

# Assessment Report 96

**Assessment method:  
Referral Information**

**Melville Island Road Upgrades  
Department of Infrastructure, Planning and Logistics  
September 2022**

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (NT) (EP Act). It describes the outcomes of the NT EPA's assessment of the Melville Island Road Upgrades proposed by the Northern Territory Department of Infrastructure, Planning and Logistics on Melville Island.

This assessment report documents potential environmental impacts and risks identified during the environmental impact assessment process, focusing on those that could be significant, and the measures and recommended conditions required to address potentially significant impacts.

In accordance with section 65 of the EP Act the assessment report is for the Northern Territory Minister for Environment, Climate Change and Water Security to consider when making a decision about whether to approve the action under the EP Act.



**Dr Paul Vogel AM**  
NT EPA Chairperson

14 September 2022

**Northern Territory Environment Protection Authority**

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## Summary

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (NT) (EP Act) for the Melville Island Road Upgrades (proposal).

The Department of Infrastructure, Planning and Logistics (proponent) proposes to upgrade Pirlangimpi and Pickertaramoor roads from gravel to bitumen within NT Portion 1644 on Melville Island. The upgrades require clearing of up to 297 hectares of native vegetation for gravel extraction, road widening and alignments, and access tracks to water points. The construction works will be along approximately 73 km of an existing road located on freehold Aboriginal Land held by the Tiwi Aboriginal Land Trust, on land that is not zoned under the NT Planning Scheme.

The NT EPA assessed the proposal by the Referral information assessment method, the shortest method of assessment including public consultation on the referral information. The assessment was carried out in accordance with the requirements of the EP Act and Environment Protection Regulations 2020. The NT EPA examined the potential for significant direct, indirect and cumulative impacts on the environment as a whole.

In the course of the assessment the NT EPA examined potential significant impacts on the values of one environmental factor, Terrestrial ecosystems.

The proposal is the second referral for road upgrades on the Tiwi Islands in response to deterioration of the existing Tiwi Island road network. The proposal would result in improvements to: safety and connectivity to essential services for communities; local and regional economic development and employment; and environmental outcomes from improved erosion control.

The environmental risks associated with the proposal can be minimised by appropriate site selection and progressive rehabilitation of all gravel extraction areas and decommissioned roads.

The NT EPA concludes that the proposal can be implemented and managed in a manner that is environmentally acceptable and recommends that environmental approval be granted subject to the conditions recommended in Appendix 1. This assessment report and the draft environmental approval (Appendix 1) are provided to the Minister for Environment, Climate Change and Water Security (Minister) for consideration in deciding whether to grant an environmental approval.

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# 1. Introduction

This assessment report provides advice and recommendations of the Northern Territory Environment Protection Authority (NT EPA) to the Minister for Environment, Climate Change and Water Security (Minister) on completion of the NT EPA's environmental impact assessment of the Melville Island Road Upgrades (proposal). The proposal is to upgrade sections of Pirlangimpi and Pickertaramoor roads from gravel to bitumen, including road widening and realignments, gravel extraction, access to water points and water extraction along 73 km of road on Melville Island.

The NT EPA has prepared this report in accordance with section 64 of the *Environment Protection Act 2019 (NT)* (EP Act). As prescribed by regulation 156 of the Environment Protection Regulations 2020 (EP Regulations), the purpose of this report is to:

- assess whether the proposal is likely to meet the environmental objectives
- assess the potential significant environmental impacts of the proposal
- make recommendations for avoiding, mitigating and managing those impacts
- advise the Minister as to the environmental acceptability of the proposal.

This report must assess the potential significant environmental impacts and risks of the proposal and whether there are any significant residual impacts remaining after all reasonable measures to avoid, minimise and offset the impacts and risks have been taken.

This assessment report and the draft environmental approval (Appendix 1) are provided to the Minister for consideration in deciding whether to grant an environmental approval for the proposal. Matters taken into account during the assessment are tabulated in Appendix 2. An environmental impact assessment timeline is provided at Appendix 3.

## 1.1. Proponent

The proponent is the Northern Territory Department of Infrastructure, Planning and Logistics (Australian business number 84 085 734 992). The proponent is responsible for planning, designing and procuring contractors to undertake the works in accordance with any environmental approval.

