Environmental Approval & Compliance Solutions

Cape Flattery Silica Mine Progressive Rehabilitation and Closure Plan

Cape Flattery Silica Mines Pty Ltd

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Author	**Technical Review**	**Editor**	**Document Version**	**Approved for Issue by QA Manager**	
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Tim Anderson MAgrSc, BAgrSc(Hons), CENVP (#002), CPESC (#2723)	Lindsay Popple PhD, BSc(Hons), CENVP (#803)	–	R01	22/4/2022	
Megan Grixti BSc	–	Kirsty Anderson BA(Hons)	R02	31/5/2022	
Tim Anderson MAgrSc, BAgrSc(Hons), CENVP (#002), CPESC (#2723)	Lindsay Popple PhD, BSc(Hons), CENVP (#803)		R03	5/8/2022	
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EA holder name:	Cape Flattery Silica Mines Pty Ltd
EA holder contact details:	Cairns Corporate Tower Level 15; 15 Lake Street CAIRNS QLD 4870 PO Box 6212. CAIRNS QLD 4870 Ph: (07) 4051 5099

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1. Rehabilitation Planning Part

1.1 Project planning

This section includes baseline information, site location details, a description of the project and information on rehabilitation/improvement planning.

1.1.1 Site location and tenure

Cape Flattery Silica Mines Pty Ltd (CFSMPL) operates the Cape Flattery Silica Mine (CFSM). CFSM is located at Cape Flattery, approximately 50 km north of Cooktown, north Queensland (**Figure 1**).

Details of the mining leases comprising CFSM are shown in **Table 1**. To the east of CFSM, Ports North holds three adjoining areas of Strategic Port Land (Lot 9 on BS223, Lot 10 on BS224, Lot 11 on BS268) used by CFSMPL to load product onto ships for export. According to the State, the port has been established solely for the export of silica sand from CFSM (QDMR 2018).

Table 1: Mining leases

Locality	Land (tenure type)	Mining lease	Area (ha)[1]	Minerals/purpose	Expiry date[2]
Cape Flattery	35/SP232620 (freehold)	ML2806	4915	Monazite, rutile, silica/silicon/rock crystal, zircon, ore/overburden, transport/conveyor/vehicular, stock pile	31/08/2033
		ML40048	131.6	Transport/conveyor/vehicular	31/08/2033
		ML2965	712	Loading facilities/railway, monazite, rutile, silica/silicon/rock crystal, stock pile, ore/overburden, transport/conveyor/vehicular, zircon	31/08/2033
		ML7069	584.6	Ilmenite/leucoxene, monazite, rutile, silica/silicon/rock crystal, stock pile, ore/overburden, zircon	31/08/2033

[1] https://qldglobe.information.qld.gov.au/ accessed 23 March 2022.

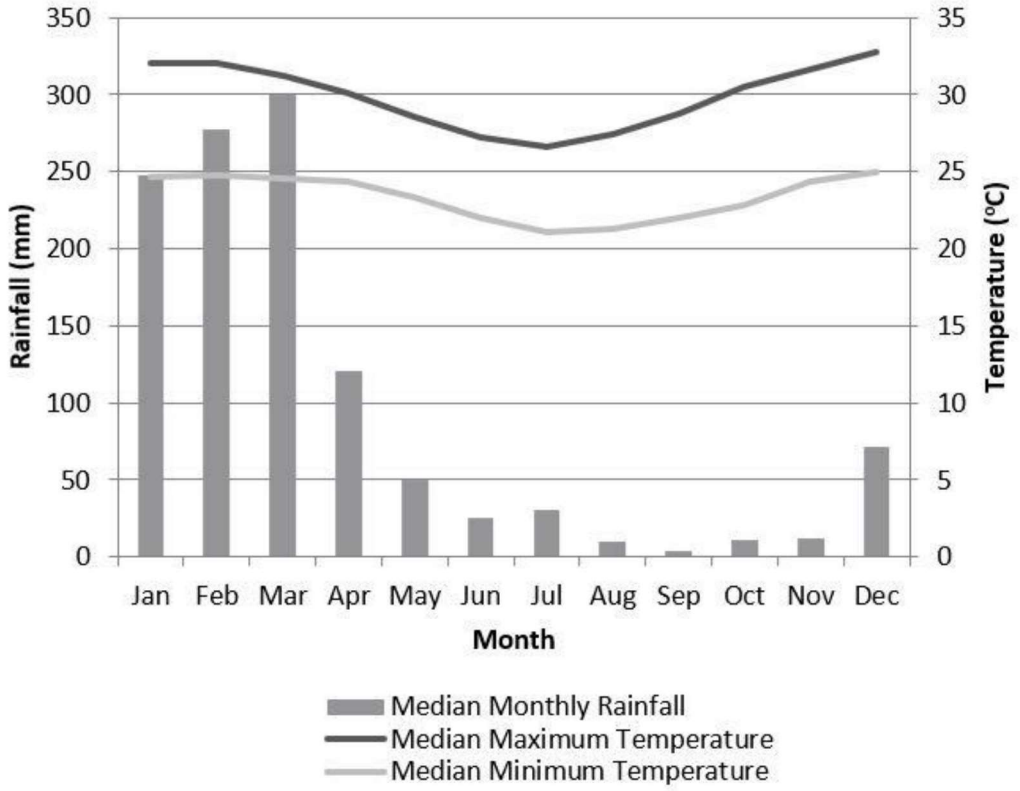
[2] The resource on the leases is significant. In 1990, based on the proven resources in the mining lease areas at a production rate of 1.5 Mt/year the estimated mine life was more than 100 years (NRA 1990b).

1.1.2 Baseline information

1.1.2.1. Climate

Cape Flattery is in the northern tropics and is subject to distinct wet (nominally December to April) and dry (nominally May to November) seasons.

Data sourced from the Bureau of Meteorology (BoM) for Cape Flattery (station 31213) indicates the average annual rainfall for the region is 1,366.4 mm, with the majority falling in February and March (BoM 2022b). Temperatures are warm throughout the year, with the maximum median temperature recorded in December (32.8ºC) and the lowest median recorded in July (21.1ºC). Median monthly rainfall and temperature statistics are in **Graph 1**.



Source: BoM (2022a).

Graph 1: Cape Flattery median monthly rainfall and temperature

Pan evaporation mapping data available from BoM indicates the Cape Flattery area should expect an average of 1,800 mm of evaporation annually (BoM 2022c). This is approximately 430 mm more than the annual average rainfall.

Wind direction data from the BoM Cape Flattery weather station (31213) indicates that the prevailing winds for the area are from the south-east for much of the year. The long-term mean daily wind speed[1] at Cape Flattery is 22.4 km/h. The long-term mean daily wind speed varies per month, with the highest speed in May (27.5 km/h) and the lowest in February (15.4 km/h) (BoM 2022b).

1.1.2.2. Topography

The maximum elevation on CFSM is approximately 160 m Australian Height Datum (AHD). This is associated with the headlands of Cape Flattery. The topography across the Cape Flattery dunefields is generally between 10 mAHD (at the coastline and Airport Lake) and 30 mAHD, with some large dunes reporting maximum elevations of between 60 mAHD and 80 mAHD. The topography of the dunefield can vary between gently rolling hills to steep dune slopes. Topographical contours (in 10 m intervals) are presented on **Figure 2**. Small lakes can be found throughout the dunefield, often on the leeward side of dune formation, and often in connection with groundwater (as a 'window lake').

[1] Mean daily wind speed (km/h) was calculated from a long-term dataset (2003–2021) of mean daily wind run (km) from the BoM operated weather station at Cape Flattery (31213) (BoM 2022a).

1.1.2.3. Land

Geology and soil

The Cape Bedford/Cape Flattery dunefield represents over 40% of the total dunefield on Cape York Peninsula and contains significant representations of the dune landforms and vegetation found on Cape York Peninsula. In comparison to other dunefields in north Queensland, the Cape Flattery area contains a significant diversity of constructional and erosional dune landforms, including relict (stabilised) and active parabolic dunes, large elongate parabolic dunes, broad low ridges, intra-dune corridors and gegenwalles, inter dune sandplains, lakes, swamps and streams (Stock 1991, DoEE 2019). The Cape Flattery dunefield is one of the few places in the world with an extensive development of active, large, elongate parabolic dunes. The gegenwalle ground patterns (low repeated 'V' shaped ridges in the deflation areas behind advancing parabolic dunes) in the dunefield are the best developed and largest in the world (DoEE 2019). These factors led to the inclusion of the Cape Bedford/Cape Flattery dunefield into the Register of the National Estate (RNE)[2].

The complexity of the dunefield landscape is shown on **Figure 3**. Even within areas classified as inter-dunal plains or ill-defined lakes and swamps, there is a great deal of variation. This variation (at the scale of the landscape, between landforms or between locations within a landform) is intrinsic to the dunefield. Datar (2014) showed that landform heterogeneity could explain a large proportion of the variance in measurements of selected ecological variables in dune vegetation on North Stradbroke Island. The landform diversity at CFSM is likely responsible for the diversity of vegetation observed at small- to medium-scales noted in NRA (1998b).

The soil resources have been previously mapped and described (NRA 1990a). Three major soil types exist: the soils of Cape Flattery headlands and Lookout Point, the dunefield sands, and the sands influenced by lateritic subsoils (**Figure 4**). These are described in NRA (1990a) as follows.

- *Headland.* Where present, soil comprised silt and granular peds of varying sizes. Silt and peds are alluvial and colluvial in origin and form a thin soil cover of <8 cm. Colour variation is from light olive-brown to yellowish brown.
- *Dunefield.* The dunefield sand association comprises white silica sands, some of which exhibit podzol soil profile development, having lightly coloured B horizons with piping. Topsoil occurrence varies with position and dune stability. Stable dunes have as much as 50 cm of organically enriched soil. In lower lying areas adjacent to lakes, topsoil is deeper (up to 1 m). On less stable dunes, topsoil is either <40 cm or absent, depending on the state of erosion (natural) and vegetative cover.
- *Sands influenced by lateritic subsoils*. This group of sands is found in isolated zones throughout the lease areas, and varies from deep, well-developed profiles to shallow sands on the laterite basement.

Landscape context

Several studies of terrestrial flora and fauna have been undertaken at CFSM (NRA 1985, 1990a, 1991, 1994, 1995a, 1995b, 1996, 1997a, 1997b, 2000, Landsberg & Clarkson 2001). In 2019, a terrestrial fauna and flora assessment was conducted (NRA 2020a) to inform an

[2] The area was entered in the RNE prior to the register's closure in 2007. The existence of an entry for a place in the RNE does not create a requirement to protect the place under Commonwealth law (DoEE 2019, undated). The area is not included in the National Heritage List or the Commonwealth Heritage List (DoEE undated).

Environmental Authority (EA) amendment application and rehabilitation planning. The 2019 assessment involved desk-based research and wet and dry season field surveys. The wet season survey occurred between 23 January and 1 February 2019 and the dry season survey occurred between 26 June and 5 July 2019. Both surveys focused on terrestrial flora and vertebrate fauna. Weather conditions were generally suitable for the detection of Threatened and Near Threatened (T&NT)[3] flora and fauna. Vegetation communities were assessed in accordance with the methods of Neldner *et al.* (2019a).

The information provided below is a summary of the environmental values (EVs) identified in the abovementioned studies.

CFSM is within the Starke Coastal Lowlands subregion of the Cape York Peninsula bioregion and in the most extensive section of the Cape York dunefields (Sattler & Williams 1999), which extends between Cape Bedford and Point Lookout. This area is considered to contain some of the best examples of elongate parabolic dunes and gegenwalle ridges in the world (Hitchcock *et al.* 2013).

CFSM occurs along the coastline, extending inland approximately 12 km. The large sandstone headland of Cape Flattery is in the north-eastern corner of CFSM. It has two peaks, with the larger of the two reaching approximately 240 mAHD. Otherwise, relief in the landscape is limited to the dune terrains, which have elevations that vary between <0 and >60 mAHD. Beaches and mangrove-lined sandflats occur south and west of the headland, respectively. Extensive dunefields and wetlands occupy the remainder of CFSM. Mt Wraigth, the westernmost extension of CFSM, is composed of a large sand dune and is south of Point Lookout. No significant river systems occur within CFSM. The nearest river is McIvor River, which is approximately 15 km south of CFSM.

Flora

Regional Ecosystem (RE) mapping for the project area was reviewed and field verified using secondary and quaternary vegetation assessments (Neldner *et al.* 2019a). Potentially occurring T&NT flora were identified by desk-based searches of relevant databases, and field surveys were designed to ensure effort was devoted to searching for T&NT flora.

Threatened Ecological Communities

Threatened Ecological Communities (TECs) are regulated under the EPBC Act. A desk-based review undertaken by NRA (2020a) identified the potential presence of one TEC: 'Littoral Rainforest and Coastal Vine Thickets of Eastern Australia' (Critically Endangered). TSSC (2018a) identifies eight REs for the Cape York Peninsula bioregion that correspond to the TEC. One of the REs (3.2.12) is mapped by the Queensland Department of Environment and Science (DES) (2018a) within CFSM (**Figure 5**).

Field verification confirmed the presence of REs 3.2.12a and 3.2.12b at CFSM. Details of the field assessments are presented in NRA (2020a). Field observations allowed for delineation of the boundaries of the TEC and predictions to be made regarding the potential occurrence of the TEC in areas that could not be formally assessed. Areas where the TEC is known to occur (field verified by NRA 2020a) or have potential to occur are presented on **Figure 6**.

[3] T&NT flora and fauna are species listed under the Queensland *Nature Conservation Act* 1992 (NC Act) and/or Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) as Critically Endangered, Endangered, Vulnerable, or Near Threatened.

Regional Ecosystems

CFSM supports remnant[4] and non-remnant vegetation, and the vegetation communities are mapped as REs (DES 2018b). The REs mapped to occur within CFSM by DES (2018a) are presented in **Figure 5**. According to DES (2018a) mapping, REs with an Of Concern VM[5] class and BD status[6] are present as dominant and/or subdominant communities at CFSM.

The 2019 surveys revealed that the RE mapping at CFSM is generally reliable for its intended use. Most of CFSM is composed of a mosaic of vegetation communities, which are mapped by DES (2018a) as heterogenous polygons. The boundaries between vegetation communities were ambiguous and difficult to discern using the aerial imagery. The composition of most REs mapped within each heterogenous polygon appeared to be correct; however, some exceptions were identified in the field (NRA 2020a).

Threatened and Near Threatened flora

The following T&NT species were identified within CFSM during the 2019 surveys:

- *Acacia solenota* (Vulnerable, NC Act)
- *Myrmecodia beccarii* (Vulnerable, EPBC Act and NC Act)
- *Xanthostemon arenarius* (Near Threatened, NC Act).

Another T&NT species that was found previously at CFSM[7] was not encountered during the 2019 surveys:

- *Stackhousia* sp. (McIvor River JR Clarkson 5201) (Endangered, NC Act).

At least two different epiphytic orchids (*Dendrobium* spp.) with the potential to be T&NT species were recorded at CFSM in 2019. These species could not be definitively identified to species level due to the absence of fertile material at the time of the field surveys. Several species of *Dendrobium* have the potential to occur at CFSM, including the following T&NT species, which have a high likelihood of occurrence:

- *Dendrobium bigibbum* (Vulnerable, EPBC Act and NC Act)
- *Dendrobium johannis* (Vulnerable, EPBC Act and NC Act).

One other orchid species that was not found during the 2019 surveys or previous surveys is considered to have a high likelihood of occurrence:

- *Acriopsis emarginata* (Vulnerable, EPBC Act and NC Act).

Suitable habitat and field observations for T&NT flora are shown on **Figure 7**.

Weeds

Weed[8] incursions at CFSM are generally isolated to areas of infrastructure such as road sides, dumps, the Cape Flattery Township, and the wharf. Twenty-one weed species were recorded during the 2019 surveys (NRA 2020a).

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[4] 'Remnant vegetation' as defined under the Queensland *Vegetation Management Act* 1999 (VM Act).

[5] Queensland *Vegetation Management Act* 1999.

[6] Biodiversity status according to DES.

[7] Landsberg and Clarkson (2001).

[8] Non-native flora species are referred to as 'weeds'.

Weed species of management significance comprise the following:

- Weeds of National Significance (WoNS)
- weeds on the National Environmental Alert List
- '*Prohibited Matter*' or '*Restricted Matter*' under the Queensland *Biosecurity Act* 2014 (Biosecurity Act)
- priority species listed under local government biosecurity plans and regional pest management plans (CYNRM 2007)
- weeds identified as transformer species in TSSC (2008b).

The following weed species of management significance were present at CFSM during the 2019 surveys:

- *Mesosphaerum suaveolens*: transformer species in TSSC (2008b)
- *Praxelis clematidea*: listed on National Environmental Alert List, and as High Priority in CYNRM (2007)
- *Senna obtusifolia*: listed as Category 3 *Restricted Matter* under the Biosecurity Act, and as High Priority in CYNRM (2007).

Fauna

In preparation for the 2019 surveys, database searches for fauna species were undertaken using the EPBC Act Protected Matters Search Tool, DES Wildlife Online database, and the Atlas of Living Australia. RE mapping, Broad Vegetation Group (BVG) mapping (DES 2018c) and aerial photographs were consulted. Survey planning was informed by the recommended timing and methods in Eyre *et al.* (2018).

Fauna habitats

Seven BVGs (1:2M) are mapped to occur in CFSM. The BVGs are shown on **Figure 8** with descriptions reproduced from Neldner *et al.* (2019b) as follows:

- BVG 3 – 'Notophyll vine forest/thicket (sometimes with sclerophyll and/or Araucarian emergents) on coastal dunes and sandmasses'
- BVG 13 – 'Dry to moist eucalypt woodlands and open forests, mainly on undulating to hilly terrain of mainly metamorphic and acid igneous rocks'
- BVG 14 – 'Woodlands and tall woodlands dominated by *Eucalyptus tetrodonta* (Darwin stringybark) (or *E. megasepala*), and/or *Corymbia nesophila* (Melville Island bloodwood) and/or *E. phoenicea* (scarlet gum)'
- BVG 22 – '*Melaleuca* spp. on seasonally inundated open forests and woodlands of lowland coastal swamps and fringing lines'
- BVG 28 – 'Open forests to open woodlands in coastal locations. Dominant species such as *Casuarina* spp.*, Corymbia* spp.*, Allocasuarina* spp. (she-oak), *Acacia* spp., *Lophostemon suaveolens* (swamp box), *Asteromyrtus* spp., *Neofabricia myrtifolia*'
- BVG 29 – 'Heathlands and associated scrubs and shrublands on coastal dunefields and inland rocky substrates'
- BVG 34 – 'Wetlands. Swamps (wooded or otherwise) and lakes (permanent or ephemeral), claypans. Includes fringing woodlands and shrublands'.

Habitats within CFSM are generally in good condition; the majority of habitats are intact and undisturbed, with minimal weed invasion (NRA 2020a).

Threatened and Near Threatened fauna

During the 2019 surveys, the following T&NT fauna species were recorded at CFSM:

- Eastern Curlew (*Numenius madagascariensis*) – Critically Endangered, EPBC Act; Endangered, NC Act
- White-throated Needletail (*Hirundapus caudacutus*) – Vulnerable, EPBC Act and NC Act
- Beach Stone-Curlew (*Esacus magnirostris*) – Vulnerable, NC Act
- Estuarine Crocodile (*Crocodilus porosus*) – Vulnerable, NC Act
- Cape Heath Ctenotus (*Ctenotus rawlinsoni*) – Vulnerable, NC Act.

Two additional T&NT species were possibly recorded during the 2019 surveys, but were unable to be confirmed. These species have a high likelihood of occurrence:

- Bare-rumped Sheathtail Bat (*Saccolaimus saccolaimus nudicluniatus*) – Vulnerable, EPBC Act, Endangered, NC Act
- Yakka Skink (*Egernia rugosa*) – Vulnerable, EPBC Act and NC Act.

The following T&NT species were not recorded in CFSM in 2019, yet are considered to have a high likelihood of occurrence:

- Curlew Sandpiper (*Calidris ferruginea*) – Critically Endangered, EPBC Act, Endangered, NC Act
- Great Knot (*Calidris tenuirostris*) – Critically Endangered, EPBC Act; Endangered, NC Act
- Greater Sand Plover (*Charadrius leschenaultii*) – Endangered, EPBC Act and NC Act
- Northern Quoll (*Dasyurus hallucatus*) – Endangered, EPBC Act (high likelihood Mt Wraigth only)
- Lesser Sand Plover (*Charadrius mongolus*) – Vulnerable, EPBC Act and NC Act
- Western Alaskan Bar-tailed Godwit (*Limosa lapponica bauera*) – Vulnerable, EPBC Act and NC Act
- Ingram's Lerista (*Lerista ingrami*) – Vulnerable, NC Act
- Endeavour River Litter Skink (*Lygisaurus tanneri*) – Vulnerable, NC Act.

Mapping of suitable habitat for T&NT fauna species that are known or likely to occur at CFSM is shown on **Figure 9**.

Migratory and Special Least Concern fauna

Terrestrial fauna species listed as Migratory under the EPBC Act and Special Least Concern under the NC Act are known to occur or considered likely to occur at CFSM. Almost all of the relevant species are transient visitors associated with shorelines on the periphery of CFSM that would not be expected to occur on a regular or predictable basis within the more central parts of CFSM. The following species are exceptions:

- Fork-tailed Swift (*Apus pacificus*)
- Gull-billed Tern (*Gelochelidon nilotica*)
- White-throated Needletail (*Hirundapus caudacutus*)
- Caspian Tern (*Hydroprogne caspia*)
- Eastern Osprey (*Pandion cristatus*)
- Little Tern (*Sternula albifrons*)
- Estuarine Crocodile (*Crocodilus porosus*).

Fauna breeding places

Breeding activity for the following fauna species was confirmed at CFSM during the 2019 surveys:

- Caspian Tern (*Hydroprogne caspia*)
- Olive-backed Sunbird (*Cinnyris jugularis*) – Least Concern, NC Act.

The locations are shown on **Figure 9**.

Pest species

Feral pigs (*Sus scrofa*) and dogs (*Canis lupus*)[9] were the only pest[10] fauna species confirmed present at CFSM during the 2019 surveys. Evidence of pig activity was widely observed, with wetland habitats providing ideal habitats for this species. Dog prints were observed in CFSM and dogs were detected on cameras. Feral cats (*Felis catus*) (also a pest fauna species) were recorded at CFSM during previous surveys (NRA 1991) and may still occur.

1.1.2.4. Water

CFSM and its receiving waters are within the Jeannie River Basin in eastern Cape York (EHP 2017) and within the Cape Bedford/Cape Flattery dunefield. Watercourses in the dunefield typically take the form of lakes and wetlands that are largely undisturbed. Watercourse formation in the dunefield is limited because surface run-off from the highly permeable sands is minimal. Flowing surface water is typically related to flows from lakes and groundwater expression (NRA 2003). Drainage at CFSM is shown on **Figure 10**. The topography of the Cape Flattery dunefield varies between gently rolling hills to steep dune slopes. The topography at CFSM is detailed in **Section 1.1.2.2** and presented on **Figure 2**. The adjacent marine environment (to the north and east) forms part of the Great Barrier Reef World Heritage Area. Marine features include seagrass meadows to the north, and areas of fringing reef to the north and east.

Hydrology

The hydrology of the Cape Flattery dunefield consists of a fluctuating water table that is linked to surface water. Where the upper surface of the water table intersects a low point in the topography, it expresses as surface water. The upper level of the water table is defined by the groundwater piezometric surface and the lower level by sedimentary basement rocks (DP 1993). The water table in the dunefield fluctuates between wet and dry seasons largely due to infiltration of rainfall. The relationship between surface water and the water table means that many of the lakes and streams disappear during the dry season (NRA 1999).

Surface waterbodies at CFSM predominantly occur as ‘windows’ into the water table. Wetlands and drainage features are also present at CFSM, and are largely influenced by a process similar to the window lakes.

Flooding potential

There is currently no risk mapping of a 1% annual exceedance probability flood event for the CFSM area (DNRME 2022). Cape Flattery has not been mapped as a high hazard area or a medium hazard area for storm tides (DNRME 2022).

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[9] Wild domestic dogs (*Canis lupus familiaris*) are not considered native fauna, whereas Dingoes (*C. l. dingo*) are considered native fauna. It is not clear whether dog observations at CFSM in 2019 were wild domestic dogs or Dingoes or dog/Dingo hybrids, or a combination of these. Therefore, all observations have been referred to broadly under the name *C. lupus*.

[10] Pest fauna are species listed as *Prohibited Matter* or *Restricted Matter* under the Biosecurity Act.

Groundwater

Groundwater on-site primarily occurs in the sand dune aquifer. This is generally considered a large continuous unconfined aquifer unit[11] (DP 1993, HLA 2004). The sand dune aquifer is underlain by Hodgkinson Formation (HLA 2004) and Dalrymple Sandstone (DP 2011).

The sand dune aquifer generally consists of younger white sands overlying older red sands, with minor instances of localised 'coffee rock'. The red sands have been reported as having higher content of fine sand to silt sized particles.

Perched aquifers associated with lower permeability 'coffee rock' have the potential to occur in the Cape Flattery dunefield but have not been reported (DP 1993, HLA 2004).

Groundwater flow regimes were defined in DP (1993), which identified groundwater flow as follows.

- Regime 1 flows generally from the west of CFSM to the dunefield lakes and other surface waterbodies.
- Regime 2 flows from groundwater regime dividing ridges in the south, east and west in a generally northwards direction to the ocean (*ie* the Great Barrier Reef Marine Park).
- Regime 3 is centred around Airport Lake, with groundwater flow identified as radial towards this lake.
- Regime 4 flows south and east of Airport Lake, towards the ocean, from the dunefield between the ocean and Airport Lake.

Subsequent geotechnical reporting (HLA 2004, DP 2011) supports this assessment.

Figure 11 contains a reproduction of predicted groundwater flow regimes from DP (1993).

Depth to the water table varies across CFSM due to topography and seasonal fluctuations. CFSMPL (2019b) reported depths to the water table of between <2 mbgl[12] and >18 mbgl for bores not undergoing water extraction. Wet season and dry season fluctuation of the water table has been reported as high as 10 m (DP 1993). DP (2011) reported less extreme fluctuations of between 1.1 m and 3.4 m from 2008 to 2010 (from dry season to wet season). CFSMPL (2019b) reported approximately 1–2 m of variation (for bores not undergoing water extraction) across the 2018–2019 reporting period.

There are 34 identified groundwater bores on CFSM and one bore identified off lease. The off lease bore is RN 126534, approximately 18 km west of the CFSM airport. The locations of these bores are presented on **Figure 12**.

The water take that occurs on CFSM is for consumptive uses, including mine operations and ancillary activities. It is taken as 'non-associated' water as permitted under the existing water licence (180150) issued by the Queensland Department of Natural Resources and Mines[13]

[11] An unconfined aquifer unit is an aquifer that is not bound by an upper confining layer, such as an aquitard.

[12] Metres below ground level.

[13] The current Administering Authority is the Department of Regional Development, Manufacturing and Water.

under the *Water Act* 2000. The water take is limited to the nominal entitlement under the licence of 12,000 ML.

Wetlands and groundwater dependent ecosystems

Wetlands

Wetlands in the Cape Flattery dunefield primarily occur in low-lying areas such as swales and deflation areas. Wetlands are mapped under the following categories.

- Environmentally Sensitive Areas (Wetlands):
  - wetlands of international importance:
    - Ramsar sites
  - wetlands of national importance:
    - Directory of Important Wetlands – Cape Flattery Dune Lakes
    - Directory of Important Wetlands – Great Barrier Reef Marine Park.
- Great Barrier Reef Wetland protection areas.
- Wetlands of high ecological significance (HES)[14].

Each of these mapping types for wetlands is discussed below.

- Environmentally Sensitive Areas (Wetlands):
  - wetlands of international importance:
    - Ramsar sites: no Ramsar sites are on or near CFSM
  - wetlands of national importance:
    - Directory of Important Wetlands – Cape Flattery Dune Lakes are mapped on or near CFSM.
    - Directory of Important Wetlands – Great Barrier Reef Marine Park areas are mapped on or near CFSM.
- Great Barrier Reef Wetland protection areas: no wetland protection areas are mapped for CFSM or the surrounding area.

HES and GES (General Ecological Significance) wetlands are mapped on and adjacent to CFSM (**Figure 13**). These include the modified waters of Airport Lake, Arnie's Lake and waters adjacent to previously mined and rehabilitated areas. Other mapped areas include wetlands north and east of the existing rejects area and many smaller systems north and west of the current CFSM disturbance area.

Groundwater dependent ecosystems

The Australian Bureau of Meteorology groundwater dependent ecosystem (GDE) atlas maps potential GDEs over the extent of CFSM (BoM 2018). GDE types are as defined in Richardson *et al.* (2011) and field observations are summarised as follows.

- **Terrestrial GDE**. An ecosystem that is dependent on the sub-surface expression of groundwater. This includes all terrestrial vegetation communities that use groundwater permanently or intermittently throughout their life cycle.
  - Mapped over the entire CFSM extent as having a high to moderate potential occurrence (**Figure 14**).
  - Field observations verified the potential presence of terrestrial GDEs at CFSM.

[14]HES wetlands are shown on the Map of Queensland wetland environmental values, as defined in the *Environmental Protection (Water and Wetland Biodiversity) Policy* 2019.

- **Aquatic GDE**. An ecosystem that is dependent on the surface expression of groundwater (including springs and watercourses). This includes vegetation communities that require their roots to be in contact with groundwater permanently or intermittently throughout their life cycle.
  - Mapped over wetland and swamp areas of CFSM as having a high to moderate potential occurrence (**Figure 14**).
  - No springs are mapped to occur at CFSM. The nearest spring to CFSM is approximately 100 km north-west.
  - Field observations verified the presence of aquatic GDEs at CFSM.
- **Subterranean GDE**. An ecosystem that is dependent on the presence of groundwater in subterranean systems such as caves and aquifers.
  - Subterranean GDEs are not mapped to occur at CFSM.

GDEs in the Cape Flattery dunefield generally exist in topographic lows. This is consistent with hydrogeological studies identifying window lakes in these areas.

Identified aquatic GDEs include the modified systems of Arnie's Lake and Airport Lake. Aquatic GDEs generally conform to field observations and hydrogeological interpretations of where GDEs may be observed (*ie* in low-lying areas).

Terrestrial GDE mapping, particularly the mapping of high potential GDEs, does not match field observations or hydrogeological interpretations. These GDEs have been observed in topographically low-lying areas; however, map data does not indicate specific potential terrestrial GDE areas and instead indicates all of Cape Flattery is a potential terrestrial GDE (*eg* including the Cape Flattery headlands).

Cape Flattery background water quality

Surface water

Surface water quality data has been gathered at CFSM since 1985 (NRA 2003). Surface water contaminants of concern at CFSM are identified in the EA. Routine surface water monitoring for the contaminants is undertaken at the EA-listed monitoring locations (**Figure 15**) and frequency (EA Schedule C – Table 2). Monitoring locations include lakes/wetlands and streams.

The background surface water quality at CFSM is summarised as follows.

- pH in lakes/wetlands ranges from 2.72 to 7.68. In streams it ranges from 2.96 to 6.91. The waterbodies at CFSM have a wide pH range, experiencing generally acidic conditions typically associated with lakes in dunefields (NRA 2003).
- Background dissolved oxygen ranges from 29% to 140% saturation in lakes/wetlands, and from 16% to 119% saturation in streams.
- Background turbidity ranges from 0.23 NTU to 86 NTU in lakes/wetlands, and from 0.12 NTU to 35 NTU in streams.
- Background chlorophyll a concentrations range from <2 µg/L to 59 µg/L in lakes/wetlands, and from <2 µg/L to 22 µg/L in streams.

Background total petroleum hydrocarbon[15] (TPH) concentrations in lakes/wetlands have been recorded below the laboratory limit of reporting (LOR)[16] on nearly all monitoring occasions.

[15] The laboratory analysis for TPHs includes C6-C9, C10-C14, C15-C28 and C29-C36.

[16] LORs ranged from <20 µg/L to <200 µg/L.

The TPH concentrations that were reported above the LOR ranged from 26 µg/L to 3,900 µg/L. Background TPH concentrations in streams at CFSM have been recorded below the LOR[17] on all monitoring occasions.

Groundwater

Groundwater monitoring data is available for CFSM from June 1985 (NRA 2003) and becomes more consistent and comprehensive from 2007 onward.

The groundwater contaminants of concern at CFSM are identified in the EA. These vary according to the activity being monitored. The background groundwater quality at CFSM is summarised below[18].

- pH in groundwater ranges between 3.23 and 7.79. Low pH values in groundwater have been attributed to humic acid leaching into the groundwater system from decomposition of vegetation that accumulated during dune formation (HLA 2004).
- Background electrical conductivity (EC) ranges from 68.8 µS/cm to 289 µS/cm.
- Background chloride concentrations range from 11 mg/L to 61 mg/L.
- Background total oxidised nitrogen concentrations range from <0.005 mg/L to 0.88 mg/L
- Background total phosphorus concentrations range from <0.02 mg/L to 0.23 mg/L.
- TPHs typically report at less than the LOR, with six results (out of 1,236 reported TPH values) reporting above the (various) laboratory LORs[19] at the reference site bores since 1996. The maximum value reported was 240 µg/L for the C15-C28 TPH fraction.
- Major ion profiles (*eg* major anions and cations) have been reported as sodium, potassium[20] and chloride dominant (HLA 2004).

Limnology

In addition to water quality monitoring, CFSMPL has conducted limnology surveys to characterise the waterbodies at CFSM based on fauna (aquatic macroinvertebrates and fish) and habitat. Limnology surveys were conducted between 1995 and 1997 with the aim of meeting the CFSM Environment Management Overview Strategy (EMOS) commitments.

The *Cape Flattery Silica Mines Limnology Survey* (NRA 1998a) provides details of the water quality characteristics and ecology (fish and aquatic macroinvertebrates) across different types of aquatic environments at CFSM (streams, lakes and wetlands) from disturbed and undisturbed areas, which were monitored over 3 calendar years, and is summarised as follows.

- Water quality was typical of coastal dune systems in eastern Australia, being characterised by acid conditions and tannin staining.

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[17] LORs ranged from <20 µg/L to <200 µg/L.

[18] Many of the values used to calculate summary statistics for lead, manganese, total oxidised nitrogen, total phosphorus and filtered reactive phosphorus were calculated using the convention of substituting <LOR values with a value half the LOR. This was done to allow <LOR values to be used in calculations. Over the long period the data was collected, various LORs have been used for some analytes. The statistics calculated using data that included the various LORs with the substitution convention employed are suitable general descriptions of water quality data.

[19] LORs ranged from <20 µg/L to <200 µg/L.

[20] The inclusion of potassium as a dominant ion by HLA (2004) appears to be related to piper plot interpretation (where sodium and potassium ions are grouped), as potassium contributes less than magnesium when milliequivalent values are defined.

- The assessment of fish populations and assemblages was logistically challenging, and the results showed a high degree of variability, making regular surveys of little long-term value.
- Most aquatic macroinvertebrate taxa were generally found in only a few sites and at relatively low numbers.

1.1.2.5. Cultural heritage

Traditional Owners and Native Title

The Dingaal, Nguurruumungu and Thanil groups are the Traditional Owners (TOs) of CFSM. In 1997, a Native Title claim over the Hope Vale Deed of Grant in Trust was successful (Federal Court Number: QUD179/1997; NNTT Number: QCD1997/001). The Dingaal, Nguurruumungu and Thanil groups are parties to the Native Title agreement and are represented collectively by the Hope Vale Congress Aboriginal Corporation (HVCAC) (the Registered Native Title Body Corporate).

Aboriginal cultural heritage

The first survey at CFSM for items and places of Aboriginal cultural heritage significance occurred in 1985 (Robins 1985), and surveys continue to be undertaken as part of CFSM operations. Cultural heritage surveys have identified a range of items and places of Aboriginal cultural heritage significance, including items such as stone artefacts (*eg* grinding stones and axe heads), shell middens[21] and manuports[22], and places such as culturally significant raw material deposits (*eg* ochre), campsites, hunting grounds, and water resources. Of the items and places found, some are also listed on the Aboriginal Cultural Heritage Register (DATSIP 2019a, 2019b, 2019c).

Identification of items and places of Aboriginal cultural heritage significance at CFSM can be difficult. Previous cultural heritage surveys have been restricted by the thick vegetation and steep slopes, which have limited or prevented access to some areas. The transient nature of the dunes often results in items of Aboriginal cultural heritage significance being buried beneath the surface and not detected during surveys. It is not uncommon for surveys to find new items in areas where items of Aboriginal cultural heritage significance have previously been collected.

Historical cultural heritage

European presence in the broader Cape Flattery area (*ie* the CFSM mining leases and surrounding areas) dates to 1770 (Niche 2015). Noteworthy events include the following:

- James Cook's passing of Lizard Island in August 1770
- the sea cucumber (bêche-de-mer) industry at Lizard Island (and surrounds) that was briefly active in 1860 and again from 1879 to 1881
- the establishment of the Elim Aboriginal Mission in 1885 at Cape Bedford, and subsequent relocation to Hope Vale in 1900
- the commencement of silica mining at Cape Flattery in 1967 by Hope Vale community members
- the acquisition of Cape Flattery Silica Mine by Mitsubishi in 1977.

[21] Collections of shells or shell fragments that indicate past Aboriginal hunting, gathering and food processing activities.

[22] Unmodified natural items that have been removed from their original context by humans (*eg* shells or stones).

These events occurred in the broader Cape Flattery area; however, few items or places of historical cultural heritage have been found within CFSM, and CFSM is not listed on the Queensland Heritage Register.

CFSMPL has management practices in place that have proven successful in identifying and managing items and places of cultural heritage significance. These procedures and practices are outlined below.

Policies

CFSMPL's commitments to maintaining Aboriginal cultural heritage and relationships with TOs are long-standing and now are described in the *Yuuru Relations Policy* (CFSMPL 2021a) and the *Environmental Policy* (CFSMPL 2021b). The commitments in the policies are communicated to CFSMPL personnel and contractors through site inductions, display of the policies on notice boards, and implementation of the Environmental Management System (EMS)[23].

Cultural Heritage Agreement

Between 2007 and 2014, CFSM operated under a Cultural Heritage Management Plan (CHMP), which was ratified by CFSMPL and the Dingaal and Nguurruumungu groups. The CHMP was replaced by the Cultural Heritage Agreement (CHA) in November 2014. The CHA between CFSMPL and the HVCAC (on behalf of the Dingaal, Nguurruumungu and Thanil groups) provides strategies to manage and protect Aboriginal cultural heritage items and places at CFSM.

Land Clearing Procedure

CFSMPL operates under a Land Clearing Procedure and Land Clearing Permit system, which forms part of the EMS. The Land Clearing Procedure and Land Clearing Permit system was developed to minimise impacts on the environment and cultural heritage values at CFSM. Any vegetation clearing at CFSM is required to be approved under a Land Clearing Permit (LCP). The LCP requires that the items listed on the LCP procedural checklist (and detailed in the CFSM Land Clearing Procedure) be addressed, and that the LCP be signed off by CFSMPL management.

1.1.3 Project description

CFSMPL has been undertaking silica mining, treatment, transport and ship loading at Cape Flattery since mid-1968 (CFSMPL 1994). The mine was purchased by Mitsubishi in 1977, and in 1987 a deep-water jetty was established (CFSMPL 2019a). The ship loading facility was completed by CFSMPL in April 1987, replacing the previous operation that required vessels to anchor offshore and to receive product from self-unloading barges. Ownership of the offshore facility and portion of the land facility was ceded to the Harbours Corporation (*ie* a State Government entity) (CFSMPL undated). A new process mill was commissioned on 26 December 2012 (NRA 2014), which improved water recycling rates and introduced slurry lines to transport product and reject material. In response to the market, production rates have varied, increasing from approximately 2,200,000 t/year in 2011 to approximately 2,600,000 t/year in 2018 (CFSMPL 2018). Responding to variable market forces demands flexibility in the operation; therefore, it is not possible to forecast the exact location of mining operations. Between 1967 and 1999, CFSM derived product mainly from Airport Lake South Mining Area on ML2965. From 1999 onwards, CFSM derived product mainly from the Central and Central West mining areas on ML2806 (CFSMPL 2019c). In 2020 CFSMPL

[23] CFSM has an EMS, which is certified to ISO 14001:2015 Environmental Management Systems.

applied to amend the EA and received approval to increase production to approximately 3,5000,000 t/year.

The regulatory requirements and related administrative arrangements relative to CFSM have evolved over time. Queensland had legislative controls to manage the environmental impacts associated with mining, particularly rehabilitation, for at least 33 years prior to 2002 (Anderson 2002). From 2002 onward, numerous changes in the regulatory requirements for mining projects occurred. The status of the Environmental Management Overview Strategy (EMOS) as a key regulatory mechanism prevailed, with relevant modifications to the *Environmental Protection Act* 1994 (EP Act) (as in force 2 January 2001), though it was replaced by the Environmental Management Plan (EM Plan), which is no longer required for submission pursuant to legislative processes (Butler *et al.* 2015).

The EMOS addressed life of mine, including rehabilitation (**Appendix 1**). For CFSM, its EMOS (CFSMPL 1994) was accepted and approved by the Administering Authority (**Appendix 2**).

The EMOS provided overarching rehabilitation goals, and the development of specific acceptance criteria was progressed through the late 1990s and into the early 2000s (CFSMPL 1994, NRA 2015). Statutory requirements transitioned through this period, and the EA (reference MIM800108703, first issued in May 2003) included approval conditions that rehabilitation requirements could be undertaken in accordance with Commitments made in the preparation of the EMOS. The Commitments defined in the EMOS (CFSMPL 1994) are similar to what would now be known as rehabilitation objectives or, where they are very specific, rehabilitation performance targets or completion criteria. The Commitments formed the basis of the site-specific rehabilitation targets that were developed during the CFSM Rehabilitation Optimisation Project and formalised in the CFSM EA (EA dated 8 November 2019). The CFSM Rehabilitation Optimisation Project was a detailed study of CFSM rehabilitation practices undertaken over 5 years (2014–2019). It consolidated the knowledge from past rehabilitation work, formalised rehabilitation performance targets[24] for disturbances and associated post-mining land use (PMLU) and, in consultation with DES, secured these targets in the statutory framework that remains current (EA dated 14 February 2020).

The introduction of the latest change in the regulatory requirements for mining projects requires the preparation of a progressive rehabilitation and closure plan (PRCP), also for the life of mine—as was the requirement for the EMOS. CFSMPL received a *Transition Notice for a PRC plan* (dated 29 October 2020) from DES requiring the EA holder to submit a proposed PRC plan, that meets the requirements in sections 126C and 126D of the EP Act, pursuant to section 754 of the EP Act, by 1 June 2022. The transitional provisions in section 754(3) of the EP Act in regard to 126C(1)(g) or (h), or 1260(2) or (3) have application to CFSMPL *ie* '*an outcome for the land has been identified under a land outcome document; and the outcome for the land is the same as, or substantially similar to, the outcome for the land if it were a non-use management area under a PRCP schedule*', the land outcome document being the EA. The EA states sufficient detail to identify the location or area of the land to which each outcome relates. The PRCP comprises a rehabilitation planning part and PRCP schedule.

[24] *ie* rehabilitation objectives, indicators and completion criteria for the attainment of the goals: safe, stable, does not cause environmental harm, and is able to sustain the PMLU.

CFSM general arrangements are shown on **Figure 16** and proximity to sensitive receptors is shown on **Figure 17**. Activities at CFSM include the following.

- Activities associated with exploration, mining, processing and export will continue at CFSM subject to market demand.
- The resource on the leases is significant. In 1990, based on the proven resources in the mining lease areas at a production rate of 1.5 Mt/year, the estimated mine life was over 100 years (NRA 1990b).
- Exploration drilling (inclusive of Land Clearing Permit procedures) ahead of mining, processing and export activities, and appurtenant works and activities.
- Removal and stockpiling of vegetation ahead of the mine path.
- Stripping and stockpiling of topsoil for later use in rehabilitation.
- Mining of sand from dunes by front-end loader. The front-end loader transports sand to a conveyor or slurry pipeline, which transports the sand to the mill.
- Processing at the mill. Slurry is fed at controlled density through spirals and classifiers that separate feed into product and rejects by physical means, relying on gravity and size differences.
- Product slurry is pumped to the filter belt. The product is dewatered by a filter belt and stockpiled at approximately 85–92% solids. The stockpile capacity is approximately 175,000 tonnes.
- A proportion of the product from the mill is pumped to the low iron plant and passed through a magnetic separator, further reducing iron levels in the product sand.
- Low iron product is dewatered and conveyed to the low iron stockpile adjacent to the product stockpile. Low iron rejects are transferred as a slurry to the Arnie's Lake settling area adjacent to the old (pre-December 2012) rejects stockpile.
- Rejects from the mill are transferred to the rejects area as a slurry of 26% solids at 82 tonnes/h (solids), assuming production at 716 tonnes/h[25]. The rejects area is in an existing mined area of the central mining area. The rejects area is managed in accordance with the CFSM Water Management Plan to manage the risk of unauthorised release into the receiving environment.
- Water for the mill is supplied from the process water pond to the process water tank.
- Wash water is recycled through the thickener, with solids diverted to the reject flow and water diverted to the process water tank for re-use.
- Water treatment (flocculant and coagulant products) applied at the new mill, rejects pipeline, and filter belt reduce the turbidity of water outflows to the rejects area, Arnie's Lake, and Airport Lake.
- Make-up water is taken predominantly from Airport Lake, with some water taken from groundwater bores. Water is taken under a Water Licence issued to CFSMPL under the Queensland *Water Act* 2000 (reference 180150).
- Product is reclaimed from the product stockpiles and transported by conveyor to ships berthed at the bulk loading facility (wharf), which is operated by CFSMPL under a lease from Ports North Queensland.
- Maintenance works associated with the bulk handling facility (conveyor) and the supply wharf area.
- Incineration of waste.

[25] Based on Mineral Technologies process flowsheet for 800 tph silica processing plant, 7 December 2018 (cited in CFSMPL 2019c).

- Quarry/borrow areas activities.
- Drainage works to manage site flooding.
- Rehabilitation of mined areas, including quarry and borrow areas.
- Road maintenance works (including vegetation clearing and drainage works).
- Water management. CFSMPL will manage water on-site to ensure year-round supply of water for process requirements while managing the risk of unauthorised releases in accordance with the CFSM Water Management Plan.
- CFSMPL operates under an EMS at CFSM. The EMS has been certified as conforming to AS/NZ ISO: 14001:2015 by a conformity assessment body (Compass Assurance Services Pty Ltd), certification date: 7 July 2017, certificate number: 2093-1299-01 (valid to 7 July 2023).

The approach to continuous improvements to the process water circuit, which have achieved significant reductions in water use per tonne of product (CFSMPL 2018), will continue. Initiatives in the concept phase include water re-use direct from Arnie's Lake and the rejects area (*ie* decant and return water to reduce bore field intake to the circuit) and methods to improve the efficiency of the current transfer mechanism from Arnie's Lake to Airport Lake (*ie* improvements to the existing drain achieved by constructability options to reduce maintenance requirements and improve flow and/or direct transfer through pumping). Similarly, a continuous improvement approach to waste management will persist, supported by the EMS and driven by the potential value (opportunity cost reductions as well as direct revenue). Current initiatives in the discussion phase include the beneficial re-use of mined materials (a 'waste to product' concept) and the mining method necessary to achieve maximum recovery of existing resources. Mining method related initiatives are not new at CFSM; different techniques have been undertaken over the life of the mine. Notwithstanding this, considerable investigative studies, including bench scale and field-based pilot trials, associated with evaluating feasibility, need to occur well in advance of any proposed change.

Research and development will continue. The current themes include:

- rehabilitation of disturbed lands:
  - progressive rehabilitation certification
  - trials for disturbed areas that have proven problematic
  - improvements to mine planning
- waste management:
  - beneficial re-use of mined materials
- resource utilisation:
  - mining method
  - conveyance of mined materials
  - water resource management (reduce, re-use, recycle).

1.1.3.1. Notifiable activities

Notifiable activities (as defined in Schedule 3 of the EP Act) carried out on CFSMPL mining leases (on Lot 35 on Plan SP232620) are:

- 1. Abrasive blasting
- 20. Landfill (decommissioned)
- 23. Metal treatment or coating
- 29. Petroleum product or oil storage.

Figure 18 illustrates where all notifiable activities are carried out. Details of all notifiable activities carried out at CFSM (past and present) are provided in **Table 2**.

Table 2: CFSM notifiable activities

Notifiable activity[1]	Facility	Coordinates (WGS 84)	Area (ha)	Mining lease	Past/ present use
1. Abrasive blasting	Abrasive blasting area	E 318421.21 N 8345023.08	<0.5	2806	Present
20. Landfill	Landfill (decommissioned)	E 318367.47 N 8344949.55	3	2806	Past
23. Metal treatment or coating	Abrasive blasting area	E 318421.21 N 8345023.08	<0.5	2806	Present
29. Petroleum product or oil storage	Main fuel farm	E 318362.07 N 8345322.01	<0.5	2806	Present
	Powerhouse fuel storage	E 320050.83 N 8343617.12	<0.5	2806	Present
	Workboat refuelling area	E 318378.21 N 8345888.43	<0.5	2806	Present
	Underground storage (store/workshop)	E 318706.26 N 8344373.63	<0.5	2806	Present
	Mobile tanker	NA	<0.5	2806/2965	Present
	Bulk oil (workshop)	E 318647.84 N 8344364.22	<0.5	2806	Present
	Waste oil	E 318647.84 N 8344364.22	<0.5	2806	Present
	Disused underground storage	E 318422.11 N 8345304.18	<0.5	2806	Past
	Disused aboveground storage	E 318416.58 N 8345369.47	<0.5	2806	Past

[1] As defined in Schedule 3 of the EP Act.

1.1.3.2. Environmentally Relevant Activities

Another key regulatory requirement is Environmentally Relevant Activities (ERAs). The formulation and application of ERAs to mining projects has evolved from inception to current. For example:

- activities that require to be permitted as an ERA have been introduced or removed from legislation
- the Integrated Environmental Management System (IEMS), the regulatory mechanism to account for multiple ERAs, although remaining in the EP Act, appears to have once applied though no longer applies for CFSM
- the nomenclature and description of ERAs have altered in legislation (and have not necessarily been reflected in the EA)
- a list of ERAs has been included *and* not included in the EA.

The regulatory system allows for an amendment to the EA to account for errors arising from the above inconsistencies. For CFSM, some activities that have existed for decades, and have been permitted and reported upon in the past, may in the future warrant listing.

ERAs listed on EA EPML00550113 (dated 14 February 2020) are:

- *Ancillary 31 - Mineral processing, 2: Processing, in a year, the following quantities of mineral products, other than coke, (b) more than 100,000t*
- *Schedule 3 12: Mining mineral sand*

- *Schedule 3 09: A mining activity involving drilling, costeaning, pitting or carrying out geological surveys causing significant disturbance*
- *Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme*
- *Ancillary 60 - Waste disposal, 2: Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1) (b), (a) 50t to 2000t*
- *Ancillary 08 - Chemical Storage, 3: Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c)*
- *Schedule 3 10: Investigating the potential development of a mineral resource by large bulk sampling or constructing an exploratory shaft, adit or open pit*.

Table 3 lists ERAs that were undertaken at CFSM, were previously licensed (CFSMPL 1999), but at various times may or may not have been listed on the CFSM EA. The list is not exhaustive and is presented for illustrative purposes.

Table 3: CFSM 'Historical' ERAs

ERA no. (1998/99)[1]	Description of ERA	ERA no. (2017)
ERA 11(b)	Petroleum Storage (500,000 L or more)	ERA 8(3) Chemical storage
ERA 15 (b)	Sewage Treatment (>100 EP, <1,500 EP)	ERA 63(1)(b)(i) Sewage treatment
ERA 16	Water Treatment	ERA 64 Water treatment
ERA 74	Bulk stockpiling, loading or unloading	ERA 50 Bulk material handling
ERA 75(a)(i)	Waste Disposal Facility (>50 t, <2,000 t)	ERA 60 Waste disposal (CFSM landfill decommissioned)
ERA 28	Motor Vehicle Workshop	Repealed

[1] Source: CFSMPL (1999).

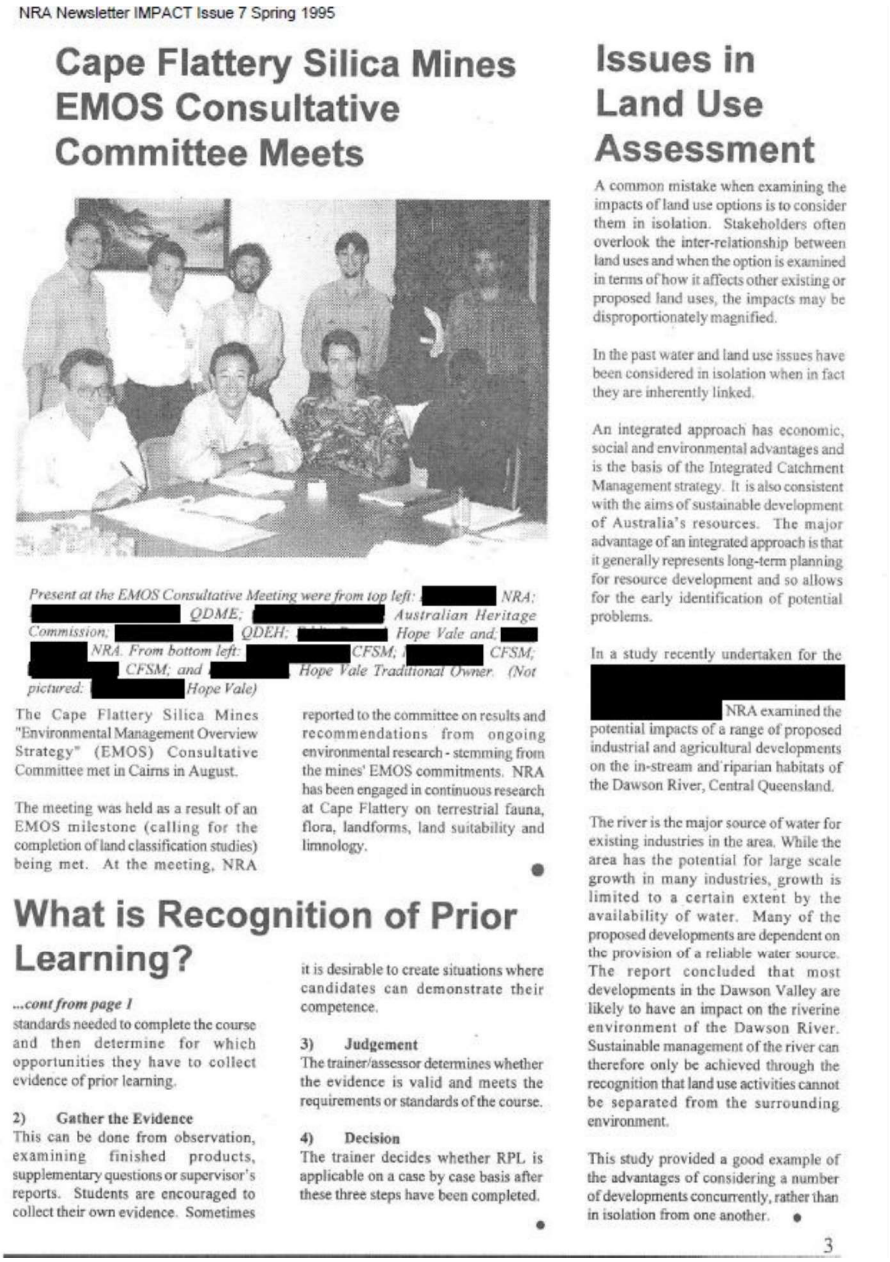
1.2 Community consultation

This section includes information on stakeholder consultation.

Environmental management and rehabilitation goals for CFSM were defined during the preparation of the EMOS in 1994 (CFSMPL 1994). The EMOS stakeholder consultative process (CFSMPL 1994), which was undertaken under the guidance of statutory requirements, was and remains a rarity—in that it involved a wide range of stakeholders in the negotiation of PMLU and rehabilitation performance targets. In accepting and approving the EMOS, the Administering Authority commended CFSMPL on the consultative approach (**Appendix 2**):

> '*As I have said before, CFSM are to be commended for the consultative approach adopted in finalising the EMOS. This approach will be recommended to any mining company faced with similar circumstances where their mining project is subject to intense scrutiny by a variety of community interest groups*.'

The consultative process involved CFSMPL, Traditional Owners (TOs), regulators, government agencies, community groups and conservation groups (**Plate 1**). It was a formal process initiated in 1992 (**Appendix 3**) that continued through to completion of the EMOS (**Appendix 4**).



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Cape Flattery Silica Mines EMOS Consultative Committee Meets

Present at the EMOS Consultative Meeting were from top left: [redacted] NRA; [redacted] QDME; [redacted] Australian Heritage Commission; [redacted] QDEH; [redacted] Hope Vale and [redacted] NRA. From bottom left: [redacted] CFSM; [redacted] CFSM; [redacted] CFSM; and [redacted] Hope Vale Traditional Owner. (Not pictured: [redacted] Hope Vale)

The Cape Flattery Silica Mines "Environmental Management Overview Strategy" (EMOS) Consultative Committee met in Cairns in August.

The meeting was held as a result of an EMOS milestone (calling for the completion of land classification studies) being met. At the meeting, NRA reported to the committee on results and recommendations from ongoing environmental research - stemming from the mines' EMOS commitments. NRA has been engaged in continuous research at Cape Flattery on terrestrial fauna, flora, landforms, land suitability and limnology.

What is Recognition of Prior Learning?

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standards needed to complete the course and then determine for which opportunities they have to collect evidence of prior learning.

2) Gather the Evidence

This can be done from observation, examining finished products, supplementary questions or supervisor's reports. Students are encouraged to collect their own evidence. Sometimes it is desirable to create situations where candidates can demonstrate their competence.

3) Judgement

The trainer/assessor determines whether the evidence is valid and meets the requirements or standards of the course.

4) Decision

The trainer decides whether RPL is applicable on a case by case basis after these three steps have been completed.

Issues in Land Use Assessment

A common mistake when examining the impacts of land use options is to consider them in isolation. Stakeholders often overlook the inter-relationship between land uses and when the option is examined in terms of how it affects other existing or proposed land uses, the impacts may be disproportionately magnified.

In the past water and land use issues have been considered in isolation when in fact they are inherently linked.

An integrated approach has economic, social and environmental advantages and is the basis of the Integrated Catchment Management strategy. It is also consistent with the aims of sustainable development of Australia's resources. The major advantage of an integrated approach is that it generally represents long-term planning for resource development and so allows for the early identification of potential problems.

In a study recently undertaken for the [redacted] NRA examined the potential impacts of a range of proposed industrial and agricultural developments on the in-stream and riparian habitats of the Dawson River, Central Queensland.

The river is the major source of water for existing industries in the area. While the area has the potential for large scale growth in many industries, growth is limited to a certain extent by the availability of water. Many of the proposed developments are dependent on the provision of a reliable water source. The report concluded that most developments in the Dawson Valley are likely to have an impact on the riverine environment of the Dawson River. Sustainable management of the river can therefore only be achieved through the recognition that land use activities cannot be separated from the surrounding environment.

This study provided a good example of the advantages of considering a number of developments concurrently, rather than in isolation from one another.

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Plate 1: EMOS consultative meeting

Environmental management and rehabilitation goals were wide ranging. Some required considerable research effort to gather information to allow the commitments to be progressed and to inform environmental management. The EMOS provided overarching rehabilitation goals, and the development of specific acceptance criteria was progressed through the late 1990s and into the early 2000s. The rehabilitation strategy developed at CFSM in the 1980s and 1990s, and articulated in commitments in the EMOS, remained largely valid. From 2014 to 2019, resources were devoted by CFSMPL for the development of rehabilitation completion criteria for the attainment of goals for the disturbance types at CFSM. The criteria informed an EA amendment application, which was approved; the EA now includes detailed rehabilitation specifications.

The consultative process undertaken for the EMOS contributed to the formal stakeholder consultation process initiated in 1992, which persists—informal and formal consultation occurs and, among other matters, mine planning and associated rehabilitation aspects are discussed.

For the directly relevant community stakeholders:

1. informal consultation occurs consistent with being mutually respected good neighbours:
   a. CFSMPL consults with the TOs routinely on a day-to-day operational basis through personal communication channels (*ie* face-to-face discussions, email, telephone). Where necessary, consultation with TOs may occur via an independent cultural heritage consultant
   b. CFSMPL has a specific policy to this end (CFSMPL 2021a)
2. formal consultation occurs:
   a. CFSMPL consults quarterly with the HVCAC Registered Native Title Bodies Corporate (RNTBC) (*ie* Agreement Implementation Committee meetings) for which minutes are taken
   b. discussions with HVCAC RNTBC concerning the '*Retention of Infrastructure Deed*' are convened periodically, the outcomes of which are documented by third party legal advisors.

The consultation meetings may be attended by legal representation for both parties, the regulator, and environmental and/or cultural heritage consultants as required.

All proceedings from the consultation meetings, including but not limited to agreements made between CFSMPL and the TOs regarding land use, are minuted (**Appendix 5**) and, where necessary, formalised in the CFSMPL procedures and/or policies. Some agreements may also be implemented through the regulatory framework. For example, an amendment to the CFSM EA formalised the agreement between CFSMPL and TOs to retain infrastructure for Hope Vale Owner Use (Schedule F) as nominated in the Retention of Infrastructure Deed. The infrastructure to be retained is listed in EA Appendix 2 – Table H.

