that the principal test of conformance with the LOD should be that the PMLUs proposed within this PRCP:

1) fit within the breadth of PMLUs included in both the resource activity and waste disposal EAs (i.e., 'light grazing' and 'fauna habitat');
2) conform with the intent of the *post mine land descriptions* included within the EA; and
3) conform with the existing surrounding land uses.

As indicated in section 3.1.8, Ison (2004) describes the Project area prior to mining as largely restricted to the grazing of cattle on a mixture of native and introduced pasture grasses with limited cash and fodder crops grown on areas of better quality soils. Land capability is principally class VII being land with limited pastoral suitability with areas of class IV being land primarily suited to pastoral use but which may be safely used for occasional cultivation with careful management and class VI land not suitable for cultivation but well suited to pasture improvement (Ison 2004).

Land use mapping (DES 2019b; 2020) classifies the local area land use as 'production from relatively natural environment – grazing native vegetation', with adjacent pockets of dryland cropping. The Australian Land Use and Management Classification system defines 'grazing native vegetation' as *land uses based on grazing by domestic stock on native vegetation where there has been limited or no deliberate attempt at pasture modification* (ABARE 2016).

The majority of Project disturbance occurs within the area of Lithosol soils that extend to the southeast of the ML and which are characterised as shallow and stony with rock outcrops common. This area is associated with the REs 11.7.4 and 11.7.7 defined as *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp. woodlands. These remnant Eucalyptus species woodlands are considered to provide the best target community to meet the 'fauna habitat' post-mine land description nominated in Table 8 of the resource activity EA.

All areas of waste rock dump associated with the Project, with the exception of the southern margin of the final void, will be returned to a 'light grazing' PMLU as per Table 8 of the resource activity EA.

As indicated earlier, there is an apparent inconsistency with the post mining land description of 'light grazing' and the post-mine land classification of '5' included in Table 8 of the resource activity EA. **The highwall and low wall slopes of the final void will not support a PMLU of 'light grazing', and therefore all final void rehabilitation areas are proposed to be rehabilitated to a native 'fauna habitat' PMLU**. While this does not conform with the *post-mine land* description stated in Table 8 of the resource activity EA, it does conform with the *post-mine land classification* included in Table 8, as well as being practically feasible, aligned with the range

of *post-mine land descriptions* used both the resource activity and waste disposal EAs, and compliant with condition F4 of the resource activity EA.

From an ecological perspective, retaining connectivity with the adjacent remnant vegetation communities to the south-east of the ML provides a higher order rehabilitation benefit for the Project, as well as being compatible with surrounding and pre-existing land uses.

PMLU aspects associated with the final void are discussed further at section 3.5.12.

As per Table 8, some water management infrastructure will be retained (refer section 3.5.11) with the PMLU specified by the resource activity EA (although a smaller area than indicated in the EA), while the remainder will be decommissioned and rehabilitated to a light grazing PMLU.

Proposed PMLUs for areas of disturbance and existing land uses within the ML are illustrated at Figure 13.

3.3.3 Planning scheme conformance

The Western Downs Planning Scheme 2017 incorporating Amendment 1 (WDRC 2019) identifies the area of the Kogan Creek Mine as being in the Rural Zone which has a purpose defined as to:

> *(a) Provide for rural uses and activities; and*
>
> *(b) Provide for other uses and activities that are compatible with -*
>
> *(i) existing and future rural uses and activities; and*
>
> *(ii) the character and environmental features of the zone; and*
>
> *(c) Maintain the capacity of land for rural uses and activities by protecting and managing significant natural resources and processes.* (WDRC 2019)

The Rural Zone primarily accommodates cropping or animal husbandry and ancillary detached dwellings. The adjacent Kogan Creek Power Station is represented within the planning scheme as existing within a Community Facilities Zone and is nominated as a Special Industry Area. The PMLUs proposed are considered to be compatible with the planning scheme. It is also noted that the Western Downs Planning Scheme is acknowledged as integrating all State government planning policy interests and provisions.

Areas adjacent to, and to the north and south of the Project are mapped as a priority agricultural area within the Darling Downs Regional Plan.

In summary, the PMLUs identified within the resource activity EA; of light grazing, water storage and fauna habitat, and their various combinations:

- are generally considered viable, having regard to the use of land in the surrounding region;
- are consistent with how the land was used before the mining activity was carried out on the land;
- are consistent with the approval processes associated with the development of the power station and associated mining activity;
- are consistent with the uses of land permitted under the Planning Act; and
- will deliver, or aim to deliver, a beneficial environmental outcome.

3.4 Non-use management areas

No NUMAs are currently proposed for the Kogan Creek Mine.

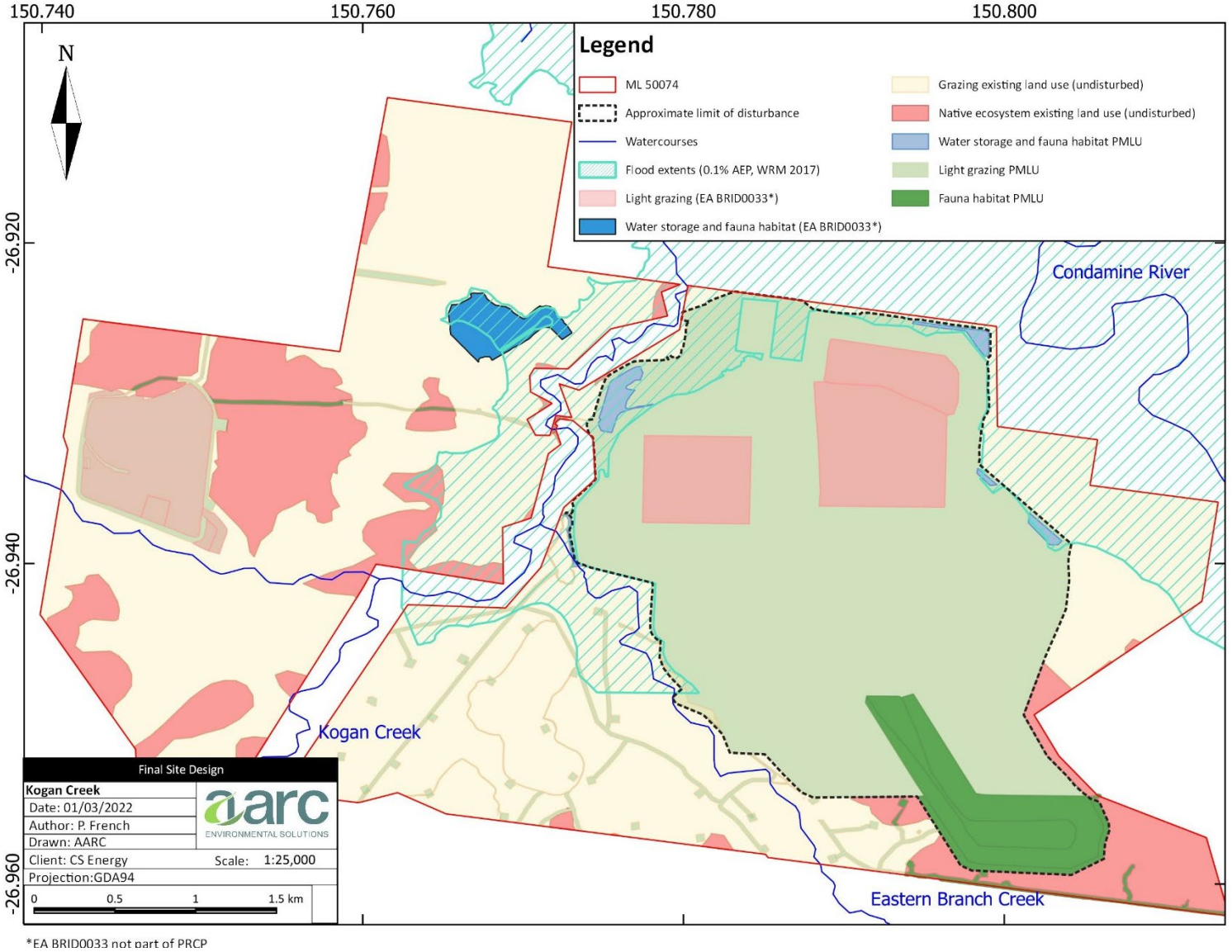

Figure 13 Final site design

3.5 Rehabilitation management methodology

3.5.1 Rehabilitation objectives

In Queensland, mine rehabilitation is required under the EP Act. Amendments to the EP Act in late 2018 implemented key elements of the State Government's Mined Land Rehabilitation Policy (Queensland Government 2018) which intends to ensure that, for land disturbed by mining activities:

- the land is safe and structurally stable;
- there is no environmental harm being caused by anything on or in the land; and
- the land can sustain a post-mining land use (section 111A of the EP Act).

These three objectives are the general rehabilitation goals for all areas disturbed by mining in Queensland. The rehabilitation area designs and rehabilitation methodologies described in the following sections have been developed based on existing rehabilitation experience, technical studies and a range of assessments to achieve the objectives listed above.

3.5.2 Rehabilitation indicators and completion criteria

Key to assessing the success of rehabilitation is the definition of performance indicators and completion criteria. Rehabilitation performance indicators are preferably specific, measurable, achievable, realistic and timely. They should:

- be outcome-based (linked to the end land use);
- be flexible to adapt to changing circumstances;
- be able to evolve as the mine life progresses;
- include metrics suitable to demonstrate that rehabilitation is trending positively;
- undergo periodic review; and
- include a measurement approach that details how the criterion will have been met (CoA 2016; ANZMEC and MCA 2000).

A set of performance indicators has been identified for the Project to provide a clear definition of successful rehabilitation for each rehabilitation area, as well as a set of completion criteria able to demonstrate the successful completion of the closure process. These indicators and completion criteria have been developed to demonstrate:

- the productivity of the land (for agricultural PMLUs), and or its suitability for native habitat;
- the suitability of soils to sustain the intended use and the sufficiency of vegetation cover;
- acceptable levels of erosion and sediment loss;
- the stability of rehabilitated areas (e.g. acceptable slopes and slope lengths, acceptable levels of sediment loss);
- acceptable run-off water quality;
- engineering standards and certifications for retained and rehabilitated infrastructure, where applicable; and
- remediation and/or knowledge of any lands subject to contamination.

The nominated performance indicators and completion criteria for the Project are set out in Table 8. The performance indicators are assessed against completion criteria, which act as targets for the rehabilitation process. The rehabilitation areas referred to, and their relationship with rehabilitation milestones are discussed further at section 3.5.3 and Appendix A.

Table 8 Rehabilitation objectives, performance indicators and completion criteria

Milestone Reference	Milestone Description	Performance indicators	Completion criteria	Applicable RAs
RM1	Infrastructure decommissioning and disposal	• Presence of mine infrastructure equipment, or materials not required for the PMLU	• All non-required services disconnected and removed • All concrete, bitumen and gravel removed • All operational pipelines drained and removed • All fencing that is not part of PMLU requirements removed • All buildings and footings demolished and/or removed • All machinery and equipment removed • All surface water drainage infrastructure that is not retained in the final landform removed • All rubbish removed	RA2a, RA2b, RA3 and RA7
RM2	Determination of contaminated land status	• Presence of contaminated materials or contaminants • Contaminated land assessment	• Contaminated material either remediated in-situ or removed/transported to an approved landfill for disposal and waste tracking information recorded and submitted. • Contaminated land assessment undertaken by an appropriately qualified person1. If required, a site investigation report including a site suitability statement prepared and submitted in accordance with the provisions of Chapter 7, Part 8 of the EP Act.	RA2b, RA3
RM3	Landform development (reshaping and reprofiling)	• Slope of final landform • Geotechnical study completed by a suitably qualified person to assess the geotechnical stability of final landforms • Drainage design by suitably qualified person	**Landform development works** • All bulk earthworks and landform reshaping/reprofiling works completed • Geotechnical assessment by an appropriately qualified person confirming that long term geotechnical stability has been achieved for each relevant landform • Installation of graded drains where slope lengths on slopes of 8° (14%) or greater would exceed 160 m constructed to an engineering specification by a suitably qualified person **Slope** • RA1 final landform slope < 8° (14%) • RA5 final landform:	RA1, RA2b, RA4, RA5 and RA6

Milestone Reference	Milestone Description	Performance indicators	Completion criteria	Applicable RAs
			• Highwall – achieve target design slope of 24°, but a maximum of 70° in competent rock or 45° in competent clays and weathered material where this can be demonstrated to reduce the disturbance footprint • Low wall – maximum 24° • Retained access ramp – maximum 6° • RA6 final landform slope < 9.5° (17%) **Residual Void Floor** • RA4 final void floor backfilled to be above regional equilibrium groundwater level	
RM4	Surface preparation (topdressing, scarification, contour ripping/discing, soil amelioration activities)	• Evidence of landform surface preparation (contour ripping/discing/scarification, presence of topdressing/amelioration materials)	• Surface scarification, ripping or discing, along the contour of any slope to a depth of at least 200 mm. • Prior to each rehabilitation event, soil testing and agronomic analysis undertaken by an appropriately qualified person and a recommendation made for a topsoil/growth media/ ameliorant and nutrient combination suitable for the post mining land use revegetation program • Ameliorants applied and incorporated into surface, as recommended by an appropriately qualified person	RA1, RA2b, RA3, RA4, RA5, RA6 and RA7
RM5	Revegetation (seeding and/or planting)	• Seed germination and development of groundcover establishment	• Revegetation works by tubestock and/or direct seeding at rates determined for each rehabilitation event drawn from *Table 18 Current indicative species and rates for light grazing PMLU* or *Table 19 Indicative proposed revegetation species for the native fauna ecosystem PMLU* (Kogan Creek Mine Transitional PRCP, Version 9, 4 March 2022) • No later than 12 months from planting, a >50% survival rate for any given perennial species is achieved	RA1, RA2b, RA3, RA4, RA5, RA6 and RA7
RM6	Achievement of target revegetation criteria	• Ground foliage cover based on data acquired through the Rehabilitation Monitoring and Maintenance Plan • Erosion classification determined based on data acquired through the Rehabilitation Monitoring and Maintenance Plan	**Light Grazing and Fauna Habitat PMLUs:** • Total percentage of ground foliage cover is >50% • No recorded erosion classifications of 'Severe', no active erosion present as demonstrated by no increase in erosion ratings over time	RA1, RA2b, RA3, RA4, RA5, RA6 and RA7

Milestone Reference	Milestone Description	Performance indicators	Completion criteria	Applicable RAs
RM7	Achievement of target PMLU	• Ground foliage cover and diversity based on data acquired through the Rehabilitation Monitoring and Maintenance Plan • Erosion classification determined based on data acquired through the Rehabilitation Monitoring and Maintenance Plan • Land suitability assessment by an appropriately qualified and experienced person • Fauna surveys including observations, scat identification in Open Woodland Ecosystem PMLUs • Surface water quality based on water quality monitoring program • Groundwater quality based on water quality monitoring program • Hazard and Safety Assessment by suitably qualified person	**Light Grazing PMLU:** • Total percentage of ground foliage cover, organic litter and rock is >75% • Land suitability assessment by an appropriately qualified person certifies land has achieved a post-mine land suitability of 4 or better • Minimum of 4 palatable perennial pasture species and 2 shade tree species established (note that shade tree species are to be excluded on RA6) • Evidence of recruitment from rehabilitation monitoring data • No evidence of erosion classified as 'Severe'. • No active erosion present as demonstrated by no increase in erosion ratings over time **Fauna Habitat PMLU (final void floor and high wall/low wall):** • Ground foliage cover > 75% • Minimum 14 target vegetation species comprising: o Grasses and forbs ≥ 4 o Mid storey species ≥ 6 o Canopy species ≥ 4 • Evidence of fauna habitat features (e.g. tree hollows, fallen timber, rock piles) consistent with analogue fauna habitat sites • Evidence of recruitment from rehabilitation monitoring data • No evidence of erosion classified as 'Severe' • No active erosion present as demonstrated by no increase in erosion ratings over time • Evidence of native fauna species utilisation in the form of fauna spotting, scats, and tracks • All safety precautions undertaken in accordance with the relevant legislation—signs comply with AS1319:1994–Safety Signs for the Occupational Environment	RA1, RA2a, RA2b, RA3, RA4, RA5, RA6 and RA7

Milestone Reference	Milestone Description	Performance indicators	Completion criteria	Applicable RAs
			• Access restrictions; either berms or fencing in place • Void highwalls and low walls are internally draining • Assessment from an appropriately qualified person that the final void does not act as a groundwater sink, the final void floor is above regional equilibrium groundwater levels and the final void is protected from flood water ingress **Water Storage PMLU:** • All retained water storages (banks and spillways) assessed as safe and stable by an appropriately qualified person • Retained storage water quality parameters to be below the trigger values for livestock drinking water defined in Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Volume 3 Primary Industries — Rationale and Background Information (ANZECC and ARMCANZ 2000). **All PMLUs:** • Hazard and Safety Assessment completed by an appropriately qualified person demonstrates hazards in rehabilitation areas are of a similar type and not significantly different to hazards in neighbouring unmined landscapes subject to a similar land use • Surface water quality parameters for runoff from all PMLUs to be below the trigger values for aquatic ecosystem values defined in Condamine River Basin Environmental Values and Water Quality Objectives (October 2020 or a later version). • Evidence that on-lease monitoring bores meet groundwater quality trigger levels as per Table 3 of the EA	

3.5.3 Rehabilitation areas and milestones

To allow the development of a PRCP schedule in accordance with the requirements of the PRCP Guideline, discrete rehabilitation areas, were identified distinguished primarily by the sequence of rehabilitation activities deemed appropriate for each rehabilitation area. The rehabilitation areas considered relevant to the Project are outlined in Table 9.

Table 9 Identified rehabilitation areas

Rehabilitation Area Reference	Description
RA1	In-pit and out-of-pit waste rock emplacements
RA2a	Retained water management infrastructure (including diversions)
RA2b	Rehabilitated water management infrastructure (including levees)
RA3	Infrastructure areas (including major haul roads)
RA4	Residual void
RA5	Residual void highwall/ low wall
RA6	IPAC and OPAC cell batters
RA7	Exploration tracks and drill pads

The nominated rehabilitation milestones considered relevant to the Project are outlined in Table 10. It should be noted that not all rehabilitation milestones are applicable to all rehabilitation areas; the applicability of rehabilitation milestones to the various rehabilitation areas is also indicated in Table 10.

The rehabilitation methodology sections following reference the rehabilitation areas and rehabilitation milestones listed in Table 10 and Table 11.

Table 10 Milestones and their applicability to rehabilitation areas

Milestone reference	Description	RA1, RA6 Waste rock dumps, ash cell batters	RA2a Retained water mgmt infrastrct	RA2b Rehabilitated water mgmt infrastrct	RA3 MIA	RA4, RA5 Void, void high wall / low wall	RA7 Exploration works
RM1	Infrastructure decommissioning and disposal		√	√	√		√
RM2	Determination of contaminated land status			√	√		
RM3	Landform development (reshaping and reprofiling)	√		√		√	
RM4	Surface preparation (topdressing, contour ripping/discing/ scarification, soil amelioration activities)	√		√	√	√	√
RM5	Revegetation (seeding and/or planting)	√		√	√	√	√
RM6	Achievement of target revegetation criteria	√		√	√	√	√
RM7	Achievement of target PMLU	√	√	√	√	√	√

3.5.4 General rehabilitation practice

The rehabilitation practices used at any mining site inevitably evolve as a result of increasing knowledge gained from experience in the following areas:

- early rehabilitation successes and failures;
- weather, subsoils, soils, local flora and fauna and revegetation species; and
- site preparation, seeding practices, the maintenance and repair of previously rehabilitated areas and/or local agricultural practices.

For this reason, the rehabilitation practices outlined in the following subsections should not be interpreted as the precise method that will be used from this point on, but rather as a record of the current rehabilitation knowledge and intent at the time of writing; and with the expectation that rehabilitation practices will further evolve and develop from this point on. A record of the existing rehabilitation efforts at site is provided at section 3.1.2.

While rehabilitation objectives, performance indicators and completion criteria for the Project are detailed at sections 3.5.1 and 3.5.2, from the perspective of operational rehabilitation planning and practice, the following overarching principles are considered key:

- Ensuring that reshaped areas proposed for rehabilitation meet the required landform design principles, that prepared areas meet the rehabilitation design specification for the area, and that local site drainage has been considered and surrounding areas graded to mitigate any rainfall run-off from adjacent areas to run-on to prepared rehabilitation areas.
- Topdressing materials, final surface preparation methods and soil amelioration activities have the objective of supporting vegetative growth.
- Revegetation species selection, seeding and/or planting methods, and fertiliser applications target rapid vegetative ground cover effective at mitigating soil erosion, during the period of initial revegetation when areas are most at risk.
- Ongoing monitoring and maintenance are used both to assess rehabilitated area performance against completion criteria as well as to feedback to, and update rehabilitation practices; and to identify maintenance or modification requirements such that rehabilitation areas are proceeding along a trajectory towards the designated PMLU.

Erosion potential will be managed through a combination of soil ameliorants (see section 3.5.7) and vegetation and other groundcover such as organic litter. The target total percentage cover of ground foliage cover, organic litter and rock is >75%. An interim target (RM6) total percentage cover of ground foliage cover only of >50% is considered sufficient for protecting the soil surface from erosion caused by rain drop impact and overland flow, and reducing the risk of rill development on slopes <15% (So et al. 1998, Loch 2000). Soil ameliorants will also be utilised where necessary to bring soil pH values within the range of 5.5 to 9.0, the range most suitable for plant growth (Hazelton and Murphy 2016).

There will be circumstances when rehabilitation practices outside of those discussed within this PRCP are utilised. For example, discrete areas of steeper slopes, rehabilitation failures or other scenarios that may necessitate more intensive rehabilitation practices. These circumstances will be identified, assessed and rehabilitation activities planned for as required.

3.5.5 Hydrogeology

The hydrogeology of the region is described at section 3.1.6. The hydrogeological model for the Project site is described in Appendix G and illustrated in Figure 14. In summary, the model indicates that much of the power station area and IADA are underlain by Springbok Sandstone while the mine area is underlain by Walloon Coal Measures strata with outcrops of Springbok Sandstone on elevated terrain.

The Kogan Creek alluvium consists of fine to medium-grained sands and coarse sands and gravels and is of the order of 13 to 14 m thick as measured at various bores (MB1, MB3 and MB8). On the eastern side of the planned extent of mining, the Condamine River alluvium is only 4 m thick at bore MB26 (refer Figure 9), but is present at depths of up to 15 m in bores further to the north of the OPAC.

While groundwater pressure declines around Kogan Creek Mine have been observed, the horizontal permeability of the exposed coal seams is sufficiently low that little free groundwater discharges to the pit floor. Consequently, no pit dewatering to specifically manage groundwater inflows is required to be carried out.

The most recent reported estimate of water volume attributed to groundwater ingress is 22 ML/year (Golding 2020), equivalent to a continuous flow of around 0.7 L/sec. However, this is not a direct measurement but the difference between estimated pit inflows from rainfall/runoff and estimated outflows (pumpage and evaporation). Consequently, there is a high degree of uncertainty in the estimate, as groundwater inflow would be a very small component of the overall mine pit water balance and there can be a relatively high degree of inaccuracy (relative to the groundwater inflow estimate) in the estimates of other water balance parameters, in particular runoff and evaporation.

The hydrogeological model indicates that the final void will act as a sink for local area Walloon groundwater and potentially groundwater in the adjacent Springbok Sandstone strata on nearby outcrops, where hydraulic connectivity between Springbok and Walloon strata might exist.

Estimates of future groundwater levels in the vicinity of the final void have been made based on the historical response to groundwater depressurisation in bores monitoring Walloon strata on the south side of the mine. The floor of the final mining pit, based on coal floor levels, will be at about RL 260 m AHD. Hydrological modelling (refer Figure 21) indicates that "steady-state" water level conditions in the final void, if left at coal floor levels would settle at about RL 265 mAHD after about 10 years. To mitigate the potential for a groundwater window to result in the final void, it is proposed to backfill the pit to a final floor level of 280 mAHD. Considering the limited use of groundwater in the area, and the limited extent of groundwater depressurisation expected, the resulting void is expected to have minimal potential impact on local groundwater resource use.

3.5.6 Flooding

The Condamine River flows past the northern and eastern boundaries of the ML which is bisected by Kogan Creek, an ephemeral creek, and its tributary Eastern Branch Creek. Kogan Creek flows into the Condamine River to the north of the ML. To protect the mine workings, flood protection levees and a small creek diversion of Eastern Branch Creek have been constructed.

The design of levees and related embankments was originally based on providing protection from 1 in 100-year ARI flood levels. However, regulatory requirements were updated in 2016 such that where a levee is designed to prevent ingress of non-mine affected flood water into a mine operational area, the levee would be a regulated structure and must be constructed to have a flood immunity of at least the 0.1% annual exceedance probability (AEP) event.

The most recent flood study for the site was undertaken by WRM Water and Environment (WRM) in 2017 (WRM 2017, refer Appendix G) primarily for the purpose of assessing the current levee infrastructure against the 2016 updated requirements. The WRM flood study proposed to modify the existing levees (the Eastern Branch Creek levee and the Condamine levee) by raising the levees to achieve an updated minimum crest level with a 0.3m freeboard to account for model calibration and ground level survey accuracy. These works were completed in 2018/19. The WRM (2017) study found that raising these levees would not impact peak 0.1% AEP flood levels and flood velocities. The locations of flood protection levees are shown in Figure 15. Figure 13 shows the 0.1% AEP flood extents determined by WRM prior to construction works to increase levee crests, and shows some floodwater ingress to the north which would no longer occur given the levee changes. The 2017 flood study boundary is limited to the south in Eastern Branch Creek, but floodwater ingress is limited given the final rehabilitated landform in this area. As mining progresses southwards, there will be a requirement to extend the eastern Condamine levee further to the south.

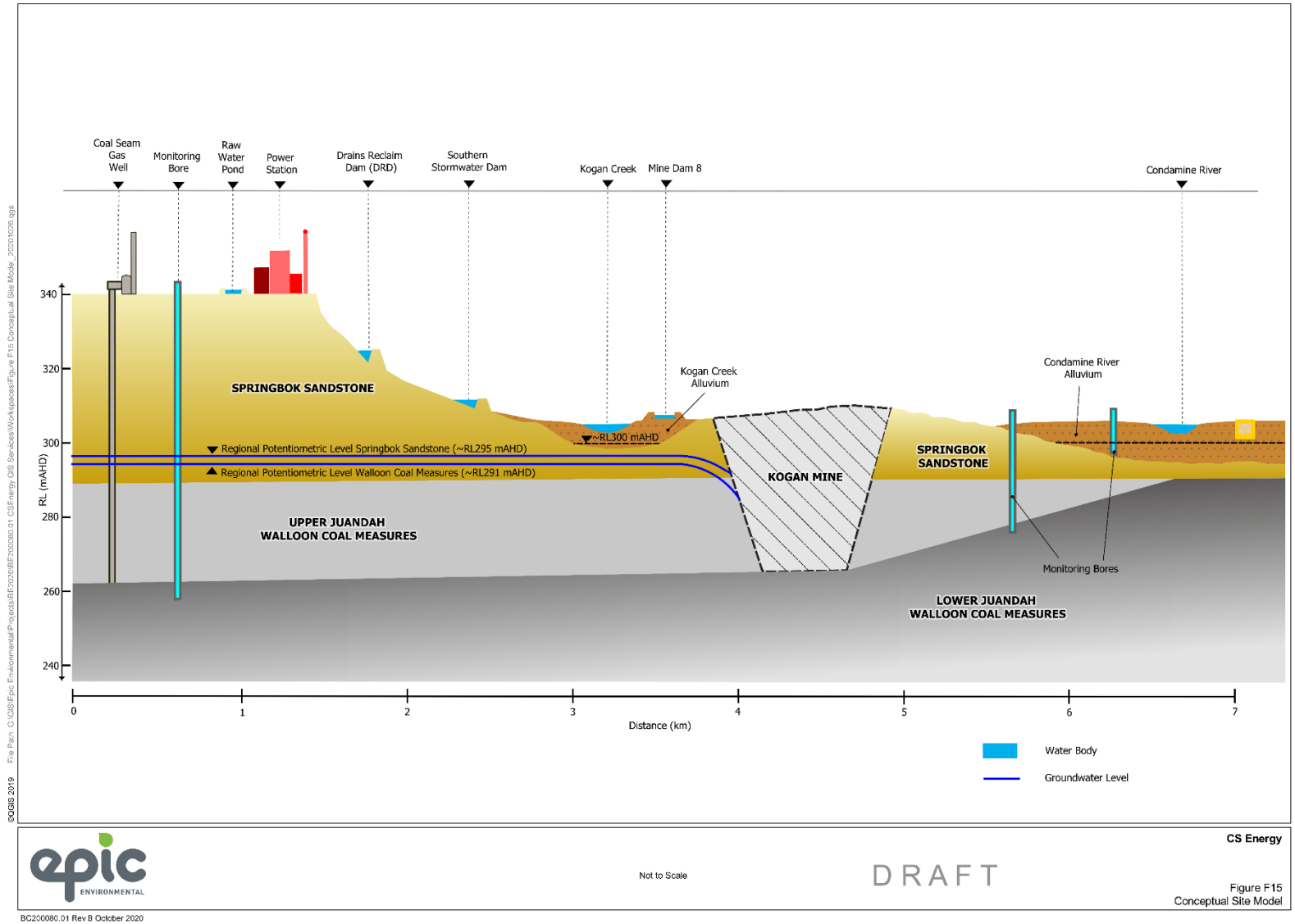

Figure 14 Generalised, conceptual hydrogeological model

3.5.7 Soil and growth media

Topsoil and subsoil testing across the Project site have universally confirmed that available soil resources are deficient in organic carbon and phosphorus, are generally moderately saline and are sodic to varying degrees. The levels of sodicity measured indicate that the soil resources are expected to be prone to dispersion, hard setting (potentially limiting germination success), and vulnerable to erosion; particularly tunnel erosion if slopes and drainage pathways are not properly managed.

Research work and rehabilitation trials undertaken to date have demonstrated that a blend of topsoil and power station bottom ash provides a growth medium having lower sodicity and salinity (Landloch 2017). Landloch (2017) concluded that a 50:50 topsoil:ash blend provides a growth medium having the lowest sodicity and salinity but that blends with a ratio of 70:30 (topsoil:ash) would still provide a growth medium more beneficial than topsoil alone. The soil nutrient deficiencies are able to be addressed through the application of slow-release fertiliser, including di-ammonium phosphate and urea, and organic matter, with gypsum applied to further ameliorate sodicity (Landloch 2017). Trial work undertaken suggests that the addition of composted biosolids in the form of feedlot manure, as well as the use of specific fertilisers can address fertility levels and assist in achieving acceptable germination rates. Any use of bottom ash in rehabilitation/soil amelioration will comply with the *End of Waste Code Coal - Combustion Products* (DES 2018b).

Where possible, topsoil has been, and will continue to be progressively stockpiled for rehabilitation purposes ahead of mining across the Project site. Given the deficiency of topsoil resources on-site, topsoil stockpiles will be managed to mitigate risks associated with erosion, weed infestation and loss of the soil seedbank. A topsoil register is maintained.

An assessment of topsoil and growth medium requirements out to 2027 was undertaken for the Project's 2021 estimated rehabilitation cost determination. Table 11 identifies the topsoil volume available and material balance for rehabilitation purposes up to June 2027. This assessment indicates that sufficient *in situ* topsoil will not be available to undertake the areas proposed for rehabilitation for the same period. Based on Landloch (2017) and current rehabilitation experience, ash and biosolids will generally comprise greater than 30% of required growth media; equivalent to greater than 273,600 m^3 and resulting in sufficient topsoil being available. As a minimum, an additional volume of 19,110 m^3 of growth medium (ash material and/or biosolids) will need to be sourced externally. These supplementary materials are available from the adjacent power station (ash), as well as from regional feedlots (composted biosolids), and are not expected to be limiting for the life of the operation. It should be noted that prior to each rehabilitation event, topsoil resource testing will be undertaken and subjected to agronomic analysis to optimise growth medium blend requirements.

