

Regional Interests Development Approval
Assessment Application Report:
Elyse Project
(EPM 26076 & EPM 25526)

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Author:
Ecotone Environmental Services Pty Ltd
(ACN 078 058 750)

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1. Introduction

Rio Tinto Exploration Pty Limited (RTX) proposes to undertake exploration drilling for bauxite on EPM 26076 and EPM 25526 as part of the Elyse Project, which is located adjacent to the Rio Tinto held mining lease ML 7031.

The applicant holds existing Environmental Authorities (EPSX02004914 & EPSX03606215) and is seeking additional approvals to allow exploration to be undertaken within a Category C Environmentally Sensitive Area (SEA) (Figure 1).

RTX commissioned Ecotone Environmental Services to assess the environmental attributes of the tenement areas and outline proposed mitigating steps or guidelines to ensure protection of these attributes from irreversible impacts.

1.1 Project Overview

The Elyse Project is located approximately 15 kilometres from the existing Andoom mine operated by Rio Tinto Aluminium Weipa (RTAW). The bauxite exploration target is an extension to the known resources and bauxite occurrences on the Ely mining lease ML 7031.

The bauxite target is a typical Weipa style bauxite-laterite plateau with an exploration potential of ~50Mt. Wide-spaced air core drilling is proposed to test for the presence of bauxite on the plateau.

1.2 The applicant

The applicant is Rio Tinto Exploration Pty Limited.

1.3 Landholder and Tenure Details

Exploration Permit EPM 25526 was granted on 20 July 2017 over an area of 3 sub-blocks with environmental authority EPSX02004919.

EPM 26076 was granted on 20 July 2017 covering an area of 98 sub-blocks with environmental authority EPSX03606215.

The underlying land is held by the Napranum Council as DOGIT (Deed of Grant in Trust).

The relevant Native Title party is Northern Cape York #2 – Mokwiri Aboriginal Corporation RNTBC (Determined Native Title), QC2014/011 (National Native Title Tribunal Number), QUD156/2011 (Federal Court Number)

2. Proposed Exploration Activities

2.1 Preliminary Assessment

A reconnaissance of the area may be undertaken to assess whether the proposed drilling is warranted in all areas.

This work would involve walking around the area mapping the soil and geology and use of a small bucket (4" diameter) hand auger to penetrate the soil and check if there is bauxite below the soil.

Where possible, soft tyred 4WD vehicles will be driven through open woodland forest to get closer to the areas of interest.

2.2 Drilling Program

Exploration drilling will be undertaken using conventional air core methods. The drill rig is small and mounted on a 6-wheel Toyota Land Cruiser with soft pneumatic tyres. Air core drilling is carried out without the addition of water or drilling muds to penetrate the overburden and bauxite-laterite profile.

No drill pads or sumps are required, with drilling to occur on exploration tracks or existing unsealed tracks.

Following reconnaissance, exploration drilling is initially planned in phases over 3-4 years on the plateaus. Initial phases of exploration drilling are designed at wide spacing to test for the presence of bauxite with subsequent phases aimed at improving ore body knowledge and evaluating a potential bauxite resource. Closer spaced drilling will only be conducted if suitable quality bauxite is discovered in the earlier phases.

Table 1: summary of proposed exploration drilling by Area and Phase

Area	Phase	Spacing	Air core drill holes
Area A	1	800m x 400m	90
Area A	2	400m x 400m	100
			340

Approximately 90-100 drillholes are planned in each phase at a nominal 800m and 400m spacing. Planned drill depths are up to 3m. The design may be adjusted for changes for example in geology, logistics of access, and due to cultural heritage reasons

Other equipment includes light vehicles for the geologist and fieldhands, and other project support personnel e.g., environment surveyors, traditional owners.

2.2 Access Roads and Tracks

Parts of EPM 25526 and EPM 26077 were previously explored in the period 1960 - 1980s. There is a well-used unsealed road running from Vyces Crossing, northeast of Andoom mine, to the Moreton Telegraph Station which transects both plateau bauxite targets and provides access to the exploration tenements.