In terms of the Government, consultation is a continual process due to evolving regulatory requirements.

DES requires the inclusion of a *community consultation register* (detailing consultation already undertaken) and a *community consultation plan* (outlining future commitments to consult regarding rehabilitation outcomes). As requested by DES, a description of the consultation undertaken to date is given above; the requested examples of the past and recent processes, complete with evidence of the topics addressed, are in **Appendices 3**, **4** and **5**.

Community Consultation Register

Consultation date	Community member	Consultation type	Information provided	Issues raised by community	How issues were considered	Decisions / outcomes	Commitments
1992 to current	Traditional Owners (HVCAC)	Formal meetings	Life of mine planning and closure related	End land use, retained infrastructure, and rehabilitation	Formal collaborative process	Reflected in EMOS; retained in EA; as relevant listed in the Retention of Infrastructure Deed and/or Cultural Heritage Agreement	Reflected in EMOS; retained in EA; as relevant listed in the Retention of Infrastructure Deed; and/or Cultural Heritage Agreement

Community Consultation Plan

Objective	Engagement type	Proposed consultation frequency	Released information	How feedback / comments are considered
Discuss mine activities in the context of the interests of TOs and CFSMPL for the purpose of resolving agreed outcomes.	Formal meeting.	Quarterly.	Minutes of meeting.	Collaboratively, and as relevant formalised in the Retention of Infrastructure Deed and/or Cultural Heritage Agreement.

1.3 Post-mining land use

This section includes the assessment of post-mining land use (PMLU) options, methodology for determining PMLU options, and details of each nominated PMLU.

The EA provides detailed specifications of PMLU for disturbed areas. The agreed PMLU for land disturbances are listed in Schedule F – Table 1 of the EA.

The derivation of the detailed information evident in the EA has occurred over at least 30 years (**Sections 1.2** and **1.5** explain the approach taken to develop the PMLU for disturbed areas). The PMLU in the PRCP Schedule (**Appendix 8**) is:

1. consistent with the outcome of the community consultation (**Section 1.2**)
2. consistent with the outcome agreed with the State (there are no local government, State or Commonwealth strategies or plans for the relevant land).

The methodology for determining PMLU options, and details of each nominated PMLU are formally documented in an EA amendment application (CFSMPL 2019d), assessed and approved by DES, and the EA issued (the current EA reflects this).

Progressive Rehabilitation Certification (**Appendix 6**) has been achieved for 119.97 ha of area mined—evident that the knowledge base and method necessary to achieve successful PMLU outcomes exist.

This information informs the PRCP *ie* the rehabilitation planning part and the schedule.

1.4 Non-use management areas

No non-use management areas (NUMAs) will be present at CFSM at closure.

1.4.1 Voids in flood plains

No voids in flood plains will be present at CFSM at closure.

1.5 Rehabilitation management methodology

This section includes information describing how the proposed rehabilitation management methodology has been developed and will be implemented.

Rehabilitation has been carried out progressively at CFSM since 1989 and the majority of areas disturbed by mining that are available for rehabilitation have undergone some form of treatment. Rehabilitation monitoring has been conducted since approximately 1992 to

determine the progress of rehabilitated ecosystems and to support the ongoing development of rehabilitation methods.

CFSMPL has developed and documented rehabilitation planning and delivery methods that are site-specific, detailed and demonstratively effective. The EA reflects this sophistication.

Progressive Rehabilitation Certification (**Appendix 6**) has been achieved for 119.97 ha of area mined for which rehabilitation commenced in 1989 (**Figure 19**). An additional 94.3 ha of mined land has been rehabilitated to various stages of completion for which rehabilitation commenced from 2008 to 2021 (refer to PRCP Schedule RA1 and RA2 where this information is captured) (**Figure 20**). The current area of land that is available for rehabilitation for which rehabilitation has not commenced is *ca* 41.3 ha (as at 24 March 2022).

As land areas become available post mine activities, rehabilitation commences. Broadly, the annual rate of mining disturbance is nominally 30 ha and rehabilitation is nominally 40 ha. These nominal rates apply until 2038, at which time the rates of mining and rehabilitation are forecast to be equal (*ie* nominally 30 ha). These rates are based on the consideration of forecast production requirements, EA conditions that nominate an overarching maximum area of disturbance and subordinate maximum areas at any one time for active mining, mobile infrastructure, and exploration (as well as the obligation to undertake progressive rehabilitation).

The PRCP Schedule (**Appendix 8**) has been prepared in accordance with the legislative requirements and with the benefit of:

1. proven performance of demonstrating success in rehabilitation that includes considerations of planning, techniques, monitoring and performance measures
2. long standing rehabilitation program with knowledge base captured in documents
3. a sophisticated EA that provides the majority of information necessary to inform progressive rehabilitation planning
4. consultation with DES in preparing the PRCP Schedule to achieve an outcome that captures the existing information without reinvention or corruption of its integrity.

The rehabilitation areas (RAs) nominated in the PRCP Schedule have been defined considering the relevant land outcomes, disturbance types and rehabilitation methods. The time periods (*date area is available*, *milestone completed by*) have been determined in consideration of:

1. the requirement for progressive rehabilitation
2. mine planning
3. evidence of the period required to achieve successful rehabilitation for different disturbance types *ie* 30 years where landforms are altered, 20 years elsewhere
4. the logical aggregating of land parcels (for RA3).

The *rehabilitation milestones* and *rehabilitation criteria* are site-specific. The majority have been taken from the EA, with some additions to account for the formative stages of rehabilitation. Included in the PRCP Schedule is the information relevant to the definition of success—without which, outcomes that can be relied upon are not likely.

1.5.1 General rehabilitation practices

Environmental management and rehabilitation goals for CFSM were defined during the preparation of the EMOS in 1994 (CFSMPL 1994). This was a consultative process involving

CFSMPL, TOs, regulators, government agencies, community groups and conservation groups (see **Section 1.2**). The EMOS provided overarching rehabilitation goals, and the development of specific acceptance criteria was progressed through the late 1990s and into the early 2000s. The rehabilitation strategy developed at CFSM in the 1980s and 1990s, and articulated in commitments in the EMOS, remained largely valid. From 2014 to 2019 resources were devoted by CFSMPL for the development of rehabilitation completion criteria for the attainment of goals for the disturbance types at CFSM. The criteria informed an EA amendment application, which was approved; the EA now includes detailed rehabilitation specifications.

The CFSMPL Environmental Management System (EMS) has been implemented to help CFSMPL meet the environmental management objectives for activities undertaken at CFSM. The EMS is a non-regulatory document that assists CFSMPL to meet its compliance obligations (*ie* EA conditions), enhance CFSM's environmental performance, and achieve environmental objectives. The intended outcomes of the EMS are as follows.

- Ensure all activities carried out at CFSM comply with statutory environmental requirements.
- Reduce financial assurance through progressive rehabilitation.
- Manage and control the impacts of operations on the Cape Flattery environments, ensuring significant species and habitats are protected.
- Manage, control and minimise waste streams.
- Adopt pollution prevention practices to conserve natural resources.
- Promote environmental awareness amongst personnel on-site, including interested parties.
- Recognise and work to meet the needs of the TOs when rehabilitating mining impact areas.
- Continually improve site practices and management systems to maintain environmental values.

The CFSM Rehabilitation Plan (NRA 2020b) has been prepared to provide a strategy to fulfil the obligations of the CFSM EA EPML00550113 (dated 14 February 2020), specifically Schedule F. The purpose of the CFSM Rehabilitation Plan is to provide a clear path to successful and acceptable rehabilitation outcomes that allow CFSMPL to meet its statutory obligations for mining leases ML 2806, ML 2965, ML 7069 and ML 40048.

The objectives of the CFSM Rehabilitation Plan are as follows.

- Provide a clear framework to assist verification of compliance with statutory commitments.
- Provide supporting evidence for progressive rehabilitation certification during operations and to demonstrate practical completion of the rehabilitation process and discharge of CFSMPL's financial assurance post-closure.
- Achieve progressive rehabilitation to an agreed PMLU in a cost-effective manner that is integrated into the mining operation.
- Establish a process whereby the CFSM Rehabilitation Plan and associated operation is subject to continuous improvements.

The CFSM Rehabilitation Plan is intended to be a 'live' document that will be responsive to changes in mine plans, stakeholder priorities and research results. Notwithstanding the evolution of the document in response to an expanding knowledge base, the logic behind the Rehabilitation Plan should remain.

The CFSM Rehabilitation Manual (NRA 2020c) provides direction on the planning and implementation of progressive rehabilitation at CFSM and has been prepared to support the CFSM Rehabilitation Plan. The purpose of the CFSM Rehabilitation Manual is to provide a clear path to achieving successful rehabilitation outcomes that will allow CFSMPL to meet its statutory obligations for CFSM MLs.

The CFSM Rehabilitation Manual documents the following.

- Rehabilitation overview:
  - milestones
  - EMS inspection test procedures
  - natural landscape features of relevance to rehabilitation at CFSM
  - values.
- Rehabilitation planning and design:
  - pre-mining rehabilitation planning
  - topsoil management
  - nursery and propagation management
  - production and scheduling.
- Rehabilitation process:
  - infrastructure removal and land contamination
  - land re-forming
  - stabilising land types
  - re-establishing vegetation.
- Rehabilitation development and monitoring:
  - Maintenance monitoring, contingencies and remedial action.
- Staffing and training.
- Rehabilitation completion documentation.

The CFSM Rehabilitation Manual is intended to be a 'live' document that will be responsive to changes in mine plans, stakeholder priorities and research results. Notwithstanding the evolution of the document in response to an expanding knowledge base, the logic behind the CFSM Rehabilitation Manual should remain.

1.5.2 Revegetation plan

Rehabilitation for each area will progress broadly as follows.

Pre-disturbance rehabilitation planning and design.

- Final landform planning.
  - Planning and designating dune and/or wetland features based on pre-disturbance landform types.
  - Includes design works related to the approved final landform types.
  - Includes planning for topsoil stripping, stockpiling and management.
- Revegetation planning and design.
  - Planning the revegetation program to deliver the agreed rehabilitation targets.
  - Includes pre-disturbance seed collection and storage.

Rehabilitation works with active or passive vegetation establishment.

- Final landform construction.
  - Construction of the required landform features (*eg* dune and/or wetland features) to the approved design.
- Topsoil stabilisation and vegetation establishment.
  - Implementation of topsoil and surface protection measures (*eg* provision of groundcover such as trash or brush-matting) and a revegetation program designed to achieve the agreed rehabilitation targets.

Rehabilitation development and monitoring.

- Maintenance monitoring and contingencies.
  - Additional works or maintenance required to maximise the likelihood of a vegetation community developing that is resilient to anticipated levels of stress and thus capable of maintaining adequate long-term vegetation cover and dune stabilisation.
- Rehabilitation monitoring program.
  - Post-establishment annual monitoring of rehabilitation progression towards successful achievement of the agreed rehabilitation targets.

Documentation

CFSMPL documents rehabilitation actions using established Inspection Test Procedures (ITPs). ITPs provide a Quality Assurance (QA) method for verifying that CFSM EMS ISO 14001:2015 procedures have been followed when carrying out rehabilitation works, and document (for future reference) changes or incidents that occurred during rehabilitation planning or implementation.

Natural features that influence rehabilitation

Climate

The region is subject to a monsoonal climate, with the majority of rainfall occurring during summer, along with higher temperatures and evaporation rates. For the majority of the year, the wind is from a south-easterly direction.

Landform types

Landforms are integral to rehabilitation at CFSM. The common landform types at CFSM are as follows.

- Large elongate parabolic dunes.
- Small parabolic dunes (including coastal parabolic dunes).
- Long narrow ridges.
- Inter-dune sand plains.
- Deflation corridors.
- Ill-defined lakes and swamps.
- Waterbodies.

Relationship between landform types and vegetation communities

Vegetation community structure and composition is highly influenced by the relief, slope angle and slope aspect of the landform types on which the community is situated, and the level of wind exposure it receives. To provide a base unit for describing variation in landforms at

CFSM, the characteristic classes of relief, slope angle and slope aspect were used to identify landform elements[26] as shown in **Table 4**.

Table 4: Landform characteristic classes used to generate landform elements

Relief	Code identifier	Slope angle	Code identifier	Slope aspect	Code identifier
<5 m	**100**	<10°	**10**	87.5° – 177.5°	**1**
5 m – 10 m	**200**	10° – 30°	**20**	177.5° – 267.5°	**2**
10 m – 35 m	**300**	>30°	**30**	267.5° – 357.5°	**3**
>35 m	**400**			357.5° – 87.5°	**4**

A total of 48 landform elements are possible using combinations of the above classes. Each landform element was given a code using the identifiers in **Table 4**. For example, landform element 331 = 10 – 35 m relief, >30° slope and south-easterly aspect.

A landform group classification system[27] was derived to assist in assessing the rehabilitation of vegetation structure and composition against that in the surrounding landscape. Ten landform groups are recognised at CFSM, as shown in **Table 5**.

Table 5: Classification of landform groups

Landform group	Relief	Slope angle	Slope aspect	Relevant landform element codes[1]
1	<5 m	all	all	111-134
2	≥5 m	<10°	all	211–214, 311–314, 411–414
3	≥5 m	10° – 30°	87.5° – 177.5°	221, 321, 421
4	≥5 m	10° – 30°	177.5° – 267.5°	222, 322, 422
5	≥5 m	10° – 30°	267.5° – 357.5°	223, 323, 423
6	≥5 m	10° – 30°	357.5° – 87.5°	224, 324, 424
7	≥5 m	>30°	87.5° – 177.5°	231, 331, 431
8	≥5 m	>30°	177.5° – 267.5°	232, 332, 432
9	≥5 m	>30°	267.5° – 357.5°	233, 333, 433
10	≥5 m	>30°	357.5° – 87.5°	234, 334, 434

[1] See **Table 4** for definitions of codes.

Conservation values

Special use plants

Special use plants[28] are species that require special consideration in the re-establishment of vegetation and that are listed in EA Appendix 2 – Table A. Special use plants are species that are:

- recognised by TOs as important food plants
- recognised by TOs as having potential for commercial exploitation (*eg* essential oil production and floriculture).

[26] The identification of landform elements is based on a Digital Elevation Model (DEM), generated from LiDar data (0.5 contours).

[27] Landform groups are a based on the consolidation of landform elements into broader categories, which also incorporate relief.

[28] Special use plants have been referred to in historical reporting and rehabilitation manuals as *special use species.*

Flora and fauna

T&NT flora and fauna are discussed in **Section 1.1.2.3**. The re-instatement of endemic and/or T&NT flora species, in areas disturbed by mining at CFSM, has been provided for in the rehabilitation tubestock and/or seeding mix specifications.

Rehabilitation planning and design

Pre-mining rehabilitation planning

The pre-mining planning of rehabilitation is a critical step in mine path planning, and effective and early planning minimises life-of-mine rehabilitation costs. To minimise the costs of final landform shaping, it is critical to prepare landform designs as early in the disturbance planning as possible.

Final landform type design

Natural dunes vary in slope, size and shape depending on the processes that have contributed to their formation. When re-forming landform types, reproducing minor details of landform morphology is not always achievable or practical. Therefore, final landform type design will be dependent on the dominant pre-mining landform type(s) (*ie* dimensions and location) and the sand available for reconstruction. Landforms vary over time, and this has been accommodated in the PRCP schedule.

Water management

The silica extraction process at CFSM results in little waste production compared to other mining operations where large quantities of reagents and solvents are used. Most mine-related wastes are generated by ancillary operations and equipment, generally due to the replacement of parts or substances (*eg* oils, tyres, conveyor and filters). The Cape Flattery Township is a source of domestic waste. At CFSM, waste is sorted and held at various locations on-site prior to transportation off the mining leases by barge. The waste category (*eg* general or recyclable, regulated (non-trackable), regulated (trackable)) determines the documentation required to accompany the waste and, in some instances, storage requirements.

The main surface waterbodies on-site at CFSM are Airport Lake and Arnie's Lake (refer to **Figure 16**). Arnie's Lake was an existing landform that in 1985 was modified by CFSMPL pursuant to Waterworks Licence (no. 44998) and formed into a water holding feature into which process waters discharged (CFSMPL 1985). Prior to December 2012 (*ie* prior to commission of the new mill), water was extracted from Airport Lake and used for sand washing in the old mill, with wastewater returned to Airport Lake via Arnie's Lake. Reject sand from the old mill was transported as slurry to previously mined-out areas to rebuild dune formations. In current operations, water is pumped from Airport Lake to a lined process water pond at the new mill area where it supplies the process water tank for use in the new mill process circuit. Overflow water from the new mill is recirculated back to the process water tank. Residual sands are transferred as a slurry to the new mill rejects area located at a previously mined area within the central mining area. Primary product is pumped overland to the filter belt and low iron plant. Wastewater from the filter belt and low iron plant flows to Arnie's Lake, which acts as a settling pond by removing suspended solids before the water flows to Airport Lake.

Under Schedule C Condition C1-1 of the CFSM EA, the release of water is permitted to occur from Airport Lake release point. Water released enters a drainage line, which directs flow to the Coral Sea. [CFSM is located within the Cape Flattery Dune Lakes (Wetland Aggregate listed in the Directory of Important Wetlands in Australia (DIWA)—nationally important wetlands (EA 2001). Two types of surface waters occur at Cape Flattery—perched lakes, and 'windows' in the water table which occur where low topography drops below the groundwater surface level. Most surface waters at Cape Flattery are of the latter type. Wetlands and streams

which channel overland flow or which are windows in the water table are also present. Previous surveys of waters at Cape Flattery have recorded generally acidic water with overall uniformity in water quality across the site, reasonably diverse and regionally distinctive fish fauna and breeding populations of aquatic macroinvertebrates, with different lakes found to support different aquatic macroinvertebrate taxon assemblages.] Licensed releases from Airport Lake are intended to manage water levels to prevent flooding of mining infrastructure and unplanned and unlicensed releases in the receiving environment. The potential contaminants in the water to be released from the EA release point for Airport Lake are identified in Schedule C Table 3 (*Receiving Water Trigger Levels*) and Table 4 (*Receiving Water Contaminant Levels*) of the CFSM EA *ie* **Plate 2** and **Plate 3**.

Parameter	Units	Trigger Level for lakes		Trigger Level for streams	Trigger Level Type
Chlorophyll α	µg/L	10[3] or 80th percentile[1] of reference site[2] whichever is higher		10[3] or 80th percentile[1] of reference site[2] whichever is higher	Mean[5]
pH	Units	4.0[6] or 20th percentile[1] of reference site[2] whichever is lower 8.0[6] or 80th percentile[1] of reference site[2] whichever is higher.		4.0[6] or 20th percentile[1] of reference site[2] whichever is lower 8.0[6] or 80th percentile[1] of reference site[2] whichever is higher	Mean[5]
Total Petroleum Hydrocarbons[7]	µg/L	C6-C9	20[9]	N/A	95th percentile[5]
		C10-C14	50[9]		
		C15-C28	100[9]		
		C29-C36	50[9]		
Turbidity	NTU	22[8] or 80th percentile[1] of reference[2] whichever is higher		15[3] or 80th percentile[1] of reference[2] whichever is higher	Mean[5]
Dissolved Oxygen	%	90%[3] or 20th percentile[1] of reference site[2] whichever is lower 120%[3] or 80th percentile[1] of reference site[2] whichever is higher		85%[3] or 20th percentile[1] of reference site[2] whichever is lower 120%[3] or 80th percentile[1] of reference site[2] whichever is higher	Mean[5]

[1] Trigger value based on the 80th or 20th percentile are derived using ANZECC (2000) methodology.

[2] Reference sites as defined in Schedule C – Table 2 .

[3] ANZECC (2000) trigger levels for aquatic ecosystems slightly – moderately disturbed systems – Table 3.4.1 95% level of protection or Table 3.3.4 / 3.3.5 - tropical Australian low rivers and fresh water lakes & wetlands.

[5] The mean and the 95th percentile must be determined based on no more than ten (10) consecutive samples.

[6] The values for pH in unimpacted lake and stream waters at CFSM are naturally in excess of ANZECC (2000) trigger levels in aquatic ecosystems for slightly disturbed systems – table 3.3.4. The minimum trigger value here is derived from the CFSM EMOS (1994). The minimum values are within the range recorded for reference sites - lake (SWL004), and stream (SWS002) between October 1996 and November 2002.

[7] TPH will only be analysed for in lake waters (SWL002) and (SWL001).

[8] The turbidity values in some unimpacted lake waters at CFSM are in excess of the lower ANZECC (2000) trigger levels for aquatic ecosystems of slightly disturbed systems – table 3.3.5. The trigger value here represents the 80th percentile value for control SWL003 calculated from 22 data points generated between October 1997 and November 2002.

[9] Value based on the Limit of Detection attainable by NATA accredited analytical laboratories.

Plate 2: Receiving water trigger levels

Parameter	Units	Limit	Limit Type
pH	Units	3.8[1] or 0.5 unit less than the value recorded at a reference site[3] during the same sampling event, whichever is lower	Minimum
		8.5[2] or 0.5 unit more than the highest value recorded at a reference site[3] during the same sampling event, whichever is higher	Maximum
Turbidity	NTU	95[4] or 10% more than the value recorded at the reference site[3] during the same sampling event, whichever is higher	Maximum
Chlorophyll α	µg/L	83[5] or 10% more than the value recorded at the reference site[3] during the same sampling event, whichever is higher	Maximum
TPH	NA	Oil and petrochemicals should not be noticeable as a visible film on the water nor should they be detectable by odour[2]	Maximum

[1] Value based on lowest pH recorded at reference site SWL004 in Schedule C – Table 2.

[2] Value based on Recreational waters ANZECC (2000) Guidelines for Recreational Water Quality and Aesthetics.

[3] Reference sites as defined in Schedule C Table 2.

[4] Value based on the highest turbidity recorded at reference site SWL003 in Schedule C – Table 2.

[5] Value based on highest Chlorophyll α recorded at reference site SWL004 in Schedule C – Table 2.

Plate 3: Receiving water contaminant levels

The contaminants are pH, dissolved oxygen, turbidity, chlorophyll *a* and Total Petroleum Hydrocarbons (TPHs). Potential sources of these contaminants include the processing circuit, soil erosion from land disturbance, eutrophication associated with vegetation disturbance, fertiliser application, and petroleum products associated with plant and equipment (NRA 1999). Licensed releases from the release point are managed through the CFSM Water Management Plan (WMP). A pump with 325 L/s pumping capacity is in place throughout the wet season to facilitate licensed releases. A licensed release from Airport Lake is initiated when the Airport Lake water level reaches 6.4 m. Once commenced, pumping is continuous until either the end of the wet season (30 April) or when the Airport Lake water level reaches 6.3 m.

Unplanned and uncontrolled releases of contaminants at CFSM may occur from the storage and handling of hydrocarbons and chemicals, Arnie's Lake, and the new mill rejects area, process pond and pond overflow area. Each of these is discussed below.

Hydrocarbons

Unplanned releases or discharges of hydrocarbons remain the highest potential environmental risk for CFSM. CFSMPL has in the past modified, and will continue to modify, hydrocarbon management in response to third party audits and consistent with its continuous improvement approach. Hydrocarbons are handled or stored at the following locations, with maximum reported volumes (CFSMPL 2019e and site observations) in parenthesis:

- fuel farm (3 x 105,000 L above ground diesel storage)
- powerhouse (3 x 110,000 L above ground diesel storage)
- supply wharf
- reclaimer
- mine face
- airport hangar (1 x 1,000 L IBC of Jet A-1).

The volumes of fuel handled at the mine face, reclaimer and airport hangar are comparatively minor. Over 80% of the diesel fuel delivered to CFSM is used to run the electricity generators on-site (TfA 2015).

- Aviation fuel (Jet A-1) is stored in a 1,000 L IBC at the airport hangar in a bunded compound for 'top up' use (*ie* aircraft are primarily re-fuelled off-site).
- Mine face fuel handling[29] (*ie* refuelling of front end loaders and other heavy equipment) units are:
  - 1x 6,000 L double skinned self bunded fuel trailer
  - 1x 1,800 L fuel pod mounted in a dedicated trailer
  - 2x 400 L fuel pods ute tray mounted
  - 2x 200 L fuel pods ute tray mounted.
- The reclaimer is refuelled via the vehicle mounted mobile fuel pods.
- Lubricants are stored at general stores in a bunded compound, prior to use in the adjacent workshop area.
- Waste oil is collected in IBCs or 200 L drums and all collection points are bunded. Waste oil is transported off-site for disposal.

Fuel (diesel) is transferred between delivery at the supply wharf to the fuel farm via an 80 mm welded steel pipeline. Additional fuel pipelines transfer fuel from the fuel farm to the powerhouse.

Groundwater monitoring is undertaken at the main fuel storage areas (*ie* the fuel farm and powerhouse). These monitoring bores are assessed for TPHs (with a threshold of above the laboratory LOR) in the existing EA.

Arnie's Lake

Arnie's Lake is one of the main surface waterbodies on-site at CFSM and acts as the site process buffer storage. Water from the filter belt and low iron plant flows to Arnie's Lake, which acts as a settling pond by removing suspended solids before the water flows to Airport Lake. The storage area of Arnie's Lake is 17.4 ha, with a storage capacity of 200 ML and annual spill probability of 1.6% (ACTW 2019).

Unplanned and uncontrolled releases of contaminants from Arnie's Lake may occur due to a breach in the sand plug that blocks the outlet channel from Arnie's Lake into the downstream receiving environment. To manage the unplanned and uncontrolled releases of contaminants from Arnie's Lake, the CFSM EA permits planned and controlled pumped releases from the licensed Airport Lake release point. This allows for water levels in Airport Lake to be controlled to reduce the risk of backflow from Airport Lake to Arnie's Lake and, thus, reduces the risk of unplanned/unlicensed releases from Arnie's Lake to the receiving environment.

New mill rejects area, process pond and pond overflow area

CFSMPL has identified that there is a potential risk of an unplanned and uncontrolled release from the new mill rejects area into the receiving environment. Rejects consist of oversize sand particles and are non-toxic. ATC Williams (ATCW 2019) has indicated the annual spill probability of <1%.

[29] CFSMPL plans to reduce the number of ute mounted pods with the introduction of a 3,000 L self bunded double skin tank mounted on a dedicated fuel/service truck.

A release (if it was to occur) from the rejects area would likely report to the adjacent wetland to the north-east. CFSMPL has established a management regime for the new mill rejects area to reduce potential erosion of the embankment surrounding the rejects area and to manage turbidity levels *ie* as a safeguard to minimise the potential for environmental harm should there be an unlicensed/uncontrolled release from the rejects area to the receiving environment. The treatment protocol includes the establishment of internal bunds to allow settling and reduce potential erosion, and the use of a dosing system to reduce turbidity levels. Water treatment (flocculant and coagulant products) applied at the new mill, rejects pipeline and filter belt reduces the turbidity of water outflows to the rejects area, Arnie's Lake and Airport Lake.

An unplanned and uncontrolled release into the receiving environment from the new mill process pond may occur. The process water pond was designed to have a capacity of 31 ML, and is not a hazardous dam (DERM 2011, Fraser 2011). The process pond is lined with a 1 mm HDPE liner (NRA 2011). Potential releases from the process water pond would flow to an enclosed overflow area in a depression to the south of the process water pond, which is surrounded by a wind break and an old mine face. The overflow area has a capacity of 20 ML. This capacity is sufficient to reduce the probability of release to the receiving environment from the process pond and overflow area to <1% (AWA 2011).

The background groundwater quality at CFSM is summarised below.

- pH in groundwater ranges between 3.23 and 7.79.
- Background electrical conductivity (EC) has ranges between 68.8 µS/cm and 289 µS/cm.
- Background lead concentrations range from <0.001 mg/L to 0.002 mg/L.
- Background manganese concentrations range from <0.005 mg/L to 0.1 mg/L.
- Background chloride concentrations range from 11 mg/L to 61 mg/L.
- Background total oxidised nitrogen concentrations range from <0.005 mg/L to 0.88 mg/L.
- Background ammonia concentrations range from <0.05 mg/L to 1.8 mg/L.
- Background total kjeldahl nitrogen concentrations range from 0.32 mg/L to 4.7 mg/L.
- Background total phosphorus concentrations range from <0.02 mg/L to 0.23 mg/L.
- Background filterable reactive phosphorus concentrations range from <0.005 mg/L to 0.19 mg/L.
- TPHs typically report at less than the LOR, with six results (out of 1,236 reported TPH values) reporting above the (various) laboratory LORs[30] at the reference site bores since 1996. The maximum value reported was 240 µg/L for the C15 to C28 TPH fraction.
- Major ion profiles (*eg* major anions and cations) have been reported as sodium, potassium and chloride dominant.

Groundwater monitoring (monthly) is undertaken at the new mill, process pond and rejects area under the existing EA for the potential contaminants associated with each: pH, electrical conductivity, ammonia and total phosphorus.

Monitoring and maintenance will continue post-closure (terminating at lease relinquishment and the acceptance by the administering authority of surrender of the EA). Contingency strategies, if monitoring data indicates performance requirements are not being met, identify

[30] Limit of reporting ranged from <20 µg/L to <200 µg/L.

incipient failures and, where failure has occurred, promote a timely response. Contingency strategies provide a framework for responding to a failure as opposed to itemising all possible failure events (and the magnitude of failure). The monitoring program serves to provide warning of pending failure. The maintenance measures promote continuity of rehabilitation success.

Management practices

The CFSM EA provides conditions to protect the EVs of water at CFSM, including conditions relating to the release of contaminants to receiving waters and the storage and handling of flammable and combustible liquids. CFSMPL has developed management practices to enable compliance with these EA conditions. The relevant management protocols and procedures are discussed below.

CFSMPL has an Environmental Management System (EMS), which is certified to ISO 14001:2015 Environmental Management Systems. The EMS has been designed to help CFSMPL meets its environmental management objectives of activities undertaken at CFSM. The EMS consists of a manual, supporting Environmental Programs (EPs) and the Environmental Monitoring and Reporting System (EMRS). The manual provides an overview of the environmental management for the site and documents how the CFSM EMS addresses the requirements of ISO 14001:2015. The EPs have been developed to address the major activities undertaken at CFSM relating to the EMS.

In conjunction with the EMS, CFSMPL has developed and implemented a number of management protocols and procedures, with actions to protect the EVs of water at CFSM.

Water management plan

CFSMPL has a documented Water Management Plan (WMP) prepared for:

- management of inflow of water into Airport Lake
- management of controlled releases from the Airport Lake licensed release point
- ensure year-round supply of water for process requirements
- management of the risk of flooding of mining infrastructure
- management of the risk of unplanned and unlicensed release from Arnie's Lake, the new mill rejects area, the process pond and pond overflow area.

The *Wet Season Contingency Plan* complements the WMP for application during the wet season, detailing contingency measures for managing and responding to any unplanned and unlicensed mine-affected water release event from CFSM. The WMP is a non-regulatory document developed for operational purposes. This is a working document and for practical implementation on-site; modifications are expected.

Monitoring programs

The *CFSM Water Monitoring Plan* ensures that surface water and groundwater monitoring requirements of the CFSM EA and water licence are met. The plan covers monitoring required under the EA (surface water and groundwater), process circuit monitoring, sewage and wastewater monitoring, and water licence monitoring.

The *CFSM Surface and Groundwater Sampling Procedure* provides instructions and assigns responsibilities and accountabilities for the sampling of surface water and groundwater at CFSM. The procedure details management and staff responsibilities, sample locations and frequency, sampling preparation, routine and water licence sample collection (surface water and groundwater), sample handling and shipping, and hazards and controls.

Monitoring and maintenance will continue post-closure (terminating at lease relinquishment and the acceptance by the administering authority of surrender of the EA). Contingency strategies, if monitoring data indicates performance requirements are not being met, identify incipient failures and, where failure has occurred, promote a timely response. Contingency strategies provide a framework for responding to a failure as opposed to itemising all possible failure events (and the magnitude of failure). The monitoring program serves to provide warning of pending failure. The maintenance measures promote continuity of rehabilitation success.

Hydrocarbon storage and handling

The CFSM *Bulk Fuel Transfer Procedure*, *Storage Transport Handling of Diesel Fuel Procedure* and *Environmental Management System Manual* (as previously described) detail specific controls and procedures associated with the storage and handling of fuel. These include requirements for spill response and spill kit placement where hydrocarbons are stored, reporting requirements for spills, minimum standards for bunding (including maintenance and capacity), and product reconciliation requirements.

Water management post-closure

All infrastructure/assets (including water diversions) not stipulated in a landholder statement[31] as being retained are removed. A contaminated land assessment will be completed on relevant infrastructure areas where required. This includes all areas where notifiable activities were undertaken, to ensure unacceptable levels of contaminants are not present prior to undertaking rehabilitation. All areas where infrastructure/assets have been removed have been rehabilitated to meet the completion criteria for *Conservation Use* as prescribed in the PRCP schedule.

The existing decommissioned historical landfill (0.66 ha) was closed in 1999. Decommissioning of the landfill occurred over the period *ca* 2000 to 2007, during which a statutory environmental management program (inclusive of the landfill) (EMP-MAN2873) was developed and implemented by CFSMPL. Groundwater monitoring downgradient from the landfill has not indicated groundwater impact from potential leachate. As is required by the EA, groundwater monitoring downgradient of the site will continue monthly until relinquishment and acceptance of surrender of the EA. The performance measure is water quality downgradient of the decommissioned landfill (*ie* at GW010) will not exceed contaminant limits for this location as documented in the EA (*ie* pH, EC, manganese, ammonia, chloride, lead) at the time of relinquishment and there will be no unexplained increasing trends or unresolved exceedances of groundwater contaminant trigger levels for this location in the 12 months prior to relinquishment.

Contingency strategies, if monitoring data indicates performance requirements are not being met, identify incipient failures and, where failure has occurred, promote a timely response. Contingency strategies provide a framework for responding to a failure as opposed to itemising all possible failure events (and the magnitude of failure). The monitoring program serves to provide warning of pending failure. The maintenance measures promote continuity of rehabilitation success.

[31] For CFSM, the landholder statement is the *Retention of Infrastructure Deed ie* Hope Vale Congress Aboriginal Corporation RNTBC and CFSMPL have entered a *Retention of Infrastructure Deed* (dated 26 August 2015), which includes details of the infrastructure to be retained (updated periodically as agreed).

Topsoil removal and stockpiling

The topsoil resource is the organically rich upper sand layer on the dunes at CFSM (**Section 1.1.2.3**); it provides a ready nutrient supply, increased water holding capacity and a native seed reserve. There is nil requirement for 'capping material'.

Topsoil management at CFSM includes the following.

- Remove topsoil prior to mining.
- Directly place removed topsoil onto rehabilitation areas (where practicable).
- Stockpile removed topsoil (which cannot be directly placed) as close as possible to areas that will soon be available for rehabilitation.
- Manage topsoil stockpiles until they are used in rehabilitation.
- Place topsoil on rehabilitation areas as soon as they become available.

Topsoil resources at CFSM are suitable for use and have been successfully used in rehabilitation on-site. Slow release fertiliser may need to be added to soils to promote regeneration. Fertiliser may be applied during direct seeding or as a tablet when planting tubestock.

Where practicable, the removed topsoil and vegetation (*ie* as brushmatting) should be directly placed onto rehabilitation areas that have undergone landform type re-formation. If there are no re-formed landform types available for direct placement of topsoil at the time of removal, the topsoil and vegetation is to be stockpiled as close as possible to areas that will soon be available for rehabilitation.

Experience demonstrates that a surplus of topsoil material for use in rehabilitation can be forecasted. This is demonstrated as follows.

- The estimated volume of soil resource identified as at 30 November 2020 was 2,004,702 m^3 (**Table 6**) and shown on **Figure 24**.
- The volume of soil resource allocated for respreading during the year of maximum liability in the current ERC was estimated[32] as *ca* 974,000 m^3. A further estimated 190,000 m^3 of soil resource was to be recovered from new mining areas during the year of maximum liability. Therefore, a surplus in soil material exists for the year in which the maximum rehabilitation liability occurs.
- For the remaining years of the current ERC term, *ca* 125 ha of new mining areas occur. The estimated *in situ* soil resource for these areas is *ca* 625,000 m^3 (nominally 500 mm of[33] organically enriched material from 125 ha). Allowing for rehabilitation of this 125 ha with a nominal depth of 300 mm for soil replacement (*ie* total volume of 375,000 m^3), a surplus exists.
- It follows that for the life of mine, providing the existing soil material recovery practices are followed, and there is nothing to indicate that this will not occur, then a surplus of topsoil material resource for use in rehabilitation following the established and demonstrated successful rehabilitation plan will occur.

[32] Nominal 300 mm depth of soil applied to mining disturbance and product stockpile footprint areas (*ca* 290 ha) and nominal 200 mm depth of soil applied to rehabilitated areas requiring remedial action (*ca* 52 ha).

[33] CFSMPL reports that up to 1.5 m of material is recovered from areas ahead of mining. This material includes the organically enriched soil layer and vegetative material.

Table 6: Topsoil stockpiles at CFSM, 30 November 2020

Topsoil stockpile label	Topsoil stockpile ID	DLR area/s[1]	Estimated height (m)	Area (m^2)	Estimated volume (m^3)
TSP001	CW4a	329, 331, 347	10	20,888	208,880
TSP002	CW4b	346	10	8,019	80,190
TSP004	CW4c	329, 331, 333	15	19,108	286,620
TSP003	CW	330, 333, 334.01, 334.02, 335, 336, 346, 347	15	52,930	793,950
TSP005	CW5 east	336	4	51,680	206,720
TSP008	CW3a	334.03	8	2,398	19,184
TSP009	CW3b	334.02, 335	3	23,688	71,064
TSP007	D2	334.03, 335, 338, 339.02, 342	8	12,645	101,160
TSP006	D3	341, 343	8	16,688	133,504
TSP010	CW4 East ext	380	5	13,270	66,350
TSP011	BHF	381	3	12,360	37,080
TOTAL				**233,674**	**2,004,702**

[1] Refers to CFSM's Disturbed Land Register (DLR) mapping identifiers.

Prior to mining, any vegetative cover and supportive topsoil is removed. If there are no re-formed landform types available for direct placement of topsoil at the time of removal, the topsoil and vegetation should be stockpiled as close as possible to areas that will soon be available for rehabilitation. The most effective removal and stockpiling are achieved by using a dozer and loader working in combination. Minimising the time soil is stored in stockpiles enhances both the nutrient status and natural germination from seed bank supplies.

Nursery requirements and propagation management

To ensure optimal propagation success, strict nursery hygiene and sanitation practices must be followed in all stages of propagation. Only species that are indigenous to the Cape Flattery dunefields will be used to revegetate disturbed areas, with the exception of a cover crop grass species mix used for initial stabilisation. Sterile non-native cover crop species will be used in direct seeding to increase the likelihood of successful establishment of the native species.

Rehabilitation process

Infrastructure removal and land contamination

Roads, access ways and conveyer lines traverse CFSM and dunefields. Any infrastructure that is not retained (*ie* land has been nominated for *Conservation Use*) needs to be removed and the land included in rehabilitation.

Land contamination assessments of areas with suspected contamination are to be undertaken by an appropriately qualified person and in accordance with the Queensland *Environmental Protection Act* 1994.

A contaminated land assessment will be completed on relevant infrastructure areas where required. This includes all areas where notifiable activities were undertaken *ie* abrasive blasting, landfill (decommissioned), metal treatment or coating, petroleum product or oil storage (**Figure 18**), to ensure unacceptable levels of contaminants are not present prior to undertaking rehabilitation. The assessment will include a preliminary site investigation to identify if any areas require further detailed site investigation. The investigation(s) will be prepared and certified by an appropriately qualified person. Where the preliminary site investigation identifies a requirement for further investigation, a targeted detailed site investigation will be undertaken to confirm and characterise areas of concern. If contamination

is identified, the potential risks will be assessed and, where required, remediation will be undertaken and/or a site management plan developed.

Landform re-forming

Prior to landform re-forming activities, the final landform type design should be reviewed and updated, with consideration of:

- appropriateness of the final landform type design in the overall landscape context
- availability of sand and topsoil for re-forming
- drainage and/or water requirements
- potential for future re-disturbance.

Stabilising landform types

The establishment of vegetation should occur immediately following the re-forming of any landform types, and additional land stabilisation techniques should only be used as a remedial or corrective action when necessary.

Re-establishing vegetation

The revegetation strategy will vary between landform types in rehabilitation areas, reflecting the complex nature of the biotic and abiotic factors affecting vegetation establishment and growth at CFSM. The revegetation strategy used will primarily depend on the final landform type design and the dominant landform groups that occur within the landform type.

Detailed records should be kept on:

- surface preparations
- lists of species planted
- type of re-treatments and justification for undertaking
- irrigation installation works (if applicable)
- monitoring and maintenance works
- remediation works.

1.5.3 Tailings storage facilities

No tailings storage facilities occur at CFSM.

Rejects are the main by-product. Rejects are non-toxic and are created through the process of physical separation of mined sand:

- slurry is fed at a controlled density through spirals and classifiers at the new mill, which separate the feed into product and rejects, relying on gravity and size difference
- rejects from the new mill are separated and pumped as a slurry to the new mill rejects area.

The rejects material is residual sand. The residual sand, and the raw material, is dominated by silica (silicon dioxide); median of 98% and 99% respectively. Quantification of its characteristics is shown, together with characteristics of the *in situ* sand resource from unmined areas, in **Table 7**.

Table 7: Chemical and physical characteristics of residual sand^,*

Sunrise Hill assay data#	Al_2O_3 %	BaO %	CaO %	Cr_2O_3 %	Fe_2O_3 %	K_2O %	MgO %	MnO %	Na_2O %	NiO %	P_2O_5 %	SO_3 %	SiO_2 %	SrO %	TiO_2 %	V_2O_5 %	ZrO_2 %
Median	0.22	<0.01	<0.01	<0.01	0.46	0.01	0.02	0.03	0.01	<0.01	<0.01	0.01	97.65	<0.01	0.89	<0.01	0.12
Range	0.07–0.64	<0.01–<0.01	<0.01–0.01	<0.01–<0.01	0.03–0.82	<0.01–0.01	<0.01–0.04	<0.01–0.05	<0.01–0.15	<0.01–<0.01	<0.01–<0.01	<0.01–0.03	96.57–98.89	<0.01–<0.01	0.04–1.58	<0.01–<0.01	<0.01–0.23
Count	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Exploration assay data$	**Al_2O_3 %**	**BaO %**	**CaO %**	**Cr_2O_3 %**	**Fe_2O_3 %**	**K_2O %**	**MgO %**	**MnO %**	**Na_2O %**	**NiO %**	**P_2O_5 %**	**SO_3 %**	**SiO_2 %**	**SrO %**	**TiO_2 %**	**V_2O_5 %**	**ZrO_2 %**
Median	0.05	<0.01	<0.01	<0.01	0.14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	99.41	<0.01	0.06	<0.01	<0.01
Range	<0.01–0.13	<0.01–0.01	<0.01–0.03	<0.01–<0.01	0.05–0.46	<0.01–0.02	<0.01–0.01	<0.01–0.02	<0.01–0.08	<0.01–<0.01	<0.01–<0.01	<0.01–0.01	98.39–100	<0.01–<0.01	0.02–0.57	<0.01–<0.01	<0.01–0.11
Count	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Particle size distribution (µm)**	2000	1000	850	710	600	500	425	355	300	250	180	125	75	45	0	–	–
% Passing	100	100	99.9	99.5	98.0	95.1	89.9	83.5	77.4	68.5	44.7	7.5	4.3	1.9	0.0	–	–

^ Sand has a specific gravity of 2.65.

* Australian Laboratories Services Pty Ltd, Certificate of Analysis BR20235345 and BR21285561.

Sunrise Hill is a landform formed from residual sand from processing.

$ Exploration is from unmined sand resource areas.

** IHC Mining. Job Number 2153. Feed (*ie* residual sand) Characterisation. Client Cape Flattery Silica Mine.

The new mill rejects area, which receives rejects from the new mill process circuit, is within an existing mined area in the central mining area. The rejects area is approximately 20 ha (NRA 2019). Rejects are also created by the low iron plant. After the initial separation of product and rejects, a proportion of the product from the new mill is pumped to the low iron plant. At the low iron plant, the product is passed through a magnetic separator to reduce iron levels in the product sand. Rejects from the low iron plant are transferred as a slurry to Arnie's Lake, which acts as a settling pond, removing reject material before water eventually flows to Airport Lake (CFSMPL 2019c). Slimes produced by the thickener at the process plant are also disposed in the rejects area. This is expected to improve eventual rehabilitation outcomes for the rejects area, with slimes increasing the stability and moisture-holding capacity of the rejects (NRA 2011).

Under current operations, 10% of the feed (*ie* sand put through the mill) becomes rejects, and more than 90% of these rejects are silica. The new mill existing rejects area has sufficient remaining storage to accommodate the quantity of rejects estimated to be generated during the next 10 years at an annual rate of production of 3.5 Mt/year. CFSMPL is investigating modifications to the process circuit that will reduce the amount of feed sent to rejects by approximately 5%. CFSMPL has flagged existing mined areas within the central mining area as potential locations for future rejects areas.

There is a potential risk of an unplanned and uncontrolled release from the new mill rejects area into the receiving environment. The annual spill probability is <1% (ATCW 2019). A release (if it was to occur) from the rejects area would likely report to the adjacent wetland to the north-east. CFSMPL has established a management regime for the new mill rejects area to reduce potential erosion of the embankment surrounding the rejects area and to manage turbidity levels *ie* as a safeguard to minimise the potential for environmental harm should there be an unlicensed/uncontrolled release from the rejects area to the receiving environment. The treatment protocol includes the establishment of internal bunds to allow settling and reduce potential erosion, and the use of a dosing system to reduce turbidity levels. Water treatment (flocculant and coagulant products) applied at the new mill, rejects pipeline and filter belt reduce the turbidity of water outflows to the rejects area, Arnie's Lake and Airport Lake.

Landforms are integral to rehabilitation at CFSM (**Figure 3**). The re-creation of assemblages of landform elements (unique combinations of slope, elevation and aspect) that are characteristic of the unmined landscape is necessary. Natural dunes vary in slope, size and shape depending on the processes that have contributed to their formation. Dunefields are mobile and therefore the spatial definition will vary over time. Some of the landform types are shown in **Plates 4–9**.

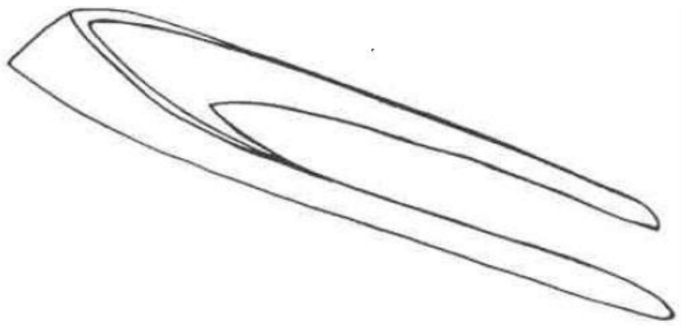


Plate 4: Diagram of a large elongate parabolic dune

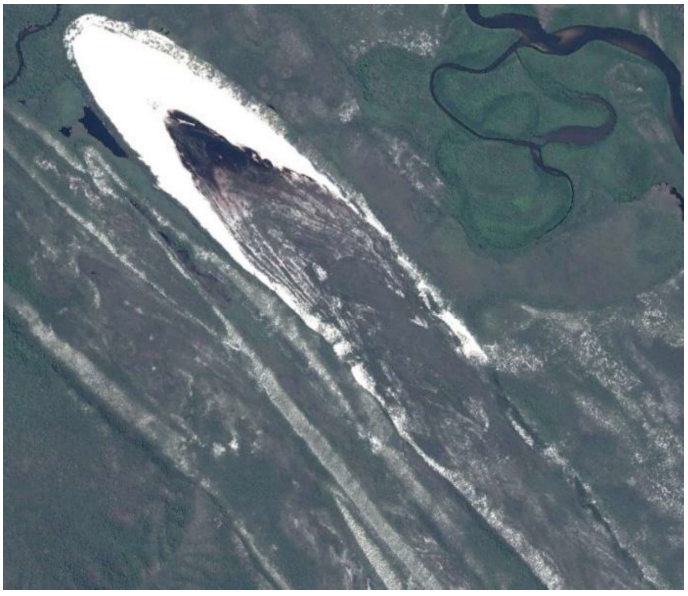


Plate 5: Aerial image of a large elongate parabolic dune (imagery: Google Earth)

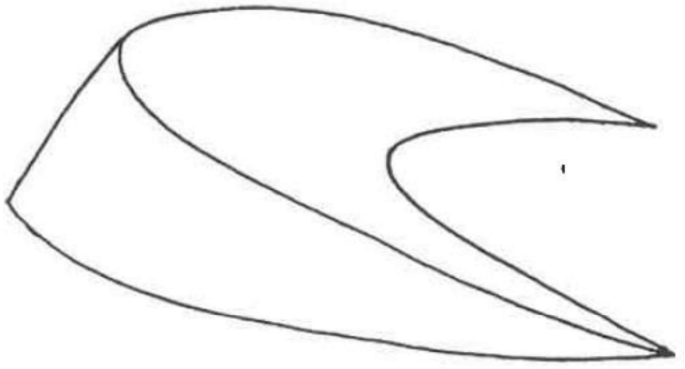


Plate 6: Diagram of a small parabolic dune

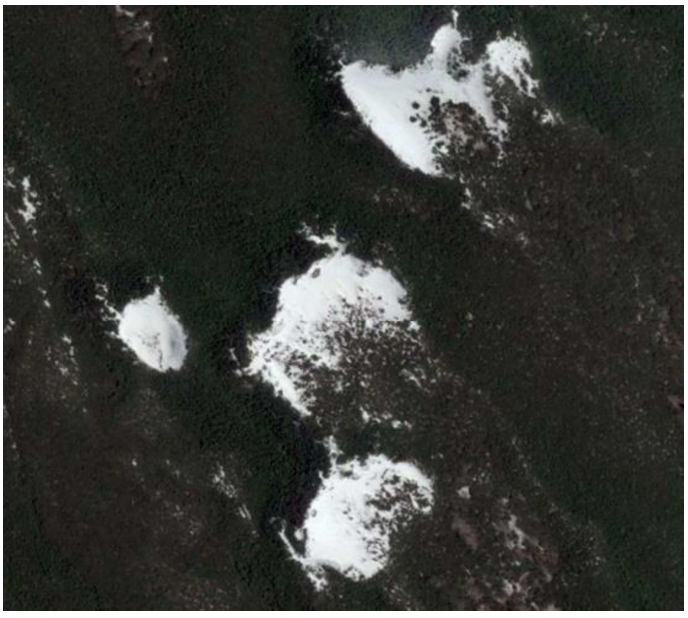


Plate 7: Aerial image of small parabolic dunes (imagery: Google Earth)

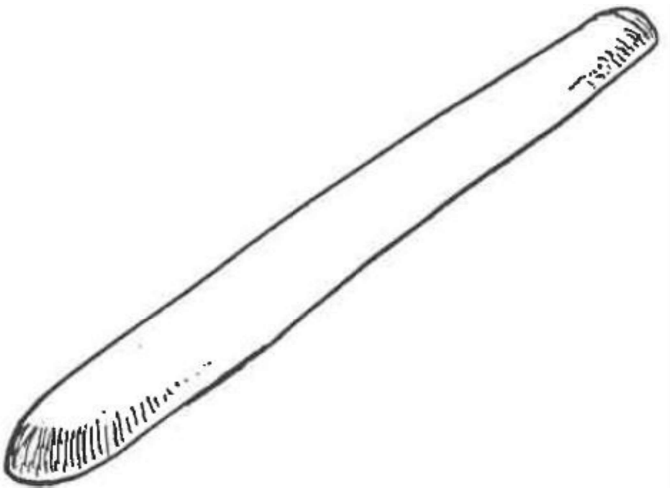


Plate 8: Diagram of a long narrow ridgeline

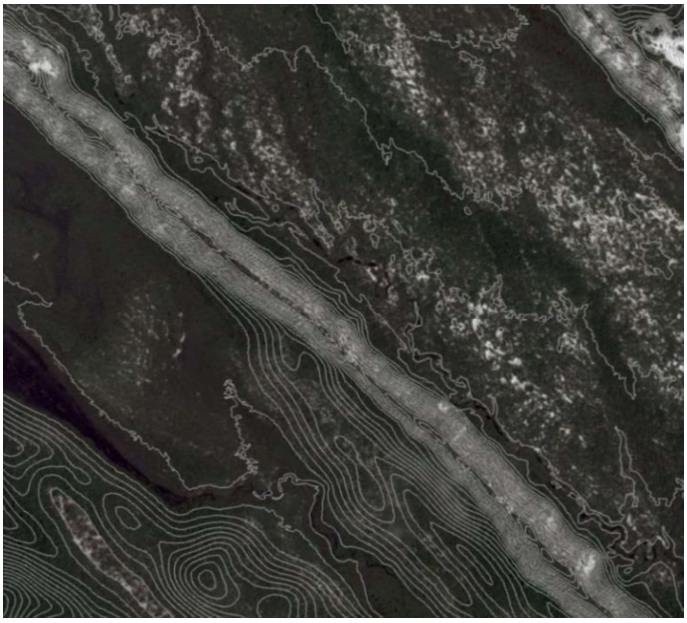


Plate 9: Aerial image of a long narrow ridgeline highlighted by 2 m contours (imagery: Google Earth)

Final landform type design will be dependent on the dominant pre-mining landform type(s) and the sand available for reconstruction. When planning for the final landform in the reject sand areas, the following additional considerations are made.

- The dune should be shaped to conform as closely as possible with the surrounding landform types using all the sand available (*ie* height, slopes and direction).
- The reject sand is pumped to the area via a pipe from the mill, and the general form of the dune should be constructed, as practicable, by controlling how it is deposited.
- The creation of ridgelines is generally considered the most favourable design for the rejects sand.
- Large expanses (*ie* width >100 m) of flat and featureless land must be avoided.

The deposition of residual sand in mined-out areas contributes to the formation of a satisfactory landform type. The final landform, achieved through a combination of the method of deposition augmented using earth moving machinery, is to be consistent with the required post-mine life landform type, defined with reference to the landscape context, to satisfy the

completion criteria (detailed in the EA and mirrored in the PRCP Schedule). The feature will be revegetated and the resultant landform capable of achieving the success criteria defined in the PRCP Schedule.

1.5.4 Voids

No voids will be present at CFSM at closure.

1.5.5 Underground mining

No underground mining occurs at CFSM.

1.5.6 Built infrastructure

The infrastructure assets to be retained for Hope Vale Owner Use have been documented in the Retention of Infrastructure Deed[34] and are listed in EA Appendix 2 – Table H.

Any infrastructure that is not retained (*ie* land has been nominated for *Conservation Use*) is included in rehabilitation.

Figures 21, **22** and **23** illustrate all existing infrastructure, including infrastructure that is to remain for the landholder.

1.6 Risk assessment

This section identifies the risk of a stable condition for land not being achieved and a risk treatment plan outlining how the applicant will manage or minimise the risk.

The general environmental risk management processes follow the CFSMPL EMS[35], which has been certified. Environmental Programs (EPs) have been developed to address the major activities undertaken by CFSMPL relating to the EMS. The EPs link environmental objectives and controls required to meet compliance obligations and formally allocate environmental responsibilities to employees. Rehabilitation plan risk management at CFSM is administered through the CFSMPL EMS. The potential hazards, their risk levels, and their associated mitigation controls are identified in the CFSM Risk Assessment Register (RAR)[36]. The potential hazards and mitigation controls relevant to rehabilitation outcomes at CFSM, as per the CFSM RAR, are provided in **Appendix 7**.

1.6.1 Rehabilitation trials

The rehabilitation strategy for CFSM was initiated in the 1980s; implementation of rehabilitation commenced in the early 1990s. The technical and cultural components of the strategy and its implementation were pioneering *ie* the approach and its implementation involved components of trial, error, and modification. The EMOS detailed research

[34] Hope Vale Congress Aboriginal Corporation RNTBC and CFSMPL have entered a *Retention of Infrastructure Deed* (dated 26 August 2015), which includes details of the infrastructure to be retained (updated periodically as agreed).

[35] The EMS is a non-regulatory document developed for operational purposes only.

[36] The CFSMPL RAR, which is part of the CFSMPL EMS, is a live document. The environmental risks associated with rehabilitation are reviewed periodically when reviewing the CFSM Rehabilitation Plan or as risks associated with rehabilitation are identified.

commitments, which included rehabilitation-specific programs. These have long been completed; the outcome of which is:

1. captured in the current technical documentation that informs the rehabilitation activities at CFSM
2. reflected in the EA
3. instrumental to the achievement of Progressive Rehabilitation Certification (**Appendix 6**).

The monitoring of rehabilitation informs the rehabilitation activity and provides evidence for Progressive Rehabilitation Certification. Some areas of rehabilitation require further resource inputs to promote the necessary outcome. In specific locations it is not certain that the existing rehabilitation method alone will prove successful. Areas of deposited rejects from the old mill at Arnie's Lake (Area 30 and Sunrise Hill) have proven to be unstable (with respect to wind erosion). For these areas additional rehabilitation trials have been considered and budget allocations made should it prove necessary to develop further knowledge.

1.7 Monitoring and maintenance

This section includes a monitoring and maintenance program that identifies and describes the monitoring systems that will be undertaken to demonstrate that milestones and milestone criteria have been achieved.

The CFSM Rehabilitation Monitoring Manual (NRA 2020d) describes the methods and protocols for an annual rehabilitation monitoring program. The rehabilitation monitoring program measures the progress of key ecological attributes of the rehabilitated landscape at CFSM, and evaluates the performance of the rehabilitation against the CFSMPL rehabilitation targets (*ie* rehabilitation objectives, indicators and completion criteria).

The monitoring attributes and the measurement assessment methods have been selected based on the PMLU and rehabilitation targets as stipulated in the CFSM EA Schedule F – Table 2a and Schedule F – Table 2b and they support the CFSM Rehabilitation Plan.

The CFSM Rehabilitation Monitoring Manual documents the following.

- Rehabilitation targets to be assessed and reported during annual monitoring.
- Detailed monitoring methods including:
  - rehabilitation and reference site selection and sampling intensity
  - field monitoring methods
  - ecological function specifications
  - the monitoring program schedule.
- Detailed monitoring data validation assessment methods for each rehabilitation objective and associated completion criteria.
- Proformas for field data collection.

Potential maintenance issues that may be encountered, and suitable remedial actions, are provided in the CFSM Rehabilitation Manual. Briefly these include:

- vegetation establishment
- weed control
- contingency planning
- remedial landform stabilisation
- re-treatment of rehabilitation areas
- trash layering

- trash bunds
- brushmatting
- accretion fencing.

1.7.1 Maintenance monitoring and contingencies

Vegetation at rehabilitation areas should be monitored twice weekly for 4 weeks following establishment. Weed monitoring of newly established rehabilitation areas should be undertaken twice monthly for the first 3 months following establishment, and then monthly until the anniversary of establishment. Priority should be given to treating weeds that are declared pest plant species.

Contingency planning provides a framework for responding to significant failures as opposed to localised maintenance issues. The components of contingency planning are as follows.

- To identify a failure or pending failure. The annual rehabilitation monitoring program provides warning of impending failure.
- Where failure has occurred or is imminent, it is necessary to evaluate:
  - the landform involved
  - the cause/nature of the failure
  - the receiving environment
  - risk assessment (likelihood and consequences of failure).

Failure of areas of revegetation and/or surface stabilisation is likely to occur and, in most instances, timely re-treatment will be the most appropriate response. However, response to significant failure events (*ie* failure events that are extensive or cannot be addressed by re-treatment) needs to be handled in partnership with the administering authority and in consultation with relevant stakeholders.

1.7.2 Remedial landform stabilisation

Remedial landform stabilisation may be required when drift or a blowout occurs due to a lack of vegetative cover. This is likely in areas of little wind protection and high wind velocities (*eg* coastal areas), and where a source of sand is available (*ie* remaining sections of dunes disturbed by mining). In these situations, immediate stabilising cover may be required.

The following are common landform stabilising techniques:

- re-treatment of rehabilitation areas
- trash layering
- trash bunds
- brushmatting
- accretion fencing.

Where a high level of intervention is necessary, a combination of these techniques may be required.

1.7.3 Annual CFSM rehabilitation monitoring program

The rehabilitation monitoring program measures the progress of key ecological attributes of the rehabilitated landscape at CFSM, and evaluates the performance of the rehabilitation against the CFSMPL rehabilitation targets (*ie* rehabilitation goals, objectives, indicators and completion criteria).

1.7.4 Rehabilitation completion

The requirements for achieving rehabilitation completion and certification are detailed in the PRCP Schedule.

Achievement and verification of the revegetation works are controlled by the use of the following:

- *Retention of Infrastructure Deed*
- Inspection Test Procedures (ITPs):
  - ITPs document the application of established rehabilitation methods and ensure that each step of rehabilitation progresses towards achievement of the rehabilitation goals
  - ITPs contain checklists for each step of rehabilitation, including landform design, infrastructure removal, landform re-formation, surface preparation, seeding and fertilising and maintenance monitoring
  - each checklist is completed once per disturbance area, with the maintenance monitoring check completed 12 months after rehabilitation establishment to determine if early retreatments or infill planting are required
- as built drawings/plans
- GIS mapping
- rehabilitation monitoring reports
- annual reports
- site investigation reports
- site management plans (where applicable).

Procedures, plans and reports are to be filed on-site and must be accessible on request by any appropriate authority.