Table 11 Predicted growth media material balance

Material type	**Volume of material available (m^3)**	**Volume of material required (m^3)**
Topsoil resource stockpiled (as at Oct 2020)	687,450	-
Topsoil stripping to 2027 (assumed stripping depth of 0.2 m)	205,440	-
Additional growth medium requirements (ash and biosolids)	19,110	912,000
Total material volume	**912,000**	**912,000**

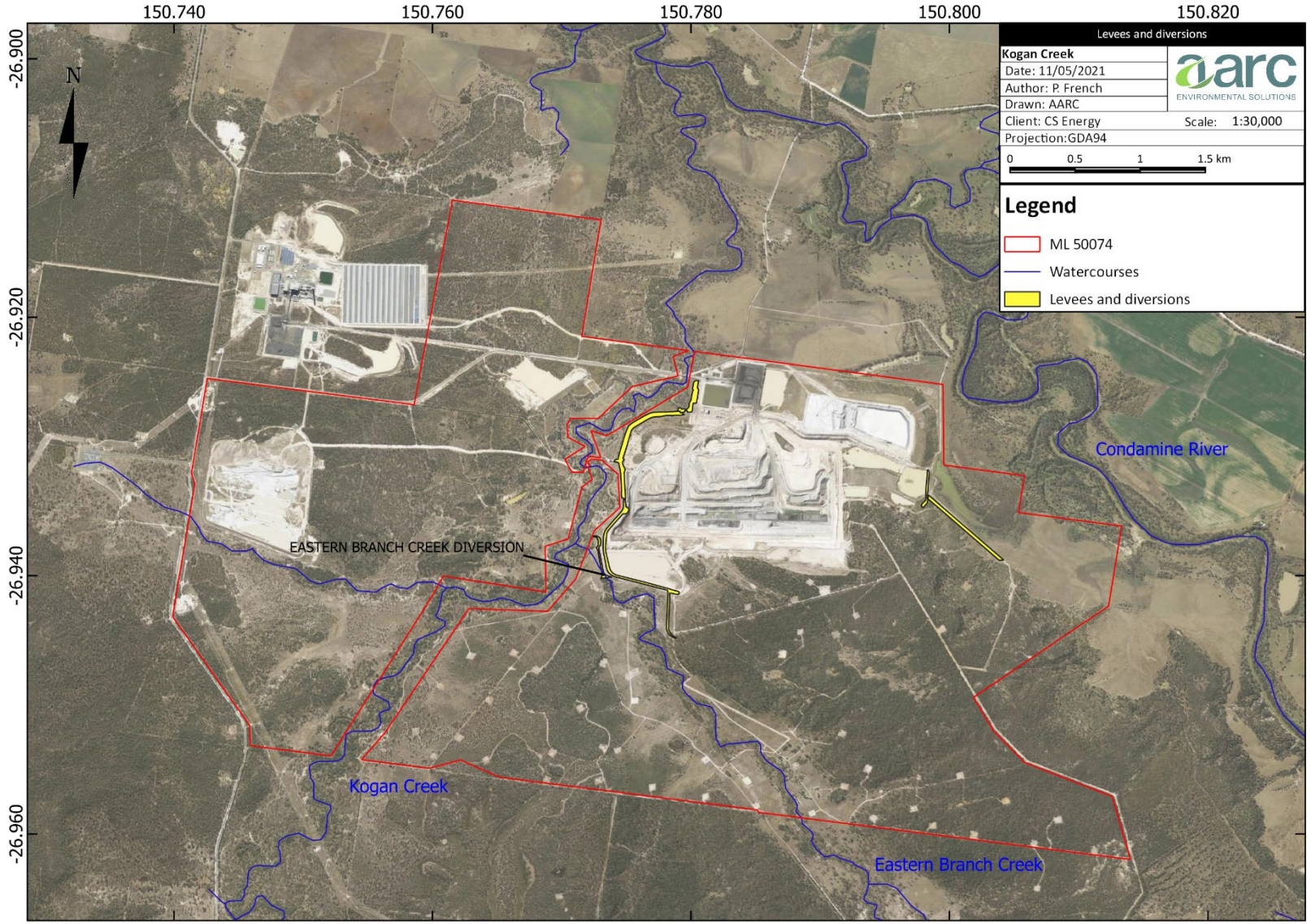

Figure 15 Locations of existing and proposed levees, and the EBC diversion

3.5.8 Landform design

The final landform design and the sequencing of landform development (and hence also the resultant rehabilitation milestone schedules) are influenced by a range of factors, key of which include:

- The current design life of the Kogan Creek Power Station runs to 2042, which also establishes the currently proposed end point for the Project. A decision to extend or shorten the life of the power station would result in an extension or contraction of the life of the mine.
- The rate of coal extraction from the Project is directly proportional to the energy demand forecast for the power station. A reduction in energy demand will reduce the coal extraction rate and result in less total disturbance. This will have commensurate impacts on the location of the final void, and the resulting final landform. An increase in energy demand above original forecasts could trigger either an application for a ML extension or an application for an additional ML, which would be subject to normal approval and permitting processes.
- Power station ash disposal, while not subject to PRCP requirements, is an integral component of the mine operation and impacts on mine planning and sequencing. The rate of ash generation is determined by power station energy demand in the same way that coal extraction rates are impacted.
    - Development of the IADA was required to facilitate the initial start-up and operation of the power station. It is required to remain until 2042 as an emergency ash disposal area and therefore final rehabilitation of this area cannot commence until the power station ceases operation.
    - The OPAC, as well as being required for approximately the first ten years of power station operation, through the need to construct engineered ash placement cells, also facilitated the initial out-of-pit overburden dumping required to create sufficient room for early mining operations, until such time that in-pit dumping could commence.
    - The transition from out-of-pit ash disposal to in-pit ash disposal is currently occurring. The creation of ash disposal cells has been the key focus for the majority of overburden dumping up until about 2020. Once construction of the IPACs are complete – expected within the next ten years, normal in-pit overburden dumping can occur, which will provide greater operational flexibility with respect to landform design and construction.
    - The rate of utilisation of the IPAC and OPAC areas is subject to the ash generation rate from the power station, with rehabilitation of the cells themselves unable to commence until each cell has been filled to design capacity. The current landform design assumes that full life-of-mine coal extraction occurs and ash cell capacity is fully utilised. This is a conservative approach and should ash cells not be filled to completion, there will be a lowering of the overall landform in the vicinity of the ash cells. Regardless, waste rock emplacement design criteria will still be met.
- As for most open-cut coal mining operations, a void will remain at completion of mining. For the Project, a single void will remain at the southern extremity of the mine pit.
- The existence of flood protection levees which have been constructed to the east and west of the mining operation, and which are referred to as the Eastern Branch Creek (EBC) levee, the EBC levee southern extension, the Haul Road levee to the north and west of the Project, and the Condamine levee in the east. There is a current proposal to extend the Condamine levee further to the south. The levees and diversion were proposed in the EMOS for the Project (Ison 2004) to be retained as permanent structures after decommissioning of the mine.

Landform design principles for each of the key mine rehabilitation areas are discussed in the following sections. The final landform design surface along with an indicative surface drainage system is illustrated in Figure 16.

3.5.9 Waste rock dump

3.5.9.1 Waste rock dump design

Prior to operations commencing, a conceptual mine dump design study was carried out to provide an initial design for the out-of-pit and in-pit waste rock dumps (WRDs), incorporating the required ash disposal cells

(Runge 2002). Dump locations, slopes and heights were proposed to meet known environmental, hydrological and operational criteria, while volumetric capacity was based on accommodating waste rock from the mining activities and ash from the power station in a series of cells constructed from mine waste rock. As part of developing this PRCP, a review of landform design principles was undertaken with outcomes reflected in the discussion below.

For the Project, initial placement of waste rock was undertaken with the additional purpose of constructing ash disposal cells (the OPAC and IPAC) to strict engineered designs. These structures form the northern part of the final landform. The western ash disposal cells (IPAC 1 and 2) sit proud of the western side of the final landform by approximately 14 m, while the eastern cells (OPAC and IPACs 3 and 4) comprise the highest landform elements; with OPAC maximum elevation at approximately 350 mAHD, and from there grading south across the IPAC 3 and 4 cells to the main in-pit waste rock dump at an elevation of approximately 340 mAHD immediately south of the IPAC 3 and 4 structures (Figure 16).

To the south of the western OPAC and IPAC structures, a single contiguous WRD forms the bulk of the final landform. On the eastern side, the landform rises to a maximum elevation of 350 mAHD before blending into an existing ridgeline to the south. The western plateau slopes to natural ground to the east at slopes limited to less than 8° (14%) and to a formed bench to the west at similar slopes.

The main operational haul road which connects the ROM pad in the north to the final void in the south, creates a north–south running bench in the landform at about 320-325 mAHD before ramping down to the final void at a maximum slope of 6° (10%).

The western part of the final landform slopes gently to the west to natural ground at a typical slope of 1° (1.5%).

Key waste rock dump design criteria are summarised in Table 12. For the purposes of the PRCP and milestone schedule the WRD has been defined to include the engineered ash cell batters but exclude the ash cells themselves. A slope analysis for the final landform is provided at Figure 17.

Table 12 Key waste rock dump design criteria

Parameter	**Value**
Final landform slope range (excluding OPAC and IPAC batters)	1° - 8° (1.5% - 14%)
Final landform slope range (OPAC and IPAC batters)	9.5° (17%)
Ramp to final void gradient	Maximum of 6° (10%)
Maximum slope lengths (for slopes greater than 8° (14%))	160 m

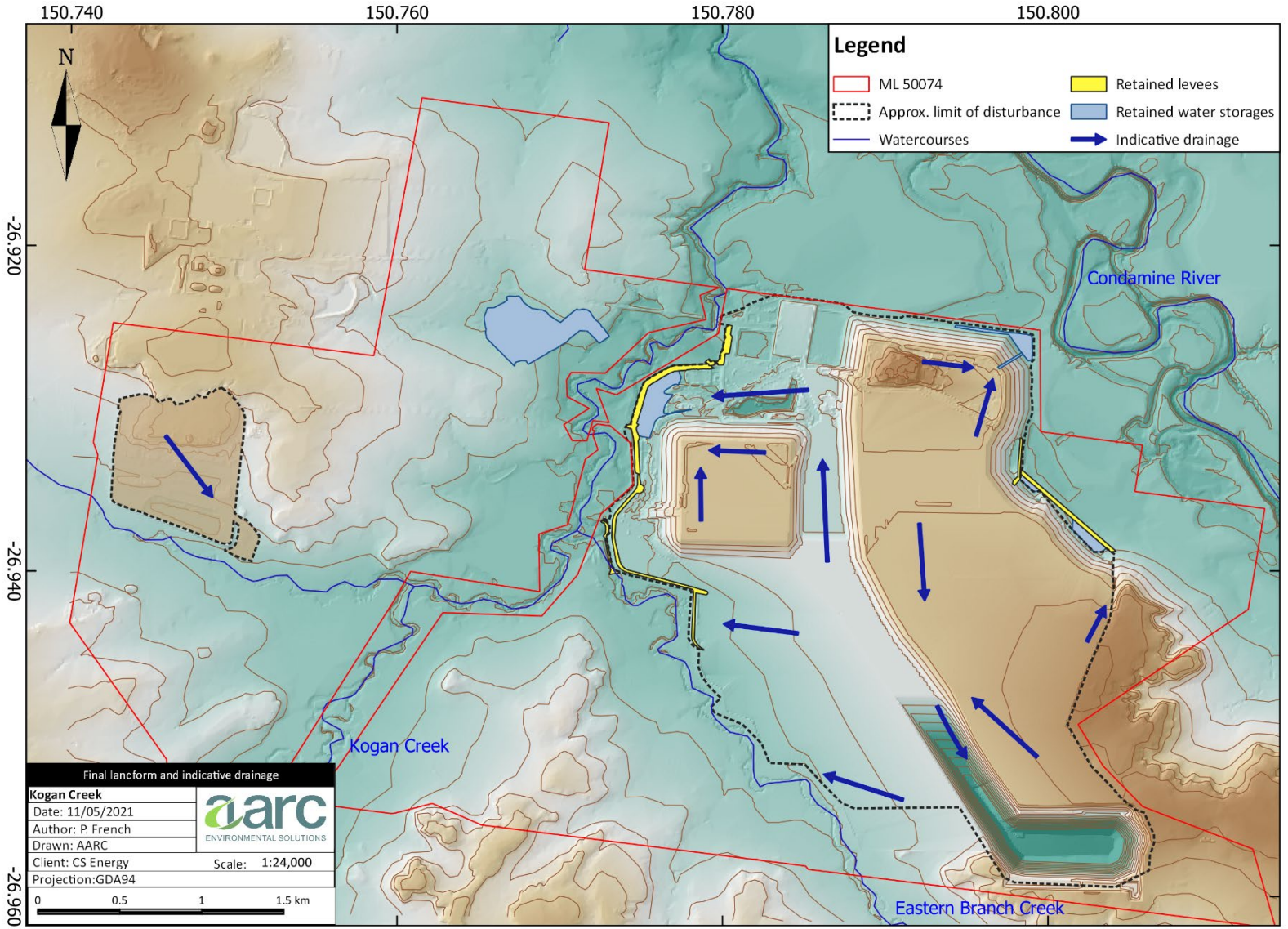

Figure 16 *Final Project landform design and indicative drainage configuration*

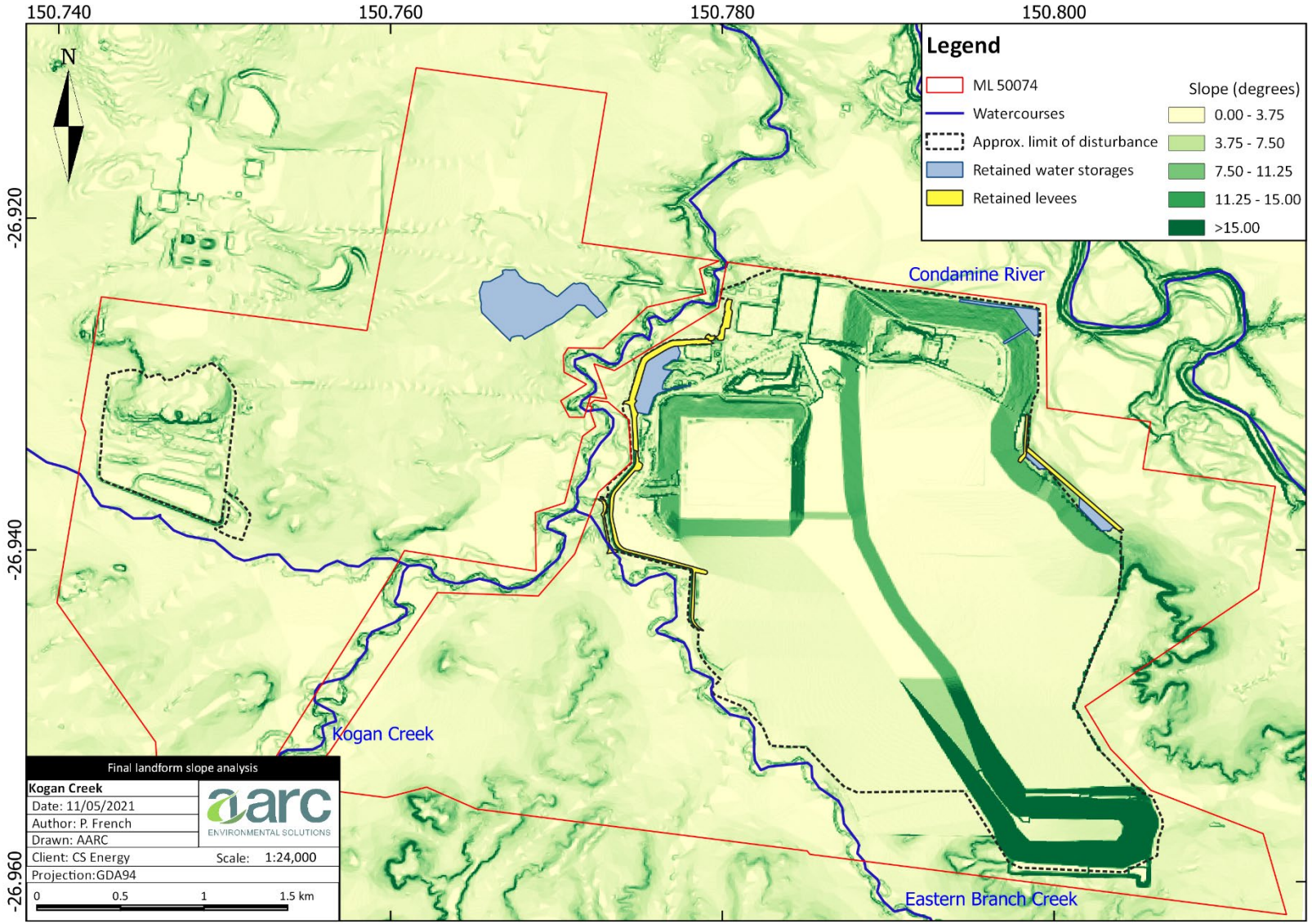

Figure 17 Final Project landform slopes

The drainage intent for the WRD is indicated in Figure 16, however, at this stage, this is indicative only and subject to change if the mine plan changes. The following drainage principles have been adopted:

- The IADA, IPAC and OPAC top surface landforms will be crowned to ensure a free draining surface. The design of these structures includes an engineered drainage system utilising spillways to convey run-off safely to ground level.
- The main western plateau area of the WRD will be largely free draining but will incorporate some localised internally draining dams to act as stock watering points. Any stock dams constructed on rehabilitation will be wholly excavated structures at natural low points in the landscape. Run-off from the majority of the western plateau landform area will be directed to the west where graded slopes will be created that are sufficiently low to safely convey run-off to ground level while minimising the risk of erosion.
- Given that maximum lengths of slopes above 2° are generally limited to about 150-160 m (other than for the OPAC and IPACs), it is expected that the use of graded banks to reduce slope lengths can be minimised. For the steeper 'batter' slopes shown, graded banks may be utilised to ensure that slope lengths are maintained at less than 100m, which is considered acceptable to provide an erosionally stable landform.
- Sedimentation basins will be utilised to ensure downstream water quality impacts are mitigated until such time as WRD areas have been adequately revegetated.

The proposed PMLU for the waste rock dump area is a light grazing land use with the exception of a small buffer around the southern highwall perimeter of the final void which will be a fauna habitat PMLU to maintain connectivity between the final void PMLU and bordering remnant vegetation to the south.

3.5.9.2 Waste rock dump geotechnical stability

As indicated at Table 12, the steepest slopes occurring within the design landform are associated with the OPAC and IPAC engineered cell batters. In 2010, Golder undertook a geotechnical assessment of the OPAC (Golder 2010), assessing a range of scenarios including a long-term scenario with a maintained intact liner, a long-term scenario with a leaking liner, and a seismic loading case assuming an earthquake having a peak ground acceleration of 0.07 g. For the outer OPAC batter, minimum Factors of Safety were determined and ranged from 3.0 to 1.6; in all cases above the required factor of safety for this structure.

There is not considered to be any scenario where the IPAC cell batters or the remainder of the waste rock dump will result in materials or slopes that will result in a factor of safety less than that already assessed for the OPAC.

3.5.9.3 Mine spoil geochemistry

Geochemical assessments of overburden materials from the Project site were carried out by Ison in 1992, and then by RGS Environmental (RGS) in 2015, 2017 and 2019; in total assessing well over 330 spoil samples. The outcomes of these assessments and experience from mining to date indicate that the overburden material is sodic and alkaline and displays no tendency for acid generation. The material is characterised by a low sulphur content and high inherent acid neutralising capacity. Overburden material samples were found to be non-toxic but not generally suitable for use as subsoil without calcium amendment.

The most recent geochemical and physical study of mine spoil at the Project site was undertaken by RGS (2019), and is attached as Appendix G. A total of 117 samples were collected from 31 drill holes within the area proposed to be disturbed over the remaining life of the mine. The lithological types represented included soil, mudstone, sandstone and siltstone. A range of static geochemical and physical tests was performed on the samples. The results of geochemical testing are summarised in the following subsections.

Acid Base Accounting

Acid base accounting (ABA) has been undertaken for each of the RGS assessments by screening samples for pH, EC, total sulphur, net acid producing potential (NAPP) and acid neutralising capacity (ANC). ABA assessments undertaken for the site have uniformly indicated that the spoil materials are non-acid forming (NAF).

For the 117 samples used for the 2019 assessment, $pH_{(1:5)}$ ranged from 4.4 to 10.1 with a median value of 8.8 pH units. Overburden materials classified as soils, mudstone and sandstone covered a wide pH range although predominantly alkaline; while the siltstone material exhibited a narrower, alkaline range (7.8 to 9.6 pH units). Other than lithology, there is no other correlation between pH and sample location, depth or type.

The $EC_{(1:5)}$ of the samples ranged from 62 to 1,650 µS/cm, with a relatively low median value of 285 µS/cm. A total of 108 of the 117 samples (92%) tested had an EC value less than 600 µS/cm with a single outlier mudstone sample returning a value of 1,650 µS/cm. There appeared to be no correlation between EC and sample lithology, location, depth or type.

Based on the median pH and EC values, the majority of samples tested were classified as having 'high' soil pH and 'low' salinity values against criteria defined by the *Technical Guidelines for the environmental management of exploration and mining in Queensland* (DME 1995). The exception to this finding was the soil material, which was classified as having a low to neutral soil pH.

The total sulphur content of the 2019 assessment samples ranged from below the laboratory limit of detection (less than 0.01%S) to 0.57%S and was considered to be low. The median sample value was 0.03%S, which can be compared to the median crustal abundance value of 0.07%S in 52 unmineralised soils (Bowen 1979; INAP 2009). Materials containing less than 0.1%S are generally considered to be barren of sulphur, as they represent the background concentration in soils, and have negligible capacity to generate acidity.

The 13 samples that reported a total sulphur content greater than 0.1%S were further analysed for sulphide as chromium reducible sulphur. The test results showed a sulphide content ranging from 0.01 to 0.21%S. The results indicated that, on average, less than half of the sulphur content was present as sulphide sulphur (e.g. pyrite) confirming that the materials represented by these samples have a low potential to generate acidity.

The maximum potential acidity (MPA) for the samples ranged from 0.2 to 6.5 kg H_2SO_4/t; considered to be low with a median value of 0.9 kg H_2SO_4/t. The ANC for the samples ranged from 0.25 to 150.0 kg H_2SO_4/t with a median value of 10.5 kg H_2SO_4/t (i.e. an order of magnitude greater than the median MPA).

The NAPP is the capacity of a sample to generate acidity (MPA) minus its capacity to neutralise acidity (ANC). NAPP values for the 2019 assessment ranged from -149.1 to +0.4 kg H_2SO_4/t, with a negative median value of -8.7 kg H_2SO_4/t. The NAPP data is presented in Figure 18. Given the low sulphide content of the materials tested and the negative NAPP values, the risk of generating acidity from these materials was considered to be low.

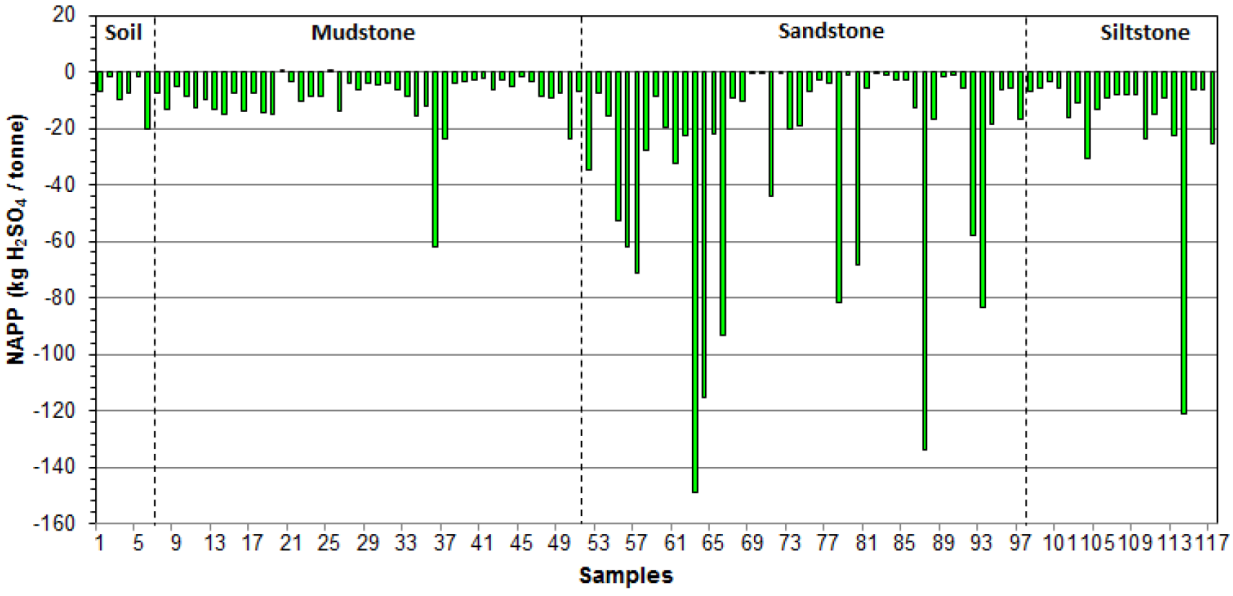

Figure 18 *NAPP results for spoil of the Project (RGS 2019)*

The ANC:MPA ratio of the 2019 assessment samples ranged from 0.4 to 189.4, with a median value of 11.2. Figure 19 shows a plot of the ANC versus MPA values for the samples. Generally, those samples with an ANC:MPA ratio of greater than 2 and a sulphide content of ≤ 0.1% S are considered to represent material with a low to negligible risk of acid generation and a high factor of safety in terms of potential for acid and metalliferous drainage (AMD) (CoA 2016; INAP 2009). With reference to Figure 19, all of the spoil samples are defined as being of either negligible or low risk and therefore have a very low risk of acid generation.

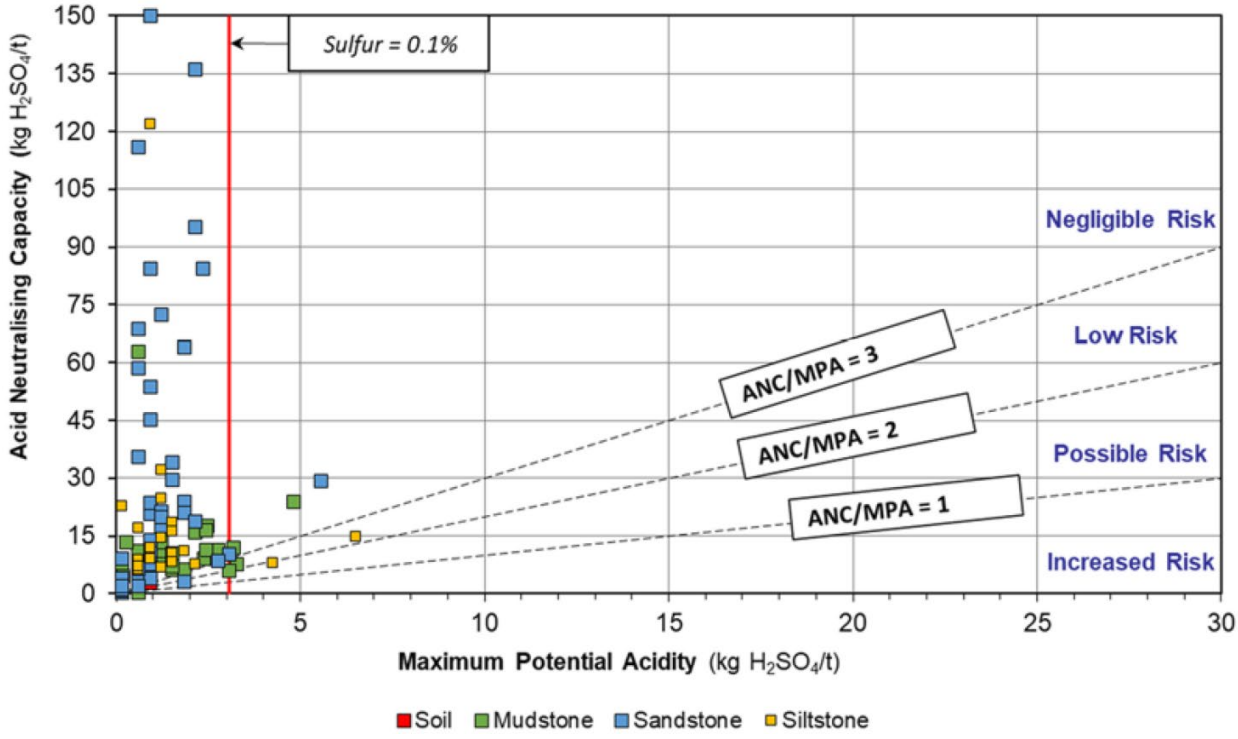

Figure 19 *ANC vs MPA of spoil for the Project (RGS 2019)*

The RGS (2019) study used the classification criteria summarised in Table 13 for the geochemical classification of tested samples. The classification criteria reflect Australian and international guidelines (CoA 2016; INAP 2009) for the classification of mine waste materials.

Table 13 *Geochemical classification criteria (RGS 2019)*

Geochemical classification	**Total sulphur[1] (%)**	**NAPP**	**ANC:MPA Ratio**	**No. samples (n = 117)**
Non-Acid Forming (Barren)[2]	≤ 0.1	-	-	112
Non-Acid Forming	≤ 0.1	≤ -5	≥ 2	4
Uncertain	≤ 0.1	> -5 and ≤ 5	≥ 2	1
Potentially Acid Forming	> 0.1	> 5	< 2	0

Notes: 1. If total sulphur is less than or equal to 0.1%S, the NAPP and ANC:MPA ratio are not required for material classification as the sample is essentially barren of oxidisable sulphur.
2. A sample classified as NAF can be further described as 'barren' if the total sulphur and/or sulphide sulphur content is less than or equal to 0.1%S, as the sample essentially has negligible acid generating capacity.

Based on these criteria, 116 of the 117 spoil samples (over 99%) were classified as NAF with one sample classified as Uncertain. No samples were classified as PAF.

Multi-element concentration in solids

For the RGS 2019 assessment, multi-element assays were carried out on ten composite spoil samples, representing the three main lithological types present, to identify any elements (metals/metalloids) present in these materials at concentrations that may be of environmental concern with respect to revegetation and surface water/groundwater quality. The total metals/metalloids concentration for individual elements in these materials can be relevant for revegetation activities and/or where the potential exists for human contact (e.g., if the material was to be used off-site).

Compositing of samples is used to provide a cost-effective means of identifying any elements of concern requiring further testing to be carried out. For the ten composite samples, all major, minor and trace elements tested for the samples returned values substantially below those listed in the *Guideline on investigation levels for soil and groundwater – Health Based Investigation Levels for public open spaces*, recreational land use (NEPC 2013). As a result, no further investigation was undertaken.

Geochemical abundance index

RGS (2019) compared total metal/metalloid concentrations in mining waste materials to the median crustal abundance for 54 non-mineralised soils (Bowen 1979; CoA 2016; INAP 2009). The extent of enrichment was reported as the geochemical abundance index (GAI), which relates the actual concentration in a sample with the median (or average) crustal abundance on a $\log_{10}$ scale.

The GAI results indicated that of the metals/metalloids measured, none of the major elements were significantly enriched compared to median crustal abundance.

Water static test

The results of multi-element testing of water extracts (1:5 solid:water) from the same ten composite spoil samples (RGS 2019) can be summarised as follows:

- The pH of the water extracts ranged from pH 6.7 to 9.8 (median 9.1) and was therefore considered to be neutral to alkaline. The alkalinity value in the water extract samples was dominated by bicarbonate and exceeded any acidity value, such that the net alkalinity value was strongly positive.
- The EC in the water extracts was typically low, ranging from 136 to 692 µS/cm (median 365 µS/cm). As such, these materials exhibited low salinity and were likely to have relatively low concentrations of dissolved solids when in contact with water.
- The concentrations for calcium, magnesium and potassium were generally below the laboratory limit of reporting, however, the concentrations of sodium, chloride and sulphate were higher, with median values of 82 mg/L, 33 mg/L and 33 mg/L, respectively. The highest major ion concentrations were well below the water quality guidelines for livestock drinking water (ANZECC and ARMCANZ 2000), where applicable.
- The concentration of dissolved trace metals/metalloids tested in water extracts was mostly at or below the laboratory limit of reporting for most samples. The exceptions were aluminium (six samples), arsenic (three samples), copper (two samples) and nickel (one sample) which were greater than guideline levels for freshwater aquatic ecosystems, but well within guideline trigger levels for livestock drinking water (ANZECC and ARMCANZ 2000).
- It is possible that a colloidal effect may have contributed to the elevated dissolved concentrations (e.g., aluminium) in the water extracts.
- The particle size distribution test results suggested that all of the samples contained at least a small amount of very fine material (clay fraction or below), which may have transported some metal/metalloid bearing materials through the sample filtration stage.

Overall, the results indicated that the dissolved metal/metalloid concentrations in initial surface run-off and seepage from the materials represented by the spoil samples would be unlikely to significantly impact upon the quality of surface and groundwater resources.

In summary, the RGS (2019) geochemical assessment confirmed previous geochemistry assessments and indicated that the spoil materials at the Project are NAF and have a high factor of safety with respect to potential for AMD, neutral mine drainage and/or saline drainage. The spoil materials also contain low concentrations of total and leachable metals/metalloids.

As the mine waste material characteristics are relatively benign, no selective handling of the mine overburden or partings is undertaken or planned.

3.5.10 Ash cells

As described at section 3.1.1.3, the Kogan Creek Power Station produces ash as a by-product from the coal combustion process. While ash transport, placement, cover and rehabilitation activities are not subject to the PRCP provisions of the EP Act, being regulated by the waste disposal EA, these activities are integral to mine planning and operation and therefore to the progression of rehabilitation activities. The following sub-sections relating to ash cell rehabilitation are provided for information purposes.

3.5.10.1 Initial ash disposal area

During the initial stages of power station operation ash was disposed of within the IADA located approximately 1.5 km to the south of the power station but within the Project ML. The IADA was utilised for a period of three years from 2007 to 2009 as a short-term disposal method until the OPAC was constructed. The IADA has been partially rehabilitated (refer section 3.1.2), however, as the IADA is being retained as a contingency ash disposal area, it is therefore not planned for final rehabilitation until closure of the power station. The IADA in its present state constitutes a bunded containment structure rising approximately 10 m above natural ground level and occupying an area of approximately 68 ha.

Engineering design details for the IADA are included in the Ash Disposal Management Plan (Ison 2006). Relevant features of the IADA design include:

- ash toe containment bunds;
- drainage directing surface water around active cells to a water/leachate collection dam at the southern end of the cell;
- external bunds to direct clean water away from cells; and
- an overflow channel.

3.5.10.2 Out-of-pit ash cell and in-pit ash cell structures

During the early stages of mining, overburden was placed in an out-of-pit spoil dump to the north-east of the mining operations, to form the base and walls for construction of an out-of-pit ash cell – referred to as the OPAC. From approximately 2020 on, ash disposal will occur by deposition in staged cells in designated areas of the mined-out pit. These in-pit ash cells, or IPACs, will be developed on a scheduled basis, with ash disposal occurring concurrently with mining activities.

The design concept for the OPAC and IPACs is to place ash into a facility that is encapsulated in low permeability mine spoil. The OPAC and IPAC facilities are engineered structures subject to RPEQ design and surveillance requirements. Design criteria have been specified to minimise seepage or percolation of ash leachate and the design incorporates a 1.5 mm thick linear low-density polyethylene (LLDPE) liner placed over the mine waste floor and extending part-way up the internal embankment batters. The construction method utilises existing mining equipment to place the construction materials with additional watering and compaction utilised as required. A staged approach to the construction of the ash cells has been adopted.

3.5.10.3 Ash geochemistry

The ash placed into the ash disposal cells is a mixture of fly ash, bottom ash and mill rejects and has a fine silty texture. It typically retains approximately 22% to 25% moisture and upon deposition consolidates to a very firm consistency within a short period of time - typically days.

A study to assess the composition of leachate generated from ash was carried out by AGE Consultants (AGEC 1999). The study analysed the leachate properties of the ash using the TCLP test procedure. The results indicated that the ash leachate from the M, N and O seams of the Walloon Coal Measures is highly alkaline (pH 11.5 to 12 pH units) and characterised by high concentrations of calcium and sulphate with elevated levels of boron, aluminium, chromium, molybdenum and nickel. Salinity is high (2,800 to 7,360 µS/cm) but well within the typical range of the Walloon Coal Measures. Comparison of the ash leachate analyses to the National Environment Protection Council (NEPC) (2013) and ANZECC and ARMCANZ (2000) guidelines show that only aluminium and molybdenum concentrations, and pH in the leachate would exceed the water quality guidelines for livestock. The physical properties of the ash are detailed in Table 14.

A geochemical study on the ash materials was carried out by RGS (2015). Ash samples were obtained from within the IADA and the OPAC. The results concluded that the ash is geochemically classified as NAF-Barren and is also likely to be acid consuming. Kinetic leach column test results confirmed the results from the earlier study (AGEC 1999). The test results suggested that the contact water contains metals/metalloids such as boron, fluoride, molybdenum and selenium which are potentially mobile under alkaline conditions, and can have elevated concentrations in contact water compared to applied livestock drinking water guideline criteria (ANZECC and ARCANZ 2000).

