

Mining Management Plan Exploration Activities

Northern Territory of Australia – Mining Management Act

It is recommended that the Mining Management Plan is completed in conjunction with the user guide, available on the [Northern Territory Government website](#).

Section 1 – Project Details

Project Name Provide new or existing project name	Nolans Bore Project
Authorisation Number Insert existing authorisation number, where applicable	A0192-02
Operator Name Use ASIC-ABR registered name (if a company), or name of the applicant	Arafura Resources Limited
Location and Access Details Include brief description of the location, access details, and distance to nearest town or community	135 kilometres north-northwest of Alice Springs, via Stuart Highway and station tracks.
Target Commodity Details Include target commodities (i.e. gold, copper etc)	Rare Earth Elements and Phosphate. and Groundwater

Mining Management Plan Exploration Activities

<p>Mining Activities Summarise the mining activities (exploration) to be the subject of the proposed Authorisation or Variation</p>	<p>Arafura plans to drill 12 holes for stratigraphic (diamond) and groundwater monitoring (rotary mud) purposes in the proposed Nolans project bore field on ELs 29509, 31224, 31284 and 31957. Drill pads and sumps will be required.</p> <p>All samples from the stratigraphic drilling will be collected and placed in core trays. The holes will be capped immediately on completion of the hole and all rubbish removed from site.</p> <p>Arafura also plans to excavate 40 test pits and drill 6 holes (diamond) on ELs 28498 and 29509 for further geotechnical assessment of the proposed Nolans process plant (ML application 30704) and waste residues storage (ML application 30703) sites.</p>
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<p>Proposed Schedule Include start and finish dates of ground disturbing work</p>	January 2020 to December 2020
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Mining Interest and Land Ownership

List the mining interests (titles), the title holder name/s, the title expiry date and the Property name/Land holder (e.g. pastoralist or Aboriginal land trust) for each title.

Title Number	Title Holder	Expiry Date	Property Name or Land Holder
EL28473	Arafura Resources Limited	04/10/2021	Aileron Station, Napperby Station, Pine Hill Station
EL28498	Arafura Resources Limited	11/08/2021	Aileron Station, Napperby Station, Pine Hill Station
EL29509	Arafura Resources Limited	01/01/2021	Aileron Station
EL31224	Arafura Resources Limited	11/10/2022	Aileron Station, Napperby Station
EL31284	Arafura Resources Limited	14/12/2022	Aileron Station, Napperby Station
EL31957	Arafura Resources Limited	14/02/2025	Napperby Station
ML30703	Arafura Rare Earths Pty Ltd	20/07/2045	Aileron Station
ML30704	Arafura Rare Earths Pty Ltd	20/07/2045	Aileron Station

Organisational Structure

Position Title	Name
Managing Director	Gavin Lockyer
GM Exploration & Business Development	Richard Brescianini
GM NT & Sustainability	Brian Fowler
GM Projects	Stewart Watkins
GM Sales & Marketing	Lloyd Kaiser
CFO & Company Secretary	Peter Sherrington
Principal Geologist	Kelvin Hussey
Senior Field Supervisor	Jeremy Grose

Section 2 – Operator Self-Assessment of the Environmental Risk

The purpose of this self-assessment is to ensure Operators complete a project risk assessment of potential environmental impacts and are aware of other legislative obligations from various Agencies. As a result of this self-assessment, further information may be required in the form of a management plan to enable full assessment of the MMP. If you have any queries please contact a Mining Officer prior to submitting the MMP. Useful resources to assist with this self-assessment are provided in the User Guide.

Environmental considerations

ASSESSMENT ASPECT	YES or NO	ACTIONS REQUIRED (if answered YES)	APPENDED INFORMATION (Evidence of consultation with DENR and/or management plan)
<p>Step 1: Are there any threatened flora and fauna species or habitats of significance that may occur in the proposed work area?</p>	<p>Yes</p>	<p>It is likely a threatened species will show up in most reports. Therefore, the Operator must undertake a likelihood analysis, which looks at the likelihood of the species or its habitat occurring at or near the site. If the analysis results in a high likelihood, then a “Significant Impact Assessment” should be undertaken, which may require consultation with the Department of Environment and Natural Resources (DENR) – Flora and Fauna Division. The DENR may recommend a Biodiversity Management Plan – this must be developed and attached to the MMP.</p>	<p>Please see 2018 MMP Appendices 3 and 4. In 2006-2007 Lowe Ecological Services conducted a flora and fauna survey, the results of which were attached to the MMP submission for that period. Supplemental and additional regional surveys were provided in Arafura’s EIS documentation in 2016 and 2017. Arafura will follow the NT’s EPA recommendations for the threatened flora and fauna species when conducting the exploration program.</p>