1.7.5 Monitoring methods

Site selection

To address differences in rehabilitation histories and to manage the variability of landforms and vegetation communities, the following approach is undertaken.

- Individual rehabilitation areas[37] are grouped into rehabilitation domains[38] to enable adequate replication to assess rehabilitation progress against the completion criteria.
- Rehabilitation site selection is focused on the two dominant landform groups in each rehabilitation domain.
- Sites are established in each relevant landform group in each rehabilitation domain/reference[39] at a high sampling intensity in spatially randomised locations, with multiple transects (**Plate 10**).

[37] 'Rehabilitation area' means an area of land that is no longer active for mining and rehabilitation of that land has progressed (*ie* terraforming has occurred).

[38] 'Rehabilitation domain' means one or more rehabilitation areas that are grouped by similar age, treatment and/or proximity and have a cumulative area greater than or equal to 1.8 ha and less than or equal to 40 ha.

[39] Reference sites were sampled from the undisturbed environment for comparison with rehabilitation.

Field vegetation monitoring methods

During each monitoring event (**Plate 11**), for each site, the following records are kept:

- representative photographs
- GPS coordinates and site identification number
- measures of slope and aspect
- notes on erosion not associated with dune-forming processes (if applicable)
- inventory of flora species and their reproductive status
- crown cover of the ecologically dominant layer
- notes on presence of T&NT species
- notes on presence of weeds.

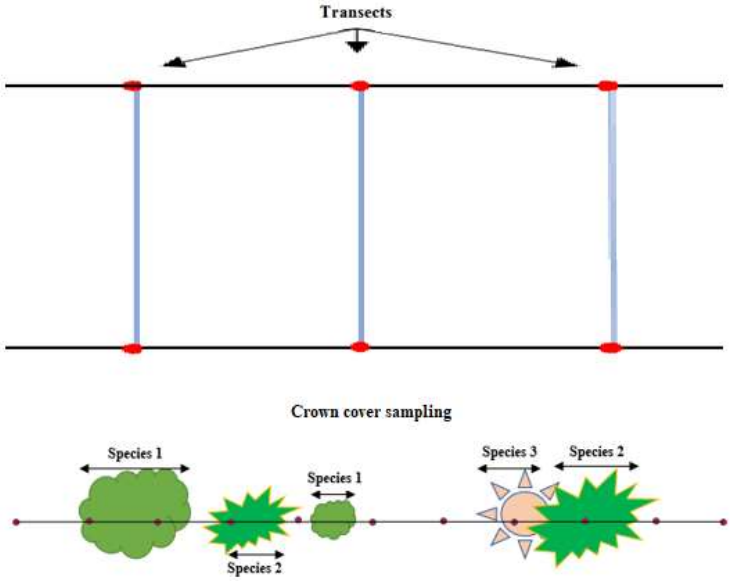


Plate 10: Indicative site layout and sampling



Plate 11: CFSM field vegetation monitoring

Plant functional group allocation

Flora species are assigned to Plant functional group (PFG) codes with reference to **Table 8**.

Table 8: Plant functional groups for assessing rehabilitation performance at CFSM (EA Appendix 2 Table F)

Plant functional attribute	Range of possible traits	Plant functional group (PFG) code component[1]
Growth form	• Woody species (trees and shrubs)	• W
	• Graminoids (grasses, sedges and rushes)	• G
	• Forbs (including vines, ferns and epiphytes)	• F
Nutrient acquisition strategy	• N-fixing (may also be mycorrhizal)	• N
	• Specialised root systems (some graminoids)	• S
	• Mycorrhizal associations only (for woody species and forbs)	• M
	• Other	• -
Primary regeneration mode	• Seeder	• 1
	• Resprouter organ (rhizomes, corms, tubers, large woody subterranean organs)	• 2
	• Vegetative reproduction/dispersal	• 3

1.7.6 Rehabilitation monitoring schedule

Monitoring, reporting and review for each rehabilitation milestone, for each relevant rehabilitation area, will be undertaken annually. In accordance with EA condition F2-2: *By 1 November 2021 and every two years thereafter, the holder of this environmental authority must submit a rehabilitation monitoring report to the administering authority.* Monitoring reports will collate and provide results and key findings relevant to rehabilitation progress.

1.7.7 Data assessment

The data collected from monitoring sites is used to assess progress towards meeting the completion criteria in the PRCP Schedule.

Monitoring will be undertaken by a suitably qualified person(s) using appropriate quality assurance and data management processes and systems. This approach will ensure that work is undertaken by appropriately qualified, skilled and experienced individuals. The data collection methods have been adapted from established and accepted authorities reported in the PRCP Schedule (*ie* Neldner *et al.* 2019a). Field data is recorded onto appropriate proforma by suitably qualified person(s); on return to the office relevant data is entered into digital format for data analysis and interpretation in accordance with established and accepted method. A quality assurance check on data entry is undertaken, and a technical review of the reporting is undertaken prior to finalisation. This method ensures the technical accuracy of data and interpretation.

Data assessment will be undertaken annually; every 2 years, the holder of the environmental authority will submit a rehabilitation monitoring report to the administering authority. Monitoring reports will collate and provide results and key findings relevant to rehabilitation progress.

1.7.8 Monitoring and maintenance post-closure

Post rehabilitation success, monitoring and maintenance will continue post-closure (terminating at lease relinquishment and the acceptance by the administering authority of surrender of the EA). The post-closure monitoring, to ensure milestone criteria has been demonstrated, will be against the success criteria in the PRCP Schedule.

Monitoring, reporting and review of rehabilitation will be undertaken annually. The holder of the environmental authority will submit a rehabilitation monitoring report to the administering authority every 2 years. Monitoring reports will collate and provide results and key findings relevant to rehabilitation progress. This information will identify maintenance requirements. Potential maintenance issues that may be encountered, and suitable remedial actions, include:

- vegetation establishment
- weed control
- remedial landform stabilisation
- re-treatment of rehabilitation areas.

Contingency strategies, if monitoring data indicates milestone criteria are not being met, identify incipient failures in the rehabilitation and, where failure has occurred, promote a timely response. Contingency strategies provide a framework for responding to a failure as opposed to itemising all possible failure events (and the magnitude of failure). The monitoring program serves to provide warning of pending failure. The maintenance measures promote continuity of rehabilitation success. This approach reflects that used for areas of rehabilitation that have achieved successful rehabilitation certification that is a standardised and repeatable approach. Adaptive management is inherent in the rehabilitation method and includes landform re-formation, in-fill planting, weed control, soil fertility enhancement.

Monitoring, reporting and review of rehabilitation, including areas already rehabilitated but not certified, will be undertaken annually. The holder of the environmental authority will submit a rehabilitation monitoring report to the administering authority every 2 years. Monitoring reports will collate and provide results and key findings relevant to rehabilitation progress.

2. Appendices and Attachments

The completed PRCP Schedule and any relevant required reports/plans and figures are included in this section.

The PRCP Schedule is included as **Appendix 8**.

Spatial information relating to the PRCP is in **Appendix 9**.

Figures



Figure 1: Location and land tenure

N

0 15

Kilometres

Mining lease boundaries

Road

Drainage

Town

Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2019.

NRA Ref: 101094.03/
101098.01
Date: October 2019

T:_Temp Mapping 2022\101\WOR\101098.01\Fig 1_PRCP_220405.WOR
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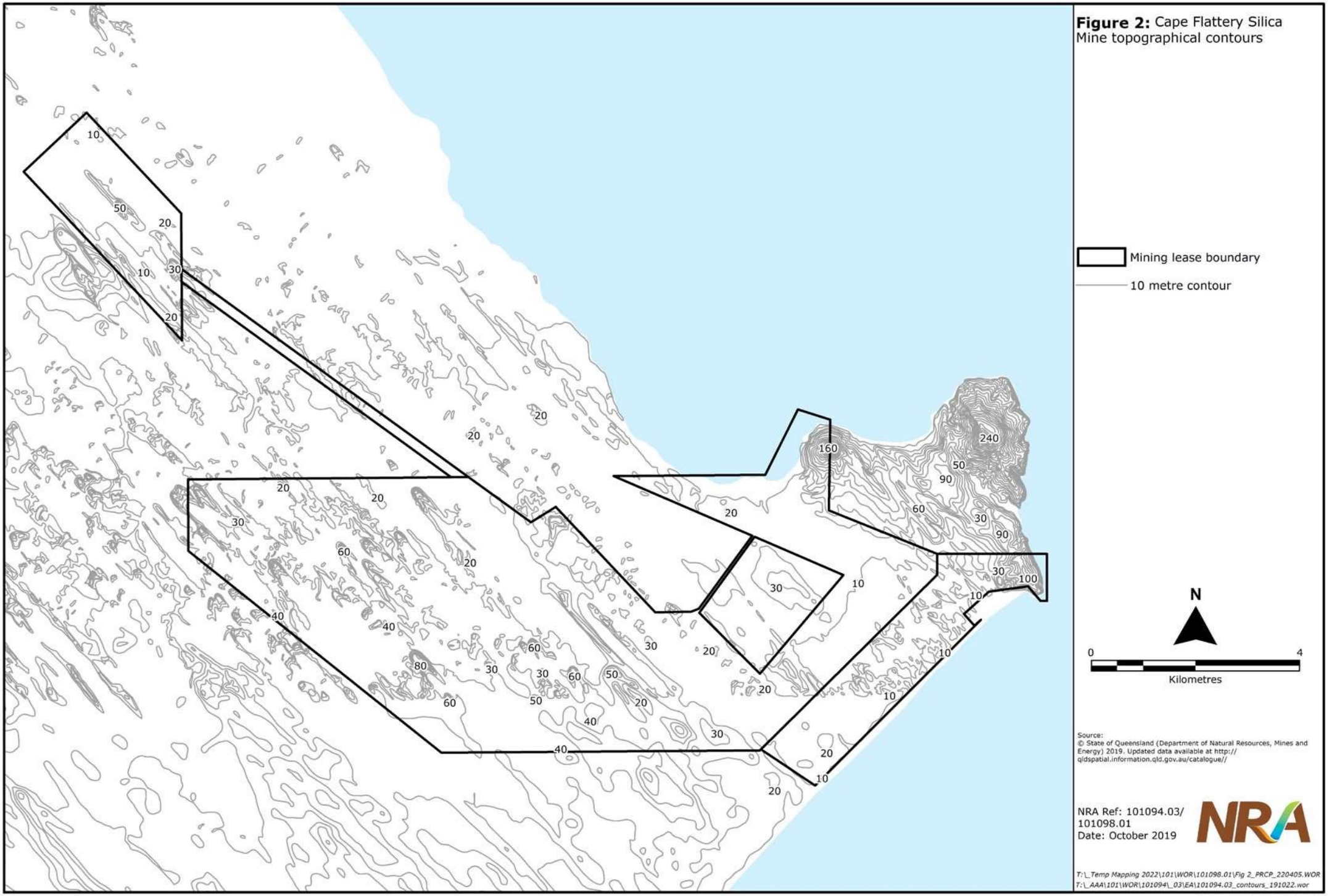


Figure 2: Cape Flattery Silica Mine topographical contours

Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//

NRA Ref: 101094.03/ 101098.01
Date: October 2019

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Recommended print size: A4

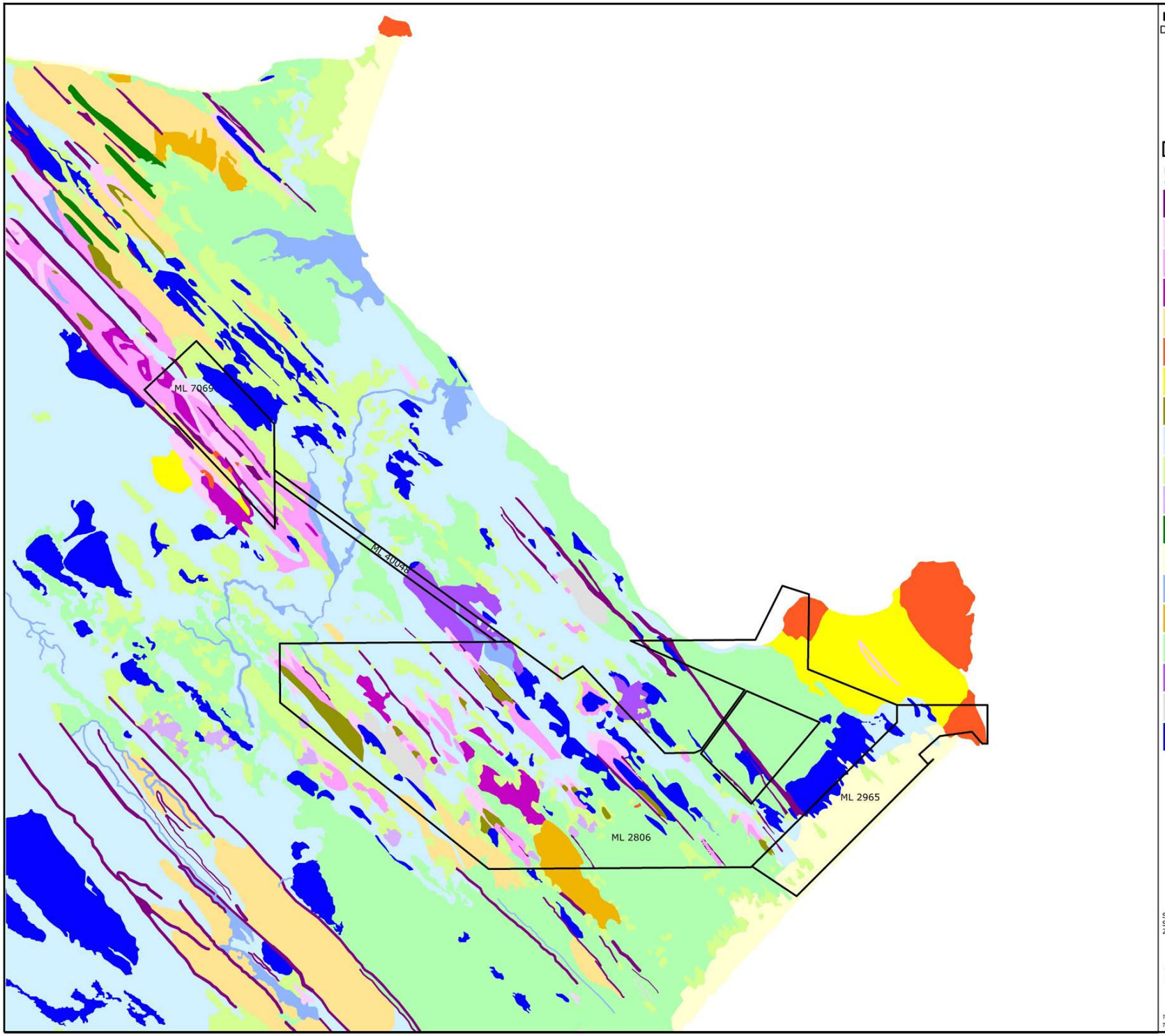


Figure 3: Distribution of landforms across the Cape Flattery Dunefield

Mining lease boundary

Landform Classification
(Stock, 1991 cited in NRA 1995)

- Long narrow ridges
- Elongate parabolic dune head
- Deflation corridor of active elongate/parabolic dune
- Depositional area in deflation corridor
- Relict gegenwalles
- Outcrop
- Sand veneer over outcrop
- Active gegenwalles
- Ill-defined lakes and swamps
- Small parabolic dunes
- Small deflation areas
- Relict ridges, modified by gegenwalles
- Coastal parabolic dunes
- Stream corridor
- Gegenwalles modified by parabolic dune inception
- Inter-dune sand plains
- Transition: Lakes and swamps with small deflation areas
- Extensive development of small parabolic dune & associated deflation
- Waterbody

N

0 4
Kilometres

Source:
Stock, 1991 cited in NRA 1995, © State of Queensland (Department of Natural Resources and Mines) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//

NRA Ref: 101094.03/101098.01
Date: October 2019

NRA

T:_Temp Mapping 2022\101\WOR\101098.01\Fig 3_PRCP_220405.WOR
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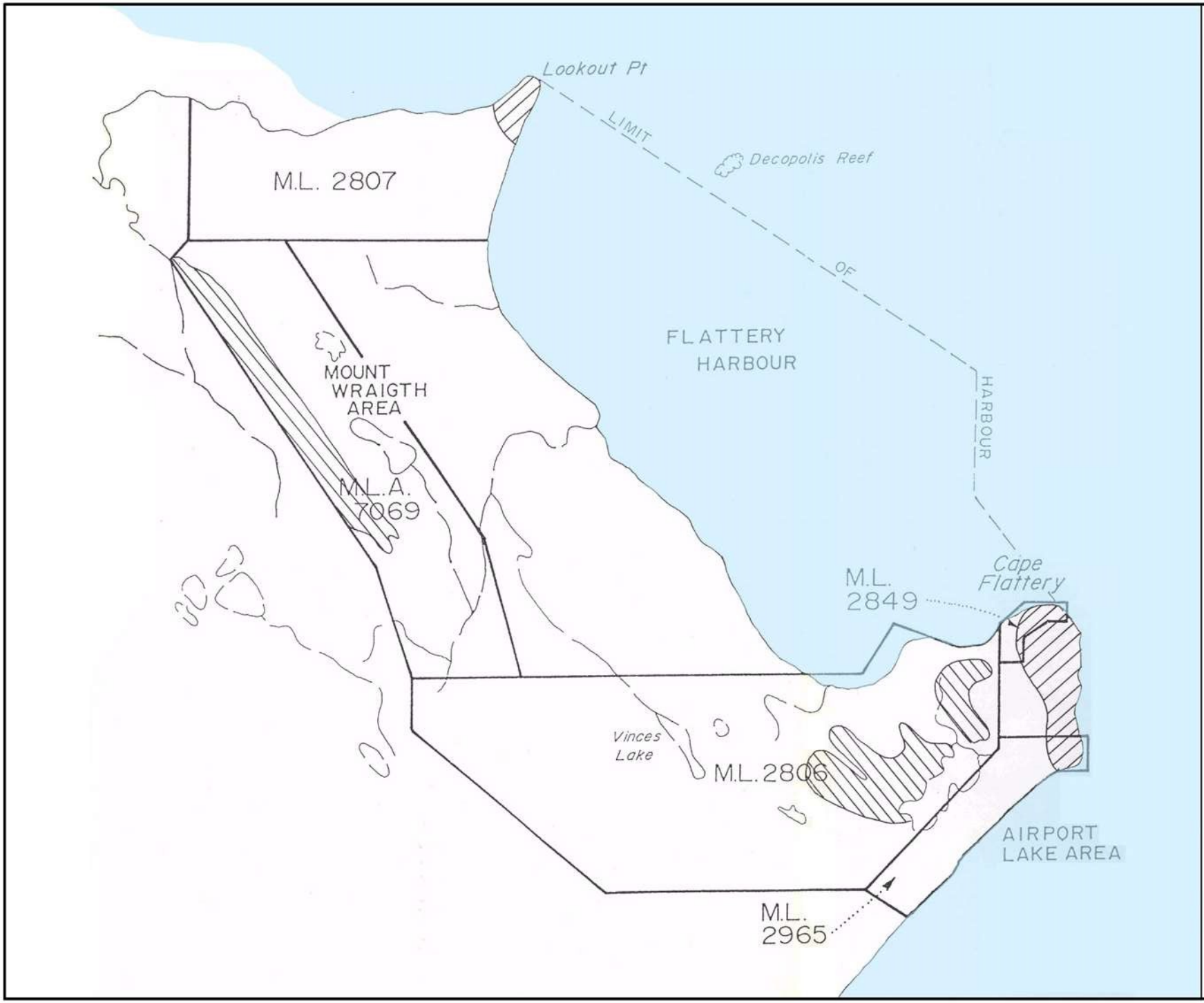


Figure 4: Soils of the Cape Flattery Dunefield (NRA 1990)

Mining lease boundary

Soils of the Cape Flattery Dunefield (NRA 1990)

- Headland soils
- Sand influenced by lateritic subsoils
- Dunefield sands

N

0 5

Kilometres

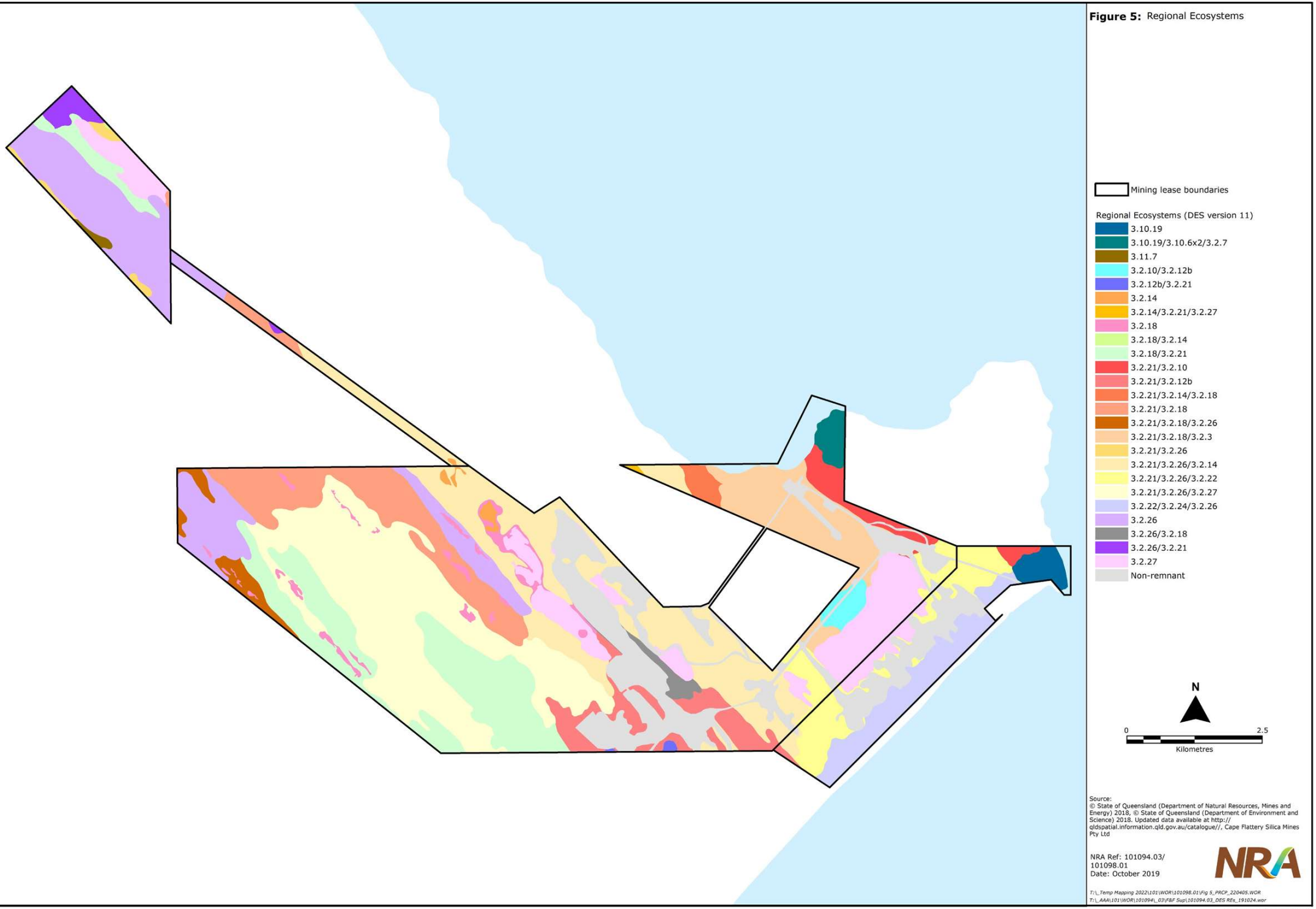
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NRA Ref: 101094.03/
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Date: October 2019

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T:_AAA\101\WOR\101094_03\EA\101094.03_Soils1990_191022.wor

Recommended print size: A4


Figure 5: Regional Ecosystems
Mining lease boundaries
Regional Ecosystems (DES version 11)
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3.10.19/3.10.6x2/3.2.7
3.11.7
3.2.10/3.2.12b
3.2.12b/3.2.21
3.2.14
3.2.14/3.2.21/3.2.27
3.2.18
3.2.18/3.2.14
3.2.18/3.2.21
3.2.21/3.2.10
3.2.21/3.2.12b
3.2.21/3.2.14/3.2.18
3.2.21/3.2.18
3.2.21/3.2.18/3.2.26
3.2.21/3.2.18/3.2.3
3.2.21/3.2.26
3.2.21/3.2.26/3.2.14
3.2.21/3.2.26/3.2.22
3.2.21/3.2.26/3.2.27
3.2.22/3.2.24/3.2.26
3.2.26
3.2.26/3.2.18
3.2.26/3.2.21
3.2.27
Non-remnant
N
0
2.5
Kilometres
Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2018, © State of Queensland (Department of Environment and Science) 2018. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//, Cape Flattery Silica Mines Pty Ltd
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Date: October 2019
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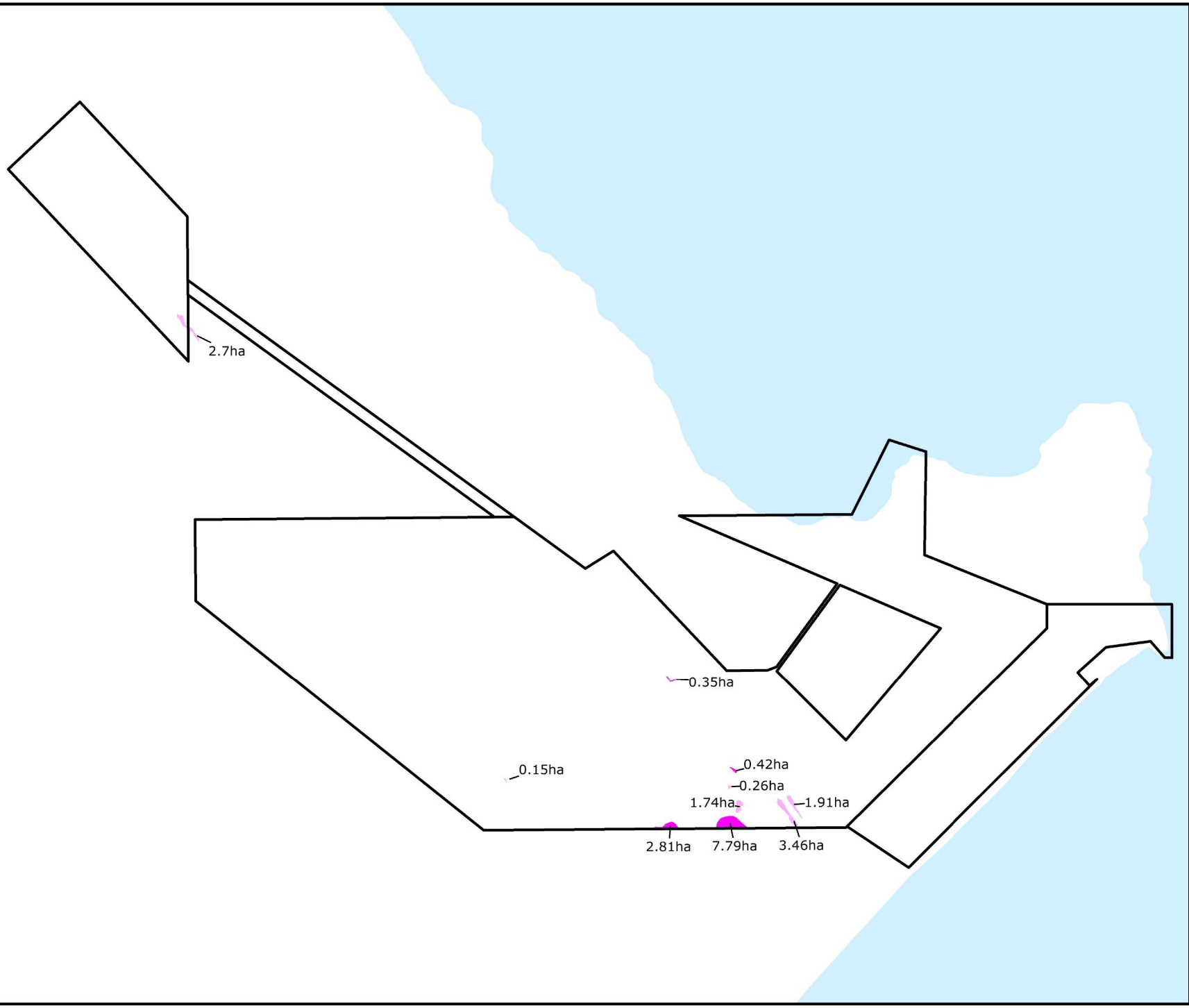


Figure 6: Field verified locations of Littoral Rainforest and Coastal Vine Thickets of Eastern Australia TEC

Mining lease boundaries

Confirmed TEC

Potential TEC

N

0 4

Kilometres

Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2018, Updated data available at http://qldspatial.information.qld.gov.au/catalogue//, Cape Flattery Silica Mines Pty Ltd

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Date: October 2019

NRA

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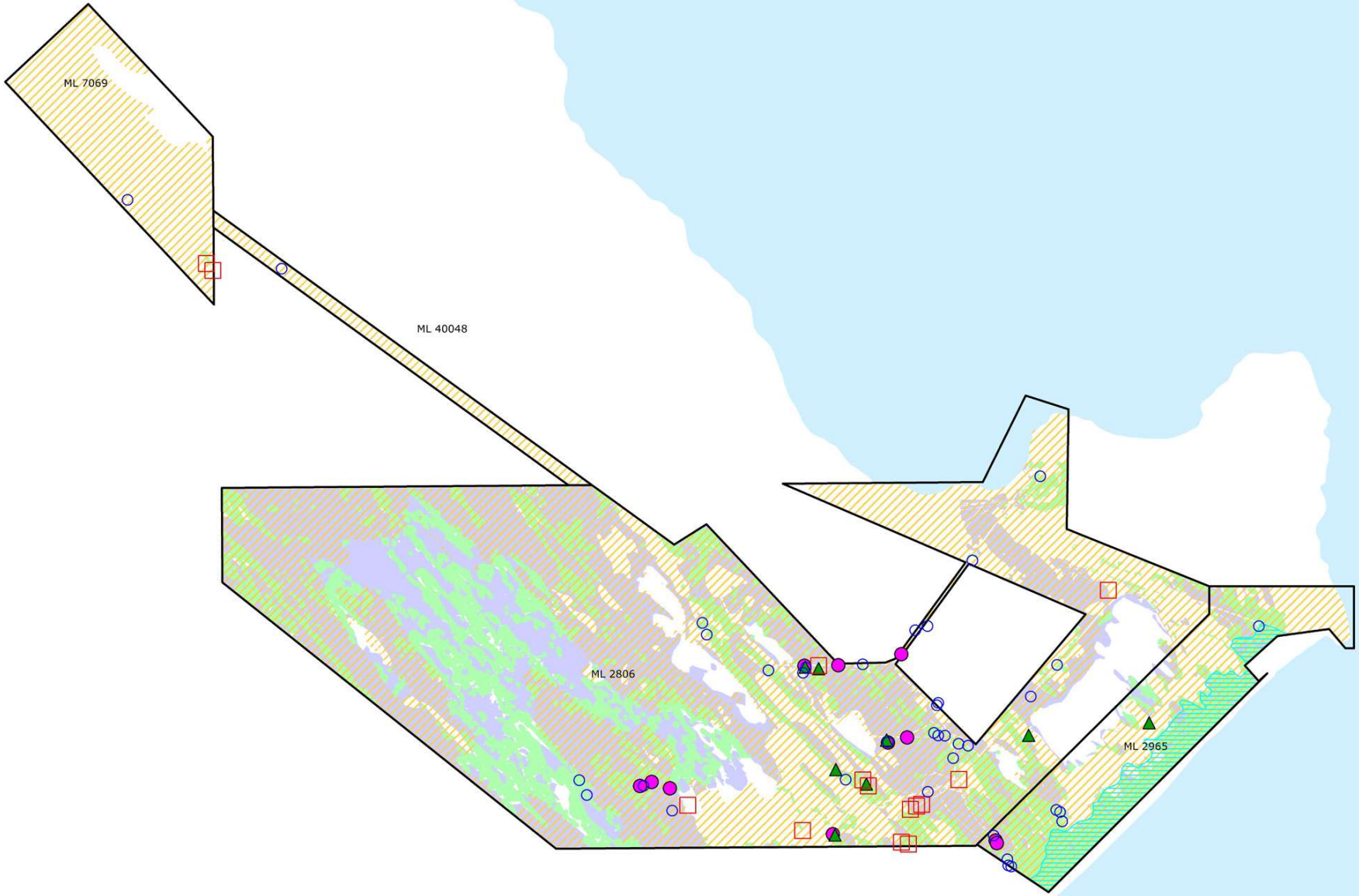


Figure 7: Field observations and areas containing suitable habitat for T&NT flora

Mining lease boundaries

T&NT flora observations

- *Dendrobium spp.*
- *- D. johannis?*
- *- D. bigibbum?*
- *Myrmecodia beccari*
- *Xanthostemon arenarius*
- *Acacia solenota*

Suitable habitat for T&NT flora

- *Xanthostemon arenarius*
- *Myrmecodia beccarii, Dendrobium johannis, Dendrobium bigibbum, Acriopsis emarginata*
- *Stackhousia sp.* (McIvor River J.R.Clarkson 5201)
- *Acacia solenota*

Note: mapped habitat for Xanthostemon arenarius, Myrmecodia beccarii, Dendrobium johannis, Dendrobium bigibbum and Acriopsis emarginata is only available for ML 2806 and ML 2965. Habitat may also be present in ML 40048 and ML 7069

N

0 2.5

Kilometres

Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2018, Updated data available at http://qldspatial.information.qld.gov.au/catalogue//, Cape Flattery Silica Mines Pty Ltd

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Date: October 2019

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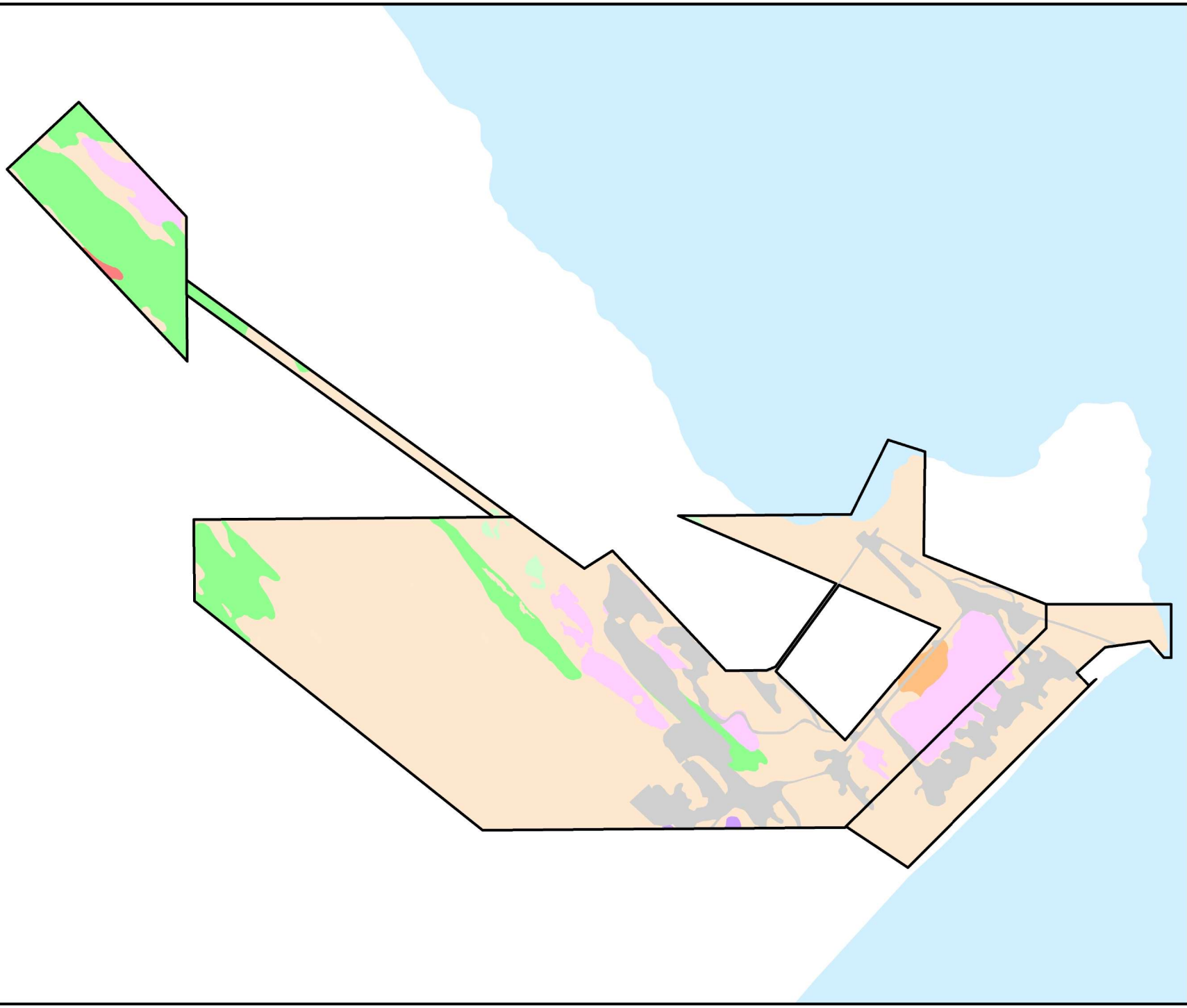


Figure 8: Broad Vegetation Groups (1:2M)

Source:
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Date: October 2019

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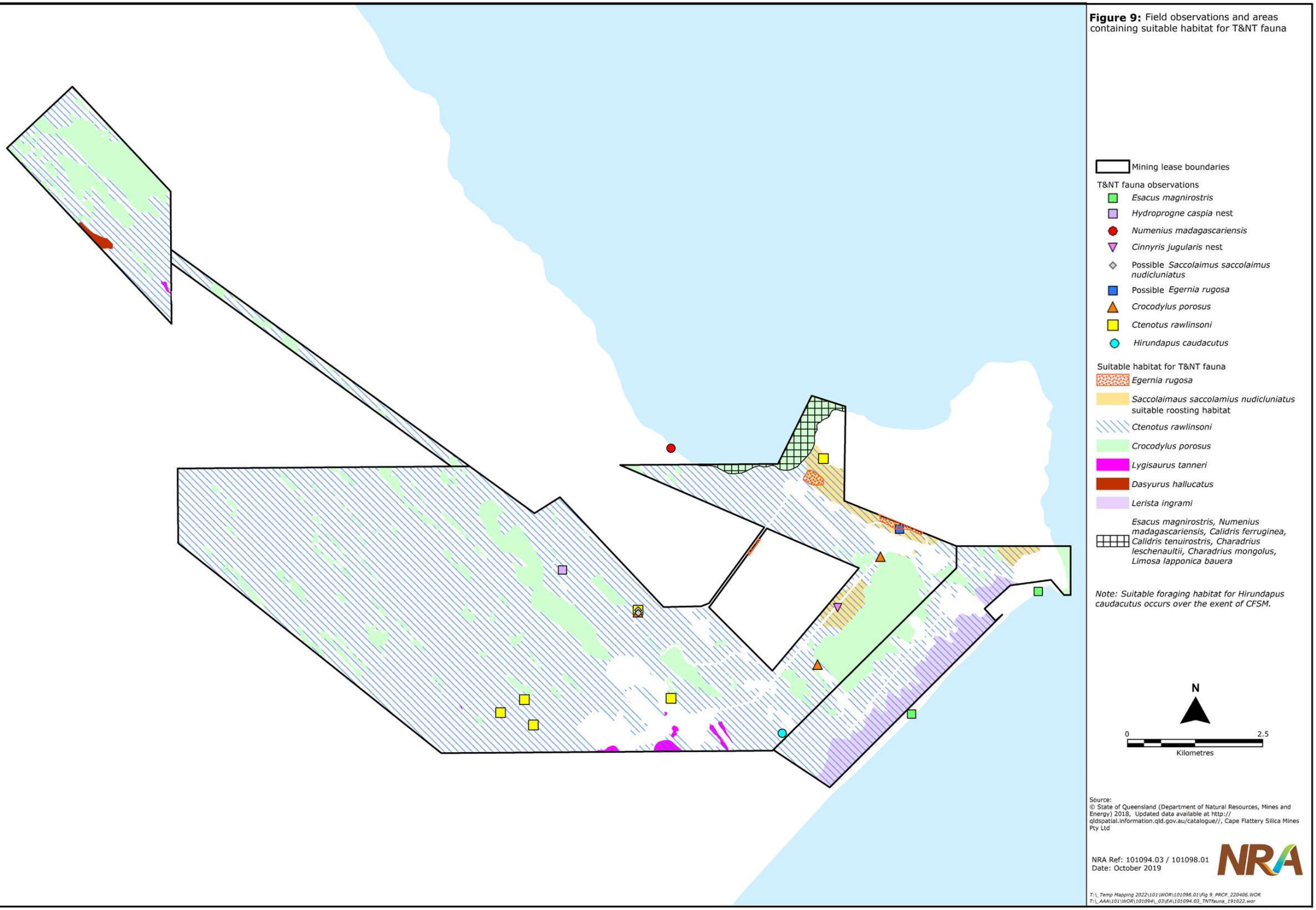


Figure 9: Field observations and areas containing suitable habitat for T&NT fauna

Source:
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Date: October 2019

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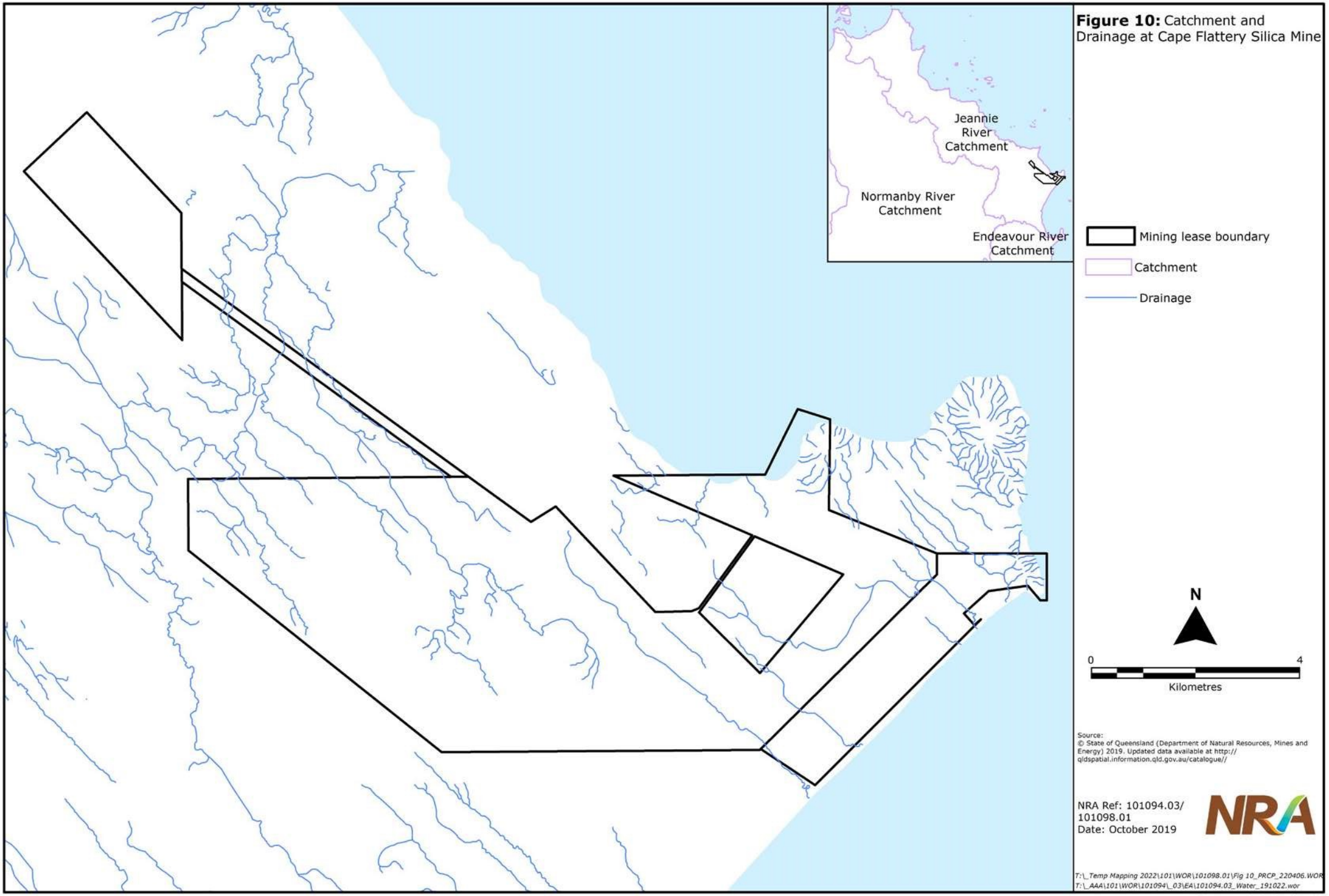


Figure 10: Catchment and Drainage at Cape Flattery Silica Mine

Source:
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Date: October 2019

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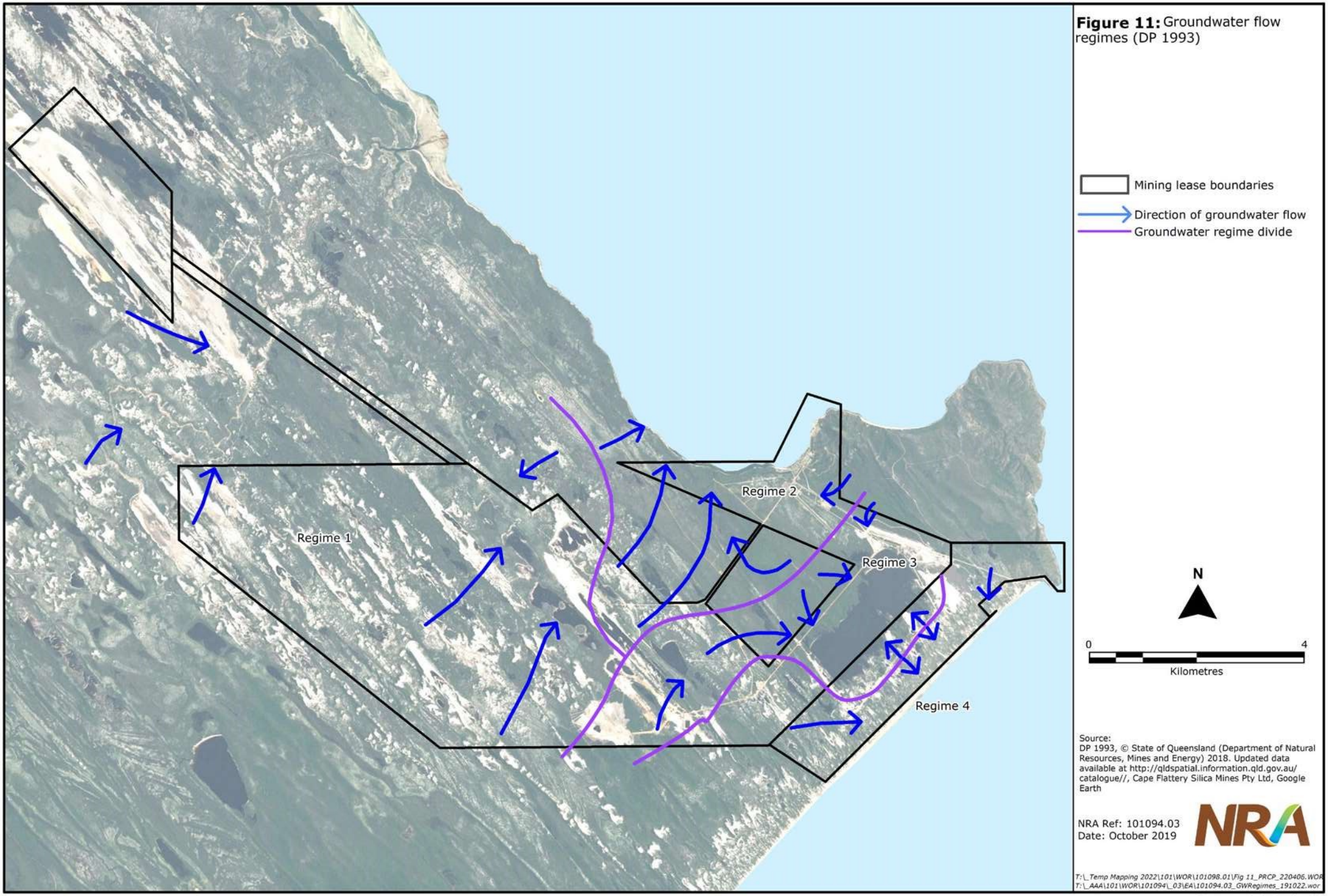


Figure 11: Groundwater flow regimes (DP 1993)

Source:
DP 1993, © State of Queensland (Department of Natural Resources, Mines and Energy) 2018. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//, Cape Flattery Silica Mines Pty Ltd, Google Earth

NRA Ref: 101094.03
Date: October 2019

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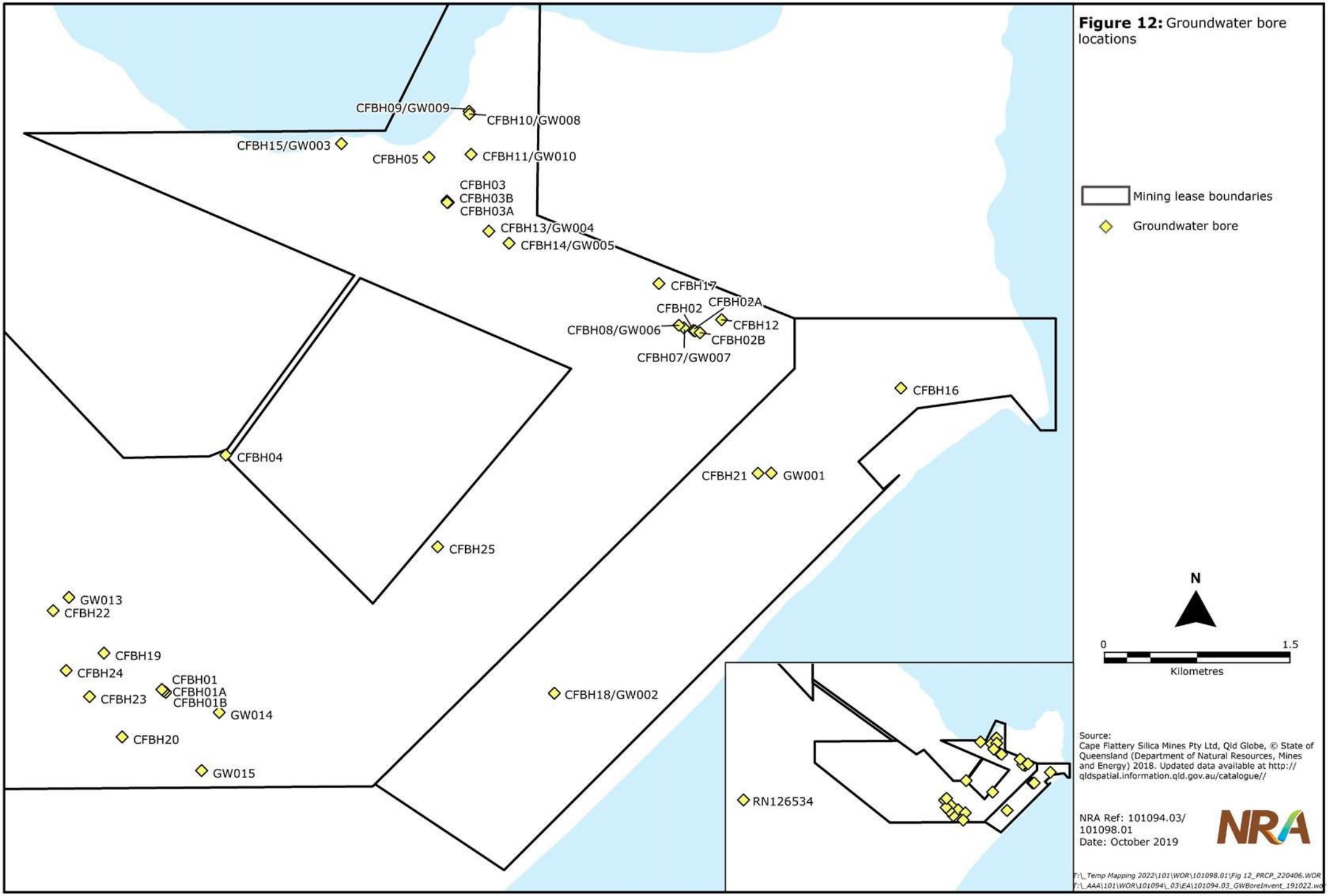


Figure 12: Groundwater bore locations

Source:
Cape Flattery Silica Mines Pty Ltd, Qld Globe, © State of Queensland (Department of Natural Resources, Mines and Energy) 2018. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//

NRA Ref: 101094.03/
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Date: October 2019

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T:_AAA\101\WOR\101094_03\EA\101094.03_GWBoreInvent_191022.wo

Recommended print size: A4



Figure 13: Wetlands of ecological significance at CFSM (DES 2019)

Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2018, State of Queensland (Department of Environment and Science) 2019, Updated data available at http://qldspatial.information.qld.gov.au/catalogue//, Cape Flattery Silica Mines Pty Ltd

NRA Ref: 101094.03/
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Date: October 2019

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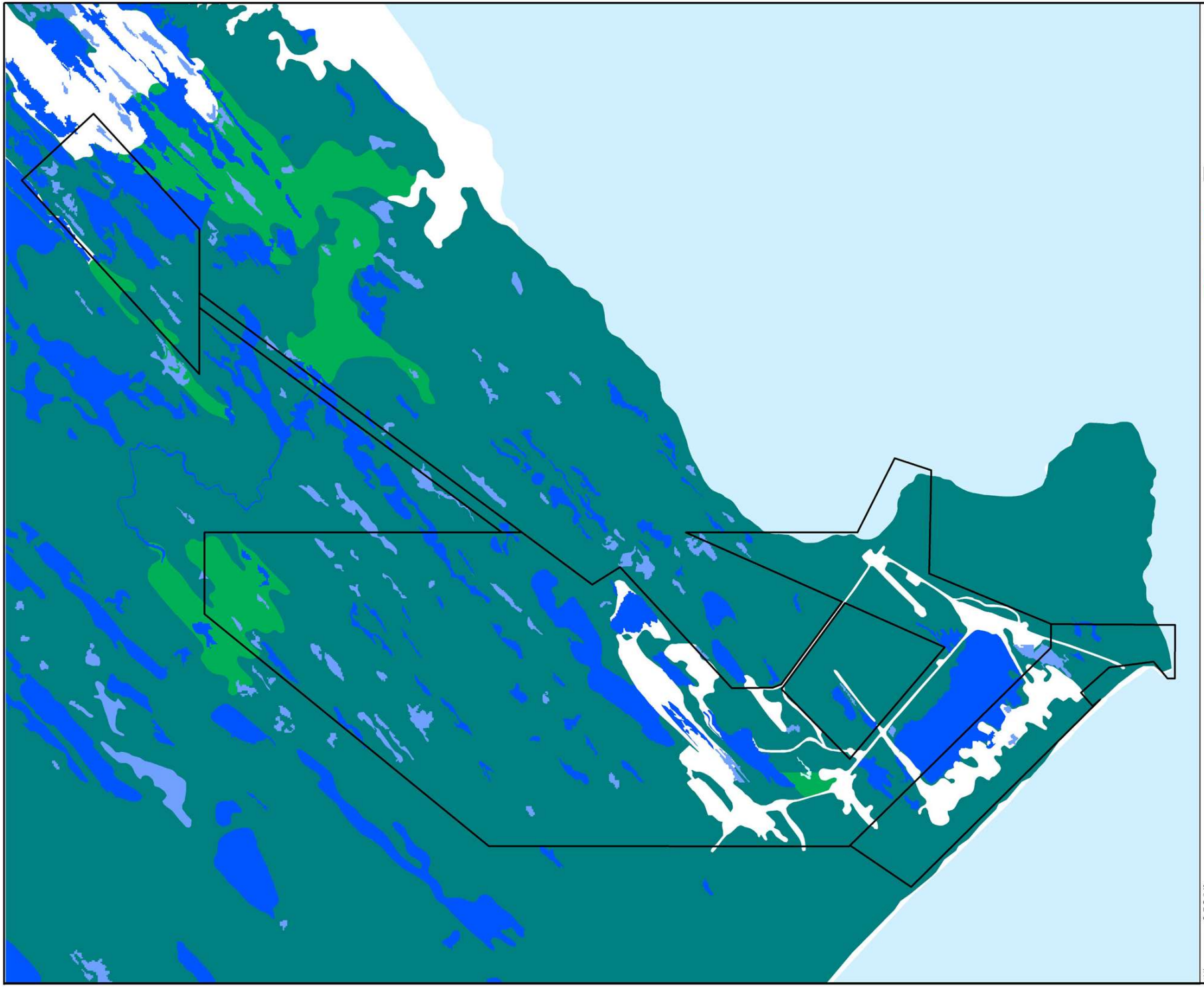


Figure 14: Groundwater Dependent Ecosystems at CFSM (BoM 2018)

Source:
© Commonwealth of Australia (Bureau of Meteorology) 2018, © State of Queensland (Department of Natural Resources, Mines and Energy) 2018. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//, Google Earth.