## 1.2. Location and context

The Tiwi Islands are located approximately 80 km north of Darwin and comprise Australia's second and fifth largest islands, Melville and Bathurst islands respectively. The proposal is on and surrounded by unzoned, freehold Aboriginal Land held by the Tiwi Aboriginal Land Trust.

The existing Pirlangimpi and Pickertaramoor roads are unsealed roads providing important links to multiple communities on Melville and Bathurst islands; both roads meet with Paru Road (NT EPA Assessment report 95) and Milikapiti Road. In recent years, road usage has grown rapidly. This trend is expected to continue with the establishment of a new car ferry that is expected to double the number of vehicles travelling on the Tiwi Islands.

The nearest residences to the proposal are at Pirlangimpi (population 450) at the western extent of the proposal, Pickertaramoor (Tiwi College – boarding school) at the eastern extent of the proposal. Taracumbi Outstation is located approximately 5.4 km north of road works, 2 km northeast of gravel extraction (GP11\_1), and 200 m from a water extraction point (**Figure 1**). New workers' camps will be established along road works each year to house workers who are unable to commute from their place of residence for the duration of the proposal.

The Tiwi Islands experience a tropical monsoonal climate with distinct dry seasons and wet seasons. Environmental values which require protection from the proposal area arise from the high average annual rainfall experienced by Melville Island, which is greater than and occurs over a long period than experienced on the mainland (1987 mm<sup>1</sup>). The higher rainfall combined with geographic isolation of the islands contributes to the high environmental value of the Tiwi Islands as high biodiversity refuge for threatened flora and fauna species, including endemic species not found elsewhere in the world.

## 2. Proposal

### 2.1. Description

The proposal is to upgrade Pirlangimpi and Pickertaramoor roads from gravel to bitumen and straighten sections of the road within NT Portion 1644 on Melville Island.

The proposal area includes all areas for road works, water extraction and gravel extraction, and covers 1466 hectares (ha) with a maximum native vegetation clearing requirement of 297 ha. Table 1 describes the major components of the development and Figure 1 shows the location of road works, gravel pits and water points. A detailed description of the proposal is presented in section 3.3 of the proponent's referral<sup>2</sup>.

**Table 1 Proposal description**

Aspect	Description
Timing	Works are anticipated to commence in 2024 and to be undertaken over five years between the months of April to October with approximately 15 to 20 km of road constructed per year.
Road works	<ul style="list-style-type: none"> <li>• Pirlangimpi Road (47 km) and Pickertaramoor Road (26 km)</li> <li>• Land clearing for road widening and alignments (28 ha)</li> <li>• Works include pavement lifts, re-gravelling, sealing to a two-lane standard, formation widening, realigning, installation of drainage structures and overall improvements to the flood immunity.</li> <li>• Works require importing vehicles, plant and machinery from the mainland to Melville Island</li> </ul>
Gravel pits	<ul style="list-style-type: none"> <li>• Area surveyed for gravel extraction across 10 locations (1169.6 ha)</li> <li>• 23 proposed gravel pit areas<sup>3</sup> with combined land clearing of up to 234 ha.</li> </ul>

<sup>1</sup> Australian Government Bureau of Meteorology, 2022. [Climate statistics for Australian locations \(bom.gov.au\)](https://www.bom.gov.au)

<sup>2</sup> Proponent's [Referral report](#) submitted to the NT EPA

<sup>3</sup> Configuration of proposed gravel pits shown in Figures 3 to 6 of the proponent's [Referral report](#)