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ASSESSMENT ASPECT	YES or NO	ACTIONS REQUIRED (if answered YES)	APPENDED INFORMATION (Evidence of consultation with DENR and/or management plan)
<p>Step 2: Are there any known declared weeds within the proposed work area?</p>	Yes	<p>Under the <i>Weeds Management Act</i> declared weeds are required to be eliminated or controlled by the owner and occupier of land. Seek advice from DENR – Weeds Management to ensure management measures are appropriate for the level of activity proposed and attach a Weed Management Plan (if required).</p>	<p>Please see 2018 MMP Appendices 3 and 4.</p> <p>In 2006-2007 Lowe Ecological Services conducted a flora and fauna survey, the results of which were attached to the MMP submission for that period. Supplemental and additional regional surveys were provided in Arafura’s EIS documentation in 2016 and 2017.</p>
<p>Step 3: Will you be using water from bores or other sources for the operation?</p>	Yes	<p><i>Note the Government is proposing to amend the exemption of water licencing under the Water Act for mining activities, including exploration.</i></p> <p><i>This section will be updated in light of any changes in the future.</i></p>	<p>Water from bores and drill holes will be sampled to acquire background groundwater data around the mine site and plant site areas.</p> <p>Water from existing Arafura bores in the vicinity of the planned stratigraphic (diamond) drill holes will be used to support that program.</p> <p>A map showing the existing bore locations is in Appendix 17 of the 2018 MMP.</p>

Environmental assessment and cultural considerations

ASSESSMENT ASPECT	YES or NO	MANAGEMENT REQUIREMENTS
<p>Step 4: Is your project likely to have a significant impact on the environment?</p>	No	Refer to the NTEPA Environmental Factors and Objectives Guideline.
<p>Step 5: Are there Aboriginal sacred sites in the Project area?</p>	Yes- Please see Appendix 8 of 2018 MMP for AAPA map.	Sacred Sites are protected under the NT <i>Aboriginal Sacred Sites Act</i> and administered by the Aboriginal Areas Protection Authority (AAPA). It is recommended that advice be sought from AAPA in relation to sacred site protection.
<p>Step 6: Are there archaeological and heritage sites in the Project area?</p>	No	Heritage and archaeology sites are protected in the NT. NT Heritage Branch of the DENR administers the <i>Heritage Act</i> . Seek advice in relation to protection of heritage and archaeological sites.

Section 3 – Amendments

As per Section 41(3) of the *Mining Management Act*, an MMP reviewed and amended under Section 41(1)(a) is to clearly identify amendments made.

Section	Amendment
Section 1- Project Details	<p>Proposed works updated.</p> <p>Groundwater removed from target commodities, as requested by DPIR.</p> <p>Licence details updated in Mining Interest and Land Ownership section.</p>
Section 2	Update to section, as requested in the 2019 variation approval document.
Section 4- Activities Proposed	<p>Addition of 'Works previously approved' table to segregate previously approved works that will still be conducted from new proposed works.</p> <p>Addition of EL31957.</p> <p>Bulk sampling application not required. Only a total of 144m³ to be extracted from the test pits. The pits will be mapped, photographed and selectively sampled in small quantities. Samples will be put in calico bags.</p> <p>Each pit will be filled in with the extracted material (and the area rehabilitated) immediately after examination. Topsoil and subsoil will be stockpiled separately on either side of the test pit for rehabilitation. Backfilling will occur in the correct sequence that it was extracted (i.e. topsoil will be placed back on top).</p>
Section 5- Previous Disturbance	Section updated with works and rehabilitation conducted in 2019.
Appendices 1, 14, 19, 20, 22, 23	<p>Updated appendices.</p> <p>Updated security calculation, as suggested in the 2019 variation approval document.</p>
Appendix 23	Updated map included to show the proposed 2020 works. Updated map requested in 2019 variation approval document.
Appendix 24	Addition of Ti Tree Water Control District Map.