Surface and groundwater monitoring programs are in place at the Project to ensure any unexpected water quality due to ash and spoil geochemistry is detected. Analyses of elements such as aluminium, arsenic, boron, fluorine, chromium, molybdenum and vanadium have been included in the surface and groundwater monitoring programs (CS Energy 2019).

3.5.10.4 Ash disposal hydrogeology

An impact assessment of ash disposal on the groundwater regime was carried out by AGEC (1999). The hydrogeological review of the aquifer systems concluded that the aquifers which may be impacted by the Project generally and ash disposal specifically are the Walloon Coal Measure aquifers, the Springbok Sandstone and the alluvial aquifers. These aquifer systems are described in more detail in Section 3.1.6.

The study concluded that given the described approach to ash disposal and ash leachate geochemistry, negligible impact on the hydrogeological regime of the area or on other groundwater users is expected. Groundwater monitoring is undertaken to ensure leachate migration is detected so that remedial action can be taken to prevent any ongoing contamination. A groundwater monitoring network has been established and most recently reviewed in 2019 (Environmental Management Strategies 2019).

Table 14 Physical properties of power station ash

Physical parameters	Property	Physical property relevance
Density	1.15 t/m^3 +/- 15%	Affects storage volume. Varies according to state of ash (hardpan, compacted, trafficked or loose).
Moisture state (gravimetric) mass of water/mass of solids	Ash slurry ~ 30–35% Deposited ash ~ 22-25%.	Run-off evaporation and infiltration moisture loss of approximately 10% during deposition. Higher moisture state increases hydraulic conductivity.
Rainfall infiltration	10-70% of annual rainfall	Increases ash moisture state, possible seepage from toe of ash deposited. Run-off captured.
Electrical conductivity	2,800 – 7,400 µS/cm as a function of moisture / depth	Indication of salinity. Dominant cation is Ca. A likely high EC (> 5000 µS/cm) at the surface may impact on rehabilitation. Capping reduces this effect.
Particle size distribution	Ash is predominately non-plastic silt-sized material with some sand and clay sized particles	Affects coning and radius of distribution i.e. stacking.
Saturated hydraulic conductivity	10^{-7} to 10^{-9} m/sec.*	Quantifies the rate of movement of leachate or infiltration through the ash profile.
Porosity	High	High number of pores increases water holding capacity. With increased depth, greater ability to store infiltration above natural ground/lining.
TCLP (leachate test)	11-12 pH units. Highly alkaline with high concentrations of Ca^{2+} and SO_4^{2-}	Ability to neutralise any acid generating material. Possible increased levels of some metals such as aluminium in leachate.

* Depends if *in situ* test or laboratory test

The OPAC and IPACs 1 and 2 comprise 'turkey's nest' type structures. The OPAC final landform external batters to the north, east and west are constructed of mine spoil to a 6(h):1(v) or 9.5° slope and a final upper crest width of 50 m. The southern external wall of the OPAC will eventually form an internal ash containment wall when the IPAC 3 and 4 cells are constructed immediately adjacent and to the south and extending into the mine footprint. Ash is transported from the power station to the ash cells *via* an ash pipeline.

The waste disposal EA, which is relevant to the ash cells, requires an annual surveillance inspection of the ash cells to be undertaken and submitted to the administering authority. The waste disposal EA also requires the design storage allowance and mandatory reporting level for the ash cells to be determined. Geotechnical assessments of the stability of the structures are undertaken annually or as required.

The proposed closure strategy for the OPAC and IPAC cells involves progressively capping the deposited ash, as each ash cell is completed. The current design of the cap for the OPAC constitutes a minimum 2.8 m thick capping layer of overburden and 0.2 m topsoil layer. A surface water drainage system will be constructed on the surface of the facilities to direct water off the capped surface in a controlled manner; during the operational period down available access ramps, but at final closure via engineered spillways.

Key OPAC design criteria are presented in Table 15.

Table 15 Ash cell design criteria

Parameter	Out-of-Pit Ash Cell	In-Pit Ash Cells
Approximate projected footprint area – excluding associated walls and batters (ha)	26 ha	40 ha (IPAC 1 and 2) 63 ha (IPAC 3 and 4)
Approximate maximum final elevation (m AHD)	350	340
Nominal wall thickness (m)	50	50
Minimum buffer thickness against pit wall (m)	Not applicable	30
Minimum thickness of lining material on floor and sides (m)	0.6 - 3.0	0.6 – 3.0
Total thickness of capping on top of ash (m)	3	3
Permeability of lining material (m/sec)	10^{-9} to 10^{-8}	10^{-9} to 10^{-8}

* This is approximate only as there is no clear delineation between the IPAC3 and IPAC 4 batters and the in-pit waste rock dump.

The proposed PMLU for the ash containment structures is 'light grazing and fauna habitat'. It is likely that revegetation species will be limited to native and improved pasture grasses with grazing activities being used as a management tool to maintain a viable grass cover, particularly on the batter slopes of the structures. While the capping layer is relatively thick at a total of 3.0 m, upper storey woodland species will not be actively introduced. Self-sown, upper storey individuals will be closely monitored to ensure that any detrimental impact to the capping layer is identified and managed.

3.5.11 Water management infrastructure

3.5.11.1 Water storages

The Project operates a water management system based on the separation of 'clean water' catchments from 'dirty water' catchments. Rainfall run-off from disturbed areas and which is expected to contain sediment and dissolved solids is captured by sedimentation dams. Mine affected waters are captured in designated storages and reused within the mine.

Key parameters of the water storages that comprise the water management system are detailed in Table 16 including their expected fate post-closure. Water management infrastructure have been split into two rehabilitation areas being infrastructure that is retained as water storage and fauna habitat (including the diversion) and water management infrastructure that is rehabilitated to light grazing (including the levees). Water storage locations are shown at Figure 20. Note that the Southern Stormwater Dam is a component of the Kogan Creek Power Station water management infrastructure and not subject to the requirements of this PRCP.

The management of surface water and drainage is a key consideration in achieving a sustainable rehabilitation outcome. The in-principle drainage approach for the final landform, as well as water infrastructure retained post-closure is depicted in Figure 16 and at Table 16.

3.5.11.2 Levees

The Project is currently protected from the ingress of flood waters by the existence of four engineered earthen flood prevention levees which have been constructed to the east, north and west of the mining operation. The levees are referred to as the EBC levee, the EBC levee southern extension, the Haul Road levee to the north and west of the Project, and the Condamine levee in the east. There is a current proposal to extend the Condamine levee further to the south.

Modifications to the EBC levee and the Condamine River levee have been undertaken to comply with the updated requirement for levees to provide flood immunity for the 0.1% AEP event. A 0.3 m freeboard provision was also included to account for flood model calibration ground level survey contingencies. The levees, with the exception of the redundant EBC levee are regulated structures under the EP Act (WRM 2017).

The levees were proposed in the EMOS for the Project (Ison 2004) to be retained as permanent structures after decommissioning of the mine (refer Appendix G). As such, current planning has the levees being retained as part of the final landform. At closure, the levees will not be required to protect the final landform from flood water ingress (refer section 3.5.12.2) and will therefore cease to be regulated structures. If the cross-sectional profile of the levee becomes an impediment to the operation of the grazing PMLU, works will be undertaken to reprofile the levee in whole or in part.

3.5.11.3 Eastern Branch Creek Diversion Channel

A relatively short (approximately 360 m) diversion of Eastern Branch Creek to the west of the operational mine area was approved, constructed and licensed as part of the development of the Project. This diversion will be retained as a permanent structure after decommissioning of the mine, and will continue to operate as it currently does and with its current design and profile.

Table 16 Project water storages

Water storage	Volume (ML)	Description	Regulated structure?	Retained post-closure
North ROM Pond	4.8	ROM hopper area drainage (pumps to Dam 1)	No	No
Dam 1 (ROM Pond)	86.5	ROM drainage – discharge point to Kogan Creek	Yes – 'significant' rating for both 'failure to contain – overtopping' and 'dam break' failure modes	No
Dam 2	89	Western batter of OPAC and MIA drainage, eastern edge of ROM pad and haul roads	No	No
Dam 8	176.8	A spillway releasing direct to Kogan Creek. Receives water from the levee banks, the IPAC north and west embankments, topsoil stockpiles, the go-line mining area surrounds. All storage dams can be transferred to this dam. Authorised release point to Kogan Creek	No	Yes
Test Pit	464	Pit dewatering, water truck fill point	No	No
Dam 4, 5 and 6	181	Southern batter of OPAC drainage and pit dewatering. Temporary natural surface run-off collection.	No	No
Proposed Sediment Dam (SD) 1 (2027)	TBD	Planned for construction prior to 2027	No	Yes
Proposed Sediment Dam (SD) 2 (2027)	TBD	Planned for construction prior to 2027	No	Yes
IADA Lower Pond	325	Collection of runoff from IADA catchment area	No	No
OPAC Sediment Dam (OPAC SD)	4	Sediment dam servicing OPAC catchment area	No	Yes

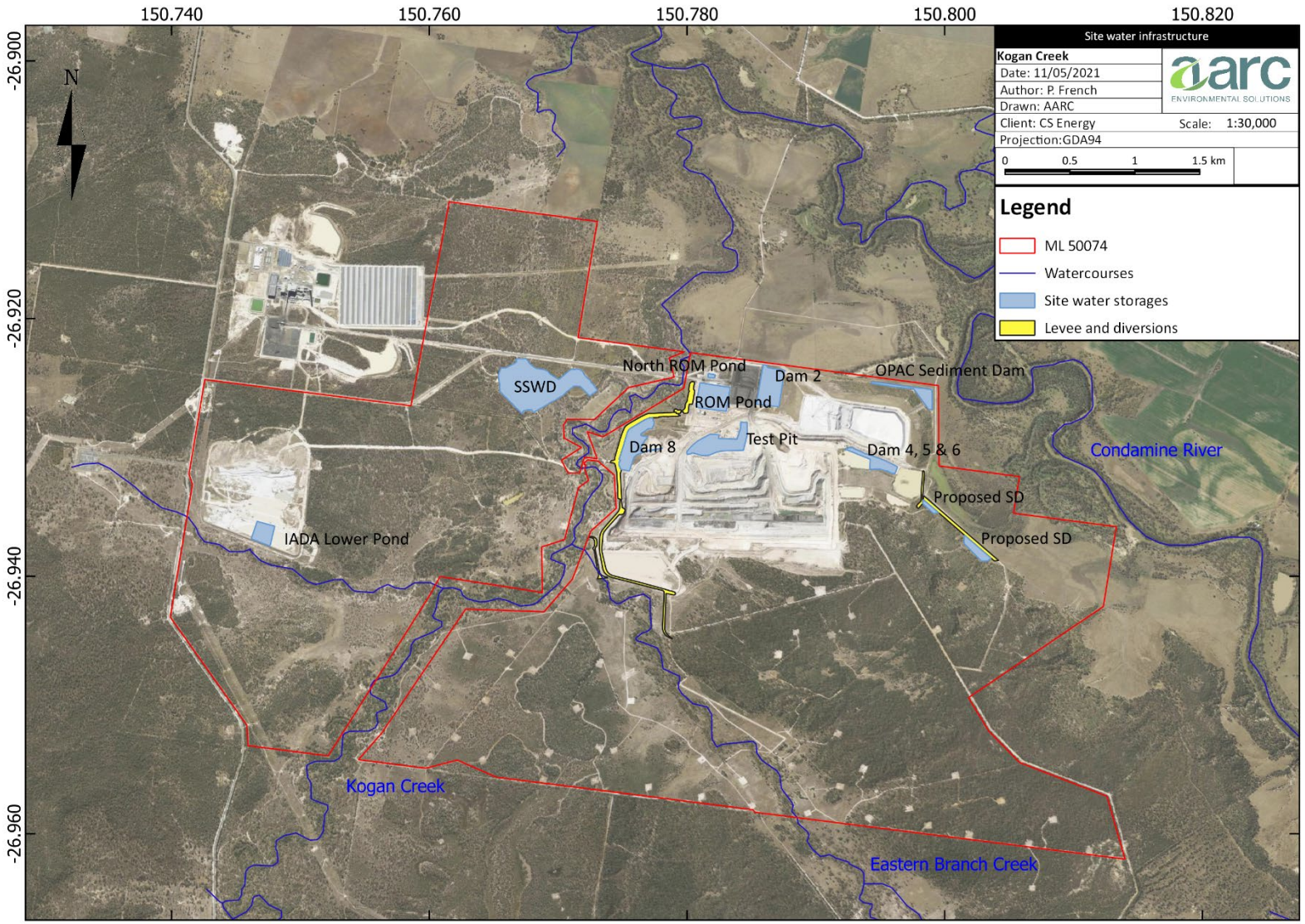

Figure 20 Location of key water management infrastructure

3.5.12 Final void

3.5.12.1 Final void landform design

Table 8 of the resource activity EA (refer Table 7) identifies that a final void will remain following mining having a projected disturbance area of 100 ha. A review of the life-of-mine plan was undertaken in 2020 and has resulted in a final void with a reduced footprint area of approximately 75 ha by maximising the opportunity to backfill the active mining area as mining draws to a close, and thereby minimising the areal extent of the final void. Figure 16 indicates the approximate location and configuration of the final void.

The updated final void design incorporates regraded void low wall slopes of approximately 24°, and highwall slopes to the same angle. While the final highwall slopes will ultimately depend on the geology intercepted, the updated final void design slopes are significantly less than allowed for by the resource activity EA criteria to reduce the risks identified with respect to revegetating and stabilising these slopes. The final access ramp to the mine workings will be retained as part of the final void and will enable safe access to enable rehabilitation works and to undertake monitoring as required. The floor of the void will be backfilled with approximately 20 m of fill to cover exposed coal seams. A geotechnical assessment will be undertaken to confirm the long term geotechnical stability of all slopes associated with the final void. A specific factor of safety criterion is not nominated as this will be a matter for geotechnical engineering judgement at the time of undertaking the assessment. The geotechnical stability criteria is therefore expressed as a geotechnical assessment that determines that long term geotechnical stability has been achieved. Table 17 outlines key void design criteria.

Table 17 Key final void design criteria

Parameter	Value
Projected area (ha)	84
Retained access ramp gradient	Maximum of 6° (10%)
Highwall angle maximum (as per resource activity EA for competent rock)	Design slope of 24° but a maximum of 70° allowable
Highwall angle maximum (as per resource activity EA for weathered material)	Design slope of 24° but a maximum of 45° allowable
Design low wall angle (including low wall faces to access ramp)	Maximum of 24°
Approximate void floor RL (m AHD)	280

3.5.12.2 Final void hydrology

It is proposed to fill the final void such that the lowest point of the final void floor will be at approximately 280 m AHD. The nearest monitored groundwater bore is MB31 located to the west of the final void approximately 550 m from its westernmost edge. MB31 accesses the Walloon Coal Measures and reports water levels of approximately 286 m AHD which are noted to be generally consistent with regional standing water elevations from aquifers in the Walloon Subgroup (Environmental Management Strategies 2019). Depressurisation of the Walloon Coal Measures as a consequence of mining activity, and the presence of the void itself is anticipated to lower the standing water level in the vicinity of the void to the level of the void floor itself. This scenario is also supported by the absence of any groundwater ingress to the active pit, however, it may be the case that an intermittent water storage results at the base of the final void.

A void water balance model has been developed to assess the behaviour of the void under various rainfall conditions (See Built Earth 2020). The proposed landform results in a void with a catchment surface area of 84 ha and, with no drainage modifications, a potential catchment reporting to the void of an additional 147 ha. While model scenarios have been run with and without the surrounding catchment, it is currently proposed that localised reshaping and/or bunding of the void crest will occur such that none of the surrounding catchment area will report to the final void. The model developed operates by applying the available 120-year rainfall record as a daily time step and determining rainfall run-off using an initial loss and run-off coefficient suitable for the soils and landscape. Any water volume which is water balance positive is stored within the pit as a volume with a surface area based on the storage curve of the void. Evaporation is determined as a loss to the system. The balance executes as a running storage to show changes in water storage. Three starting storage scenarios were run assuming the void was either dry (low storage), at mid-storage, or at full storage level at commencement. The model was run assuming the base of the pit being the floor of the coal seam without 20 m backfill, that is, a floor at approximately 260 mAHD.

For all scenarios, the water balance stabilises and reaches a steady-state at about 265 mAHD, with a seasonal variation typically plus or minus less than 5 m, refer Figure 21. Backfilling to 280 mAHD, is anticipated to result in a dry void within 7-35 years depending on the starting assumptions used by the model. It is likely that occasional ponding will occur for limited periods depending on seasonal climate sequences. When ponding does occur, from available groundwater monitoring data and the surface water quality assessment at section 3.1.7, the pH of any retained water is expected to be neutral to slightly alkaline with moderate salinity in the range of 1,000 mg/L to 5,000 mg/L TDS.

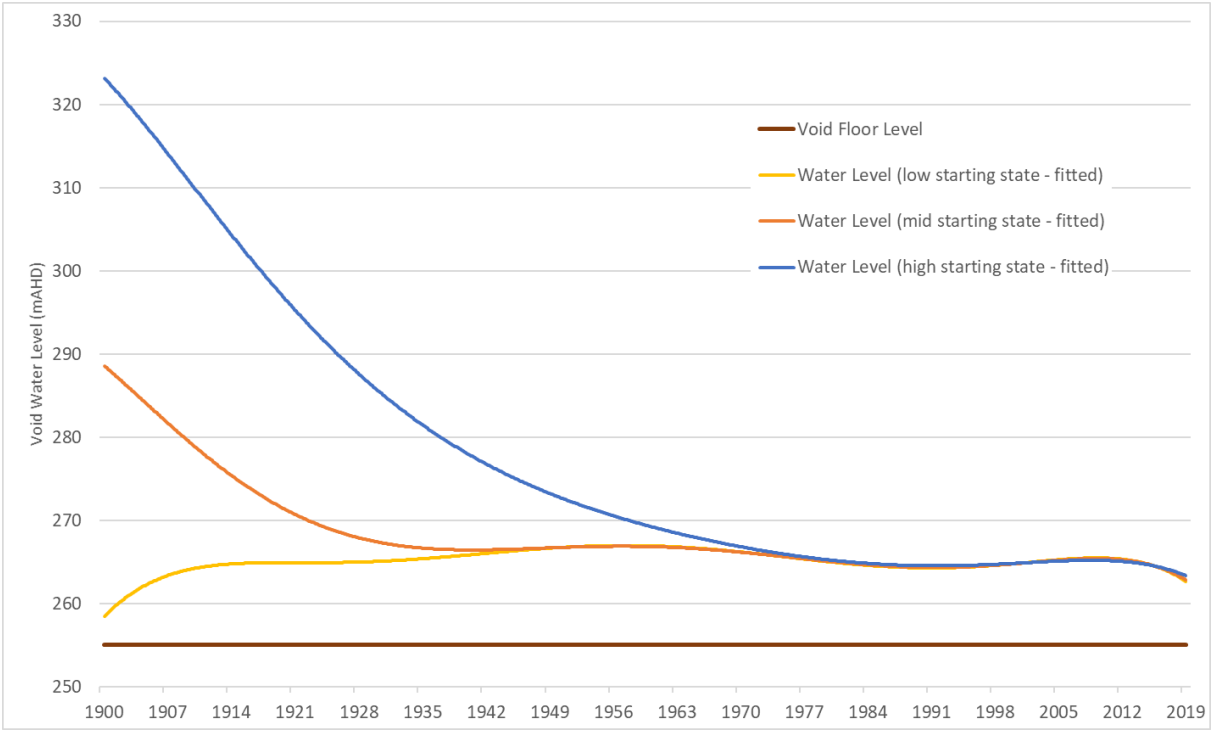

Figure 21 *Modelled void water levels (note: lines of best fit are presented)*

From a flood inundation perspective, the lowest point of ingress for the void exists at 320m AHD at the northern end of the access ramp. This point is 6m above the predicted peak surface water elevation for a 0.1% AEP design event (WRM 2017), indicating that no risk of flood inundation of the final void exists.

3.5.12.3 Final void post-mining land use

The proposed PMLU for the final void is 'fauna habitat'. The 2020 life-of-mine plan review has modified the final void both to reduce the overall size of the void, as well as to introduce low wall and highwall slopes better suited to achievement of this PMLU. Regardless of these modifications, the final void is not considered to be suited to a 'light grazing' PMLU and the rehabilitation focus will be on creating a fauna habitat PMLU aligned with the local woodland remnant vegetation present locally and adjacent to the final void. Appropriate seed species will be included in direct seeding programs and if deemed necessary, tube stock plantings will be undertaken. Additional details on rehabilitation methods to be employed are provided at section 3.5.15.

It should be noted that the current resource activity EA includes a condition (F5) which requires the submission of an investigation into the final void not less than five years prior to the end of mining. This investigation is to include a final landform design, and management of human and animal safety.

3.5.13 Built infrastructure

Apart from the water management structures discussed at section 3.5.11, built infrastructure established and utilised for the development and operation of the Project includes:

- a ROM hopper, primary and secondary crushers and a conveyor used to transport coal to the Kogan Creek Power Station;
- access roads, haul roads and various service roads;
- workshops, fuel storage, laydown yards and various equipment storages; and
- relocatable offices, power generators, communications infrastructure, potable water tanks and other miscellaneous infrastructure.

At the end of Project life, all remaining mine infrastructure will be removed unless there is a specific request for the infrastructure to remain by the subsequent land user, and an agreement established to transfer any liability associated with the infrastructure.

A phase 1 land contamination investigation will be undertaken by a suitably qualified person and any identified contaminated material incompatible with the proposed PMLU will be either treated *in situ* or on-site, confined by burial, or removed and transported to an approved landfill for disposal.

Infrastructure decommissioning and disposal has been nominated as a rehabilitation milestone and will be completed for each rehabilitation area in accordance with the progressive rehabilitation schedule.

Temporary roads will be ripped and revegetated when they are no longer required, as will roads not required post-closure.

3.5.14 Rehabilitation milestone activities applicable to waste rock dump rehabilitation

3.5.14.1 RM3: Landform development (reshaping and reprofiling)

To date, all rehabilitation works have been associated with structures having a strict engineering design as required for the ash deposition structures. Within the next ten years, areas of more-typical, in-pit overburden dumping will be completed, reshaped and become available for rehabilitation. To ensure that reshaped overburden dumps comply with the overall landform design, completion criteria for each step are required to be established and met, before the next rehabilitation activity commences. This sequence includes the following:

- **Bulk earthworks reshaping:** Site survey will be required to demonstrate that bulk earthworks reshaping has resulted in a landform that is within a tolerance of 2 m of the currently defined landform plan and that slopes and consequently drainage of the area conforms with the final landform drainage plan prior to final reprofiling and construction of drainage works; and

- **Final reprofiling and installation of drainage features including graded banks and water storage infrastructure etc.:** Site survey will be required to demonstrate that constructed drainage works conform with the current drainage plan prior to topsoiling/ growth medium application.

3.5.14.2 RM4: Surface preparation (e.g., topdressing, contour scarification, soil amelioration activities)

Prior to the spreading of topdressing materials and depending on the condition of the subject area following reshaping/reprofiling (e.g., if areas have been subject to high intensity rainfall events and erosion has occurred or been left for some time), it may be necessary to carry out further reprofiling and/or scarification works. Achieving a roughened surface is important for keying-in soil materials and assisting the soil to retain infiltrating rainfall.

Topsoil and subsoil testing across the Project site has universally confirmed that available soil resources are deficient in organic carbon and phosphorus, are generally moderately saline and are sodic to varying degrees. The levels of sodicity measured indicate that the soil resources are expected to be prone to dispersion, hard setting (potentially limiting germination success), and vulnerable to erosion - particularly tunnel erosion if slopes and drainage pathways are not properly managed.

Research work and rehabilitation trials undertaken have demonstrated that a blend of topsoil and power station bottom ash provides a topsoil having lower sodicity and salinity. Trial work undertaken suggests that the addition of composted biosolids in the form of feedlot manure, as well as the use of specific fertilisers can address fertility levels and assist in achieving acceptable germination rates. Any use of bottom ash in rehabilitation/soil amelioration must comply with the *End of Waste Code Coal - Combustion Products* (DES 2018b). Given available knowledge, the current approach to surface preparation involves:

- Identification of the topsoil resource to be utilised for a given rehabilitation area, and the carrying out composite soil sampling and agronomic laboratory analyses.
- Determination of amelioration requirements, based on agronomic analysis results, as each rehabilitation event is planned.
- Determination of whether the required ameliorants, including the use of bottom ash, would be both beneficial and in compliance with the relevant End of Waste Code.
- Procurement of an adequate volume of ameliorants which may include composted feedlot manure, gypsum, lime, or other required ameliorants.
- Preferably, and depending on the rehabilitation area slope and/or other constraints, topsoil is first spread by tipping at a predetermined spacing and then bulldozing or grading to create an evenly spread surface. Ameliorants can then be spread using a spreader and subsequently incorporated into the surface by various tillage methods.
- If the above approach cannot be used, then ameliorants are laid out sequentially in adjacent parallel rows beside topsoil windrows and mixed using either an excavator or other equipment. The pre-mixed topsoil material is then loaded and tipped on the rehabilitation area at a predetermined spacing and then bulldozed or graded to create an even thickness of topsoil material.
- The final tillage technique used should result in a rough surface with regular depressions running along the contour to capture and retain rainfall run-off on the slope.

Given the deficiency of topsoil resources on-site, topsoil stockpiles will be managed to mitigate risks associated with erosion, weed infestation and loss of the soil seedbank. A topsoil register will be maintained.

3.5.14.3 RM5: Revegetation (seeding and/or planting)

The current species being utilised for revegetation have been chosen according to a range of considerations including:

- the local climate;
- the soil conditions present;

- the requirement to establish a rapid vegetative cover (e.g., inclusion of annual or sterile cover crops having strong germination energy and able to assist in commencing the establishment of organic material cycling into the topsoil layer);
- species growth habit (e.g., stoloniferous growth habits that inhibit erosion rather than concentrate water flows); and
- being representative of native flora communities, particularly pioneer species for those communities.

As discussed at section 3.5.4, the species list developed for each rehabilitation area, as well as sowing rates will evolve over time as experience is gained from prior rehabilitation works. The species list and rate recommendations used for the most recent rehabilitation works at the IPAC are provided in Table 18. Sowing rates will be adjusted based on the quality of the seeds selected (e.g. seed purity, fill, viability and dormancy) which is to be advised by the seed collector.

Table 18 Current indicative species and rates for light grazing PMLU

Species	**Rate (kg/ha)**
Grasses	
Many-Headed Wiregrass (*Aristida caput-medusae*)	0.25
Purple Wire Grass (*Aristida ramosa*)	0.25
Curley Mitchell Grass (*Astrebla lappacea*)	1
Forest Blue Grass (*Borthiochloa bladhii*)	0.5
Pitted Blue Grass (*Bothriochloa decipiens*)	0.25
Windmill Grass (*Chloris truncata*)	0.5
Barbed Wire Grass (*Cymbopogon refractus*)	0.15
Lagoon Saltbush (*Atriplex muelleri*)	0.05
Berry Saltbush (*Atriplex semibaccata*)	0.05
Creeping Saltbush (*Einadia nutans*)	0.05
Fishweed (*Einadia trigonos*)	0.05
Small Leaf Bluebush (*Maireana microphylla*)	0.05
Legumes	
Barrel medic e.g., Parabinga, Caliph varieties (*Medicago trunculata*)	3.0
Spineless burr medic e.g., Cavalier or Scimitar varieties (*Medicago polymorpha)*)	2.0
Other medics e.g., Toreador (*Medicago spp.)*	2.0

When sourcing native seed stock, the use of local provenance native seed will be prioritised, being better adapted to the Project's edaphoclimatic conditions. Where seed for the species selected is not available, a non-endemic option may exist. Species selection will be planned sufficiently in advance to improve the ability to obtain commercial quantities.

The preferred practice for revegetation is the direct machine seeding of a multi-species seed mix which includes a sterile, annual fast-growing cover crop together with either the target pasture species mix or a mix

of native perennial grasses and other target native species. If possible, seeding will be undertaken as soon as practicable following the completion of surface preparation activities.

Where local circumstances require, for example localised steep slope, levee batters, remediation areas etc., hydromulching is an option that may be utilised for delivering seeds to revegetation areas, and which has the advantage of providing early-stage erosion mitigation.

For the native fauna habitat PMLU, tubestock planting may be utilised for plants that have limited seed availability, for slow growing species or where specific seasonal conditions are required for successful germination. For the purposes of revegetation at the Project site, tubestock planting will be considered for plantings of rushes and for some shrubs and trees. This will ensure that at least a certain percentage of deep rooting plants will be established in revegetation areas.

A list of flora species to be seeded and/or planted to facilitate the native fauna habitat PMLU will be developed based on key species and other identified species associated with the vegetation community that existed in the area prior to mine disturbance. The pre-clearing RE is 11.7.4 – *Eucalyptus decorticans* and/or *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp., *Lysicarpus angustifolius* woodland on Cainozoic lateritic duricrust. The DES Regional Ecosystem Technical Descriptions (DES 2018) provides detailed descriptions of floristic composition and structure. The species utilised will include a selection of tree, shrub and groundcover species, including the dominant species and endemic species. Rare or threatened species may also be included where the growth medium supports their establishment. Species availability will be confirmed with suppliers, and locally sourced plant material used when available and practicable. Revegetation trials of target species may be conducted to verify species suitability for the growth medium being used (i.e., use of ash and other ameliorants). The species utilised will be refined considering the outcome of revegetation trials and vegetation monitoring results.

A species list (Table 19) has been developed from the RE technical description of RE 11.7.4 (DES 2018). This list is provisional and is subject to change based on suitability and availability and as new information becomes available from rehabilitation monitoring and research. Planting density of native tubestock and/or rates of direct seeding will be determined through a vegetation survey of an area of remnant RE 11.7.4 within the Project site. The survey will be undertaken by a suitably qualified person and will verify plant density of canopy, midstory and groundcover species. Planting rates will incorporate up to an additional 50% to compensate for potential losses.

Table 19 Indicative proposed revegetation species for the native fauna ecosystem PMLU

Species	Common name
Canopy species	
Eucalyptus crebra	Narrow-leaved Red Ironbark
Corymbia trachyphloia	Bloodwood
Eucalyptus exserta	Queensland Peppermint
Eucalyptus decorticans	Gum Top Ironbark
Angophora leiocarpa	Rusty Gum
*Eucalyptus beaniana**	Bean's Ironbark
Corymbia watsoniana	Large-fruited Yellow Jacket
Callitris glaucophylla	White Cypress Pine
Mid storey species	
Alphitonia excelsa	Soap Tree
Acacia conferta	Crowded-leaf Wattle
Acacia crassa	Curracabah
Acacia julifera	Catkin Wattle
Acacia sparsiflora	Currawong
Acacia leiocalyx subsp. leiocalyx	Brisbane Black Wattle
Psydrax odorata forma subnitida	Shiny-leaved Canthium
Petalostigma pubescens	Quinine Tree
Grasses and forbs	
Dodonaea triangularis	Hop Bush
Entolasia stricta	Wiry Panic
Gahnia aspera	Cut Sedge
Dianella revoluta	Blueberry Lily

*Nature Conservation Act 2014 listed species

3.5.14.4 RM6 and RM7: Vegetation monitoring and maintenance

Following revegetation, areas will be subject to monitoring and maintenance to assess the progress of rehabilitation, identify improvements to rehabilitation methods and to demonstrate the achievement of the nominated completion criteria.

During the period after active revegetation, access to rehabilitated areas will be limited to monitoring, management and rehabilitation maintenance activities. Fencing of rehabilitated areas may be required to prevent access by fauna or livestock. Irrigation, weed control, further erosion stabilisation and control measures will be undertaken as required.

Demonstration of achievement of milestones RM6 and RM7 will be determined based on the results of the monitoring and maintenance plan outlined in Section 3.7 and the criteria specified in Table 8.

3.5.15 Rehabilitation milestone activities applicable to the final void

As per Table 10, rehabilitation milestones RM3, RM4, RM5, RM6 and RM7 are relevant to rehabilitation of the final void. Descriptions for these milestones are provided at section 3.5.14. The following subsections relate specifically to aspects of the final void.

3.5.15.1 RM4: Surface preparation (e.g., topdressing, contour scarification, soil amelioration activities)

Many of the general principles outlined at section 3.5.14.2 in relation to RM4 activities are applicable to the final void, particularly with respect to soil resources. While the target design slopes of the final void are relatively moderate at about 24°, they create additional challenges with respect to landform profiling and surface preparation operations. Regardless, the principles of achieving a stable surface, with sufficient roughness to assist in mitigating erosion, and able to support germination of sown seed will still apply.

For the final void, it is likely that different methodologies will need to be investigated and utilised to apply and integrate soil ameliorants, undertake surface preparation and sow the appropriate seed selection. This is likely to include dozer mounted equipment and/or the use of more intensive rehabilitation methods such as hydromulching.

3.5.16 Rehabilitation milestone activities applicable to mining infrastructure areas

As per Table 10, rehabilitation milestones RM1, RM2, RM4, RM5, RM6 and RM7 are relevant to the rehabilitation of mining infrastructure areas. Descriptions for these milestones are provided at section 3.5.14. The following subsections relate specifically to aspects of mining infrastructure areas.

3.5.16.1 RM1: Infrastructure decommissioning and disposal

Following the cessation of mining, the following activities will occur:

- Relocatable buildings, structures and equipment will be disposed of either by private sale, auction or as scrap. It is likely that limited office, ablutions and storage infrastructure will remain until rehabilitation works have been completed and until such time as ongoing monitoring works no longer require any site infrastructure.
- Contracts will be let for the dismantling and disposal of fixed equipment and buildings, including buried pipelines, pumps etc.
- The only existing services to be disconnected are communication services which will remain until such point they are no longer required, at which time termination at the site access point will occur.

Once all buildings and infrastructure have been removed, activities under rehabilitation milestone RM2 will commence.

3.5.16.2 RM2: Determination of contaminated land status

To meet the requirements of milestone RM2, a contaminated land investigation will be undertaken by a suitably qualified person and certified by an approved auditor. The contaminated land investigation will include a site investigation report, validation report and, if required a draft site management plan. Areas investigated will include any location identified as being subject to a notifiable activity or having potential to have held hazardous materials.

Subsequent activities for this milestone will be contingent on the findings of the contaminated land investigation.