Existing tracks are being used wherever possible. New exploration tracks will need to be constructed for exploration and air core drilling. New exploration tracks are proposed to be cleared with a small dozer (e.g., Caterpillar D6) to approximately 3-4m wide. The dozer will clear ground with a minimum disturbance approach, which is with the blade-up to preserve root stocks and going around larger trees wherever possible. Between 15 and 30 new tracks are required depending on the phase of work.

All ground disturbance activities will avoid known significant environmental sites as defined in the Government GIS database: Matters of State Environmental Significance or MSES.

Tracks constructed for the purpose of exploration will be rehabilitated at the end of each phase and prior to the onset of the wet season.

2.3 Campsite and other facilities

No camp is required for any of the exploration activities. Personnel will be accommodated in Weipa and commute to and from the Project Area each day by 4WD.

No laydown is required for exploration. All rubbish generated will be removed from the Project Area and disposed of at a licenced facility.

2.4 Water Supply

No water will be extracted from groundwater, bores or surface waterways within the tenements. Drilling does not require the injection or use of water. Drinking water will be purchased in Weipa and taken to the Project Area.

2.5 Timing

Exploration will be undertaken during the dry season only from April to November. The planned duration of each exploration phase is approximately 2-3 months, operating only during daylight hours.

3. Environmental Attributes

3.1 Climate

The general location of the exploration area is up to 60 km to the north east of Weipa Township and has a tropical monsoonal climate with a distinct wet and dry season. The nearest weather station is Weipa Airport (station number 027045) which has a mean maximum annual temperature of 32.8°C and a mean minimum annual temperature of 22°C. The mean annual rainfall is 1918.1 mm with most occurring from December through to March (refer **Table 2**). Very little rainfall is typically reported from June to September (BOM 2018).

Table 2: Mean temperature and rainfall data for the study area adapted from Bureau Of Meteorology (2018).

Month	Mean maximum temperature (°C)	Mean minimum temperature (°C)	Rainfall (mm)			
			Mean	10 th Percentile	50 th Percentile	90 th Percentile
January	32	24.2	481.1	298.9	500.8	699.9
February	31.4	24.1	516.8	267.3	464.8	841.6
March	31.8	23.8	413.2	205	377	725.5
April	32.3	22.8	93.3	8.7	65.8	212.1
May	31.9	21.4	20.5	0.3	7	52.9
June	31.1	20	3.6	0	1.2	13.3
July	31	19	1.5	0	0.4	5
August	32.1	18.7	5.2	0	0.4	13.8
September	34.4	19.9	1.7	0	0	3.9
October	35.7	21.8	20.8	0.1	8.4	48.1
November	35.7	23.5	101.3	21.3	59.4	270.8
December	34	24.2	272.8	95.3	259.8	424.9
Annual	32.8	22	1918.1	1478.6	1907	2344.1

3.2 Hydrology

The topography of the area within which the tenements are located ranges from gently inclined laterite plateaus with shallowly incised drainage channels to extensive floodplains along the channel of the Wenlock River. Elevations across the tenements range from approximately 70 m above sea level (Billy's Lagoon Plateau) to only a few metres above sea level on the Wenlock River estuary. The area mostly drains to the Wenlock River which ultimately forms Port Musgrave.

3.3 Geomorphology

The study area is located on the Weipa Plateau subregion of Cape York Peninsula (CYP) Bioregion. This subregion covers approximately 28,500 km² and extensively lies over the Wenlock River drainage system. The Weipa Plateau subregion is characterised by Darwin Stringybark (*Eucalyptus tetradonta*) open forest and woodland on bauxitic red earth plateaus. Other ecosystems are widespread throughout the bioregion including riparian forests, paperbark wetlands, isolated vine forest patches and extensive coastal ecosystems. Based on the Regional Ecosystem framework of the Queensland Government, Land Zones present within the study area comprise:

- Land Zone 3 - recent Quaternary alluvial systems
- Land Zone 5 - Tertiary-early Quaternary loamy and sandy plains and plateaus
- Land Zone 7 - Cainozoic duricrusts
- Land Zone 9 - fine grained sedimentary rocks