Section	Amendment
<p>Requested in Site Inspection</p>	<p>Arafura have not yet tidied up the remaining process residue bulk samples nor removed the corresponding bags from the 'bag farm' area. This will not be actioned until Arafura receives a report from Northern Territory Environmental Laboratories (NTEL) detailing the results of a neutralisation and leachate test work program and design and execute an authorised process residues burial program.</p> <p>Once a burial program has been submitted and authorised, Arafura will mobilise suitable earthmoving equipment to site to conduct the burial works. Until then, moving materials other than for the purpose of burial would be impractical and may spread material within the area, necessitating further clean-up.</p>
<p>Comments from 2018 MMP Approval</p>	<p>3.1 Previous Activities and Current Status All holes are temporarily capped or permanently plugged below ground level.</p> <p>3.2 Proposed Activities Arafura are aware that changes to the <i>Water Act 1992</i>, requires future water bores to be drilled under a permit issued by DENR.</p> <p>Permits are only required if the water use is for exploration or mining purposes or if the bore is within a water control district. EL29509 and the north eastern tip of EL31224 are within the Ti Tree Water Control District. Map attached at Appendix 24.</p> <p>Arafura submitted a Water Extraction Licence Application for the development of the Nolans project on 7 January 2020 to DENR Water Resources Division.</p> <p>Appendix 21 Arafura have not yet verified the readings along the NW boundary of the 'bag farm' area. There will be no clean-up work undertaken until a process residues burial program is proposed by Arafura and authorised by DPIR.</p>
<p>Security Calculation</p>	<p>Notes in red in the comment section describe the proposed new works. Items with no red comments have already been approved and these figures have not been updated.</p>

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Section 4 – Activities Proposed

Works previously approved, but not yet conducted.

Mining Interests (i.e. titles)	EL28473	EL28498	EL29509	EL31224	EL31284
Number and type of proposed drill holes	Nil	Nil	Nil	Nil	Nil
Maximum depth of proposed holes (m)	Nil	Nil	Nil	Nil	Nil
Number and size of drill pads to be cleared (Length: 25m x Width:20m)	Nil	Nil	Nil	Nil	Nil
Total area of drill pads to be cleared (ha)	Nil	Nil	Nil	Nil	Nil
Number of sumps (Length: 3 x Width: 3 x Depth: 2 m)	Nil	Nil	Nil	Nil	Nil
Is drilling likely to encounter groundwater? (Y, N, unsure)	N/A	Nil	Nil	N/A	N/A

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Mining Interests (i.e. titles)	EL28473	EL28498	EL29509	EL31224	EL31284
Number of costeans (Length: m x Width: m x Depth: m)	Nil	Nil	Nil	Nil	Nil
Number of bulk sample pits	Nil	Nil	Nil	Nil	Nil
Total bulk sample (tonnes) (Length: m x Width: m x Depth: m)	Nil	Nil	Nil	Nil	Nil
Bulk sample pits approved under <i>Mineral Titles Act</i> ? (Y or N)	N/A	Nil	Nil	N/A	N/A
Test pit (3m x 0.6m x 2m deep)	Nil	Nil	Nil	Nil	Nil
Length of line/track clearing (km: x Width: m)	Nil	Nil	Nil	Nil	Nil
Camp area to be cleared (ha)	Nil	Nil	Nil	Nil	Nil

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Mining Interests (i.e. titles)	EL28473	EL28498	EL29509	EL31224	EL31284
Camp Infrastructure (i.e. demountable, tents)	2 x 20ft shipping containers 2 x 6m x 2.5m	Nil	Nil	N/A	N/A
Previous disturbance yet to be remediated on title (ha) if known	Nolans camp & bag farm – 3.375ha Gridlines – 66.95ha (naturally revegetating)	Nil	Nil	N/A	N/A
Other	Nil	Nil	Nil	Nil	Nil
Total area disturbed proposed (ha)	Nil	Nil	Nil	Nil	Nil