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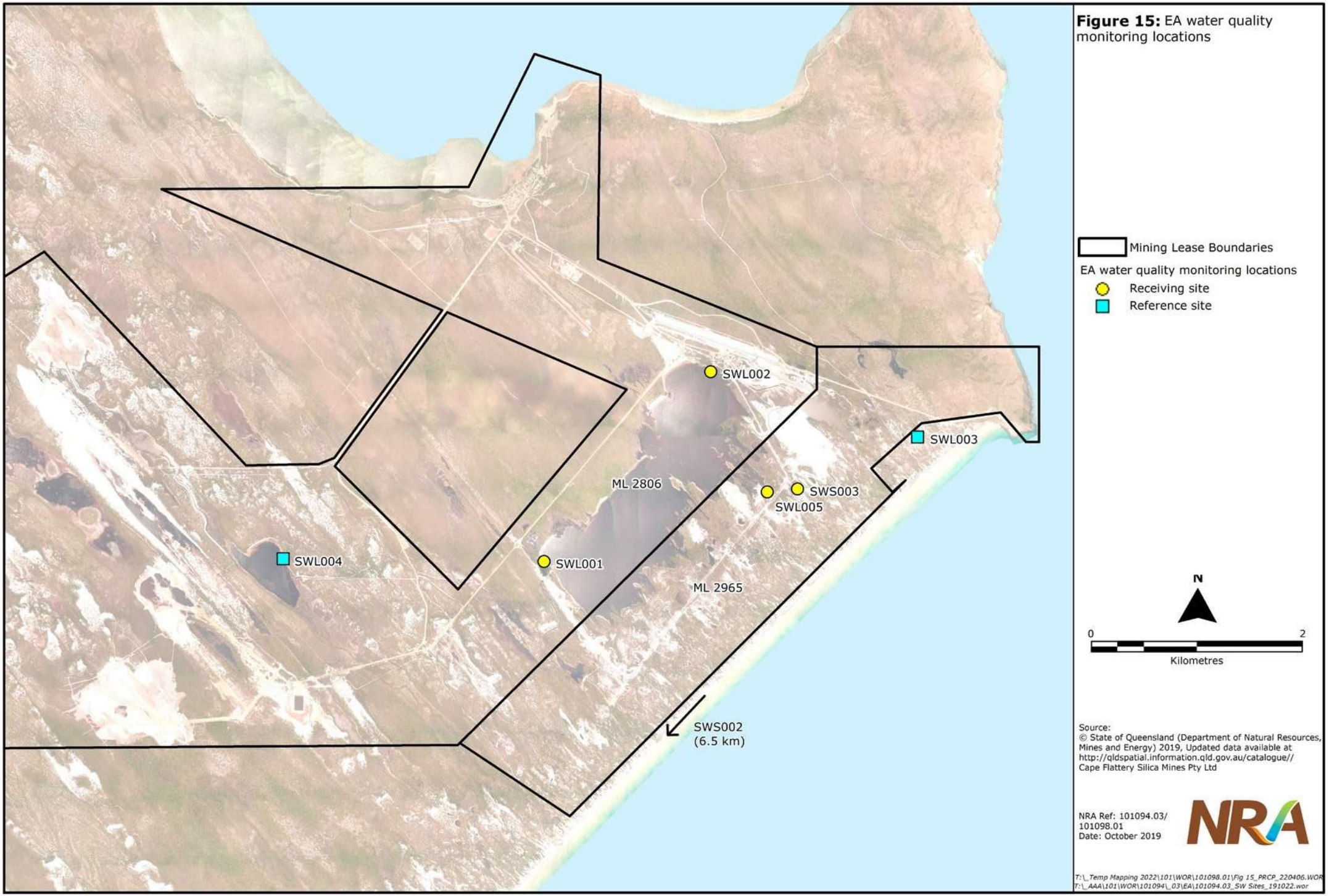


Figure 15: EA water quality monitoring locations

Source:
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Cape Flattery Silica Mines Pty Ltd

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Date: October 2019

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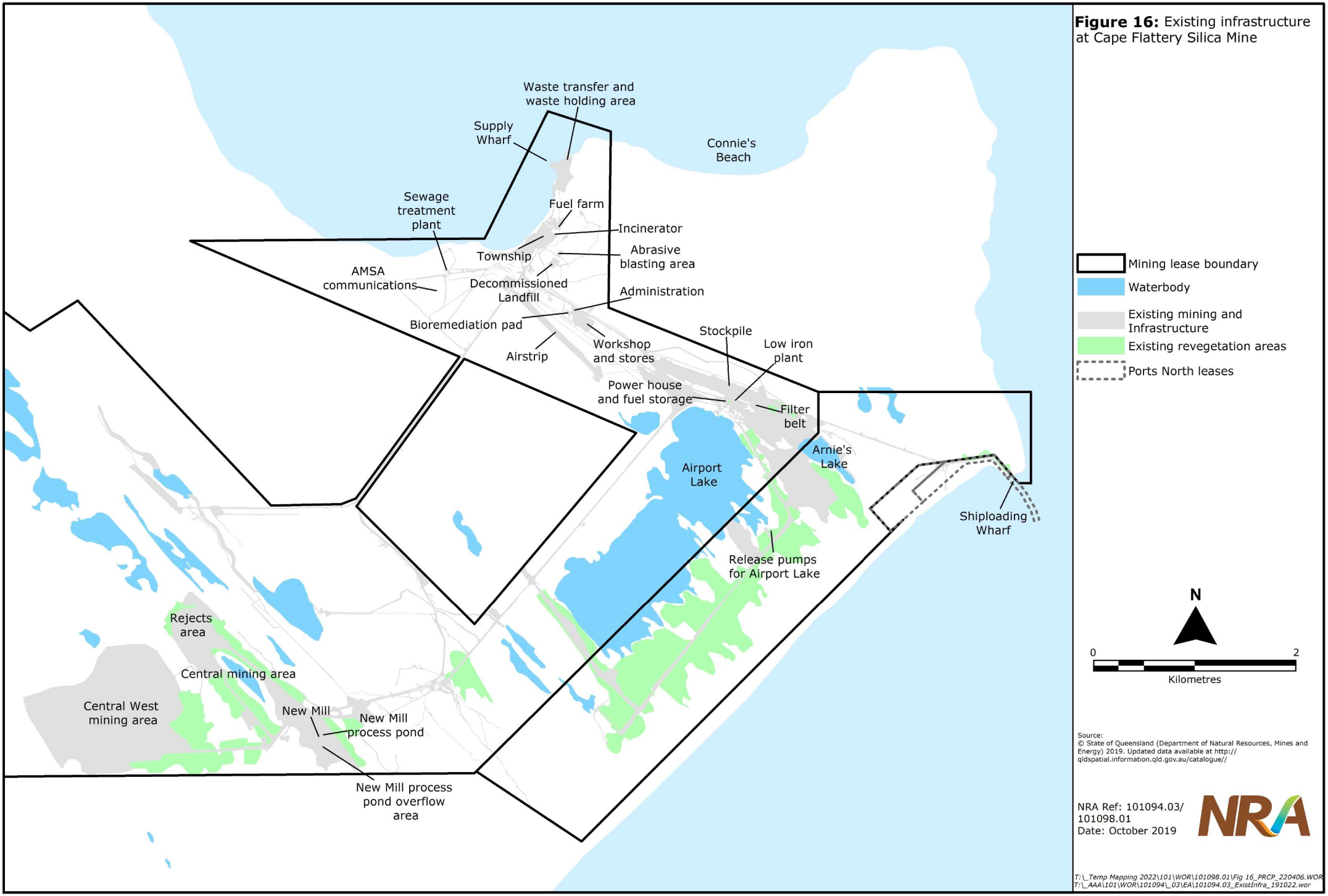


Figure 16: Existing infrastructure at Cape Flattery Silica Mine

Source:
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NRA Ref: 101094.03/101098.01
Date: October 2019

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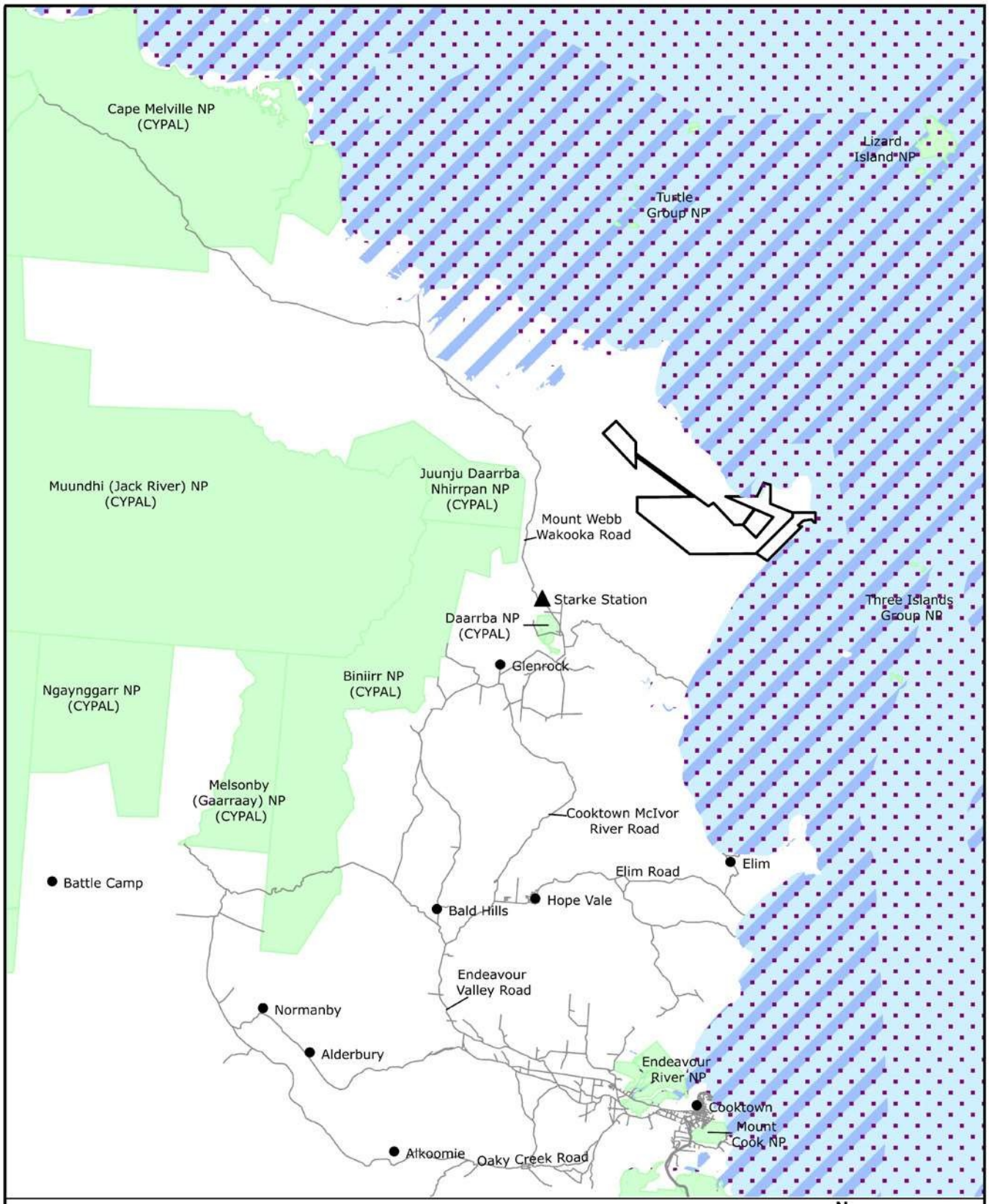


Figure 17: Nearest sensitive places/receptors to CFSM

Project: Cape Flattery Silica Mine EA Amendment Supporting Information

Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2019, © State of Queensland (Department of Environment and Science) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//.

NRA Ref: 101094.03/101098.01
Date: October 2019

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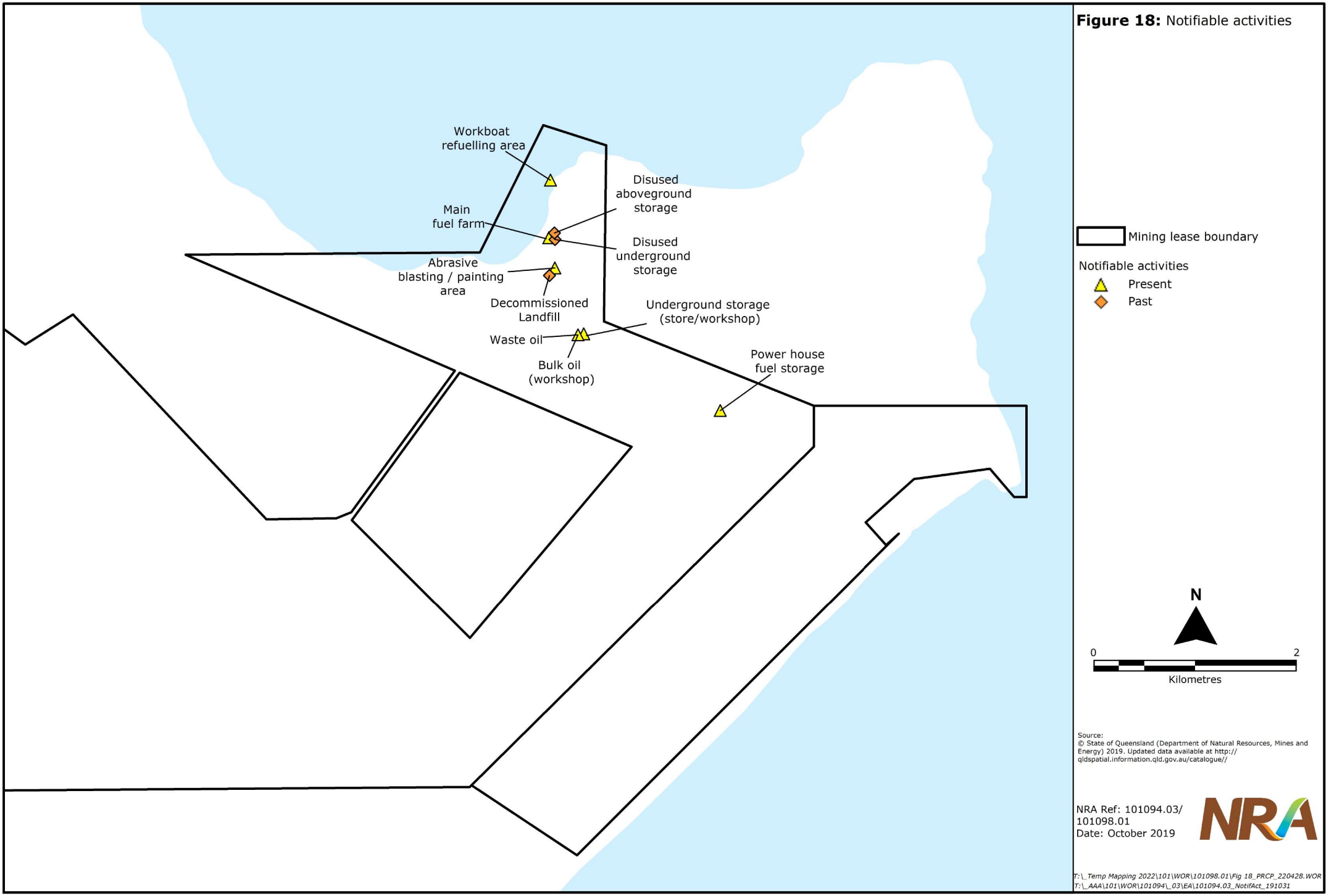


Figure 18: Notifiable activities

Source:
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NRA Ref: 101094.03/101098.01
Date: October 2019

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Recommended print size: A4

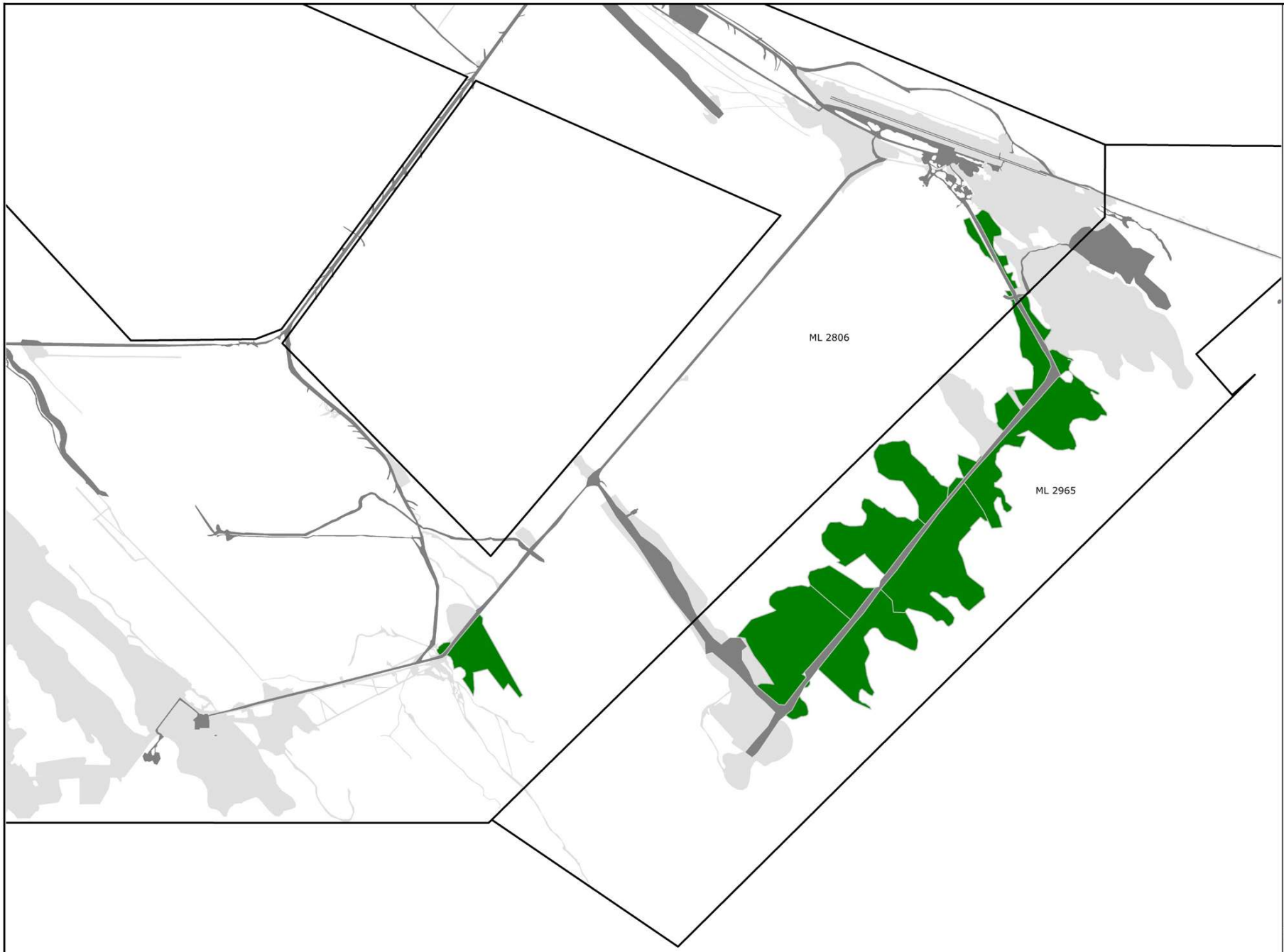


Figure 19: Summary of progression of rehabilitation completion in 2020 - legacy areas

Mining lease boundary
Mining disturbance
Retained infrastructure

Summary of progression of rehabilitation completion in 2020
All completion criteria met. Rehabilitation complete for certification

N

0 700
Metres

Source: Queensland Department of Natural Resources, Mines and Energy 2019, Cape Flattery Silica Mines Pty Ltd 2019.

NRA Ref: 101100.01/101098.01
Date: December 2021

T:_Temp Mapping 2022\101\WOR\101098.01\Fig 19_PRCP_220428.WOR
T:_AAA\101\WOR\101100_01\DES Response\101100.01_RehabProgress2020_211213.WOR

Recommended print size: A3



Figure 20: Summary of progression of rehabilitation completion in 2021

Mining lease boundary
Mining disturbance
Retained infrastructure

Summary of progression of rehabilitation completion in 2021
All completion criteria met on at least one occasion
Not all completion criteria achieved. Insufficient data to demonstrate achievement in 2021
Not all completion criteria achieved

N

0 1
Kilometres

Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//, Cape Flattery Silica Mines Pty Ltd.

NRA Ref: 101045.17/101098.01
Date: July 2021

T:_Temp Mapping 2022\101\WOR\101098.01\Fig 20_PRCP_220504.wor
T:_AAA\101\WOR\101045_17\101045.17_2021RehabProgress_210723.wor

Recommended print size: A3

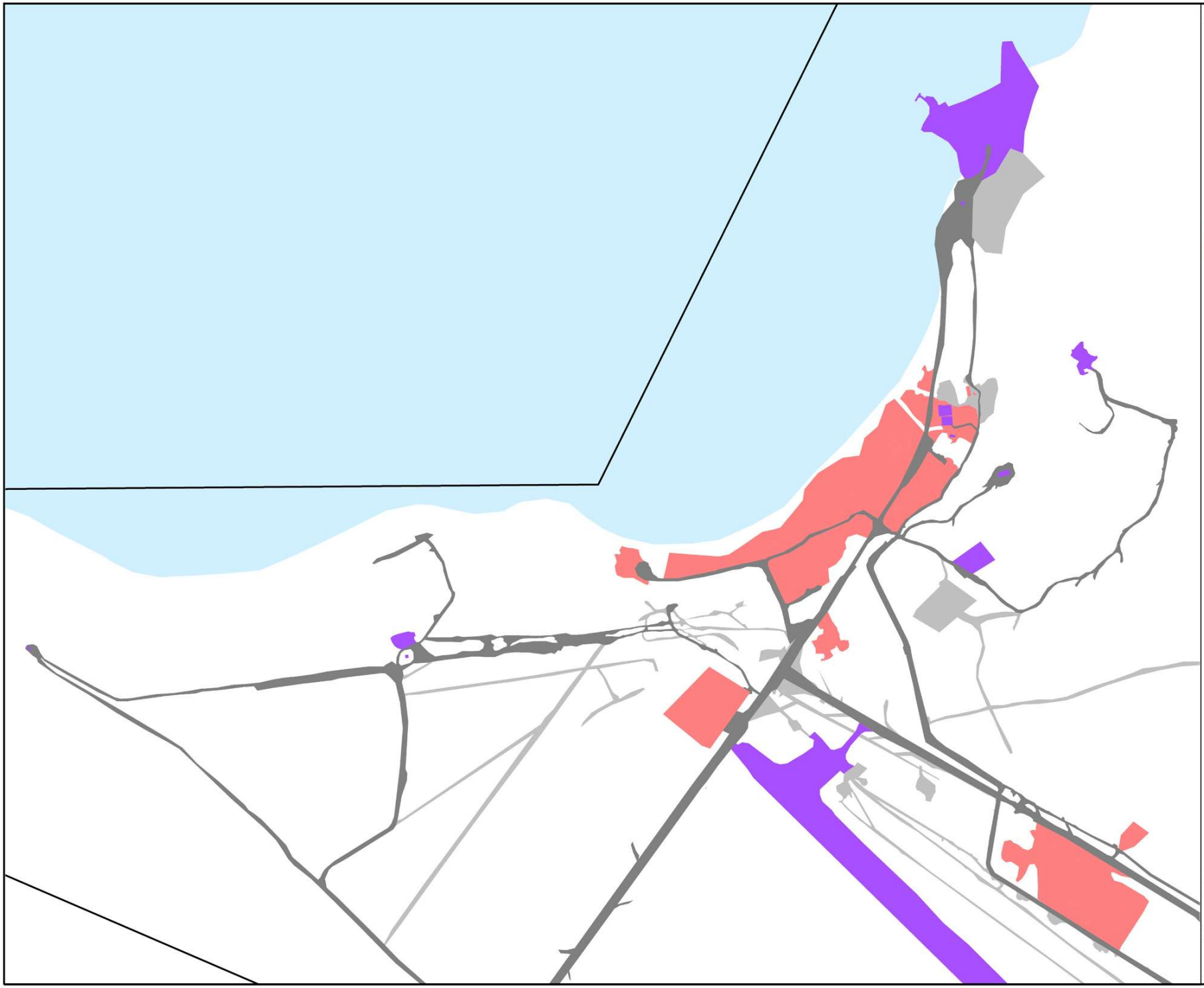


Figure 21: Locations of infrastructure for landowner retention at CFSM - Township

Mining lease boundary

Infrastructure not for landowner retention

Retained Infrastructure
As identified in EA Appendix 2 Table H

Township

Infrastructure

Access

N

0 250

Metres

Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//, Cape Flattery Silica Mines Pty Ltd

NRA Ref: 101045.17/101098.01
Date: July 2021

T:_Temp Mapping 2022\101\WOR\101098.01\Fig 21_PRCP_220428.WOR
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Recommended print size: A3

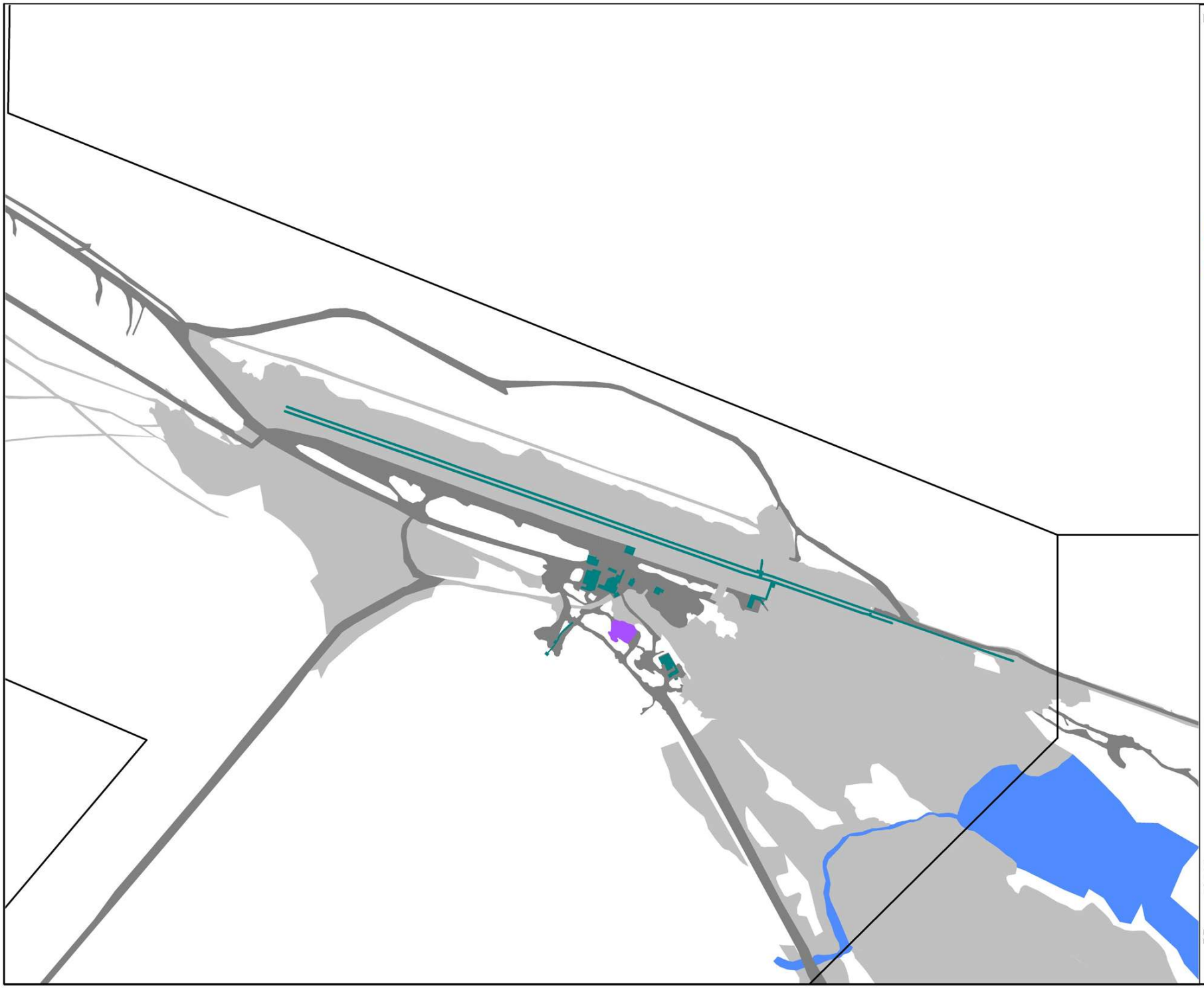


Figure 22: Locations of infrastructure for landowner retention - Treatment Plant

Mining lease boundary

Infrastructure not for landowner retention

Retained infrastructure
As identified in EA Appendix 2 Table H

Infrastructure

Treatment Plant

Access

Dams and Diversions

N

0 250

Metres

Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//, Cape Flattery Silica Mines Pty Ltd

NRA Ref: 101045.17/101098.01
Date: July 2021

T:_Temp Mapping 2022\101\WOR\101098.01\Fig 22_PRCP_220428.WOR
T:_AAA\101\WOR\101045_17\App D\101045.17_RetainedInfraLowIronPlant_210723.wor

Recommended print size: A3



Figure 23: Locations of infrastructure for landowner retention - Treatment Plant (new)

Mining lease boundary

Infrastructure not for landowner retention

Retained infrastructure
As identified in EA Appendix 2 Table H

Treatment Plant

Access

Dams and Diversions

N

0 250

Metres

Source:
© State of Queensland (Department of Natural Resources, Mines and Energy) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//, Cape Flattery Silica Mines Pty Ltd

NRA Ref: 101045.17/101098.01
Date: July 2021

T:_Temp Mapping 2022\101\WOR\101098.01\Fig 23_PRCP_220428.WOR
T:_AAA\101\WOR\101045_17\App D\10104S.17_RetainedInfraNEWMll_210723.wor

Recommended print size: A3

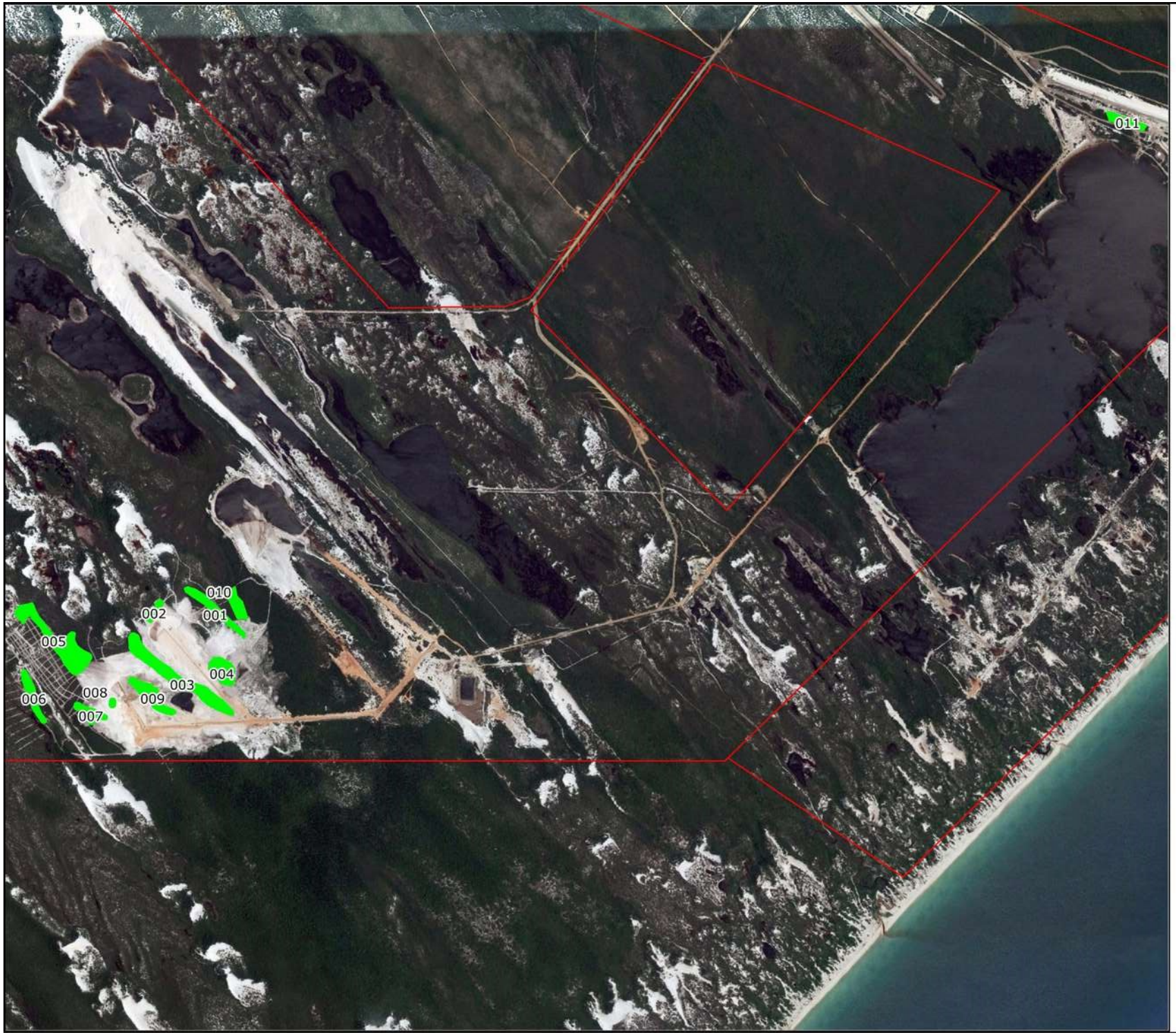


Figure 24: CFSM topsoil stockpiles

Topsoil stockpiles

Mine lease boundary

N

0 1.5

Kilometres

NRA Ref: 101097.01 / 101098.01
Date: December 2020

Source: © State of Queensland (Department of Natural Resources and Mines) 2017. Google Earth. CFSMPL.

NRA

T:_AAA\101\WOR\101097_03\Topsoils\101097_TSMatBal_201130.wor
T:_Temp Mapping 2022\101\WOR\101098.01\Fig 24_PRCP_220805.WOR

Appendix 1:
EMOS Environmental Policy for Mining & EMOS Policy Booklet

DEPARTMENT OF RESOURCE INDUSTRIES

DEPARTMENT OF RESOURCE INDUSTRIES

ENVIRONMENTAL MANAGEMENT FOR MINING IN QUEENSLAND

ENVIRONMENTAL POLICY FOR MINING

2/7/91.

ENVIRONMENTAL PERFORMANCE CRITERIA

THE SETTING OF SECURITIES FOR MINING OPERATIONS

Implementation schedules for existing mines

[redacted]

5 yrs land tmi Metalliferous

10 yr " " Coal.

June, 1991

ENVIRONMENTAL POLICY FOR MINING

OBJECTIVES

The Department of Resource Industries has adopted a policy that activities on exploration permits, mineral development licences and mining leases should be managed in a responsible manner to achieve the environmental objectives detailed below.

This policy should assist the mining industry in meeting environmental responsibilities under the Mineral Resources Act 1989(the Act), and any conditions applied to exploration, mineral development and mining activities.
The long term goal is to achieve industry self-regulation with the Department of Resource Industries providing technical guidelines, advice and an inspectorate role in overseeing the development and implementation of this Policy.

Achievement of acceptable post-disturbance land use capability

Mining and rehabilitation should aim to create a landform with land use capability and/or suitability similar to that prior to disturbance, unless other beneficial land uses are pre-determined and agreed.

Stable post-disturbance landform

Mine wastes and disturbed land should be rehabilitated to a condition which is self sustaining, or to a condition where the maintenance requirements are consistent with an agreed post mining land use.

Preservation of down stream water quality

Surface and ground waters that leave the leased area should not be degraded to a significant extent.

Current and future water quality should be maintained at levels which are acceptable for users down stream of the site, and contaminated water shall not unlawfully leave the site. Water discharges from the site will be subject to the provisions of The Clean Waters Act (1972 - 1989) and other applicable legislation.

PLANNING

The holder of an exploration permit or mineral development licence may undertake mine feasibility and environmental impact studies within the subject area to fulfil the requirements for an application for the grant of a mining lease.

An Environmental **M**anagement **O**verview **S**trategy (**EMOS**) will be required as a mechanism to provide the planning and operational link between any **study of environmental impact** (Section 7.21 of the Act) and the **Plan of Operations** (Section 7.48 of the Act).

The **EMOS** should address environmental protection and rehabilitation for the life of the operation and extend to the completion of rehabilitation of disturbed land. The Strategy should be based on practical options and demonstrated practice or research, and should include costing, implementation and monitoring provisions. The Strategy should satisfy, in a conceptual manner, all prescribed environmental performance criteria and be in place before a lease is granted.

A person may seek approval of an **EMOS** from the Minister while holding a exploration permit or mineral development licence.

The application for grant of a mining lease should be accompanied by a statement acceptable to the Minister in support of the application, pursuant to Section 7.13(1)(o)(iv) of the Act. An acceptable statement will include:

- proposals for environmental protection and rehabilitation;
- an **EMOS** acceptable to the Minister; and
- if required by the Minister, pursuant to Section 7.21 of the Act, a Study into Environmental Impact **(SEI)** to support the application. The **EMOS** may be revised following completion of a satisfactory **SEI.**

Before commencing operations the holder of a mining lease shall submit a **Plan of Operations** that is in accordance with an approved **EMOS**. A revised **Plan of Operations** may be submitted at any time by the lease holder.

ENVIRONMENTAL MANAGEMENT

Environmental management should aim to meet the objectives addressed in an approved **EMOS** and performance will be measured against the **environmental performance criteria.**

These criteria are ordered so that environmental management effectiveness is reflected as **performance categories 6 to 1.**

Category 6 Basic operational and strategic requirements.
- approved **EMOS**
- **Plan of Operations** in accordance with the **EMOS**
- all discharges are or will be permitted or licensed as required

Category 5 Strategic ability for environmental compliance.
- a stable profile is possible
- suitable soil is identified

Category 4 Environmental compliance possible at all times.
- sufficient volumes of suitable soil located to complete rehabilitation
- water management systems in place

Category 3 Demonstrated environmental compliance capability.
- financial capability
- rehabilitation materials in place
- suitable expertise provided
- annual targets developed from the **Plan of Operation**

Category 2 Demonstrated action.
- progressive rehabilitation
- monitored rehabilitation and environmental protection

Category 1 Validation.
- **EMOS** validated

INCENTIVES

Environmental performance criteria are provided to promote responsible environmental management. A reduction in the security deposit will be available to lease holders achieving the prescribed **environmental performance criteria.**

Regulatory controls incorporated in the Act will also be used if necessary. The following measures, among others, may be adopted by the Department of Resource Industries to ensure the Objectives are achieved:
- the education of lease holders towards self-regulation,
- the lowering of security deposits for competent planning, demonstrated performance, achievement of standards incorporated in an approved **EMOS**, and compliance with conditions on a mining lease,
- the fostering of better rehabilitation and pollution control technology,
- the issuing of cautions in respect of poor practice, lease holder non-compliance with lease conditions and **Plan of Operations**, or insufficient allocations of resources to environmental management,
- the taking of Notice to Show Cause action and the imposition of penalties for non-compliance with the Act and lease conditions, and
- the refusal of tenure to applicants where there is demonstrated non-performance.

ENVIRONMENTAL AUDITING

The aim of the audit is to confirm achievement or the potential to achieve, the **environmental performance criteria**. The audit should confirm that the claims made are valid and should determine the lease holder's performance category and the amount of security to be lodged in each case. This approach should assist in moving toward industry self regulation.

The audit will be used as the basis for accepting operator performance in respect of **Plans of Operations** and other documents without the need for detailed assessment by the Department. The Department may conduct environmental audits in relation to mining operations to determine compliance with lease conditions and the current **Plan of Operations** or variation to that plan.

Persons with suitable qualifications and experience may be accepted as auditors for the purposes of this policy and may be full time employees of the lease holder. An auditor who certifies a false audit would no longer be accepted.

POLICY IMPLEMENTATION

A consultative committee will be formed comprising representatives from the mining industry and government. The tasks of the committee will be to develop a strategy to implement this policy and to deal with any issues arising form implementation.

ASSESSMENT OF THIS POLICY

The Department of Resource Industries will seek co-operation and input from the mining industry on the assessment of this Policy's achievements towards an acceptable balance of public interest, environmental protection, and industry development.

This policy may be reviewed and amended after consideration of relevant submissions from the mining industry or others affected by the policy. Such submissions may include:
- an assessment of the balance of cost and benefit of mining to Queensland, and
- a review of the policies, standards, and technology relating to mining in Queensland, other states of Australia and other countries.

ENVIRONMENTAL PERFORMANCE CRITERIA

INTRODUCTION

A reduction in the required security will result from improved environmental management measured by achieving the prescribed **Performance Criteria.** The implementation of **criteria and actions** detailed here, and reflected in the **EMOS**, should ensure satisfactory management of environmental matters. If all these criteria are met there will be a high probability of satisfactory rehabilitation and water quality impact control resulting in a lower security requirement.

An **environmental audit** will be used as a basis for accepting operator performance in respect of **Plans of Operations** and other documents.

An environmental audit should address the **performance criteria** by confirming that the claims made by the lease holder are valid and by determining the performance category and amount of security to be lodged.

By using the **suggested actions** detailed in this document, auditors will be able to certify that each of the contributing actions has been carried out and that the associated performance criteria has been satisfied.

If alternative actions have been carried out by a lease holder in order to achieve the performance criteria, then the auditor must also assess that these actions result in achievement of the performance criteria.

The criteria that constitute **Category 6** are the basic operational and strategic requirements that must be met before acceptance of a **Plan of Operations.**

PERFORMANCE CRITERIA	CATEGORY	SUGGESTED ACTION TO ACHIEVE CRITERIA
Basic operational and strategic requirements		
EMOS developed to estimate the rehabilitation and environmental protection requirements for the leased area so that: ·the returned landform and ecological conditions will be capable of sustaining the agreed post-disturbance land use; ·the returned leased land will be stable landform having acceptable maintenance requirements; and ·the surface and ground waters that leave the lease area will not be degraded to a significant extent.	6	1. Applicants (or existing lease holders) shall select from the range of practical options, their nominated post-disturbance land capability and/or suitability, and seek acceptance. 2. Applicants (or existing lease holders) shall select pollution abatement and rehabilitation techniques that: ·prevent degraded surface and ground waters leaving the site, and ·create a stable landform and/or acceptable post-disturbance land capability and/or suitability. 3. These techniques shall be developed to form an **EMOS** that describes a manag ement strategy based on practical options, and demonstrated practice or research and include costing, implementation and monitoring provisions. 4. The **EMOS** shall satisfy, in a conceptual manner, all the **performance criteria**.
Plan of Operations in accordance with the **EMOS**.		5. The **Plan of Operations** shall embody the application of accepted options and demonstrated practice or research to achieve the **EMOS**.
All necessary licences and permits are held or will be held for contaminated water discharges from the site.		6. All necessary permits and licences relating to runoff seepage or other water discharges to the environment must be held and all other waste water shall be contained by the water management system. 7. Ability to comply with the conditions of these permits and licences shall be demonstrated.
Strategic ability for environmental compliance		
Acceptable slope and profile design allowing rehabilitation within the lease area.	5	8. The range of possible bulking factors, chemical and physical nature, profile slopes, revegetation method, and other key rehabilitation criteria for the on-site soil, spoil and mine waste shall be determined. 9. The range of land areas required to accommodate re-profiled material shall be able to be fitted into the leased land area. 10. The final profiles to be formed on the site shall be determined.
Suitable soil and overburden for rehabilitation needs is identified.		11. The various sources of overburden, spoil, mine waste and top soil that could be used for rehabilitation shall be identified. 12. These various materials shall be appraised to demonstrate and verify the key rehabilitation criteria by the use of rehabilitation trials.
Environmental compliance possible at all times		
Sufficient volumes of suitable soil and overburden types located for complete mine rehabilitation.	4	13. The volumes of suitable soil and overburden required for rehabilitation shall be evaluated as a whole-of-project volume and as progressive volumes required at the various stages of the project. 14. The source area, stockpile location and final placement location for all rehabilitation materials shall be mapped. 15. Rehabilitation material movements shall be included in the accepted Plan of Operations.
Water management systems in place to contain, treat, discharge or dispose of contaminated water.		16. The range of pre-rehabilitation land surface characteristics shall be identified and suitable runoff and seepage treatment designed. 17. All runoff and seepage from pre-rehabilitated areas shall be contained, treated, discharged or otherwise disposed of as those areas are created.

PERFORMANCE CRITERIA	CATEGORY	SUGGESTED ACTION TO ACHIEVE CRITERIA
Demonstrated environmental compliance capability		
Financial capability to complete the rehabilitation of the mined area.	3	18. Lease holders shall assess the progressive costs of rehabilitation of mined areas and demonstrate financial capability to rehabilitate.
Materials in-place for full rehabilitation.		19. Rehabilitation material movements shall be carried out and profiling and rehabilitation commenced in accordance with the accepted **Plan of Operations**, such that full rehabilitation could be carried out should the mining operation cease.
Suitable expertise provided effectively.		20. All the rehabilitation and water management functions shall be organised into a management structure on the basis of expertise required to carry out the function. 21. The organisational structure for environmental management personnel shall be integrated effectively into mine management.
Environmental management using annual targets developed from the **Plan of Operations**.		22. A series of annual environmental management targets that describe the operation of the mine to achieve the accepted **Plan of Operations** shall be developed. 23. Lease holders shall demonstrate by audit that these targets are achieved.
Demonstrated action		
Progressive rehabilitation carried out.	2	24. Lease holders shall commence profiling and rehabilitating completed waste emplacements and disturbed areas as soon as possible in accordance with the accepted **Plan of Operations**. 25. Performance shall be validated by demonstration of proof.
Monitored rehabilitation and environmental protection.		26. The performance of the rehabilitation process shall be monitored on a quantitative basis to determine its potential to achieve the long term rehabilitation objectives. 27. The results of this monitoring shall be used to validate the critical design criteria used in the rehabilitation program. 28. The performance of the water management system shall be monitored on a quantitative basis to determine its potential to achieve the accepted pollution abatement objectives.
Validation		
EMOS validated and updated within the term of the **Plan of Operations**.	1	29. Lease holders shall use information on rehabilitation and water management performance to validate and, if necessary, modify the **EMOS** within the term of the accepted **Plan of Operations**.

THE SETTING OF SECURITIES FOR MINING OPERATIONS

INTRODUCTION

This document describes the objectives and the means of setting security deposits for the mining industry. The Mineral Resources Act, 1989, provides for the lodgement of security for:

- compliance with conditions of the mining lease,
- compliance with provisions of the Act, and
- rectification of any actual damage.

In accordance with the Act, the calculation of the amount of security to be deposited will be based on the following factors:

- compliance with lease conditions and the provisions of the Act,
- the nature and extent of the actual damage the Crown may have to rectify, and
- the exposure to risk that the Crown may have to undertake this rectification.

The lease holder's estimated security (taking into account security already lodged) is to be lodged with each **Plan of Operations.** The security provided by a holder of a mining lease is to reduce the risk to the Crown that may be incurred by failure of the lease holder to meet environmental management responsibilities.

AMOUNT OF SECURITY

The principal environmental objectives are detailed in the **Environmental Policy for Mining.** A security is to be lodged against possible failure by the lease holder to meet the environmental responsibilities.

The higher the risk of poor environmental performance, the higher the security required. The amount of security will depend on:

- the maximum estimated area of land not rehabilitated in the current **Plan of Operations.**
- the actual cost of rehabilitation of that land, and
- the environmental performance category of the lease holder at the time of lodgement.

The maximum amount of security will be required for operations where lease holders cannot demonstrate that they are able to meet their responsibilities in terms of environmental management. A lesser security will be accepted after demonstrated performance on the mine site in accordance with the **E**nvironmental **M**anagement **O**verview **S**trategy (**EMOS**).

A category system has been adopted to determine the risk of lease holder non-performance on a particular lease. The categories range from **Category 1** lease holders who demonstrate they are able to meet or have met their responsibilities in terms of environmental management to **Category 6** lease holders who are unable to demonstrate these attributes.

The amount of security to be lodged will be based on the lease holder's calculation using **demonstrated site specific costs** for rehabilitation. The cost of rehabilitation is the sum of the required surface treatments for each hectare on the lease requiring a particular treatment.

Lease holders who demonstrate attainment of the **performance criteria** will lodge less security. The percentage of rehabilitation security to be lodged by a lease holder will be dependant on the performance category as follows:

Performance Category	**Percentage to be paid**
Category 1	25%
Category 2	40%
Category 3	55%
Category 4	70%
Category 5	85%
Category 6	100%

Implementation of the **Environmental policy for mining** for existing mines shall be as described in **Implementation schedule for existing metalliferous mines** and **Implementation schedule for existing coal mines.**

METHOD OF LODGEMENT

The security may be lodged as:

- cash payment (on which interest will be paid),
- a guarantee or indemnity from a bank, insurance company or other financial institution or
- a written guarantee from a company provided the shareholder's equity of the company as disclosed in the latest audited balance sheet is at least five times the value of the security,

or a combination of the above.

REVIEW OF SECURITIES

The amount of security to be lodged may be reviewed in accordance with Section 7.34 of the Mineral Resource Act by the lease holder:

- submitting a new **Plan of Operations,** or
- submitting a variation to a current **Plan of Operations.**

RELEASE OF SECURITY

A security deposit applicable to any part of a mining lease will be released once that part of the tenement has attained the rehabilitation status prescribed in the **EMOS**, current **Plan of Operations** and the conditions of tenure. The rehabilitation status at the surrender of the whole or part of a lease area shall be verified by audit.

IMPLEMENTATION SCHEDULE FOR EXISTING METALLIFEROUS MINES

METALLIFEROUS MINES

The implementation of this policy for **existing** operations, other than coal mines, shall be over five years. The percentage of rehabilitation cost to be lodged as security for an **operation expected to continue more than five years** is as listed. The security to be lodged for each year of the implementation phase shall be pro rata if the expected mine life is less than five years.

Years	Percentage lodged
1991/1992	20%
1992/1993	40%
1993/1994	60%
1994/1995	80%
1995/1995	100%

EXAMPLES

CASE STUDY I: SMALL OPAL MINE

Summary of possible progress of an **existing small opal mine** to full implementation of the **Setting of Securities for Mining Operations.** It is assumed that there will be progress on rehabilitation and environmental management during that period so that the miner achieves Category 1 after six years.

Year (Implem't %)	Rehabilitation Progress	* Cost to Rehabilitate	Category	**Security	Liability to Government
1991/1992 (20%)	0.5ha disturbed	$4750	**Category 6**(100%); EMOS approved, Plan of Ops' in.	$1000	$3750
1992/1993 (40%)	Rehab keeping pace with disturbance	$4750	**Category 5**(85%); final profiles decided and topsoil located.	$2000	$2750
1993/1994 (60%)	Rehab keeping pace with disturbance	$4750	**Category 4**(70%); topsoil volume confirmed and water management in-place.	$2000	$2750
1994/1995 (80%)	Rehab keeping pace with disturbance	$4750	**Category 3**(55%); financial projection complete, rehab materials in-place, environmental expertise available, and annual targets set.	$2000	$2750
1995/1996 (100%)	Rehab keeping pace with disturbance	$4750	**Category 2**(40%); doing and monitoring rehab and environmental protection.	$2000	$2750
1996/1997 (100%)	Rehab keeping pace with disturbance	$4750	**Category 1**(25%); EMOS validated against demonstrated performance.	$1000	$3750

The security calculation demonstrated in the table above is based on the estimated cost of individual rehabilitation treatments (listed below for this example) that would need to be applied to the disturbed area to achieve the desired rehabilitation. The security calculation (**) is rounded to the nearest $1000. The rehabilitation cost for each mine should be based on the miner's demonstrated site-specific costs.

Surface Treatment	Estimated cost ($/ha)	Area (ha)	Cost ($) (1991)
1. Rip, seed, fertilise and construct graded banks on plant area, roadways, spoil.	$1500	0.5	$750
2. Profiling of spoil for topsoil spreading.	$4000	0.5	$2000
3. Pick-up, cart 100m, spread topsoil per 300mm	$4000	0.5	$2000
		* Cost to Rehabilitate	$4750

Explanation

An existing opal mine with $4,750 of rehabilitation works under performance category 6 and with the concession for implementation pays less than the previous security calculation system during the 5 year implementation period. With continued progress with rehabilitation the security deposit remains at $2,000 after 5 years. Government liability for the rehabilitation costs exceeds 50% of the estimated cost during the 5 year implementation term. The minimum security possible is $1,000 for a **Category 1** mine. New mines with adequate environmental management could commence on category 4 and improve the rating with demonstrated performance after as little as 12 months operation.

The security required under the previous scheme would have been $8,000 regardless of surface treatment required ($8000 per hectare).

Summary of possible progress of an **existing small gold mine** to full implementation of the **Setting of Securities for Mining Operations.** It is assumed that there will be progress on rehabilitation and environmental management during that period so that the miner achieves category 1 after 6 years.

Year (Implem't %)	Rehabilitation Progress	* Cost to Rehabilitate	Category	**Security	Liability to Government
1991/1992 (20%)	1.5ha disturbed, 0.25ha tails	$14750	**Category 6**(100%); EMOS approved, Plan of Ops' in, and discharges licensed.	$3000	$11,750
1992/1993 (40%)	Rehab keeping pace with disturbance	$14750	**Category 5**(85%); final profiles decided and topsoil located.	$5000	$11,750
1993/1994 (60%)	Rehab keeping pace with disturbance	$14750	**Category 4**(70%); topsoil volume confirmed and water management in-place.	$6000	$8,750
1994/1995 (80%)	Rehab keeping pace with disturbance	$14750	**Category 3**(55%); financial projection complete, rehab materials in-place, environmental expertise available, and annual targets set.	$6000	$8,750
1995/1996 (100%)	Rehab keeping pace with disturbance	$14750	**Category 2**(40%); doing and monitoring rehab and environmental protection.	$6000	$8,750
1996/1997 (100%)	Rehab keeping pace with disturbance	$14750	**Category 1**(25%); EMOS validated against demonstrated performance.	$4000	$10,750

The security calculation demonstrated in the table above is based on the estimated cost of individual rehabilitation treatments (listed below for this example) that would need to be applied to the disturbed area to achieve the desired rehabilitation. The security calculation (**) is rounded to the nearest $1000. The cost to rehabilitate each mine should be based on the miner's demonstrated site-specific costs.

Surface Treatment	Estimated cost ($/ha)	Area (ha)[ML]	Cost ($)
1. Rip, seed, fertilise and construct graded banks on plant area, roadways, spoil.	$1500	1.5	$2250
2. Profiling of spoil for topsoil spreading.	$4000	.5	$2000
3. Pick-up, cart 1500m, spread topsoil per 300mm	$10000	.75	$7500
4. Prepare tailings dams for capping	$10000	.25	$2500
5. Treatment of stored contaminated water per ML at previous November 1	$1000	[.5]	$500
		* Cost to Rehabilitate	$14750

Explanation
An existing gold mine with $14,750 of rehabilitation works under performance category 6 and with the concession for implementation lodges less than the previous security calculation system during the 5 year implementation period.
With continued progress with rehabilitation, the security deposit remains at $6,000 after 5 years. Government liability for the rehabilitation costs exceeds 50% of the estimated cost for the 5 year implementation term. The minimum security possible is $4,000 for a **Category** 1 mine.

The security required under the previous scheme equated to $8,000 per hectare regardless of the surface treatment required resulting in a lodgement of $16,000 calculated for this project.

New mines with adequate environmental management could commence on category 4 and improve with demonstrated performance after as little as 12 months operation.

CASE STUDY III: MEDIUM SIZE GOLD MINE

Summary of possible progress of an **existing medium size gold mine** to full implementation of the **Setting of Securities for Mining Operations.** It as assumed that there will be progress on rehabilitation and environmental management during that period so that the miner achieves category 1 after 6 years.

Year (Implem't %)	Rehabilitation Progress	* Cost to Rehabilitate	Category	**Security	Liability to Government
1991/1992 (20%)	Current position. 10 ha of spoil. 11.5 ha tailings dam. 40 ha disturbed. Void 5ha.	$627250	**Category 6**(100%); EMOS approved, Plan of Ops' in, and discharges licensed.	$125,000	$502,250
1992/1993 (40%)	Current position. 10 ha of spoil. 11.5 ha tailings dam. 40 ha disturbed. Void 5ha.	$627250	**Category 5**(85%); final profiles decided and topsoil located.	$213,000	$414,250
1993/1994 (60%)	Spoil increased to 12 ha. Tailings up 1ha. 35ha. disturbed. Void up 1ha.	$692250	**Category 4**(70%); topsoil volume confirmed and water management in-place.	$291,000	$401,250
1994/1995 (80%)	Spoil reduced to 10ha. Tailings up 1ha. Void up 1ha. 30ha. disturbed.	$695250	**Category 3**(55%); financial projection complete, rehab materials in-place, environmental expertise available, and annual targets set.	$306,000	$389,250
1995/1996 (100%)	Spoil reduced to 8ha. Tailings up 1ha. Void up 1ha. Disturbed down 5 ha.	$698250	**Category 2**(40%); doing and monitoring rehab and environmental protection.	$279,000	$419,250
1996/1997 (100%)	Spoil reduced to 8ha. Tailings up 1ha. Void up 1ha. Disturbed down 5 ha.	$698250	**Category 1**(25%); EMOS validated against demonstrated performance.	$175,000	$523,250

The security calculation demonstrated in the table above is based on the estimated cost of individual rehabilitation treatments (listed below for this example in 1991) that would need to be applied to the disturbed area to achieve the desired rehabilitation. The security calculation (**) is rounded to the nearest $1000. The cost to rehabilitate for each mine should be based on the miner's demonstrated site-specific costs.

Surface Treatment	Estimated cost ($/ha)	Area (ha)[ML]	Cost ($) (1991)
1. Rip, seed, fertilise and construct graded banks on plant area, roadways, spoil.	$1500	61.5	$92250
2. Profiling of spoil for topsoil spreading.	$4000	10	$40000
3. Pick-up, cart 1500m, spread topsoil per 300mm.	$10000	21.5	$215000
4. Prepare tailings dams for capping.	$10000	11.5	$115000
5. Treatment of stored contaminated water per ML at previous November 1.	$1000	[115]	$115000
6. Reshape void.	$10000	5	$50000
		* Cost to Rehabilitate	$627250

Explanation

An existing medium size gold mine with about $650,000 worth of rehabilitation works under performance category 6 and, with the concessions for implementation, lodges less than the previous security calculation system. With continued rehabilitation progress, the security deposit is $279,000 after 5 years. Government liability for the rehabilitation costs usually exceeds 50% of the estimated cost during the 5 year implementation period.

The previous security calculation would require the lodgement of $496,000 for the 62ha site ($8,000 per ha).

New mines with adequate environmental management could commence on category 4 and improve with demonstrated performance after as little as 12 months operation.

IMPLEMENTATION SCHEDULE FOR EXISTING COAL MINES

COAL MINES

The history of rehabilitation of disturbed areas of coal mining operations, particularly large scale open cut operations, has generally resulted in a substantial area of incomplete rehabilitation. Recognising the complexity and time needed to rectify this situation, a longer implementation phase is provided as an incentive to promote rehabilitation.

For existing coal mines, where the expectation is for a **continuing operation after 10 years**, the percentage of the rehabilitation cost to be lodged as security is as listed.

The percentage of rehabilitation cost to be lodged as security for each year of the implementation phase shall be pro rata if the expected mine life is **less than ten years**.

Years	Percentage lodged
1991/1992	10%
1992/1993	20%
1993/1994	30%
1994/1995	40%
1995/1996	50%
1996/1997	60%
1997/1998	70%
1998/1999	80%
1999/2000	90%
2000/2001	100%

EXAMPLE

CASE STUDY : EXISTING OPEN CUT COAL MINE

Summary of possible progress of an **existing open cut coal mine** to full implementation of the **Setting of Securities for Mining Operations** . It as assumed that there will be progress on rehabilitation and environmental management during that period.

Year (Implem't %)	Rehabilitation Progress	* Cost to Rehabilitate	Category	**Security	Liability to Government
1991/1992 (10%)	Current position. 625 ha of spoil. 119 ha tailings dam. 359 ha disturbed. Void 298ha.	$21,591,000	**Category 6**(100%); EMOS approved, Plan of Ops' in, and discharges licensed.	$2,159,000	$19,432,000
1992/1993 (20%)	Current position. 625 ha of spoil. 119 ha tailings dam. 359 ha disturbed. Void 298ha.	$21,591,000	**Category 5**(85%); final profiles decided and topsoil located.	$3,670,000	$17,921,000
1993/1994 (30%)	Current position. 625 ha of spoil. 119 ha tailings dam. 359 ha disturbed. Void 298ha.	$21,591,000	**Category 4**(70%); topsoil volume confirmed and water management in-place.	$4,533,000	$17,058,000
1994/1995 (40%)	525 ha of spoil. 120 ha tailings dam. 359 ha disturbed. Void 300ha.	$20,656,000	**Category 4**(70%); topsoil volume confirmed and water management in-place.	$5,783,000	$14,873,000
1995/1996 (50%)	525 ha of spoil. 120 ha tailings dam. 359 ha disturbed. Void 300ha.	$20,656,000	**Category 3**(55%); financial projection complete, rehab materials in-place, environmental expertise available, and annual targets set.	$5,680,000	$14,976,000
1996/1997 (60%)	Spoil reduced to 425 ha. Tailings 100ha. 359ha disturbed. Void 275ha.	$17,738,000	**Category 3**(55%); financial projection complete, rehab materials in-place, environmental expertise available, and annual targets set.	$5,853,000	$11,885,000
1997/1998 (70%)	Spoil reduced to 425 ha. Tailings 100ha. 359ha disturbed. Void 275ha.	$17,738,000	**Category 2**(40%); doing and monitoring rehab and environmental protection.	$4,966,000	$12,772,000

1998/1999 (80%)	Spoil reduced to 350ha. Tailings 90ha. Void 275ha. 359ha. disturbed.	$16,110,000	**Category 2**(40%); doing and monitoring rehab and environmental protection.	$5,155,000	$10,955,000
1999/2000 (90%)	Spoil reduced to 350ha. Tailings 90ha. Void 275ha. 359ha. disturbed.	$16,110,000	**Category 2**(40%); doing and monitoring rehab and environmental protection.	$5,799,000	$10,311,000
2000/2001 (100%)	Spoil reduced to 300ha. Tailings 90ha. Void 275ha. Disturbed 359 ha.	$14,936,000	**Category 1**(25%); EMOS validated against demonstrated performance.	$3,734,000	$11,202,000

The security calculation demonstrated in the table above is based on the estimated cost of individual rehabilitation treatments (listed below for this example in 1991), that would need to be applied to the disturbed area to achieve the desired rehabilitation. The security calculation (**rounded down to the nearest $1000) for each mine should be based on demonstrated site-specific costs.

Surface Treatment	Estimated cost ($/ha)	Area (ha)[ML]	Cost ($) (1991)
1. Rip, seed, fertilise and construct graded banks on plant area, roadways, spoil.	$1500	1401	$2,101,000
2. Profiling spoil(20m) for topsoil spreading.	$10000	865	$8,650,000
3. Pick-up, cart 1500m, spread topsoil, seed and graded banks per 300mm.	$10000	865	$8,650,000
4. Pick-up, cart 1500m, spread benign cover per 500mm.	$10000	119	$1,190,000
5. Make high wall safe.	$100[per m]	10,000[m]	$1,000,000
		* Cost to Rehabilitate	$21,591,000

Explanation

An existing coal mine with $21.5m of rehabilitation works under performance category 6 and with the concession for implementation lodges a lesser amount than the amount required under the previous security calculation system after a 4 year build up of the security lodged. The security deposit reduces to the minimum of$3.74 after 10 years. Government liability for the rehabilitation costs exceeds 50% of the estimated cost for the 10 year implementation term. A faster reduction in backlog of rehabilitation will give a faster reduction in the security to be lodged.

The security required under the previous scheme of $8,000,000, equates to $8000 per hectare regardless of the surface treatment required.

New mines with adequate environmental management could commence on category 4 and improve with demonstrated performance after as little as 12 months operation.

PLAN OF OPERATIONS

INTRODUCTION

The Mineral Resources Act (1989) requires the holder of a mining lease to submit a **Plan of Operations** that describes how the mine will be operated to implement of the strategies in the approved **EMOS**. The **Plan of Operations** may be accepted for a period up to 5 years.

The holder of a mining lease is required to submit a **Plan of Operations** not less than 2 months before commencing operations under the authority of a mining lease, including the construction period prior to mining activities.

The submitted **Plan of Operations** will be accepted after 28 days unless the lease holder is notified otherwise. The specific reason for non-acceptance and a date for re-submission will be given to the lease holder.

PREPARING A PLAN OF OPERATIONS

A **Plan of Operations** shall address the manner and method of mining for the specified number of years and is required to:

(i) conform to the conditions of the mining lease,
(ii) conform to the approved EMOS,
(iii) adequately provide for the control of the impact on the environment of the operations,
(iv) adequately provide for rehabilitation of any disturbed ground within the mining lease boundaries, and

(v) provide a schedule of the type and area of land disturbance, the progressive rehabilitation program, and estimated costs for progressive or final rehabilitation of the various disturbed land types.