Aspect	Description
Water demand and sources	<ul style="list-style-type: none"> <li>• 200 kL per day for construction, additional water for dust suppression and workers camp.</li> <li>• Estimated demand of 36 ML per year for five years.</li> <li>• Land clearing for access tracks and bore pads (34 ha)</li> <li>• Water sourced from, in order of priority<sup>4</sup>:               <ul style="list-style-type: none"> <li>○ five existing bores (Plantation, Power Water Corporation and Matilda Mineral bores)</li> <li>○ nine proposed new bores</li> <li>○ eleven natural water bodies.</li> </ul> </li> </ul>
Rehabilitation	<ul style="list-style-type: none"> <li>• Progressive rehabilitation by assisted natural regeneration in areas cleared for gravel pit through the actions:               <ul style="list-style-type: none"> <li>○ spread unused rock and gravel material over exposed soil</li> <li>○ rip area (to depth of 100 mm to 200 mm) along contour lines to reduce erosion</li> <li>○ spread and scarify top soil and overburden to encourage regrowth from the soil's seed store</li> <li>○ broadcast of local native seed if assisted revegetation is specified by the approval holder</li> <li>○ spread cleared vegetation across the site in a manner representative of the surrounding area to assist the recolonisation of flora and fauna across the site.</li> </ul> </li> <li>• ripped natural regeneration for the decommissioned road using material from vegetation clearing at realignment.</li> </ul>
Construction facilities	<ul style="list-style-type: none"> <li>• For each road length (year) a site office, vehicle depot, laydown area and temporary camp would be constructed to reduce travel times on local roads.</li> <li>• Located within or near gravel pit areas.</li> </ul>
Post construction maintenance	The Tiwi Islands Regional Council (TIRC) will maintain the road following formal handover.

<sup>4</sup> Chainage and/or location provided in Table 6 of the proponent's [Referral report](#)