3.5.17 Rehabilitation milestone activities applicable to water management infrastructure

Water management infrastructure rehabilitation areas are split into water management infrastructure that is retained as water storage and fauna habitat (including the diversion) and water management infrastructure that is rehabilitated to light grazing (including the levees). As per Table 10, rehabilitation milestones RM1 and RM7 are relevant to retained water management infrastructure while all RMs (RM1 to RM7) are relevant to the rehabilitation of rehabilitated water management structures. Descriptions for these milestones are provided at section 3.5.14 and section 3.5.16. The following subsection relates specifically to aspects of retained water management infrastructure.

3.5.17.1 RM7: Achievement of target PMLU

Following infrastructure decommissioning and disposal, retained water storages will be monitored for water quality to demonstrate the achievement of the nominated completion criteria. Weed control, erosion stabilisation and control measures will be undertaken as required.

Demonstration of achievement of milestone RM7 will be determined based on the results of the monitoring and maintenance plan outlined in Section 3.7 and the criteria specified in Table 8.

3.5.18 Milestone timeframes

The timeframes associated with the milestones for each RA were developed by considering the requirements of each rehabilitation activity outlined in previous sections and the associated risks identified through the risk assessment (refer section 3.6 and Appendix D). The nominated timeframes and respective justifications are detailed in Table 20. These timeframes were then used to develop the milestone schedule (see Appendix A). The milestone schedule and respective stage plans are based on a five-year sequence, as such some shorter milestone intervals may not necessarily be apparent until the following period.

Table 20 Timeframe justification for RMs associated with each RA.

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
RA1: In-pit and out-of-pit waste rock emplacements	RM3: Landform development (reshaping and profiling)	• Bulk earthworks reshaping • Final reprofiling and installation of drainage features including graded banks and water storages	• Surface roughness (rockiness, depressions) in excess of that expected for the PMLU (Moderate) • Significant slope failure (Moderate) • Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Moderate)	2	As land becomes available, all bulk earthworks are to be completed according to rehabilitation design specifications and assessed as geotechnically stable by a suitably qualified person. Given that the size of areas becoming available at any point in time is highly variable, and the need to coordinate works with climatic seasons, the timeframe assigned is 2 years.
	RM4: Surface preparation (topdressing, contour ripping/discing/ scarification soil amelioration activities)	• Surface preparation (e.g., topdressing, contour scarification, soil amelioration activities as required)	• Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Moderate to Significant)	2	Subsoil and topsoil amelioration and prompt vegetation establishment are key processes to minimise the identified risks. The timeframe assigned is 2 years.
	RM5: Revegetation (seeding and/or planting)	• Revegetation (including irrigation where required)	• Failure to meet seeding rate of key target species (Low)	1	The activity of seeding target species is classified as a Low risk. The timeframe assigned is 1 year.

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
RA1: In-pit and out-of-pit waste rock emplacements (cont.)	RM6: Achievement of target vegetation criteria	• Vegetation monitoring and maintenance	• Ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Moderate to Significant) • Insufficient pasture productivity or density/diversity of vegetation in native PMLUs (Moderate) • Pests and weeds (Moderate)	10	Achievement of target revegetation criteria is dependent on good climatic conditions soil preparation. The timeframe assigned considers the time necessary for establishment of mature, self-sustaining vegetation (i.e., multiple seasons of successful recruitment) and the various risks identified. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given these factors and the Moderate to Significant risk classification, the timeframe assigned is 10 years.
	RM7: Achievement of target PMLU	• Achievement of target PMLU	• Insufficient pasture productivity or density/diversity of vegetation in native PMLUs (Moderate) • Pests and weeds (Moderate)	10	Achievement of a sustainable and non-polluting target PMLU is dependent on establishment of mature, self-sustaining vegetation demonstrated through multiple seasons and evidence of successful recruitment. As the target PMLU has not yet been achieved, allowance is provided for uncertainty associated with any required maintenance activities, the likelihood of natural hazard events such as fires or severe storms, and challenges associated with pest/weed control. Given these factors and the Moderate risk classification, the timeframe assigned is 10 years.
RA2a: Retained water management infrastructure	RM1: Infrastructure decommissioning and disposal	• Infrastructure decommissioning and disposal	• Retained structures maintain risks associated with overtopping and failure (Low) • No risks were identified associated with the rehabilitation of water management infrastructure	1	Water management infrastructure will generally be unable to be re-purposed until closure of the mining operation. It has been assumed that water management infrastructure will be required to remain operational for 5 years post-closure. Decommissioning activities are classified as Low risk, therefore the timeframe assigned is 1 year.

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
RA2a: Retained water management infrastructure (cont.)	RM7: Achievement of target PMLU	• Achievement of target PMLU	• Dam failure of retained structures (Low) • Wall failure/dam break of retained structures (Low) • Water quality in retained storages not meeting PMLU water quality requirements (Low) • Pests and weeds (Moderate)	5	As the target PMLU has not yet been achieved, allowance is provided for uncertainty associated with any required maintenance activities, the likelihood of natural hazard events such as fires or severe storms, and challenges associated with pest/weed control. Given the low slopes, small scale and lower risk classifications associated with this RA, the timeframe assigned is 5 years.
RA2b: Rehabilitated water management infrastructure	RM1: Infrastructure decommissioning and disposal	• Infrastructure decommissioning and disposal	• No risks were identified associated with the rehabilitation of water management infrastructure	1	Water management infrastructure will generally be unable to be re-purposed until closure of the mining operation. It has been assumed that water management infrastructure will be required to remain operational for 5 years post-closure. Decommissioning activities are classified as Low risk, therefore the timeframe assigned is 1 year.
	RM2: Determination of contaminated land status	• Determination of contaminated land status	• Identification and management of contaminated land (Low)	1	Given the low risk classification with this activity, the timeframe assigned is 1 year.
	RM3: Landform development (reshaping and profiling)	• Landform development (reshaping and profiling)	• Bulk earthworks reshaping • Final reprofiling and installation of drainage features	1	As land becomes available, all bulk earthworks are to be completed according to rehabilitation design specifications and assessed as geotechnically stable by a suitably qualified person. The timeframe assigned is 1 year.

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
RA2b: Rehabilitated water management infrastructure (cont.)	RM4: Surface preparation (topdressing, contour ripping/discing/ scarification soil amelioration activities)	• Surface preparation (e.g., topdressing, contour scarification, soil amelioration activities as required)	• No risks were identified associated with the rehabilitation of water management infrastructure	1	Given the low risk classification associated with this activity, the timeframe assigned is 1 year.
	RM5: Revegetation (seeding and/or planting)	• Revegetation	• Failure to meet seeding rate of key target species (Low)	1	The seeding of key target species is classified as Low risk, therefore the timeframe assigned is 1 year
	RM6: Achievement of target vegetation criteria	• Vegetation monitoring and maintenance.	• Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Low) • Insufficient pasture productivity or density/diversity of vegetation in native PMLUs (Moderate) • Pests and weeds (Moderate)	5	Achievement of target revegetation criteria is dependent on good climatic conditions soil preparation. The timeframe assigned considers the time necessary for establishment of mature, self-sustaining vegetation (i.e., multiple seasons of successful recruitment) and the various risks identified. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given the low slopes, small scale and lower risk classifications associated with this RA, the timeframe assigned is 5 years.

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
RA2b: Rehabilitated water management infrastructure (cont.)	RM7: Achievement of target PMLU	• Achievement of target PMLU	• Insufficient pasture productivity or density(Moderate) • Pests and weeds (Moderate)	5	Achievement of a sustainable and non-polluting target PMLU is dependent on establishment of mature, self-sustaining vegetation demonstrated through multiple seasons and evidence of successful recruitment. As the target PMLU has not yet been achieved, allowance is provided for uncertainty associated with any required maintenance activities, the likelihood of natural hazard events such as fires or severe storms, and challenges associated with pest/weed control. Given the low slopes, small scale and lower risk classifications associated with this RA, the timeframe assigned is 5 years.
RA3: Mine infrastructure areas (including major haul roads)	RM1: Infrastructure decommissioning and disposal	• Infrastructure decommissioning and disposal	• No Moderate or higher risk classifications were identified with the decommissioning of mine infrastructure	1	Mine infrastructure is assumed to remain operational for up to 5 years post-closure. No Moderate or higher risk classifications were identified with decommissioning activities, therefore the timeframe assigned is 1 year.
	RM2: Determination of contaminated land status	• Determination of contaminated land status	• Identification and management of contaminated land (Low)	1	A contaminated land assessment is to be undertaken by a suitably qualified person. As additional time may be required for contaminated soil to be remediated or removed if applicable, the timeframe assigned is 1 year
	RM4: Surface preparation (topdressing, contour ripping/discing/ scarification soil amelioration activities)	• Surface preparation (e.g., topdressing, contour scarification, soil amelioration activities as required)	• No Moderate or higher risk classifications were identified with the rehabilitation of mine infrastructure	1	Subsoil and topsoil amelioration and prompt vegetation establishment are key processes to minimise the identified risks. As a small scale and low-level risk, the timeframe assigned is 1 year.

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
RA3: Mine infrastructure areas (including major haul roads) (cont.)	RM5: Revegetation (seeding and/or planting)	• Revegetation	• Failure to meet seeding rate of key target species (Low)	1	The activity of seeding target species is classified as a Low risk. The timeframe assigned is 1 year.
	RM6: Achievement of target vegetation criteria	• Vegetation monitoring and maintenance	• Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Low) • Insufficient pasture productivity or density/diversity of vegetation in native PMLU (Moderate) • Pests and weeds (Moderate)	5	Achievement of target revegetation criteria is dependent on good climatic conditions soil preparation. The timeframe assigned considers the time necessary for establishment of mature, self-sustaining vegetation (i.e., multiple seasons of successful recruitment) and the various risks identified. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given the low slopes, small scale and lower risk classifications associated with this RA, the timeframe assigned is 5 years.
	RM7: Achievement of target PMLU	• Achievement of target PMLU	• Insufficient pasture productivity or density/diversity of vegetation in native PMLUs (Moderate) • Pests and weeds (Moderate)	5	Achievement of a sustainable and non-polluting target PMLU is dependent on establishment of mature, self-sustaining vegetation demonstrated through multiple seasons and evidence of successful recruitment. As the target PMLU has not yet been achieved, allowance is provided for uncertainty associated with any required maintenance activities, the likelihood of natural hazard events such as fires or severe storms, and challenges associated with pest/weed control. Given the low slopes, small scale and lower risk classifications associated with this RA, the timeframe assigned is 5 years.

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
RA4 and RA5: Residual void; Residual void highwall/low wall	RM3: Landform development (reshaping and profiling)	• Installation of drainage features and engineered spillways • Bulk earthworks reshaping • Final reprofiling and installation of drainage features including graded banks and water storages	• Highwall, low wall access (Moderate) • Final void highwalls and low walls subject to significant slope failure (Moderate) • Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Moderate to Significant)	3	Bulk earthworks and installation of drainage features are to be completed according to rehabilitation design specifications, including assessment as geotechnically stable by a suitably qualified person. Given the moderate scale of the RA, and the low risk associated with the activity itself, the timeframe assigned is 3 years.
	RM4: Surface preparation (topdressing, contour ripping/discing/ scarification soil amelioration activities)	• Surface preparation (e.g., topdressing, contour scarification, soil amelioration activities as required)	• Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Moderate to Significant)	1	Subsoil and topsoil amelioration and prompt vegetation establishment are key processes to minimise the identified risks. Given the moderate scale of the RA and the low risk associated with the activity itself, the timeframe assigned is 1 year.
	RM5: Revegetation (seeding and/or planting)	• Revegetation	• Failure to meet seeding rate of key target species (Low)	1	The seeding of key target species is classified as Low risk, therefore the timeframe assigned is 1 year

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
RA4 and RA5: Residual void; Residual void highwall/low wall (cont.)	RM6: Achievement of target vegetation criteria	• Vegetation monitoring and maintenance	• Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Moderate to Significant) • Insufficient pasture productivity or density/diversity of vegetation in native PMLUs (Moderate) • Pests and weeds (Moderate)	10	Achievement of target revegetation criteria is dependent on good climatic conditions soil preparation. The timeframe assigned considers the time necessary for establishment of mature, self-sustaining vegetation (i.e., multiple seasons of successful recruitment) and the various risks identified. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given these factors and the Moderate to Significant risk classification, the timeframe assigned is 10 years.
	RM7: Achievement of target PMLU	• Achievement of target PMLU	• Insufficient pasture productivity or density/diversity of vegetation in native PMLUs (Moderate) • Pests and weeds (Moderate)	10	Achievement of a sustainable and non-polluting target PMLU is dependent on establishment of mature, self-sustaining vegetation demonstrated through multiple seasons and evidence of successful recruitment. As the target PMLU has not yet been achieved, allowance is provided for uncertainty associated with any required maintenance activities, the likelihood of natural hazard events such as fires or severe storms, and challenges associated with pest/weed control. Given these factors and the Moderate risk classification, the timeframe assigned is 10 years.
RA6: IPAC and OPAC cell batters	RM3: Landform development (reshaping and profiling)	• Installation of drainage features and engineered spillways; • Bulk earthworks reshaping; • Final reprofiling and installation of drainage features including graded banks and water storages	• Surface roughness (rockiness, depressions) in excess of that expected for the PMLU (Moderate) • Significant slope failure (Moderate) • Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Moderate to Significant)	3	Bulk earthworks and installation of drainage features are to be completed according to rehabilitation design specifications and assessed as geotechnically stable by a suitably qualified person. Additional time has been allocated for the installation of drainage features and in consideration of the greater risk due to steeper slopes. The timeframe assigned is 3 years.

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
RA6: IPAC and OPAC cell batters (cont.)	RM4: Surface preparation (topdressing, contour ripping/discing/ scarification soil amelioration activities)	• Surface preparation (e.g., topdressing, contour scarification, soil amelioration activities as required);	• Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Moderate to Significant)	1	Subsoil and topsoil amelioration and prompt vegetation establishment are key processes to minimise risk of vegetation disease/loss. Experience currently exists for rehabilitation works in this RA, and the annual scale of works, is relatively low. The timeframe assigned is 1 year.
	RM5: Revegetation (seeding and/or planting)	• Revegetation (including irrigation where required)	• Failure to meet seeding rate of key target species (Low)	1	The activity of seeding target species is classified as a Low risk. The timeframe assigned is 1 year.
	RM6: Achievement of target vegetation criteria	• Vegetation monitoring and maintenance	• Ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Moderate to Significant) • Insufficient pasture productivity or density/diversity of vegetation in native PMLUs (Moderate) • Pests and weeds (Moderate)	10	Achievement of target revegetation criteria is dependent on good climatic conditions soil preparation. The timeframe assigned considers the time necessary for establishment of mature, self-sustaining vegetation (i.e., multiple seasons of successful recruitment) and the various risks identified. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given these factors and the Moderate to Significant risk classification, the timeframe assigned is 10 years.

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
	RM7: Achievement of target PMLU	• Achievement of target PMLU	• Insufficient pasture productivity or density/diversity of vegetation in native PMLUs (Moderate) • Pests and weeds (Moderate)	10	Achievement of a sustainable and non-polluting target PMLU is dependent on establishment of mature, self-sustaining vegetation demonstrated through multiple seasons and evidence of successful recruitment. As the target PMLU has not yet been achieved, allowance is provided for uncertainty associated with any required maintenance activities, the likelihood of natural hazard events such as fires or severe storms, and challenges associated with pest/weed control. Given these factors and the Moderate risk classification, the timeframe assigned is 10 years.
RA7: Exploration tracks and drill holes	RM1: Infrastructure decommissioning and disposal	• Infrastructure decommissioning and disposal	• No Moderate or higher risk classifications were identified with the decommissioning of mine infrastructure	1	The scale and nature of decommissioning activities for this RA result in a low risk classification, therefore the timeframe assigned is 1 year.
	RM4: Surface preparation (topdressing, contour ripping/discing/ scarification soil amelioration activities)	• Surface preparation (e.g., topdressing, contour scarification, soil amelioration activities as required)	• Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Low)	1	The scale and nature of surface preparation activities for this RA result in a low risk classification, therefore the timeframe assigned is 1 year.
	RM5: Revegetation (seeding and/or planting)	• Revegetation	• Failure to meet seeding rate of key target species (Low)	1	The activity of seeding target species is classified as a Low risk. The timeframe assigned is 1 year.

Rehabilitation area	Rehabilitation milestone	Summary rehabilitation methodology	Associated risk(s) and risk class assigned	Nominated time frame (years)	Justification for assigned timeframe
RA7: Exploration tracks and drill holes (cont.)	RM6: Achievement of target vegetation criteria	• Vegetation monitoring and maintenance	• Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (Low) • Insufficient pasture productivity or density/diversity of vegetation in native PMLU (Moderate) • Pests and weeds (Moderate)	5	Achievement of target revegetation criteria is dependent on good climatic conditions soil preparation. The timeframe assigned considers the time necessary for establishment of mature, self-sustaining vegetation (i.e., multiple seasons of successful recruitment) and the various risks identified. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given the low slopes, small scale and lower risk classifications associated with this RA, the timeframe assigned is 5 years.
	RM7: Achievement of target PMLU	• Achievement of target PMLU	• Insufficient pasture productivity or density/diversity of vegetation in native PMLUs (Moderate) • Pests and weeds (Moderate)	5	Achievement of a sustainable and non-polluting target PMLU is dependent on establishment of mature, self-sustaining vegetation demonstrated through multiple seasons and evidence of successful recruitment. As the target PMLU has not yet been achieved, allowance is provided for uncertainty associated with any required maintenance activities, the likelihood of natural hazard events such as fires or severe storms, and challenges associated with pest/weed control. Given the low slopes, small scale and lower risk classifications associated with this RA, the timeframe assigned is 5 years.

3.6 Risk assessment

3.6.1 Risk assessment requirements

Section 126C(1)(f) of the EP Act requires the PRCP to identify the risks, for each PMLU, of a stable condition not being achieved and how the applicant intends to manage or minimise the risk.

A risk assessment has been carried out in accordance with the following standards:

- AS/NZS ISO 31000:2018 Risk management - Guidelines; and
- HB203:2012 Managing environment-related risk.

3.6.2 Risk assessment process

Any risk assessment needs to be undertaken with consideration of the scope, context and criteria relevant to the assessment. For this risk assessment, the following scope and purpose was discussed and agreed to:

> *The purpose of this risk analysis is to identify the risks of a stable condition for land not being achieved for the agreed PMLUs nominated, and the approach to be taken to manage and minimise the risks identified.*

For this risk assessment, risk scenarios (or 'threats') were identified and considered for each rehabilitation area associated with the Project. The causes attributable to each risk scenario were documented as well as the potential impacts. Existing controls were noted, defined as those reasonably expected to be in place for a Project of this nature and having appropriate and contemporary management systems. Each risk scenario was then assessed with respect to health, safety, the environment and compliance against the risk assessment schema outlined in section 3.6.3. The risk assessment was effected through a workshopping process including key persons responsible for mine planning and environmental management.

3.6.3 Risk assessment schema

Identified risks were classified in accordance with CS Energy's risk classification schema which is described below. The risk assessment schema used is comparable to those used widely within the mining industry and comprises the following components:

- a control effectiveness ranking (Table 21) used for assessing the operational controls expected to be in place for a project of this type;
- a likelihood classification descriptors table (Table 22); and
- a consequence classification descriptors table (Table 23) intended to guide a consistent assessment of consequence.

Following a consensus determination of likelihood and consequence, the risk level was determined using the matrix shown in Table 24. For any risks classified as 'significant' or above, mitigation and management measures were identified and documented, including reporting and monitoring requirements where relevant. Mitigation and management measures were also documented for some lower-level risks.

Table 21 Control effectiveness ranking

Control Rank	Description	Guidance
C1	Substantially effective/adequate design	Controls considered adequate and operating effectively on almost all occasions
C2	Mostly effective/adequate design	Controls considered adequate and operating effectively on most occasions
C3	Inadequate design/partially effective	Controls considered inadequate or only operating to partial effectiveness on most occasions
C4	No controls/ineffective	There are no controls, or the existing controls are operating ineffectively on all occasions

Table 22 Likelihood of exposure to the hazard

Level of Risk Probability	Descriptive Guidance	Probability	Frequency
Highly Likely	The event is expected to occur in most circumstances	Higher than 80%	The event and consequence is expected to occur at least once per year
Likely	The event will probably occur in most circumstances	From 33% up to 80%	The event and consequence is expected to occur at least once in 1 to 3 years
Possible	The event could occur at some time	From 5% up to 33%	The event and consequence is expected to occur at least once in 3 to 20 years
Unlikely	Not expected but the event may occur at some time in the future	From 1% up to 5%	The event and consequence is expected to occur at least once in 20 to 100 years
Rare	The event may occur only in exceptional circumstances	Less than 1%	The event and consequence is expected to occur less than once in every 100 years

Table 23 Consequence classification descriptors

Category	Consequence Scale					
	1. Minor	**2. Low**	**3. Medium**	**4. Major**	**5. Severe**	**6. Catastrophic**
Safety & Health	• Incident with no injury sustained	• Low level, short-term injury (e.g., first aid)	• Impairment including short-term medical treatment (e.g., MTI)	• Reversible disability or impairment including medium term medical treatment (e.g., short-term LTI)	• Permanent disability or other injury requirement hospitalisation or long-term treatment (e.g., serious LTI)	• Single or Multiple fatalities
Environmental	• Small contaminant release or land disturbance, localised on-site area affected. Routine short-term clean-up/ remediation. • Category 1 Incident equivalent resulting in an on-site impact	• Moderate contaminant release or land disturbance, localised on-site. Routine short-term clean-up/ remediation • Category 2 Incident equivalent resulting in an on-site impact	• Moderate contaminant release or land disturbance, localised on-site. Routine short-term clean-up/ remediation • Category 3 Incident equivalent resulting in an on-site impact	• Large contaminant release or land disturbance, localised off-site. Short-term clean-up/remediation • Category 3 Incident resulting in an off-site impact	• Large contaminant release or land disturbance, localised off-site. Long-term clean-up/ remediation, potentially irreversible • Category 4 Incident equivalent resulting in an off-site impact	• Very large contaminant release, extensive off-site area affected. Complex long-term clean-up/ remediation, irreversible • Category 4 Incident equivalent resulting in an off-site impact
Legal/ Compliance/ Regulatory	• Small number of minor procedural breaches by individual staff members	• Multiple compliance incidents which are not systemic • Minor Act or code breaches • Individual legal actions	• Systemic compliance incident • Minor Act or code breaches with potential moderate range fines	• Criminal or civil regulatory prosecution of CS Energy (or directors/officers) • Multiple and systemic compliance incidents • Act or code breaches with potential fines • Individual legal actions	• Multiple significant compliance incidents • Act or code breaches leading to enforcement action • Multiple legal actions	• Serious compliance incidents creating significant compliance penalties for directors and organisations • Loss of operating licences and registrations • Multiple legal actions/ class actions

Table 24 Risk level classification matrix

Likelihood	Consequence					
	1. Minor	**2. Low**	**3. Medium**	**4. Major**	**5. Severe**	**6. Catastrophic**
A. Highly Likely	Low	Moderate	Significant	High	High	High
B. Likely	Low	Moderate	Significant	Significant	High	High
C. Possible	Low	Low	Moderate	Significant	Significant	High
D. Unlikely	Low	Low	Low	Moderate	Moderate	Significant
E. Rare	Low	Low	Low	Low	Low	Moderate

3.6.4 Risk assessment outcomes and management

Detailed risk assessment outcomes are provided at Appendix D. For this Project, a total of 34 individual risk scenarios were identified resulting in no risk scenarios classified as 'high', one risk scenario classified as 'significant', five classified as 'moderate' and the remainder (28) classified as 'low'. A summary of risk outcomes is shown at Table 25.

Table 25 Risk assessment outcomes by rehabilitation area

Rehabilitation area	Risk level				
	Low	**Moderate**	**Significant**	**High**	**Total**
Waste rock dump(s)	8	2	1	0	**11**
Final void	7	2	0	0	**9**
Water management structures	6	0	0	0	**3**
Mine built infrastructure	7	1	0	0	**8**
Totals	**28**	**5**	**1**	**0**	**34**

The risk scenario classified as 'significant' was the risk of ongoing gully, pipe and/or sheet erosion of the steeper batter slopes associated with the ash disposal cells. Management measures identified as appropriate for lowering this risk classification included: soil amelioration trials, and further development of revegetation methods and techniques and other contributing factors with the objective of improving the likelihood of early revegetation success on these slopes.

3.7 Monitoring and maintenance

For the purposes of developing the PRCP schedule, eight rehabilitation milestones have been proposed as being applicable for the Project. The PRCP Guideline (DES 2019a) requires consideration of measures to be undertaken to demonstrate that milestones and milestone criteria have been achieved. As a general principle, The Project's mining department will be charged with ensuring compliance with the milestone schedule. A key monitoring point will be the inclusion of a standing agenda item within the Project's annual environmental management system review.

The identification and nomination of areas becoming available for rehabilitation is primarily the responsibility of the mining team. The role of the environment team is to advise the mining team of the status of the milestone schedule at any given point in time and to monitor progress against the approved milestone schedule. To ensure this occurs, regular meetings (at least six monthly) will be held between the mining contractor and CS Energy teams to test the availability of areas that may have achieved this milestone.

With respect to determining the achievement of rehabilitation completion criteria, a specific rehabilitation monitoring plan exists to assess this and is provided at Appendix E.

Table 26 provides a summary of the measures to be undertaken with respect to determining the achievement of each rehabilitation milestone. Determination of the boundary of an area reaching a given rehabilitation milestone at a given point in time, where this is other than a discrete point or item of infrastructure, will utilise standard survey techniques, including land-based survey and airborne survey at an appropriate frequency – nominally annually – to achieve satisfactory geolocation of areas.

As per the explanatory notes accompanying the tabling of the Mineral and Energy Resources (Financial Provisioning) Bill which instigated the PRCP provisions, the objective of the legislation is to manage the financial risk to the State in the event that mineral and energy resource tenure holders do not comply with their environmental management and rehabilitation obligations; and to ensure that land disturbed by mining activities is rehabilitated to a safe and stable landform that does not cause environmental harm, and can sustain an approved PMLU. To this end, and reflecting that the PRCP schedule is a forecast estimate subject to a variety of commercial, environmental and other pressures; in assessing performance against the milestone schedule there needs to be an acceptance that it is the sum total of the areas achieving a rehabilitation milestone over time that is of greater importance than the precise location of the areas being assessed.

Table 26 Rehabilitation milestone management and monitoring measures

Rehabilitation milestone	Description / criteria	Proposed management/ monitoring measure(s)
RM1: Infrastructure decommissioning /disposal	Applicable to all infrastructure identified to be decommissioned/ disposed of.	Infrastructure decommissioned/ disposed during the operational phase of mining will be subject to ground disturbance permitting processes that include a completion inspection to be undertaken by the Environment Department. Infrastructure decommissioned/ disposed at closure will be subject to strict environment and safety planning requirements including completion inspections.
RM2: Determination of contaminated land status	This milestone is applicable to any areas where notifiable activities have been carried out and involves as a minimum the completion of a phase 1 contaminated land investigation undertaken by a suitably qualified person.	A completed phase 1 contaminated land investigation report, as well as any consequent reports where required.

Rehabilitation milestone	Description / criteria	Proposed management/ monitoring measure(s)
	Where required, remediation activities will be undertaken and recorded, and notifications completed.	
RM3: Landform development (reshaping/ profiling)	Applicable to all overburden WRDs where bulk dozer push or other bulk earthworks are required. Considered to be met when installation of erosion and sediment control systems, graded banks or other final landform water storages or structures.	Regular meetings (at least six monthly) will be held including the mining contractor and the CS Energy mining and environment teams to track the progress of areas subject to this activity within the mine plan. Survey of completed areas.
RM4: Surface preparation (topdressing, contour ripping/ discing/ scarification soil amelioration activities)	Includes subsoil amelioration treatment(s) as required, final profiling etc., application of topsoil or alternative topdressing materials, final surface amelioration and/or preparation activities. Considered to be met when land can be transitioned to RM5 where applicable.	Regular meetings (at least six monthly) will be held including the mining contractor and the CS Energy mining and environment teams to track the progress of areas subject to this activity within the mine plan. Survey of completed areas.
RM5: Revegetation (seeding and/or planting)	Revegetation of prepared areas (RM4) as outlined in section 3.5.14.3.	Regular meetings (at an appropriate frequency) will be held including the mining contractor and the CS Energy mining and environment teams to plan revegetation activities with consideration of the areas available for revegetation and weather conditions. Survey of completed areas, and record of revegetation method retained.
RM6. Achievement of target revegetation type	Revegetated areas to be assessed against ground cover and stability related completion criteria (refer section 3.5.2).	A combination of field surveys and satellite imagery monitoring as detailed in the Rehabilitation Monitoring and Maintenance Plan (Appendix E).
RM7. Achievement of target post-mining land use	Revegetated areas to be assessed against all completion criteria developed with reference to analogue sites of similar characteristics and land use (refer section 3.5.2). Considered to be met when land is able to be transitioned to progressive certification.	A combination of field surveys and satellite imagery monitoring as detailed in the Rehabilitation Monitoring and Maintenance Plan (Appendix E).

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Appendix A. PRCP schedule

The development of this PRCP schedule has been based on a review of the Project's life-of-mine plan undertaken in 2020. Five-year mine stage plans developed as part of the life-of-mine plan review have been used to identify the expected status of rehabilitation milestones. Rehabilitation milestones are shown at regular five-year intervals working backwards from the indicative year of cessation of mining operations (2042). Stage plans and hence rehabilitation milestones are therefore shown for the years 2022, 2027, 2032, 2037 and 2042. An additional stage plan at five years post-closure (2047) has also been developed to highlight the progression of rehabilitation to that point at five years post-mine closure.

As per section 3.5.8, mining activities are anticipated to be completed in 2042. It is expected that, at the point that mining ceases, all disturbed land not already undergoing rehabilitation, will become available for rehabilitation; that is in 2043.

As the ash cells are not subject to PRCP regulatory requirements, this rehabilitation area has not been included in the PRCP schedule. For completeness however, they still exist as rehabilitation areas.

The draft PRCP schedule follows, with accompanying stage plan figures provided at Appendix B.

A number of specific constraints to land becoming available for rehabilitation exist for the Project as follows:

- The IADA is required to remain as an emergency ash storage for the power station until power station closure, and should therefore be considered as operating infrastructure with respect to section 126D(5) of the EP Act.
- The OPAC and IPAC facilities also exist as operating infrastructure with respect to section 126D(5) of the EP Act. However, as these rehabilitation areas are not subject to PRCP legislative requirements, they have been excluded from the PRCP schedule. It is critical to note however, that the progressive rehabilitation timeframe for these facilities is not dictated by the completion of mining in those areas, but by the rate of ash production which in turn, is solely dependent on power station energy output forecasts. The OPAC facility is currently subject to progressive rehabilitation activities demonstrating the intent of CS Energy to pursue progressive rehabilitation generally.
- The PRCP schedule and timing has been prepared with consideration of the not insignificant limitations associated with the quality and quantity of topsoil resources available at the Project site. At this point in time, no areas of rehabilitation are considered to have yet reached milestone RM6, and some early areas of rehabilitation have required significant re-work; largely as a consequence of poor topsoil quality and sporadic rainfall. While experience and research undertaken to date is informing future rehabilitation activities, uncertainty exists as to the expected timing between rehabilitation milestones RM5 and RM6, and even greater uncertainty as to the timing between RM6 and RM7. For the milestone schedule development, it has been assumed that it will take five years to progress from RM5 to RM6 and 10-15 years to progress from RM6 to RM7, particularly for the woodland ecosystem component of the PMLUs being pursued.

The following tables comprise the PRCP schedule for each rehabilitation area.