Additional Proposed Works

Mining Interests (i.e. titles)	EL28473	EL28498 (within ML30703 and ML30704)	EL29509 (within ML30703 and ML30704)	EL31224	EL31284	EL31957
Number and type of proposed drill holes	Nil	3 Diamond	3 Diamond 1 Rotary Mud	1 Diamond 2 Rotary Mud	2 Diamond 5 Rotary Mud	1 Diamond
Maximum depth of proposed holes (m)	Nil	20m	20m (Diamond) 60m (Rotary Mud)	135m	240m	320m
Number and size of drill pads to be cleared (Length: 25m x Width:20m)	Nil	3 (15m x 10m)	4 (Diamond 15m x 10m; Rotary Mud 25m x 20m)	1	6	1
Total area of drill pads to be cleared (ha)	Nil	0.045 ha	0.095 ha	0.05 ha	0.3 ha	0.05 ha
Number of sumps (Length: 3 x Width: 3 x Depth: 2 m)	Nil	3 0.0027 ha 54 m ³	4 0.0036 ha 72 m ³	3 0.0027 ha 54 m ³	7 0.0063 ha 126 m ³	1 0.0009 ha 18 m ³
Is drilling likely to encounter groundwater? (Y, N, unsure)	N/A	N	N (Diamond) Y (Rotary Mud)	Y	Y	Y

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Mining Interests (i.e. titles)	EL28473	EL28498 (within ML30703 and ML30704)	EL29509 (within ML30703 and ML30704)	EL31224	EL31284	EL31957
Number of costeans (Length: m x Width: m x Depth: m)	Nil	Nil	Nil	Nil	Nil	Nil
Number of bulk sample pits	Nil	Nil	Nil	Nil	Nil	Nil
Total bulk sample (tonnes) (Length: m x Width: m x Depth: m)	Nil	Nil	Nil	Nil	Nil	Nil
Bulk sample pits approved under <i>Mineral Titles Act?</i> (Y or N)	N/A	N/A	N/A	N/A	N/A	N/A
Test pit pads (6m x 10m)	Nil	10 (6m x 10m) 0.06 ha	30 (6m x 10m) 0.18 ha	Nil	Nil	Nil
Test pits (3m x 0.6m x 2m deep)	Nil	10 (3m x 0.6m x 2m deep) = 36 m ³	30 (3m x 0.6m x 2m deep) = 108 m ³	Nil	Nil	Nil

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Mining Interests (i.e. titles)	EL28473	EL28498 (within ML30703 and ML30704)	EL29509 (within ML30703 and ML30704)	EL31224	EL31284	EL31957
Length of line/track clearing (km: x Width: 3m)	Nil	2km x 3m 0.6 ha	6.7km x 3m 2.01 ha	Nil	6km x 3m 1.8 ha	Nil
Camp area to be cleared (ha)	Nil	Nil	Nil	Nil	Nil	Nil
Camp Infrastructure (i.e. demountable, tents)	N/A	N/A	N/A	N/A	N/A	N/A
Previous disturbance yet to be remediated on title (ha) if known	N/A	N/A	N/A	N/A	N/A	N/A
Other	Nil	Nil	Nil	Nil	Nil	Nil
Total area disturbed proposed (ha)	Nil	0.7077 ha	2.2886 ha	0.0527 ha	2.1063 ha	0.0509 ha

Proposed drilling digital files attached in Appendix 23. The proposed pits and tracks linking them are within MLs30703 and 30704. Digital files for the proposed pits and tracks are not provided, as the exact locations are not yet known. The maximum dimensions for the pits and tracks have been considered and included in the security calculation. Constructed pits and tracks will be recorded and provided in the next MMP.

Section 5 – Previous Disturbance (for existing Authorisations only)

Please see Appendix 19 for a detailed rehabilitation register.