The **Plan of Operations** should take into account any relevant industry and government guidelines. If the lease holder intends to change the current mining operation, a new **Plan of Operations** or variation to the current **Plan of Operations** must be submitted.

ENVIRONMENTAL AUDIT

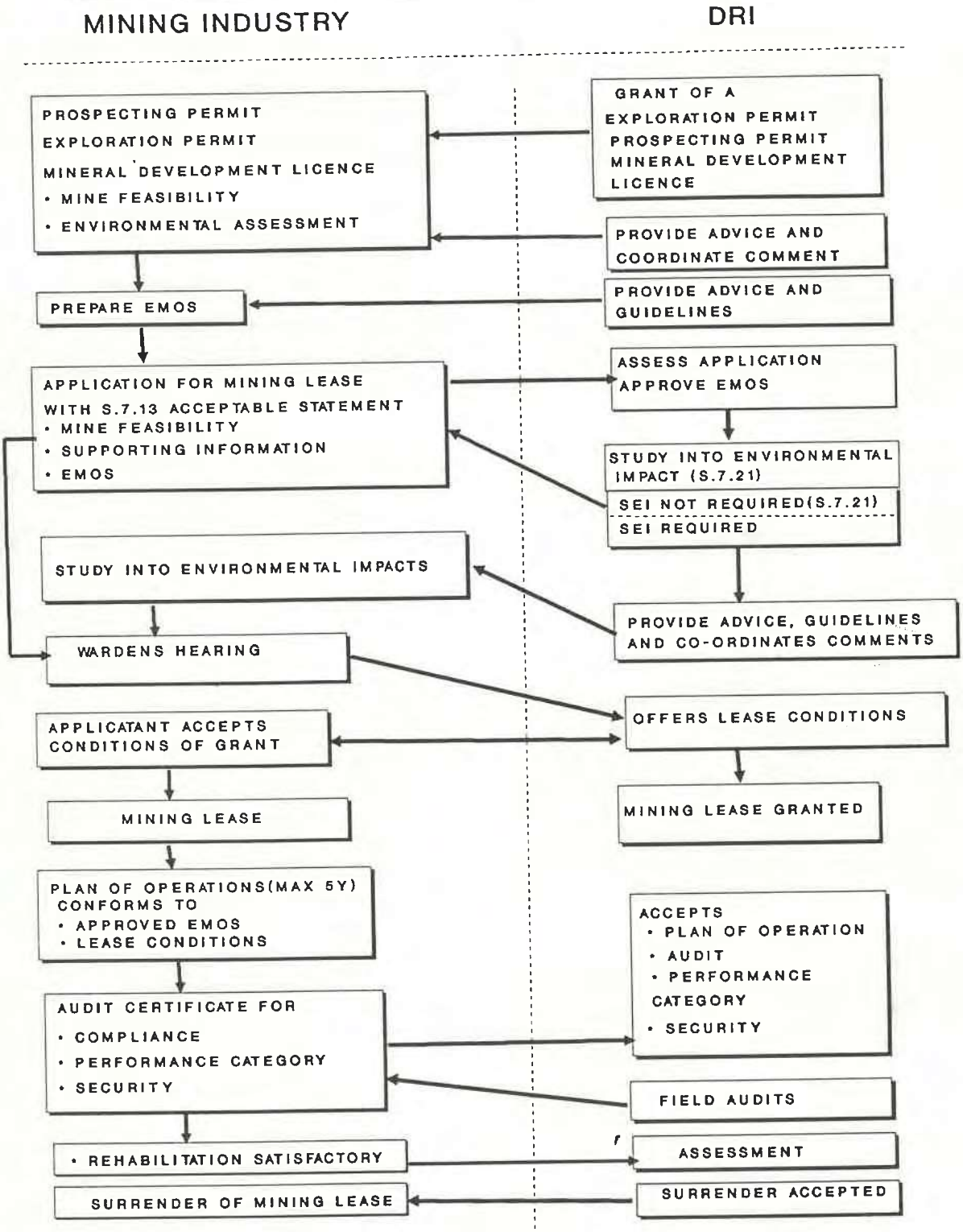
The lease holder shall conduct an environmental audit of the **Plan of Operations** and submit the audit report with the **Plan of Operations.**

The environmental audit shall confirm:

- that the **Plan of Operations** is in accordance with an approved **EMOS**,
- that the proposals in the **Plan of Operations** are achievable,
- compliance with lease conditions,
- the lease holders performance category according to **Environmental Performance Criteria**, and
- the lease holders security deposit requirement according to **The Setting of Security for Mining Operations.**

Where the auditor can not confirm any one of the above matters, qualifying notes, identifying the issues, shall be submitted with the audit report.

ENVIRONMENTAL MANAGEMENT PROCESS



Environmental Management Overview Strategy

INTRODUCTION

The Mineral Resources Act (1989) requires the applicant for a mining lease and a holder of a lease to address environmental protection and rehabilitation of disturbed lease areas in a competent manner.

Effective planning for environmental management is best achieved during the term of a prospecting permit, exploration permit, or mineral development licence when mine feasibility and environmental studies are conducted and before submitting an application to grant a mining lease.

The **Environmental Policy for Mining** requires an applicant for a mining lease to formulate an Environmental Management Overview Strategy (**EMOS**) that provides the planning and operational link between any study of environmental impacts and the **Plan of Operations.** The **EMOS** shall be submitted with the application and be approved before the grant of a mining lease.

The **EMOS** should address environmental protection and rehabilitation for the expected life of the mining operation and extend to the completion of rehabilitation of disturbed land. The strategy should be based on practical options, demonstrated practice or research and should include costing, implementation schedules and monitoring provisions and should satisfy the prescribed **environmental performance criteria.**

PREPARING AN EMOS

The **EMOS** shall comprise the following components:

The Project Description

The description of project implementation should be brief and include the location, type and scale of mining.

Environmental Impact and Control

The EMOS should state the possible environmental impacts and control strategies for the project. (Refer to attached checklist for guidance)

Overview Strategy

The overview strategy should be a description of environmental management programs developed from the attached checklist for the construction, operation, and rehabilitation processes showing their inter-relationship throughout the term of the lease.

The description is essentially a story of the mining operation told in terms of the environmental programs that deal with the environmental impact of the proposal (first part of the **EMOS**), using the standards and techniques detailed in the second part of the **EMOS**, to achieve the agreed land use capability and other environmental protection requirements.

EMOS APPROVAL PROCESS

An EMOS should be developed during the term of a prospecting permit, exploration permit, mineral development licence, and presented as part the statements supporting an application for the grant of a mining lease as required by the Mineral Resources Act, Section 7.13.

Approval of the **EMOS** indicates the application has satisfied the requirements of Section 7.13(1)(o)(iv) and no further environmental studies are required.

However, if the **EMOS** is not sufficient, a study into environment impact (Section 7.21) may be required. A revised **EMOS** will need to be developed from the findings of that study. The **EMOS** shall be approved prior to the grant of a mining lease.

The following issues may need to be considered to determine the likely environmental impacts and control measures for the mining project. From this assessment, environmental management programs can be developed and amalgamated to form the environmental management overview strategy.

Land Resources

Issues

- the likely areas and types of land disturbance.
- the likely changes in land use capability and or suitability caused by the mining operation and propose the post-mine land-use capability and/or suitability objectives.
- the criteria to be used for solid waste stability and erosion control including slope angle and length of waste stockpiles.
- the expected stability of landforms under progressive and final rehabilitation including slope angles and lengths on rehabilitation areas.
- the management and treatment strategy for solid waste in relation to the **environmental policy** and any relevant technical guidelines.
- the assessment and management strategy for topsoil to meet rehabilitation objectives.
- the post-mine landform stability, vegetation cover and pollution control requirements, if any.
- the maintenance requirements for rehabilitated lands prior to surrender of the lease.

Action

- a program of activities to be undertaken towards achieving the agreed post-mine land-use capability and/or suitability objectives.
- a program undertaken to achieve stable post-disturbance land forms, including descriptions of types of land disturbance, areas to be disturbed and rehabilitated and the erosion control and revegetation methods to be used.
- a program of activities to demonstrate conformity with the any accepted.

Water Resources

Issues

- the expected physical and chemical characteristics of drainage from waste storage facilities.
- the likely sources and characteristics of contaminated stormwater.
- the objectives to control drainage from waste storage facilities and contaminated stormwater.
- the waste water containment and treatment requirements.
- the criteria for design and construction of dams, channels and drains on the lease.
- ability to obtain all necessary licences for acceptable waste water discharges off the lease area.
- ability to obtain all necessary licences for referable dams under the Water Resources Act.
- the likely frequency, character and volume of contaminated waste water discharges off the lease and determine the physical, biological and water quality impacts that could affect down-stream users.
- the likely impacts to ground water quantity and quality.
- the water management program within the lease area.

Action

- a program of activity to comply with requirements of the Clean Waters Act, Water Resources Act.
- a program of water management activities that demonstrates conformity with any accepted lease conditions.

Noise

Issues

- the likely noise levels at various locations of possible public concern.
- the controls and standards to be achieved at relevant locations in respect of the lease area.

Action

- a program of activities to comply with the Noise Abatement Act and any accepted lease conditions.

Air Quality

Issues

- the controls and standards to be achieved at relevant locations in respect of the lease area.

Action

- a program of activities to comply with the Clean Air Act and any accepted lease conditions.

Conservation Values

Issues

- the likely impacts and conservation issues related to fauna and flora protection and aesthetic, recreational, educational, scientific values within the proposed lease area and in proximity to it.
- the measures to minimise or avoid impacts to any significant conservation values within the lease or in proximity to it.
- ability to comply with other requirements imposed by environmental protection authorities.

Action

- a program to comply with any accepted lease conditions and other conservation requirements.

Heritage and Cultural Values

Issues

- the likely effects on heritage values within the possible lease area.
- the likely impact to cultural values of aboriginal groups or communities.
- any other requirements imposed by environmental protection authorities and state the intent comply.
- measures to minimise or avoid impacts to any heritage or cultural (aboriginal) values affected by a mine operation.

Action

- a program of activities to comply with any accepted lease conditions and other requirements.

Social

Issues

- the likely social impacts to the local communities.
- measures to minimise or avoid impacts to local communities or landowners.

Action

- a program of activities to comply with any accepted lease conditions and other requirements.

Research

Issues

- requirements to investigate matters related to waste management, pollution control and rehabilitation and to apply any useful results.

Action

- a program of research activities as required.

Environmental Monitoring and Validation

Issues

- the requirements for environmental impact monitoring over the life of the mining operations and extending to final rehabilitation i.e. surrender of mining lease.

Action

- the standards for environmental monitoring.
- the impact assessment and reporting program.
- measures to validate the **EMOS**.

Environmental Audit

Issues

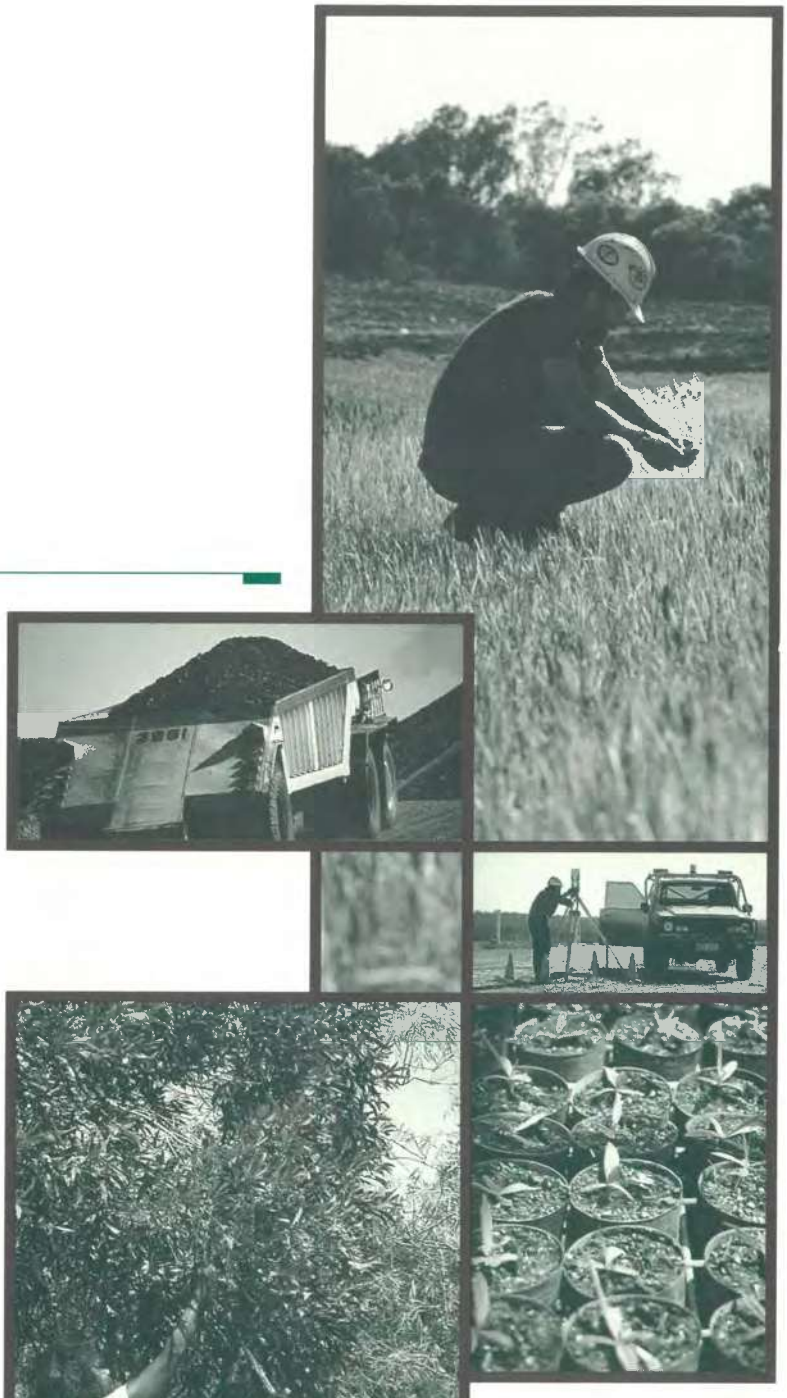
- the requirements to require environmental audits of the **Plan of Operations.**

Action

- the strategy for environmental auditing of the **Plan of Operations.**

Environmental Management for Mining in Queensland

Policy Booklet



This booklet describes the environmental provisions of the Mineral Resources Act. It shows how the intention of the Act is being put into action through a new Environmental Management Policy for Mining. This policy has been prepared in co-operation with the Queensland Mining Council.

This booklet describes the policy, which is based on industry self-regulation. It shows you, the miner, how to plan for environmental management at each stage of your mining operation. A preparation guide is included in this kit to help you prepare the documents you will need to submit. Case studies tailored to meet your needs are also included.

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The Mineral Resources Act and Environmental Management

The Mineral Resources Act came into force in 1990. The Act recognises the importance of Queensland's multi-billion dollar mining industry to the State economy and supports future mineral resource development.

The Act encourages explorers and miners to assess, develop and use the State's mineral resources and supports the concept of sustainable development.

The Queensland mining industry recognises that there have been examples of poor environmental management in the past and the industry is taking the initiative to improve environmental performance in line with community expectations.

The Act also includes new initiatives for improved environmental performance and requires explorers and miners to minimise environmental damage and practice responsible land care and environmental management at every stage of exploration and mine development — from prospecting to mine site rehabilitation.

The Act recognises that mining will have an effect on the environment and that there are other groups who have a stake in how land is used, including rural and community groups.

The Act, which is the result of years of extensive negotiation between the State Government and mining and rural groups, provides the mechanisms to resolve the conflicts of interest which will inevitably arise.

By providing for effective environmental management before, during and after exploration and mining, the Mineral Resources Act provides the mechanisms to achieve a balance between the community's need for mineral products and a healthy environment.

By adopting sound environmental principles, and achieving results, explorers and miners can continue to press for greater access to land.

Environmental Management and Your Mining Lease

The Mineral Resources Act emphasises environmental matters at nearly all stages of exploration and mining — from the application stage for a Prospecting Permit, Exploration Permit, Mining Claim, Mineral Development Licence or Mining Lease — right through to the stage when they expire or are surrendered.

To ensure your mining project proceeds as smoothly and as quickly as possible it is important you begin to assess the potential environmental effects of your project as early as possible in the prospecting, exploration and mine planning stages and plan what measures you can take to minimise or avoid damage.

Planning ahead will enable you to submit a competent Mining Lease application. This will allow an efficient assessment and approval process.

Applying for a Mining Lease

When you apply for a Mining Lease under the Mineral Resources Act you must outline your proposed mining program and your method of operation.

You must also submit strategies for protecting the environment, and proposals for progressive and final rehabilitation for the life of your mine.

Up until now there have been no clear guidelines on how this is to be done. The environmental management policy now provides you with the advice you need to prepare your application for a Mining Lease.

Public Notification Process

After your Certificate of Application is issued by the Mining Registrar at your District Office, the public notification process begins. During this process your Certificate of Application must be displayed and advertised and sent to relevant landowners and the local authority. It is at this stage that objections can be lodged.

When objections are heard in the Wardens Court the Warden must consider a number of environmental and other factors before making a recommendation to the Minister. These include –

- whether the public right and interest would be prejudiced
- your plans to minimise and avoid damage to the environment
- your plans for progressive rehabilitation with clear goals for final rehabilitation
- whether your proposed mining operation is considered to be an appropriate land use
- your financial and technical competence to provide adequate environmental protection and rehabilitation
- your past performance as a miner.

This is why it is vitally important to plan how you will manage your project's impact on the environment well before you submit your application for a Mining Lease. It is in your interest to have competent and practical solutions to any environmental objections which may arise.

Even if no one objects to your application the Warden and the Department must still consider these environmental and other factors before making a recommendation to the Minister.

Environmental Impact Assessment Process and the Wardens Court

While the onus is on you to address environmental effects and control measures in your application, the Minister may require you to undertake a full Environmental Impact Assessment process. The Minister can use this power if it is considered your proposed mining project is going to have significant environmental impact.

This process involves you having to prepare an Environmental Impact Study (EIS) based on guidelines issued by the Department of Resource Industries. If this is the case then your application cannot be heard in the Wardens Court until your Environmental Impact Study has been given to the Minister and released for public scrutiny and the date for receipt of objections has closed.

In most cases, for small to medium scale mine proposals, the environmental impact assessment process under section 7.21 of the Mineral Resources Act will not be needed if you adequately identify environmental effects and propose adequate control measures in your application.

A proposed large scale project may involve significant environmental impacts eg. infrastructure developments which extend beyond the boundaries of the lease. In this case the *State Development and Public Works Organisation Act* 1971–1981 may come into play.

Also, under the *Commonwealth Environment Protection (Impact Proposals) Act* 1974, any proposal which involves a Commonwealth decision, such as approval of foreign investment or export approvals, may be subject to environmental assessment by the Department of the Arts, Sport, the Environment, Tourism and Territories.

Miner/Landowner Agreements and Compensation

Environmental issues again come into play when compensation is being agreed or decided upon. Agreements drawn up between you and the landowner can cover issues such as land care, rehabilitation and flora and fauna conservation. You can enter private negotiations with the landowner over compensation or, if you cannot reach an agreement, you or the landowner can ask the Wardens Court to decide the amount of compensation.

However, if an agreement over compensation cannot be reached within three months of the Warden making a recommendation to grant your lease, then the matter automatically goes before the Wardens Court. You can appeal against the Wardens Court decision in the Land Court. However, the decision of the Land Court is final.

The Wardens Court looks at a number of principle issues when deciding how much compensation should be paid. Again, environmental factors come into play as some of these issues are directly related to environmental impact, such as — loss of value of the land or improvements; and loss of use, or intended use, of the land or improvements.

Conditions of the Act and Regulations

The Mineral Resources Act and its Regulations contain a number of conditions applying to a Mining Lease and many of these deal with environmental matters. For example, you must –

- control the effect on the environment of any operations carried out; and
- rehabilitate the surface of the land disturbed as a result of operations.

As well, the Minister can impose Special Conditions on your lease and many of these deal with environmental and rehabilitation matters in detail.

Plan of Operations

At least two months before you commence operations under your Mining Lease you must submit a Plan of Operations.

This plan describes how your mine will be operated for a term of up to five years. It forms part of the conditions of your lease and it must conform to these conditions.

Your Plan of Operations should adequately provide for the control of the effects of your project on the environment. It should also provide for rehabilitation of any disturbed ground within the boundaries of your Mining Lease.

Security Deposits

The Mineral Resources Act requires you to lodge a security deposit before mining can begin. This security deposit is lodged to encourage you to complete rehabilitation of disturbed areas to the agreed standard and comply with the Act and lease conditions.

This booklet explains in detail how to calculate your security deposit and when to lodge it. In general, the higher the risk of poor environmental performance, the higher the security required.

If you follow the planning process described in this booklet you could be eligible for a discount on your security deposit.

Renewing your Mining Lease

Your performance in environmental management is also assessed when your lease is considered for renewal.

Before your lease can be renewed the Minister must be satisfied that you have observed the conditions applying to your lease and abided by the Mineral Resources Act.

The Minister may also amend your lease conditions and reassess your security deposit at this time. You must also submit a revised Plan of Operations when you renew your lease.

Enforcement

If you breach the conditions of your Mining Lease, or do not operate your mine in accordance with your Plan of Operations, you may have to pay a penalty or you could have your Mining Lease cancelled. The Minister must first serve you with a written notice asking you to show cause why a penalty should not be imposed or your lease cancelled. At present the maximum penalty is $90,000. The Department will conduct inspections of mine sites to ensure miners comply with the requirements.

Surrender of a Mining Lease

When you have finished mining, and have rehabilitated the land to the agreed standard, you can apply for a refund of your security deposit. The Department will check the standard of your rehabilitation and provide an appropriate refund, or request that you do further work to reach a satisfactory standard.

Other Acts and how they Relate to Mining and the Environment

The Mineral Resources Act is not the only legislation controlling mining. As well as health and safety legislation, mining may be regulated by other environmental legislation at the State and Federal level. When planning your project you may have to consult with some other Government Departments to find out if you need additional licences and approvals.

These are the main Acts which may impact on mining projects –

- *State Development and Public Works Organisation Act* 1971–1981
- *Rural Lands Protection Act* 1985–1990
- *Clean Waters Act* 1971–1989
- *Water Resources Act* 1989
- *Cultural Record (Landscapes Queensland and Queensland Estate) Act* 1989
- *Rural Fires Act* 1946–1987
- *Forestry Act* 1959–1990
- *Beach Protection Act* 1968–1986
- *Noise Abatement Act* 1978–1983
- *Nature Conservation Act (Proposed)*

Copies of these Acts can be obtained from GOPRINT *at* 135 *George Street, Brisbane. Telephone* (07) 224 4146 *or at* 371 *Vulture Street, Woolloongabba, Brisbane. Telephone* (07) 896 3448

From the Act to Action

As you have just read, the Mineral Resources Act places great emphasis on environmental protection and rehabilitation.

However, up until now there have been no comprehensive processes to help you, the miner, comply with the environmental provisions of the Act and produce the results the public and government want.

Good environmental results are important. If miners can demonstrate they are achieving results in protecting the environment, and successfully rehabilitating mine sites, then they will be in a stronger position to gain access to land in the future.

With a track record of sound environmental management the mining industry will be able to argue more forcefully that there is no need to create more legislation and administration which might constrain the mining industry and the nation's ability to earn export income.

In an effort to get results which were clearly understood, the Department of Resource Industries and the Queensland Mining Council developed and agreed upon an Environmental Management Policy for Mining.

Industry Self-Regulation

The first key to the success of the Environmental Management Policy for Mining is industry self-regulation.

This means that the mining industry will drive, and eventually own, the environmental management approach. Government and the industry will jointly set performance standards and guidelines for environmental protection and rehabilitation. Government will then take a back seat and act in an advisory and auditing role.

The environmental management policy outlined in this booklet provides the framework and guidelines to assist the mining industry to improve its environmental performance and achieve self-regulation.

The aim is to have self-regulation in place by 1996.

Under self-regulation your environmental performance is audited by suitably qualified people of your choice; they can even be your own employees. Your mining operation will be checked by environmental officers of the Department of Resource Industries against the documentation you have lodged with the Department.

Financial Incentives

The second key to the success of the Environmental Management Policy for Mining is that it offers financial incentives by allowing you to lodge less security than your rehabilitation liability.

Miners with environmentally sound performance will not have to lodge as much security as miners who do not perform.

By putting in place, and improving, your environmental protection and rehabilitation practices over the life of your mine, you can take advantage of the lower security deposit the policy offers. A system of Performance Categories is used to rate the environmental performance of a mine.

In some cases, where a very low security deposit is currently held in comparison to the actual rehabilitation costs, a miner may initially have to lodge more security until their performance improves.

Clear Processes and Objectives

The third key to the success of the Environmental Management Policy for Mining is that it sets up a complete planning and assessment process with clear objectives for environmental protection and rehabilitation.

These objectives have been agreed to by industry and the Government.

Having clear processes and objectives means you, your auditor and the Department will be able to measure your performance with certainty.

Help When You Need It

The fourth key to the success of the Environmental Management Policy for Mining is that it is backed up by help and advice from the Department of Resource Industries.

We will continue to formulate advice and technical guidelines which will provide you with appropriate techniques for waste management, environmental protection and rehabilitation.

The Department has set up an environmental help line to give you the assistance you need. The line is manned between 10am and 4pm Monday to Friday.
Call (07) 237 1635 (*Metalliferous Mines*), (07) 234 9911 (*Coal Mines*).

How the Policy Works

The policy is about planning. The policy will ensure that environmental management becomes an integral part of normal mine planning and mine operation.

Planning for environmental management and rehabilitation during the mine planning stage will reduce delays in the processing of your Mining Lease application.

Central to the planning process is the **Environmental Management Overview Strategy** or EMOS.

The EMOS is the life-of-mine strategy you will submit with your application for a Mining Lease. This is a requirement of the Mineral Resources Act.

If your mine is already operational you will also have to submit an EMOS which reflects the situation which now exists on your lease. You will have to submit your EMOS before you submit your next Plan of Operations.

Your EMOS will present a strategy to protect the environment in and around your mine site, and to rehabilitate disturbed areas, over the life of your mining operation.

The next step in the planning process is the **Plan of Operations**, which you should submit at least two months before you start mining and then every five years or less. Your Plan of Operations tells the Department how you will conduct your mining operations to match the commitments you made in your EMOS over your chosen period.

Your plan will also provide an assessment of the cost to rehabilitate the disturbed areas on your lease.

When you are preparing your Plan of Operations you will have to propose a **Performance Category** for your mining operation. These categories range from Category 1 — for the highest environmental performance — to Category 6 — the lowest. To rate your performance you will use a set of Performance Criteria which are set down in the policy document and summarised on page 16 of this booklet.

Your Performance Category will determine how much security you pay. Category 1 — miners with a high standard of environmental performance — will pay the lowest rate of security deposits while Category 6 miners will pay the highest. By proving you can meet higher environmental requirements you can move up the scale and pay less security.

The final step in the planning process is the **Environmental Audit**. The auditor checks if your Plan of Operations matches your EMOS and assesses and confirms your Performance Category rating and your Security Deposit.

Environmental Objectives

Q **What are the objectives of the environmental management policy for mining?**

A

- **Achievement of acceptable post-disturbance land use capability**

  Mining and rehabilitation should aim to create a landform with land use capability and/or suitability similar to that prior to disturbance, unless other beneficial land uses are predetermined and agreed.

- **Stable post-disturbance landform**

  Mine wastes and disturbed land should be rehabilitated to a condition which is self-sustaining, or to a condition where the maintenance requirements are consistent with an agreed post mining land use.

- **Preservation of down stream water quality**

  Surface and ground waters that leave the leased area should not be degraded to a significant extent. Current and future water quality should be maintained at levels which are acceptable for users down stream of the site, and contaminated water shall not unlawfully leave the site. Water discharges from the site will be subject to the provisions of *The Clean Waters Act* 1972–1989 and other applicable legislation.

Step One
Mine Planning

When you are looking at the feasibility of a mining project, either in the Prospecting Permit, Exploration Permit or Mineral Development Licence stage, you should look at the effects your proposed mine will have on the environment and work out ways to minimise or avoid environmental problems.

At this stage in the process you can start collecting basic information which will enable you to prepare an EMOS. The Preparation Guide contained in this kit has a checklist which lists the types of questions you should be asking at this stage, together with the plans and methods you may need to use to control any environmental damage. The checklist looks at issues such as –

- what the land can be used for after mining
- how your project will be planned and operated to ensure the land can be used for the purpose required
- how your project will affect the local environment
- how you will avoid or minimise any possible environmental effects

Small-scale projects may only need simple planning. Large projects will need more detailed planning and possibly an Environmental Impact Assessment.

Step Two
The EMOS

You must submit a proposed EMOS with your application for a Mining Lease.

If your mine is already operational you will also have to submit an EMOS. *Your* EMOS *must reflect the situation which exists on your lease. You will have to submit your* EMOS *for approval before you submit your next Plan of Operations.*

Small scale mine projects are likely to have a simple EMOS. Large projects will require a more detailed EMOS.

You can prepare your own EMOS by following the Preparation Guide in this kit. This kit also contains a case study closely related to your type of mining.

Your EMOS should contain:

Project Description

This is where you describe the location of your project and the type and scale of mining you will be carrying out.

Management Programs

This is where you describe what management programs you are going to put into place to control the environmental effects of your project and to rehabilitate disturbed areas.

Overview Strategy

This is where you describe how your management programs will relate to each other over the life of your project until your lease is surrendered.

Your EMOS should be based on practical methods which have been shown to work. Unproven methods can be proposed and tested. If you can show they work you can use them. If they don't work you may have to fall back on proven methods before mining finishes.

Your EMOS should also meet the environmental performance criteria in the category for which you are aiming. For example, if you are aiming for the reduced security deposit available in Category 4, then your EMOS should meet all the performance criteria for Category 4.

EMOS *Approval Process*

Q **Where does an EMOS fit into the approval process for a Mining Lease?**

A You submit your proposed EMOS with your Mining Lease application. Environmental Officers of the Department of Resource Industries will assess your EMOS to see if it is acceptable or if more information is required.

Before your EMOS is approved you must reach agreement with the Department of Resource Industries on what the land could be used for after mining.

Q **What happens once my EMOS is approved?**

A Once your EMOS is approved you will not have to undertake any more environmental studies to support your application for a mining lease.

Q **What if my EMOS is unacceptable?**

A We will contact you and ask you for more information and discuss with you how to revise your EMOS.

Q **What if the environmental impact of my project is going to be significant?**

A We will assess the likely environmental impacts of your project when you lodge your proposed EMOS with your application.

If the Minister for Resource Industries decides your proposed project is going to have significant effects on the environment, then a more thorough environmental impact assessment may be required under Section 7.21 of the Mineral Resources Act.

If this is the case, we will coordinate input from other interested groups and advise you on the scope of the investigations and reporting required to adequately address the environmental issues. Your EMOS will need to be revised based on the findings of this study.

Q **I already have a Mining Lease. Do I have to submit an EMOS?**

A Yes. However, you do not have to start from scratch. You submitted preliminary environmental advice to the Department when your lease application was assessed, and a Plan of Operations. You may also have submitted Impact Assessment Study reports, or even Environmental Impact Studies for the Federal Government. Your EMOS should be based on the information contained in these documents and accurately describe the situations which exist on your lease and the management programs you are using to control the environmental effects. You can either restate your key environmental commitments — if they are achievable — or propose changes.

Category 6 — *Basic Operational and Strategic Requirements*

To fulfil the requirements of Category 6 you must have, or be able to demonstrate –

- An approved EMOS
- A Plan of Operations in accordance with your EMOS
- All necessary licences and permits are held, or will be held, for contaminated water discharges from the site and waste storage structures.

These are the BASIC requirements which must be met before your Plan of Operations can be accepted.

Category 5 — *Strategic Ability For Environmental Compliance*

To fulfil the requirements of Category 5 you must meet the requirements of Category 6, PLUS you must be able to demonstrate –

- an acceptable slope and profile design allowing for rehabilitation
- suitable soil and overburden are identified for rehabilitation.

Category 4 — *Environmental Compliance Possible At All Times*

To fulfil the requirements of Category 4 you must meet the requirements of Categories 5 and 6, PLUS you must be able to demonstrate –

- sufficient volumes of suitable soil and overburden are located to complete rehabilitation
- water management systems are in place to contain, treat, discharge or dispose of contaminated water.

Category 3 — *Demonstrated Environmental Compliance Capability*

To fulfil the requirements of Category 3 you must meet the requirements of Categories 4, 5 and 6, PLUS be able to monitor your performance to demonstrate –

- financial capability to complete the rehabilitation of the mined area
- materials are in place for full rehabilitation
- suitable expertise provided
- environmental management using annual targets developed from the Plan of Operations.

Category 2 — *Demonstrated Action*

To fulfil the requirements of Category 2 you must meet the requirements of Categories 3, 4, 5 and 6, PLUS be able to monitor your performance to demonstrate the plans in the EMOS are being carried out, including –

- progressive rehabilitation is being carried out
- rehabilitation and environmental protection is being monitored.

Category 1 — *Validation*

To fulfil the requirements of Category 1 — the highest category — you must meet the requirements of Categories 2, 3, 4, 5 and 6, PLUS you –

- must be able to prove that the management programs in your EMOS have been successfully carried out or can be successfully completed.

All Existing Coal Mines

All Existing Metalliferous Mines

All New Mines

Step Six
The Audit

The final step in the process is the Environmental Audit.

The audit is an essential part of self-regulation.

Each Plan of Operations should be submitted with an audit report.

The audit report should certify that your Plan of Operations complies with your EMOS. Your Audit Report should also verify your proposed Performance Category — based on proven past performance and the actions you propose — and the amount of your security deposit.

Your Plan of Operations cannot be accepted by the Department without an acceptable audit.

It is advisable to prepare your audit report and Plan of Operations together to ensure all the information required by the audit is included in your plan.

- If you have not started mining — your Plan of Operations is audited against your EMOS and any activities you might have already carried out at the mine planning stage.
- If you have an existing mining operation — the auditor will compare your Plan of Operations with your EMOS and actual mining activities, including environmental protection and rehabilitation measures.

Q **Who can be an auditor?**

A People with suitable qualifications and experience will be accepted as auditors. One of your full-time employees can be an auditor. Alternatively you may wish to employ a consultant. The auditor must attach their qualifications and experience to the audit report. The auditor must also reveal their employment status and connection with the lease holder.

Q **What happens to auditors who certify false audits?**

A They will no longer be acceptable to the Department.

Q **Who audits the auditors?**

A The Department's Environmental Officers will carry out inspections on a priority and random basis to ensure the information in your Plan of Operations and the Audit Report is correct.

Appendix 2:
EMOS Accepted & Approved

DEPARTMENT OF MINERALS AND ENERGY

OUR REF. [redacted]

YOUR REF.

Contact Officer: [redacted]
Telephone: [redacted]
MNL\ENV\TEMPERLE.LET:JB:LB

Queensland
Minerals &
Energy Centre
61 Mary Street
Brisbane
QLD 4000
G.P.O. Box 194
Brisbane QLD 4001
Telephone: (07) 237 1436
Facsimile: (07) 229 7770

17 May 1994

[redacted]
General Manager
Cape Flattery Silica Mines Pty Ltd
[redacted]

Dear [redacted]

ENVIRONMENT MANAGEMENT OVERVIEW STRATEGY (EMOS)
FOR CAPE FLATTERY SILICA MINES
MINING LEASE ML 2806, ML 2807, ML 2849, ML 2965, ML 7069 AND ML 40048

I wish to advise that your Environmental Management Overview Strategy document submitted to this Department on 9 May 1994 has been accepted and approved.

As I have said before, CFSM are to be commended for the consultative approach adopted in finalising the EMOS. This approach will be recommended to any mining company faced with similar circumstances where their mining project is subject to intense scrutiny by a variety of community interest groups.

As you aware the next step in the planning process is for CFSM to prepare a Plan of Operations to be submitted to the Department with an accompanying Audit Report. The Audit Report will confirm the Plan of Operation complies with relevant planning period EMOS commitments and confirms the performance category and net security calculation.

Both myself and [redacted] look forward to assisting you with the ongoing planning process.

Yours faithfully

[redacted]

Manager Environment Branch

Appendix 3:
1992 Inaugural Consultative Meeting

[redacted]

31st August 1992.

THE HOPE VALE COMMUNITY, CAPE FLATTERY AGREEMENTS

THE INAUGURAL MEETING OF
THE CO-ORDINATING COMMITTEE

This meeting was held on Thursday 20th August 1992. It consisted of a tour of the access road to Lookout Point and the branch road to Cape Flattery. Formal discussions then took place in the mine office at Cape Flattery. In attendance;

For Hope Vale Community Council

[redacted] (Community Councillor)
(Community Councillor)
(Senior Elder of the Community)
(Representative of the Traditional Owners)
(Representative of the [redacted] Family)

For Cape Flattery Silica Mines P/L.

[redacted] (Director)
(Mine Manager)
(General Manager)

COMMENTS RAISED

1. LIAISON OFFICER

Hope Vale representatives put forward their selected candidate [redacted] Cape Flattery raised the request that Hope Vale consider applications resulting from local applicants, ie. [redacted] (a late applicant) prior to final decisions.

The duties associated with this position were discussed, with Cape Flattery offering to provide a written description for assessment before recruitment is finally decided. This is included herewith.

2. [redacted] CLAIMS

Cape Flattery expressed the view, that all claimants to lands associated with their mining operation or leases, should discuss these issues with and through the Community Council and Trustees. The booklet produced by Hope Vale Council 'Gangurru' was used by the company for historical and informational guidance. It was on this basis that the Work Boat [redacted] had been named.

It was suggested by Hope Vale that the seven traditional owners, working through the Community Council, should be kept informed and take part in environmental matters as required or requested.

SIGNIFICANT SITES

The [redacted] family stated that several important sites existed in the area, especially that area of the headland on which no mining is to take place. The company asked for a list of these and any others of concern within the leases, to ensure their protection.

GOOD ORDER COMMITTEE

Hope Vale employees represented upon this Committee have been selected as;

a) Any two from three.
[redacted]
& the Liaison Officer.

b) From Unions
A.W.U. (presently [redacted]).

The first meeting of this Committee is planned for September 15th 1992.

E.M.O.S. COMMITTEE

The Committee planned for the Environmental Management Organisation and Strategy, for the mining lease areas, especially 7069, should include two Hope Vale representatives. The company suggested;

i) [redacted], as spokesman for the traditional owners;
ii) A Council Member, ie. [redacted];

to ensure all sections of the Community are aware of intentions and results. An initial meeting on this topic is requested with the Council for 15th September 1992.

GENERAL

i) The company informed that, it is still awaiting the grant of 7069 and the access way. Once that is completed the surrender of 2807 and 2849 will be carried out.

ii) The access roads as requested, to Lookout Point, are completed.

iii) The two apprentices, [redacted] (Electrical) and [redacted] (Mechanical) have been employed for 1992. An additional two will be recruited early 1993.

iv) Applications have been requested from Hope Vale for;

An apprentice Cook
A trainee office worker
(through Cairns Apprenticeship Board)

In line with the employment of females from Hoe Vale, it is preferred that two initially come in together ensuring the process is given a fair chance of success.

v) The housing provision for Supervisors are taking place.

vi) A copy of the company's suggested terms of reference for the Co-Ordinating Committee is included herewith for consideration and discussions.

vii) Access - The problem of visitors bringing in alcohol was raised and Hope Vale Council's assistance requested to remove this problem.

The meeting closed at 4.00pm. with all the above in attendance.

[redacted]

General Manager.

CAPE FLATTERY SILICA MINES PTY. LTD.

[redacted]

[redacted]

[redacted]

[redacted]

Council Chairman,
Hope Vale Community Council,
Hope Vale,
via COOKTOWN QLD. 4871.

Dear Sir,

Liaison Officer selection by Hope Vale Council, [redacted]

[redacted]

Yours sincerely,
CAPE FLATTERY SILICA MINES P/L.

[redacted]

General Manager.

CO-ORDINATING COMMITTEE

Three monthly meetings consisting of;

3 members of Hope Vale Community Council
3 members of Cape Flattery Management representatives

For the purpose of;

1) An official communication and informative arrangement.

2) Cementing communications and co-operation between the two communities. The implementation of policies directed towards the maintenance of the high standards required.

3) The control and overview of environmental, historical and Aboriginal issues raised in association with mining and camp operations including significant sites.
(In the event of agreement, on any such issue, failing to be reached, provision for an agreed independent arbitrator is provided).

4) The regular review and reporting of the results and actions taken within these agreements.

5) The compiling of a list of all significant sites and areas of environmental importance within the Mining Lease areas. The provision of guidelines for the approach on the mining of such and/or new areas.

6) The selection of representation of this Committee on other bodies involved in investigations or decision making associated with any matters affecting the areas concerned.

7) The planning, assessment and introduction of normalisation programmes, or further co-operative arrangements.

8) Promote awareness and understanding of local Aboriginal Culture and History.

9) Monitor the performance of obligations of each party, under the Agreement.

10) Supervise the selection and direction of the Liaison Officer.

11) Perform any other tasks assessed as necessary within this Agreement.

Appendix 4:
March 1993, April 1993 & October 1993 Consultative Meetings

CAPE FLATTERY SILICA MINE

E.M.O.S. CONSULTATIVE COMMITTEE

TUESDAY 2ND MARCH, 1993

Discussion Notes

PRESENT:

[redacted] (CFSM)
[redacted] (CFSM)
[redacted] (DME)
[redacted] (AHC)
[redacted] (CAFNEC)
[redacted] (Hopevale)
[redacted] (Ranger Hopevale)
[redacted] (NRA)

[redacted] (CFSM)
[redacted] (DME)
[redacted] (DME)
[redacted] (DEH)
[redacted] (Hopevale)
[redacted] (Hopevale)
[redacted] (NRA)

12.00pm Informal meeting – [redacted] welcomed the group.

12.30 LUNCH

1.30 Mine Tour
- Airport Lake
- Reject Dune 21
- Reject Dune 22
- Nursery
- Mill & Generating Plant
- Fauna study site
- Loading Facility
- Old rehabilitation areas

5.20 [redacted] gave a brief overview of CFSM EMOS plans. [redacted] explained the Department of Minerals and Energy's Environmental Policy and the purposes of an Environmental Management Overview Strategy (EMOS).

6.00 DINNER

7.30 Slide presentation – [redacted] explained Geographic Information Systems (GIS), rehabilitation techniques step–by–step including nursery operations and procedures and rehabilitation problems specific to Cape Flattery. Also a description of fauna surveys completed on–site and satellite imagery and its use.

9.00 CLOSE

WEDNESDAY 3RD MARCH 1993

Discussion Notes

7.00am [redacted] outlined CFSM Environmental Policy and presented minutes from the first meeting comprising mine supervisors and Hopevale Community Council representatives.

[redacted] (ranger from Hopevale) raised the presence of a visitor problem in the Hopevale area. Tourists claim CFSM has given permission to traverse Deed of Grant in Trust (DOGIT) land, but the Hopevale Community Council hasn't been advised. CFSM claim the same problem, in reverse. Both parties have to repair damage and clean-up after unauthorised visitors.

EMOS Strategies & Plans Nos. 1-14 explained by [redacted].

[redacted] explained how CFSM define their own required control measures and then monitor to ensure these are upheld; other guidelines required by DME are then complied with as instructed.

8.30 Mine Tour
- Hill 13
- Hill 14
- Mount Mitchell
- Hill 10 (first lease to be mined)

11.15 [redacted] opened the formal meeting by introducing [redacted] from the Commonwealth government body, Australian Heritage Commission (AHC). [redacted] briefly described the role of AHC and its actions in relation to National Estate listing. The AHC is concerned with anything that has heritage significance whether cultural or historical (land, buildings etc).

The first step when submitting an item to the Register of the National Estate, is for it to be placed on an interim list for three months so objective views and national estate significance can be identified. In 1990, [redacted] was granted funds to investigate Aboriginal areas which should be listed in the Cape Flattery area.

Cape Flattery's dunefields and mangrove associations were listed for their environmental heritage value; the very diverse dunefields are considered to be of greater value than those at Shelbourne Bay. When Cape Flattery environs were first placed on the Register interim list, AHC were contacted by both [redacted] Hopevale community and Cape Flattery Silica Mine with relative concerns.

Second step in the Register of the National Estate process, after mining approval has been granted and significant elements identified, is to establish rehabilitation management plans when mined areas are completed. The EMOS will be a vital tool to the AHC in the accurate assessment of Cape Flattery's national estate value.

The subsequent inventory is then available to individuals, authorities and Government bodies when making decisions about listed places. AHC's role is to advise requirements and identify values that need protection under the Register of the National Estate. They do not have the power to designate land-use perse.

Cape Flattery, in turn, by being aware of the identified areas and associations can instigate and apply relevant policies and management.

11.40 [redacted] outlined Cairns and Far North Environment Centre's role on the consultative committee as representing the community interest in environmental issues such as the Register of National Estate, National Parks and Heritage Listing. He is impressed to see a mining company actively and sincerely managing the environment, rather than just making "paper promises".

11.45 [redacted] from the Department of Environment & Heritage saw their role on this committee as monitoring and ensuring quality levels of water, noise and air. At Cape Flattery, the Department is concerned with sustaining and managing the ecology of the dunefields.

State government authorities refer to Qld National Parks and Wildlife Service for advice and requirements for ecologically sustainable management.

11.50 A call for the positions of Chairman and Secretary was made. It was decided that the Chairman should be a nominated representative from the Hopevale Community Council and traditional owners. Hopevale Council are to have designated that position and advise CFSM before the next meeting. Natural Resource Assessments will accept the role of Secretary. CFSM will organise all travel and accommodation requirements from Cairns and Hopevale to Cape Flattery mine site.

(The co-ordinating council at Hopevale were advised last September 1992 of the need for a representative on the consultative committee, then at the following meeting (comprising CFSM mine supervisors and Hopevale reps) Hopevale were asked to nominate three traditional owners for the consultative committee and that one of those should become Chairman.)

The Department of Minerals and Energy were requested to become a Deputy Chairman to assist the traditional owners in their Chairman role.

[redacted] trustee from the Hopevale Community Council, noted he was happy to hear CFSM will mine around any cultural/historical sites. [redacted] said [redacted] was very concerned that mining operations might disturb ancient burial grounds or destroy historically sacred sites. Also, that finally the Aboriginal people and traditional owners of the land were being asked for their advice, concerns and information on the relevant areas. [redacted] made the point of recognising the need for reconciliation and cooperation so that everyone could continue to work together towards a common goal.

LUNCH

1.30pm Meeting resumed with [redacted] traditional owner from Hopevale, declaring the various spring water sources be protected and maintained. When a site is disturbed, the water spirits leave and don't return. [redacted] suggested the replanting of native and fruit trees, ti-tree and coconut after mining.

[redacted] explained Cape Flattery Silica Mine's fourteen environmental management programs. From these, EMOS strategies will be developed by the group.

2.20 [redacted] explained CFSM leases, application for lease and their area; history, negotiations and proposed surrender of areas of land. In compliance with one of the company's self-imposed EMOS commitments, Cape Flattery Silica Mine will reduce designated lease areas (a reduction in area from 13,500ha to approximately 6,500ha), subject to DME approval. There are only certain areas – the township, loading facility – that CFSM need.

The Australian Heritage Commission commended CFSM on offering the reduction in lease areas. The government has been trying to persuade mining companies to reach this type of situation for many years.

CAFNEC stressed the "process" is just as important as the "outcome". [redacted] would like to work more closely with CFSM to fully understand and clarify all the processes involved in their environmental management and policies.

On behalf of all groups present, [redacted] thanked [redacted] and CFSM for the two days of hospitality and education at the mine site.

[redacted] suggested placing an article in relevant mining journals, using CFSM as an example of what mining companies could achieve and outline their progress and policies. It was agreed by all that this should be done, but after further EMOS development/progress.

Actions prior to next meeting – [redacted] to prepare one area (interim land use – Rehab 24) of rehabilitation, before the next meeting, to show the group the progress of rehabilitation over a one month period.

Proposed date for next meeting was tentatively 27th and 28th April/early May 1993. Agenda will include:

- Acceptance of the Chairman
- Surrender of undisturbed land
- Historical and cultural sites – archaeological report by Hopevale Community Council
- EMOS commitments suggested by CFSM

3.45pm First meeting of the Cape Flattery Silica Mine EMOS Consultative Committee was declared closed.

CAPE FLATTERY SILICA MINES PTY LTD

E.M.O.S. CONSULTATIVE COMMITTEE MEETING

MINUTES 28TH APRIL 1993.

PRESENT:

CHAIRMAN: [redacted] (HOPEVALE TRADITIONAL OWNER)
(HOPEVALE TRADITIONAL OWNER)
(HOPEVALE TRADITIONAL OWNER)
(HOPEVALE)
(YOUTH DEVELOPMENT OFFICER IN HOPEVALE)
(DEPUTY EXECUTIVE DIRECTOR OF AUSTRALIAN HERITAGE COMMISSION)
(AUSTRALIAN HERITAGE COMMISSION)
(PRESIDENT OF CAIRNS AND FAR NORTH ENVIRONMENT CENTRE)
(ENVIRONMENTAL OFFICER WITH DEPT.OF MINERALS & ENERGY)

Deputy Chairman: [redacted] **(CFSM)**
(NRA)

APOLOGIES: [redacted] (D.E.H.) [redacted] (D.M.E.)

THE MEETING OPENED AT 8.00AM

- [redacted] delegated chairperson. Accepted and passed. [redacted] deputy chairman to assist [redacted].

- Brief summary explaining the need for an EMOS over Cape Flattery Silica Mines leases, [redacted] gave an historical background.

[redacted] suggested that during the course of reviewing the Draft commitments, the following criteria be considered:

1. Commitments
   - Landform Management
   - Water
   - Conservation Issues

   Are the commitments –
   - Achievable ?
   - Auditable ?
   - Measurable ?

2. Overview Strategy

Describe the processes an EMOS must comply with:

- Mining Resources Act (relevant legislation)
- Lease Conditions
  (every five years a Plan of Operations is produced and submitted (five years is the maximum time allowable between review of Plans of Operations although two to three years is the usual period).

There will be a maximum period of four months before a final Plan of Operations is produced after EMOS completion. The consecutive Plan (five years later) will then run concurrently on from the last (submitted in 1990).

[redacted] asked whether this committee can still be consulted periodically (annually) to keep in contact with CFSM progress. [redacted] accepted this as a good idea and suggests that everyone be updated on a yearly basis instead of discontinuing this committee on completion of the EMOS document.

It was moved that an updated Draft Plan of Operations be produced annually and forwarded to the committee participants before final copies are submitted, if required, to the Department of Minerals and Energy.

Draft minutes will be sent out after meeting for comment and amendment. Minutes will be finalised and accepted at the next meeting.

[redacted] stressed the importance of going through all the commitments and refining them – group agreed.

Discussion notes from the previous committee meeting were summarised by [redacted] for the benefit of those members who didn't attend.

[redacted] suggested that CFSM should adopt commitments that include "best practice" for the Cape Flattery area.

[redacted] from DME advised that lease conditions are mine specific so they can be realistic and individual.

It was decided that the final overview strategy is to be presented at the next meeting.

[redacted] categorised the commitments presented and suggested they be re-organised to reflect the following format:

1) How to identify values
   - NATURAL: landform; flora/fauna; water/limnology
   - CULTURAL: archaeological; social

2) What to protect

3) Rehabilitation
- land
- vegetation
- fauna

4) Environmental management
- water
- toxic waste

5) G.I.S.

[redacted] also made the suggestion that "Heritage & Cultural Values" heading in the Draft Commitments be changed to "Cultural Values", encompassing heritage into the one category.

[redacted] said the Department of Minerals & Energy has set the standard that the commitments are to comply with and the headings as noted below. [redacted]s suggestions above could be incorporated in this format:

1) Landform Management
2) Water
3) Conservation Issues

The meeting agreed to incorporate the logic of the above categories in the EMOS.

[redacted] emphasised the need for as much technical detail as possible in the Plan of Operations, and that the EMOS should be a document that is able to be simply read and understood.

REVIEW OF COMMITMENTS

The following reflects the discussion and amendment of the Draft Commitments distributed prior to this meeting.

ORIGINAL Commitment (1)
"CAPE FLATTERY SILICA MINES PTY LTD (CFSM) WILL MINE IN ACCORDANCE WITH ALL STATUTORY REQUIREMENTS APPLICABLE TO THE CAPE FLATTERY SILICA MINING AND EXPLORATION LEASES. THE EMOS, OR ANY VARIATION, DESCRIBES ENVIRONMENTAL ACTIVITIES THAT COMPLY WITH SPECIAL LEASE CONDITIONS, COMPENSATION AGREEMENTS AND ANY DIRECTIVES FROM GOVERNMENT DEPARTMENTS."

The meeting was agreed on this Commitment to remain as presented. No further action or amendment required.

ORIGINAL Commitment (2)

"THE COMMITMENTS NOTED IN THIS STATEMENT WILL BE IMPLEMENTED USING TECHNIQUES AND METHODS EITHER DESCRIBED IN THIS EMOS, OR SUCCESSIVE PLANS OF OPERATIONS AS REQUIRED."

The meeting was agreed on this Commitment to remain as presented. No further action or amendment required.

ORIGINAL Commitment (3)

"C.F.S.M. WILL MAINTAIN A GEOGRAPHIC INFORMATION SYSTEM (GIS) FOR MINING LEASES IN ORDER TO DEFINE VEGETATION, TOPOGRAPHY, MINE PATH, REHABILITATION AREAS AND WATER MANAGEMENT."

Issues discussed regarding the above commitment were:

- including the entire Cape Flattery area, not just the leased areas, within GIS;
- State Government may have useful GIS information and it would be beneficial to obtain access to same;
- that utilising CFSM held aerial photography would expedite vegetation identification over more current mine areas;

AMENDED Commitment (3)

"C.F.S.M. WILL MAINTAIN A GEOGRAPHIC INFORMATION SYSTEM (GIS) CONTAINING ALL THE INFORMATION RELEVANT TO IMPLEMENTING THE EMOS IN ORDER TO DEFINE VEGETATION, TOPOGRAPHY, MINE PATH, REHABILITATION AREAS AND WATER MANAGEMENT IN THE CAPE FLATTERY DUNEFIELDS."

No further action or amendment required.

ORIGINAL Commitment (4)

"THE MAXIMUM AREA WITHIN ALL LEASES WHICH WILL BE DISTURBED BY MINING RELATED ACTIVITIES IS OVER THE NEXT FIVE YEARS."

The following points were made:

- it was noted that a typing error had been made as a space had not been left "is ..... over the next five years";
- under current legislation, there is a predetermined amount of disturbed land allowed in order to mine;
- this disturbed area will determine the figure calculated for bond/security that CFSM pays, prior to operations commencing.

AMENDED Commitment (4)

"THE MAXIMUM AREA WITHIN ALL LEASES WHICH WILL BE DISTURBED BY MINING RELATED ACTIVITIES IS _____HECTARES OVER THE NEXT FIVE YEARS."

No further action or amendment required.

ORIGINAL Commitment (5)

"AREAS NOT ALREADY DISTURBED, AND WHICH ARE LIKELY TO BE DISTURBED, WILL BE SURVEYED USING ENVIRONMENTAL PARAMETERS AT A SURVEY DESIGN OF 1:25,000."

Environmental parameters were defined as:

i) topographic
ii) vegetation type
iii) water
iv) cultural

AMENDED Commitment (5)

"AREAS NOT ALREADY DISTURBED AND ARE LIKELY TO BE DISTURBED WILL BE SURVEYED USING ENVIRONMENTAL AND CULTURAL PARAMETERS AT A SURVEY DESIGN SCALE OF 1:25,000, TWELVE MONTHS PRIOR TO DISTURBANCE. ENVIRONMENTAL PARAMETERS WILL CONSIST OF TOPOGRAPHY, VEGETATION AND WATER."

No further action or amendment required.

ORIGINAL Commitment (6)

"CAPE FLATTERY SILICA MINES WILL REDUCE THE NUMBER OF LEASES IT CURRENTLY HOLDS."

Discussion on reducing the lease area described the subsequent process as follows:

1. Inspection and report on area
2. Non Deed of Grant in Trust (D.O.G.I.T.) land (if any). All DOGIT land is under Hopevale jurisdiction.
3. Continue to develop GIS management over surrendered leases and maintain information access to the Hopevale community.
4. Lease no. 7069 has a separate process/EMOS. Lease approval is subject to this EMOS outcome. Leases can't be considered on a individual basis as the EMOS encompasses all CFSM leases whether they are due for renewal or are a new lease application.

AMENDED Commitment (6)

"CAPE FLATTERY SILICA MINES WILL REDUCE THE NUMBER OF LEASES IT CURRENTLY HOLDS FROM ..... TO ..... AND THIS WILL INCLUDE ....." (Lease Nos.)

No further action required.

ORIGINAL Commitment (7)

CAPE FLATTERY SILICA MINES WILL REDUCE THE SIZE OF THE LEASES IT CURRENTLY HOLDS ON (DATE) FROM ..... TO ....."

It was stipulated that the predicted date this is to occur on and the exact area to be reduced, is to be made a firm submission.

AMENDED Commitment (7)

"CAPE FLATTERY SILICA MINES WILL REDUCE THE SIZE OF THE LEASES IT CURRENTLY HOLDS ON (DATE) FROM ..... TO ....."

No further action required.

ORIGINAL Commitment (8)

"CAPE FLATTERY SILICA MINES WILL RETURN DISTURBED AREAS TO LANDFORM TYPES CONSISTENT WITH SURROUNDING LANDFORMS IN THE DUNE FIELD."

The committee noted the importance of maintaining dunefield diversity and the determined classification should be declared in the wording of the Commitment. The Hopevale traditional owners are to be consulted in consideration of their requirements on final landforms developed after mining.

AMENDED Commitment (8)

"CAPE FLATTERY SILICA MINES WILL RETURN DISTURBED AREAS TO THE LANDFORM TYPE CONSISTENT WITH SURROUNDING LANDFORMS IN THE DUNE FIELD. TYPE AND CLASSIFICATION WILL BE IDENTIFIED PRIOR TO DISTURBANCE.

LANDFORM TYPES IN THE DUNE FIELD WILL BE CONSISTENT WITH THE FOLLOWING CRITERIA:

* EROSION PATTERNS FOUND ELSEWHERE IN THE DUNE FIELD.
* CONTAINS NO NOXIOUS OR DECLARED WEEDS.
* IS FREE OF ANY MINING OPERATION INTRODUCED WASTE MATERIAL.
* WHERE MINING IMPACTS ON NATURAL WATER STORAGE AND DRAINAGE LINES, THE REMAINING WATER WILL BE OF A STANDARD SUITABLE FOR NATIVE FAUNA."

No further action required.

ORIGINAL Commitment (9)

"LAND USE WILL BE ACCEPTED AS BEING SUITABLE FOR THE NOMINATED LANDUSE WHEN:

* THE SIMILARITY INDEX OF THE REHABILITATED LAND AND A REFERENCE SITE REDUCES FOR TWO CONSECUTIVE YEARS
* THE QUALITY OF RECEIVING WATERS DOWNSTREAM OF DISTURBED AREAS IS WITHIN NOMINATED STANDARDS

THE PROPOSED LAND USES IMMEDIATELY AFTER LEASE SURRENDER OF REHABILITATED LAND WILL BE OF VARYING CAPABILITIES CONSISTENT WITH THE OPTIONS RAISED TO DATE AND PRESENTED BELOW:

- MINING
- HORTICULTURE AFTER MINING – PREPARE LAND FOR FLOWERS (XMAS BELLS), FRUIT TREES, TI–TREES ETC
- TOURISM – TURTLE/DUGONG SPOTTING, ARCHERY, GOLF COURSE, WATER SPORTS CENTRE ETC
- AQUACULTURE – OYSTER PEARLS, CROCODILE FARMING, PRAWNS, BARRAMUNDI, FRESHWATER LOBSTERS ETC.
- PERIODIC CATTLE GRAZING
- SPACE STATION
- LEAVE IN A NATURAL STATE AFTER MINING AND REHABILITATION COMPLETED
- RESIDENTIAL – UPGRADE TOWNSHIP
- UTILISE WHARF/LOADING FACILITIES WITH OUTSIDE INDUSTRY (COAL)
- MARINA/SLIPWAY
- EXTENDED AND IMPROVED AIRPORT
- GLASS MANUFACTURE ON–SITE"

It was suggested that monitoring the mined and undisturbed areas be undertaken so as to collate an index of the areas and nominate the final land use, before mining commences.

AMENDED Commitment (9)
"PRIOR TO MINING, THE FINAL LANDUSE WILL BE NOMINATED AND WILL BE ACCEPTED WHEN THE FOLLOWING CRITERIA IS MET:

* THE SIMILARITY INDEX OF THE REHABILITATED LAND AND A REFERENCE SITE REDUCES FOR TWO CONSECUTIVE YEARS
* THE QUALITY OF RECEIVING WATERS DOWNSTREAM OF DISTURBED AREAS IS WITHIN NOMINATED STANDARDS
* WHEN IT IS ACCEPTABLE TO THE TRADITIONAL OWNERS FOR THEIR PREFERRED LAND USE.

THE PROPOSED LAND USE IMMEDIATELY AFTER LEASE SURRENDER OF REHABILITATED LAND WILL BE OF VARYING CAPABILITIES CONSISTENT WITH THE OPTIONS RAISED TO DATE AND AS ACCEPTED OR PREFERRED BY THE TRADITIONAL LAND OWNERS."