Post-mining land uses (PMLU)										
Rehabilitation area	RA1									
Relevant activities	in-pit and out-of-pit waste rock emplacements									
Total rehabilitation area size (ha)	425.2									
Commencement of first milestone: <insert milestone reference>	2022									
PMLU	Light grazing									
Date area is available	10/12/22	10/12/27	10/12/32	10/12/37	10/12/42					
Cumulative area available (ha)	20.4	30.2	124.2	229.7	425.6					
Milestone completed by	10/12/27	10/12/32	10/12/37	10/12/42	10/12/47	10/12/52	10/12/57	10/12/62	10/12/67	10/12/xxxx
Milestone Reference	**Cumulative area achieved (ha)**									
RM3	20.4	30.2	124.2	229.7	425.2					
RM4	20.4	30.2	124.2	229.7	425.2					
RM5	20.4	30.2	124.2	229.7	425.2					
RM6			20.4	30.2	124.2	229.7	425.2			
RM7					20.4	30.2	124.2	229.7	425.2	

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA2a									
Relevant activities	Retained water management infrastructure									
Total rehabilitation area size (ha)	10.3									
Commencement of first milestone: <insert milestone reference>	2047									
PMLU	Water storage and fauna habitat									
Date area is available	10/12/47							10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	10.3									
Milestone completed by	10/12/52							xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	10.3									
RM7	10.3									

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA2b									
Relevant activities	Rehabilitated water management infrastructure									
Total rehabilitation area size (ha)	43.4									
Commencement of first milestone: <insert milestone reference>	2022									
PMLU	Light grazing									
Date area is available	Prior to 2022	10/12/22	10/12/27	10/12/47				10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	4.6			43.4						
Milestone completed by	10/12/22	10/12/27	10/12/32	10/12/52	10/12/57	10/12/62		xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	4.6			43.4						
RM	4.6			43.4						
RM3	4.6			43.4						
RM4	4.6			43.4						
RM5	4.6			43.4						
RM6		4.6			43.4					
RM7			4.6			43.4				

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA3									
Relevant activities	Mine infrastructure areas (including major haul roads)									
Total rehabilitation area size (ha)	94.4									
Commencement of first milestone: <insert milestone reference>	2047									
PMLU	Light grazing									
Date area is available	10/12/47									10/12/xxxx
Cumulative area available (ha)	94.4									
Milestone completed by	10/12/52	10/12/57	10/12/63							xx/xx/xxxx
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	94.4									
RM2	94.4									
RM4	94.4									
RM5	94.4									
RM6		94.4								
RM7			94.4							

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA4									
Relevant activities	Residual void									
Total rehabilitation area size (ha)	13									
Commencement of first milestone: <insert milestone reference>	2043									
PMLU	Fauna habitat									
Date area is available	10/12/42									10/12/xxxx
Cumulative area available (ha)	13									
Milestone completed by	10/12/47	10/12/57	10/12/67							xx/xx/xxxx
Milestone Reference	**Cumulative area achieved (ha)**									
RM3	13									
RM4	13									
RM5	13									
RM6		13								
RM7			13							

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA5									
Relevant activities	Residual void high wall / low wall									
Total rehabilitation area size (ha)	63.1									
Commencement of first milestone: <insert milestone reference>	2043									
PMLU	Fauna habitat									
Date area is available	10/12/42			10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	63.1									
Milestone completed by	10/12/47	10/12/57	10/12/67	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	**Cumulative area achieved (ha)**									
RM3	63.1									
RM4	63.1									
RM5	63.1									
RM6		63.1								
RM7			63.1							

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA6									
Relevant activities	IPAC and OPAC cell batters									
Total rehabilitation area size (ha)	81.7									
Commencement of first milestone: <insert milestone reference>	2022									
PMLU	Light grazing									
Date area is available	Prior to 2022	10/12/22		10/12/32			10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	44.1	66.3		81.7						
Milestone completed by	10/12/22	10/12/27	10/12/37	10/12/42	10/12/52	10/12/62	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	**Cumulative area achieved (ha)**									
RM3	44.1	66.3		81.7						
RM4	44.1	66.3		81.7						
RM5	44.1	66.3		81.7						
RM6			44.1	66.3	81.7					
RM7					66.3	81.7				

2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA7									
Relevant activities	Exploration tracks and drill pads									
Total rehabilitation area size (ha)	45.3									
Commencement of first milestone: <insert milestone reference>	2022									
PMLU	Light grazing									
Date area is available	10/12/22			10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx	10/12/xxxx
Cumulative area available (ha)	45.3									
Milestone completed by	10/12/27	10/12/32	10/12/37	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx	xx/xx/xxxx
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	45.3									
RM4	45.3									
RM5	45.3									
RM6		45.3								
RM7			45.3							

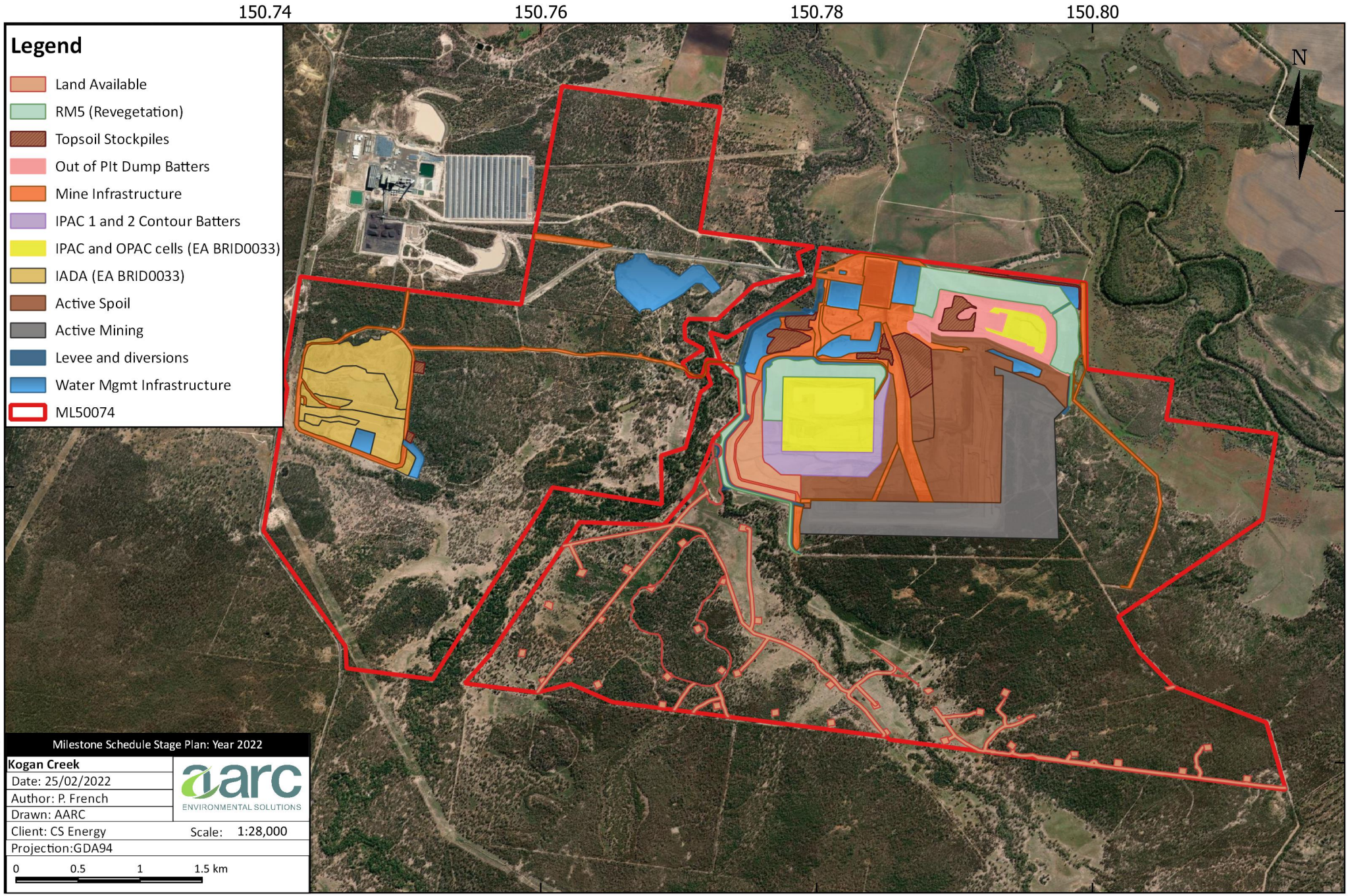
1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Milestone reference	Rehabilitation milestone	Milestone criteria
RM1	Infrastructure decommissioning and disposal	•All non-required services disconnected and removed •All concrete, bitumen and gravel removed •All operational pipelines drained and removed •All fencing that is not part of PMLU requirements removed •All buildings and footings demolished and/or removed •All machinery and equipment removed •All surface water drainage infrastructure that is not retained in the final landform removed •All rubbish removed
RM2	Determination of contaminated land status	•Contaminated material either remediated in-situ or removed/transported to an approved landfill for disposal and waste tracking information recorded and submitted. •Contaminated land assessment undertaken by an appropriately qualified person1. If required, a site investigation report including a site suitability statement prepared and submitted in accordance with the provisions of Chapter 7, Part 8 of the EP Act.
RM3	Landform development (reshaping and reprofiling)	**Landform development works** •All bulk earthworks and landform reshaping/reprofiling works completed •Geotechnical assessment by an appropriately qualified person confirming that long term geotechnical stability has been achieved for each relevant landform •Installation of graded drains where slope lengths on slopes of 8° (14%) or greater would exceed 160 m constructed to an engineering specification by a suitably qualified person **Slope** •RA1 final landform slope < 8° (14%) •RA5 final landform: •Highwall – achieve target design slope of 24°, but a maximum of 70° in competent rock or 45° in competent clays and weathered material where this can be demonstrated to reduce the disturbance footprint •Low wall – maximum 24° •Retained access ramp – maximum 6° •RA6 final landform slope < 9.5° (17%) Residual Void Floor •RA4 final void floor backfilled to be above regional equilibrium groundwater level
RM4	Surface preparation (topdressing, scarification, contour ripping/discing soil amelioration activities)	•Surface scarification, ripping or discing, along the contour of any slope to a depth of at least 200 mm. •Prior to each rehabilitation event, soil testing and agronomic analysis undertaken by an appropriately qualified person and a recommendation made for a topsoil/growth media/ ameliorant and nutrient combination suitable for the post mining land use revegetation program •Ameliorants applied and incorporated into surface, as recommended by an appropriately qualified person
RM5	Revegetation (seeding and/or planting)	Revegetation works by tubestock and/or direct seeding at rates determined for each rehabilitation event drawn from Table 18 Current indicative species and rates for light grazing PMLU or Table 19 Indicative proposed revegetation species for the native fauna ecosystem PMLU (Kogan Creek Mine Transitional PRCP, Version 9, 4 March 2022) •No later than 12 months from planting, a >50% survival rate for any given perennial species is achieved
RM6	Achievement of target revegetation	**Light Grazing and Fauna Habitat PMLUs:** •Total percentage of ground foliage cover is >50% •No recorded erosion classifications of 'Severe', no active erosion present as demonstrated by no increase in erosion ratings over time

Milestone reference	Rehabilitation milestone	Milestone criteria
RM7	Achievement of target PMLU	**Light Grazing PMLU:** •Total percentage of ground foliage cover, organic litter and rock is >75% •Land suitability assessment by an appropriately qualified person certifies land has achieved a post-mine land suitability of 4 or better •Minimum of 4 palatable perennial pasture species and 2 shade tree species established (note that shade tree species are to be excluded on RA6) •Evidence of recruitment from rehabilitation monitoring data •No evidence of erosion classified as 'Severe'. •No active erosion present as demonstrated by no increase in erosion ratings over time **Fauna Habitat PMLU (final void floor and high wall/low wall):** •Ground foliage cover > 75% •Minimum 14 target vegetation species comprising: oGrasses and forbs ≥ 4 oMid storey species ≥ 6 oCanopy species ≥ 4 •Evidence of fauna habitat features (e.g. tree hollows, fallen timber, rock piles) consistent with analogue fauna habitat sites •Evidence of recruitment from rehabilitation monitoring data •No evidence of erosion classified as 'Severe' •No active erosion present as demonstrated by no increase in erosion ratings over time •Evidence of native fauna species utilisation in the form of fauna spotting, scats, and tracks •All safety precautions undertaken in accordance with the relevant legislation—signs comply with AS1319:1994–Safety Signs for the Occupational Environment •Access restrictions; either berms or fencing in place •Void highwalls and low walls are internally draining •Assessment from an appropriately qualified person that the final void does not act as a groundwater sink, the final void floor is above regional equilibrium groundwater levels and the final void is protected from flood water ingress
RM7 (cont.)		**Water Storage PMLU:** •All retained water storages (banks and spillways) assessed as safe and stable by an appropriately qualified person •Retained storage water quality parameters to be below the trigger values for livestock drinking water defined in Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Volume 3 Primary Industries — Rationale and Background Information (ANZECC and ARMCANZ 2000). **All PMLUs:** •Hazard and Safety Assessment completed by an appropriately qualified person demonstrates hazards in rehabilitation areas are of a similar type and not significantly different to hazards in neighbouring unmined landscapes subject to a similar land use •Surface water quality parameters for runoff from all PMLUs to be below the trigger values for aquatic ecosystem values defined in Condamine River Basin Environmental Values and Water Quality Objectives (October 2020 or a later version). •Evidence that on-lease monitoring bores meet groundwater quality trigger levels as per Table 3 of the EA

1) Insert new rows below the table to record more Rehabilitation Area Milestones for the project
2) Ensure all Rehabiitation Milestones recorded in this table align with those included in the RA sheets in this form.
3) See the PRCP guideline before developing site-specific Rehabilitation Area Milestones

Appendix B. Schedule stage plans


150.74
150.76
150.78
150.80
-26.92
-26.94
-26.96
N
Legend
Land Available
RM5 (Revegetation)
Topsoil Stockpiles
Out of Plt Dump Batters
Mine Infrastructure
IPAC 1 and 2 Contour Batters
IPAC and OPAC cells (EA BRID0033)
IADA (EA BRID0033)
Active Spoil
Active Mining
Levee and diversions
Water Mgmt Infrastructure
ML50074
Milestone Schedule Stage Plan: Year 2022
Kogan Creek
Date: 25/02/2022
Author: P. French
Drawn: AARC
aarc
ENVIRONMENTAL SOLUTIONS
Client: CS Energy
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Projection:GDA94
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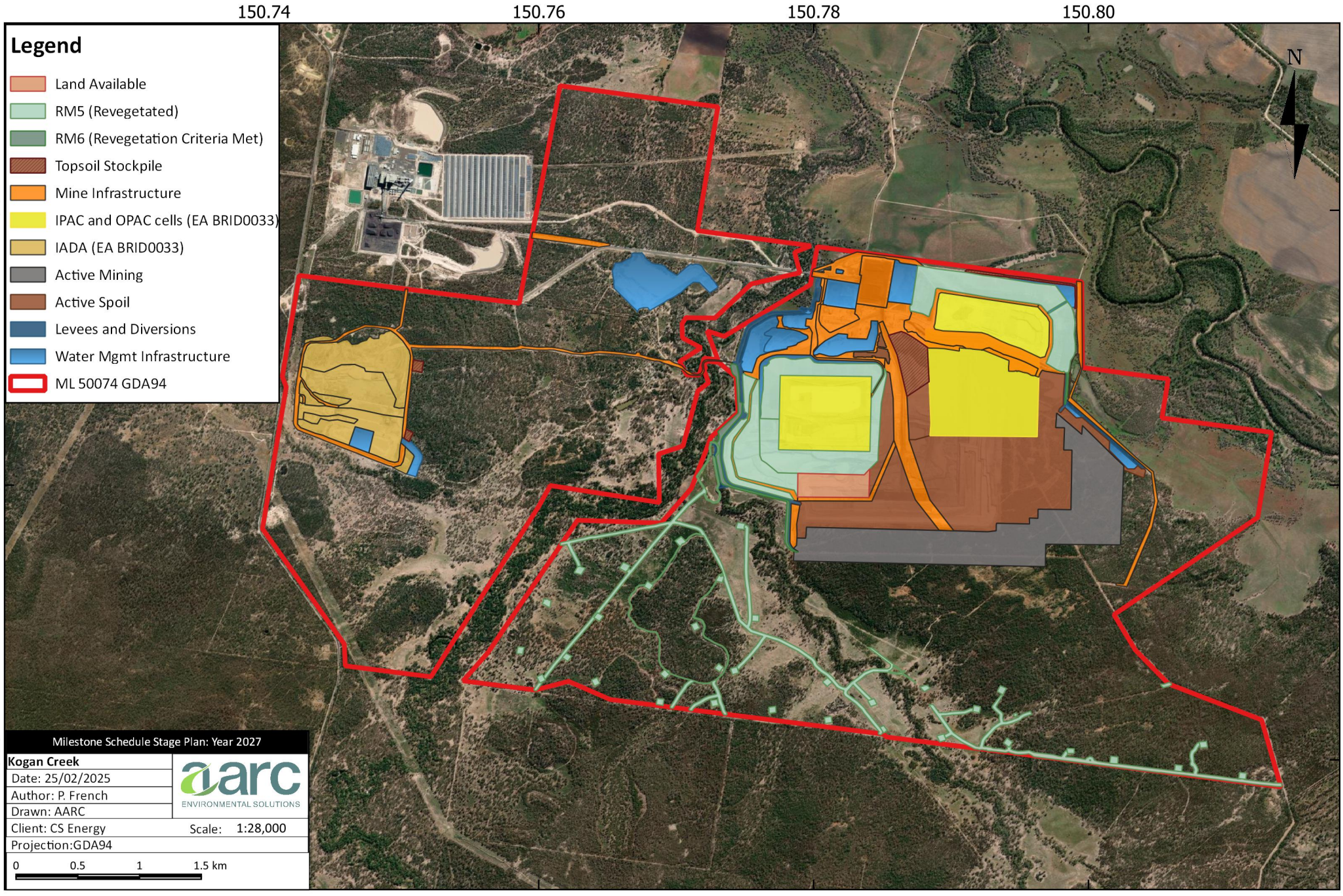
1.5 km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-26.94
-26.96
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Legend
Land Available
RM5 (Revegetated)
RM6 (Revegetation Criteria Met)
Topsoil Stockpile
Mine Infrastructure
IPAC and OPAC cells (EA BRID0033)
IADA (EA BRID0033)
Active Mining
Active Spoil
Levees and Diversions
Water Mgmt Infrastructure
ML 50074 GDA94
Milestone Schedule Stage Plan: Year 2027
Kogan Creek
Date: 25/02/2025
Author: P. French
Drawn: AARC
aarc
ENVIRONMENTAL SOLUTIONS
Client: CS Energy
Scale: 1:28,000
Projection:GDA94
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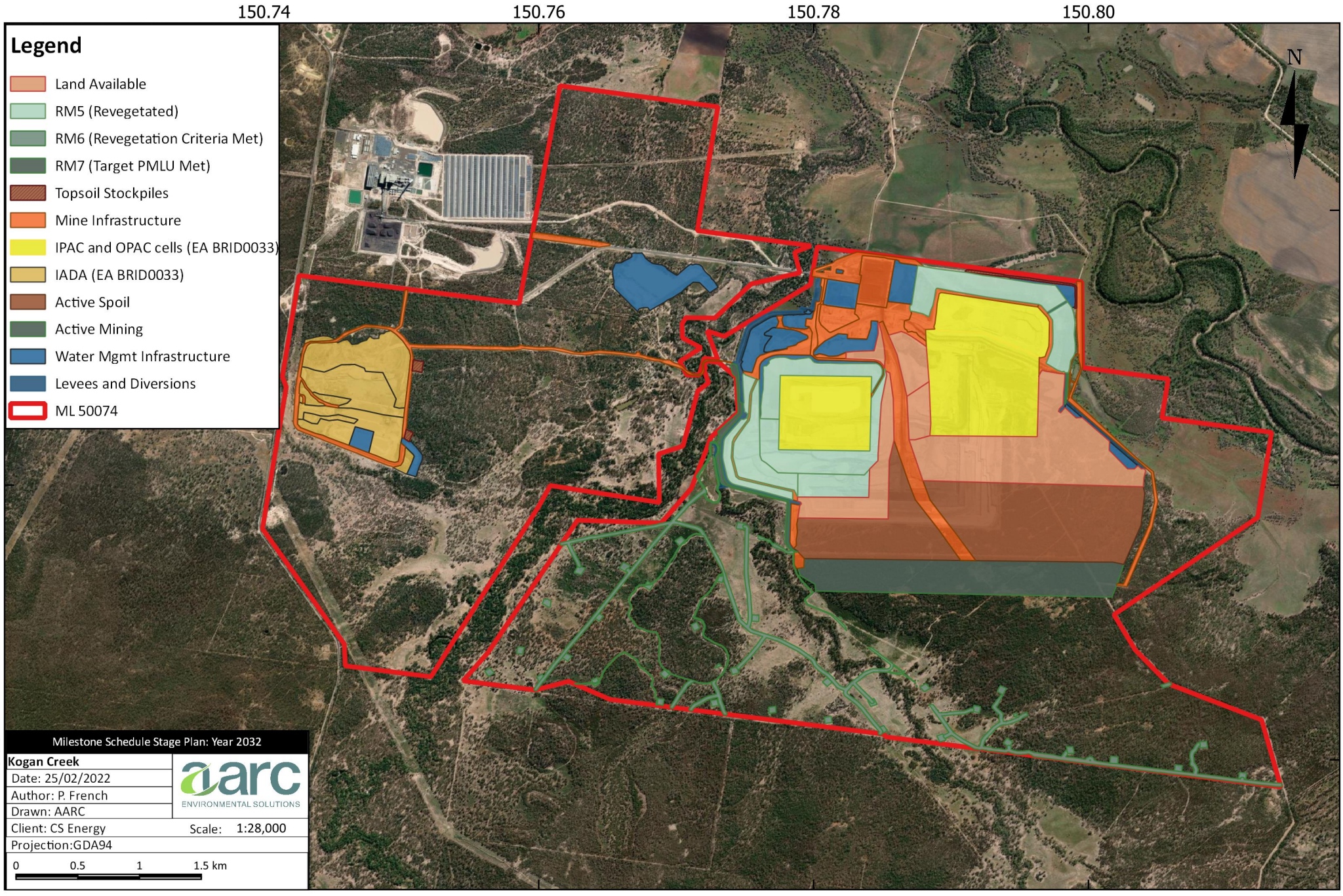
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Legend
Land Available
RM5 (Revegetated)
RM6 (Revegetation Criteria Met)
RM7 (Target PMLU Met)
Topsoil Stockpiles
Mine Infrastructure
IPAC and OPAC cells (EA BRID0033)
IADA (EA BRID0033)
Active Spoil
Active Mining
Water Mgmt Infrastructure
Levees and Diversions
ML 50074
Milestone Schedule Stage Plan: Year 2032
Kogan Creek
Date: 25/02/2022
Author: P. French
Drawn: AARC
aarc
ENVIRONMENTAL SOLUTIONS
Client: CS Energy
Scale: 1:28,000
Projection:GDA94
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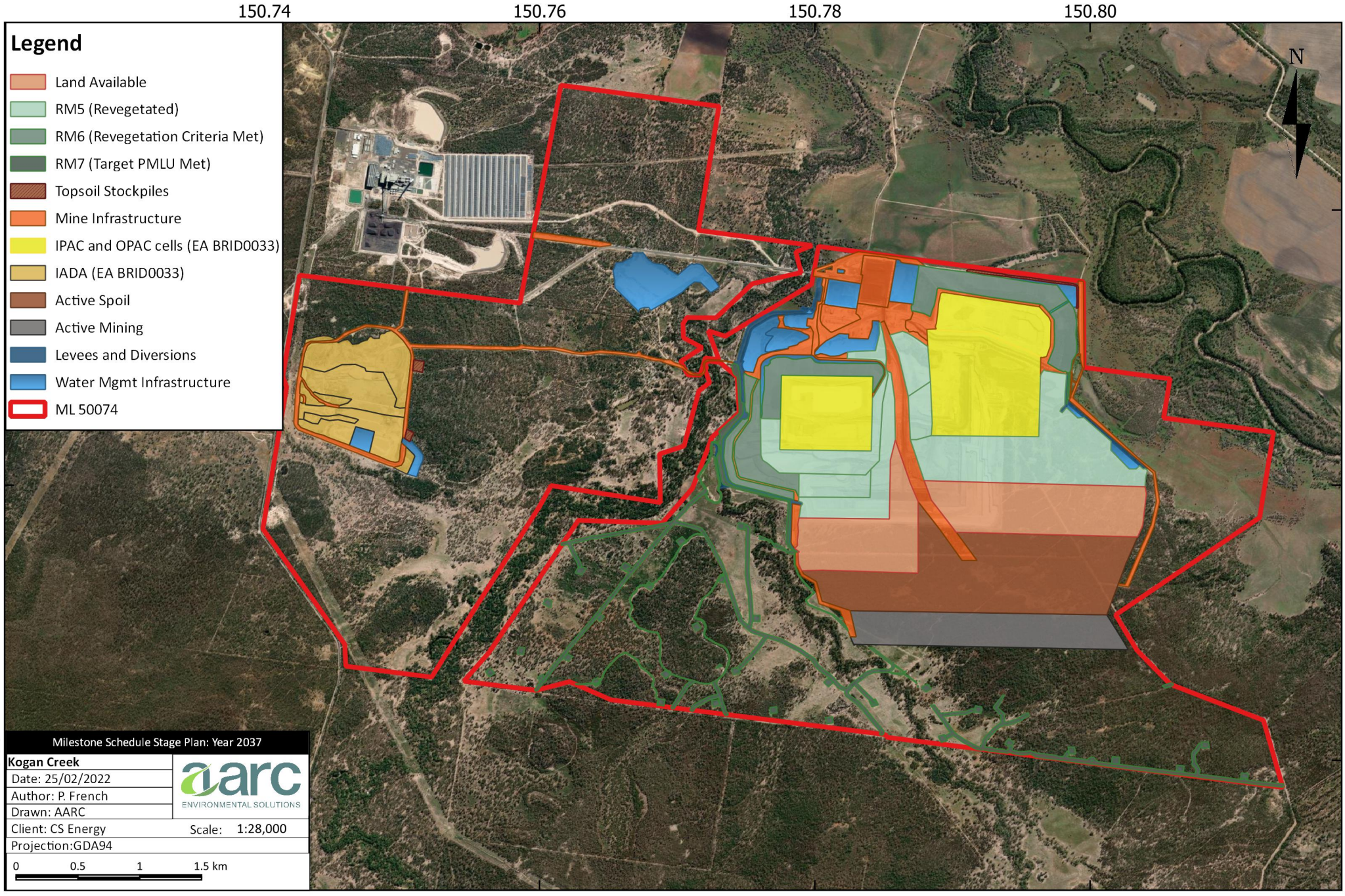
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150.76
150.78
150.80
-26.92
-26.94
-26.96
N
Legend
Land Available
RM5 (Revegetated)
RM6 (Revegetation Criteria Met)
RM7 (Target PMLU Met)
Topsoil Stockpiles
Mine Infrastructure
IPAC and OPAC cells (EA BRID0033)
IADA (EA BRID0033)
Active Spoil
Active Mining
Levees and Diversions
Water Mgmt Infrastructure
ML 50074
Milestone Schedule Stage Plan: Year 2037
Kogan Creek
Date: 25/02/2022
Author: P. French
Drawn: AARC
aarc
ENVIRONMENTAL SOLUTIONS
Client: CS Energy
Scale: 1:28,000
Projection:GDA94
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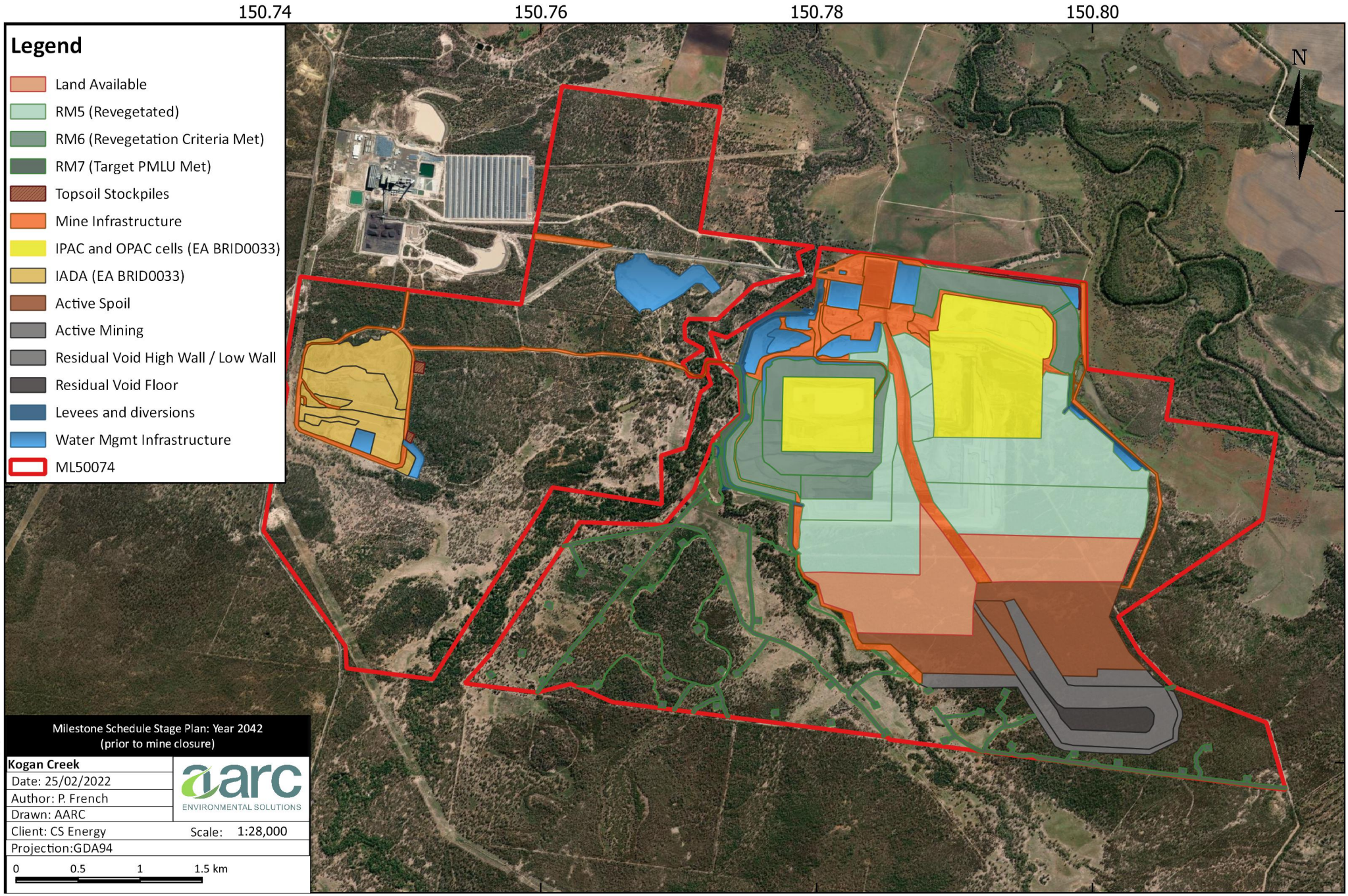
150.74
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-26.92
-26.94
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N
Legend
Land Available
RM5 (Revegetated)
RM6 (Revegetation Criteria Met)
RM7 (Target PMLU Met)
Topsoil Stockpiles
Mine Infrastructure
IPAC and OPAC cells (EA BRID0033)
IADA (EA BRID0033)
Active Spoil
Active Mining
Residual Void High Wall / Low Wall
Residual Void Floor
Levees and diversions
Water Mgmt Infrastructure
ML50074
Milestone Schedule Stage Plan: Year 2042
(prior to mine closure)
Kogan Creek
Date: 25/02/2022
Author: P. French
Drawn: AARC
aarc
ENVIRONMENTAL SOLUTIONS
Client: CS Energy
Scale: 1:28,000
Projection:GDA94
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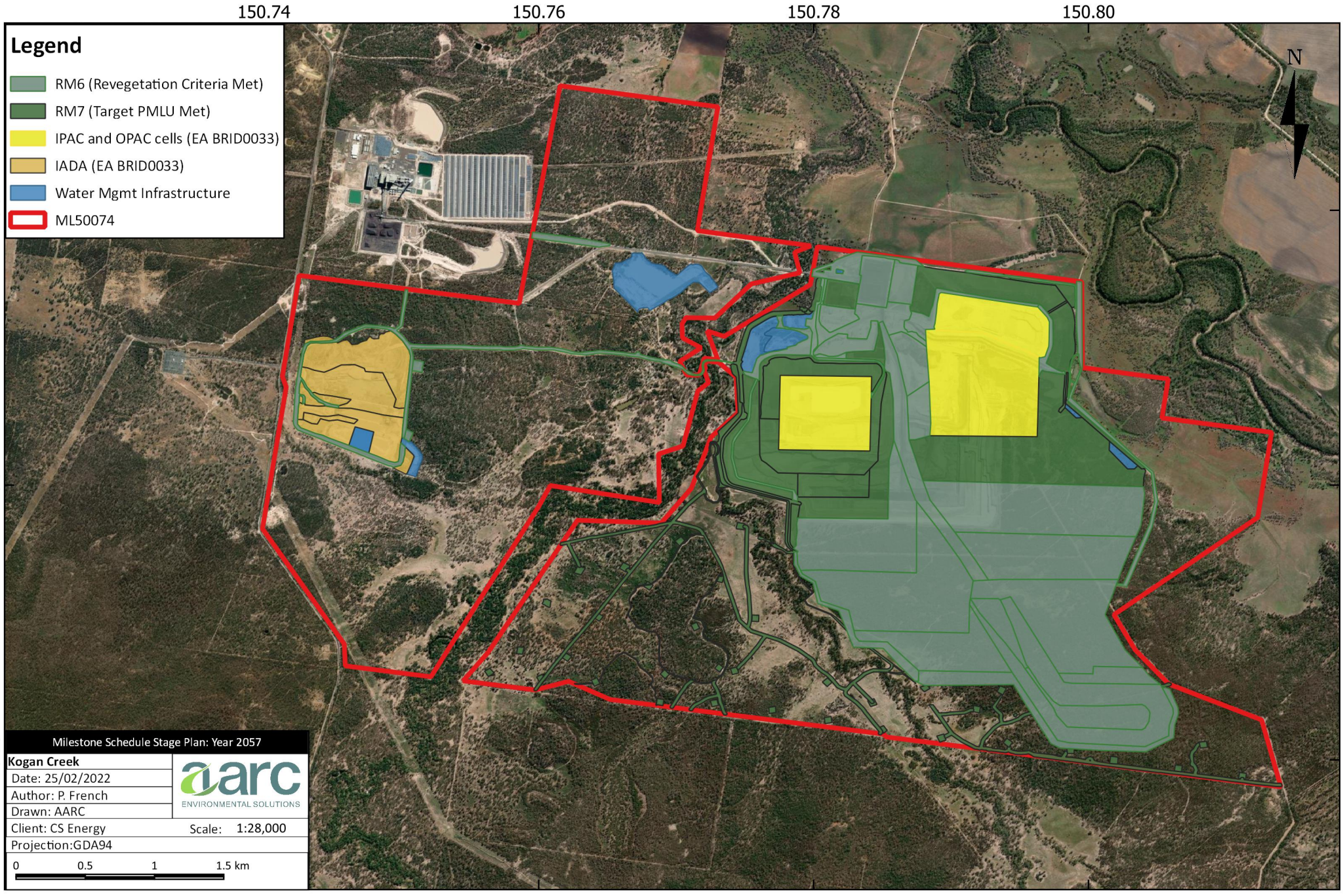
150.74
150.76
150.78
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-26.92
-26.94
-26.96
N
Legend
RM6 (Revegetation Criteria Met)
RM7 (Target PMLU Met)
IPAC and OPAC cells (EA BRID0033)
IADA (EA BRID0033)
Water Mgmt Infrastructure
ML50074
Milestone Schedule Stage Plan: Year 2057
Kogan Creek
Date: 25/02/2022
Author: P. French
Drawn: AARC
Client: CS Energy
Scale: 1:28,000
Projection:GDA94
0
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aarc
ENVIRONMENTAL SOLUTIONS

Appendix C. Spatial information

Spatial information prepared in accordance with the guideline *Spatial Information Submission* (DES 2018c) to accompany this PRCP has been submitted electronically to the administering authority.