3.4 Vegetation Communities

Regional ecosystem mapping identified the following broad vegetation groups present within the study area:

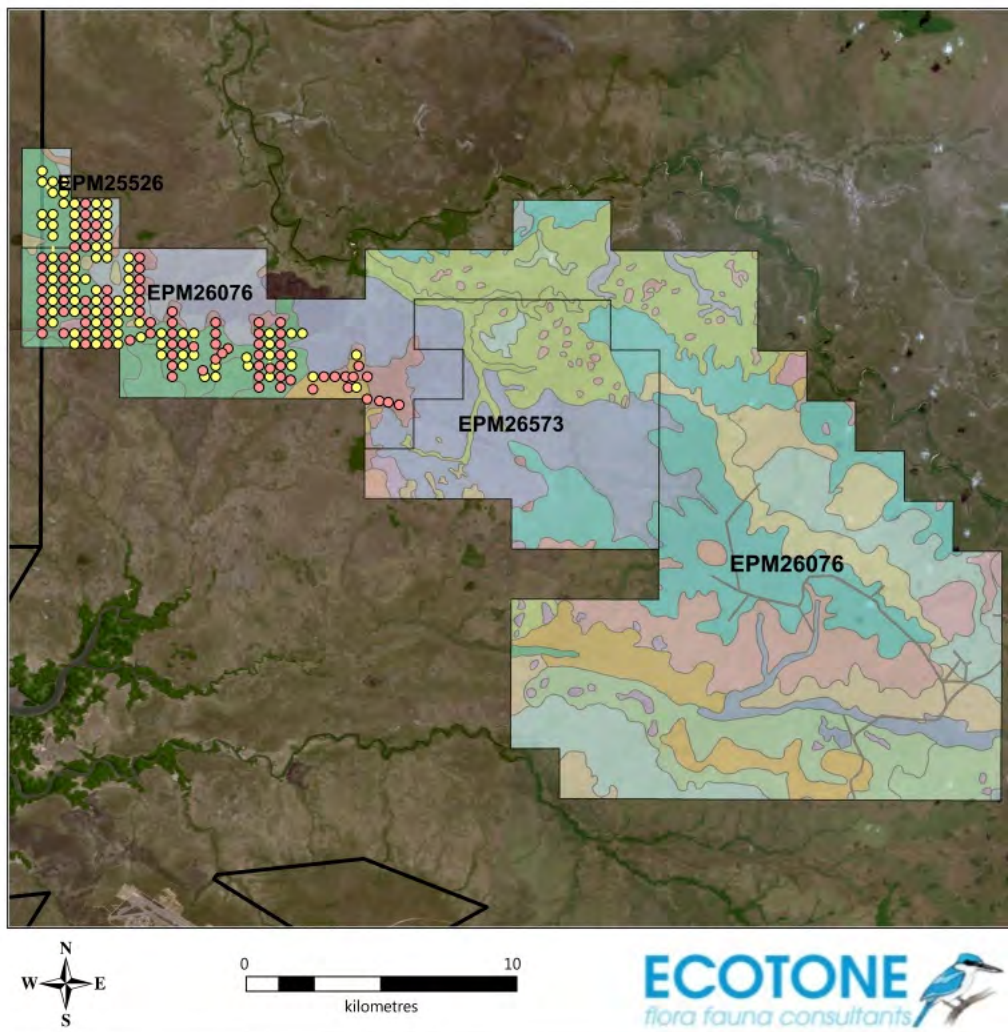
- Eucalypt/Corymbia woodlands to open forests on bauxite plateau, erosional escarpments alluvial plains, riverine levees, sand plains and floodplains
- Rainforests and scrubs
- Melaleuca woodland on drainage/sinkhole swamps
- Melaleuca low open woodlands on depositional plains

These vegetation groups are typical for the Weipa region. At least 23 Regional Ecosystem Types (RE Types) are mapped within the Elyse study area, including three RE Types considered to be 'Of Concern' under the provisions of the Queensland *Vegetation Management Act 1999* (VMA). No Endangered RE's are currently mapped for the study area (refer **Table 3** and **Figure 1**).