No further action required.

ORIGINAL Commitment (10)
"DOCUMENTATION OF SOIL LOSS AND LANDFORM CHANGES BY WIND AND WATER WILL NOT BE REQUIRED TO MEET ANY CRITERIA FOR LEASE SURRENDER."

[redacted] from the Department of Minerals and Energy said that its environmental policy on land stability states that mined areas must always be in a stable condition. It was noted that sand dunes are more difficult or impossible to define in compliance with this requirement.

AMENDED Commitment (10)

"DOCUMENTATION OF SOIL LOSS AND LANDFORM CHANGES BY WIND AND WATER, THE RESULT OF NATURAL CONDITIONS AND IN LINE WITH PRE-EXISTING CONDITIONS, WILL NOT BE REQUIRED TO MEET ANY CRITERIA FOR LEASE SURRENDER."

No further action required.

ORIGINAL Commitment (11)

"THE CAPE FLATTERY TOWNSHIP WILL BE SERVICED BY A SEWAGE TREATMENT FACILITY ACHIEVING WATER QUALITY OF A STANDARD OUTLINED IN TABLE .... (MARINE PARKS STANDARD).
DOMESTIC WASTE WILL BE DISPOSED OF IN A LANDFILL SITE MANAGED ACCORDING TO THE FOLLOWING GUIDELINES IN TABLE ....."

The meeting discussed the point that Cape Flattery needs a "salvage/waste" yard/dump to recycle material. Recycling cannot be stated literally as a "commitment" as the D.M.E. deems it as unauditable under the E.M.O.S. criteria. It was agreed to make a statement about recycling.

AMENDED Commitment (11)

"THE CAPE FLATTERY TOWNSHIP WILL BE SERVICED BY A SEWAGE TREATMENT FACILITY ACHIEVING WATER QUALITY OF A STANDARD OUTLINED IN TABLE .... (MARINE PARKS STANDARD FOR DISCHARGE).

DOMESTIC WASTE WILL BE DISPOSED OF AT A LANDFILL SITE MANAGED ACCORDING TO THE FOLLOWING GUIDELINES IN TABLE .....

RECYCLING OF WASTE MATERIAL WILL BE IMPLEMENTED ON-SITE AND REVIEWED ANNUALLY IN THE SUCCESSIVE PLANS OF OPERATIONS."

No further action required.

ORIGINAL Commitment (12)

"A TOWN PLAN WITH A MAXIMUM LEAD TIME OF THREE YEARS WILL BE DEVELOPED BY DECEMBER 1993."

The following points were discussed:

- The Strategic Plan will be produced on a three year basis.
- It was decided that a Town Plan be produced and included in the Plan of Operations to guarantee regular revision and updating.
- Should the Town Plan be included in the commitments at all.

AMENDED Commitment (12)

"THE OVERALL TOWN PLAN BASED ON THE FIVE YEAR PLAN PROJECTION, WILL FORM PART OF THE PLAN OF OPERATIONS AND WILL BE CONSISTENT WITH CURRENT ENVIRONMENTAL POLICY AND MANAGEMENT."

No further action required.

ORIGINAL Commitment (13)
INTERIM REHABILITATION
"ZONE OF IMPACT OUTSIDE THE AREA TO BE LESS THAN ONE HECTARE."

The meeting agreed to the submitted commitment and clarified the wording for final inclusion.

AMENDED Commitment (13)
"INTERIM REHABILITATION
ZONE OF UNPLANNED MINE IMPACT OUTSIDE THE AREA OF MINING DISTURBANCE WILL BE MAINTAINED AT NO MORE THAN ONE HECTARE PER MINE SITE."

No further action required.

ORIGINAL Commitment (14)
"FINAL REHABILITATION
THE NOMINATED VEGETATION ASSOCIATION IS ACHIEVED AS DESCRIBED IN THE TABLE BELOW FOR A PERIOD OF ONE GROWING SEASON WITHOUT ASSISTANCE."

The following points were discussed in relation to Commitment (14)

- state the minimum projected species cover and this is to be included in the data collated;
- state the percentage (number and diversity) of species of existing vegetation;
- the nominated vegetation type will be 70% of the number of species, number of individuals and;
- projected foliage cover of a reference site to be pre-determined.

[redacted] pointed out that it is difficult to achieve a high percentage of recovery. The general consensus was to aim high, eg. 75% plus a minimum equivalent ground cover. It was noted that processes will be in place to indicate the association is progressing toward 100% of the reference site.

Wherever possible, top soil will be re-used immediately for rehabilitation purposes or stored in low stockpiles less than 2 metres in height. This will aid diversity and density of species colonising in rehabilitation areas.

AMENDED Commitment (14)
"FINAL REHABILITATION
THE NOMINATED VEGETATION ASSOCIATION WILL BE ACHIEVED WHEN GREATER THAN 70% OF SPECIES AND NUMBERS OF INDIVIDUALS FROM A REFERENCE SITE HAVE BEEN ACHIEVED. MONITORING OF THE ASSOCIATION WILL SHOW PROGRESS TOWARD THE REFERENCE SITE OVER A PERIOD OF ONE GROWING SEASON WITHOUT ASSISTANCE."

No further action required.

ORIGINAL Commitment (15)

"ROAD RATIONALISATION PROGRAM WILL BE IMPLEMENTED ON-SITE, IN CONSULTATION WITH THE TRADITIONAL OWNERS."

This Commitment concerns access and road rehabilitation. The meeting agreed that rationalisation and implementation in conjunction and consultation with the Hopevale community was important. Closure of unnecessary access roads was suggested.

The meeting was agreed on this Commitment to remain as presented. No further action or amendment required.

ORIGINAL Commitment (16)

"CAPE FLATTERY SILICA MINE WILL DEVELOP A STANDARDS MANUAL THAT WILL BE FREELY AVAILABLE TO ALL EMPLOYEES AND MINE STAFF."

Environmental awareness encompassed Commitment (15) with regard to road widths and pipeline disturbance etc. Standards set have to be realistic and should be presented at joint environmental awareness meetings.

The Australian Heritage Commission offered to loan a video to the mine, showing the importance of National Estate, for the benefit of management, staff and the Hopevale community.

Minor changes were made.

AMENDED Commitment (16)

"CAPE FLATTERY SILICA MINE WILL DEVELOP A STANDARD PROCEDURES MANUAL THAT WILL BE FREELY AVAILABLE TO ALL EMPLOYEES AND MINE STAFF. THIS WILL FORM AN INTEGRAL PART OF INDUCTION AND STAFF TRAINING PROCEDURES."

No further action required.

ORIGINAL Commitment (17)

"NO 'CONFIRMED SITES' AS DESCRIBED BY THE CONTAMINATED LANDS ACT (1991) ARE TO BE LEFT ON ANY AREA DISTURBED BY MINING ACTIVITIES AT LEASE SURRENDER IE. ALL SITES WILL BE SUITED TO THE LAND USE NOMINATED AND BE CLASSED AS "RELEASED LAND".

AREAS OF POSSIBLE CONTAMINATION SUCH AS PLANT, LABORATORY, WORKSHOPS, REJECT AREAS WILL BE INVESTIGATED PRIOR TO REHABILITATION. IF ANY AREA EXCEEDS THE THRESHOLD LEVELS (ANZEC 1992 GUIDELINES, TABLE ...), FURTHER INVESTIGATIONS REGARDING ADJACENT BACKGROUND LEVELS, INTENDED USE AND EXTENT OF CONTAMINATION WILL BE UNDERTAKEN TO ENSURE THAT ALL AREAS CAN BE CLASSED AS "RELEASED SITES".

IF LEVELS EXCEED BACKGROUND LEVELS AND POSE A THREAT TO HUMAN, ANIMAL OR PLANT LIFE OR, THE MATERIAL IS HAZARDOUS ACCORDING TO CURRENT SCIENTIFIC

LITERATURE, THE MATERIAL WILL BE BURIED OR COVERED TO AT LEAST A ONE METRE DEPTH BY NON-HAZARDOUS MATERIAL."

Under the Contaminated Lands Act, all mined sites are deemed to be probable contaminated areas. It was discussed that any contaminated soil would need to be covered by more than one metre of uncontaminated material.

AMENDED Commitment (17)

"LAND CANNOT BE CLASSED AS "CONFIRMED CONTAMINATED SITES" AS DESCRIBED BY THE CONTAMINATED LANDS ACT (1991). ANY SUSPECTED SITES ARE NOT TO BE LEFT ON ANY AREA DISTURBED BY MINING ACTIVITIES AT LEASE SURRENDER.

AREAS OF POSSIBLE CONTAMINATION SUCH AS PLANT, LABORATORY, WORKSHOPS, REJECT AREAS WILL BE INVESTIGATED PRIOR TO REHABILITATION. IF ANY AREA EXCEEDS THE THRESHOLD LEVELS, (ANZEC 1992 GUIDELINES, TABLE .....) FURTHER INVESTIGATIONS REGARDING ADJACENT BACKGROUND LEVELS, INTENDED USE AND EXTENT OF CONTAMINATION WILL BE UNDERTAKEN TO ENSURE THAT ALL AREAS CAN BE SAFELY USED.

IF LEVELS EXCEED BACKGROUND LEVELS AND POSE A THREAT TO HUMAN, ANIMAL OR PLANT LIFE OR, THE MATERIAL IS HAZARDOUS ACCORDING TO CURRENT SCIENTIFIC LITERATURE, THE MATERIAL WILL BE BURIED OR COVERED TO AT LEAST A ONE METRE DEPTH BY NON-HAZARDOUS MATERIAL.

ALL CONTACT WILL BE MADE WITH RELEVANT AUTHORITIES SHOULD A HAZARDOUS SITUATION ARISE."

The meeting was agreed on this Commitment to remain as presented. No further action required.

ORIGINAL Commitment (18)

WATER RESOURCES

"ALL POSSIBLE CONTAMINATION SOURCES OF BOTH MARINE AND FRESHWATER SYSTEMS WILL BE IDENTIFIED.

ALL OIL/FUEL STORAGE ON-SITE WILL BE BUNDED AND A STANDARD OPERATING PROCEDURE DEVELOPED TO PREVENT ANY CONTAMINATION OF THE SURROUNDING AREA.

CFSM WILL DEVELOP A SHIPPING ACCIDENT AND FUEL/OIL SPILL CONTINGENCY PLAN FOR CAPE FLATTERY HARBOUR.

BILGE/WASTE OIL AND WATER PUMPING FACILITIES WILL BE AVAILABLE AT THE SMALL VESSELS WHARF AT CAPE FLATTERY.

NO SET NETTING OR COMMERCIAL FISHING WILL BE PERMITTED BY MINE EMPLOYEES."

It was noted that the relevant regulatory authorities claim they are closely monitoring shipping and associated condition compliance (such as bilge water being pumped only into nominated containers).

The meeting suggested CFSM take samples of bilge water and have them analysed every six months. Separate data information systems will be compiled for freshwater and marine environments.

AMENDED Commitment (18)
"IDENTIFY ALL POSSIBLE CONTAMINATION SOURCES OF BOTH MARINE AND FRESHWATER SYSTEMS.

ALL OIL/FUEL STORAGE ON-SITE WILL BE BUNDED AND A STANDARD OPERATING PROCEDURE DEVELOPED TO PREVENT ANY CONTAMINATION OF THE SURROUNDING AREA.

CFSM WILL DEVELOP A SHIPPING ACCIDENT AND FUEL/OIL SPILL CONTINGENCY PLAN FOR CAPE FLATTERY HARBOUR.

BILGE/WASTE OIL AND WATER PUMPING FACILITIES WILL BE AVAILABLE AT THE SMALL VESSELS WHARF AT CAPE FLATTERY.

NO SET NETTING OR COMMERCIAL FISHING WILL BE PERMITTED BY MINE EMPLOYEES."

No further action required.

ORIGINAL Commitment (19)
"CFSM WILL DEVELOP A WATER BUDGET FOR WATER TREATMENT CONSUMPTION AND MAINTAIN WATER CONSUMPTION RECORDS.

MINE IMPACTED WATERS LEAVING THE LEASE WILL BE OF THE FOLLOWING QUALITY. SEE TABLE ... (BACKGROUND WATER QUALITY)."

The meeting suggested that in the course of water monitoring that appropriate parameters be determined and it would be beneficial to produce a model of these for future reference.

AMENDED Commitment (19)
"CFSM WILL DEVELOP A WATER BUDGET FOR WATER TREATMENT CONSUMPTION, MAINTAIN WATER CONSUMPTION RECORDS AND DEVELOP A WATER MODEL TO DETERMINE APPROPRIATE PARAMETERS.

MINE IMPACTED WATERS LEAVING THE LEASE WILL BE OF THE FOLLOWING QUALITY. SEE TABLE ... (BACKGROUND WATER QUALITY)."

No further action required.

ORIGINAL Commitment (20)

"HERITAGE & CULTURAL VALUES

EXISTING AND PROPOSED MINING WILL DISTURB SITES PREVIOUSLY IDENTIFIED AND DOCUMENTED IN THE FOLLOWING NAMED REPORTS, ONLY AFTER CONSULTATION AND AGREEMENT WITH HOPE VALE REPRESENTATIVES; "CAPE FLATTERY SILICA MINES PTY LTD: REPORT IN COMPLIANCE WITH MINES DEPARTMENT COVENANTS AND CONDITIONS M.L. 1061 COOKTOWN" BY N.R.A. PTY LTD; "ARCHAEOLOGICAL ASSESSMENT OF THE SPALENKA DUNEFIELD" BY [redacted]; AND "TRADITIONAL AND CURRENT USE OF EXISTING AND PROPOSED LEASE AREAS OF CAPE FLATTERY SILICA MINES PTY LTD" BY [redacted].

PROCEDURES TO ADDRESS DOCUMENTATION AND DISTURBANCE OF SITES WILL BE DEVELOPED IN CO-OPERATION WITH REPRESENTATIVES OF HOPEVALE TRUSTEES/TRADITIONAL OWNERS/RANGERS.

CAPE FLATTERY SILICA MINES PROPOSE TO DEVELOP A PROGRAM OF PRE-EXAMINATION OF MINING DISTURBANCE AREAS BY HOPEVALE TRADITIONAL OWNERS AND RANGERS, PRIOR TO MINING.

CAPE FLATTERY SILICA MINES WILL DEVELOP STANDARD PROCEDURES IN THE EVENT OF FINDING ARTEFACTS DURING THE MINING PROCESS.

CAPE FLATTERY SILICA MINES WILL CONTINUE TO EDUCATE AND MAKE ITS EMPLOYEES AND CONTRACTORS AWARE OF THE CULTURAL VALUES ASSOCIATED WITH THE CAPE FLATTERY DUNE FIELD."

Cultural values are detailed under this Commitment. The members were advised by [redacted] that archaeological sites had been identified and plotted on a map of Cape Flattery. These need to be updated regularly, in the event that further sites are located by Hopevale community and that in the future, survey equipment such as a GPS, be used to accurately plot and catalogue the sites to current maps.

Clarification is required regarding the legal process involved should any archaeological/cultural sites be discovered while mining. Previous negotiations with Hopevale have concluded to initially contact a traditional owner to inspect the identified site. All mining operations in that area stops immediately until further advice from the traditional owner.

The traditional owners wish to be involved in the preliminary discussions regarding dunes and areas to be disturbed. Valuable sites are to be identified and descriptions of the reasons why the sites are important, recorded. There is to be provision made in the EMOS for this action and its report.

It was agreed that induction courses may prove valuable if shown to recreational visitors and study groups to Cape Flattery dunefields and particularly useful in educating the community as to the importance of the cultural history of the area.

AMENDED Commitment (20)

"CULTURAL VALUES

EXISTING AND PROPOSED MINING WILL DISTURB SITES PREVIOUSLY IDENTIFIED AND DOCUMENTED IN THE FOLLOWING NAMED REPORTS, ONLY AFTER CONSULTATION AND AGREEMENT WITH HOPE VALE REPRESENTATIVES; "CAPE FLATTERY SILICA MINES PTY LTD: REPORT IN COMPLIANCE WITH MINES DEPARTMENT COVENANTS AND CONDITIONS M.L. 1061 COOKTOWN" BY N.R.A. PTY LTD; "ARCHAEOLOGICAL ASSESSMENT OF THE SPALENKA DUNEFIELD" BY [redacted]; AND "TRADITIONAL AND CURRENT USE OF EXISTING AND PROPOSED LEASE AREAS OF CAPE FLATTERY SILICA MINES PTY LTD" BY [redacted]

CAPE FLATTERY SILICA MINES WILL DEVELOP A PROGRAM OF PRE-EXAMINATION BY HOPEVALE TRADITIONAL OWNERS AND RANGERS, OF MINING DISTURBANCE AREAS PRIOR TO MINING.

PROCEDURES TO ADDRESS DOCUMENTATION AND DISTURBANCE OF SITES WILL BE DEVELOPED IN CO-OPERATION WITH REPRESENTATIVES OF HOPEVALE TRUSTEES/TRADITIONAL OWNERS/RANGERS.
CAPE FLATTERY SILICA MINES WILL DEVELOP STANDARD PROCEDURES IN THE EVENT OF FINDING ARTEFACTS DURING THE MINING PROCESS.

CAPE FLATTERY SILICA MINES WILL CONTINUE TO EDUCATE AND MAKE ITS EMPLOYEES AND CONTRACTORS AWARE OF THE CULTURAL VALUES ASSOCIATED WITH THE CAPE FLATTERY DUNE FIELD."

[redacted] *to clarify legal process involved with archaeological site discovery and develop procedures for managing archaeological sites within the lease areas. This is to be done in association with the traditional owners and trustees.*

ORIGINAL Commitment (21)

"FAUNA

CFSM WILL DEVELOP A POLICY ON CONTROL OF DOMESTIC ANIMALS.

CFSM WILL CHARACTERISE WATER BODIES IN TERMS OF HABITAT AND FAUNA TYPES.

AN ACTIVE FERAL ANIMAL CONTROL PROGRAM WILL BE OPERATED BY CFSM."

ORIGINAL Commitment (22)

"FLORA

- VEGETATION IN ALL LEASES AND EXPLORATION AREAS WILL BE MAPPED.
- VEGETATION SURVEYS AT 1:10,000 OR BETTER WILL BE UNDERTAKEN IN ALL MINING AREAS PRIOR TO DISTURBANCE.
- A WEED PREVENTION AND ERADICATION PROGRAM WILL BE INITIATED BY CFSM."

Both commitment 21 and 22 covering flora and fauna were discussed together.

[redacted] proposed that the mapping scale be incorporated under a commitment in the EMOS. It was noted that Government representatives like mapping to be at a 1:10,000 scale. The CFSM mapping scale most commonly used is 1:5,000. [redacted] commented that a 1:10,000 scale of mapping was appropriate and that Cape Flattery Silica Mines should not commit to mapping at a larger scale.

Discussion regarding fauna concentrated on three points:

1) Investigate and identify significant fauna species and make a commitment to protect their habitat and/or re-establish areas for transferring to.

2) Maintain the quality of the water bodies for faunal use - either prevent mining or leave a wide buffer zone.

Feral control is to be refined into a definite strategy and implemented regularly.

AMENDED Commitment (21)
"**FAUNA**
CFSM WILL DEVELOP A POLICY ON CONTROL OF DOMESTIC ANIMALS. CATS ARE UNCONDITIONALLY BANNED AND OTHER ANIMALS BROUGHT ON-SITE WILL BE NEUTERED PRIOR TO ARRIVAL.

CFSM WILL CHARACTERISE WATER BODIES IN TERMS OF HABITAT AND FAUNA TYPES.

AN ACTIVE FERAL ANIMAL CONTROL PROGRAM WILL BE OPERATED BY CFSM."

AMENDED Commitment (22)
"**FLORA**
VEGETATION SURVEYS AT 1:10,000 OR BETTER WILL BE UNDERTAKEN IN ALL MINING AREAS PRIOR TO DISTURBANCE. BEFORE OPERATIONS COMMENCE, SIGNIFICANT FLORA WILL BE REMOVED AND MAINTAINED FOR RELOCATING IN FINAL REHABILITATION AREAS.

A WEED PREVENTION AND ERADICATION PROGRAM WILL BE INITIATED AND MAINTAINED BY CFSM.

PROTECTION OF SPECIFIC VEGETATION SPECIES IN IDENTIFIED AREAS."

No further action required.

GENERAL MATTERS:

[redacted] (CAFNEC) raised the matter of energy conservation and natural energy utilisation at Cape Flattery. [redacted] informed the Committee that renewable energy had already been investigated at Cape Flattery and found to be too expensive because generators have to be backed up in the event of no sun or wind, which presents a doubling up of capital. The Cape Flattery mine area requires 4 mega watts to run its operations. It was reported to cost $5million to install solar and wind alternators.

[redacted] asked would CFSM consider a small scale alternative energy source, as it is accepted that some applications are economically viable. [redacted] commented that CFSM was open to that suggestion and would make some investigations.

[redacted] from DME suggested that the DME views impacts made by noise, air quality, dust and social interaction are non-issues in many remote areas, consequently the Committee accepted that these issues were not crucial to CFSM EMOS.

Fire management and control was discussed and it was moved that the central areas and Mt. Wraith be targeted for further investigation.

The next consultative committee meeting is proposed for mid-July, possibly the dates of 13th, 14th and 15th. That being two nights and three days on-site to finalise the Commitments and EMOS strategy.

The Chairman closed the meeting at 4.30pm.

→ 101001.01

MINUTES OF THE EMOS MEETING 25–27 October 1993.

PRESENT:

CFSM [redacted]

Liaison Officer CFSM/Hopevale [redacted]

Hopevale [redacted]

Hopevale Community Council [redacted]

Natural Resource Assessments [redacted]

Australian Heritage Commission [redacted]

Department Environment & Heritage [redacted]

Department Minerals & Energy [redacted]

CAFNEC [redacted]

Day 1: 25 October 1993 – 1:15pm

Chairmen of the meeting:
[redacted] / [redacted]

Introductory comments

[redacted] welcomed all to the meeting.

[redacted] explained the format for the next two days. First issue was to get through all the recommendations that have been collated in Document 1.

The next issue was to determine the process which was to take place upon conclusion of this meeting.

Third point was to organise a press release and disseminate the information to the public if this was acceptable to the Committee.

[redacted] also explained that there was a meeting with those from Hopevale in order to determine what they wanted to do in relation to comments received about the cultural values.

Hopevale Council members, [redacted] and [redacted], will be attending the meeting from Tuesday (26 October).

[redacted] apologised for not getting formalised comments in on the due date.

Document 1 – Proposed changes to the draft EMOS report (R2)

[redacted] proceeded to work through Document 1.

Point 1:
Letter

Agreed to remove the three lease descriptions and change the letter. [redacted] felt the letter was purely protocol.

[redacted] asked that the covering letter purvey a sense of why the land had been relinquished.

[redacted] said it was probably a good idea and [redacted] agreed.

Action 1: The reference to the three leases is to be omitted from the letter.

Action 2: Some comment of this nature will be placed in the front of the letter.

Action 3: The last sentence of the last paragraph on Page 1 of the letter is to be changed to "members of the Committee."

[redacted] explained a five year Plan of Operations could be submitted, but an annual variation schedule for disturbed areas would be submitted to DME. This makes the paper work a lot simpler.

[redacted] explained that he was happy to do this and would give all members a copy of the annual variation. Would expect to produce a Plan Of Operations by February 1994 which would then be given to the Committee members.

[redacted] explained that the milestones are checkpoints for the process. It was agreed not to commit to a meeting every five years to review the EMOS as the Plan of Operations consultation would deal with that.

[redacted] confirmed that members would be notified of research being conducted. This information would not necessarily be sent out.

Action 4: The Consultative Process is to be enacted with any major changes to **Commitment 1** the EMOS (as outlined in the Milestone table). The Plan of Operations is to be sent to each member for comment one month prior to submission (and for subsequent re–submissions).

This is to take the form of a commitment.

Point 2
Project Description

[redacted] explained that this new paragraph is adding a new milestone to the table. It is in replacement of the reviewing of the EMOS every five years or as outlined in the new commitment.

Action 1: Insert the following after Paragraph 1:

Strategic mine planning describes operations until 2004 which coincides with the term of ML 2965. Consequently, 10 years can be considered as the mine life for this EMOS. A milestone exists for the year 2003 whereupon the EMOS shall be reviewed and any variations submitted to the Department of Minerals & Energy for approval.

Action 2: Add the word "the" to "when satisfied, will allow..."

Action 3: Change the last sentence of the second paragraph from "annual Plan of Operations" to "Plan of Operations".

Point 3
Section 1.1 Background Ownership

[redacted] explained that it was necessary to have supporting information to show the background ownership and where this information has come from. Remained open for further discussion.

Point 4
Table 1 – Lease Description

Action 1: The table was accepted as it was presented, but retain the other two columns of the table. These were the status and activity columns.

Point 5
Locality Figure

Action 1: The revised locality map was accepted.

Point 6
Size of tenements – Commitment 1

Action 1: The following wording for the commitment was accepted:

CFSM shall submit to the Department of Minerals And Energy an area of approximately 7,201.1ha as shown in Figure 1, being part or all thereof of MLs 2806, 2807, 2849, 2965 and 40048. Application for surrender of the remaining areas shall be made together with the submission of this EMOS.

Point 7
Special Lease Conditions

Action 1: Add a new commitment (between 1 and 2)

CFSM will change its former lease conditions on ML____ to conform with the _____ lease conditions. The application for change is to be lodged to the Department of Minerals & Energy by January 1994.

Point 8
Section 1.3 Treatment Process

Action 1: Add the word "grade" to "Coarse Silica" and "Fine Silica" in the first paragraph

Action 2: The following addition to Paragraph 3 was accepted:

...mining operation proposed. The investigation of the feasibility of wet mining will include an assessment of its potential environmental impact including local hydrological studies and limnological studies including faunal surveys of waterbodies.

Point 9
Section 1.3 Last sentence of Treatment Process

[redacted] said that routinely in mining, the DME wants to know what is happening to the waste material.

Action 1: It was agreed to make a commitment of:

Waste produced in the operation is sub–grade silica sand which is returned to excavation areas and utilised in rehabilitation.

Point 10
Section 2.0 Commitment 4 relating to the GIS systems

Action 1: Revise wording to the following:

Surveys relating to vegetation, rehabilitation areas and habitat shall be conducted at intensities supporting a 1:25,000 scale. Information relating to water management, topography and the mine path shall be accurate to at least 1:10,000. This information shall be maintained by CFSM or a nominated consultant as directed by CFSM as the basis for environmental management.

Point 11
Section 2.1.1 Table of Disturbance types

It was agreed to include a table of disturbance types. The table presented is current at this point in time. The numbers may change once satellite imagery is completed.

[redacted] said they wanted to look at areas which would remain fairly constant over the life of mine.

Action 1: Include a land capability before and after column to the table. If the study has not been completed, will commit to that information being filled in once the information becomes available.

Action 2: Areas relating to active mining in the table are to be deleted

Action 3: Commitment 5 was revised to the following:

Land classification studies including wilderness value in the Cape Flattery dunefield will be submitted to the Department of Minerals & Energy for review by June 1994.

Point 12
Land Classification – Commitment 6

Action 1: The following wording was added to Commitment 6:

Environmental parameters will consist of topography, vegetation (including significant plant species and communities and significant faunal habitat), landform and hydrology. Cultural parameters will include:

Point 13
Commitment 7

Action 1: The wording was changed to the following:

The maximum area within all leases which will be disturbed by active mining other than those in Table 2 is 150 hectares. No further disturbance types to those in Table 2 shall occur.

Point 14/15
Section 2.1.2.1 and 2.1.2.3

Action 1: Change "to an extent" to "so as to prevent" in the first paragraph.

It was agreed not to make the last paragraph a Commitment.

Point 16
Section 2.1.3.1 Commitment 8

Action 1: Revise the wording of the Commitment to:

CFSM will chair six monthly meetings with Hopevale Owners for agreement on reinstated land capability and landuse options for land disturbed due to mining. The outcome of the meetings shall be reported to the Department of Minerals and Energy annually.

Point 17
Section 2.1.3.2 Commitment 9

Action 1: Replace the word "surrender" with "prior to the preparation of each Plan of Operation" in the Commitment.

It was agreed not to list the landuses.

Point 18
Commitment 11

Action 1: Add the clause "Demonstrated by the establishment of second generation species" to the first bullet point of the Commitment.

Action 2: The following wording was accepted for the second point:

The nominated vegetation association will be achieved when greater than 70% of species and 70% of the total number of individuals from an appropriate reference site have been achieved. An appropriate reference site is one that closely matches, in terms of plant species and plant numbers, that of a nominated land classification.

Action 3: The following third point was accepted:

Monitoring of the association will show progress toward the reference site over a period of two growing seasons without assistance and in keeping with Commitment 30?

Point 19
Commitment 12

Action 1: The wording of Point 2 was revised to the following:

The similarity of vegetation within the rehabilitated land, and a reference site of same capability and use, will increase for two consecutive years. Similarity will be measured by species diversity and numbers.

Action 2: The relevant Commitment number (mine impacted waters) was added to the end of Point 3.

Point 20
Section 2.1.3.4 Hazardous Material

[redacted] explained that the only authority CFSM has to report to in relation to hazardous material is DME.

Action 1: The wording was changed to the following:

Areas of possible contamination, such as plant, laboratory, workshops and reject areas, will be investigated and remediated when required prior to lease surrender. If any area exceeds the threshold levels listed in Table 2, further investigations regarding adjacent background levels, intended use and extent of contamination will be undertaken and reported to the Department of Minerals and Energy.

Point 21
Table 2: Threshold Levels for Contamination of Soils

Action 1: Changes to the table were accepted.

Point 22
Contaminated Land Act

At lease surrender, there will only be former or released sites remaining as defined under the Contaminated Lands Act (1991).

Action 1: [redacted] will produce the correct wording of the first part of the Commitment. Keep the second part of the sentence, up to in non–active areas. Start a new sentence for the last part of the Commitment which is to read: "If material cannot be stabilised or confined, it will be "physically removed from the lease".

Point 23
Commitment 16 Register of relevant authorities

Action 1: Wording was changed to the following:

Should a hazardous situation arise, Department of Minerals and Energy will be notified and contact will be made with all other relevant authorities.

Point 24
Commitment 17

Action 1: The following wording was added to the Commitment:

A register of location and quantities will be maintained on–site.

Point 25
Commitment 18 Table 3 Landfill Management Guidelines

Action 1: It was agreed to reference the table to a standard. [redacted] is to make contact with Department of Environment and Heritage.

Point 26
Commitment 19 Groundwater Contamination

[redacted] noted there was a need for a nearby reference site to compare the results.
Action 1: Wording of Commitment 19 was revised to the following:

Groundwater downstream of the landfill site and a nearby reference site will be monitored on a yearly basis. Should levels reach the threshold values shown in Table 4, the Department of Minerals and Energy will be notified. Action will be taken to determine the source and to prevent further impact using methods described in or supporting each Plan of Operation.

Point 27
Table 4 Threshold for Groundwater Quality

The pH 9.0 range in the table was questioned by [redacted].

Action 1: The pH of 9.0 was changed to 8.0 and referenced to "within ANZECC guidelines".

Point 28
Commitment 20 Waste Material

Action 1: The Commitment was retained, but is to be qualified by adding "decision implemented" after "reviewed annually".

Point 29
Section 2.1.3.5 Progressive Rehabilitation

Action 1: Delete "interim rehabilitation" from the first sentence of the third paragraph in Section 2.1.3.5.

Action 2: Use the term temporary instead of interim.

Point 30
Paragraph 4 "Some nominated areas..."

[redacted] explained it was necessary to have this term for areas which may have to be disturbed again.

Action 1: [redacted] will write a sentence to further clarify this point.

Point 31
Commitment 21 Unplanned Impacts

Action 1: Change the wording of the Commitment to the following:

The area of unplanned mine impact, outside the area of mining disturbance, will be maintained at no more than one hectare per mine or rehabilitation site or 10% of current active mine areas, whichever is the greater.

Appendix 5:
AIC Meeting Minutes & Hopevale Congress Minutes

Cape Flattery Silica Mines
&
Hope Vale Congress Aboriginal Corporation

AIC Meeting
3rd Meeting 2016
Thursday 22nd September 2016, 1.00pm
Cooktown Events Centre

Present:
CFSM
[redacted] – Chief Financial Officer
[redacted] – General Manager
[redacted] – Human Resource Manager

HCAC
[redacted] – General Manager
[redacted] – Chairperson HCAC
[redacted] – Traditional Owner
[redacted] – Traditional Owner

Apologies
[redacted] – Chief Executive Officer (Outgoing)
[redacted] – Chief Executive Officer (Incoming)
[redacted] – MC Tokyo Trainee
[redacted] – Traditional Owner

Agenda Items

1. **Appointment of meeting Chairperson (CFSM & Congress)**
Congress to Chair the meeting - [redacted] nominated to Chair.
[redacted] welcomed everyone to the meeting and declared the meeting open.
[redacted] explained that CFSM has a new CEO as of the 29th September, [redacted] and apologised [redacted] could not be here today but will be at the next meeting.

2. **Review and adoption of the minutes of the previous meeting (CFSM & Congress)** Minutes from previous meeting moved by [redacted] seconded by [redacted] and accepted by all.

3. **CFSM's Operations / Quarterly reports (CFSM)**
[redacted] distributed the Operations report. See attached.



Presentation [redacted]

[redacted] and [redacted] to arrange a date for a mine visit for the 7 Hope Vale Trainees and 2 Congress Members.
[redacted] said a Wednesday is the best day for CFSM.

[redacted] provided members with 4 maps regarding the Infrastructure Retention Deed.



Infrastructure Retention Maps

[redacted]

[redacted]
If these items are not specifically listed in the Infrastructure Retention Deed then CFSM would have to remove them on departure. It makes sense that if we are leaving the houses that we also leave the supporting infrastructure however maintenance and any licences would then have to be transferred to and maintained by the land holder.

The proposed changes on these maps have been drafted into the Infrastructure Retention Deed, if Congress agrees in this meeting the changes can be confirmed. A copy of the updated Deed will be sent to Congress.

All Congress members agreed the changes should be included in the Infrastructure Retention Deed.

[redacted] distributed Tonnage and Compensation Payment graph. See attached.



[redacted]

[redacted]

[redacted] said being not so busy this year as last year it has given us an opportunity to do more preventive maintenance. [redacted]

[redacted]

[redacted]

[redacted]

[redacted] asked if Congress has heard anything further from [redacted]

[redacted] said there has been no contact at all.

4. **Feedback on studies, reports and assessment produced by CFSM (CFSM)**
No issues to discuss

Report / discussion on Cultural Heritage activities / CHA matters (CFSM & Congress) No issues to discuss

5. **Proposed changes to support provided by CFSM (CFSM)**
No issues to discuss

6. **Report / discussion on Environmental Protection Management (CFSM)**

[redacted] was asked by the Rangers in Hope Vale if Weed Eradication / Control was required at CFSM and if there was any Prickly Acacia or Singapore Daisy identified on the mine site.

[redacted] said he asked [redacted] the QC & Environmental Manager and none of these weeds have been identified.

[redacted] raised the issue regarding pig eradication [redacted]

[redacted]

7. **CFSM past, present & future operations impacting Traditional Owners (CFSM/ Congress)** No Issues to discuss

8. Update on Indigenous Business, Employment & Training Programs & related activities

[redacted] asked if Congress knew [redacted] as they have approached us saying they had been working with the TO's and were asking for a meeting to discuss training and labour hire.

[redacted] and [redacted] said they have had some dealings with [redacted] and advised CFSM to refer them to Congress for any future inquiries.

[redacted] distributed the Congress Trainee list. See attached.



[redacted]

Current placements are 2 trainees with Sport and Recreation at the Hope Vale PCYC, 1 in Horticulture with HVAC and 2 in Civil Engineering with [redacted] working on the roads to Hope Vale past the dairy.

[redacted] asked about getting Traineeships.

[redacted] said that people just need to apply at the Congress office.
General discussion regarding traineeships.

[redacted] asked about the working hours and shifts of the current trainees as there seemed to be an increase in overtime hours.

[redacted]

[redacted] to email [redacted] regarding Traineeship hours.

[redacted] asked if we get any feedback from the host employers about the traineeships progress.

[redacted] said Congress does get some feedback but it would be good to get more information and feedback to CFSM also.

9. Any other items (CFSM & Congress)

[redacted] asked [redacted] how the excavator was going.

[redacted] said the excavator has been working well.

[redacted] asked if CFSM can fix the road through Peter's Garden as the last swap crossing is really deep.

[redacted] asked what is the best way to fix this.

[redacted] suggested digging out the bottom side to allow the water to run off better.

[redacted] introduced [redacted] from [redacted] who is working with Congress regarding Fire Management.

[redacted] explained he is from [redacted] an independent contractor engaged by [redacted] to work with Congress and Hope Vale Community to discuss fire management, working in with the local rangers. [redacted] said [redacted] has recently conducted some test burning and helicopter fire controlled burning to protect the community of Hope Vale and cultural sites. [redacted] has held meetings with the local disaster management committee and is looking to create a proactive cost effective fire management program. Also exploring the options of fire trails and fire breaks and the maintenance of these. [redacted] is working together with the Council, Congress and the local Rural Fire / Rangers and will be holding community workshops to develop a proposal for fire management and risk assessment including a controlled annual burn off.

[redacted] said the risk of fire is low for the mine site as there are only low scrubs around the mine site accept for around Pine Forest area. We have a water truck that has a water cannon and a trailer with a pump that caters for the requirements of CFSM.

[redacted] thanked [redacted] for his time and explaining his business to the committee today.

Next meeting **Thursday 1st December 1.00pm** in Cooktown
All invited to dinner that evening.
[redacted] and [redacted] to attend [redacted]'s tour on Friday 2nd December 2016.

Minute of AIC Meeting between Cape Flattery Silica Mines Pty Ltd and Hope Vale Congress Aboriginal Corporation RNTBC held in Cooktown Congress Offices Cooktown Queensland on Thursday 13th June 2019.

Detailed minute as follows:

RETENTION OF INFRASTRUCTURE DEED

In accordance with clause 3.1 of the Retention of Infrastructure Deed between Hope Vale Congress Aboriginal Corporation and Cape Flattery Silica Mines Pty Ltd (CFSM) and dated 13th June 2019 (Deed), the AIC resolves and agreed to vary the list of Retention Infrastructure (as that term is defined in the Deed) to include the following changes and additions as detailed on the attached maps.

[redacted]

This document is evidence of the resolution and is the minute of the meeting in relation to the resolution, such that upon signing (in accordance with clause 3.2(2), the terms of the Deed apply to the Additional Infrastructure.
Also refer to attached listing of retained infrastructure for the complete changes and additions agreed to date.

Dated: 13th June 2019

Signed by Hope Vale Congress Aboriginal Corporation INC 3135 with the authority of the directors:

[redacted]
Name of Director

[redacted]
Signature (Representative for Nguurruumungu Clan)

[redacted]
Name of Director

[redacted]
Signature (Representative for Dingaal Clan)

[redacted]
Name of Director

[redacted]
Signature (Representative for Thanil Clan)

Signed by Cape Flattery Silica Mines Pty Ltd [redacted] with Section 27 of the Corporations Act:

[redacted]
Name of Director

[redacted]
Signature

[redacted]
Name of Director/Company Secretary

[redacted]
Signature

Appendix 6:
Progressive Certification

Notice

Environmental Protection Act 1994

Decision about an application for progressive certification

This notice is issued by the administering authority[1] pursuant to section 318ZJ of the Environmental Protection Act 1994 *to advise of a decision made about an application for a progressive rehabilitation certification.* This notice replaces the original notice issued pursuant to Section 24AA of the Acts Interpretation Act 1954 to correct a clerical error.

To: Cape Flattery Silica Mines Pty Ltd
[redacted]
Cairns 4870

ATTN: [redacted]

Our reference: EPML00550113

Decision about an application for progressive certification for a resource project

1. Application details

The application for progressive certification of an environmental authority was received by the administering authority on 17 January 2022.

Land description: Mining lease (ML) 2806, ML2965, ML40048 and ML7069

2. Decision

The administering authority has considered the criteria for making a decision on the progressive certification application under section 318ZI of the *Environmental Protection Act 1994*, and has decided to give the progressive certification under section 318ZH of the *Environmental Protection Act 1994* (the certified area).

The certified area is shown in Attachment 1 and is located within the co-ordinates shown in Attachment 2a and Attachment 2b.

3. Human rights

A human rights assessment was carried out in relation to this decision and it was determined that the decision is compatible with human rights.

[1] The Department of Environment and Science is the administering authority under the *Environmental Protection Act 1994*.

Queensland Government

[redacted]	6 April 2022
Signature	Date

[redacted]
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:
Minerals Business Centre
Department of Environment and Science
PO Box 7230, CAIRNS QLD 4870
Phone: (07) 4222 5334
Email: ESCairns@des.qld.gov.au

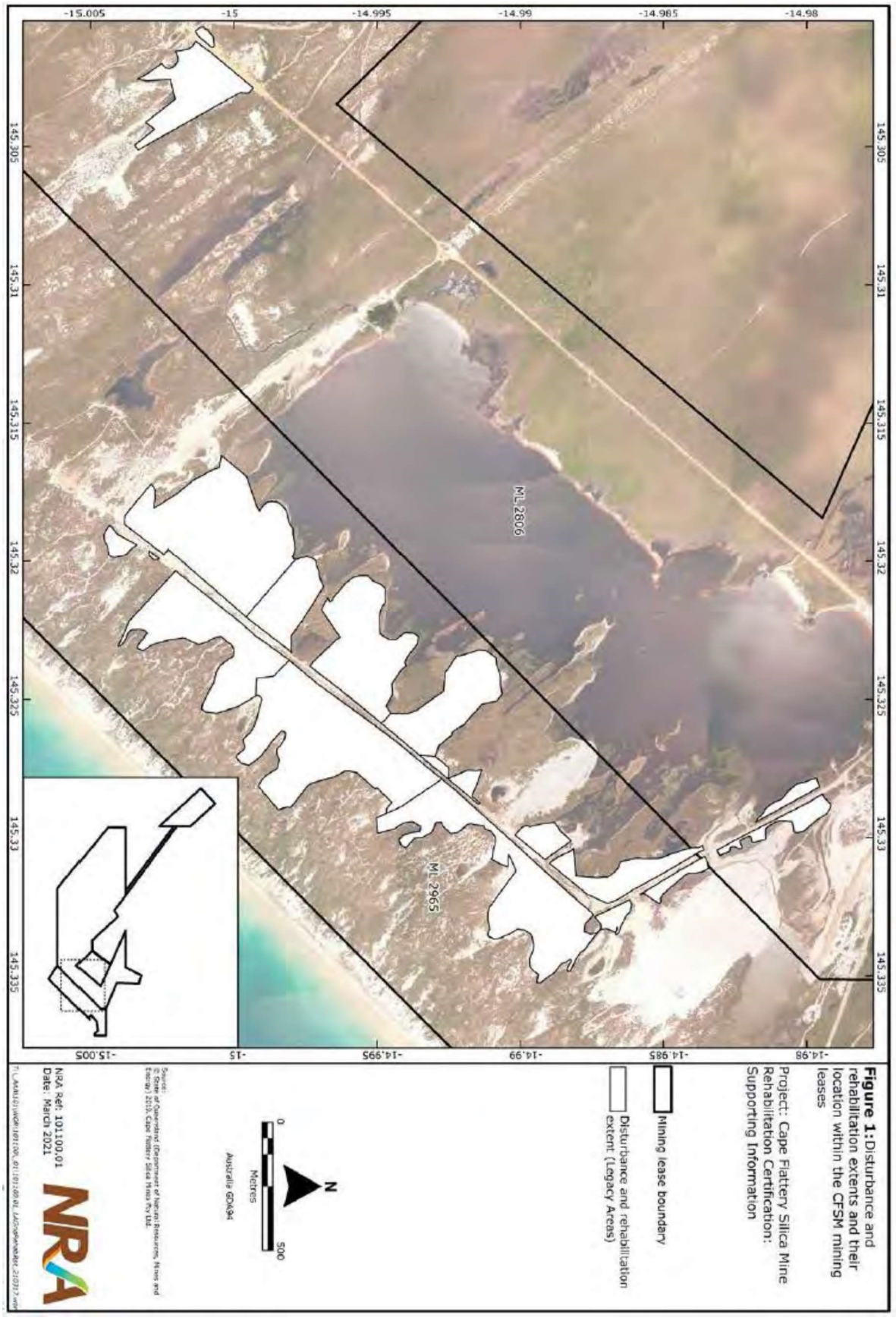
Attachments

Attachment 1 – Map of legacy areas within CFSM mining lease boundaries

Attachment 2a – Geographical coordinates of legacy areas – Airport Lake 1

Attachment 2b – Geographical coordinates of legacy areas – Airport Lake 2, Airport Lake 4 and Hill 13

Attachment 1 – Map of legacy areas within CFSM mining lease boundaries



Attachment 2a – Geographical coordinates of legacy areas – Airport Lake 1

Node	Latitude	Longitude	Node	Latitude	Longitude	Node	Latitude	Longitude	Node	Latitude	Longitude
Airport Lake 1 Legacy Area											
1	-14.9797	145.3278	65	-14.9867	145.3312	126	-14.9911	145.3325	189	-14.9915	145.3276
2	-14.9796	145.3282	66	-14.9866	145.3311	127	-14.9902	145.3312	190	-14.9913	145.3275
3	-14.9818	145.3294	67	-14.9865	145.3309	128	-14.9904	145.3306	191	-14.9917	145.3285
4	-14.9817	145.3293	68	-14.9865	145.3309	129	-14.9904	145.3307	192	-14.993	145.3271
5	-14.9816	145.3292	68	-14.986	145.3307	130	-14.9904	145.331	193	-14.9935	145.327
6	-14.9815	145.3291	69	-14.9852	145.3308	131	-14.991	145.3308	194	-14.9948	145.3259
7	-14.9815	145.329	70	-14.9847	145.3306	132	-14.991	145.3307	195	-14.9945	145.3255
8	-14.9811	145.3287	71	-14.9843	145.3304	133	-14.991	145.3304	196	-14.994	145.3255
9	-14.9809	145.3286	72	-14.984	145.3303	134	-14.9909	145.3302	197	-14.9936	145.3254
10	-14.9803	145.3281	73	-14.9838	145.3304	135	-14.9909	145.33	198	-14.9927	145.3247
11	-14.9801	145.328	74	-14.9837	145.3303	136	-14.9911	145.3298	199	-14.9926	145.324
12	-14.9798	145.3279	75	-14.9836	145.3307	137	-14.9912	145.3297	200	-14.9922	145.3234
13	-14.9794	145.3284	76	-14.9834	145.3311	138	-14.9913	145.3296	201	-14.9922	145.3234
14	-14.9794	145.3286	77	-14.9835	145.3312	139	-14.9916	145.3295	202	-14.9915	145.3232
15	-14.9792	145.3288	78	-14.9838	145.3313	140	-14.9917	145.3295	203	-14.9912	145.3232
16	-14.9792	145.3289	79	-14.9841	145.3313	141	-14.9919	145.3295	204	-14.9908	145.3235
17	-14.9793	145.3292	80	-14.9843	145.3314	142	-14.9921	145.3297	205	-14.9908	145.3238
18	-14.9796	145.3293	81	-14.9851	145.3322	143	-14.9922	145.3298	206	-14.9907	145.3242
19	-14.98	145.3297	82	-14.9851	145.3323	144	-14.9925	145.3299	207	-14.9907	145.3245
20	-14.9801	145.3298	83	-14.9852	145.3324	145	-14.9927	145.3296	208	-14.9906	145.3248
21	-14.9803	145.3298	84	-14.9857	145.332	146	-14.9928	145.3294	209	-14.9908	145.3251
22	-14.9804	145.3298	85	-14.9858	145.332	147	-14.993	145.3295	210	-14.9913	145.3252
23	-14.9805	145.3298	86	-14.9862	145.3323	148	-14.9931	145.3298	211	-14.992	145.3259
24	-14.9804	145.3297	87	-14.9861	145.3324	149	-14.9931	145.3298	212	-14.9921	145.326
25	-14.9805	145.3294	88	-14.9862	145.3327	150	-14.9935	145.33	213	-14.9924	145.3262
26	-14.9807	145.3294	89	-14.9863	145.3328	151	-14.9937	145.33	214	-14.9924	145.3263
27	-14.9808	145.3294	90	-14.9865	145.3332	152	-14.9938	145.3302	215	-14.9925	145.3264
28	-14.9808	145.3294	91	-14.9866	145.3335	153	-14.994	145.3304	216	-14.9926	145.3265
29	-14.9811	145.3294	92	-14.9867	145.3335	154	-14.9941	145.3303	217	-14.9927	145.3266
30	-14.9814	145.3296	93	-14.9867	145.3334	155	-14.9942	145.3301	218	-14.9928	145.3267
31	-14.9814	145.3297	94	-14.987	145.3333	156	-14.9941	145.3299	189	-14.9915	145.3276
32	-14.9814	145.3297	95	-14.9872	145.3333	157	-14.9939	145.3299	190	-14.9913	145.3275
33	-14.9814	145.3298	96	-14.9878	145.3341	158	-14.9938	145.3298	191	-14.9917	145.3285
34	-14.9814	145.3299	97	-14.9879	145.3341	158	-14.9935	145.3298	192	-14.993	145.3271
35	-14.9814	145.33	98	-14.9883	145.3348	159	-14.9935	145.3296	193	-14.9935	145.327
36	-14.9814	145.3301	99	-14.9883	145.3348	160	-14.9938	145.3294	194	-14.9948	145.3259
37	-14.9819	145.3302	100	-14.9884	145.3347	161	-14.9941	145.3295	195	-14.9945	145.3255
38	-14.9819	145.3302	101	-14.9882	145.3345	162	-14.9944	145.3297	196	-14.994	145.3255
39	-14.982	145.33	102	-14.9882	145.3344	163	-14.995	145.3298	197	-14.9936	145.3254
40	-14.982	145.3299	103	-14.9883	145.3344	164	-14.995	145.3293	198	-14.9927	145.3247
41	-14.982	145.3299	104	-14.9884	145.3345	165	-14.9942	145.3289	199	-14.9926	145.324
42	-14.9823	145.3301	105	-14.9886	145.3346	166	-14.9928	145.3279	200	-14.9922	145.3234
43	-14.9823	145.3301	106	-14.9888	145.3349	167	-14.9927	145.3279	201	-14.9922	145.3234
44	-14.9823	145.3303	107	-14.9893	145.3352	168	-14.9875	145.3328	202	-14.9915	145.3232
45	-14.9823	145.3304	108	-14.9894	145.3352	169	-14.9877	145.3331	203	-14.9912	145.3232
46	-14.9823	145.3304	109	-14.9894	145.3349	170	-14.9878	145.3334	204	-14.9908	145.3235
47	-14.9824	145.3304	110	-14.9895	145.3348	171	-14.9876	145.3335	205	-14.9908	145.3238
48	-14.9825	145.3303	111	-14.9897	145.3347	172	-14.9873	145.3335	206	-14.9907	145.3242
49	-14.9826	145.3303	112	-14.9897	145.3344	173	-14.9872	145.3333	207	-14.9907	145.3245
50	-14.9827	145.3304	112	-14.9896	145.3341	174	-14.9872	145.3331	208	-14.9906	145.3248
51	-14.9827	145.3305	113	-14.9896	145.3338	175	-14.9874	145.3329	209	-14.9908	145.3251
52	-14.983	145.3306	114	-14.9896	145.3335	176	-14.9882	145.3301	210	-14.9913	145.3252
53	-14.9831	145.3305	115	-14.9899	145.3333	177	-14.9891	145.3308	211	-14.992	145.3259
54	-14.9836	145.3305	116	-14.99	145.3333	178	-14.9902	145.3299	212	-14.9921	145.326
55	-14.9868	145.3323	117	-14.9901	145.3333	179	-14.99	145.3297	213	-14.9924	145.3262
56	-14.987	145.3324	118	-14.9904	145.3335	180	-14.9898	145.3296	214	-14.9924	145.3263
57	-14.9877	145.332	119	-14.9907	145.3336	181	-14.9897	145.3296	215	-14.9925	145.3264
58	-14.989	145.3309	120	-14.991	145.3337	182	-14.9893	145.3295	216	-14.9926	145.3265
59	-14.9887	145.3307	121	-14.991	145.3336	183	-14.9888	145.3295	217	-14.9927	145.3266
60	-14.9882	145.3305	121	-14.9911	145.3336	184	-14.9886	145.3298	218	-14.9928	145.3267
61	-14.9882	145.3304	122	-14.9911	145.3335	185	-14.9914	145.3287			
62	-14.9881	145.3314	123	-14.9911	145.3333	186	-14.9915	145.3288			
63	-14.9873	145.3315	124	-14.9911	145.333	187	-14.9925	145.3279			
64	-14.987	145.3314	125	-14.9911	145.3327	188	-14.9918	145.3276			

Attachment 2b – Geographical coordinates of legacy areas – Airport Lake 2, Airport Lake 4 and Hill 13

Node	Latitude	Longitude	Node	Latitude	Longitude	Node	Latitude	Longitude	Node	Latitude	Longitude
Airport Lake 2 Legacy Area			Airport Lake 4 Legacy Area						Hill 13 Legacy Area		
219	-14.9925	145.3275	284	-14.998059	145.323579	348	-14.999581	145.32202	377	-14.9993	145.3029
220	-14.9925	145.3279	285	-14.998615	145.324166	349	-15.002301	145.319555	378	-14.9995	145.3031
221	-14.9935	145.327	286	-14.999195	145.324237	350	-15.00235	145.31965	379	-14.9998	145.303
222	-14.993	145.3271	287	-14.999223	145.324873	351	-15.002433	145.319736	380	-15.0033	145.3051
223	-14.9927	145.3279	288	-14.99989	145.32528	352	-15.003813	145.318639	381	-15.0035	145.305
224	-14.9928	145.3279	289	-15.0006	145.325498	353	-15.003795	145.318327	382	-15.0028	145.3044
225	-14.9942	145.3289	290	-15.000992	145.32545	354	-15.002877	145.317176	383	-15.0031	145.3041
226	-14.9946	145.3291	291	-15.001124	145.325345	355	-15.002754	145.317392	384	-15.0021	145.3033
227	-14.9947	145.3291	292	-15.001079	145.325144	356	-15.002756	145.317769	385	-15.0022	145.3026
228	-14.9947	145.329	293	-15.000673	145.324344	357	-15.002786	145.318066	386	-15.0031	145.3026
229	-14.9947	145.329	294	-15.000621	145.32406	358	-15.001377	145.317031	387	-15.0034	145.3026
230	-14.994471	145.328731	295	-15.00042	145.323719	359	-15.000662	145.316647	388	-15.0025	145.302
231	-14.99499	145.328206	296	-15.000032	145.323458	360	-15.000491	145.3166	389	-15.0024	145.3022
232	-14.995078	145.328234	297	-14.999988	145.323309	361	-15.000425	145.316159	390	-15.0023	145.3022
233	-14.995698	145.327651	298	-15.000001	145.323168	362	-14.999565	145.316913	391	-15.0021	145.3021
234	-14.99608	145.327577	299	-15.000095	145.323016	363	-14.999113	145.318165	392	-15.0019	145.3019
235	-14.996524	145.327818	300	-15.000268	145.322894	364	-14.998831	145.31784	393	-15.0019	145.3018
236	-14.997309	145.328038	301	-15.000441	145.322722	365	-14.998688	145.317814	394	-15.002	145.3016
237	-14.998008	145.328914	302	-15.00058	145.322741	366	-14.998441	145.317855	395	-15.0019	145.3015
238	-14.998127	145.328899	303	-15.000765	145.322826	367	-14.998251	145.318041	396	-15.0017	145.3015
239	-14.998448	145.328987	304	-15.000923	145.322922	368	-14.998154	145.318179	397	-15.0016	145.3015
240	-14.999147	145.328132	305	-15.001178	145.323003	369	-14.998045	145.318618	398	-15.0014	145.3014
241	-14.99903	145.327933	306	-15.00127	145.323001	370	-14.997933	145.318809	399	-15.0013	145.3012
242	-14.998876	145.327751	307	-15.00174	145.32277	371	-14.997926	145.319048	400	-15.0007	145.3014
243	-14.998481	145.327508	308	-15.002311	145.322859	372	-14.997855	145.319513	401	-15.0008	145.3014
244	-14.998411	145.327177	309	-15.002918	145.323064	373	-14.997898	145.319703	402	-15.0013	145.301
245	-14.998493	145.326982	310	-15.003093	145.323202	374	-14.997944	145.319811	403	-15.0013	145.3008
246	-14.998499	145.326822	311	-15.003199	145.323246	375	-14.997912	145.319905	404	-15.0012	145.3007
247	-14.998468	145.326742	312	-15.003371	145.323149	376	-14.997837	145.319929	405	-15.001	145.3007
248	-14.998366	145.326664	313	-15.003312	145.323006				406	-15.001	145.3008
249	-14.998231	145.326455	314	-15.003261	145.322914				407	-15.0009	145.3008
250	-14.998186	145.326241	315	-15.003151	145.322805				408	-15.0008	145.301
251	-14.998252	145.326142	316	-15.003087	145.322681				409	-15.0007	145.301
252	-14.99833	145.326144	317	-15.003024	145.322622						
253	-14.999017	145.327005	318	-15.003078	145.322527						
254	-14.999276	145.327254	319	-15.003253	145.322463						
255	-14.999477	145.327379	320	-15.003569	145.322475						
256	-14.999749	145.327313	321	-15.003698	145.322617						
257	-14.999915	145.327094	322	-15.003755	145.322798						
258	-14.999876	145.327	323	-15.003916	145.323025						
259	-14.999651	145.326816	324	-15.004042	145.323078						
260	-14.999603	145.326698	325	-15.003623	145.322137						
261	-14.999648	145.326585	326	-15.002033	145.320346						
262	-14.999676	145.326459	327	-14.999279	145.32268						
263	-14.999537	145.326296	328	-15.002606	145.319888						
264	-14.999431	145.326212	329	-15.00265	145.319928						
265	-14.999271	145.32593	330	-15.002788	145.31994						
266	-14.999055	145.325117	331	-15.002935	145.319807						
267	-14.99901	145.324991	332	-15.002955	145.319616						
268	-14.999085	145.324891	333	-15.003374	145.319386						
269	-14.999168	145.324843	334	-15.003553	145.319506						
270	-14.997981	145.323281	335	-15.003665	145.31965						
271	-14.999566	145.322018	336	-15.003745	145.319724						
272	-14.997835	145.319928	337	-15.003894	145.319787						
273	-14.997813	145.319934	338	-15.00415	145.319845						
274	-14.99764	145.31987	339	-15.004282	145.319833						
275	-14.997447	145.319815	340	-15.00436	145.319726						
276	-14.997198	145.319908	341	-15.004394	145.319535						
277	-14.997147	145.319968	342	-15.004389	145.319478						
278	-14.99709	145.320198	343	-15.00452	145.319223						
277	-14.99702	145.32035	344	-15.004537	145.319021						
278	-14.997006	145.320511	345	-15.004439	145.318827						
279	-14.996951	145.320713	346	-15.004323	145.318677						
280	-14.996883	145.320861	347	-15.004063	145.319012						

Appendix 7:
Environment Risk Register & Decision Rules

Environment Risk Register

Facility: North Queensland Cape Flattery Silica Mines Site

Completed by: [redacted]

Reviewed by: [redacted] (SSE), [redacted] (WHS), [redacted] (Prod), [redacted] (Maint), [redacted] (PM), [redacted] (Q&Env), [redacted] (Elect),

Revision No: 7 **Date of Review:** 27/04/2021

Approved by (Name & Position): [redacted] Environmental Coordinator

Date of Initial Assessment: 26-May-16

Next Review Date: 13-Apr-22

INSTRUCTIONS FOR ADDING ROWS

Select the last ROW (content only) hover pointer over the bottom right corner of the last cell then drag down.

This will ensure all formula and formatting is maintained.