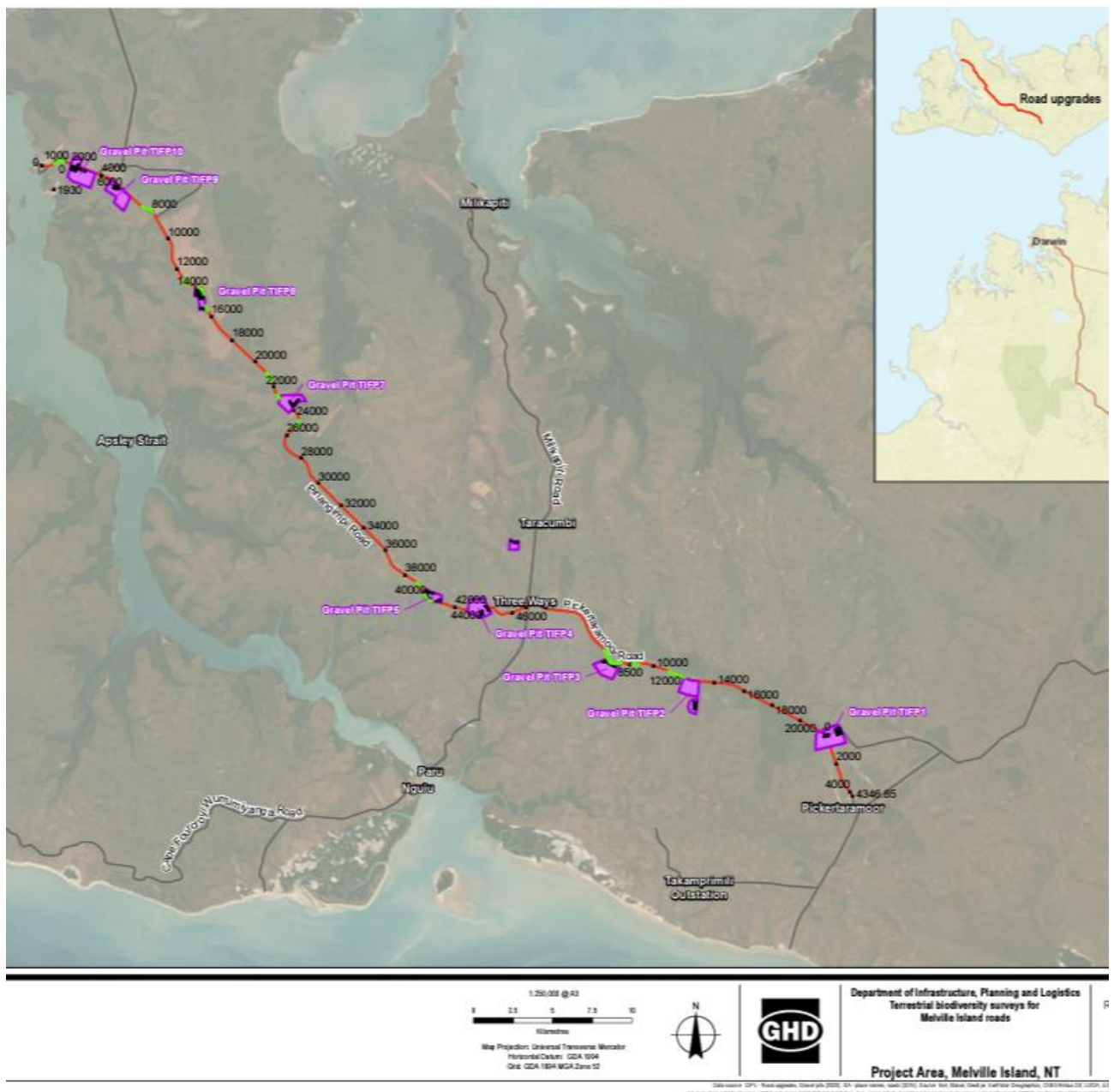


Figure 1. Proposal components. Legend: road upgrades (red), road alignments (green x13), potential gravel pit areas (purple x10) and proposed gravel pits (black x23) (Source: Referral report)

## 2.2. Justification for the proposal and alternatives

The proponent advises that the proposed road upgrade would provide long term benefits for the communities and businesses across the Tiwi Islands through:

- improving access for tourism, forestry, mining and energy developments and employment opportunities in those industries through:
  - increased regional and local economic development (for example, improved inter-community connections, support growth of existing and new industries development, improved access to land management actions)
  - increased Indigenous employment (for example, opportunities for Indigenous employment and training during construction, provide possible sustainable source of future employment for ongoing maintenance of the roads)
  - reduced road maintenance costs.



- improved motorist safety, travel times and driver amenities through:
  - improved freight efficiency, connectivity and travel time (for example, reduced mass restriction, frequency and duration for heavy vehicles, improved flood immunity, reduced vehicle operating costs)
  - increased safety (for example, safer overtaking opportunities, reduced crash frequency and severity).
  - reduced road maintenance costs.

The proponent selected the preferred road alignments with consideration of avoiding high value areas and high density threatened species. The specific locations for gravel pits were determined by applying the environmental decision making hierarchy to avoid threatened flora and fauna, sensitive and significant vegetation, taking into account appropriate buffer zones.

### 3. Strategic context

The proposal is consistent with and contributes to the NT Government's commitment to creating jobs and economic growth, and with strategic plans and initiatives including:

- **Indigenous Employment and Supplier-Use Infrastructure Framework** – aims to increase Indigenous employment and supplier-use in the delivery of land transport infrastructure projects funded or co-funded by the Australian Government
- **Corridor Investment Strategy** – provides an evidence-based approach to road transport infrastructure informed by consultation with the Tiwi Land Council (TLC), Tiwi Islands Regional Council (TIRC) and forestry industry representatives and delivering outcomes for the Australian Government and NT Government.
- **Closing the Gap initiative** – through improving access to health and educational services, facilitating social and cultural connections and reducing barriers to development including operating costs for business.

## 4. Statutory context

### 4.1. Overview

The proposal requires assessment by the NT EPA under the EP Act. The NT Minister for Environment, Climate Change and Water Security is the approval authority.

The environmental approval is the principal approval; however, the proposal may also require separate regulatory approvals. It is the responsibility of the proponent to obtain all approvals, which may include, but not be limited to:

- an Aboriginal Areas Protection Authority (AAPA) certificate (part of the proposal is not covered by the existing certificate)
- a land clearing permit under the *Planning Act 1999*.

Pursuant to section 61 of the EP Act, the purpose of the environmental approval is to manage the potentially significant environmental impacts of a proposal during all phases. This includes planning, designing, construction, rehabilitation and completion of the proposal.

## 4.2. Mandatory matters for consideration

In preparing this assessment report, the NT EPA considered the following information in accordance with regulation 157 of the EP Regulations:

- referral information
- submissions on the referral information
- any other information the NT EPA considers relevant under EP Regulation 157(2)(c).