Appendix D. Rehabilitation risk assessment

Ref.				Risk Description				Control Effectiveness	Risk Evaluation						Risk Rating				Count				Final Risk Rating
Risk Type (T=Threat)	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls		Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	H	S	M	L	
T	A	01		**Waste rock dump(s) (incl. ash cell batters)**																			
T	A	01		**Safe**																			
T	A	01	01	Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Erosion gullies etc due to challenging subsoils/ topsoils, inadequate surface preparation, localised settlement	Safety hazard for personnel, stock and wildlife	Surface preparation measures (initial), monitoring, maintenance controls (pre-closure)	C2		P		3				M			0	0	1	0	M
T	A	01	02	Slope steepness in excess of that expected for the PMLU	Inappropriate landform design	Safety hazard for personnel, stock and wildlife	Landform design appropriate to PMLU, slope controls	C1		R		2				L			0	0	0	1	L
T	A	02		**Stable - geotechnical risk**																			
T	A	02	01	Significant slope failure	Excessive slope steepness, physical material properties, poor drainage, adverse rainfall event	Localised land impacts and downstream water quality impacts	Slope moderation, max. slopes subject to engineered design, provision of adequate drainage infrastructure, rapid revegetation	C1		R			4				L		0	0	0	1	L
T	A	03		**Stable - erosional risk**																			
T	A	03	01	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required, sediment controls during establishment	C2		L			3				S		0	1	0	0	S
T	A	03	02	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Drainage network design with acceptable design standards for drainage structures, avoidance of flow concentration, sub-catchment delineation, sufficient water storage structures, engineered flow channels, effective revegetation techniques, rehabilitation monitoring and management as required	C2		U			2				L		0	0	0	1	L
T	A	03	03	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Existing rehabilitation of WRDs, downstream sedimentation controls, revegetation, monitoring and maintenance	C3	U				2				L		0	0	0	1	L
T	A	03	04	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ vegetation disease/loss, climatic events, other	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required	C2		P			2				L		0	0	0	1	L
T	A	04		**Non-polluting - geochemical risk**																			
T	A	04	01	Acid and saline drainage generation	Adverse waste rock geochemistry	Revegetation performance impacts, downstream receiving environment water quality and dependent ecosystem impacts	Confirmed non-NAPP materials and low risk of saline drainage. Routine confirmatory geochemical testing, regular water quality monitoring and assessment	C1		U			2				L		0	0	0	1	L
T	A	04	02	Impacts to groundwater	Adverse waste rock geochemistry	Groundwater impacts (incl. GDEs)	Negative NAPP materials and low risk of saline drainage. Routine confirmatory geochemical testing, regular water quality monitoring and assessment	C2		R			5				L		0	0	0	1	L
T	A	05		**Non-polluting - other environmental harm**																			
T	A	05	01	Not applicable															0	0	0	0	
T	A	06		**Sustainable - PMLU**																			
T	A	06	01	Insufficient pasture productivity or density/diversity of vegetation in native PMLU	Weather, poor soil characteristics, poor management practices impacting germination, vegetation establishment and PMLU density/diversity metrics, and shortage of topsoil resources	Insufficient pasture productivity, habitat unsuitable for native fauna	Improving rehabilitation methodologies, trial activities, management and maintenance activities, rehabilitation performance monitoring	C2		P			3	3			M	M	0	0	2	0	M
T	A	06	02	Pests and weeds	Poor local, regional or site property management practices.	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management	C2		P			2				L		0	0	0	1	L

Ref.				Risk Description				Control Effectiveness	Risk Evaluation						Risk Rating				Count				Final Risk Rating
Risk Type (T=Threat)	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls		Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	H	S	M	L	
T	C			**Final void**																			
T	C	01		**Safe**																			
T	C	01	01	Highwall, low wall access	Insufficient warnings, barriers preventing access to hazardous areas (highwalls, pit lake)	Falls, slips, trips impacting humans, livestock, fauna	Signage, physical barriers, slope moderation	C2		U		3				L			0	0	0	1	L
T	C	02		**Stable - geotechnical risk**																			
T	C	02	01	Final void highwalls and low walls subject to significant slope failure	Excessive slopes, inadequate drainage controls, adverse weather event	Localised land impact	Slope moderation, final landform design, geotechnical assessment at closure, drainage infrastructure	C1		U		2	2			L	L		0	0	0	2	L
T	C	03		**Stable - erosional risk**																			
T	C	03	01	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts	Adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required	C2		L			2				M		0	0	1	0	M
T	C	03	02	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts	Reduced catchment drainage away from void. Void internally draining. Evolving revegetation techniques	C2		P			2				L		0	0	0	1	L
T	C	03	03	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Existing rehabilitation of WRDs, downstream sedimentation controls, revegetation, monitoring and maintenance	C3	U				2				L		0	0	0	1	L
T	C	03	04	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ revegetation disease, climatic events	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required	C2		P			2				L		0	0	0	1	L
T	C	04		**Non-polluting - geochemical risk**																			
T	C	04	01	High water storage salinity	Leaching of salts contained in overburden materials to the pit lake and concentration of salts by evaporation	Adverse water quality and dependent ecosystem impacts; accession to groundwater	Water storage anticipated to be intermittent, low salinity overburden materials, anticipated limited groundwater seepage to void	C2		L			2				M		0	0	1	0	M
T	C	05		**Non-polluting - other environmental harm**																			
T	C	05	01	Not applicable															0	0	0	0	
T	C	06		**Sustainable - PMLU**																			
T	C	06	01	Insufficient density/diversity of vegetation in water storage native PMLU	Weather, poor soil characteristics and slopes impacting germination, vegetation establishment and PMLU density/diversity metrics	Insufficient habitat; habitat unsuitable for native fauna	Water storage anticipated to be intermittent, improving native rehabilitation methodologies, trial activities, management and maintenance activities, rehabilitation performance monitoring	C2		P			2				L		0	0	0	1	L
T	C	06	02	Pests and weeds	Poor local, regional or site property management practices.	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management	C2		P			2				L		0	0	0	1	L
T	C	06	03																0	0	0	0	
T	C	07		**Sustainable - NUMA**																			
T	C	07	01	Not applicable															0	0	0	0	

Ref.				Risk Description					Risk Evaluation						Risk Rating				Count				
Risk Type (T=Threat)	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Control Effectiveness	Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	H	S	M	L	Final Risk Rating
T	D			**Water management structures**																			
T	D	01		**Safe**																			
T	D	01	01	Dam failure of retained structures	Extreme rainfall events	Downstream hazard to public	Only minor stock dams or engineered water storages to be retained at closure	C1		U		2				L			0	0	0	1	L
T	D	01	02	Failure of retained levees	Extreme flood events	Increased area of flooding	Retained levees will not be required to limit flooding post mining	C1		R		1				L			0	0	0	1	L
T	D	02		**Stable - geotechnical risk**																			
T	D	02	01	Wall failure/dam break of retained structures (including levees)	Extreme rainfall events	Downstream hazard to public	Only minor stock dams or engineered water storages to be retained at closure	C1		U		2	2			L	L		0	0	0	2	L
T	D	03		**Stable - erosional risk**																			
T	D	03	01	Erosion of retained minor creek diversion	Extreme rainfall events	Ongoing watercourse erosion	Diversion is existing and operating as designed with no evidence of erosion	C1		U			2				L		0	0	0	1	L
T	D	04		**Non-polluting - geochemical risk**																			
T	D	04	01	Water quality in retained storages not meeting PMLU water quality requirements	Adverse geochemical characteristics of disturbed materials in catchment	Livestock health	No evidence of adverse water quality in existing comparable structures	C2		U			2				L		0	0	0	1	L
T	D	05		**Non-polluting - other environmental harm**																			
T	D	05	01	Not applicable															0	0	0	0	
T	D	06		**Sustainable - PMLU**																			
T	D	06	01	Erosion of retained minor creek diversion	Extreme rainfall events	Ongoing watercourse erosion	Diversion is existing and operating as designed with no evidence of erosion	C1		U			2				L		0	0	0	1	L
T	D	07		**Sustainable - NUMA**																			
T	D	07	01	Not applicable															0	0	0	0	

Ref.				Risk Description				Control Effectiveness	Risk Evaluation						Risk Rating				Count				Final Risk Rating
Risk Type (T=Threat)	Category	Subcategory	Item	Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls		Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	H	S	M	L	
T	E			**Mine built infrastructure**																			
T	E	01		**Safe**																			
T	E	01	01	Surface roughness (rockiness, depressions) in excess of that expected for PMLU	Inadequate surface preparation, localised settlement, erosion gullies	Safety hazard for personnel, stock and wildlife	Slopes will be low, surface preparation measures (initial), monitoring, maintenance controls (pre-closure)	C1		U		2				L			0	0	0	1	L
T	E	02		**Stable - geotechnical risk**																			
T	E	02	01	Not applicable															0	0	0	0	
T	E	03		**Stable - erosional risk**																			
T	E	03	01	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required	C2		U			2				L		0	0	0	1	L
T	E	03	02	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Drainage network design with acceptable design standards for drainage structures, avoidance of flow concentration, sub-catchment delineation, sufficient water storage structures, engineered flow channels, effective revegetation techniques, rehabilitation monitoring and management as required	C2		U			2				L		0	0	0	1	L
T	E	03	03	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Existing rehabilitation of WRDs, downstream sedimentation controls, revegetation, monitoring and maintenance	C3	U				2				L		0	0	0	1	L
T	E	03	04	Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ vegetation disease/loss, climatic events	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required	C2		P			2				L		0	0	0	1	L
T	E	04		**Non-polluting - geochemical risk**																			
0	0	0	01	Not applicable															0	0	0	0	
T	E	05		**Non-polluting - other environmental harm**																			
T	E	05	01	Contaminated land	Operational phase industrial use of land	Land, surface water impacts	Infrastructure management, housekeeping. Phase 1 assessment at closure	C2		U			3				L		0	0	0	1	L
T	E	06		**Sustainable - PMLU**																			
T	E	06	01	Insufficient pasture productivity or density/diversity of vegetation in native PMLU	Weather, poor soil characteristics, poor management practices impacting germination, vegetation establishment and PMLU density/diversity metrics	Insufficient pasture productivity, habitat unsuitable for native fauna	Improving rehabilitation methodologies, trial activities, management and maintenance activities, rehabilitation performance monitoring	C2		P			3	2			M	L	0	0	1	1	M
T	E	06	02	Pests and weeds	Poor local, regional or site property management practices.	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management	C2		P			2				L		0	0	0	1	L
T	E	07		**Sustainable - NUMA**																			
T	E	07	01	Not applicable															0	0	0	0	
				End of record																			

Appendix E. Monitoring and maintenance plan

REHABILITATION MONITORING AND MAINTENANCE PLAN

KOGAN CREEK MINE PROJECT
REHABILITATION MONITORING AND MAINTENANCE PLAN

PREPARED FOR

CS ENERGY LTD

MARCH 2022

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Note: Appendices comprising field sheets have been removed from this version

1 Introduction

1.1 Purpose

The purpose of this monitoring and maintenance plan is to inform the development and implementation of rehabilitation monitoring programs at Kogan Creek Mine.

Rehabilitation monitoring is undertaken to provide a scientific basis has to support:

- the continuous review and development of rehabilitation methodologies suited to Kogan Creek Mine;
- the identification of rehabilitated areas not achieving a trajectory towards successful completion and the implementation of remedial action; and
- an informed assessment of rehabilitation performance able to support the progressive certification and eventual relinquishment of the mining lease following mine closure.

Effective rehabilitation monitoring plans are designed through consideration of the following steps:

1) the definition of the post-mining land uses to be achieved;
2) the identification of specific 'rehabilitation areas' or 'domains' where different post-mining land uses might be targeted;
3) the nomination of appropriate rehabilitation objectives for each rehabilitation area;
4) the establishment of completion criteria for each rehabilitation area; and
5) the identification of performance indicators and metrics that can be used to assess performance against the completion criteria established for each rehabilitation area.

1.2 Post-mining land use

For Kogan Creek Mine, Table 8 of the resource activity Environmental Authority (EA), EPML0041721), nominates post-mining land uses for various rehabilitation areas. However, the EA does not the nominate specific locations of rehabilitation areas. Similarly, the waste disposal EA (BRID0033) defines target post-mining land uses in Schedule F – Table 1. Given the general gradation of pre-mining land uses from grazing native vegetation in the northwest of the Project area to the remnant Eucalyptus species woodlands in the southeast, the proposed approach to rehabilitation of the site is to pursue a similar gradation of post-mining land use, that is from a primarily grazing land use in the northwest to areas of woodland in the southeast. This approach is consistent with the post-mine land descriptions used in the resource activity EA and best caters for the poor and limited topsoil resources available for rehabilitation.

1.3 Rehabilitation indicators and completion criteria

The identified rehabilitation indicators and completion criteria for Kogan Creek Mine are reproduced in Table 1.

Table 1: Rehabilitation objectives, performance indicators and completion criteria

Milestone Reference	Milestone Description	Performance indicators	Completion criteria	Applicable RAs
RM1	Infrastructure decommissioning and disposal	• Presence of mine infrastructure equipment, or materials not required for the PMLU	• All non-required services disconnected and removed • All concrete, bitumen and gravel removed • All operational pipelines drained and removed • All fencing that is not part of PMLU requirements removed • All buildings and footings demolished and/or removed • All machinery and equipment removed • All surface water drainage infrastructure that is not retained in the final landform removed • All rubbish removed	RA2a, RA2b, RA3 and RA7
RM2	Determination of contaminated land status	• Presence of contaminated materials or contaminants • Contaminated land assessment	• Contaminated material either remediated in-situ or removed/transported to an approved landfill for disposal and waste tracking information recorded and submitted. • Contaminated land assessment undertaken by an appropriately qualified person1. If required, a site investigation report including a site suitability statement prepared and submitted in accordance with the provisions of Chapter 7, Part 8 of the EP Act.	RA2b, RA3
RM3	Landform development (reshaping and reprofiling)	• Slope of final landform • Geotechnical study completed by a suitably qualified person to assess the geotechnical stability of final landforms • Drainage design by suitably qualified person	**Landform development works** • All bulk earthworks and landform reshaping/reprofiling works completed • Geotechnical assessment by an appropriately qualified person confirming that long term geotechnical stability has been achieved for each relevant landform • Installation of graded drains where slope lengths on slopes of 8° (14%) or greater would exceed 160 m constructed to an engineering specification by a suitably qualified person **Slope** • RA1 final landform slope < 8° (14%) • RA5 final landform:	RA1, RA2b, RA4, RA5 and RA6

Milestone Reference	Milestone Description	Performance indicators	Completion criteria	Applicable RAs
			• Highwall – achieve target design slope of 24°, but a maximum of 70° in competent rock or 45° in competent clays and weathered material where this can be demonstrated to reduce the disturbance footprint • Low wall – maximum 24° • Retained access ramp – maximum 6° • RA6 final landform slope < 9.5° (17%) **Residual Void Floor** • RA4 final void floor backfilled to be above regional equilibrium groundwater level	
RM4	Surface preparation (topdressing, scarification, contour ripping/discing/ soil amelioration activities)	• Evidence of landform surface preparation (contour ripping/discing/scarification, presence of topdressing/amelioration materials)	• Surface scarification, ripping or discing, along the contour of any slope to a depth of at least 200 mm. • Prior to each rehabilitation event, soil testing and agronomic analysis undertaken by an appropriately qualified person and a recommendation made for a topsoil/growth media/ ameliorant and nutrient combination suitable for the post mining land use revegetation program • Ameliorants applied and incorporated into surface, as recommended by an appropriately qualified person	RA1, RA2b, RA3, RA4, RA5, RA6 and RA7
RM5	Revegetation (seeding and/or planting)	• Seed germination and development of groundcover establishment	• Revegetation works by tubestock and/or direct seeding at rates determined for each rehabilitation event drawn from *Table 18 Current indicative native revegetation species and rates* or *Table 19 Indicative proposed revegetation species for the native fauna ecosystem PMLU* (Kogan Creek Mine Transitional PRCP, Version 9, 4 March 2022) • No later than 12 months from planting, a >50% survival rate for any given perennial species is achieved	RA1, RA2b, RA3, RA4, RA5, RA6 and RA7
RM6	Achievement of target revegetation criteria	• Ground foliage cover based on data acquired through the Rehabilitation Monitoring and Maintenance Plan	**Light Grazing and Fauna Habitat PMLUs:** • Total percentage of ground foliage cover is >50% • No recorded erosion classifications of 'Severe', no active erosion present as demonstrated by no increase in erosion ratings over time	RA1, RA2b, RA3, RA4, RA5, RA6 and RA7

Milestone Reference	Milestone Description	Performance indicators	Completion criteria	Applicable RAs
		• Erosion classification determined based on data acquired through the Rehabilitation Monitoring and Maintenance Plan		
RM7	Achievement of target PMLU	• Ground foliage cover and diversity based on data acquired through the Rehabilitation Monitoring and Maintenance Plan • Erosion classification determined based on data acquired through the Rehabilitation Monitoring and Maintenance Plan • Land suitability assessment by an appropriately qualified and experienced person • Fauna surveys including observations, scat identification in Open Woodland Ecosystem PMLUs • Surface water quality based on water quality monitoring program • Groundwater quality based on water quality monitoring program • Hazard and Safety Assessment by suitably qualified person	**Light Grazing PMLU:** • Total percentage of ground foliage cover, organic litter and rock is >75% • Land suitability assessment by an appropriately qualified person certifies land has achieved a post-mine land suitability of 4 or better • Minimum of 4 palatable perennial pasture species and 2 shade tree species established (note that shade tree species are to be excluded on RA6) • Evidence of recruitment from rehabilitation monitoring data • No evidence of erosion classified as 'Severe'. • No active erosion present as demonstrated by no increase in erosion ratings over time **Fauna Habitat PMLU (final void floor and high wall/low wall):** • Ground foliage cover > 75% • Minimum 14 target vegetation species comprising: o Grasses and forbs ≥ 4 o Mid storey species ≥ 6 o Canopy species ≥ 4 • Evidence of fauna habitat features (e.g. tree hollows, fallen timber, rock piles) consistent with analogue fauna habitat sites • Evidence of recruitment from rehabilitation monitoring data • No evidence of erosion classified as 'Severe' • No active erosion present as demonstrated by no increase in erosion ratings over time	RA1, RA2a, RA2b, RA3, RA4, RA5, RA6 and RA7

Milestone Reference	Milestone Description	Performance indicators	Completion criteria	Applicable RAs
			• Evidence of native fauna species utilisation in the form of fauna spotting, scats, and tracks • All safety precautions undertaken in accordance with the relevant legislation—signs comply with AS1319:1994– Safety Signs for the Occupational Environment • Access restrictions; either berms or fencing in place • Void highwalls and low walls are internally draining • Assessment from an appropriately qualified person that the final void does not act as a groundwater sink, the final void floor is above regional equilibrium groundwater levels and the final void is protected from flood water ingress **Water Storage PMLU:** • All retained water storages (banks and spillways) assessed as safe and stable by an appropriately qualified person • Retained storage water quality parameters to be below the trigger values for livestock drinking water defined in Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Volume 3 Primary Industries — Rationale and Background Information (ANZECC and ARMCANZ 2000). **All PMLUs:** • Hazard and Safety Assessment completed by an appropriately qualified person demonstrates hazards in rehabilitation areas are of a similar type and not significantly different to hazards in neighbouring unmined landscapes subject to a similar land use • Surface water quality parameters for runoff from all PMLUs to be below the trigger values for aquatic ecosystem values defined in Condamine River Basin Environmental Values and Water Quality Objectives (October 2020 or a later version). • Evidence that on-lease monitoring bores meet groundwater quality trigger levels as per Table 3 of the EA	

2 Monitoring program type

2.1 Rehabilitation inspections

Rehabilitation inspections provide the opportunity to acquire semi-quantitative data relating to rehabilitation performance with nominal preparation and effort. Kogan Creek Mine's approach to inspections may be either:

1) Event-based: i.e. following significant weather events. When safe to access following a significant weather event, rehabilitation areas are to be visited and the following data collected:

    a) photographs of any new instances of erosion, graded bank failure, capacity and condition of water storages, loss of vegetation or other biota;

    b) where possible, estimate the extent of any new instances of erosion including, for example, rehabilitation area, rill lengths, widths and depths, slope and location on slope;

    c) observations of vegetation health, cover, instances of lack of vegetation

    d) stability and function of erosion and sediment control and water management structures;

    e) presence of weeds and/or pests; and

    f) any other relevant observations.

2) Frequency-based: at least annually, and when safe to access, rehabilitation areas are to be visited and the following data collected:

    a) photographs of any new instances of erosion, graded bank failure, capacity and condition of water storages, loss of vegetation or other biota;

    b) where possible, estimate the extent of any new instances of erosion including, for example, rehabilitation area, rill lengths, widths and depths, slope and location on slope;

    c) observations of vegetation health, cover, instances of lack of vegetation

    d) stability and function of erosion and sediment control and water management structures; and

    e) presence of weeds and/or pests; and

    f) any other relevant observations.

A standardised data collection approach is to be utilised, to allow temporal analysis to be undertaken.

2.2 Rehabilitation monitoring

Rehabilitation monitoring provides the opportunity to acquire scientific, quantitative data relating to rehabilitation performance but requires planning effort and monitoring resources. Kogan Creek Mine's approach to monitoring includes:

1) Initial establishment monitoring: that is for newer rehabilitation areas and annually for the first three years from initial establishment. A rapid assessment is to be undertaken at a consistent time of year (post-wet season), and the following data collected:

    a) percentage estimate of bare ground;

b) estimate of general vegetation height;

c) vegetation composition (comparison with sown species);

d) observations of plant species of management concern (pest species);

e) observations of erosion including depth, width, suspected cause (e.g. soil dispersibility, run-on drainage, graded bank failure etc.); and

f) photo point monitoring.

2) Long term monitoring: at years three, five, seven and then and thereafter every five years. The detailed rehabilitation monitoring methodology used is described in section 3.

Consideration will be given to integrating rehabilitation monitoring programs with remote sensing technologies where these can be demonstrated to provide comparable, replicable, broad area information that meets the objectives outlined for rehabilitation monitoring in section 1.1.

2.3 Rehabilitation monitoring records

For each rehabilitation campaign (i.e. following seeding of a rehabilitation area), the complete details of the rehabilitation operation are to be recorded, and are to include:

- Topsoil source, analysis results and pre-treatments applied;
- Surface preparation works (e.g. contour ripping including depth, spacing, machinery, graded bank design parameters, addition of ameliorants including type and rate);
- Climatic records;
- Revegetation species, rates and sowing method;
- Fertiliser applications including types, rates and timing;
- Maintenance works undertaken.

Where possible, records will be maintained along with area polygons using a geographic information system.

2.4 Rehabilitation monitoring plan review

A review of the effectiveness of the rehabilitation monitoring plan is to be undertaken at least every two years. The following aspects will be considered as a minimum:

- post-mining land use, completion criteria, and indicator validity and effectiveness;
- appropriateness of inspection and monitoring frequency;
- overall rehabilitation performance; and
- requirements for maintenance works including frequency and severity of works required.

3 Monitoring methodology

The following subsections detail the monitoring methodology implemented for the ongoing management of the Project's rehabilitation activities. A combination of field surveys, satellite imagery and external and internal reporting will be utilised for the monitoring of rehabilitation activities.

3.1 Determining analogue site locations

Where analogue sites are required, they will be established in areas having the same or similar final land use vegetation community. Reference transects should be at sufficient replication to allow for statistical testing that is rigorous enough to determine differences between analogue and rehabilitation sites and the achievement of completion criteria. For the PMLU of grazing, a minimum of five transects should be established for each land suitability class anticipated to be used to characterise the rehabilitation areas. Fauna habitat rehabilitation sites will be paired with five or more reference sites characterised by native regrowth. Vegetation communities of native regrowth areas exhibit the ability to re-establish in previously disturbed areas. This is a trait required by mining disturbed areas to optimise the likelihood of successful rehabilitation.

3.2 Vegetation surveys

A transect based approach (consistent with the BioCondition methodology) will be utilised for vegetation monitoring. This approach aims to provide a measure of the capacity of a terrestrial ecosystem to maintain biodiversity values at a local or property scale and allows a comparative assessment of pre- and post-mining ecosystems.

BioCondition monitoring assesses a suite of parameters at different landscape positions on each site, namely on flats, slopes and in troughs (Eyre *et al.* 2017). Repeated edaphic (soil properties) and biological measurements are taken over time for various parameters that indicate changes in ecosystem function as rehabilitation proceeds

Vegetation monitoring will involve the collection of the quantitative data relevant to the land use and vegetation being monitored. This may include:

- ground cover percentage;
- canopy cover;
- species richness;
- woody stem density;
- recruitment; and
- weeds.

Permanent pasture monitoring transects should be established in rehabilitation and unmined (reference site) areas, where available. Rehabilitation and reference site monitoring transects shall be stratified according to the target pasture type, as appropriate. Monitoring plots should then be randomly located within each rehabilitation block according to age class of the rehabilitation. The recommended minimum number of transects for pasture rehabilitation areas per age class and type of pasture is shown in Table 2.

Table 2: Recommended minimum number of transects

Area	Minimum number of transects
0-10	1
> 10-25	3
> 25-50	4
> 50-100	5

Pasture reference transects should be at sufficient replication to allow for statistical testing that is rigorous enough to determine differences between reference site and rehabilitation values and the achievement of completion criteria. A minimum of three transects within each representative reference pasture area is recommended and it is recommended that the frequency and timing of monitoring of reference sites coincides with monitoring of rehabilitation areas. Where possible reference sites should be chosen that replicate anticipated rehabilitated area slopes. Results from reference sites will be used to compare monitoring results obtained from rehabilitated site transects.

To establish transects, at each monitoring site a 50 m tape is extended, with a star picket installed at each end of the transect to consistently and precisely identify the transect location during each monitoring period. The coordinates of the transect are recorded at each end of the transect, to establish a permanent 50 m transect. The transect area extends 5 m on either side of the 50 m tape.

The survey methodologies outlined below have been adapted from the Queensland Herbarium survey technique 'Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland' (Neldner *et al*. 2019) and the 'Method for the Establishment and Survey of Reference Sites for BioCondition' (Eyre *et al*. 2017).

Field sheets should be used to collect rehabilitation survey data.

Monitoring of vegetation will preferably be undertaken after the wet season to ensure the presence of ephemeral herbaceous plants and to assist with identification of species that require the presence of flowers/fruiting material for accurate identification.

3.2.1 Ground cover

Ground cover monitoring involves the collection of quantitative data on average ground cover (percent) where the percentage of all types of ground cover within ten 1 m x 1 m quadrats is determined. Similar to the transect above, the quadrat shall be placed every 5 m on alternating sides of the transect, commencing at 0 m on the right and the final quadrat at 45 m. In each quadrat the total percentage ground foliage cover of each plant species and the percentage cover of bare soil, rock and organic litter is to be recorded.

Ground foliage cover incorporates native perennial grass cover, native annual grass cover, native forbs and other species, native shrubs (< 1m height), non-native grass, non-native forbs and shrubs, and cryptogams. A datasheet for the collection of data and for consistency a guide to estimating percentage ground cover is provided.

3.2.2 Species diversity

Species diversity is assessed using the method outlined in Eyre *et al*. (2017) where all vascular plants that occur within a 10 m x 50 m plot area are recorded. The surveyor is to walk along each side of the 50 m transect

centre-line and record all trees, shrubs, forbs/other species, and grasses occurring within 5 m of either side of the centre-line. Species that cannot be identified within the field are collected for later identification or sent to the Queensland Herbarium for identification.

3.2.3 Stem density

Woody stem density is calculated using methodology adapted from the '*Method for the Establishment and Survey of Reference Sites for BioCondition'* (Eyre *et al*. 2017). All woody stems for each tree and shrub species are counted within the 10 m x 50 m plot area (i.e. 5 m either side of each 50 m transect). From this data, both total woody stem density as well as the density of each individual tree or shrub species is calculated. The density of species and growth forms on the monitoring sites is then calculated using the following equation:

Density per hectare (ha) = number of stems recorded within the transect x 20.

3.2.4 Recruitment

Recruitment is assessed using methodology adapted from Eyre *et al*. (2015), whereby recruitment is assessed over the 10 m x 50 m plot (5 m either side of each 50 m transect). Within this plot, the proportion of dominant species found to be regenerating are counted. A regenerating individual is identified as a woody stem species at breast height, with a diameter of <5 cm. For each dominant canopy species present, at least one individual must be present as a sapling or seedling for the species to be considered as regenerating. The presence of all dominant species in the regenerative state would make up 100% recruitment.

3.2.5 Canopy cover

Tree canopy cover can be used to characterise stand productivity and the distribution and abundance of biomass (Eyre *et al*. 2017). It refers to the estimation of the percentage canopy cover of the living, native tree layer along a 50 m transect, using the line intercept method (Greig-Smith 1964). For this attribute, the vertical projection of tree canopy cover of the species making up the tree canopy cover is assessed. The vertical projection of the tree canopy over the 50 m transect is recorded as illustrated in Figure 1. The total length of the projected canopy of each layer is then divided by the total length of the tape to give an estimate of percentage canopy cover on the site.

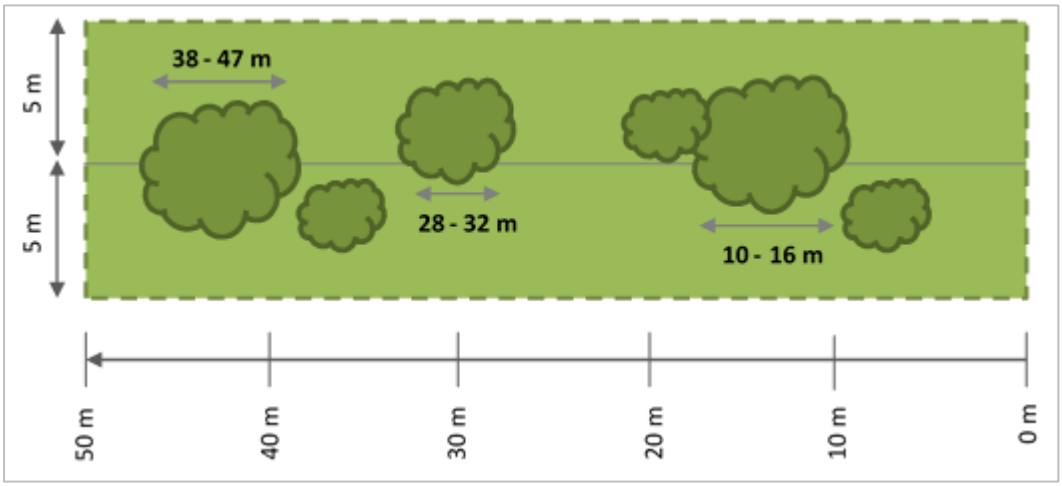

*Figure 1 Guide to monitoring canopy cover (*after *Eyre et al. 2017)*

3.2.6 Erosion monitoring

An erosion monitoring methodology has been developed by with consideration to relevant guidelines, research, and experience (The National Committee on Soil and Terrain 2009;, Eyre *et al*. 2017 and DSITI 2015). Erosion monitoring is to be conducted across all analogue and rehabilitation monitoring locations. Rehabilitation areas will be inspected to assess the extent of erosion features and an erosion rating for each site will be determined. Erosion features or indicators may include wind or sheet erosion, erosion rills, gullies or tunnels, or signs of slumping. There is no consensus in Australia on quantitative definitions for minor, moderate or severe erosion. The classifications in Table 3 have been adapted from the Australian Soil and Land Survey Field Handbook (The National Committee on Soil and Terrain 2009).

Erosion at survey sites is monitored through visual assessment over time. Assessment is undertaken by traversing the 50 m transects and recording the number and maximum depth of any erosion features or rill lines. Table 3 is used to record and classify these observations. Obvious cases of localised settlement which are not causing any subsequent erosion are not considered instances of erosion.

Erosion is considered to be stable when there is no increase in number and/or maximum depth of rill erosion over time. Erosion is expected in the first years due to topsoil ripping and an absence of vegetation. Therefore, erosion stability will be assessed from year four following seeding/planting. Monitoring will commence in the first year and the first three years will represent landform establishment. In year four the transects will be traversed by two independent recorders on the same day, recording the location, depth and number of rills/gullies. The variation in assessment between independent observers will describe the acceptable range of "no-change" in erosion over time.

Table 3: Erosion classification

Erosion classification	**Minor**	**Moderate**	**Severe**
Sheet erosion	Shallow soil deposits downslope	Partial exposure of roots; moderate soil deposits downslope, etc.	Loss of surface horizons; root exposure, etc.
Rill/gully erosion	<15 rills and <0.3 m deep	15-30 rills and <0.3 m deep	>30 rills and/or any >0.3 m deep
Tunnel erosion	-	-	Present
Mass movement	-	-	Present

Source: The National Committee on Soil and Terrain 2009

It should be noted that the placement of permanent transects may not be representative of the level of erosion across the entire rehabilitation area landforms. To compensate for this, general observations undertaken during the survey are also utilised in assessing rehabilitation performance. The location of any severe erosion outside the transect (i.e. tunnels, mass wasting, large gullies) is also recorded and marked with a handheld GPS instrument.

The following information is recorded at each site:

- GPS reading of location;
- general description of type of erosion (gully [> 30 cm], rill line [<30 cm], circular failure, tunnelling etc.) and possible causes, refer to the glossary of terms for definitions of erosion types;
- depth of erosion;
- width of erosion;

- length of erosion;
- where eroded material is being deposited; and
- whether the erosion line is being stabilised by vegetation.

3.2.7 Soil monitoring

Soil monitoring involves the collection of topsoil samples from a maximum depth of 10 cm to obtain quantitative data on the chemical and physical properties of soil. Soil sampling methodology has been adapted from 'Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009' (DES 2018). Soil sampling is conducted by collecting approximately 200 g samples with a clean non-metallic shovel and bucket every 10 m along the 50 m transect. The first sample is collected at 0 m. These five samples are mixed in the bucket. The final 200 g soil sample is taken from the mix and placed into plastic sample bag. Samples are sent to a National Association of Testing Authorities (NATA) certified laboratory for analysis of indicators of soil nutrition and land contamination.

Soil moisture content shall be measured for interpretive purposes only and will not be assessed in determining rehabilitation performance.

Ideally, rehabilitation site data should reflect that of analogue sites, though data indicating a trajectory to meet performance criteria may be sufficient in supporting the chosen post-mining land use.

3.2.8 Photographic monitoring

Photographic monitoring provides a visual record of the vegetation, ground cover, erosion, and general appearance of each analogue and rehabilitation site, allowing these sites to be compared over time (Eyre *et al*. 2015). A digital camera is used to take the photos so that a permanent record can be kept for each site. The process of taking the monitoring photos is as follows:

1) The site, date the photo was taken and the direction the photo was taken should be recorded for each photograph taken. A data board included in the photograph can be useful for this purpose.
2) The person taking the photograph stands at the star picket which marks the beginning of the 50 m.
3) The camera is aimed directly towards the end of the 50 m transect and a single, landscape photograph is taken.
4) The person then stands at the star picket which marks the end of the 50 m transect.
5) The camera is aimed directly towards the start of the 50 m transect and a single photograph is taken.
6) Steps 1 – 6 are repeated for all terrestrial monitoring sites.

The digital photographs are to be downloaded and stored for future reference.

3.2.9 Emerging monitoring technologies

Where emerging rehabilitation technologies develop to a level that they can cost-effectively provide information allowing an improved assessment of rehabilitation completion criteria, these will be reviewed and introduced as appropriate. An example is the normalised difference vegetation index, which can be used to assess vegetation cover and vegetative health.

3.2.10 Fauna observations

Observations of any fauna species presence within or in the vicinity of the rehabilitation areas will be noted as part of rehabilitation monitoring. Where monitoring and management deems necessary, targeted fauna surveys will be developed and undertaken.

3.3 Surface water and groundwater

All surface water and groundwater quality monitoring is undertaken in accordance with the Project's *Surface Water and Groundwater Monitoring Program* (CS Energy 2019). This document specifies the objectives, monitoring locations, monitoring parameters and frequencies of monitoring, quality control and assurance requirements and provides procedures for use by monitoring staff.