Mining Interests (i.e. titles)	EL28473	EL28498	EL29509	EL31224	EL31284
Number/type of holes drilled	17 RC 9 Diamond	2 Diamond 4 Geotech-Diamond	4 Diamond 2 RAB	N/A	N/A
Maximum depth of holes drilled (m)	60m 491.46m	30.1m	Diamond- 25.5m RAB- 60.5m	N/A	N/A
Number of holes remediated (i.e. plugged/capped)	17 Capped, not plugged 9 Capped, not plugged.	2 grouted with cement bentonite mix 4 Geotech plugged and backfilled	4 Diamond- grouted with cement bentonite mix 2 RAB- Monitoring bores	N/A	N/A
Number and size of drill pads cleared (Length: m x Width: m)	9 (Length: 25m x Width: 20m)	4 (Length: 25m x Width: 20m)	0	N/A	N/A
Total area of drill pads cleared (ha)	9 0.45 ha	4 0.2 ha	0	N/A	N/A
Total area of drill pads remediated (ha)	9 0.45 ha	4 0.2 ha	N/A	N/A	N/A
Sumps	9 0.0081 ha 162 m³	2 (3m x 1.5m x 1m)	4 (15m x 5m x 1.5m) 0.03 ha		

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Mining Interests (i.e. titles)	EL28473	EL28498	EL29509	EL31224	EL31284
Sumps remediated	9 0.0081 ha 162 m ³	2 backfilled	4 backfilled		
Was groundwater encountered? (Y or N)	N	Y	Y	N/A	N/A
Length of line/track cleared (Length: km x Width: m)	32,500m x 6m= 19.5 ha 25,160 x 15m= 37.74 ha			N/A	N/A
Length of line/track remediated (Length: km x Width: m)	0	0	0	N/A	N/A
Number of costeans excavated (L: m x W: m x D: m)	9	N/A	N/A	N/A	N/A
Number of costeans remediated	9	N/A	N/A	N/A	N/A
Disposal Pit/ Borrow Pit (Various dimensions)	7 Disposal Pits	1 Borrow Pit	N/A	N/A	N/A
Disposal/ Borrow Pit remediated	6 Disposal Pits	1 Borrow Pit	N/A	N/A	N/A
Test pits excavated (Various dimensions)	33	23	26	N/A	N/A
Test pits remediated	33	23	26	N/A	N/A

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Mining Interests (i.e. titles)	EL28473	EL28498	EL29509	EL31224	EL31284
Camp area/s cleared (ha)	Nolans camp & bag farm – 3.375ha Gridlines – 66.95ha (naturally revegetating)	N/A	N/A	N/A	N/A
Camp area/s remediated (ha)	N/A	N/A	N/A	N/A	N/A
Total area disturbed (ha)	Please see Appendix 19 for a complete rehabilitation register.			N/A	N/A
Total area remediated (ha)	Please see Appendix 19 for a complete rehabilitation register.			N/A	N/A

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Section 6 – Environmental Management

By checking these boxes, you are agreeing to implement the following minimum environmental management standards on the project area. Where boxes have been left unchecked, justification is required.

6.1	✓	Blade-up approach for clearing will be used (i.e. no windrows, leave root stock and topsoil)
6.2	✓	Significant vegetation will be avoided during clearing (i.e. large trees, specimens providing habitat or food sources, riparian vegetation, and threatened species)
6.3	✓	Vegetation clearing during, and immediately after rainfall events, will be avoided
6.4	✓	Vegetation clearing will be kept to the minimum required to safely traverse vehicles and drill rigs along tracks and drill pads
6.5	✓	Where blade-up techniques cannot be employed, topsoil and vegetation will be stockpiled appropriately for remediation purposes
6.6	✓	All employees and contractors will be trained and inducted in relation to the management of environmental risks in the work area, including weeds, waterways, threatened species, soil erosion, sacred sites and heritage areas
6.7	✓	Sumps will be lined or tanks of appropriate size to contain water, sediment and drilling fluids encountered during drilling, will be used
6.8	✓	Sumps, drill holes, and fuel stores will be located away from environmentally significant areas and water courses
6.9	✓	Excavations (sumps, costeans and pits) will be appropriately ramped to allow fauna egress
6.10	✓	Drill holes will be securely capped immediately after drilling
6.11	✓	Vehicle hygiene measures will be employed to prevent the introduction and spread of invasive species and pathogens when mobilising vehicles and equipment from one location to another
6.12	✓	Hydrocarbon spills will be minimised using liners and drip trays under machinery, and appropriately sized spill-kits available in the event of a spill
6.13	✓	Hazardous substances (including hydrocarbons) will be stored and handled in accordance with relevant Australian Standards
6.14	✓	Hydrocarbons will be stored in lined and bunded areas
6.15	✓	Waste will be stored securely while on-site to minimise windblown rubbish and access by feral animals
6.16	✓	Waste will be removed off-site and disposed of at an appropriate waste management facility
6.17	✓	All environmental incidents will be reported to the Department in accordance with Section 29 of the <i>Mining Management Act</i> .