The area where the proposed drill holes are situated comprises predominantly RE3.5.36b (*Eucalyptus tetradonta*, *Corymbia nesophila* tall woodland on sands on tertiary plateaus) and a smaller portion of combined mixed polygon RE3.5.36b/3.5.36a, the later comprising *Eucalyptus tetradonta*, *Corymbia nesophila* tall woodland on undulating plains and remnant plateaus. These REs are not considered to be environmentally sensitive vegetation types and they are not classified as an 'Of Concern' RE.

Detailed spatial analysis of the proposed survey design identified preliminary drill holes/lines that are located within RE3.5.4 (Semi-deciduous notophyll vine forest in small patches on northern plateaus) and RE3.3.14/3.3.22a (*Melaleuca saligna* +/- *M. viridiflora*, *Lophostemon suaveolens* woodland on drainage swamps and *Corymbia clarksoniana* or *C. novoguineensis* woodland on alluvial and erosional plains, respectively). These RE types are regarded as environmentally sensitive to disturbance (though not listed as of conservation significance under the VMA) and will be avoided under an environmental buffer system to be employed during the works.

Sensitive ecosystems will generally be buffered by 200m and no exploration activities will be undertaken within the buffer area. As part of preclearing environmental surveys the exact location of sensitive ecosystem boundaries will be ground truthed prior to drilling.



Legend

- Rio Tinto Weipa Mining Lease Boundary
- Rio Tinto Exploration Tenement Boundaries
- Regional Ecosystem Polygons - to many RE types to label clearly
- Drill Hole Phase 1
- Drill Hole Phase 2

Figure 1: Site overview map displaying regional ecosystems and preliminary proposed drill holes within the Elyse Study Area.

Table 3: Regional Ecosystems of the Elyse study area.

RE	VMA Status	Description
Alluvial Plains (Freshwater Drainage Lines, Wetlands and Streams)		
3.3.10a	Least Concern	<i>Melaleuca argentea</i> and/or <i>M. fluviatilis</i> +/- <i>M. leucadendra</i> open forest or <i>Melaleuca saligna</i> open forest fringing streams and creeks
3.3.14	Least Concern	<i>Melaleuca saligna</i> +/- <i>M. viridiflora</i> , <i>Lophostemon suaveolens</i> woodland on drainage swamps
3.3.14a	Least Concern	<i>Melaleuca saligna</i> +/- <i>M. viridiflora</i> , <i>Lophostemon suaveolens</i> woodland on drainage swamps
3.3.20b	Least Concern	<i>Corymbia clarksoniana</i> and Other <i>Eucalyptus</i> spp. +/- <i>Melaleuca viridiflora</i> on floodplains.
3.3.22a (3.5.22c)	Least Concern	<i>Corymbia clarksoniana</i> or <i>C. novoguineensis</i> woodland on alluvial and erosional plains
3.3.25a	Least Concern	<i>Eucalyptus leptophleba</i> +/- <i>Corymbia tessellaris</i> +/- <i>E. platyphylla</i> woodland on riverine levees and floodplains
3.3.27c	Least Concern	<i>Eucalyptus tetradonta</i> and/or <i>Corymbia nesophila</i> +/- <i>E. leptophleba</i> +/- <i>E. cullenii</i> +/- <i>Brachychiton diversifolius</i> on alluvial plains
3.3.39	Of Concern	Semi-deciduous microphyll vine forest +/- <i>Melaleuca</i> spp. associated with sinkholes
3.3.49b	Least Concern	<i>Melaleuca viridiflora</i> low open woodland on low plains
3.3.50	Least Concern	<i>Melaleuca viridiflora</i> +/- <i>Petalostigma pubescens</i> low open woodland on low plains
3.3.54a	Of Concern	<i>Asteromyrtus lysicephala</i> , <i>Choriceras tricorne</i> and <i>Jacksonia thesioides</i> +/- <i>Melaleuca viridiflora</i> , <i>Allocasuarina littoralis</i> and <i>Banksia dentata</i> , shrub layer dominated by <i>Asteromyrtus lysicephala</i> . Associated with streams, on low sandstone plateaus
3.3.5a	Least Concern	Evergreen to semi-deciduous notophyll vine forest on alluvia on major watercourses. RE varies in structure and floristic composition depending on the position relative to the stream channel, the substrate and the permanence of water flow.
3.3.64	Least Concern	<i>Baloskion tetraphyllum</i> subsp. <i>meiostachyum</i> open sedgeland in drainage swamps in dune fields
3.3.66x1a	Of Concern	Rivers & water holes with permanent water. Occurs along major rivers and creeks. Riverine wetland or fringing riverine wetland.