						Inherent Risk Analysis				Current Controls			Residual Risk Analysis					Additional Controls Required	Residual Risk with Additional Controls				Provide explanation of how risk is reduced ALARP, with additional controls
Ref No.	Location and/or Dept	Activity / Aspect	Hazard *(source of potential harm or cause)*	Potential Impact *(potential outcome)*	AspectLink	Consequences	Likelihood	Risk Rating	Priority Score	Engineered | Management System Ref Key Standards *(e.g. AS, ISO, BS)* Capital Expense Program | Other	Effectiveness Controls	Person Responsible for Control	Residual Consequences	Residual Likelihood	Residual Risk Rating	Residual Priority Score	Is this risk reduced ALARP? If so provide explanation	Engineered | Management System Ref Key Standards *(e.g. AS, ISO, BS)* Capital Expense Program | Other	Additional Consequences	Additional Likelihood	Additional Risk Rating	Additional Priority Score	
5	Site	Exploration, Mining and other activities involving vehicle and machinery movements between areas	Introduction of weeds/non-local species through vehicles and other equipment brought to site or used in undisturbed areas.	Environment and Legal: Impact to native flora and fauna	Pests & weeds Flora & fauna	3. Moderate	4. Likely	High	7	Physical - Ensure on-site vehicles and new vehicles brought to site are free of plant reproductive material. - Confirm vehicles are weed free when entering undisturbed areas.	Improving	Site Senior Executive	3. Moderate	2. Unlikely	Medium	18	No. Additional controls required.	Physical (2021-2022) - Implement Weed Management Plan and initiate recommended weed control program. System (2021-2022)	3. Moderate	1. Rare	Medium	21	Targeted weed survey has identified problem weeds and informs program for improved weed control outcomes.
6	Site	All site activities involving vehicles, equipment and machinery.	Hydrocarbon spill/leak.	Land contamination	Spills & containment	4. Major	3. Possible	Extreme	11	Physical - Plan and conduct clearing and exploration activities to ensure that a contaminant is not placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance. - Maintain vehicles and equipment in good working order and in accordance with manufacturer specifications. - Clean up spills of hazardous contaminants (ie hydrocarbons) as quickly as practicable. System - Comply with the environmental conditions outlined in the Eligibility criteria and standard conditions for exploration and mineral development projects—Version 2. - Refer to EP001 - Land Disturbance Environmental Program. - Complete monthly reporting under EMRS EP001 Land Disturbance. - Refer to EP002 - Processing Environmental Program. - Complete monthly reporting under EMRS EP002 Processing.	Satisfactory	Site Senior Executive	3. Moderate	1. Rare	Medium	21	Application of controls, historical inspections & audit data provides compliance evidence.				None Entered	Prority Score	
7	Site	Exploration / Mining	Disturbance to land and vegetation not in compliance with the Environmental Authority.	Legal: Non-compliance with Environmental Authority	Land degradation	4. Major	3. Possible	Extreme	11	Physical - Do not disturb more than 1000m2 at any one location. - Measure and clearly demarcate the exploration area prior to undertaking clearing activities. - Avoid disturbing large and/or mature trees; select specific trees to be cleared and avoid causing damage to surrounding vegetation; where practicable leave the rootstock intact to promote regeneration and regrowth. - Operate in accordance with the requirements documented in the Land Clearing Permit. System - Refer to approved mine path documented in EA and ERC. - Comply with the environmental conditions outlined in the Eligibility criteria and standard conditions for exploration and mineral development projects—Version 2. - Undertake pre-clearance surveys in accordance with Land Clearing Procedure. - Complete Land Clearing Permit (CFSM-ENV-FOR-0011) prior to undertaking clearing for exploration activities. - Maintain the Disturbed Land Register to serve as a record of areas of disturbance and their status. - Refer to EP001 - Land Disturbance Environmental Program. - Complete monthly reporting under EMRS EP001 Land Disturbance.	Satisfactory	Site Senior Executive	4. Major	1. Rare	High	19	No. Additional controls required.	2021-2022 (continuing) System - Implement stop-work actions where operators become aware of unauthorised clearing activites. - Update Disturbed Land Register to consolidate planned and actual clearing. - Implement Rehabilitation Manual. - Update EP001 - Land Disturbance Environmental Program with responsibility assigned to Production Manager. - Finalise update to Land Clearing Procedure and Permit with recommendations from [redacted], [redacted] and NRA (draft provided by NRA April 2020). - Prepare and submit draft Progressive Rehabilitation and Closure Plan by 1/06/2022. - Consider update to ERC when changes to planned mine path occur.	4. Major	1. Rare	High	19	
8	Site	Exploration	Loss of topsoil	Environment: Land disturbance and degradation	Land degradation	2. Minor	4. Likely	High	10	Physical - Ensure that topsoil is removed and stockpiled (or directly placed on areas avaialble for rehabilitation) prior to carrying out exploration activity; reuse topsoil within 12 months; establish and maintain a temporary cover crop on stockpiles; and limit the height of topsoil stockpiles to 2 metres. - Operate in accordance with a Land Clearing Procedure, which includes management of topsoil. - Operate in accordance with the requirements documented in the Land Clearing Permit. System - Comply with the environmental conditions outlined in the Eligibility criteria and standard conditions for exploration and mineral development projects—Version 2. - Undertake pre-clearance surveys in accordance with Land Clearing Procedure. - Complete Land Clearing Permit (CFSM-ENV-FOR-0011) prior to undertaking clearing for exploration activities. - Refer to EP001 - Land Disturbance Environmental Program. - Complete monthly reporting under EMRS EP001 Land Disturbance.	Satisfactory	Site Senior Executive	2. Minor	2. Unlikely	Low	22	Application of controls, historical inspections & audit data provides compliance evidence.				None Entered	Prority Score	
9	Site	Exploration, Mining	Unreasonable noise at a Noise Sensitive Place.	Non-compliance with the Environmental Authority.	Noise pollution	2. Minor	1. Rare	Low	23	Physical - Maintain equipment in good working order and in accordance with manufacturer specifications. (CFSM is not near a noise sensitive place). - Refer to EP001 - Land Disturbance Environmental Program. - Complete monthly reporting under EMRS EP001 Land Disturbance.	Satisfactory	Site Senior Executive	2. Minor	1. Rare	Low	23	Application of controls, historical inspections & audit data provides compliance evidence.				None Entered	Prority Score	

Environment Risk Register

Ref No.	Location and/or Dept	Activity / Aspect	Hazard *(source of potential harm or cause)*	Potential Impact *(potential outcome)*	AspectLink	Inherent Risk Analysis: Consequences	Inherent Risk Analysis: Likelihood	Inherent Risk Analysis: Risk Rating	Inherent Risk Analysis: Priority Score	Current Controls: Engineered | Management System Ref Key Standards (*e.g. AS, ISO, BS*) Capital Expense Program | Other	Current Controls: Effectiveness Controls	Current Controls: Person Responsible for Control	Residual Risk Analysis: Residual Consequences	Residual Risk Analysis: Residual Likelihood	Residual Risk Analysis: Residual Risk Rating	Residual Risk Analysis: Residual Priority Score	Is this risk reduced ALARP? If so provide explanation	Additional Controls Required: Engineered | Management System Ref Key Standards (*e.g. AS, ISO, BS*) Capital Expense Program | Other	Residual Risk with Additional Controls: Additional Consequences	Residual Risk with Additional Controls: Additional Likelihood	Residual Risk with Additional Controls: Additional Risk Rating	Residual Risk with Additional Controls: Additional Priority Score	Provide explanation of how risk is reduced ALARP, with additional controls
14	Site	Exploration, Mining	Disturbance to cultural heritage sites.	Environment and Legal: impact to cultural heritage and non-conformance with legislative requirements.	Heritage preservation	2. Minor	5. Almost Certain	High	5	System - Undertake pre-clearance surveys for cultural heritage artefacts with appropriate local aboriginal heritage representatives. - Implement pre-clearance surveys in accordance with Land Clearing Procedure and Land Clearing Permit (CFSM-ENV-FOR-0011). - Refer to EP001 - Land Disturbance Environmental Program. - Complete monthly reporting under EMRS EP001 Land Disturbance.	Satisfactory	Site Senior Executive	2. Minor	2. Unlikely	Low	22	Application of controls, historical inspections & audit data provides compliance evidence.	2021-2022 System - Obtain additional resources and assistance to meet Cultural Herigage Agreement obligations (additonal personnel or consultant assistance).			None Entered	Prority Score	
15	Site	Mining	Disturbance to land and vegetation not in compliance with the Environmental Authority.	Non-compliance with the Environmental Authority.	Land degradation	4. Major	5. Almost Certain	Extreme	2	Physical - Minimise clearing footprints. - Commence rehabilitation activities as soon as practicable after disturbed areas become available for rehabilitation. System - Refer to proposed disturbance documented in the Estimated Rehabilitation Cost (ERC) submission. - Update Rehabilitation Planning documents with rehabilitation plans and schedules for disturbed areas every 1-2 years. - Undertake pre-clearance surveys in accordance with Land Clearing Procedure and Land Clearing Permit (CFSM-ENV-FOR-0011). - Maintain Disturbed Land Register. - Refer to EP001 - Land Disturbance Environmental Program. - Complete monthly reporting under EMRS EP001 Land Disturbance.	Satisfactory	Site Senior Executive	4. Major	2. Unlikely	High	16	No. Additional controls required.	2021-2022 (continuing) System - Implement stop-work actions where operators become aware of unauthorised clearing activites. - Update Disturbed Land Register to consolidate planned and actual clearing. - Implement Rehabilitation Manual. - Update EP001 - Land Disturbance Environmental Program with responsibility assigned to Production Manager. - Finalise update to Land Clearing Procedure and Permit with recommendations from [redacted] and NRA (draft provided by NRA April 2020). - Consider update to ERC to reflect changes to planned mine path.	4. Major	1. Rare	High	19	Application of controls, historical inspections & audit data provides compliance evidence.
16	Site	Exploration, Mining	Machinery movement and clearing activities.	Fauna injury/death	Animal management	2. Minor	4. Likely	High	10	Physical - Clear only when necessary. - Maintain low vehicle speed. - Traffic controls and speed limits. - Operate in accordance with Species Management Program. System - Undertake pre-clearance surveys in accordance with Land Clearing Procedure and Land Clearing Permit (CFSM-ENV-FOR-0011). - Undertake fauna/flora inspection prior to clearing. - Report in accordance with Species Management Program. - Refer to EP001 - Land Disturbance Environmental Program. - Complete monthly reporting under EMRS EP001 Land Disturbance. - Refer to EP002 - Processing Environmental Program. - Complete monthly reporting under EMRS EP002 Processing.	Satisfactory	Site Senior Executive	2. Minor	1. Rare	Low	23	Application of controls, historical inspections & audit data provides compliance evidence.				None Entered	Prority Score	
17	Site	Exploration, Mining	Machinery movement and clearing activities.	Loss of topsoil Impacting native flora and fauna communities.	Land degradation	3. Moderate	4. Likely	High	7	Physical - Ensure that topsoil is removed and stockpiled (or directly placed on areas avaialble for rehabilitation) prior to carrying out exploration activity; reuse topsoil within 12 months; establish and maintain a temporary cover crop on stockpiles; and limit the height of topsoil stockpiles to 2 metres. System - Undertake pre-clearance surveys in accordance with Land Clearing Procedure and Land Clearing Permit (CFSM-ENV-FOR-0011). - Refer to EP001 - Land Disturbance Environmental Program. - Complete monthly reporting under EMRS EP001 Land Disturbance.	Satisfactory	Site Senior Executive	3. Moderate	1. Rare	Medium	21	Application of controls, historical inspections & audit data provides compliance evidence.				None Entered	Prority Score	
18	Site	Exploration, Mining	Track development	Environmental: Loss of vegetation and fauna habitat. Legal: Non-conformance with legislative obligations.	Flora & fauna	4. Major	5. Almost Certain	Extreme	2	Physical - Minimise clearing footprints during exploration. - Commence rehabilitation activities as soon as practicable after disturbed areas become available for rehabilitation. System - Refer to CFSM-ENV-PLN-0005 Rehabilitation Plan. - Refer to CFSM-ENV-PLN-0006 Rehabilitation Manual. - Refer to CFSM-ENV-PLN-0007 Rehabilitation Monitoring Manual. - Update Rehabilitation Planning documents with rehabilitation plans and schedules for disturbed areas every 1-2 years. - Follow requirements of the Species Management Program. - Undertake pre-clearance surveys in accordance with Land Clearing Procedure and Land Clearing Permit (CFSM-ENV-FOR-0011). - Refer to EP001 - Land Disturbance Environmental Program. - Complete monthly reporting under EMRS EP001 Land Disturbance.	Satisfactory	Site Senior Executive	4. Major	2. Unlikely	High	16	No. Additional controls required.	2021-2022 (continuing) System - Implement procedures and recommendations from Rehabilitation Plan, Rehabilitation Manual and Rehabilitation Monitoring Manual. - Update EP001 - Land Disturbanc Environmental Program with responsibility assigned to Production Manager. - Finalise update to Land Clearing Procedure and Permit with recommendations from [redacted] and NRA (draft provided by NRA April 2020).	4. Major	1. Rare	High	19	Application of controls, historical inspections & audit data provides compliance evidence.

Approved by: [redacted]

Environment Risk Register

						Inherent Risk Analysis				Current Controls			Residual Risk Analysis					Additional Controls Required	Residual Risk with Additional Controls				Provide explanation of how risk is reduced ALARP, with additional controls
Ref No.	Location and/or Dept	Activity / Aspect	Hazard *(source of potential harm or cause)*	Potential Impact *(potential outcome)*	AspectLink	Consequences	Likelihood	Risk Rating	Priority Score	Engineered | Management System Ref Key Standards (*e.g. AS, ISO, BS*) Capital Expense Program | Other	Effectiveness Controls	Person Responsible for Control	Residual Consequences	Residual Likelihood	Residual Risk Rating	Residual Priority Score	Is this risk reduced ALARP? If so provide explanation	Engineered | Management System Ref Key Standards (*e.g. AS, ISO, BS*) Capital Expense Program | Other	Additional Consequences	Additional Likelihood	Additional Risk Rating	Additional Priority Score	
19	Site	Exploration, Mining	Machinery movement and clearing activities.	Environmental: tampering with animal breeding place. Legal: non-conformance with Nature Conservation Act 1992.	Animal management	3. Moderate	4. Likely	High	7	System - Undertake pre-clearance surveys for animal breeding places. - Undertake pre-clearance surveys in accordance with Land Clearing Procedure and Land Clearing Permit (CFSM-ENV-FOR-0011). - Follow the requirements of the Species Management Program for those species whose breeding places will be affected by exploration activities. - Report in accordance with the Species Management Program. - Refer to EP001 - Land Disturbance Environmental Program. - Complete monthly reporting under EMRS EP001 Land Disturbance	Satisfactory	Site Senior Executive	3. Moderate	1. Rare	Medium	21	Application of controls, historical inspections & audit data provides compliance evidence.				None Entered	Prority Score	
24	Site	Mining	Alteration of land formation / structure	Land disturbance and degradation.	Land degradation	2. Minor	4. Likely	High	10	System - Refer to CFSM-ENV-PLN-0005 Rehabilitation Plan. - Refer to CFSM-ENV-PLN-0006 Rehabilitation Manual. - Refer to CFSM-ENV-PLN-0007 Rehabilitation Monitoring Manual. - Consider final landform requirements for rehabilitation planning (Rehabilitation Optimisation). - Refer to EP002 - Processing Environmental Program. - Complete monthly reporting under EMRS EP002 Processing. - Refer to EP006 - Rehabilitation Management Environmental Program. - Complete monthly reporting under EMRS EP002 Rehabilitation Management	Satisfactory	Production Manager	2. Minor	1. Rare	Low	23	No. Additional controls required.	2021-2022 (continuing) System - Implement procedures and recommendations from Rehabilitation Plan, Rehabilitation Manual and Rehabilitation Monitoring Manual. - Use rehabilitation documents to implement appropriate final landform design in completed mining areas prior to commencement of rehabilitation.	2. Minor	1. Rare	Low	23	Application of controls, historical inspections & audit data provides compliance evidence.
26	Site	Monitoring and Reporting	Not reporting in accordance with site liences and permits (eg EA, water licence).	Legal: Non-compliance with Environmental Authority, water licence, legislative obligations.	Site requirements	3. Moderate	4. Likely	High	7	System - Undertake environmental reporting in accordance with relevant lincenses and authorities as documented in the CFSM Environment Calendar. - Refer to EP007 - Environmental Monitoring and Reporting Environmental Program. - Complete monthly reporting under EMRS EP007 Environmental Monitoring and Reporting.	Satisfactory	Quality Control and Environment Manager	3. Moderate	1. Rare	Medium	21	Application of controls, historical inspections & audit data provides compliance evidence.				None Entered	Prority Score	
31	Site	Management of general waste	Unsatisfactory management of general waste may lead to wind blowng material and contamination of the surrounding environment.	Environmental: Land, surface water, groundwater contamination Legal: non-conformance with EA and legal obligations.	Land pollution	3. Moderate	4. Likely	High	7	Physical - Operate and manage general waste in accordance with the Waste Management Plan. - Store general waste in closed containers. Remove general wastes from site as soon as practicable. System - Refer to EP005 - Product Supply and Waste Management Environmental Program. - Complete monthly reporting under EMRS EP005 Product Supply and Waste Management. - Refer to EP007 - Environmental Monitoring and Reporting Environmental Program. - Complete monthly reporting under EMRS EP007	Satisfactory	Purchasing Manager	3. Moderate	1. Rare	Medium	21	Application of controls, historical inspections & audit data provides compliance evidence.				None Entered	Prority Score	
32	Site	Management of regulated waste	Unsatisfactory management of regulated wastes may lead to spills/leaks and contamination of the surrounding environment.	Environmental: Land, surface water, groundwater contamination Legal: non-conformance with EA and legal obligations.	Land pollution	4. Major	4. Likely	Extreme	6	Physical - Operate and manage regulated waste in accordance with the Waste Management Plan. - Store regulated wastes in appropriate closed containers. - Remove regulated wastes from site as soon as practicable. - Ensure wastes are transported and disposed in accordance with the Environmental Protection Act 1994 and Environmental Protection Regulation 2008, including maintaining appropriate waste tracking certificates. System - Refer to EP005 - Product Supply and Waste Management Environmental Program. - Complete monthly reporting under EMRS EP005 Product Supply and Waste Management. - Refer to EP007 - Environmental Monitoring and Reporting Environmental Program.	Satisfactory	Purchasing Manager	4. Major	1. Rare	High	19	Application of controls, historical inspections & audit data provides compliance evidence.				None Entered	Prority Score	
38	Site	All activities	Poorly or incorrectly resourced activity	Environmental harm resulting from poorly resourced activities.	General environmental duty	3. Moderate	5. Almost Certain	Extreme	3	System Managers to review annual resource requirements and submit to SSE and GM annually (approximately October - December). - Managers, SSE and GM to meet and confirm/ agree resourcing priorities for capital and expendature budget (CAPEX). - CAPEX budget submitted to Mitsubishi Corporation for approval by the Board of Directors in March, ahead of new financial year commencing April.	Satisfactory	Site Senior Executive	3. Moderate	1. Rare	Medium	21	Application of controls, historical inspections & audit data provides compliance evidence.				None Entered	Prority Score	

Approved by: [redacted]

CONSEQUENCE of an event occurring	Type of Potential Event (Incidents)		Note: Damage and other forms of loss will include theft, fire, and damage to vehicles or equipment.
	Injury Harm	**Environmental Damage**	**Property Damage or other forms of loss**
C5-Catastrophic	**Life Threatening Event**: Fatality or significant permanent disability. Prohibition Notice and OHS prosecution likely.	**Major impact** (immediate and/or serious long term harm), high potential for adverse publicity, potential EPA prosecution)	Significant financial impact Greater than $1,000, 000
C4-Major	**Potential Life Threatening Event:** Serious LTI (lost days duration 4 days or more, potential for permanent disability; Potential for OHS prosecution)	**Off-site impact and EPA reportable incident;** (off-site = effecting neighbouring property/water), measurable environmental harm penalised by EPA	Significant financial impact Between $100,000 to $1, 000, 000
C3-Serious	**Serious Injury Event:** Lost Time Injury (LTI) potential Injury for 1-3 days; Medical Treatment Injury (MTI) with work restricted duties; Improvement Notice likely for OHS regulator	**Localised impact = contained within the site boundary:** Reportable to EPA with infringement potential; Reported as Significant Incident (Company)	Between $10,000 to $100,000 loss
C2-Moderate	**Minor Injury Event:** Medical Treatment Injury (MTI) with no restricted duties, Technical breach/infringement of OHS Regulation potential for Improvement Notice	**Minor impact:** immediate containment/control, potential harm to environment, clean up required, reportable to EPA with infringement potential. Reported as Significant Incident (Company)	Between $1000 to $10,000 loss
C1-Minor	**Nil or potential minor injury event:** No injury likely or potential for minor First Aid Case (FAC). No OHS regulatory breach, Minor illness	**Negligible impact or temporary inconvenience** not requiring EPA notification	Less than $1000 loss

5X5 Matrix			Consequence				
			C1 -Minor	C2-Moderate	C3-Serious	C4-Major	C5-Catastrophic
Likelihood	L5	Almost Certain	Medium	High	Extreme	Extreme	Extreme
	L4	Likely	Low	Medium	High	Extreme	Extreme
	L3	Possible	Low	Medium	Medium	High	Extreme
	L2	Unlikely	Low	Low	Medium	Medium	High
	L1	Rare	Low	Low	Low	Low	Medium

LIKELIHOOD	Frequency of an Event
L5-Almost Certain	Common or repeating occurrence, most likely
L4-Likely	Known to occur, or, "it has happened"
L3-Possible	Could occur
L2-Unlikely	Not likely to occur/remote
L1-Rare	Practically impossible/rare occurrence

THIS 5 x 5 RISK MATRIX is based on the AS 4360 risk evaluation requirements

It can be used in conjunction with any existing hazard and risk management process such as:

- Hazard / Risk Assessment Register
- Project Hazard & Risk Assessment
- Safe Work Method Statements
- Job Safety Analysis
- Crisis and Emergency Response
- Incident Investigation

MANANGEMENT RESPONSE (Where relating to a risk for a work task)		
Level of Risk **Prior** to control(s) applied		**Actions to be taken** Assess/verify proposed hazard controls to be applied in order to reduce residual risk to as low as is practicable
20-25	**Extreme**	**STOP** – analyse work method & ensure substantial safe work controls are determined (i.e. personal locks and permit system) and documented. Final methodology to be authorised by Senior/Responsible Manager. Closely monitor progress & compliance.
16-19	**High**	**Formal and approved Work method developed and detailed Job Hazard Analysis** (JHA or similar) documented by Supervisor and confirms person or work crew understand requirements & are competent to implement controls and safely complete the work. Monitor progress & compliance.
9-15	**Medium**	**Documented Safe Work Procedure used** (ie Job Hazard Analysis (JHA) or similar is prepared prior to starting work. Supervisor confirms person or work crew understand requirements and implement the hazard control(s).
1-8	**Low**	**Take 5 or similar used**. Supervisor to review work/tasks and discuss at prior to starting task with the person or crew.

Appendix 8:
PRCP Schedule

Comprises a completed Excel Spreadsheet prepared using the DES template (ESR/2019/5103. Version 1.00. Effective 1 November 2019, and current as at 31 May 2022) and two Figures.

Progressive Rehabilitation and Closure Plan Schedule template

Instructions

General Instructions:

- **This form can be used for completing a PRCP schedule for the submission of a progressive rehabilitation and closure plan (PRC plan).**
- **See the PRCP schedule section of the PRC plan guideline (ESR/2019/4964) for further information requirements.**

- A default value of one (1) Rehabilitation Area (RA) is represented by one RA sheets below (RA1).
- A default value of one (1) Improvement Area (IA) is represented by one IA sheet below (IA1).

- To record additional RAs for your project make a copy of the RA sheet below and update it to the relevant RA number (i.e. RA2).
- To record additional IAs for your project make a copy of the IA sheet below and update it to the relevant IA number (i.e. IA2).
- To remove the IA sheet if there is no IA for your project, delete the IA sheet below.

- Each RA and IA sheet contains **two separate excel tables** (yellow and blue) for recording the time-based rehabilitation milestones.
- Add a new column or row to each table as required for your information requirements.

- Two (2) separate sheets below exist for recording the "Rehabilitation Area Milestones" and "Improvement Area Milestones".
- Delete the Improvement Area Milestone sheet if it does not apply to your project.
- Delete additional rows in either sheet if they do not apply to your project.
- See the PRC plan guideline for a list of reference milestones and further information for developing additional site-specific milestones where appropriate.

Further Instructions when inputting PMLUs

Headings under Rehabilitation Area (RA) sheets

Rehabilitation area - The rehabilitation area must align with the spatial information included in the rehabilitation planning part of the PRC plan. This area must have the same PMLU and same milestones applied to the whole area.

Relevant activities - The relevant activities must align with the activities identified in the rehabilitation planning part of the PRC plan. The relevant activities are those undertaken within the rehabilitation area prior to land becoming available for rehabilitation.

Total size of rehabilitation area (ha) - Total size of rehabilitation area in hectares.

Commencement of first milestone - The applicant must nominate a date for when the first milestone for the rehabilitation area will commence. The milestone reference for the first milestone must be included in the heading.

PMLU - The PMLU must align with those identified in the rehabilitation planning part of the PRC plan and in the proposed final site design.

Date area is available - The PRCP schedule must identify when land within the rehabilitation area becomes available for rehabilitation. If the whole rehabilitation area becomes available at once there should be only one date. If the rehabilitation areas becomes available progressively there should be multiple dates. These dates should reflect the information provided in the rehabilitation planning part of the PRC plan.

Cumulative area available (ha) - The PRCP schedule must identify the area of land within the rehabilitation area that will become available at a given time.

Milestone completed by - The PRCP schedule must identify completion dates for milestones to be completed.

Cumulative area achieved (ha) - The PRCP schedule must show how progressive rehabilitation is being achieved over the life of the mine. This section must reflect the proposed rehabilitation work required for the rehabilitation area to achieve stable condition. The milestone reference to be included refers back to the Rehabilitation Area Milestones sheet with the detailed milestone criteria. The milestones must be achieved consecutively.

Headings under Rehabilitation Area Milestones sheet

Rehabilitation milestone & Milestone criteria - The “rehabilitation milestone” is a short description of the rehabilitation activities. The "milestone criteria" must be able to demonstrate achievement of the milestone.

Further Instructions when inputting NUMAs

Headings under Improvement Area (IA) sheets

Improvement area - The improvement area must align with the spatial information included in the rehabilitation planning part of the PRC plan. This area must have the same NUMA and same milestones applied to the whole area.

Relevant activities - The relevant activities must align with the activities identified in the rehabilitation planning part of the PRC plan. The relevant activities are those undertaken within the improvement area prior to land becoming available for improvement.

Total size (ha) - Total size of improvement area in hectares.

Commencement of first milestone - The applicant must nominate a date for when the first milestone for the improvement area will commence. The milestone reference for the first milestone must be included in the heading.

NUMA - The NUMA must align with those identified in the rehabilitation planning part of the PRC plan and in the proposed final site design.

Date area is available - The PRCP schedule must identify when land within the improvement area becomes available for improvement. If the whole improvement area becomes available at once there should be only one date. If the improvement areas becomes available progressively there should be multiple dates. These dates should reflect the information provided in the rehabilitation planning part of the PRC plan.

Cumulative area available (ha) - The PRCP schedule must identify the area of land within the improvement area that will become available at a given time.

Milestone completed by - The PRCP schedule must identify completion dates for milestones to be completed.

Cumulative area achieved (ha) - The PRCP schedule must show how progressive improvement is being achieved over the life of the mine. This section must reflect the proposed management work required for the improvement area to achieve sufficient improvement. The milestone reference refers back to the Improvement Area Milestones sheet with the detailed milestone criteria. The milestones must be achieved consecutively.

Post-mining land uses (PMLU)										
Rehabilitation area	RA1									
Relevant activities	Environmental Authority Schedule F Table 1 Disturbance Category ''Active mining, non-active mining" and "Borrow Pits" (Existing rehabilitation non-certified)									
Total rehabilitation area size (ha)	82.2									
Commencement of first milestone: RM4	1/06/2022									
PMLU	Conservation Use									
Date area is available	1/01/2008	1/01/2009	1/01/2013	1/01/2015	1/01/2017	1/01/2020	1/01/2021			
Cumulative area available (ha)	13.9	37.6	44.7	47.3	53.8	67.1	82.2			
Milestone completed by	31/12/2038	31/12/2039	31/12/2043	31/12/2045	31/12/2047	31/12/2050	31/12/2051			
Milestone Reference	**Cumulative area achieved (ha)**									
RM4	13.9	37.6	44.7	47.3	53.8	67.1	82.2			
RM20	13.9	37.6	44.7	47.3	53.8	67.1	82.2			

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	RA2									
Relevant activities	Environmental Authority Schedule F Table 1 Disturbance Category 'Access' (Existing Rehabilitation non-certified)									
Total rehabilitation area size (ha)	12.1									
Commencement of first milestone: RM4	1/06/2022									
PMLU	Conservation Use									
Date area is available	1/01/2011	1/01/2020								
Cumulative area available (ha)	6.6	12.1								
Milestone completed by	31/12/2031	31/12/2040								
Milestone Reference	**Cumulative area achieved (ha)**									
RM4	6.6	12.1								
RM20	6.6	12.1								

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	RA3													
Relevant activities	Environmental Authority Schedule F Table 1 Disturbance Category "Active mining, non-active mining" and "Borrow Pits" (Proposed rehabilitation)													
Total rehabilitation area size (ha)	1164.4													
Commencement of first milestone: RM1	1/01/2023													
PMLU	Conservation Use													
Date area is available	1/01/2023	1/01/2028	1/01/2033	1/01/2038	1/01/2043	1/01/2048	1/01/2053							
Cumulative area available (ha)	200.0	400.0	600.0	750.0	900.0	1050.0	1164.4							
Milestone completed by	31/12/2027	31/12/2032	31/12/2037	31/12/2042	31/12/2047	31/12/2052	31/12/2056	31/12/2057	31/12/2062	31/12/2067	31/12/2072	31/12/2077	31/12/2082	31/12/2086
Milestone Reference	**Cumulative area achieved (ha)**													
RM1	200	400	600	750	900	1050	1164.4							
RM2	200	400	600	750	900	1050	1164.4							
RM3	200	400	600	750	900	1050	1164.4							
RM4								200	400	600	750	900	1050	1164.4
RM20								200	400	600	750	900	1050	1164.4

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	Environmental Authority Schedule F Table 1 Disturbance Category "Mobile infrastructure", "Access" (Proposed rehabilitation																			
Total rehabilitation area size (ha)	211.1																			
Commencement of first milestone: RM1	1/01/2059																			
PMLU	Conservation Use																			
Date area is available	1/01/2059	1/01/2060	1/01/2063	1/01/2066	1/01/2078	1/01/2079		1/01/2082		1/01/2085	1/01/2086	1/01/2087	1/01/2088							
Cumulative area available (ha)	12.7	19.2	44.1	47.6	74.2	100.7		106.6		139.2	168.5	198.5	211.1							
Milestone completed by	31/12/2059	31/12/2060	31/12/2063	31/12/2066	31/12/2078	31/12/2079	31/12/2080	31/12/2082	31/12/2083	31/12/2085	31/12/2086	31/12/2087	31/12/2088	31/12/2098	31/12/2099	31/12/2102	31/12/2105	31/12/2106	31/12/2107	31/12/2108
Milestone Reference	**Cumulative area achieved (ha)**																			
RM1	12.7	19.2	44.1	47.6	74.2	100.7		106.6		139.2	168.5	198.5	211.1							
RM2	12.7	19.2	44.1	47.6	74.2	100.7		106.6		139.2	168.5	198.5	211.1							
RM3	12.7	19.2	44.1	47.6	74.2	100.7		106.6		139.2	168.5	198.5	211.1							
RM4						12.7	19.2		44.1		47.6			74.2	100.7	106.6	139.2	168.5	198.5	211.1
RM20						12.7	19.2		44.1		47.6			74.2	100.7	106.6	139.2	168.5	198.5	211.1

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	RA5									
Relevant activities	Environmental Authority Schedule F Table 1 Disturbance Category 'Treatment Plant' (Proposed rehabilitation)									
Total rehabilitation area size (ha)	60.1									
Commencement of first milestone: RM1	1/01/2057									
PMLU	Conservation Use									
Date area is available	1/01/2057	1/01/2058								
Cumulative area available (ha)	20.1	60.1								
Milestone completed by	31/12/2057	31/12/2058	31/12/2087	31/12/2088						
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	20.1	60.1								
RM2	20.1	60.1								
RM3	20.1	60.1								
RM4			20.1	60.1						
RM20			20.1	60.1						

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	Environmental Authority Schedule F Table 1 Disturbance Category 'Quarries and Borrow Pits', Disturbance Type 'Quarry (incl borrow pits)'. RA6 relevant to Quarry areas at headlands including abandoned fuel storage area above the township. RA6 does not include Borrow pits (red sand) in mining areas or adjacent to haul roads. (Proposed rehabilitation)									
Total rehabilitation area size (ha)	2.2									
Commencement of first milestone: RM4	1/01/2109									
PMLU	Conservation Use									
Date area is available	1/01/2109									
Cumulative area available (ha)	2.2									
Milestone completed by	31/12/2110									
Milestone Reference	**Cumulative area achieved (ha)**									
RM4	2.2									
RM8	2.2									
RM9	2.2									
RM10	2.2									
RM11	2.2									

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	RA7									
Relevant activities	Environmental Authority Schedule F Table 1 Disturbance Category 'Township'									
Total rehabilitation area size (ha)	12.9									
Commencement of first milestone: RM4	1/01/2109									
PMLU	Hope Vale Owner Use									
Date area is available	1/01/2109									
Cumulative area available (ha)	12.9									
Milestone completed by	31/12/2110									
Milestone Reference	**Cumulative area achieved (ha)**									
RM4	12.9									
RM5	12.9									
RM12	12.9									
RM19	12.9									

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	RA8										
Relevant activities	Environmental Authority Schedule F Table 1 Disturbance Category 'Infrastructure', Disturbance Type 'Airstrip'										
Total rehabilitation area size (ha)	7.8										
Commencement of first milestone: RM14	1/01/2109										
PMLU	Hope Vale Owner Use										
Date area is available	1/01/2109										
Cumulative area available (ha)	7.8										
Milestone completed by	31/12/2110										
Milestone Reference	**Cumulative area achieved (ha)**										
RM14	7.8										
RM19	7.8										

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	RA9									
Relevant activities	Environmental Authority Schedule F Table 1 Disturbance Category 'Infrastructure', Disturbance Type 'Landfill'. (Proposed rehabilitation)									
Total rehabilitation area size (ha)	0.7									
Commencement of first milestone: RM4	1/01/2109									
PMLU	Native Grass									
Date area is available	1/01/2109									
Cumulative area available (ha)	0.7									
Milestone completed by	31/12/2110									
Milestone Reference	**Cumulative area achieved (ha)**									
RM4	0.7									
RM6	0.7									
RM7	0.7									
RM8	0.7									

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	RA10									
Relevant activities	Environmental Authority Schedule F Table 1 Disturbance Category 'Infrastructure' and 'Treatment Plant', All Disturbance Types other than 'Airstrip' (RA6) and 'Landfill' (RA9)									
Total rehabilitation area size (ha)	6.4									
Commencement of first milestone: RM4	1/01/2109									
PMLU	Hope Vale Owner Use									
Date area is available	1/01/2109									
Cumulative area available (ha)	6.4									
Milestone completed by	31/12/2110									
Milestone Reference	**Cumulative area achieved (ha)**									
RM4	6.4									
RM5	6.4									
RM12	6.4									
RM15	6.4									
RM19	6.4									

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	RA11									
Relevant activities	Environmental Authority Schedule F Table 1 Disturbance Category 'Access'									
Total rehabilitation area size (ha)	71.7									
Commencement of first milestone: RM5	1/01/2109									
PMLU	Hope Vale Owner Use									
Date area is available	1/01/2109									
Cumulative area available (ha)	71.7									
Milestone completed by	31/12/2110									
Milestone Reference	**Cumulative area achieved (ha)**									
RM5	71.7									
RM12	71.7									
RM13	71.7									
RM19	71.7									

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				RA12							
Relevant activities				Environmental Authority Schedule F Table 1 Disturbance Category 'Dams and Diversions', Disturbance Type 'Water Diversions'							
Total rehabilitation area size (ha)				10.4							
Commencement of first milestone: RM4				1/01/2109							
PMLU				Hope Vale Owner Use							
Date area is available	1/01/2109										
Cumulative area available (ha)	10.4										
Milestone completed by	31/12/2110										
Milestone Reference	**Cumulative area achieved (ha)**										
RM4	10.4										
RM18	10.4										
RM19	10.4										

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	RA13										
Relevant activities	Environmental Authority Schedule F Table 1 Disturbance Category 'Dams and Diversions', Disturbance Type 'Arnie's Dam'										
Total rehabilitation area size (ha)	10.0										
Commencement of first milestone: RM4	1/01/2109										
PMLU	Hope Vale Owner Use										
Date area is available	1/01/2109										
Cumulative area available (ha)	10.0										
Milestone completed by	31/12/2110										
Milestone Reference	**Cumulative area achieved (ha)**										
RM4	10.0										
RM16	10.0										
RM17	10.0										
RM19	10.0										

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	Landform preparation.	Landform preparation completed as evidenced in Inspection Test Procedure.
RM2	Surface preparation.	(a) Tracks ripped (RA4 only) to a depth of 0.5 m and graded; (b) Topsoil spread to a depth of 300 mm (± 200 mm) (RA3 and RA5 only); and (c) Evidence of (a) and (b) documented in Inspection Test Procedure.
RM3	Revegetation.	Revegetation process commenced as evidenced in Inspection Test Procedure.
RM4	All infrastructure/ assets not listed in Appendix 2 Table H are removed.	• All infrastructure/ assets not stipulated in a landholder statement as being retained are removed. • All areas where infrastructure/ assets have been removed have been rehabilitated to meet the completion criteria for Conservation Use as prescribed in **Schedule F - Table 2b** (applicable to RA7, RA10 and RA13).
RM5	Contamination associated with notifiable activities identified, risk to human or ecological receptors in terrestrial or aquatic environments assessed and remediation carried out or site management plan established.	• Site Investigation Report: - prepared and certified by an appropriately qualified person; and - approved in accordance with the Environmental Protection Act 1994. • Site removed from Contaminated Land Register by the registrar; or • Site Management Plan: - prepared and certified by an appropriately qualified person and - approved in accordance with the Environmental Protection Act 1994 and - includes a statement by the underlying landholder accepting responsibility to implement the Site Management Plan.
RM6	Landfill decommissioned according to a plan prepared by an **appropriately qualified person**.	• Decommissioning Plan prepared by an **appropriately qualified person** and implemented as approved by the administering authority. • Native grass present in revegetation of the landfill.
RM7	Landfill seepage water quality does not present a risk of impacting the environmental values of the local aquifer.	• Site Investigation Report: - prepared and certified by an appropriately qualified person; and - approved in accordance with the Environmental Protection Act 1994. • Site removed from Contaminated Land Register by the registrar; or • Site Management Plan: - prepared and certified by an appropriately qualified person and - approved in accordance with the Environmental Protection Act 1994 and - includes a statement by the underlying landholder accepting responsibility to implement the Site Management Plan.
RM8	Stormwater managed to minimise erosion and the likelihood of environmental values in the receiving environment being diminished.	• Within 2 months prior to relinquishment, all retained ESCSs are **certified** by an **appropriately qualified person** as: - being **fit for purpose**; and - causing no environmental harm.
RM9	Achievement of vegetation requirements for quarries.	• Declared pest plants[2] are being managed to minimise their threat to the surrounding landscape. - A Weed Management Plan is implemented to minimise the weed burden on lease areas and the risk of infestation in rehabilitated areas. - No declared pest plants[2] are recorded in the rehabilitation domain; or - The proportion of **declared pest plant** species relative to reference conditions is **not increasing**[2]. *2 Declared pest plant is defined as a Restricted or Prohibited Matter under the Queensland Biosecurity Act 2014, or are listed under the Weeds of National Significance list (DoEE 2016) and/or the National Environmental Alert List (DoEE 2016). 'Not increasing' is defined as the difference between rehabilitated and reference conditions not showing a successive increase over three successive monitoring events. DoEE 2016, National weeds lists, Australian Government Department of the Environment and Energy, Canberra, <http://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/index.html>.*
RM10	Geotechnical stability is assessed as part of the preparation of the Quarries Decommissioning Plan and works implemented to provide acceptable geotechnical stability.	Within six months prior to relinquishment, a geotechnical assessment has been undertaken by an **appropriately qualified person** to certify that the quarry area is geotechnically stable and meets relevant standards.
RM11	Quarries decommissioned according to a plan developed within 36 months of closure prepared by an appropriately qualified professional.	An **appropriately qualified person** has **certified** that that the quarry area has been decommissioned in accordance with an approved Quarries Decommissioning Plan that has been agreed to in writing by the administering authority.
RM12	Stormwater managed to minimise likelihood of environmental values in the receiving environment being diminished.	• Within 2 months prior to relinquishment, all retained ESCSs are **certified** by an **appropriately qualified person** as: - being **fit for purpose**; and - causing no environmental harm.
RM13	Hopevale Owner Use linear infrastructure fit for purpose on transfer.	• Access roads maintained at transfer. • Fuel and power lines in serviceable condition. • All signage and safety devices retained in place and maintained. • Minor tracks to be retained will remain open and usable at relinquishment. • Within 2 months prior to relinquishment, all retained township access roads, fuel and power lines are **certified** by an **appropriately qualified person** as: - being **fit for purpose**; and - causing no environmental harm.
RM14	Hopevale Owner Use airstrip infrastructure fit for purpose on transfer.	• Airstrip and fuel storage meet relevant standards and are maintained at transfer. • All signage and safety devices retained in place and maintained. • Within 2 months prior to relinquishment, the airstrip and fuel storage area is **certified** by an **appropriately qualified person** as: - being **fit for purpose**; and - causing no environmental harm.
RM15	Hope Vale Owner Use Infrastructure and Treatment Plant equipment and assets meet relevant standards and/or performance is in compliance with the conditions of the environmental authority (EPML00550113).	• Within 2 months prior to relinquishment, all retained infrastructure/ assets associated with the main fuel farm; sewage treatment plant (STP); water supply; powerhouse and fuel storage; water pump, nursery, pipe shed, filter belt pad and laydown areas are **certified** by an **appropriately qualified person** as: - being **fit for purpose**; and - causing no environmental harm.
RM16	All equipment and infrastructure/ assets meet relevant standards and/or performance as required by existing approvals (such as Water Licences).	• Within 2 months prior to relinquishment, all retained Dams and Diversions are **certified** by an **appropriately qualified person** as: - being **fit for purpose**; and - causing no environmental harm.
RM17	Releases or run-off to the surface water receiving environment does not diminish environmental values in the receiving environment.	• Within 2 months prior to relinquishment, a site investigation report is prepared by **appropriately qualified person** that verifies that Arnie's Dam: - meets the relevant water quality parameter requirements in this environmental authority; and - meet the requirements of its intended final use.
RM18	Diversion channels will be open and functional with no signs of active erosion that could compromise functionality.	• Within 2 months prior to relinquishment, all retained ESCSs are **certified** by an **appropriately qualified person** as: - being **fit for purpose**; and - causing no environmental harm. • Within 2 months prior to relinquishment, all retained water diversions and channels are **certified** by an **appropriately qualified person** as: - being **fit for purpose**; and - causing no environmental harm.
RM19	Agreement reached with Traditional Owners on transfer of infrastructure/ assets to maintain existing land use.	• Landholder statement in place to cover infrastructure/ assets. • All areas where infrastructure/ assets have been removed have been rehabilitated to meet the completion criteria for Conservation Use as prescribed in **Schedule F - Table 2b** (RA8, RA11 and RA13 only).
RM20	Rehabilitation objectives in accordance with **Schedule F Table 2b**	Rehabilitation completion criteria in accordance with **Schedule F Table 2b**

1) Insert new rows below the table to record more Rehabilitation Area Milestones for the project
2) Ensure all Rehabilitation 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

Schedule F - Table 2b (Land rehabilitation completion criteria for the attainment of the goals: safe, stable, does not cause environmental harm, and is able to sustain the post-mining land use)

Post-mining land use description	Disturbance category	Disturbance type	Main attribute group	Rehabilitation objectives	Indicators	Completion criteria
Conservation Use[1]	• Borrow pits • Non-active Mining • Active Mining	Borrow pits (red sand) in mining areas or adjacent to haul roads	Socio-economic	Conservation Use is confirmed by TOs as the preferred post-mining land use prior to relinquishment[1].	• Documentation.	• Documented confirmation exists that Conservation Use remains the preferred post-mining land use prior to relinquishment.

Post-mining land use description	Disturbance category	Disturbance type	Main attribute group	Rehabilitation objectives	Indicators	Completion criteria
		All areas disturbed directly by sand mining (sand removal and/or rejects replacement) including mining under rehabilitation, current mining or awaiting commencement of rehabilitation.		Rehabilitation to include plants recognised by TOs as important food plants or those having the potential for commercial exploitation by TOs (referred to generally as 'special use plants')[5] through inclusion of planting material in revegetation works.	• Species composition.	• Two or more (≥2) special use plants (**Appendix 2 Table A**)[5] are recorded in each rehabilitation domain.
			Landscape context[19]	Mining on the project area will not result in the loss of a rare or significant landform type[6] in the Cape Flattery Dunefield.	• Land occupied by a rare or significant landform type[6] disturbed by mining on the project area.	• No loss of a rare or significant landform type (**Appendix 2 Table B**)[6] in the Cape Flattery Dunefield as a result of mining on the project area.
				Rehabilitated landforms will contain complexity at different scales that is characteristic of the surrounding un-mined dunefield landform.	• **Landform element**[7] **richness** per rehabilitation area.	• Each rehabilitation area will contain no less than 4 different landform elements (**Appendix 2 Table C**)[7]. [Rehabilitation area scale complexity.]
					• **Landform element**[7] richness per rehabilitation area. • **Landform element**[7] **richness** per nominal 4 ha grid cell in un-mined areas.	• Within each rehabilitation domain, the median landform element[7] richness per rehabilitation area will be greater than or equal to eight landform elements (≥8). [Rehabilitation domain scale complexity.]
					• **Landform element**[7] **richness** per rehabilitation area. • **Landform element**[7] **richness** per nominal 4 ha grid cell in un-mined areas.	• The range in **landform element**[7] **richness** per rehabilitation area, across all rehabilitation domains available for assessment, will fall within the range of 3 to 47 landform elements. [Dunefield scale complexity.]

Post-mining land use description	Disturbance category	Disturbance type	Main attribute group	Rehabilitation objectives	Indicators	Completion criteria
				Rehabilitated landforms will contain a range of **landform elements** that are common to and characteristic of the surrounding un-mined dunefield.	• Proportion of land area in each rehabilitation domain occupied by the 30 **landform elements**[8] common to all dunefield landforms in un-mined areas. • Proportion of land area in each rehabilitation domain occupied by the 24 **landform elements** that account for 95% of the un-mined dunefield land area[9].	• The land area of each rehabilitation domain occupied by any of the 30 common **landform elements**[8] will be greater than or equal to 80% ***or*** • The land area of each rehabilitation domain occupied by any of the 24 **landform elements** that account for 95% of the un-mined dunefield land area[9] will be greater than or equal to 75%.
					• The proportion of land occupied by each **landform element** in each rehabilitation domain. • The proportion of land occupied by each **landform element** in each dunefield landform type potentially affected by mining[10].	• For at least one dunefield landform type, the average difference (all differences treated as positive values) between the proportion of land area occupied by each **landform element** in a rehabilitation domain compared to the proportion of land area occupied by the same **landform element** provided in **Appendix 2 Table D**[10] is equal to or less than 1.5 %
					• Proportion of land area in each **rehabilitation domain** occupied by **landform elements** with northeast and southwest facing aspects.	• Northeast and southwest facing **landform elements** will dominate and occupy greater than or equal to 60% of the land area in each rehabilitated domain.

Post-mining land use description	Disturbance category	Disturbance type	Main attribute group	Rehabilitation objectives	Indicators	Completion criteria
			Structure/ species composition	The rehabilitation strategy shall maximise the likely return of native plant species represented in the un-mined Cape Flattery Dunefield.	• Documentation of topsoil, trash and/or brushmatting placement[11].	• Propagules are returned to rehabilitated areas in the form of applied stored/direct placed topsoil, trash or brushmatting[11].
				Declared pest plants[2] are being managed to minimise their threat to the surrounding landscape.	• Documentation of weed management. • Presence and proportion of declared pest plant[2] species.	• A Weed Management Plan is implemented to minimise the weed burden on lease areas and the risk of infestation in rehabilitated areas. • No declared pest plants[2] are recorded in the rehabilitation domain; or • The proportion of **declared pest plant** species relative to reference conditions is **not increasing**[2].
				Fauna recolonisation from the surrounding landscape is promoted through the provision of vegetation community structure in dominant landform groups in rehabilitation domains[12] similar to the landform groups in the surrounding ecosystem.	• Vegetation structure.	• **Crown class**[4] equivalent to, or crown cover (%) progressing towards, that of surrounding undisturbed vegetation community[4] on dominant landform-groups in rehabilitation domains[12].
			Ecosystem function	**Plant functional group richness** on dominant **landform groups** in **rehabilitation domains**[12] similar to or greater than the surrounding landscape.	• Species composition. • **Plant functional group richness**.	• At least 70% of the **plant functional groups**[13] present in reference sites (on equivalent **landform groups**) are represented in the **rehabilitation domains**[14] or

Post-mining land use description	Disturbance category	Disturbance type	Main attribute group	Rehabilitation objectives	Indicators	Completion criteria
						• In areas of standing water or regular periodic inundation, characterised by the accumulation of organic detritus in depressions, at least two species of flora wetland indicator species[15] are present.
				The rehabilitation shows active recruitment of species from the surrounding landscape (a normal function of a recovering ecosystem).	• Species composition. • Documentation of seed mix or tubestock planting applied[16]. • Evidence of flowering and reproduction.	• Native species that are not in the original revegetation broadcast seed or planted tubestock species mix[16] are present in each **landform group** within each **rehabilitation domain**; and ○ At least 3 native species[17] are reproductively mature (flowering or seeding); and ○ At least 3 native species have at least 1 seedling or sapling[17].
			Ecosystem stability / resilience	Vegetation community resilient to periodic stress (drought, cyclone or fire nominated as the stresses likely to affect rehabilitation outcomes).	• Annual rainfall (as an indicator of drought). • Fire events. • Tropical cyclones. • Plant functional group richness	• All other rehabilitation criteria have been met ***and*** the **rehabilitation domain** has at some point since seeding or final surface preparation experienced either: i. at least one year with annual rainfall in the first decile range; or ii. at least one fire event covering > 50% of the rehabilitation domain; or iii. at least one severe tropical cyclone (Category 3 or greater); or iv. if the rehabilitation domain has never experienced one of the stress events (*i.e.* i, ii, or iii), then at least 80% of the plant functional groups[13] in a rehabilitation domain (on equivalent landform groups), that has experienced a stress event, are present.

Post-mining land use description	Disturbance category	Disturbance type	Main attribute group	Rehabilitation objectives	Indicators	Completion criteria
				Long-term sustainability of rehabilitation outcomes is demonstrated.	• Attainment of completion criteria.	• **Legacy areas** (rehabilitated before 2001, **Appendix 1 Figure 1**)[18]: o all rehabilitation completion criteria have been met during the first monitoring event; or o all rehabilitation completion criteria have been met on a minimum of three consecutive occasions over a period of not less than 3 years. • **Rehabilitation domains** rehabilitated since 2001: o all rehabilitation completion criteria have been met on a minimum of three consecutive occasions over a period of not less than 3 years.
Conservation Use[1]	• Treatment plant (old) • Access • Treatment plant (new) • Township • Infrastructure • Dams and diversions	Stockpile and mill outwash Mining access roads, power lines, sand and water transport systems not to be retained Process pond and new mill infrastructure not to be retained	Socio-economic	*Conservation Use* is confirmed by TOs as the preferred post-mining land use prior to relinquishment[1].	• Documentation.	• Documented confirmation exists that *Conservation Use* remains the preferred post-mining land use prior to relinquishment.
				Rehabilitation to include plants recognised by TOs as important food plants or those having the potential for commercial exploitation by TOs (referred to generally as 'special use plants')[5] through inclusion of planting material in revegetation works.	• Species composition.	• Two or more (≥2) special use plants (**Appendix 2 Table A**)[5] are recorded in each **rehabilitation domain**.

Post-mining land use description	Disturbance category	Disturbance type	Main attribute group	Rehabilitation objectives	Indicators	Completion criteria
		Township infrastructure (not to be retained) Infrastructure (not to be retained) Dams and diversions (not to be retained)	**Landscape context**[19]	Mining on the project area will not result in the loss of a rare or significant landform type[6] in the Cape Flattery Dunefield.	• Land occupied by a rare or significant **landform type**[6] disturbed by mining on the project area.	• No loss of a rare or significant **landform type** (**Appendix 2 Table B**)[6] in the Cape Flattery Dunefield as a result of mining on the project area.
			Structure/ species composition	The rehabilitation strategy shall maximise the likely return of native plant species represented in the un-mined Cape Flattery Dunefield.	• Documentation of topsoil, trash and/or brushmatting placement[11].	• Propagules are returned to rehabilitated areas in the form of applied stored/direct placed topsoil, trash or brushmatting[11].
				Declared pest plants[2] are being managed to minimise their threat to the surrounding landscape.	• Documentation of weed management. • Presence and proportion of declared pest plant[2] species.	• A Weed Management Plan is implemented to minimise the weed burden on lease areas and the risk of infestation in rehabilitated areas. • No declared pest plants[2] are recorded in the rehabilitation domain; or The proportion of **declared pest plant** species relative to reference conditions is **not increasing**[2].
				Fauna recolonisation from the surrounding landscape is promoted through the provision of vegetation community structure in dominant landform groups in rehabilitation domains[12] similar to the landform groups in the surrounding ecosystem.	• Vegetation structure.	• **Crown class**[4] equivalent to, or crown cover (%) progressing towards, that of surrounding undisturbed vegetation community[4] on dominant **landform groups** in **rehabilitation domains**[12].

Post-mining land use description	Disturbance category	Disturbance type	Main attribute group	Rehabilitation objectives	Indicators	Completion criteria
			Ecosystem function	**Plant functional group richness** on dominant **landform groups** in **rehabilitation domains**[12] similar to or greater than the surrounding landscape.	• Species composition. • **Plant functional group richness**.	• At least 70% of the **plant functional groups**[13] present in reference sites (on equivalent **landform groups**) are represented in the **rehabilitation domains**[14]; or • In areas of standing water or regular periodic inundation, characterised by the accumulation of organic detritus in depressions, at least two species of flora wetland indicator species[15] are present.
				The rehabilitation shows active recruitment of species from the surrounding landscape (a normal function of a recovering ecosystem).	• Species composition. • Documentation of seed mix or tubestock planting applied[16]. • Evidence of flowering and reproduction.	• Native species that are not in the original revegetation broadcast seed or planted tubestock species mix[16] are present in each **landform group** within each **rehabilitation domain**; and o At least 3 native species[17] are reproductively mature (flowering or seeding); and o At least 3 native species have at least 1 seedling or sapling[17].
			Ecosystem stability / resilience	Vegetation community resilient to periodic stress (drought, cyclone or fire nominated as the stresses likely to affect rehabilitation outcomes).	• Annual rainfall (as an indicator of drought). • Fire events. • Tropical cyclones. • **Plant functional group richness**.	• All other rehabilitation criteria have been met ***and*** the **rehabilitation domain** has at some point since seeding or final surface preparation experienced either: i. at least one year with annual rainfall in the first decile range; or ii. at least one fire event covering> 50% of the **rehabilitation domain**; or iii. at least one severe tropical cyclone (Category 3 or greater); or iv. if the **rehabilitation domain** has never experienced one of the stress events (*i.e.* i, ii, or iii), then at least 80% of the **plant functional groups**[13] in a

Post-mining land use description	Disturbance category	Disturbance type	Main attribute group	Rehabilitation objectives	Indicators	Completion criteria
						rehabilitation domain (on equivalent **landform groups**), that has experienced a stress event, are present.
				Long-term sustainability of rehabilitation outcomes is demonstrated.	• Attainment of completion criteria.	• Legacy areas (rehabilitated before 2001, **Appendix 1 Figure 1**)[18]: o all rehabilitation completion criteria have been met during the first monitoring event; or o all rehabilitation completion criteria have been met on a minimum of three consecutive occasions over a period of not less than 3 years. • **Rehabilitation domains** rehabilitated since 2001: o all rehabilitation completion criteria have been met on a minimum of three consecutive occasions over a period of not less than 3 years.

[1] Post-mining land use *Conservation Use* has been nominated for areas not identified by Hope Vale Owners for alternative uses. Prior to lease surrender Hope Vale Owners may nominate alternative suitable post-mining land uses (for example, retention of some roads or development of horticulture areas). Where alternative post-mining land uses are agreed between the holder of this environmental authority and Hope Vale Owners these nominated post-mining land uses will be adopted. Infrastructure/ assets that are not to be retained under Hope Vale Owner Use will revert to Conservation Use as a post-mining land use.

[2] Declared pest plant is defined as a *Restricted* or *Prohibited Matter* under the Queensland *Biosecurity Act* 2014, or are listed under the Weeds of National Significance list (DoEE 2016) and/or the National Environmental Alert List (DoEE 2016). '***Not increasing***' is defined as the difference between rehabilitated and reference conditions not showing a successive increase over three successive monitoring events. DoEE 2016, *National weeds lists,* Australian Government Department of the Environment and Energy, Canberra, <http://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/index.html>.

[3] Intentionally left blank

[4] Crown class according to Neldner *et al.* (2019) Table 28. If assessment of crown class shows that the rehabilitated domain is not equivalent to surrounding vegetation, crown cover (%) must be increasing towards equivalent crown class. '*Equivalent to'* means a crown class equal to or denser than that of the surrounding vegetation. '*Increasing*' defined as showing a net increase over three successive monitoring events (or until equivalence is reached).
Neldner, VJ, Wilson, BA, Dillewaard, HA, Ryan, TS, Butler, DW, McDonald, WJF, Addicott, EP & Appelman, CN, 2019, *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland version 5.0*, Queensland Department of Environment and Science, Brisbane.

[5] Special use plants, that are recognised by Traditional Owners as important food plants or those having potential for commercial exploitation, are listed in **Appendix 2 Table A**.

[6] Rare or significant landform types in the Cape Flattery dunefield, and the pre-mining area of each landform type, are listed in **Appendix 2 Table B**.

[7] Refer to **Appendix 2 Table C** for landform characteristic classes and data used to generate landform elements.

[8] The 30 common landform elements are 111, 112, 113, 114, 121, 122, 123, 124, 134, 211, 212, 213, 214, 221, 222, 223, 224, 233, 234, 311, 312, 313, 314, 321, 322, 323, 324, 332, 333 and 334.

[9] The landform elements that cover 95% of the un-mined dunefield are 111, 112, 113, 114, 121, 122, 123, 124, 211, 212, 213, 214, 221, 222, 224, 311, 312, 313, 314, 321, 322, 324, 332 and 334.

[10] Refer to **Appendix 2 Table D** for the list of landform types that occur in the un-mined Cape Flattery dunefield relevant to the borrow pits and mined-out areas, and the baseline proportions of landform elements which comprise each landform type.

[11] Pre-2012: Based on inclusion of procedures for the application of stored/direct placed topsoil, trash or brushmatting to rehabilitated areas. Post-2012: records of application of stored/direct placed topsoil, trash or brushmatting to individual rehabilitation areas. Areas rehabilitated before 2012 are shown on **Appendix 1 Figure 2**.

[12] Refer to **Appendix 2 Table E** for landform group classification and landform group descriptions. Dominant landform groups will be the two landform groups, when ranked by land area, that account for the top 50% (or more) of the rehabilitation domain. To achieve a 'high' to 'very high' sampling intensity, relative to the total area of dominant landform group at each rehabilitation domain (as per McKenzie *et al.* (2008) Table 3.1); a rehabilitation domain will comprise of at least one rehabilitation area (grouped by similar age, treatment and/or proximity) and must have a cumulative area greater than 1.8 ha and less than 40 ha.
McKenzie, NJ, Grundy, MJ, Webster, R & Ringrose-Voase, AJ 2008, *Guidelines for surveying soil and land resources, Australian Soil and Land Survey Handbooks Series, Second Edition*, CSIRO Publishing, Collingwood, Victoria.

[13] Refer to **Appendix 2 Table F** for the plant functional group codes that are used to determine the plant functional group for each plant species.

[14] On at least one occasion per monitoring site, it will be necessary to validate that plants regarded as nitrogen fixers show these functions, or those forming mycorrhizal associations show these functions or conditions are favourable in rehabilitated domains (*i.e.* soil has demonstrated mycorrhizal infection in bait plants).

[15] Flora wetland indicator species are native plants that are adapted to and dependent on wet conditions for at least part of their life cycle, and can successfully reproduce in wet conditions (DES 2019). Wet conditions are defined as areas where the root zone of the plant becomes periodically saturated or inundated during the growing season (DES 2019). DES 2019, *Wetland flora (plants), WetlandInfo,* Queensland Department of Environment and Science, Brisbane, <https://wetlandinfo.des.qld.gov.au/wetlands/ecology/components/flora/>.

[16] Verification that native species are present in rehabilitation domains that were not introduced in the seed mix/tubestock planting. For areas rehabilitated pre-2012 (**Appendix 1 Figure 2**): the seed or planted tubestock species mix is based on the plant species listed in the **Appendix 2 Table G**. Areas rehabilitated post-2012: this is based on records of planting stock used in individual rehabilitation areas which will be provided with the Annual Return for Environmental Authority EPML00550113. The species lists provided in the Annual Returns for areas rehabilitated after 2012 should be used to assess natural recruitment of plants into these areas.

[17] These criteria are based on 'very good' condition assessment class in the *Native Vegetation Condition Assessment and Monitoring Manual for Western Australia* (Casson *et al*. 2009). Casson, N, Downes, S & Harris, A 2009, *Native vegetation condition assessment and monitoring manual for Western Australia*, Western Australia Department of Environment and Conservation, Perth.

[18] Legacy areas were rehabilitated before 2001 and are shown on **Appendix 1 Figure 1**.

[19] Landscape context relates to topographic features and complexity. The method to create the data that is required to assess the landscape context completion criteria given in **Schedule F - Table 2b**, is provided in **Appendix 2 Table C** and **Appendix 2 Table D**.

Schedule H - Definitions

"acceptance criteria" means the measures by which the actions implemented to rehabilitate the land are deemed to be complete (same as completion criteria).

Active mining includes land:

a) that is cleared of vegetation, stripped of topsoil, and where sand is being extracted for processing

b) that is an active rejects area.

The upper limit for active mining at any one time is 150 ha.