Justification and alternative management measures:

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Section 7 – Remediation and Closure

By checking these boxes, you are agreeing to implement the following minimum remediation standards on the project area. Where boxes have been left unchecked, justification is required.

7.1	<input checked="" type="checkbox"/>	Drill holes plugged below ground level at a minimum depth of 0.4 metres and soil mounded to prevent subsidence, within 6 months of completion of drilling
7.2	<input checked="" type="checkbox"/>	Drill samples/spoil returned down drill holes, buried in sumps, or removed from site
7.3	<input checked="" type="checkbox"/>	All drill hole and access markers including flagging tape, wooden markers and star pickets will be removed from site
7.4	<input checked="" type="checkbox"/>	Re-contouring of cut and fill drill pads will be consistent with the surrounding terrain
7.5	<input checked="" type="checkbox"/>	Ripping/scarifying of drill pads, and compacted areas along the contour (on sloping ground) and cross-ripping (zig-zag) along tracks
7.6	<input checked="" type="checkbox"/>	Tracks will be remediated, including pushing in all windrows
7.7	<input checked="" type="checkbox"/>	Appropriate erosion and sediment controls will be installed where erosion is evident or likely to occur
7.8	<input checked="" type="checkbox"/>	All tracks will be remediated unless otherwise agreed in writing by the land holder or appropriate third party
7.9	<input checked="" type="checkbox"/>	Access through watercourses will be removed and banks restored
7.10	<input checked="" type="checkbox"/>	No erosion is occurring in disturbed areas, on tracks and in remediated areas
7.11	<input checked="" type="checkbox"/>	All excavations backfilled within 6 months of completion of drilling
7.12	<input checked="" type="checkbox"/>	All water bores decommissioned unless otherwise agreed in writing by the land holder or appropriate third party. The bore must comply with the Minimum Construction Requirements for Water Bores in Australia and may require permits or licenses under the <i>Water Act</i>
7.13	<input checked="" type="checkbox"/>	All rubbish and infrastructure will be removed from site
7.14	<input checked="" type="checkbox"/>	Replacement of topsoil and vegetation
7.15	<input checked="" type="checkbox"/>	Contaminated soils (e.g. hydrocarbon or hazardous chemicals) will be remediated or removed from site
7.16	<input checked="" type="checkbox"/>	Monitoring will be undertaken following the wet season or a significant rainfall event