RE	VMA Status	Description
3.3.9a	Least Concern	<i>Lophostemon suaveolens</i> open forest on streamlines, swamps and alluvial terraces, riverine wetland or fringing riverine wetland
Weipa Plateau (Laterite/Bauxite Plateau and Slopes)		
3.5.36a	Least Concern	<i>Eucalyptus tetradonta</i> , <i>Corymbia nesophila</i> tall woodland on undulating plains and remnant plateaus (formerly on deeply weathered plateaus and remnants)
3.5.36b	Least Concern	<i>Eucalyptus tetradonta</i> , <i>Corymbia nesophila</i> tall woodland on sands on tertiary plateaus.
3.5.39	Least Concern	<i>Eucalyptus tetradonta</i> and <i>Corymbia clarksoniana</i> woodland on sand plains.
3.5.4	Least Concern	Semi-deciduous notophyll vine forest in small patches on northern plateaus
3.5.41	Least Concern	<i>Melaleuca viridiflora</i> +/- <i>Corymbia clarksoniana</i> woodland on plains.
Merluna Plain (Undulating Plains to the East of Bauxite Plateau)		
3.7.3	Least Concern	<i>Eucalyptus cullenii</i> +/- <i>E. tetradonta</i> woodland on erosional escarpments and plains
3.9.4a	Least Concern	<i>Eucalyptus leptophleba</i> +/- <i>Corymbia dallachiana</i> or <i>Eucalyptus platyphylla</i> open woodland on rolling plains
3.9.5	Least Concern	<i>Corymbia papuana</i> +/- <i>Eucalyptus leptophleba</i> open woodland on rolling plains

3.4 Land Use

Land tenure underlying the EPM is land held by the Napranum Aboriginal Shire as Deed of Grant in Trust. The primary existing land use comprises production from relatively natural environments (grazing native vegetation). Riverine and non-riverine wetlands in the area are classified as marsh/wetlands

4. Potential Impacts on Environment Attributes

4.1 Hydrologic processes

The exploration program will be conducted during the dry season in northern Australia. Conducting works in the dry season will avoid periods of high rainfall and subsequently high flow of water across the landscape. As a result, it is expected that most seasonally inundated creeks within the tenements will be dry and there will be limited flow of water into the surrounding waterways such as the Wenlock River.

Under the proposed environmental buffer system, all drilling activities would generally occur outside of the 200m environmental buffer, thus, providing protection to riverine and non-riverine wetlands in the area and reducing potential changes to waterflow within the area

Existing tracks will be used where possible, however, new exploration tracks will need to be established for exploration and air core drilling. The new tracks established using a minimal disturbance approach will adequately rehabilitate naturally, as this approach will not substantially damage root stock or alter ground surface levels. All drill holes will be infilled using drilled sample and plugged as required. These measures will ensure that the natural surface water flow patterns in the area will not be substantially affected during the works.

As the exploration activities target the bauxite section of the laterite profile on elevated lateritic plateaus, it is unlikely the drilling activities will intersect shallow aquifers in the area.

4.2 Geomorphic processes

In the wet season the movement of water across the landscape is quite substantial with periods of rain that can exceed greater than 50 mm within a few hours. Thus, cleared drill lines in this landscape are prone to erosional and sedimentation issues, if trees, saplings, grass and the ground surface are disturbed.