4 Data analysis, interpretation, and reporting

4.1 Laboratory analysis

All water, soil and dust samples collected during rehabilitation monitoring will be sent to a NATA certified laboratory for analysis of the recommended parameters.

In the event that, any plants cannot be identified in the field, samples will be sent to the Queensland Herbarium for identification.

4.2 Progress reporting

Rehabilitation monitoring reports will be prepared at an appropriate frequency following the collection of monitoring data with the purpose of presenting analyses of monitoring results and evaluating rehabilitation progress towards completion criteria. This ongoing evaluation will enable the early detection of unfavourable trends in measured indicators and identify any requirements for adaptive management practices to ensure rehabilitation success and certification in the long term.

4.3 Interpretation

Rehabilitation monitoring results will be analysed both categorically and temporally. Results obtained from rehabilitation sites will be compared to analogue sites from the same final land use vegetation community. Rehabilitation monitoring results will also be compared with historical data where possible to detect any trends over time. Common variables such as climatic conditions, seasonal variation and other event specific circumstances will also be considered in the analysis of rehabilitation data.

4.4 Statistical analysis

The analysis of rehabilitation monitoring results will involve comparing rehabilitation sites generally across the Project using the following analytical methods where appropriate:

- Statistical analysis will be undertaken where required to identify any significant differences between sample means. To determine any significant differences ($\alpha = 0.05$) between the means of rehabilitation characteristics recorded across analogue and rehabilitation sites, it is recommended that rehabilitation performance be assessed using a t-test (where a minimum of three sites are available providing sufficient statistical replication) or a similar nonparametric test where the data is not normally distributed. Variables measured at analogue and rehabilitation sites are considered statistically comparable where no significant difference between the means is detected.
- in relation to vegetation and soil quality characteristics, the mean values +/- 1 standard deviation will be calculated for comparison of analogue and rehabilitation site data; and
- temporal variation will be presented graphically for vegetation and soil quality variables as required to identify any outliers or ongoing trends.

5 Maintenance

5.1 General maintenance

Following rehabilitation activities, access to rehabilitated areas will be limited to monitoring, management and reparation activities until the successful establishment of groundcover (to be determined by the completion criteria). Fencing of rehabilitated areas may be required to prevent access by fauna and will be removed once adequate groundcover is established.

5.2 Remediation activities

Significant rainfall events, floods, fire, drought, pest species outbreaks or other factors may also result in a requirement to maintain rehabilitated areas. Visual inspection of revegetated areas should be undertaken regularly to determine maintenance requirements. Maintenance of rehabilitated areas or reparation may also be required where visual observations of rehabilitation and or rehabilitation monitoring results indicate that the expected trajectory towards achieving completion criteria is not being met. Depending on the underlying cause of failed rehabilitation, reparation maintenance activities may include:

- Hydro seeding, mulching and matting;
- The application of gypsum, liquid fertiliser or feedlot manure at rates dependent on the results of soil testing;
- earthworks repair of erosion areas;
- re-seeding / replanting failed or unsatisfactory areas;
- supplementary planting of tube stock;
- irrigation in drier areas; and
- repair or alteration of drainage structures.

In the event that maintenance is required, a maintenance plan will be developed that properly assesses the risks of re-entering a rehabilitated area with earthmoving equipment, the sourcing of soils and topsoil, impacts on planned drainage of the site, erosion controls and revegetation methods.

Appropriate reparation techniques may be developed through research trials to maximise site-specific rehabilitation success.

5.3 Weed and pest management

The first few years following planting are critical for controlling the spread of invasive species. As pioneer species, weeds tend to out-compete native species on disturbed soils before desirable species have had time to set roots and adequately cover a rehabilitated area. During the first three growing seasons, botanical surveys and hand removal of weeds or targeted herbicide applications should be pursued. Weed cover should be comparable to analogue site.

Potential weed species listed as category 3 invasive plants under the Biosecurity Act 2014, known to impact surrounding sites include the following (Ecological Survey and Management 2019):

- *Opuntia aurantiaca*
- *Opuntia stricta*
- *Opuntia tomentosa;* and
- *Byrophyllum delagoense.*

Currently, the preferred treatment of Opitoid cactus includes the introduction of the biological control agent *Dactylopius austrinus* or the application of the herbicide Triclopyr (600g/L) mixed with diesel for dilution (Ecological Survey and Management 2019).

The feral pig (*Sus scrofa)* is a pest species listed as a restricted invasive animal under the *Biosecurity Act 2014* and is known to inhabit areas surrounding the Project (Ecological Survey and Management 2019). Management of feral pig will be undertaken in accordance with relevant guidelines including the *'Feral Pig Control Manual'* (DPI&F 2008) and *'Queensland pest animal strategies: Feral Pigs Sus scrofa'* (DNRME 2004).

5.4 Erosion and sediment control

Erosion and sediment control measures are managed through an Erosion and Sediment Control Plan. Erosion and sediment control structures will generally be designed and installed in accordance with *Best Practice Erosion and Sediment Control* (IECA Australasia 2008) and *Soil Erosion and Sediment Control: Engineering Guidelines for Queensland Construction Sites* (Witheridge & Walker 1996), as appropriate. Erosion and sediment control structures will be retained until disturbed areas have been stabilised and the risk of erosion or sedimentation impacts meet completion criteria and run-off water quality meets the water quality objectives detailed in accordance with the Project's EA.

6 Milestone criteria and monitoring

Nine rehabilitation milestones have been developed for the Project and will be used to inform assessment against the completion criteria for the Project.

Rehabilitation milestones are site-specific, dependent on the rehabilitation function areas and the PMLU. The proposed disturbance footprint has been divided into the rehabilitation areas outlined in Table 4. Refer to the Progressive Rehabilitation and Closure Plan (PRC Plan) for the locations of rehabilitation areas and milestone schedule.

Table 4: Kogan Creek Coal Mine rehabilitation areas

Rehabilitation Area Reference	Description
RA1	In-pit and out-of-pit waste rock emplacements
RA2a	Retained water management infrastructure (including diversions)
RA2b	Rehabilitated water management infrastructure (including levees)
RA3	Infrastructure areas (including major haul roads)
RA4	Residual void
RA5	Residual void highwall / low wall
RA6	IPAC and OPAC cell batters
RA7	Exploration tracks and drill pads

6.1 Milestones RM1 and RM2: Infrastructure decommissioning/disposal and determination of contaminated land status

Milestone RM1 is applicable to all infrastructure identified to be decommissioned and disposed of. Infrastructure decommissioned during the operational phase of mining will be subject to ground disturbance permitting processes that include a completion inspection to be undertaken by the Environment Department.

Milestone RM2 is applicable to any areas where notifiable activities have been carried out and will be assessed by, as a minimum, the completion of a phase 1 contaminated land investigation undertaken by an appropriately qualified person.

6.2 Milestone RM3: Landform development (reshaping/profiling)

On completion of construction and reprofiling of the final landform, inspection and reporting will be undertaken to confirm and provide assurance that landform development and reshaping has been undertaken in accordance with approved designs. As constructed plans will be prepared upon completion of landform

development. Where deviations from the design plans and as constructed plans occur, these will be highlighted, justified, and approved by an appropriately qualified person.

A geotechnical assessment of landform stability and the final void will be undertaken to demonstrate achievement of completion criteria.

Records of reporting including design and as constructed plans will be maintained in a database by CS Energy as per section 2.3.

6.3 Milestone RM4: Surface preparation (topdressing, scarification, contour ripping/discing, soil amelioration activities)

Soil assessments of topsoil stockpiles will be undertaken prior to use in rehabilitation activities to confirm soil is suitable to support target vegetation, the requirement for soil ameliorants and the depth of topsoil to be applied. Contours will be deep ripped across slopes to promote landform stability and vegetation uptake.

Records of topsoil use in rehabilitation activities and contour ripping undertaken will be maintained and documentation of each of the below details will indicate completion of milestone RM4:

- topsoil assessment surveys of topsoil stockpile;
- date topsoil was applied;
- GIS files that include the area topsoil was applied where soils of different soil mapping units are mapped separately;
- depth of topsoil applied;
- contour ripping undertaken including depth and space of ripping; and
- details of any further surface preparation activities including but not limited to mulch application, soil amelioration etc.

6.4 Milestone RM5: Revegetation (seeding and/or planting)

Records of revegetation activities will be maintained, documentation of each of the below details will indicate completion of the milestone:

- GIS files of the areas where seeding and planting have occurred, areas with different SMUs, seed mixes or dates of planting are to be mapped separately;
- SMU of topsoil applied;
- date the seed mix was applied, or planting of tube stock was carried out;
- if seeding, the seed mix, and rate of seeding applied;
- if planting, the number of tube stock planted; and
- where appropriate, where results from revegetation trials were used to inform revegetation methods.

6.5 Milestone RM6: Achievement of target revegetation type

A combination of field surveys and satellite imagery monitoring as described in section 3 will be used to confirm achievement on milestone RM6. Rehabilitated areas will be assessed against analogue sites of similar characteristics and land use and completion criteria outlined in the PRC Plan.

6.6 Milestone RM7: Achievement of target PMLU

The achievement of a stable landscape that can support the nominated PMLU will be assessed against the completion criteria, pre-mining assessments and appropriate analogue sites. The following assessments of monitoring data will be used to determine that land has achieved milestone RM7:

- closure post-mining soil and land suitability assessment;
- flora and fauna assessments (as described in section 3);
- erosion assessment (as described in section 3);
- groundwater assessment
    - Groundwater monitoring will be undertaken throughout mining operations, rehabilitation and closure. Groundwater quality and levels will meet EA requirements and relevant completion criteria;
- surface water quality monitoring program;
    - Surface water quality monitoring will be undertaken throughout mining operations, rehabilitation and closure. Surface water quality of the receiving environment will be assessed against the requirements of the EA and relevant completion criteria;
- Hazard and Safety Assessment of all PMLUs completed by an appropriately qualified person; and
- geotechnical assessment;
    - A geotechnical assessment will be completed by an appropriately qualified person of landform stability of retained water storages;

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Appendix F. Stakeholder engagement plan

Kogan Creek Mine: Stakeholder Engagement Plan

KOGAN CREEK MINE
STAKEHOLDER ENGAGEMENT PLAN

PREPARED FOR:
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17 DECEMBER 2020

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Document Control

Project Name:	Kogan Creek Mine
Report Title:	Stakeholder Engagement Plan
Client:	CS Energy Ltd
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Draft issued for client review		SR	SR	2 Nov 2020
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List of Abbreviations

AARC	AARC Environmental Solutions Pty Ltd
AGM	Annual general meeting
BEST	Bringing Employers and Schools Together
CCBT	Chinchilla Community Benefits Trust
CHMP	Cultural Heritage Management Plan
CLG	Community liaison group
CSP	Community Sponsorship Program
DES	Department of Environment and Science
DNRME	Department of Natural Resources, Mines and Energy
EA	Environmental Authority
ML	Mining lease
PMLU	post-mining land use
PRCP	Progressive rehabilitation and closure plan
ROM	Run-of-mine
SEP	Stakeholder Engagement Plan
TRIM	Total Records and Information Management

1 Introduction

1.1 Background

AARC Environmental Solutions Pty Ltd (AARC) has been commissioned by CS Energy Limited (CS Energy) to develop a Stakeholder Engagement Plan (SEP) for Kogan Creek Mine (the Project). The Project operates under Environmental Authority (EA) EPML00417213 issued to Aberdare Collieries Pty Ltd (Aberdare), a subsidiary of CS Energy on 10 August 2018.

Amendments to the *Environmental Protection Act 1994* (EP Act) in 2018 introduced a package of reforms relating to the progressive rehabilitation and closure of mined lands. A critical element of these reforms is a requirement for the development of a progressive rehabilitation and closure plan (PRCP) detailing how, where and when rehabilitation activities will be carried out on land in a way that maximises the progressive rehabilitation of the land to a stable condition.

Specifically, as part of the progressive rehabilitation planning requirements introduced, section 126C(1)(c)(iv) of the EP Act requires:

> *details of how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan.*

The supporting guideline 'Progressive rehabilitation and closure plans' (DES 2019), states that a community consultation plan must include details of:

- the objectives for community consultation (refer Section 2);
- how the community will be engaged (refer Section 5);
- the proposed consultation frequency (refer Section 5);
- what information will be released for community consultation (refer Section 5); and
- how feedback and comments will be considered (refer section 5.4).

This SEP outlines CS Energy's approach to the planning, management and review of stakeholder engagement activities such that the requirements of the guideline are addressed. Through this SEP, CS Energy aims to build and maintain effective relationships with its internal and external stakeholders, thereby ensuring that relevant stakeholders are provided the opportunity to engage on rehabilitation and closure matters relating to the Project.

1.2 Project overview

Kogan Creek Mine (the Project) is an open-cut coal mining operation within mining lease (ML) ML50074 located in the Surat Basin, central Darling Downs region of south-east Queensland, approximately 9 km south of Brigalow (a small town approximately 20 km east of Chinchilla and 280 km west northwest of Brisbane) (Figure 1). The Project supplies up to 2.9 million tonnes per annum (Mtpa) of thermal coal to the adjacent 750 MW Kogan Creek Power Station also owned by CS Energy. The coal required for Kogan Creek Power Station is sourced from the Project as a run-of-mine (ROM) product and transported 4 km to the power station by a covered overland conveyor.

The Project is comprised of one ML (50074) which is 2,374 ha in area, with surface rights to 2,046 ha. The ML boundaries are shown in Figure 2. Aberdare holds freehold title to the area of surface rights and significant buffer lands. The existing tenure extinguishes Native Title under the *Native Title Act 1993*.

Figure 1: Project Locality

1.3 Existing community

The Project is located within the Western Downs Region of Queensland located approximately 200 km west of Brisbane and stretching from Dalby in the east to a point approximately 60 km west of Miles. The area is predominantly rural, with numerous small townships and villages. The largest township is Dalby with a population of 12,005 (2016 ABS census data), followed by Chinchilla (5,877). Other villages proximate to the Project record populations less than 6,000. Local population centres and their proximity to the Project are shown in Figure 2.

European settlement dates from the 1840s, with land used mainly for sheep and cattle grazing, grain growing and timber getting. Growth took place during the late 1800s and into the early 1900s when several small townships were established, aided by the opening of railway lines. Coal mining began in 1914 at Warra, but only lasted for five years. Population growth took place in the post-war years, particularly in the townships of Chinchilla, Dalby, Jandowae, Miles, Tara and Wandoan. The Moonie oil field began production in 1961. The population of the Council area increased from the mid-1990s, rising from about 22,300 in 1996 to about 33,000 in 2011. This growth was aided by the opening of the Kogan Creek Power Station and mine from 2006. Population growth is expected to continue, largely as a result of ongoing growth in the gas and oil sectors in the Surat Basin.

Rural land use is largely agriculture, particularly grain and cotton growing, with some sheep and cattle grazing and broadacre farming. Forestry and mining are also important industries, with the area being home to oil fields, coal mines, power stations and gas production.

The Project has approximately five near neighbours abutting or in close proximity to owned property boundaries, and who are engaged on a regular basis on a variety of matters.

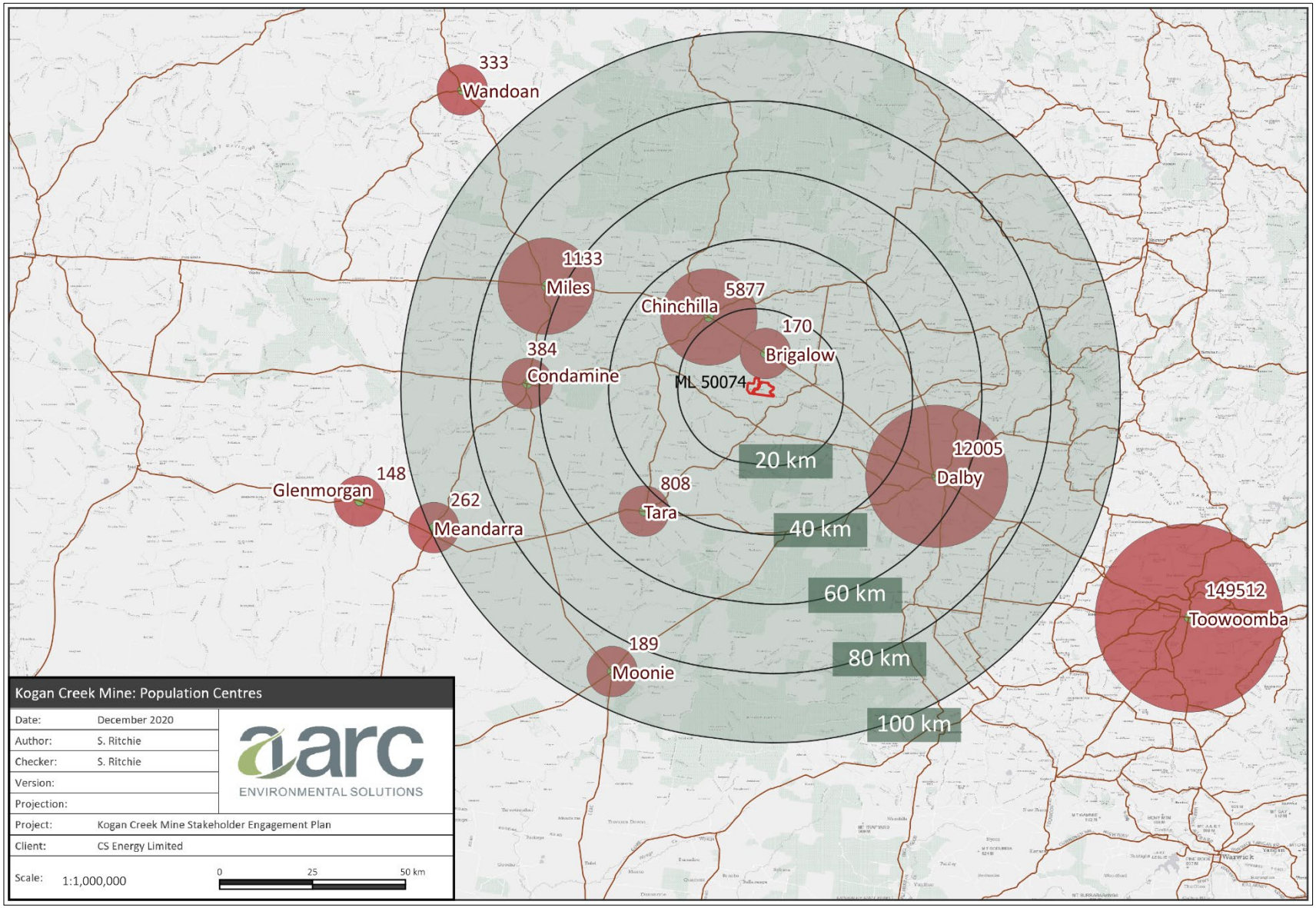


Figure 2 *Population centres local to Kogan Creek Mine*

2 Approach

2.1 Objectives and scope

CS Energy strives to be trusted as a socially responsible business and is committed to its environmental, legal and social licence by operating in an environmentally responsible manner. CS Energy has a standing commitment, outlined in its Health, Safety and Wellbeing policy, to proactively consult and communicate with employees, contractors and stakeholders.

Through this SEP, CS Energy aims to build and maintain effective relationships with its internal and external stakeholders, thereby ensuring that relevant stakeholders are provided the opportunity to engage, among other things, on certain rehabilitation and closure matters relating to the Project.

The SEP aims to provide CS Energy with a practical tool for effective stakeholder engagement on rehabilitation and closure matters and addresses the following aspects of stakeholder engagement:

- identification and analysis of stakeholders;
- engagement objectives;
- stakeholder engagement planning including engagement principles and opportunities; and
- management of stakeholder engagement including record keeping and management review.

Specifically, in relation to rehabilitation and closure matters, the following objectives are relevant:

- establish and maintain engagement practices that promote an ongoing relationship with stakeholders;
- provide relevant, timely and accurate information to stakeholders;
- provide convenient avenues for feedback from stakeholders;
- record and respond to rehabilitation and closure feedback in a timely manner; and
- monitor engagement activities to enable review and improvement of engagement activities.

2.2 Temporal rehabilitation and closure engagement aspects

All mining operations progress through a lifecycle that consists of distinct phases commencing with feasibility and approvals through to closure and post-closure. Across this lifecycle, the focus of engagement with stakeholders will inevitably evolve and change. Table 1 provides a general overview of the changing engagement focus that typically occurs over the lifecycle of a mining operation and provides a reference for planning engagement agenda and activities.

Engagement on rehabilitation and closure issues should occur over the full life cycle of a mining operation so that the range of related socioeconomic and environmental impacts can be discussed with the community.

Table 1: Mine life cycle and rehabilitation and closure engagement focus

Mine lifecycle phase	Mine lifecycle characteristics	Rehabilitation engagement focus	Closure engagement focus
Approvals phase	• 10-2 years* prior to commencement • rehab:dist = n/a	• scale of disturbance • PMLU options/ assessment • rehabilitation risks/ assessment • mine rehabilitation planning	• PMLU options and options assessment • closure risks
Construction phase	• 2-0 years* post-commencement • rehab:dist = 0*	• construction phase rehabilitation activities • topsoil management • Land management issues (e.g., pest/weed control, buffer lands management etc.) • mine rehabilitation planning • rehabilitation risks/ assessment • PMLU options/ assessment	• PMLU options and options assessment • closure risks
Early operations phase	• 0-10* years post-commencement • rehab:dist = 0-1* (gradually increasing)	• topsoil management • land management issues (e.g., pest/weed control, buffer lands management etc.) • mine rehabilitation planning • rehabilitation trials and rehabilitation methodology development • rehabilitation schedule compliance • rehabilitation risks review • estimated rehabilitation costs	• PMLU options and options assessment • estimated closure costs • closure risks review
Mid-operations phase	• > 10 years* post-commencement • rehab:dist ≈ 1* (increasing)	• rehabilitation monitoring and performance • rehabilitation trials and rehabilitation methodology development • land management issues (e.g., pest/weed control, buffer lands management, rehabilitated lands management etc.) • mine rehabilitation planning • rehabilitation schedule compliance • rehabilitation risks review • estimated rehabilitation costs review	• closure planning • PMLU options and options assessment • estimated closure costs review • closure risks review
Pre-closure phase (e.g., 5 years prior to closure)	• < 5 years* pre-closure • rehab:dist > 1 (increasing)	• rehabilitation monitoring and performance • rehabilitation methodology development	• closure planning • closure costs review • closure risks review • regional social impacts of closure

Mine lifecycle phase	Mine lifecycle characteristics	Rehabilitation engagement focus	Closure engagement focus
		• land management issues (e.g., pest/weed control, buffer lands management, rehabilitated lands management etc.) • mine rehabilitation planning • rehabilitation schedule compliance	• surrender process • land ownership transition • retained infrastructure transition • asset disposal
Post-closure phase	• 0-10 years* post-closure • rehab:dist > 1 to 0 (at completion)	• rehabilitation monitoring and performance • land management issues (e.g., pest/weed control, buffer lands management, rehabilitated lands management etc.) • rehabilitation schedule compliance	• closure risks review • regional social impacts of closure • surrender process • land ownership transition • retained infrastructure transition • asset disposal
Pre-surrender	• > 10 years* post-closure • Rehab:dist = n/a	• rehabilitation monitoring and performance • land management issues (e.g., pest/weed control, buffer lands management, rehabilitated lands management etc.)	• closure risks review • regional social impacts of closure • surrender process • land ownership transition • retained infrastructure transition • asset disposal

* numeric values are intended to be indicative only and will vary depending on specific circumstances

2.3 Roles and responsibilities

CS Energy's Corporate Affairs team holds overall responsibility for the business' approach to stakeholder engagement. For required rehabilitation and closure engagement planning and activities, CS Energy's Head of Environment will work with Corporate Affairs to plan relevant engagement activities, identify resources for implementation, and monitor and review engagement outcomes and process. SEP review and planning sessions are to be undertaken at least annually.

3 Project stakeholders

3.1 Stakeholder identification and analysis

For the purposes of stakeholder engagement planning, and further to the broad regional community description provided at section 1.3, stakeholder groups have been identified and classified broadly into potentially 'affected' and 'interested' stakeholders. The EP Act (sections 38 and 41) defines 'affected' and 'interested' persons based on the predicted level of impact, the perceived level of stakeholder involvement in site activities, and the perceived level of interest in site activities or the outcomes of decisions; as:

1) a 'potentially influential' person:
   - A person who has the authority or ability to influence the operation or management of the Project (e.g., regulators, shareholders, management etc.)
2) a 'potentially affected' person:
   - a person who is (among others) the registered proprietor/s of any freehold land, the registered holder/s of any land that is held from the State, any holder/s or applicant/s of mining tenures or other resource related tenures, a trustee of any land under the Nature Conservation Act 1992 or Land Act 1994, and a holder of any unallocated State land, State forests or Conservation parks or State Controlled Roads;
   - a registered Native Title body corporate, claimant or representative Aboriginal/Torres Strait Islander body; or
   - a relevant local government.
3) a 'potentially interested' person; may be an unincorporated community or environmental body with a financial or non-financial interest in the local government area that the operational land is in.

Section 3.5 Community consultation of the PRCP guideline states the community to be consulted may include:

- *affected landholders (such as underlying and adjoining landholders, and holders of land necessary for access to the land to which the proposed PRC plan relates);*
- *traditional owners;*
- *Local government; and*
- *Local community groups.*

Table 2 below lists the identified relevant stakeholders in accordance with the definitions above, as well as a summary of perceived potential interests in the Project.

Table 2: Project stakeholders and expected area(s) of interest

Stakeholder group	Stakeholder	Anticipated area of influence, affectation or interest	Previous engagement/ involvement (refer also Section 4)
Potentially 'influential' stakeholders			
CS Energy shareholders and Board	As a government-owned corporation, CS Energy shareholders include the Treasurer and the Minister for Energy, Renewables and Hydrogen	• CS Energy financial performance and corporate governance • Risk and compliance (including social risk)	• CS Energy provides a range of reports and publications available to the public *via* csenergy.com.au • Formal and informal reporting to shareholders, including Annual Reports, Quarterly Reports, Statement of Corporate Intent and Corporate Plan. This is supported by regular face-to-face meetings
State government regulatory bodies	Department of Environment and Science (DES)	• Project compliance with the EP Act and EA • Environmental and rehabilitation performance • Regulatory responsibilities with respect to rehabilitation and closure • operational changes • incidents and incident notifications	Regular engagement with DES via their nominated officer in relation to: • site inspections • incident and investigation notifications • EA amendments • required report submissions
	Queensland Department of Resources Queensland Department of Regional Development, Manufacturing and Water	• Water supply and water infrastructure • compliance with operational plans and safety • mine closure – Mine Lease relinquishment	CS Energy has engaged with DNRME with regard to the following: • resource tenure/ML matters • associated water reporting
	Queensland Department of Transport and Main Roads (DTMR)	• Transport and road impacts	Rehabilitation to stable landform, consultation on erosion rates and stream ecology? Compliance with legislative requirements, water resources?
Potentially 'affected' stakeholders			

Stakeholder group	Stakeholder	Anticipated area of influence, affectation or interest	Previous engagement/ involvement (refer also Section 4)
CS Energy employees	Kogan Creek Mine and power station employees and broader CS Energy employees as appropriate (employees provide a key informal communication channel to the broader community in which they reside)	• Project and job continuity • regulatory requirements associated with rehabilitation and closure • roles and responsibilities in relation to rehabilitation and closure requirements	• CS Energy maintains regular communications with employees through various channels
CS Energy contractors	Kogan Creek Mine and power station contractors as appropriate (contractors may provide a key informal communication channel to the broader community in which they reside)	• Project and job continuity • regulatory responsibilities with respect to rehabilitation and closure requirements where applicable • roles and responsibilities in relation to rehabilitation and closure requirements	• CS Energy maintains regular communications with contractors through various channels including induction programs and supervisory channels
Traditional owners	Barunggam People	• Disturbance/ management of cultural heritage sites and artefacts • access to land for cultural purposes • employment opportunities	• CS Energy has an existing positive relationship with the Barunggam People • a Cultural Heritage Management Agreement is current and in place • Annual General Meetings (AGMs) and pre-clearance meetings
Underlying landholders (near neighbours)	Various; refer site register	• Lawful management of the land • lawful operation of the Project • management of environmental impacts • land infrastructure impacts • mined land rehabilitation and post-mine land use • land management • own land access	• Underlying land is predominantly CS Energy owned
Adjacent landholders (near neighbours)	Various; refer site register	• Noise and dust emissions • blasting overpressure and vibration • management of environmental impacts • mined land rehabilitation and post-mine land use	• A positive relationship with adjacent landholders exists • discussions with neighbours occurs to arrange land access for environmental sampling • any complaints and resolutions have been recorded • A 'Darzin' database is used to capture communications

Stakeholder group	Stakeholder	Anticipated area of influence, affectation or interest	Previous engagement/ involvement (refer also Section 4)
		• land management • own land access • offsite impacts on land capability • work opportunities • post-mining land transition process • transport and road impacts • fences and gates	
Bore owners (near neighbours)	• Lagoon Gully bores • Kogan bore	• Concerns regarding potential for impact on groundwater resources	• Communications with bore owners is coordinated by the CS Energy environmental team
Community organisations/ groups (e.g., downstream water users)	Local farming community organisations including but not limited to: • Chinchilla and District Water Users Association • Condamine Balonne Water Committee • Chinchilla Amateur Fishing Club • Local rural fire brigade	• Impacts on local and regional surface and groundwater • rehabilitation success and post-mining land use • fencing realignment(s) • bushfire management of operational and offset areas • emergency access arrangements	• Temporary road diversion notifications (e.g., blasting)
Local government	Western Downs Regional Council	• Compliance with development and planning conditions • support for community and local business • engagement with stakeholders • socioeconomic impact of mine closure on regional centres • information on significant variations to Project • worker and contractor accommodation impacts • social infrastructure impacts	• Western Downs Regional Council is advised when traffic impacts are anticipated as a result of operations at the Project (e.g., oversize loads) • Temporary road diversion notifications (e.g., blasting, activities)
Potentially 'interested' stakeholders			
Local schools	Schools identified within approximately 20 km of the Kogan Creek Mine:	• Amenity, health and wellbeing of the local community • Educational opportunities	School visits, presentations to students

Stakeholder group	Stakeholder	Anticipated area of influence, affectation or interest	Previous engagement/ involvement (refer also Section 4)
	• Brigalow State Schools • Kogan State School • Chinchilla State High School • St Joseph's Chinchilla • Chinchilla State School • Warra State School		
Local organisations, businesses and groups	Relevant businesses identified within 15 km of Kogan Creek Mine: Miles: • Miles Caravan Park Brigalow: • Brigalow General Store Warra: • Warra Hotel • Australia Post Chinchilla: • Chinchilla Community, Commerce and Industry Inc. (CCCI) • BEST employment Chinchilla • Rabbit Board • Brigalow Rural Fire Brigade	• Regional business support • amenity and wellbeing of the local community	Details of the hosted/participated events and programs are provided in Appendix A1
State/ National Environmental NGOs	• Various environmental activist NGOs	• Energy sources and supply • greenhouse gas emissions footprint • environmental performance	

4 Previous stakeholder engagement

4.1 Project context and history

The following dot points provide a brief history of the development of the Kogan Creek Mine:

- 1969: Kogan Creek Coal deposit discovered and defined by exploration drilling programs conducted through the 1970s and 1980s;
- 1990: Aberdare, then a wholly owned subsidiary of Allied Queensland Coalfields Ltd, purchased the Kogan Creek coal resources;
- 1992: second trial pit excavated and subsequently rehabilitated;
- 1992 (October): Allied Queensland Coalfields Ltd submitted a tender to the Queensland Electricity Commission for the supply of coal to an existing or new power station;
- 1993: Aberdare commenced acquisition of land in the area of the coal resource;
- 1995: Queensland government refused to accept any new tenders;
- 1999 (June): Engineering, procurement and construction contract executed for construction of the Kogan Creek Power Station;
- 2000: CS Energy acquires 40% interest in the Kogan Creek Power Station Project through acquisition of a shareholding in Cepa Holding Australia Pty Ltd (now Kogan Creek Power Pty Ltd);
- 2000 (March): Department of Mines and Energy granted ML50074 to Aberdare;
- 2002 (May): CS Energy acquires balance 60% of Kogan Creek Power Pty Ltd;
- 2002 (May): CS Energy Limited (Kogan Creek Power Pty Ltd) acquires Aberdare from Allied Queensland Coalfields Ltd (including lands and licences);
- 2003: Engineering, procurement and construction contract entered into for construction of the Kogan Creek Power Station.

4.2 Engagement activities

The 2004 EMOS (Ison 2004) indicates that consultation was conducted with potentially affected landholders in the area as well as with the then Chinchilla Shire Council, as part of the approvals process for the mine. A specific control strategy identified in response to social issues raised included the development of “stable post-mining landforms through appropriate rehabilitation methods as described in the current Plan of Operations”.

Since the approvals stage, the principal engagement activities undertaken by CS Energy have included:

- community sponsorships through initially the Chinchilla Community Benefits Trust (CCBT) administered jointly with the Western Downs Regional Council), and then through the CS Energy Community Sponsorship Program.
- A number of open days, although these have tended to focus more on the Kogan Creek Power Station than the mine;
- Presentations to local services clubs (e.g., Rotary and Lions);
- School visits, various public meetings and workshops;
- Involvement in local employment support services group and the local chamber of commerce (Chinchilla Community, Commerce and Industry Inc.);
- Consultation with the Traditional Owners group – the Barunggam People – initially to develop what is now the Cultural Heritage Management Agreement and cultural heritage investigation management agreement

and now, on at least an annual basis, formal meetings and meetings as require for cultural heritage clearance operations at the Project; and

- Various *ad hoc* site tours and engagement with the shareholder, regulatory agencies and neighbouring landholders.

A summary of recent engagement activities is provided at Appendix A1.

4.3 Past and current record keeping and reporting

A record of stakeholder engagement activities has been maintained as a means of monitoring and reviewing stakeholder engagement activities. Up until July 2020, records of stakeholder engagement activities have been recorded using the CS Energy Total Records and Information Management (TRIM) system. Records since 2020 are recorded on CS Energy's Darzin stakeholder relationship management software.

The cloud-based Darzin stakeholder relationship management software allows the personnel responsible for a given stakeholder engagement activity to record the activity, while providing access to the record to other accountable staff such as CS Energy's Corporate Affairs team.

Data recorded includes:

- engagement/consultation date(s);
- stakeholders consulted;
- consultation type (face-to-face meetings, community forum, workshops, complaints etc.);
- information provided;
- topics of discussion; and
- outcomes and ongoing commitments.