"appropriately qualified person" means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

"active gegenwalles" means a rare and significant landform on the Cape Flattery dunefield that is characterised by small vegetated ridges (less than 2 m), that run perpendicular to the prevailing wind with deflation areas of bare sand, devoid of vegetation and seasonally inundated, occurring between the ridges.

"authority" means environmental authority (mining activities) under the *Environmental Protection Act 1994*.

"certified" means assessed and approved by an appropriately qualified and experienced person via a written declaration.

"commercial place" means a place used as an office or for business or commercial purposes, other than a place within the boundaries of the operational land.

"competent person" means a person with the demonstrated skill and knowledge required to carry out the task to a standard necessary for the reliance upon collected data or protection of the environment.

"Crown Class" is determined in accordance with the methodology outlined in Neldner, VJ, Wilson, BA, Dillewaard, HA, Ryan, TS, Butler, DW, McDonald, WJF, Addicott, EP & Appelman, CN, 2019, Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland version 5.0, Queensland Department of Environment and Science, Brisbane.

"declared pest plants" means a plant that is defined as a *Restricted* or *Prohibited Matter* under the Queensland *Biosecurity Act* 2014, or are listed under the Weeds of National Significance list (DoEE 2016) and/or the National Environmental Alert List (DoEE 2016). DoEE 2016, *National weeds lists,* Australian Government Department of the Environment and Energy, Canberra, <http://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/index.html>.

"deflation corridor of active elongate/ parabolic dune" means the areas of low relief that occur between the trailing arms of active elongate parabolic dunes formed by the removal of sand by wind.

"elongate parabolic dune head" means a rare and significant landform on the Cape Flattery dunefield that is characterised by an actively advancing apical dune head of an elongate parabolic dune. It has a single or several slip faces with the upwind side paralleling the downwind side which are both devoid of vegetation.

"environmental authority holder" means the holder of this environmental authority.

"extensive development of small parabolic dune and associated deflation areas" means a rare and significant landform on the Cape Flattery dunefield that comprises of a field of parabolic dunes that are too small to be mapped individually. They are produced by local remobilisation of sand from their associated deflation areas.

"**fit for purpose**" means the purpose that something is designed or expected to fulfil and meets relevant standards.

"flora wetland indicator species" means native plants that are adapted to and dependent on wet conditions for at least part of their life cycle, and can successfully reproduce in wet conditions. The root zone of the plant becomes periodically saturated or inundated during the growing season.

"gegenwalles modified by parabolic dune inception" means a rare and significant landform on the Cape Flattery dunefield that is characterised by gegenwalles formations that have been substantially modified by the development of small parabolic dunes at the windward side of the landform.

"land" in the "land schedule" of this document means land excluding waters and the atmosphere.

"land capability" as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

"**landscape context**" relates to topographic features and complexity. The method to create the data that is required to assess the landscape context completion criteria given in **Schedule F - Table 2b**, is provided in **Appendix 2 Table C** and **Appendix 2 Table D**.

"landform element" means parts of a landform with defined unique combinations of slope, relief and aspect. Refer to **Appendix 2 Table C** for landform characteristic classes and data used to generate landform elements.

"Landform element richness" means the number of landform elements recorded in an area.

"Landform group" means the landform elements that grouped according to their collective influence on vegetation structure and composition. Refer to **Appendix 2 Table E** for the landform group classification, and a description of each landform group, for assessment of relevant ecological criteria.

"Landform type" The type of landscape feature which occurs in the Cape Flattery dunefield (e.g. coastal parabolic dune, waterbody, long narrow ridges). Refer to **Appendix 2 Table D** for the landform types that naturally occur in the Cape Flattery dunefield.

"land use" term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

"legacy areas" means land that was rehabilitated before 2001 and are shown on **Appendix 1 Figure 1.**

Mobile infrastructure includes:

a) infrastructure that can be relocated from one position to another

b) land area associated with access tracks, conveyors, pipelines, slurry lines, power lines, transfer stations and mill infrastructure.

The upper limit for the disturbance area occupied by mobile infrastructure at any one time is 125 ha.

Non-active mining includes disturbed land that is not active mining, mobile infrastructure or exploration.

"**not increasing**" is defined as the difference between rehabilitated and reference conditions not showing a successive increase over three successive monitoring events.

"offensive" means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

"protected area" means - a protected area under the Nature Conservation Act 1992; or

a) a marine park under the Marine Parks Act 1992; or
b) a World Heritage Area.

"Plant functional group" means plants that are grouped according to their functional attributes and traits (ie growth form, primary regeneration mode and nutrient acquisition strategy). Refer to **Appendix 2 Table F** for the plant functional group codes that are used to determine the plant functional group for each plant species.

"Plant functional group richness" - The number of plant functional groups recorded in an area.

"progressive rehabilitation" means rehabilitation (defined below) undertaken progressively or a staged approach to rehabilitation as mining operations are ongoing.

"rehabilitation" the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

"rehabilitation area" means an area of land that is no longer active for mining and rehabilitation of that land has progressed (i.e. terraforming has occurred).

"rehabilitation domain" means one or more rehabilitation areas that are grouped by similar age, treatment and/or proximity and have a cumulative area greater than or equal to 1.8 ha and less than or equal to 40 ha.

"relict gegenwalles" means a rare and significant landform on the Cape Flattery dunefield that is characterised by gegenwalles that have been covered in vegetation and are no longer active.

"**relief**" means the difference in elevation relative to the surrounding landscape.

"significant disturbance" – includes land

(a) if it is contaminated land; or

(b) it has been disturbed and human intervention is needed to rehabilitate it.

i. to a state required under the relevant environmental authority; or

ii. if the environmental authority does not require the land to be rehabilitated to a particular state – to its state immediately before the disturbance.

Some examples of disturbed land include:

- areas where soil has been compacted, removed, covered, exposed or stockpiled;
- areas where vegetation has been removed or destroyed to an extent where the land has been made susceptible to erosion; (vegetation & topsoil)
- areas where land use suitability or capability has been diminished;
- areas within a watercourse, waterway, wetland or lake where mining activities occur;
- areas submerged by tailings or hazardous contaminant storage and dam walls in all cases;
- areas under temporary infrastructure. Temporary infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after mining activities have ceased; or
- areas where land has been contaminated and a suitability statement has not been issued.

However, the following areas are not included:

- areas off lease (e.g. roads or tracks which provide access to the mining lease);
- areas previously significantly disturbed which have achieved the rehabilitation outcomes;
- by agreement with the EPA, areas previously significantly disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions);
- areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner. The agreement to leave permanent infrastructure must be recorded in the Landowner Agreement and lodged with the EPA;
- disturbances that pre-existed the grant of the tenure unless those areas are disturbed during the term of the tenure.

"sensitive place" means;

- a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- a motel, hotel or hostel; or
- an educational institution; or

- a medical centre or hospital; or
- a protected area under the Nature Conservation Act 1992, the Marine Parks Act 1992 or a World Heritage Area; or
- a public park or gardens; or
- a place used as a workplace, an office or for business or commercial purposes which is not part of the mining activity and does not include employees accommodation or public roads.

"special use plants" plants that are recognised by Traditional Owners as important food plants or those having potential for commercial exploitation, are listed in **Appendix 2 Table A**.

"stable" means geotechnical stability of the rehabilitated landform where instability related to the excessive settlement and subsidence caused by consolidation / settlement of the wastes deposited, and sliding / slumping instability has ceased.

"trivial harm" means environmental harm which is not material or serious environmental harm and will not cause actual or potential loss or damage to property of an amount of, or amounts totalling more than $5,000.

"waters" includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea) or any part-thereof.

Appendix 1

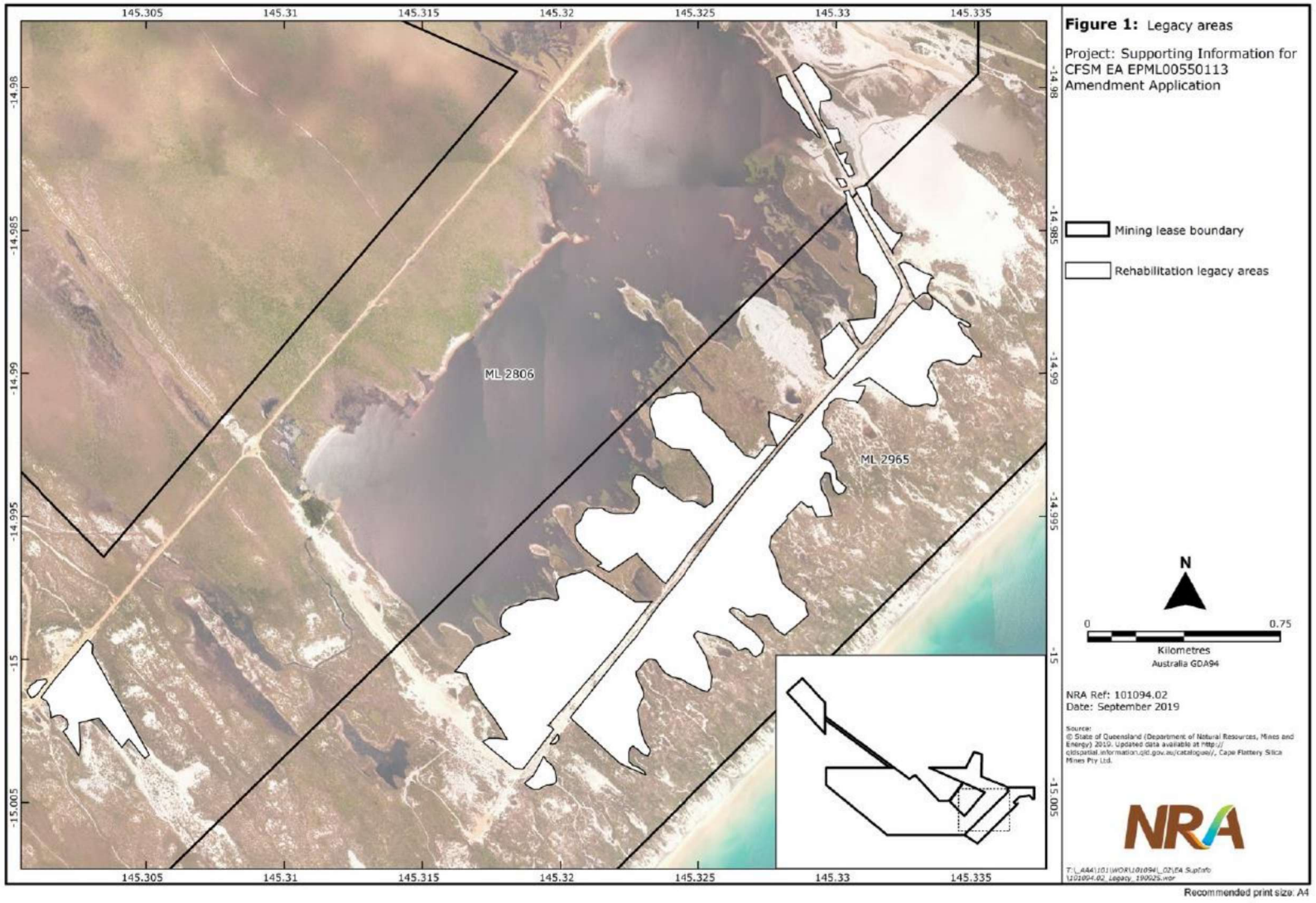


Figure 1: Legacy areas

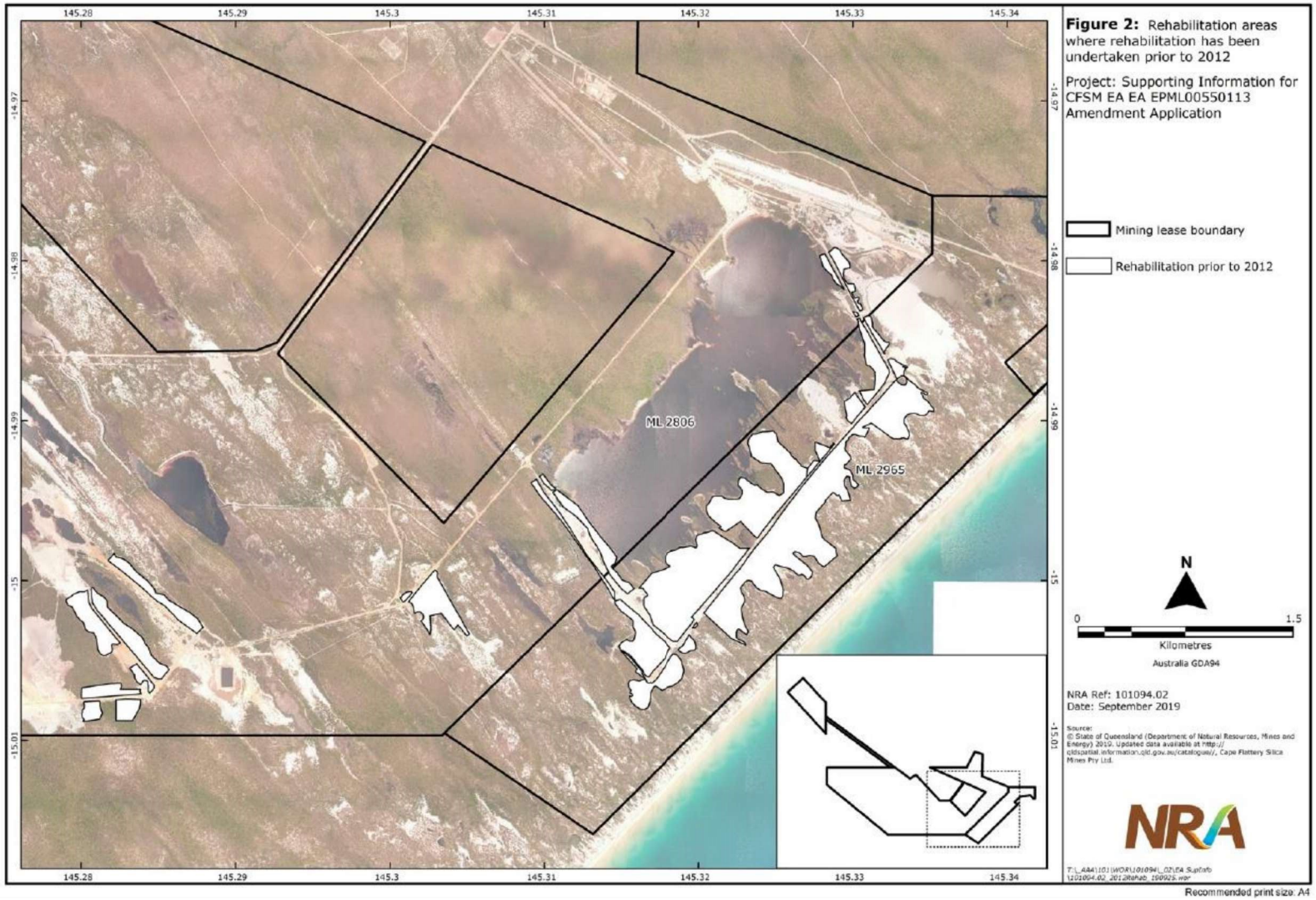


Figure 2: Rehabilitation areas where rehabilitation has been undertaken prior to 2012



Figure 3: Authorised Maximum Surface Areas of Disturbance

Appendix 2

Supporting rehabilitation tables

Table A: Special Use Plants recognised by Traditional Owners

Family	Species
Chrysobalanaceae	*Parinari nonda*
Combretaceae	*Terminalia muelleri*
Ebenaceae	*Diospyros compacta*
Ericaceae	*Leucopogon ruscifolius*
Fabaceae	*Labichea buettneriana*
Menispermaceae	*Tinospora esiangkara*
Myrtaceae	*Asteromyrtus lysicephala*
Myrtaceae	*Leptospermum polygalifolium*
Myrtaceae	*Lithomyrtus obtusa*
Myrtaceae	*Melaleuca polandii*
Myrtaceae	*Syzygium banksii*
Myrtaceae	*Syzygium forte* subsp. *forte*
Myrtaceae	*Syzygium suborbiculare*
Myrtaceae	*Thryptomene oligandra*
Myrtaceae	*Xanthostemon arenarius*
Proteaceae	*Grevillea pteridifolia*
Proteaceae	*Persoonia falcata*
Restionaceae	*Baloskion tetraphyllum* subsp. *meiostachyum*
Rutaceae	*Boronia alulata*
Sapotaceae	*Manilkara kauki*
Sapotaceae	*Sersalisia sericea*

Table B: Cape Flattery Dunefield Rare or significant landform types[1] (pre-mining)

Cape Flattery Dunefield Rare or significant landform types	Landform type area mapped in dunefield (pre-mining)
Active gegenwalles	190 ha
Deflation corridor of active elongate/parabolic dune	888 ha
Elongate parabolic dune head	494 ha
Extensive development of small parabolic dune and associated deflation areas	147 ha
Gegenwalles modified by parabolic dune inception	309 ha
Relict gegenwalles	2300 ha

[1] These data are to be referred to for the analysis of land occupied by a rare or significant landform type. Definitions of each rare or significant landform type are provided in **Schedule H**.
Notes: Rare or significant landforms were classified in the CFSM Land Capability Report (NRA 1996). From the mapping presented in NRA (1996) and with reference to the Landform Mapping of Cape Flattery Dunefield Report (NRA 1995) and to the Assessment of the Cape Bedford - Cape Flattery Dunefield for National Estate Listing (Stock 1991) the rare or significant landforms were inferred. The landform areas were calculated from NRA (1995).

NRA 1996, *Land Capability Report*, Report prepared for CFSM Pty Ltd by NRA Environmental Consultants, dated December 1996.

NRA 1995, *Landform Mapping of Cape Flattery Dunefield*, prepared for CFSM Pty Ltd by NRA Environmental Consultants, November 1995.

Stock, EC 1991, *Assessment of the Cape Bedford - Cape Flattery Dunefield for National Estate Listing*, Objection Assessment, A Report to the Australian Heritage Commission, September 1991.

Table C: Landform characteristic classes used to generate landform elements[1]

Relief [2]	Code identifier	Slope angle	Code identifier	Slope aspect	Code identifier
<5 m	**100**	<10°	**10**	87.5° - 177.5°	**1**
5 m – 10 m	**200**	10° - 30°	**20**	177.5° - 267.5°	**2**
10 m – 35 m	**300**	>30°	**30**	267.5° - 357.5°	**3**
>35 m	**400**	**-**	**-**	357.5° - 87.5°	**4**

[1] Landform element data (generated from relief, slope angle and slope aspect characteristic classes) for assessment of rehabilitation areas and domains is to be generated using a Digital Elevation Model (DEM) (created using a triangulation method) with a grid cell size equal to or less than 2 m.

For example, landform element 331 = 10 – 35 m relief, >30° slope, and south-easterly aspect.

[2] Relief is the difference in elevation relative to the surrounding landscape (ie Australian Height Datum (AHD) DEM minus Lake Reference DEM). Point data that are used to create the Lake Reference DEM are provided in Appendix 2 Table C(i).

Table C(i): Cape Flattery Silica Mine elevation point data for the creation of Lake Reference DEM for landform element relief component[1]

Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94	
	Longitude	Latitude		Longitude	Latitude		Longitude	Latitude		Longitude	Latitude		Longitude	Latitude		Longitude	Latitude		Longitude	Latitude
0.5	145.3190	-15.0090	5	145.3260	-14.9936	5.5	145.3270	-14.9782	6.5	145.3070	-14.9991	8	145.3070	-15.0067	13	145.2480	-14.9769	19	145.2790	-14.9980
1	145.3410	-14.9888	5.5	145.3030	-15.0242	5.5	145.3280	-14.9873	6.5	145.3080	-15.0011	8.5	145.3010	-14.9863	13	145.2480	-14.9771	20	145.2610	-14.9928
1.5	145.2940	-14.9643	5.5	145.3050	-15.0098	5.5	145.3280	-14.9852	6.5	145.3080	-15.0004	8.5	145.3030	-14.9944	13	145.2480	-14.9710	20.5	145.2510	-14.9875
1.5	145.3050	-14.9637	5.5	145.3190	-14.9954	5.5	145.3280	-14.9838	6.5	145.3090	-15.0012	10	145.2490	-14.9657	13.5	145.2490	-14.9786	20.5	145.2520	-14.9867
1.5	145.3420	-14.9864	5.5	145.3190	-14.9777	5.5	145.3280	-14.9863	6.5	145.3090	-15.0014	10	145.2500	-14.9623	13.5	145.2500	-14.9784	20.5	145.2520	-14.9875
2	145.3050	-14.9639	5.5	145.3200	-14.9806	5.5	145.3280	-14.9817	6.5	145.3100	-15.0018	10.5	145.3010	-15.0020	13.5	145.2500	-14.9790	20.5	145.2520	-14.9878
2.5	145.3080	-15.0131	5.5	145.3200	-14.9886	5.5	145.3280	-14.9826	6.5	145.3100	-15.0019	10.5	145.3020	-15.0018	13.5	145.2510	-14.9790	20.5	145.2620	-14.9936
2.5	145.3090	-15.0135	5.5	145.3200	-14.9945	5.5	145.3280	-14.9831	6.5	145.3100	-15.0025	10.5	145.3020	-15.0020	13.5	145.2510	-14.9794	21	145.2260	-14.9774
2.5	145.3100	-15.0140	5.5	145.3200	-14.9956	5.5	145.3280	-14.9806	6.5	145.3100	-15.0024	10.5	145.3030	-15.0018	13.5	145.2630	-14.9827	21	145.2510	-14.9849
2.5	145.3440	-14.9835	5.5	145.3200	-14.9999	5.5	145.3290	-14.9906	6.5	145.3120	-15.0016	11	145.2540	-14.9706	14	145.2690	-14.9717	21	145.2530	-14.9872
3	145.3050	-14.9640	5.5	145.3210	-14.9844	5.5	145.3290	-14.9864	6.5	145.3150	-15.0042	11	145.2540	-14.9709	14	145.2780	-14.9872	21	145.2660	-15.0240
3	145.3060	-15.0236	5.5	145.3210	-14.9819	5.5	145.3290	-14.9875	6.5	145.3350	-14.9780	11	145.2550	-14.9725	15	145.2720	-14.9859	21	145.2660	-15.0242
3	145.3410	-14.9838	5.5	145.3220	-14.9925	5.5	145.3290	-14.9857	6.5	145.3350	-14.9816	11	145.2560	-14.9720	15	145.2810	-14.9932	21	145.2660	-15.0244
3	145.3430	-14.9834	5.5	145.3220	-14.9928	5.5	145.3290	-14.9859	6.5	145.3360	-14.9790	11	145.2560	-14.9727	15	145.2850	-14.9983	21	145.2660	-15.0249
3.5	145.3260	-14.9996	5.5	145.3220	-14.9935	5.5	145.3290	-14.9848	6.5	145.3370	-14.9786	11	145.2600	-14.9729	15	145.2850	-14.9981	21.5	145.2150	-14.9759
3.5	145.3330	-14.9903	5.5	145.3220	-14.9940	5.5	145.3300	-14.9885	6.5	145.3370	-14.9802	11	145.2640	-14.9833	15	145.2850	-14.9983	22	145.2490	-14.9857
3.5	145.3340	-14.9890	5.5	145.3220	-14.9946	5.5	145.3300	-14.9872	6.5	145.3380	-14.9829	11	145.2640	-14.9845	15	145.2860	-14.9988	22.5	145.2900	-15.0058
3.5	145.3400	-14.9839	5.5	145.3230	-14.9975	5.5	145.3300	-14.9879	6.5	145.3380	-14.9829	11	145.2650	-14.9853	15	145.2860	-14.9995	23	145.2740	-15.0061
3.5	145.3440	-14.9827	5.5	145.3230	-14.9947	5.5	145.3300	-14.9851	7	145.3030	-15.0164	11	145.2660	-14.9832	15.5	145.2740	-14.9880	23	145.2740	-15.0067
4	145.3120	-15.0126	5.5	145.3230	-14.9937	5.5	145.3300	-14.9858	7	145.3040	-15.0182	11	145.2660	-14.9857	16	145.2300	-14.9687	23.5	145.2590	-14.9976
4	145.3270	-14.9978	5.5	145.3240	-14.9961	5.5	145.3390	-14.9804	7	145.3090	-14.9982	11	145.2670	-14.9844	17	145.2810	-14.9996	24.5	145.2250	-14.9788
4	145.3310	-14.9919	5.5	145.3240	-14.9770	5.5	145.3390	-14.9822	7	145.3370	-14.9802	11	145.2670	-14.9858	17	145.2810	-14.9977	24.5	145.2250	-14.9787
4	145.3320	-14.9875	5.5	145.3240	-14.9933	6	145.3130	-15.0038	7	145.3400	-14.9779	11	145.2670	-14.9874	17	145.2830	-15.0010	25	145.2660	-14.9995
4	145.3350	-14.9870	5.5	145.3260	-14.9909	6	145.3150	-15.0029	7	145.3420	-14.9774	11	145.2670	-14.9877	17	145.2840	-15.0020	25.5	145.2250	-14.9795

Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94		Elevation (m AHD)	GDA94	
	Longitude	Latitude		Longitude	Latitude		Longitude	Latitude		Longitude	Latitude		Longitude	Latitude		Longitude	Latitude		Longitude	Latitude
4	145.3390	-14.9841	5.5	145.3260	-14.9924	6	145.3160	-15.0020	7	145.3420	-14.9766	11	145.2690	-14.9887	17	145.2840	-15.0025	27.5	145.2070	-14.9754
4.5	145.3070	-15.0100	5.5	145.3260	-14.9888	6	145.3210	-14.9781	7	145.3420	-14.9771	11	145.2700	-14.9871	17.5	145.2040	-14.9625	27.5	145.2640	-15.0013
4.5	145.3080	-15.0105	5.5	145.3260	-14.9850	6	145.3220	-14.9922	7	145.3420	-14.9761	11	145.2700	-14.9886	17.5	145.2770	-14.9957	28	145.2100	-14.9789
4.5	145.3250	-14.9983	5.5	145.3260	-14.9779	6	145.3230	-14.9926	7	145.3430	-14.9783	11	145.2710	-14.9883	17.5	145.2780	-14.9952	28	145.2100	-14.9791
4.5	145.3290	-14.9927	5.5	145.3260	-14.9932	6	145.3260	-14.9845	7.5	145.3020	-15.0207	11	145.2710	-14.9888	18	145.2800	-14.9983	28	145.2130	-14.9822
4.5	145.3400	-14.9828	5.5	145.3270	-14.9862	6	145.3270	-14.9827	7.5	145.3030	-15.0161	11	145.3010	-15.0019	18	145.2800	-14.9972	30.5	145.2460	-14.9974
4.5	145.3410	-14.9831	5.5	145.3270	-14.9851	6	145.3380	-14.9790	7.5	145.3030	-15.0155	11.5	145.2630	-14.9832	18.5	145.2800	-14.9982	31.5	145.2450	-15.0009
5	145.3060	-15.0195	5.5	145.3270	-14.9840	6.5	145.3050	-15.0173	7.5	145.3330	-14.9769	12	145.2710	-14.9892	19	145.2260	-14.9744	31.5	145.2470	-15.0017
5	145.3140	-15.0089	5.5	145.3270	-14.9824	6.5	145.3060	-14.9981	7.5	145.3330	-14.9764	12.5	145.2840	-14.9925	19	145.2710	-15.0257	32	145.2490	-15.0022
5	145.3260	-14.9941	5.5	145.3270	-14.9829															

[1] These data are to be used to create the Lake Reference DEM which is then used to calculate relief. These point data were derived from the surface water elevations of lakes that occur in the Cape Flattery dunefield.

Table D: Baseline proportions of landform elements within each landform type in the un-mined natural dunefield

Landform type[1,2]	Landform element proportion (%) of landform type[3]											
	111	112	113	114	121	122	123	124	131	132	133	134
Active gegenwalles	10.5622	15.3794	10.3839	52.5581	0.3874	1.8761	0.5866	2.7634	0.0050	0.0158	0.0140	0.0529
Coastal parabolic dunes	8.5788	9.2444	4.9059	14.8323	2.6129	7.6858	2.1867	7.4096	0.0366	0.4228	0.1469	0.4224
Deflation corridor of active elongate/parabolic dune	12.1363	15.8274	8.6020	45.9789	0.5055	2.1935	0.5663	2.7762	0.0027	0.0325	0.0150	0.0275
Depositional area in deflation corridor	11.2686	14.0597	15.5791	49.2055	0.8484	1.9811	0.9722	2.1979	0.0070	0.0373	0.0345	0.0439
Elongate parabolic dune head	1.0412	1.4847	0.6461	3.5281	0.2383	2.0098	0.3642	2.7931	0.0091	0.2707	0.0960	0.4747
Extensive development of small parabolic dune and associated deflation areas	12.4651	19.3504	17.1167	42.5380	0.4855	1.3415	1.1937	1.1409	0.0000	0.0060	0.0074	0.0098
Gegenwalles modified by parabolic dune inception	23.1685	18.4960	3.9785	49.8857	0.0721	0.2096	0.1768	0.3618	0.0000	0.0000	0.0000	0.0067
Ill-defined lakes and swamps	10.9993	16.5982	12.6560	45.9403	0.4079	1.5091	0.6248	1.7545	0.0003	0.0262	0.0105	0.0282
Inter-dune sand plains <20 m[4]	10.7109	15.4387	6.5552	34.6443	0.3962	1.2473	0.4006	1.5105	0.0074	0.0135	0.0071	0.0126
Inter-dune sand plains >20 m[4]	6.5331	10.3129	3.0977	18.1462	0.1650	0.9159	0.2577	1.3929	0.0005	0.0077	0.0064	0.0253
Long narrow ridges	1.7665	5.0487	1.3160	7.3169	0.2090	4.2215	0.3282	3.8767	0.0044	0.3153	0.0305	0.1545
Relict gegenwalles	17.2016	36.9290	2.3307	40.7464	0.0378	1.3373	0.1096	0.2511	0.0000	0.0021	0.0022	0.0000
Small deflation areas	18.2296	11.7787	9.9205	41.0952	1.1972	1.3679	0.7729	2.7102	0.0000	0.0288	0.0000	0.0301
Small parabolic dunes	6.0700	7.6752	5.2957	15.3524	1.6984	3.9107	1.5809	3.9749	0.0349	0.2544	0.1610	0.3527
Transition: Lakes and swamps with small deflation areas	18.4041	18.5980	11.4956	41.5304	0.3875	0.5950	0.7272	0.7434	0.0000	0.0000	0.0000	0.0000
Landform type[1,2]	Landform element proportion (%) of landform type[3]											
	211	212	213	214	221	222	223	224	231	232	233	234
Active gegenwalles	0.6649	0.7526	0.1767	0.3771	0.3259	0.7053	0.2110	0.7763	0.0086	0.0720	0.0196	0.1492
Coastal parabolic dunes	2.3528	2.3682	1.3519	2.5722	2.9581	5.7451	1.7136	5.5912	0.1293	0.9332	0.3624	0.9682
Deflation corridor of active elongate/parabolic dune	1.3593	1.1386	0.6754	2.0796	0.4442	1.0115	0.2231	1.2907	0.0119	0.0509	0.0431	0.0884
Depositional area in deflation corridor	0.4405	0.5258	0.4920	0.7846	0.2945	0.3609	0.2447	0.3882	0.0150	0.0425	0.0358	0.0588
Elongate parabolic dune head	0.5414	0.6342	0.2188	0.8512	0.6298	3.3723	0.3846	3.2248	0.0408	1.7997	0.7615	2.7412
Extensive development of small parabolic dune and associated deflation areas	0.6930	0.7032	0.4727	0.7141	0.3378	0.4455	0.3342	0.3716	0.0029	0.1001	0.0569	0.0507
Gegenwalles modified by parabolic dune inception	0.6187	0.6366	0.4280	0.5906	0.1739	0.5011	0.2748	0.2578	0.0000	0.0215	0.0069	0.0131
Ill-defined lakes and swamps	1.1509	2.0461	1.1039	2.3104	0.2793	0.5892	0.3055	0.6694	0.0014	0.0428	0.0227	0.0383
Inter-dune sand plains <20 m[4]	3.0344	6.3812	2.8399	8.9798	0.2015	0.6548	0.2193	0.7163	0.0319	0.0181	0.0207	0.0278
Inter-dune sand plains >20 m[4]	1.6353	2.5341	1.2869	3.7844	0.2472	1.2675	0.3498	1.4525	0.0040	0.0417	0.0314	0.1014

Long narrow ridges	1.3048	3.4841	0.8465	3.6765	0.8625	4.9938	0.6281	5.2197	0.0271	0.9310	0.1242	0.6948
Relict gegenwalles	0.0758	0.0779	0.0593	0.0699	0.0379	0.4349	0.1127	0.0721	0.0000	0.0078	0.0003	0.0000
Small deflation areas	2.0702	1.5370	1.0140	2.1627	1.1117	0.7066	0.3941	1.5328	0.0181	0.0254	0.0110	0.0241
Small parabolic dunes	1.8167	2.0054	1.3503	2.3718	2.8689	4.0864	1.7278	3.7810	0.2584	1.1777	0.8716	1.3575
Transition: Lakes and swamps with small deflation areas	2.1067	1.0378	0.9584	1.5194	0.4320	0.2695	0.6305	0.5341	0.0000	0.0000	0.0025	0.0280
Landform type[1,2]	**Landform element proportion (%) of landform type[3]**											
	311	**312**	**313**	**314**	**321**	**322**	**323**	**324**	**331**	**332**	**333**	**334**
Active gegenwalles	0.2268	0.1479	0.0312	0.0650	0.0676	0.2201	0.0611	0.2556	0.0083	0.0478	0.0070	0.0378
Coastal parabolic dunes	1.2632	1.1906	0.7481	1.3497	1.6563	3.0564	0.9939	2.7561	0.1085	0.5539	0.2352	0.5417
Deflation corridor of active elongate/parabolic dune	0.7290	0.1328	0.0569	0.2244	0.4792	0.4210	0.0370	0.6943	0.0022	0.0432	0.0086	0.0729
Depositional area in deflation corridor	0.0153	0.0052	0.0089	0.0104	0.0098	0.0107	0.0083	0.0122	0.0000	0.0006	0.0003	0.0000
Elongate parabolic dune head	2.3270	1.2296	1.0972	3.6463	3.3477	7.0910	1.2741	6.3492	0.5166	9.9906	3.5317	11.5421
Extensive development of small parabolic dune and associated deflation areas	0.0064	0.0064	0.0039	0.0054	0.0103	0.0054	0.0098	0.0093	0.0000	0.0039	0.0001	0.0015
Gegenwalles modified by parabolic dune inception	0.0049	0.0072	0.0056	0.0016	0.0034	0.0636	0.0280	0.0000	0.0000	0.0048	0.0002	0.0019
Ill-defined lakes and swamps	0.0698	0.2047	0.1069	0.1003	0.0399	0.1340	0.0497	0.1321	0.0005	0.0218	0.0057	0.0195
Inter-dune sand plains <20 m[4]	0.7556	1.9047	0.6864	2.0302	0.0493	0.2186	0.0511	0.2054	0.0078	0.0084	0.0044	0.0080
Inter-dune sand plains >20 m[4]	5.6362	9.1914	3.7350	12.3139	0.8097	5.0181	1.0948	4.9491	0.0140	0.0937	0.0761	0.1774
Long narrow ridges	2.1398	4.3841	1.2288	4.1312	1.0747	11.5648	1.1182	8.8094	0.1667	3.1340	0.2867	2.8913
Relict gegenwalles	0.0107	0.0160	0.0193	0.0134	0.0000	0.0323	0.0088	0.0003	0.0000	0.0022	0.0005	0.0000
Small deflation areas	0.2187	0.1112	0.1750	0.4067	0.2942	0.0631	0.2010	0.7829	0.0000	0.0000	0.0038	0.0045
Small parabolic dunes	1.1765	1.1559	0.6977	1.2324	3.4299	4.0196	1.7718	3.9202	1.3537	3.4234	2.4030	3.5792
Transition: Lakes and swamps with small deflation areas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landform type[1,2]	**Landform element proportion (%) of landform type[3]**											
	411	**412**	**413**	**414**	**421**	**422**	**423**	**424**	**431**	**432**	**433**	**434**
Active gegenwalles	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Coastal parabolic dunes	0.0009	0.0006	0.0002	0.0006	0.0033	0.0035	0.0028	0.0033	0.0000	0.0000	0.0000	0.0000
Deflation corridor of active elongate/parabolic dune	0.0034	0.0000	0.0000	0.0000	0.0089	0.0058	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
Depositional area in deflation corridor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Elongate parabolic dune head	1.6775	1.9296	0.4944	1.8873	1.1613	5.0307	0.4696	2.7944	0.1582	1.7192	0.7219	1.8564
Extensive development of small parabolic dune and associated deflation areas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Gegenwalles modified by parabolic dune inception	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ill-defined lakes and swamps	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Inter-dune sand plains <20 m[4]	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Inter-dune sand plains >20 m[4]	0.2517	0.3535	0.1979	0.4551	0.1441	0.8837	0.0832	0.8829	0.0051	0.0252	0.0003	0.0105
Long narrow ridges	1.3823	2.2539	0.5075	1.4392	0.2320	3.8309	0.2078	1.7252	0.0000	0.0324	0.0165	0.0613
Relict gegenwalles	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Small deflation areas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Small parabolic dunes	0.0635	0.0650	0.0434	0.0699	0.1757	0.2532	0.1089	0.2233	0.1381	0.2377	0.1621	0.2611
Transition: Lakes and swamps with small deflation areas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

[1]These data are to be used for the analysis of the proportion of land occupied by each landform element in each dunefield landform type relevant to the borrow pits and mined-out areas disturbance types (*ie* it excludes these landform types: outcrops, sand veneer over outcrop, stream corridors and large waterbodies).
Notes: landforms were classified in the Landform Mapping of Cape Flattery Dunefield Report (NRA 1995, *Landform Mapping of Cape Flattery Dunefield*, prepared for CFSM Pty Ltd by NRA Environmental Consultants, November 1995) with reference to the Assessment of the Cape Bedford - Cape Flattery Dunefield for National Estate Listing (Stock, EC 1991, *Assessment of the Cape Bedford - Cape Flattery Dunefield for National Estate Listing*, Objection Assessment, A Report to the Australian Heritage Commission, September 1991).

[2] Landform mapping was updated using contemporary elevation data captured in 2014 and aerial photography dated 2015.

(NRA 2019. *Cape Flattery Silica Mine Landform Mapping Update and Baseline Natural Un-mined Dunefield Landform Element Area Proportion Table*, prepared for CFSM Pty Ltd by NRA Environmental Consultants. Issued, 25 September 2019.)

[3] Landform elements are parts of a landform with defined unique combinations of slope, relief and aspect. Refer to **Table C** for landform characteristic classes and data used to generate landform elements.

[4] Refers to elevation above sea level (AHD).

Table E: Landform group classification and landform group descriptions

Landform group	Relief	Slope angle	Slope aspect	Relevant landform element codes[1]	Landform group description
1	<5 m	all	all	111-134	• All low-lying areas. Slope angle and aspect would have a negligible influence on vegetation structure and composition when relief is <5 m. • A high proportion of these areas are likely to be subject to waterlogging, which would influence vegetation composition similarly across each landform element.
2	≥5 m	<10°	all	211-214, 311-314, 411-414	• All relatively flat, elevated areas. • Relief above 5 m would have little influence on vegetation structure and composition within the narrow range of elevations at CFSM. • Slope aspect is unlikely to have an influence in relatively flat terrain because differences in exposure to prevailing conditions are negligible and inconsistent.
3	≥5 m	10° - 30°	87.5° - 177.5°	221, 321, 421	• All elevated areas with moderate slopes and aspects (*ie* sides of ridges). • Relief above 5 m would have little influence on vegetation structure and composition within the narrow range of elevations at CFSM. • Slope aspect on moderate slopes is likely to have some influence on exposure and is likely to influence vegetation structure and composition.
4	≥5 m	10° - 30°	177.5° - 267.5	222, 322, 422	
5	≥5 m	10° - 30°	267.5° - 357.5°	223, 323, 423	
6	≥5 m	10° - 30°	357.5°-87.5°	224, 324, 424	
7	≥5 m	>30°	87.5°-177.5°	231, 331, 431	• All elevated areas with steep slopes and aspects (*ie* sides of ridges). • Relief above 5 m would have little influence on vegetation structure and composition within the narrow range of elevations at CFSM. • Slope aspect and steep terrain is likely to influence exposure and is likely to influence vegetation structure and composition.
8	≥5 m	>30°	177.5°-267.5°	232, 332, 432	
9	≥5 m	>30°	267.5°-357.5°	233, 333, 433	
10	≥5 m	>30°	357.5°-87.5°	234, 334, 434	

[1] Refer to **Table C** for landform characteristic classes used to generate landform element codes.

Table F: Plant functional group codes that are used to determine plant functional groups

Plant functional attribute	Range of possible traits	Plant functional group (PFG) code component[1]
Growth form	• Woody species (trees and shrubs) • Graminoids (grasses, sedges and rushes) • Forbs (including vines, ferns and epiphytes)	• W • G • F
Nutrient acquisition strategy	• Nitrogen-fixing (may also be mycorrhizal) • Specialised root systems (some graminoids) • Mycorrhizal associations only (for woody species and forbs) • Other	• N • S • M • -
Primary regeneration mode	• Seeder • Resprouter organ (rhizomes, corms, tubers, large woody subterranean organs) • Vegetative reproduction/dispersal	• 1 • 2 • 3

[1] For example, a plant species with a plant functional group code of WN1: has a woody species growth form (either a tree or a shrub), has a nitrogen-fixing nutrient acquisition strategy, and its primary reproduction mode is by seed.

Notes: Nutrient acquisition strategy identified with reference to Brundrett (2008), Lamont (1982) and MESA (1999-2015).

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Table G: Native plant framework species used in the original seeding and tubestock planting in areas rehabilitated before 2012

Growth form	Family	Species
Tree	Chrysobalanaceae	*Parinari nonda*
Tree	Combretaceae	*Terminalia muelleri*
Gramminoid	Cyperaceae	*Arthrostylis aphylla*
Gramminoid	Cyperaceae	*Fimbristylis cymosa*
Gramminoid	Cyperaceae	*Gahnia sieberiana*
Gramminoid	Cyperaceae	*Schoenus calostachyus*
Gramminoid	Cyperaceae	*Schoenus sparteus*
Forb	Dilleniaceae	*Hibbertia banksii*
Shrub	Ebenaceae	*Diospyros compacta*
Shrub	Ericaceae	*Leucopogon ruscifolius*
Shrub	Ericaceae	*Leucopogon yorkensis*
Tree	Fabaceae	*Acacia brassii*
Shrub	Fabaceae	*Acacia calyculata*
Tree	Fabaceae	*Acacia crassicarpa*
Shrub	Fabaceae	*Acacia humifusa*
Shrub	Fabaceae	*Acacia legnota*
Tree	Fabaceae	*Acacia platycarpa*
Shrub	Fabaceae	*Acacia pubirhachis*
Tree	Fabaceae	*Acacia racospermoides*
Shrub	Fabaceae	*Bossiaea arenicola*
Shrub	Fabaceae	*Labichea buettneriana*
Forb	Hemerocallidaceae	*Dianella caerulea*
Forb	Hemerocallidaceae	*Dianella longifolia* var. *longifolia*
Forb	Laxmanniaceae	*Lomandra banksii*
Vine	Menispermaceae	*Tinospora esiangkara*
Shrub	Myrsinaceae	*Myrsine porosa*
Shrub	Myrtaceae	*Asteromyrtus lysicephala*
Tree	Myrtaceae	*Corymbia intermedia*
Shrub	Myrtaceae	*Leptospermum polygalifolium*
Shrub	Myrtaceae	*Lithomyrtus obtusa*
Shrub	Myrtaceae	*Melaleuca arcana*
Shrub	Myrtaceae	*Melaleuca polandii*
Shrub	Myrtaceae	*Neofabricia myrtifolia*
Shrub	Myrtaceae	*Syzygium banksii*
Tree	Myrtaceae	*Syzygium forte* subsp. *forte*
Shrub	Myrtaceae	*Syzygium suborbiculare*
Shrub	Myrtaceae	*Thryptomene oligandra*
Shrub	Myrtaceae	*Xanthostemon arenarius*
Shrub	Picrodendraceae	*Neoroepera banksii*
Shrub	Picrodendraceae	*Petalostigma pubescens*

Growth form	Family	Species
Shrub	Proteaceae	*Grevillea glauca*
Shrub	Proteaceae	*Grevillea pteridifolia*
Shrub	Proteaceae	*Persoonia falcata*
Shrub	Putranjivaceae	*Drypetes deplanchei*
Gramminoid	Restionaceae	*Baloskion tetraphyllum* subsp. *meiostachyum*
Gramminoid	Restionaceae	*Dapsilanthus ramosus*
Shrub	Rubiaceae	*Psydrax odorata*
Shrub	Rutaceae	*Boronia alulata*
Shrub	Santalaceae	*Exocarpos latifolius*
Shrub	Sapindaceae	*Dodonaea polyandra*
Tree	Sapotaceae	*Manilkara kauki*
Shrub	Sapotaceae	*Sersalisia sericea*
Forb	Violaceae	*Hybanthus enneaspermus*

[1] This species list is to be used when assessing natural recruitment of plants into rehabilitation domains rehabilitated before 2012. Land rehabilitated before 2012 is shown on **Figure 2**.

Table H: Infrastructure to be retained for Hope Vale Owner Use as itemised in the Retained Infrastructure Deed[1]

Disturbance category	Disturbance Type	Retained Infrastructure assets
Township (excluding landfill) and infrastructure	• Township • Old offices, workshop and store. • Quarry (current sand blasting area and pad) • New workshops, store and offices • Supply wharf area • Communications	1. Concrete pads that are situated under the following: • Township • Workshop, offices, store and bunker • Blast yard • Administration office • Crib rooms • Abandoned fuel storage • Washdown bay (including oil/water separator) 2. Township buildings (including swimming pool and associated infrastructure) and Ellicott House 3. Hardstand lawns and garden areas 4. Old workshop (new shed behind Main Fuel Farm) 5. Water tanks 6. Fuel storage area 7. Supply wharf area 8. Service jetty and all associated infrastructure 9. Communications infrastructure 10. Administration office 11. Workshop 12. Stores buildings 13. Bunker
Access	Township access roads, fuel line and power lines	14. Main township access roads including: • All township roads • Infrastructure access roads • Wharf and beach access roads • All roads leading to concrete pads, buildings and hardstand areas
	Mining access tracks to be retained	15. Main mining access roads including:

Disturbance category	Disturbance Type	Retained Infrastructure assets
		• Slurry Line road • Haul roads • Conveyer road for access north of the mine • Airport Lake and First Ridge rehabilitation access roads • All roads leading to concrete pads, buildings and hardstand areas
Infrastructure	Airstrip and associated infrastructure	16. Concrete pads that are situated under the following: • Airstrip and hanger 17. Airport building 18. Hardstand, lawns and garden areas
Infrastructure and Treatment Plant	• Main fuel farm • Sewage Treatment Plant (STP) • Water supply • Power house and fuel storage • Water pump, nursery, pipe shed, filter belt pad and laydown areas	19. Concrete pads that are situated under the following: • Reclaimer rails • Bucket wheel • Power screen • Nursery • Filter belt • Low Iron Plant • Old Mill • Motor Control Centre and transformers 20. Power house fuel storage 21. Main Fuel Farm 22. Sewage Treatment Plant 23. Power house 24. Crib room 25. Poly shed 26. Nursery 27. Water tanks 28. Hardstand, lawns and garden areas 29. Water supply 30. Water pump, pipe shed 31. Filter belt 32. Motor Control Centre 33. Laydown areas
Dams and Diversions	Arnie's Dam	34. Arnie's Dam (*Syn*. Arnie's Lake)
	Water diversions	35. Diversion channels[2]
Treatment Plant (old)	Stockpile and mill outwash	36. Concrete pads that are situated under the following: • Reclaimer rails • Bucket wheel • Power screen • Filter belt • Low Iron Plant • Old Mill 37. Hardstand areas
Treatment Plant (new)	Process pond and new mill infrastructure	38. Concrete pads that are situated under the following: • New mill • Trommel • Water tanks • Constant Density Cone (CDC) • Water supply 39. Hardstand areas 40. Crib room

[1] Infrastructure for retention as nominated in the *Retained Infrastructure Deed* current as of 13th June 2019. In accordance with clauses 3.1 and 3.2 of the *Retention Infrastructure Deed* (Variations to Retained Infrastructure) between Hope Vale Congress Aboriginal Corporation and Cape Flattery Silica Mines Pty Ltd, the parties can agree to vary the list of Retained Infrastructure by adding additional items of infrastructure or removing items of infrastructure from that list. The parties agree that any variation to the Retained Infrastructure [list] must be: agreed by the AIC [Agreement Implementation Committee] in accordance with the processes set out in the Compensation Agreement (or otherwise agreed by the parties); and documented as a minute of the meeting at which the variation was agreed, upon with the terms of this Deed, as the case requires (*ie* apply to additional items of infrastructure ***or*** cease to apply to any items of infrastructure removed from the list of Retained Infrastructure).

[2] The diversions are channels between natural waterbodies that are not disturbed by other mining operations.

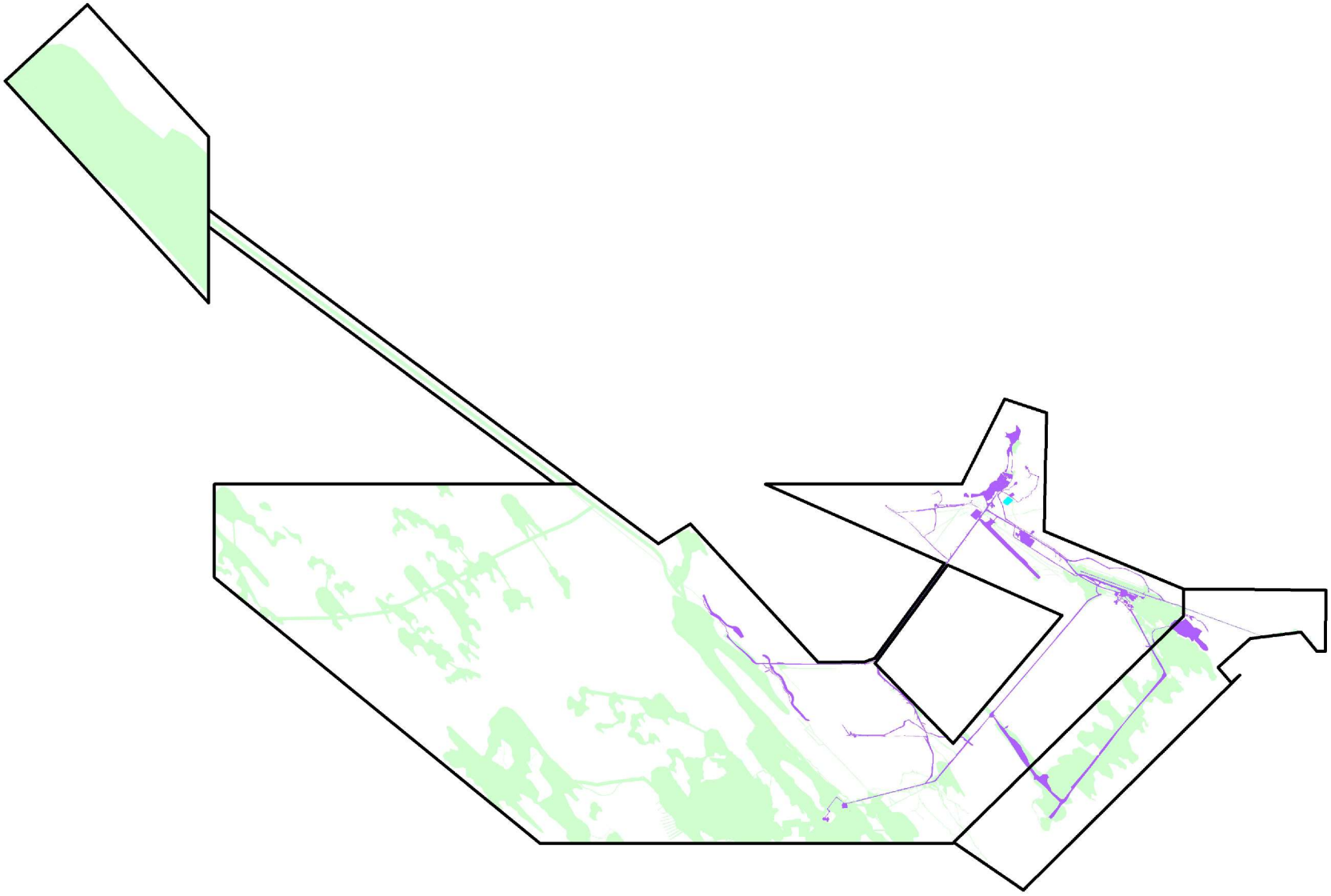


Figure 1: Final site design

Project: Cape Flattery Silica Mine Progressive Rehabilitation and Closure Plan

Mining lease

Maximum disturbance footprint[3, 4]

Post-mining Land Use

- Conservation Use
- Hope Vale Owner Use
- Native Grass

Environmental Authority EPML00550113 Appendix 1 Figure 3 relevant footnotes:

3. Production schedule is indicative and is not absolute, with variation due to many factors. Areas and types of disturbance will remain within approved limits (*ie* approved in EA and reflected in the ERC). Dune fields are mobile and therefore spatial definition will vary over time (Pye 1983a; 1983b). The upper limit for active mining at any one time is 150 ha.

4. Mobile infrastructure corridors presented are indicative and subject to change. Future mine planning areas are not precise. The maximum disturbance area for mobile infrastructure at any one time is 125 ha.

N

0 5

Kilometres

Source: Queensland Department of Resources 2022, Cape Flattery Silica Mines Pty Ltd 2019.

NRA Ref: 101098.01
Date: May 2022

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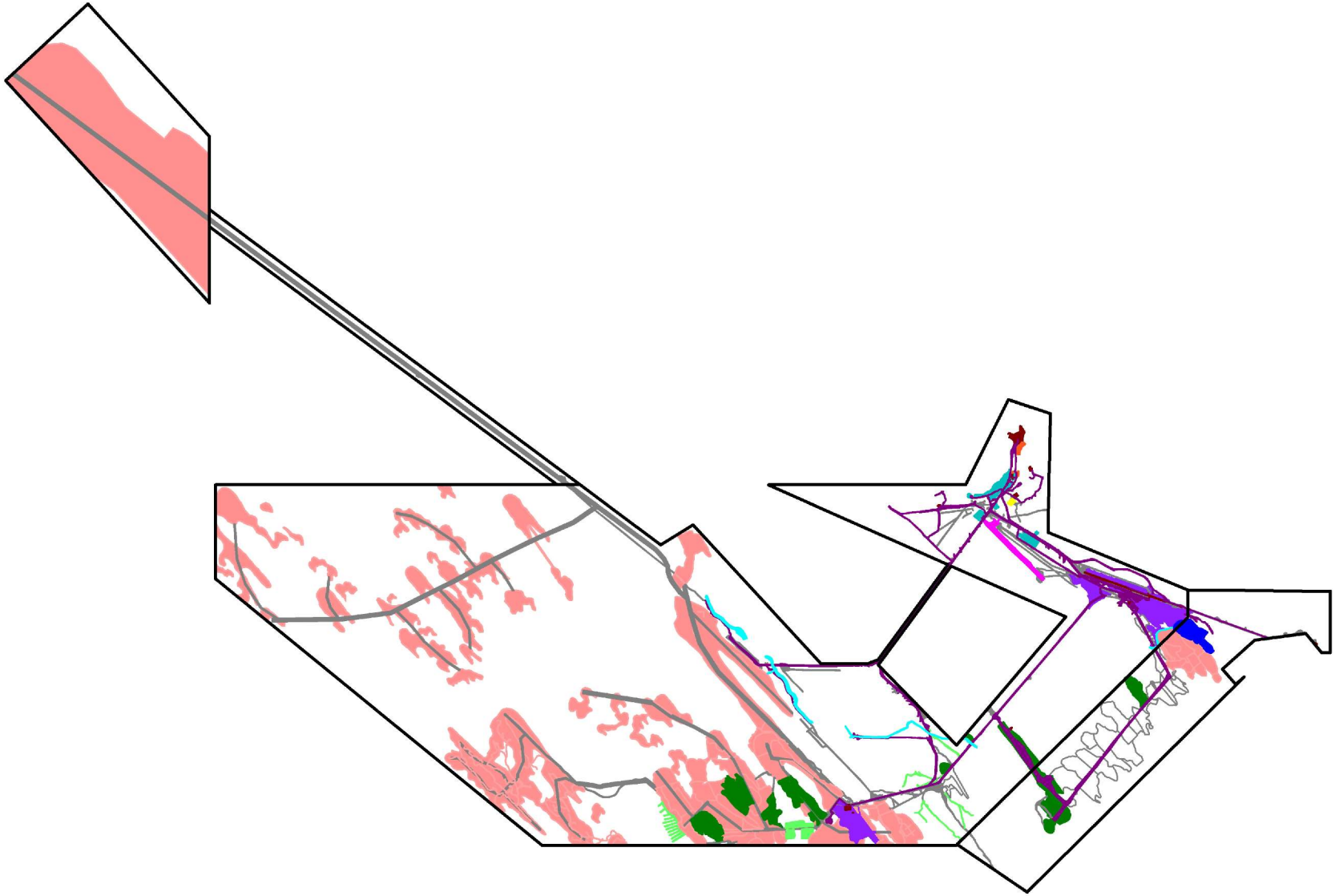


Figure 2: Rehabilitation areas

Project: Cape Flattery Silica Mine Progressive Rehabilitation and Closure Plan

Mining lease

PMLU Conservation Use[3, 4]

- Existing rehabilitation (certified)
- RA1 - Existing rehabilitation (mining)
- RA2 - Existing rehabilitation (access)
- RA3 - Mining (and Borrow Pits)
- RA4 - Access and mobile infrastructure
- RA5 - Treatment plant
- RA6 - Quarries

PMLU Hope Vale Owner Use [3]

- RA7 - Township
- RA8 - Infrastructure (airstrip)
- RA10 - Infrastructure and treatment plant
- RA11 - Access
- RA12 - Dams and diversions (water diversions)
- RA13 - Dams and diversions (Arnie's Dam)

PMLU Native Grass [3]

- RA9 - Infrastructure (landfill)

Environmental Authority EPML00550113 Appendix 1 Figure 3 relevant footnotes:

3. Production schedule is indicative and is not absolute, with variation due to many factors. Areas and types of disturbance will remain within approved limits (*ie* approved in EA and reflected in the ERC). Dune fields are mobile and therefore spatial definition will vary over time (Pye 1983a; 1983b). The upper limit for active mining at any one time is 150 ha.

4. Mobile infrastructure corridors presented are indicative and subject to change. Future mine planning areas are not precise. The maximum disturbance area for mobile infrastructure at any one time is 125 ha.

N

0 4

Kilometres

Source: Pye 1983a;1983b, Queensland Department of Resources 2022, Cape Flattery Silica Mines Pty Ltd 2019.

NRA Ref: 101098.01
Date: May 2022
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Appendix 9:
Spatial Information

1. Spatial Information

DES requires the following spatial information to be submitted as part of the PRCP:

- location and maximum extent of disturbance footprint for the mine life
- PMLUs and NUMAs for the area within the resource tenures
- any sensitive receptors.

In addition to the list above, the PRCP must include spatial information outlining the rehabilitation and improvement areas that correspond to the proposed PRCP Schedule.

Under section 126C(1)(j) of the EP Act, a transitional PRCP also includes the following details about any existing rehabilitation already completed at the time of submission of the proposed PRCP:

- a description of the rehabilitation works previously carried out
- when the rehabilitation works commenced and were completed
- whether the rehabilitation has been applied for or approved as progressively certified under the EP Act.

This information is provided in **Section 1.5** (of the main report).

Spatial information outlining the location of all existing rehabilitation is submitted as part of the proposed PRCP. All spatial information is prepared and has been submitted in accordance with the guideline 'Spatial Information Submission' (ESR/2018/4337).

NUMAs, improvement areas and floodplains are not present within the EA boundary and therefore have not been included in the spatial data submission.

Shapefiles detailing the spatial information submitted to DES are listed below.

- The location and maximum extent of the disturbance footprint for the mine life (EPML00550113_PRCP_PY_31052022_A.zip).
- The locations of PMLUs for the area within the MLs (EPML00550113_PRCP_PY_31052022_B.zip).
- The location and extent of the RAs as nominated in the PRCP Schedule (EPML00550113_PRCP_PY_31052022_C.zip).
- The location and extent of existing rehabilitation completed within the MLs (EPML00550113_PRCP_PY_31052022_D.zip).
- The location and extent of sensitive receptors/places within the MLs and/or within 2 km of the ML boundaries as follows:
  - Great Barrier Reef World Heritage Area (EPML00550113_PRCP_PY_31052022_E.zip)
  - Great Barrier Reef Marine Park (EPML00550113_PRCP_PY_31052022_F.zip).

Appendix 10:
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Environmental Approval & Compliance Solutions

Cairns Office:
Level 1, 320 Sheridan Street, PO Box 5678 Cairns QLD 4870
P: 61 7 4034 5300

Townsville Office:
Suite 2A, Level 1, 41 Denham Street, PO Box 539 Townsville QLD 4810
P: 61 7 4796 9444

www.natres.com.au • nra@natres.com.au

Natural Resource Assessments Pty Ltd trading as NRA Environmental Consultants. ABN: 77 011 073 135
Certified Integrated Management System: ISO 9001:2015 (Quality), ISO 14001:2015 (Environment), ISO 45001:2018 (Safety).