The minimal disturbance approach to establishing new access for exploration activities has been developed to minimise disturbance to the ground surface by avoiding clearing trees larger than 400 mm in diameter and reduced clearing of the ground vegetation with the blade of the dozer/loader up off the ground to maintain rootstock and limit the disturbance to the topsoil and grass layer.

The resulting minimal disturbance of the ground layer more effectively facilitates natural recovery of ground vegetation following disturbance. Observations of nearby areas where this approach has previously been utilised, reveals substantial short term recovery of natural vegetation when viewed a year later.

Additional management practices such as strategic flow dissipation and drainage works along new exploration tracks will also be employed where necessary to assist in dispersing water across the landscape rather than concentrating flows that may lead to erosion and sedimentation issues.

The proposed environmental buffer around riparian and floodplain areas will limit new disturbance in these areas. Given the combination of environmental buffers and the proposed minimal disturbance approach, it is not expected that there would be significant, widespread or irreversible impacts on natural geomorphic processes within the SEA or wider tenement area as a result of the exploration activities.

4.3 Riparian processes

Implementation of the proposed environmental buffer would include buffers around riparian corridors. No exploration or other activities leading to disturbance of vegetation would be conducted within these environmental buffers. Subsequently, it is not expected that the proposed exploration activities would have widespread or irreversible impacts on riparian function in the SEA and wider tenement area. Targeted verification of riparian corridor boundaries may be required to ensure environmental buffers are correctly located. This exercise would be undertaken during pre-clearing environmental surveys prior to the commencement of track establishment and drilling.

4.4 Water quality

As discussed in **Section 2**;

- no water will be extracted from groundwater, bores or surface waterways within the tenements,
- drilling does not require the injection or use of water, and
- drinking water will be purchased in Weipa and taken to the Project Area.

In addition, the proposed environmental buffer system will ensure that exploration activities will not be conducted in close proximity to riverine and non-riverine wetlands. This will reduce the likelihood of impacting the wetlands in the area. It is also unlikely that exploration works will be conducted within the wet season, thus, there will be no significant water flow across the landscape during any works that could lead to altered water quality in the area.

4.5 Wildlife Corridors

There are no wildlife corridors within the exploration tenement. There are three riparian corridors located on the Weipa Plateau that surround the exploration tenement including the Wenlock River and Cox and Myall Creek. The exploration activities are not expected to disturb the riparian corridors as the focus of activity is located primarily on the bauxite plateaus within the tenements.

4.6 Beneficial Flooding

The establishment of drill lines for exploration activities will result in minimal disturbance to the ground using the minimal disturbance approach. In addition, it is likely that exploration activities will occur outside of the wet season (in the dry season) thus, there will be limited to no surface water flow across the landscape during the exploration program.

The proposed minimal disturbance approach for new exploration tracks comprises minimal disturbance of the ground surface, therefore, it is unlikely that natural wet season flow paths of water across the landscape will be significantly modified or altered as a result of the exploration activities.

4.7 Threatened Fauna

A number of threatened fauna have been identified to occur within the tenements or surrounding area (within 10km of tenements).

Potential adverse effects on these species will be mitigated by employing a minimum disturbance approach to track establishment (refer **Section 2.2**) and undertaking targeted preclearing environmental surveys for threatened species along new tracks established for the works.

The preclearing environmental surveys will comprise systematic surveys for northern quoll, black-footed tree rat and chestnut dunnart, and targeted searches for active breeding places of red goshawk and palm cockatoo, along all new tracks to be established.

For the preliminary assessment works involving vehicle access across the area and use of a hand auger to assess subsurface geology, the following measures will be employed to avoid impacts on threatened fauna:

- Avoid moving hollow logs on the ground and avoid all trees, as black-footed tree rats and northern quolls could be using the hollows
- Ensure any auger locations are at least 5m from any active burrows visible on the ground surface
- Back fill all holes with remaining excavated material to prevent animals falling into them and getting stuck, and to prevent other people that may use the area from injuring themselves.

5. References

Bureau of Meteorology 2018, *Climate Statistics for Australian Locations, Weipa Aero*, Bureau of Meteorology, viewed 2 March 2018, http://www.bom.gov.au/climate/averages/tables/cw_027045_All.shtml