5 Stakeholder engagement plan

5.1 Engagement principles

For CS Energy, being 'a good neighbour' means fostering a positive, respectful, and considerate relationship built on open communication and trust.

This can be achieved by:

- **minimising our impact** on our neighbours' peaceful enjoyment of their home, and operation of their farming business, by regularly assessing our operations.
- **communicating openly, honestly and regularly** with our neighbours to understand their needs, update them about our operations and encourage them to give us feedback about our activities.
- **acting quickly on feedback** and seeking to achieve mutually agreeable outcomes where possible.
- taking our environmental responsibilities seriously through:
    - managing vegetation to stop weed spread and reduce fire risks
    - monitoring noise levels and air and water quality to ensure early identification and rectification of impacts to our neighbours
    - controlling wild animals on our land and maintaining boundary fencing.
- regularly raising awareness with staff and contractors about our commitment to our neighbours.

CS Energy's Governance Framework Standard sets out how the company complies with the *Corporate Governance Guidelines for Government Owned Corporations, Version 2.0, February 2009*, among the eight principles outlined in those guidelines, '*Principle 5: Make timely and balanced disclosure*' provides the basis for stakeholder and community engagement. Under this CS Energy is committed to be open, transparent and accountable with all information disclosed to the community and stakeholders.

5.2 Engagement activities

Stakeholder engagement activities (including frequency of engagement) have been identified for the various stakeholders discussed in Section 3.1, and once executed, are recorded in CS Energy's Darzin stakeholder relationship management system.

Table 5 extends Table 1 to include engagement methods and frequencies relevant to the engagement focal points for each remaining lifecycle phase at Kogan Creek Mine. Plan activities should be reviewed, and targets re-established as the Project moves into each successive life cycle phase.

Table 3: Mine life cycle and rehabilitation and closure engagement focus

Mine lifecycle phase	Rehabilitation engagement focus	Closure engagement focus	Target stakeholder	Feasible engagement methods	Anticipated frequency
Mid-operations phase (> 10 years* post-commencement)	• rehabilitation monitoring and performance • rehabilitation trials and rehabilitation methodology development • land management issues (e.g. pest/weed control, buffer lands management, rehabilitated lands management etc.) • mine rehabilitation planning • rehabilitation schedule compliance • rehabilitation risks review • estimated rehabilitation costs review	• closure planning • PMLU options and options assessment • estimated closure costs review • closure risks review	Employees/ contractors	• Environment toolbox talks to include rehabilitation and closure topics • Newsletters	• Rehabilitation and closure topics raised at least annually
			Near neighbours	• Establish and maintain a CLG offering membership to representatives of the local community (refer section 5.2.1)	• CLG to meet at least once per year
				• CLG site tours (combined with CLG meeting)	• As appropriate
				• Open days (by invitation)	• As considered appropriate
				• Face-to-face meetings	• As required
				• Newsletters	• As required
			Traditional Owners	• Existing AGM and pre-clearance meetings	• Annual and as required
				• CLG membership offered (as per near neighbours)	• As above
			Community organisations/ local government	• Ongoing Community Sponsorship Program	• As per current program
				• Meeting participation – rehabilitation and closure to be discussed opportunistically and if relevant to the organisation	• As appropriate

Mine lifecycle phase	Rehabilitation engagement focus	Closure engagement focus	Target stakeholder	Feasible engagement methods	Anticipated frequency
				• Social media as appropriate – Twitter, Facebook, LinkedIn	
			Potentially interested stakeholders (refer Table 2)	• Meetings • school visits (potentially combine with open days) • Social media as appropriate – Twitter, Facebook, LinkedIn • Other *ad hoc* communications	• As appropriate
Pre-closure phase (< 5 years* pre-closure)	• rehabilitation monitoring and performance • rehabilitation methodology development • land management issues (e.g., pest/weed control, buffer lands management, rehabilitated lands management etc.) • mine rehabilitation planning • rehabilitation schedule compliance	• closure planning • closure costs review • closure risks review • regional social impacts of closure • surrender process • land ownership transition • retained infrastructure transition • asset disposal	Employees/ contractors	• Environment toolbox talks to include rehabilitation and closure topics • Newsletters	• Rehabilitation and closure topics raised at least annually
			Near neighbours	• Establish and maintain a CLG offering membership to representatives of the local community (refer section 5.2.1)	• CLG to meet at least once per year
				• CLG site tours (combined with CLG meeting)	• As appropriate
				• Open days (by registration)	• As considered appropriate
				• Face-to-face meetings	• As required
				• Newsletters	• As required
			Traditional owners	• Existing AGM and cultural heritage management meetings	• Annual and as required
				• CLG membership offered (as per near neighbours)	• As above

Mine lifecycle phase	Rehabilitation engagement focus	Closure engagement focus	Target stakeholder	Feasible engagement methods	Anticipated frequency
			Community organisations/ local government	• Ongoing sponsorships program	• As per current program
				• Meeting participation – rehabilitation and closure – specifically socioeconomic impacts - to be raised for discussion • Social media as appropriate – Twitter, Facebook, LinkedIn	• At least once during this period, ideally 2-3 opportunities identified with each group
			Potentially interested stakeholders (refer Table 2)	• Meetings • school visits (potentially combine with open days) • Social media as appropriate – Twitter, Facebook, LinkedIn • Other *ad hoc* communications	• As appropriate
Post-closure phase (0-10 years* post-closure)	• rehabilitation monitoring and performance • land management issues (e.g., pest/weed control, buffer lands management, rehabilitated lands management etc.) • rehabilitation schedule compliance	• closure risks review • regional social impacts of closure • surrender process • land ownership transition • retained infrastructure transition • asset disposal	Employees/ contractors	• Environment toolbox talks to include closure update information	• As appropriate
			Near neighbours	• Establish and maintain a CLG offering membership to representatives of the local community (refer section 5.2.1)	• CLG to meet annually or at a lesser frequency determined by the CLG
				• CLG site tours (combined with CLG meeting)	• As appropriate
				• Open days (by registration)	• As considered appropriate
				• Face-to-face meetings	• As required
				• Newsletters	• As required

Mine lifecycle phase	Rehabilitation engagement focus	Closure engagement focus	Target stakeholder	Feasible engagement methods	Anticipated frequency
			Traditional owners	• Existing AGM and pre-clearance meetings	• Annual and as required
				• Existing AGM and cultural heritage management meetings	• Annual and as required
			Community organisations/ local government	• Ongoing sponsorships program – flag phase-out schedule	• As per phase-out program
				• Meeting participation – rehabilitation and closure – specifically socioeconomic impacts, and engagement phase-out, to be raised for discussion • Social media as appropriate – Twitter, Facebook, LinkedIn	• As appropriate, develop engagement phase-out schedule
			Potentially interested stakeholders (refer Table 2)	• Meetings • school visits (potentially combine with open days) • Social media as appropriate – Twitter, Facebook, LinkedIn • Other *ad hoc* communications	• As appropriate
Pre-surrender (> 10 years* post-closure)	• rehabilitation monitoring and performance • land management issues (e.g., pest/weed control, buffer lands management, rehabilitated lands management etc.)	• closure risks review • regional social impacts of closure • surrender process • land ownership transition • retained infrastructure transition • asset disposal	Employees/ contractors	• Environment toolbox talks to include closure update information	• As appropriate
			Near neighbours	• Establish and maintain a CLG offering membership to representatives of the local community (refer section 5.2.1)	• CLG to meet annually or at a lesser frequency determined by the CLG
				• CLG site tours (combined with CLG meeting)	• As appropriate

Mine lifecycle phase	Rehabilitation engagement focus	Closure engagement focus	Target stakeholder	Feasible engagement methods	Anticipated frequency
				• Open days (by registration)	• As considered appropriate
				• Face-to-face meetings	• As required
				• Newsletters	• As required
			Traditional owners	• Existing AGM and pre-clearance meetings	• Annual and as required
				• CLG membership (as per near neighbours)	• As above
			Community organisations/ local government	• Ongoing sponsorships program • Social media as appropriate – Twitter, Facebook, LinkedIn	• As per phase-out program
			Potentially interested stakeholders (refer Table 2)	• Meetings • school visits (potentially combine with open days) • Social media as appropriate – Twitter, Facebook, LinkedIn • Other *ad hoc* communications	• As appropriate

* numeric values are intended to be indicative only and will vary depending on specific circumstances

5.2.1 Employees and contractors

Employees are a key stakeholder, providing a direct conduit to the local and regional community in which they live. For this reason, it is important that CS Energy employees are provided with accurate and timely information in relation to rehabilitation and closure. Typical opportunities include toolbox talks which can be utilised to explain legislative requirements, CSEs rehabilitation and closure plans, rehabilitation progress and other related information.

Other internal communication channels can be used as required to deliver key messaging on the Project.

5.2.2 Near neighbours (underlying and adjacent landholders)

Underlying and adjacent landholders have been identified as affected Project stakeholders. Project engagement activities will include the following:

- Individual face-to-face meetings should occur if an individual near neighbour contacts CS Energy with a particular concern.
- Establishment of a CLG with a membership aimed at providing local community representation:
    - CLG meetings should be scheduled to occur two to three times per year either on-site or at a neutral community location.
    - CLG membership should be by invitation with members ideally holding a place in the community that allows feedback from CLG meetings to be relayed to the local community. Kogan Creek Mine representation should include the mine manager, the power station manager, a member of the leadership team and a representative from the environment team.
    - A CLG charter should be established to ensure that the purpose and objectives of the CLG are clearly understood by the CLG membership and only changed with the consensus of the membership;
    - CLG membership should extend geographically to Chinchilla and ideally include members able to represent population centres/communities in the vicinity of the Project.
    - CLG membership should only include regulators or other government representatives where this will not stifle open discussion.
    - Once each year, the meeting agenda should offer a pre-meeting site tour, to allow members to become familiar with the site.
    - CLG meeting agendas should address the focal points included at Table 3, as well as including a mine operational update, updates on environmental management - particularly addressing any specific or ongoing environmental concerns, and outstanding actions from previous meetings.
    - During the current operational phase, rehabilitation and closure agenda opportunities can include, for example:
        - updates on legislative changes (e.g., PRCP introduction and compliance);
        - outlining PRCP content and development, with a particular focus on rehabilitation methods and milestone scheduling;
        - proposed PMLUs for the Project;
        - the current status of final landform development.

5.2.3 Traditional Owners

Engagement will continue in accordance with the current Cultural Heritage Management Agreement (CHMA). Meetings and workshops with the Traditional Owners (the Barunggam People) required for pre-clearance tasks will be hosted. In the event that traditional owners have a local presence, they should be invited to nominate a

representative to membership of the CLG. If this is not feasible, rehabilitation and closure focal points should be suggested to be included on meeting agendas.

5.2.4 Local community organisations, businesses, and local government

The Western Downs Regional Council will have specific interests relating initially to the socioeconomic benefits of the Project and, in later life cycle phases to the socioeconomic impacts of closure.

Local community organisations present an opportunity to raise rehabilitation and closure aspects to a broader and participative community sub-sector, depending on each particular community organisation and its representation.

Opportunities should be identified to provide relevant rehabilitation and closure information to these stakeholders including aspects such as post-mining land uses, progressive rehabilitation activities and closure planning.

5.2.5 State government authorities

Engagement with State and Commonwealth government authorities occurs on both a regular and *ad hoc* basis. The DES usually seeks to undertake inspections on at least an annual basis, with other communications occurring triggered by changed legislation or regulatory processes or incidents and complaints. will occur throughout various phases of the Project. Engagement can occur via email, telephone and face-to-face meetings.

5.3 Resourcing and costs

The CS Energy Community Sponsorship Program is funded from the Corporate Affairs operating budget, which is reviewed annually. Engagement activities are funded through site operational budgets.

The only engagement activities proposed that will incur a cost to implement will be the open days, which are proposed to be held at least every two years. The most significant cost items are likely to include local coach transport, catering and security.

Beyond costs associated with open days, the implementation of this SEP will entail human resources obligations on Kogan Creek Mine which could extend to up to a 0.2 full-time equivalent depending on how CS Energy plans to resource this commitment. For example, it may be the case that aspects of the SEP are shared between the Corporate Affairs team and the Kogan Creek Mine team.

5.4 Engagement monitoring

As per section 4.3, all engagement activities will be recorded via CS Energy's cloud-based Darzin stakeholder relationship management software.

Darzin has the capability to efficiently manage the large volumes of data that stakeholder engagement programs can generate.

Furthermore, it can effectively communicate the results of the stakeholder engagement process to the relevant decision makers – turning largely qualitative data into easily understood information.

Engagement activities to be recorded in Darzin include:

- phone and face-to-face conversations with any stakeholder party;
- scheduled events or activities including open days, CLG meetings etc.;
- incidents; complaints and compliments;
- employee communications specifically relevant to rehabilitation and closure;

- CS Energy website updates and social media communications relevant to rehabilitation and closure;

Feedback, where required, from Project consultation activities will be met within the following target timeframes:

- telephone or face-to-face enquiries about current Project activities will aim to be responded to by the next business day;
- telephone or face-to-face enquiries about current and proposed Project activities will aim to be responded to within three business days; and
- email and letter enquiries within five business days from date of receipt of correspondence.

5.5 Evaluation and review

This SEP (including the Stakeholder Register) will be reviewed annually and updated accordingly to ensure that:

- any updated legislation, standards and other reference information is incorporated into the SEP and any supporting management systems; and
- CSEs engagement process throughout the Project's operations and rehabilitation and closure phases remains relevant, efficient, informative and fit for purpose in accordance with accepted industry standards and legislative requirements.

The Project Manager carries primary responsibility for the planning and implementation of stakeholder engagement activities for the Project. Where applicable, engagement will build on existing engagement between stakeholders and CS Energy personnel. Accordingly, those involved with existing engagement tasks will play an ongoing role in the implementation of the SEP.

A1 Previous stakeholder engagement activities

This appendix provides a summary overview of stakeholder engagement activities undertaken up until July 2020. It is not intended to be specific to engagement related to rehabilitation and closure. Up until July 2020 records of stakeholder engagement activities have been recorded using the CS Energy Total Records and Information Management (TRIM) system. Records since 2020 are recorded on CS Energy's Darzin stakeholder relationship management software.

Program/activities	Target stakeholder group	Details
Chinchilla Community Benefits Trust (CCBT)	Local and regional communities	The CCBT was established in 2004 to provide community support during the construction and operation of the Kogan Creek Power Station. The Trust was administered jointly by CS Energy and the Western Downs Regional Council. The Trust ended amicably in 2017
Community Sponsorship Program (CSP): charitable donations	Local and regional groups and organisations including: • Drought Angels • Country Women's Association Public Rural Crisis Fund • Lifeline Darling Downs and South West • LifeFlight South West Helicopter Rescue • Australian Red Cross • Salvation Army • Kup of Kindness • Chinchilla Family Support Centre • It's A Bloke Thing Foundation • Zonta Club Dalby	The CSP was established in July 2018 and superseded the CCBT, providing funding for local community causes. 2020 financial year donations have targeted the following causes: • emergency relief fund • crisis support and emergency relief • helicopter rescue service • Bushfire Appeal • donation to feed homeless or disadvantaged people in the region • supporting local families experiencing disadvantage • prostate cancer awareness and support • upgrade of the palliative care room at Dalby Hospital
CSP: Event or project sponsorships	Local and regional groups and organisations including: • Brigalow Recreations Grounds Committee • Queensland Music Festival • Dalby and District Show Society • Jandowae Pony Club • Chinchilla Rugby League Football Club • Lions Club of Chinchilla • St Joseph's Chinchilla • Dalby South State School • Pioneer Park Museum Dalby • Chinchilla Creative Centre • Chinchilla Museum • Goondir Health Services Dalby	The following events or projects have benefited during the 2020 financial year: • Brigalow Bush Carnival 2019 • Opera at Jimbour 2019 • 150th Annual Dalby Show (postponed due to COVID-19) • safety boundary fence for the Jandowae Pony Club • canteen upgrade for Chinchilla Rugby League Football Club • Chinchilla Christmas Lights Show • food trailer for Kup of Kindness • new laptops for St Joseph's Chinchilla • garden program for Dalby South State School • new mower for Pioneer Park Museum Dalby • verandah extension for Chinchilla Creative Centre • Fire Tower Interpretive Centre for Chinchilla Museum • rechargeable battery for mobile medical clinic for Goondir Health Services Dalby

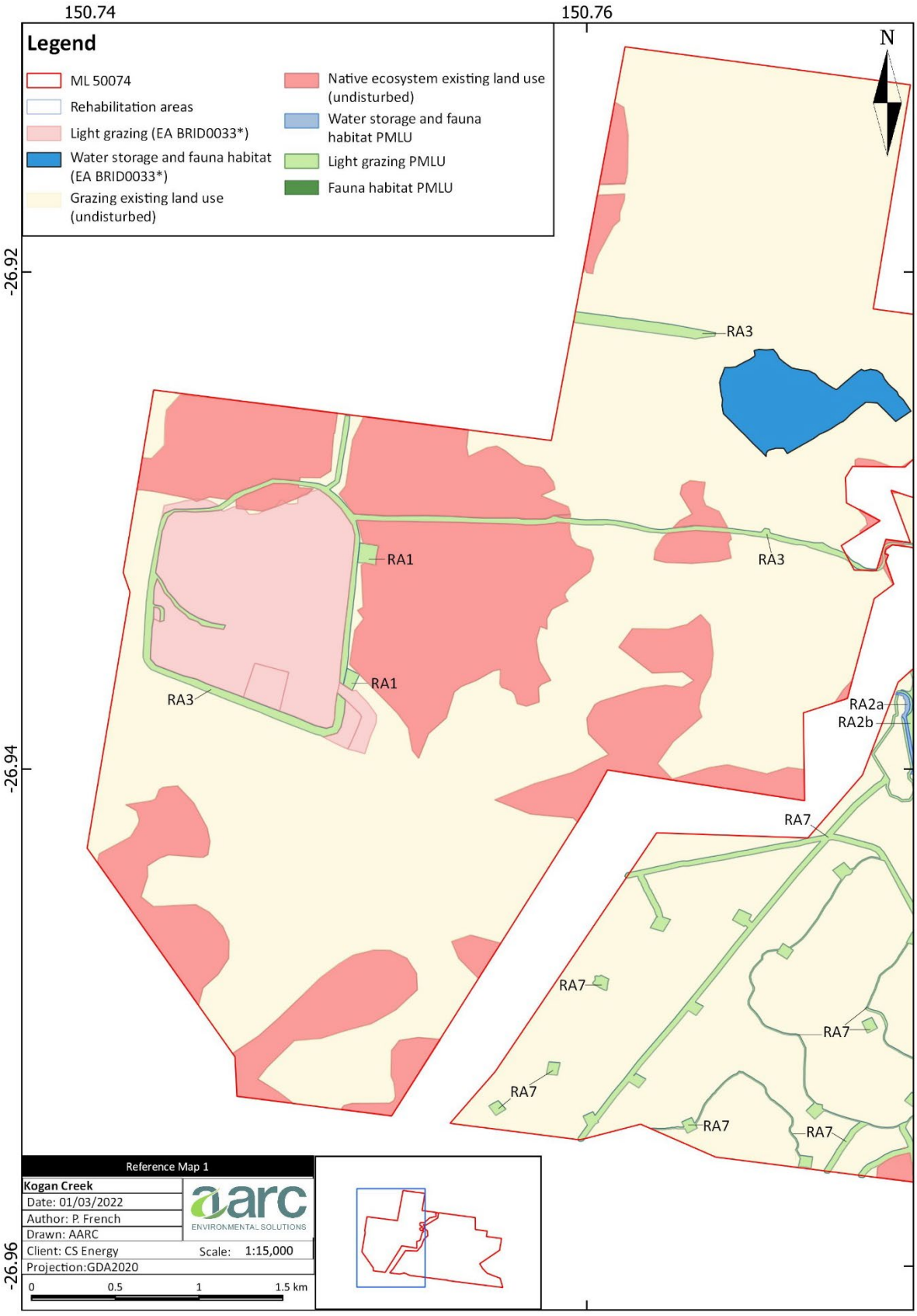
Program/activities	Target stakeholder group	Details
Open days (CS Energy hosted)	Local and regional communities	• Several open days have been held to promote the CSP • local emergency services site visits • presentations to local services clubs (Lions and Rotary) • school visits for students interested in a career in power generation
Public meetings/workshops (CS Energy hosted)	Local and regional communities	Public meetings/workshops have been held to: • promote the CSP • promote the power station and raise awareness in the general community particularly in relation to major maintenance works
Other public events and meetings (CS Energy participation)	Local and regional communities/groups including: • Chinchilla Community, Commerce and Industry Inc. (CCCI) • BEST Employment – Chinchilla • Western Downs Regional Council • other key local service providers	• CS Energy representatives have attended BEST Employment - Chinchilla meetings though 2019/20; in particular the BEST Employment Group meetings • CS Energy maintains an active membership of the CCCI • CS Energy attended a Council-run information session to publicise the CSP
Cultural heritage consultation meetings	Traditional Owners	• A total of 11 meetings with individual Traditional Owners groups and the committee were held between March and July 2003 for the development of the CHMP and negotiation of a Cultural Heritage Investigation Management Agreement. • The meetings included an orientation site visit for the Traditional Owners Committee and details of employment terms and conditions were given by the CHO employment agency Challenge Recruitment. • CS Energy and Traditional Owners meet annually for an AGM and as required for cultural clearance operations at the Project. • CS Energy representatives participate in local National Aborigines and Islanders Day Observance Committee activities and have provided support in relation to the Queensland Museum Repatriation Fund. • Operational interactions with the Barunggam People are managed by the CS Energy Mining and Environmental Team. • Corporate Affairs is currently leading the development of an Indigenous Engagement Strategy for the entire business.

Program/activities	Target stakeholder group	Details
Site tours arranged by the Corporate Affairs team	Government agency representatives	• Site tours have been held for several MPs (local, state, and federal) over the past years. These have generally been hosted by the Site Manager and Mining Manager, with the Chief Executive Officer also present on occasion
Other discussions	Affected landholders/ neighbours	• The Kogan Creek CS Energy environment team communicate with neighbours and CS Energy tenants about various issues and activities such as wild animal and pest management, land access agreements, and other matters as they arise

Appendix G. Provided technical studies

1) Environmental Management Strategies 2019, *Kogan Creek Power Station and Mine Triennial Groundwater Monitoring Review*.
2) Environmental Management Strategies 2021, *Kogan Creek Mine PRCP Groundwater Aspects*.
3) Ison 1993, *Biological and Physical Assessment: Soils, Land Capability, Flora, Fauna & Farm Management, Kogan Creek Coal Project Area*.
4) Ison 2004, *Environmental Management Overview Strategy: Kogan Creek Coal Project* (2 volumes).
5) Landloch 2017, *Kogan Creek IPAC topsoil/ash analysis and recommendations*.
6) RGS 2015, *Geochemical Assessment of Mine and Power Station Waste Materials, Kogan Creek Coal Mine*.
7) RGS 2017, *Geochemical and physical characterisation of mine spoil at Kogan Creek Coal Mine*.
8) RGS 2019, *Geochemical and physical characterisation of mine spoil, Kogan Creek Coal Mine*.
9) Runge 2002, *Conceptual Mine Dump Design Incorporating Ash Disposal Reservoirs: Kogan Creek Power Project*.
10) See Built Earth 2020, *Kogan Creek – Pit closure water balance*.
11) WRM 2017, *Condamine River Flood Study, Kogan Creek Mine – Levee Assessment*.

Appendix H. Reference Figures



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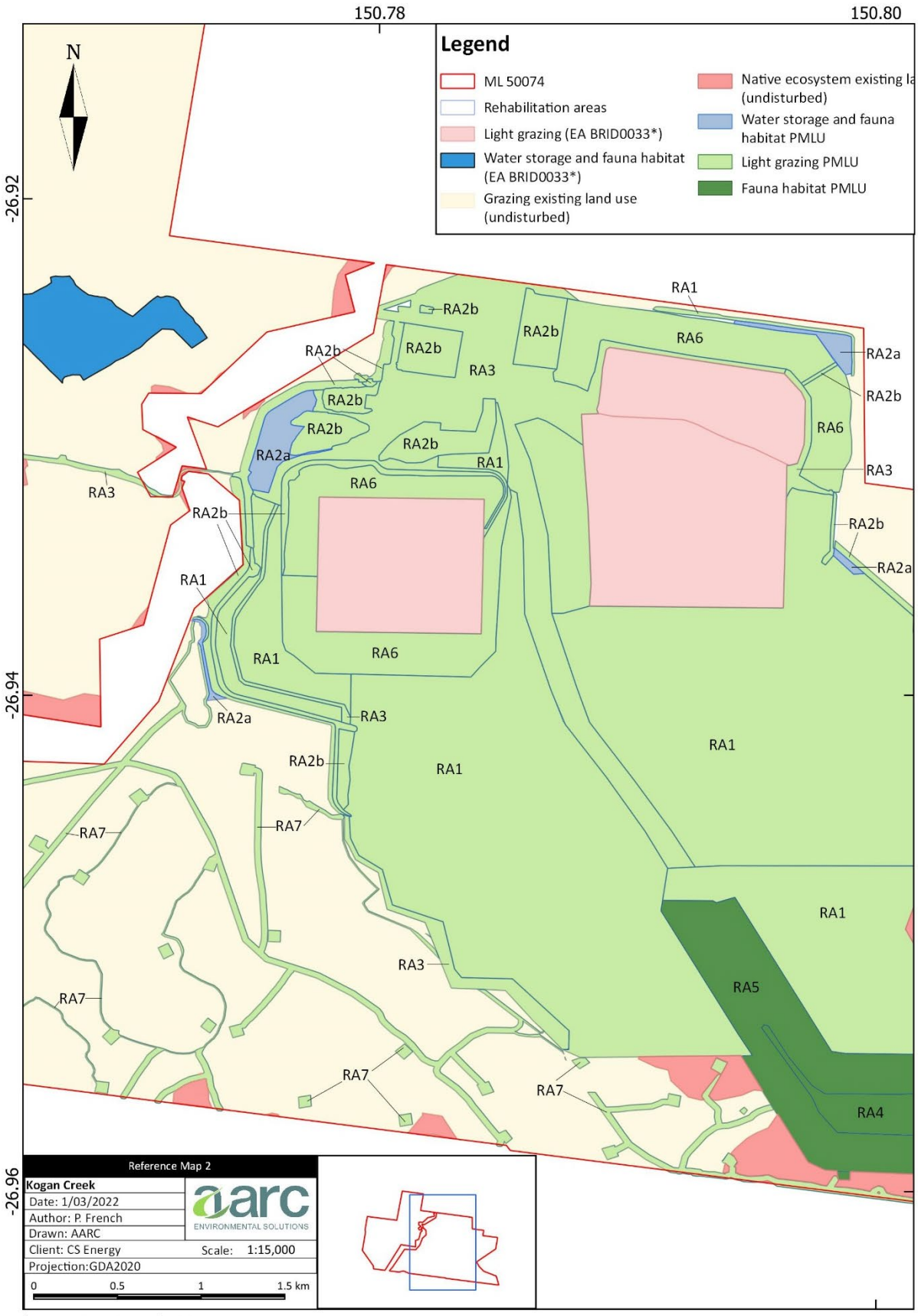

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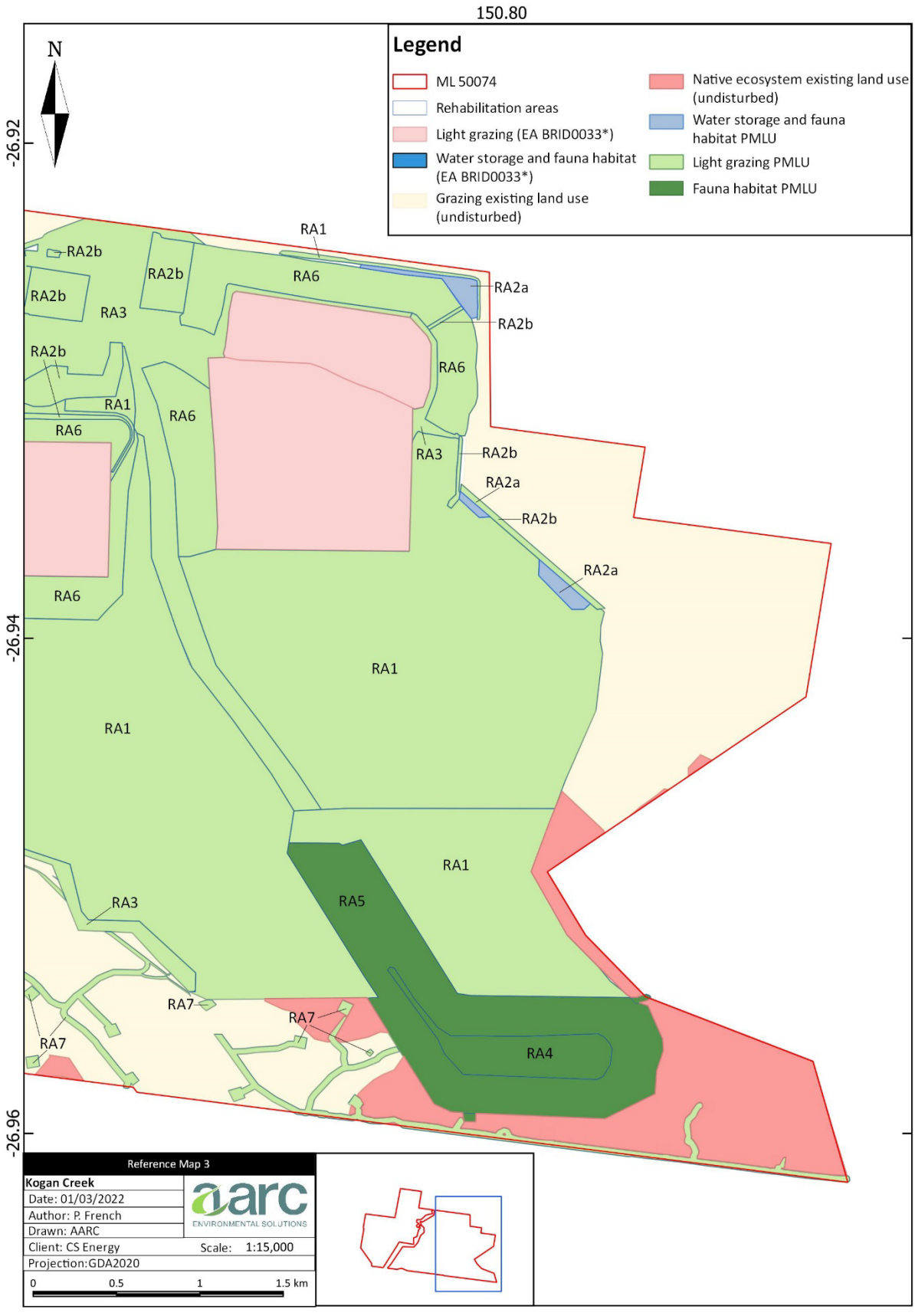

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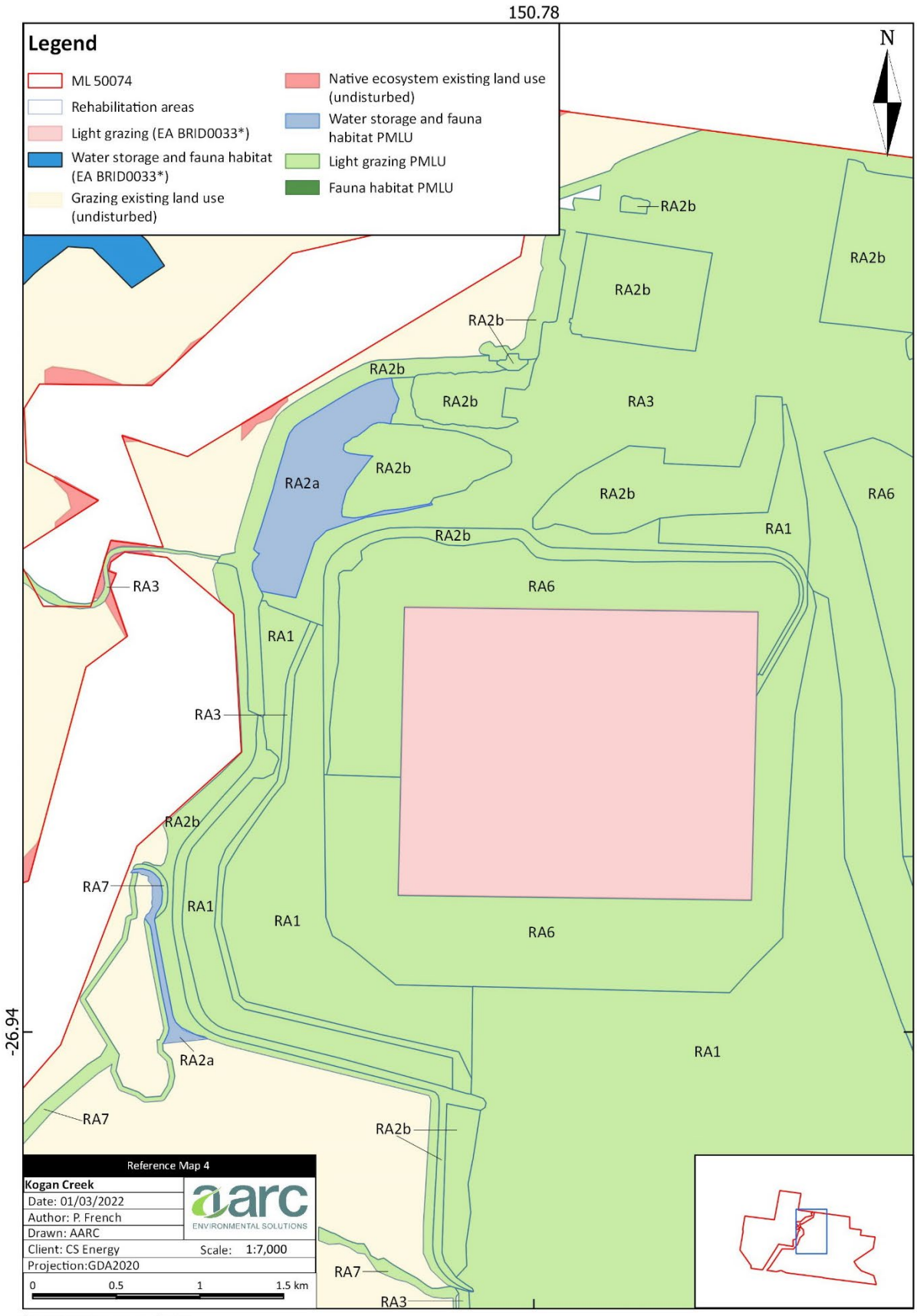

*EA BRID0033 not part of PRCP