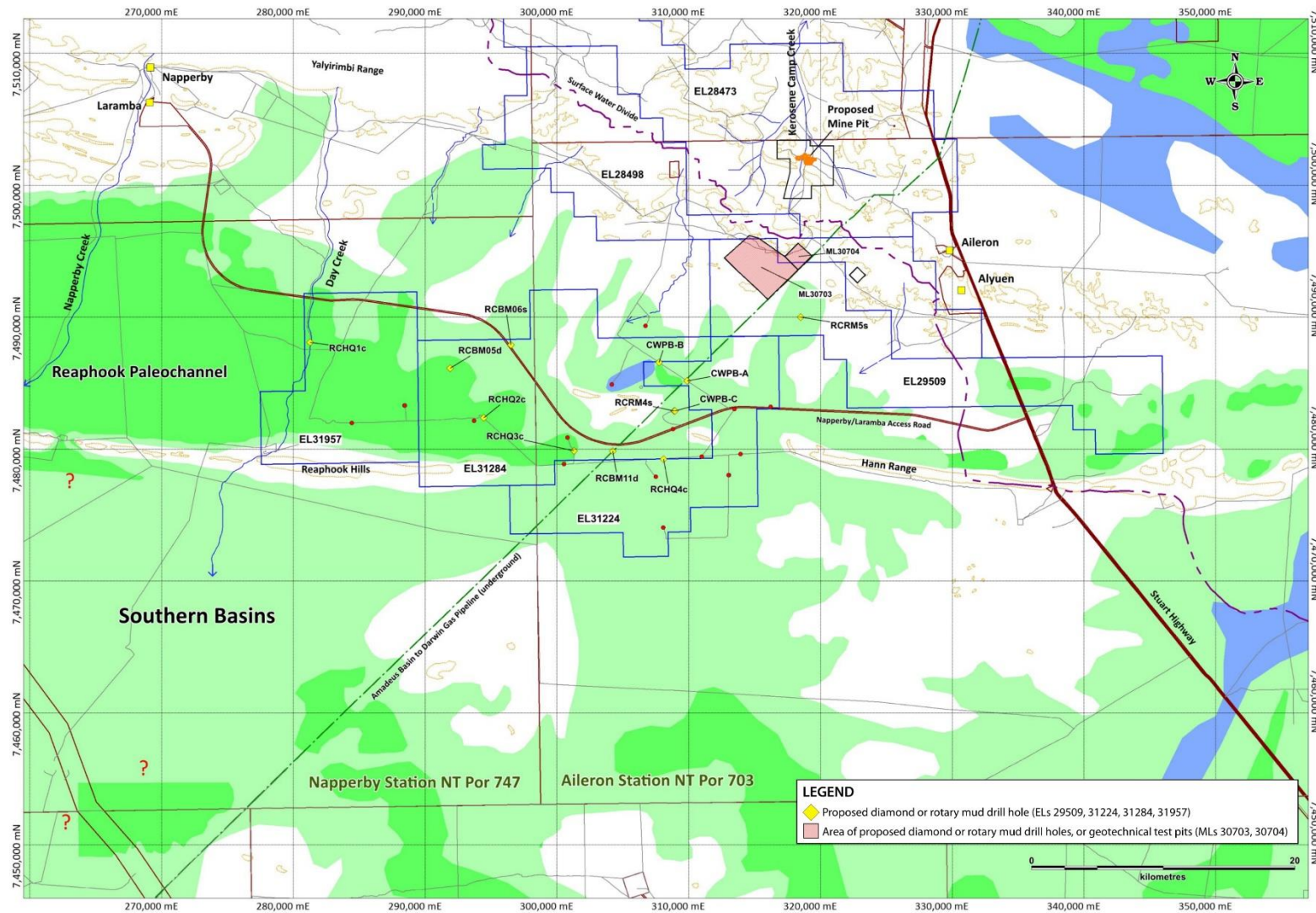
Justification and alternative management measures:

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Section 8 – Required Attachments

8.1	✓	Security Calculation Spreadsheet
8.2	✓	Nomination of Operator Form
8.3	✓	Spreadsheet with coordinates of proposed drill holes or polygons of target areas
8.4	✓	Google Earth KML/shape files/track logs of proposed tracks and camp sites
8.5	✓	<p>A map of the work area(s) showing:</p> <ol style="list-style-type: none"> 1. title boundaries and title numbers 2. current and proposed drill holes, or polygons of target areas 3. current and proposed tracks 4. remediated areas 5. camp sites 6. sacred/heritage sites 7. environmental constraints
8.6	✓	Remediation Register (for existing Authorisations)
8.7	✓	Photographs of remediation work
8.8	N/A	Radiation Management Plan (if applicable)- Lodged in 2018 MMP




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Section 9 – Declaration

The Mining Management Plan must be endorsed by a senior representative of the company who has the appropriate level of authority to do so.

	Author	Reviewed by	Approved by
Date	16/01/2020	16/01/2020	16/01/2020
Name	Holly Edgar	Richard Brescianini	Richard Brescianini
Signature			

I, Richard Brescianini, GM Exploration & Business Development, declare that I have the authority to make the commitments contained in this mining management plan on behalf of the company. To the best of my knowledge the information contained in this plan is true and correct and commit to undertake the works in accordance with the agreed minimum standards and all relevant Northern Territory and Commonwealth Government legislation.

SIGNATURE: 

DATE: 16 January 2020