The NT EPA took into account the purpose of the environmental impact assessment process under section 42 of the EP Act (addressed in Appendix 2) including consideration of:

- the objects (EP Act, section 3)
- the principles of ecologically sustainable development (EP Act, Part 2 Division 1)
- the environmental decision-making hierarchy (EP Act, section 26)
- the waste management hierarchy (EP Act, section 27)
- ecosystem-based management
- impacts of a changing climate.

Refer to Appendix 2 for further detail about matters that the NT EPA has taken into account during its assessment.

## 5. Consultation

The NT EPA published the referral for comment between 25 May and 22 June 2022. No public submissions were received during consultation on the referral. Six government authority submissions were received and are available on the NT EPA website.

The NT EPA considered the submissions in making its decision to require a standard environmental impact assessment by the referral information method.

The issues relating to potential significant impacts raised in submissions are discussed in more detail in section 6 below.

The NT EPA consulted with and invited submissions from the proponent and the statutory decision maker for land clearing under the *Planning Act 1999* on the draft environmental approval. Submissions were received from the proponent and delegate under the *Planning Act 1999*. The NT EPA considered the submissions in finalising its recommendations to the Minister.

The NT EPA acknowledges that the proponent has committed to continued engagement with relevant stakeholders during implementation of the proposal, should approval be granted.

## 6. Assessment of key environmental factors

### 6.1. Overview

The NT EPA identified that the proposal has the potential to have a significant impact on environmental values associated with one environmental factor (Table 2).

**Table 2 Key environmental factor<sup>5</sup>**

THEME	FACTOR	ENVIRONMENTAL OBJECTIVE
LAND	Terrestrial ecosystems	Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.

The NT EPA considered other environmental factors during its consideration of the referral; however, the impact on those factors was not considered to be significant.

### 6.2. Terrestrial ecosystems

#### 6.2.1. Environmental values

The terrestrial ecosystems of the Tiwi Islands are relatively extensive and intact with high biodiversity value. The Tiwi Islands support many endemic and threatened plant and animal species not found anywhere else in the Northern Territory (or the world) due to their isolation and higher rainfall. The islands also provide refuge for threatened species that have experienced population declines on the mainland.

Vegetation is dominated by tall eucalypt forest on sandy and lateritic plains and rises<sup>6</sup> and generally low weed density. Rainforests associated with perennial freshwater springs and along large estuarine rivers are an important component of the regional vegetation.

Vegetation surveys undertaken by the proponent identified 14 vegetation communities within the proposal area that are well represented and not considered to be rare or threatened at a regional scale. No threatened ecological communities are present. Mapped riparian rainforest exists near six proposed surface water extraction sites with potential for associated threatened flora, threatened flora is known from at least one site at Taracumbi Outstation. Targeted field surveys identified the presence of threatened plants (including *Cycas armstrongii*, *Typhonium jonesii* and *T. mirabile*).

Significant and sensitive vegetation types<sup>7</sup> occur within the direct disturbance footprint for gravel extraction (sand sheet heath and large trees with hollows suitable for fauna) and broader proposal area for access tracks to water points (riparian and monsoon vine forest).

The proponent's fauna surveys verified the presence and location of 11 threatened fauna, including the pale field rat, Butler's dunnart and red goshawk. The following fauna are reliant on large trees with hollows, Tiwi masked owl, brush-tailed phascogale, black-footed tree-rat and the brush-tailed rabbit-rat.

<sup>5</sup> [NT EPA Guide to Environmental Factors and Objectives](#).

<sup>6</sup> [Sites of Conservation Significance](#) – Tiwi Islands

<sup>7</sup> Rainforest, monsoon vine forest or vine thicket, riparian vegetation and vegetation containing large trees with hollows suitable for fauna as defined in the [NT Planning Scheme Land Clearing Guidelines](#) (DEPWS 2021).

Exotic grasses and other plants have increased in occurrence due to the increase in traffic from the mainland and across the Tiwi Islands. Wildings from non-NT-native *Acacia mangium* plantations have spread into both open forest and rainforest communities. Exotic grasses, in particular the grassy weeds mission grass, guinea grass and gamba grass present the highest risk for weed spread and potential environmental damage.

### 6.2.2. Investigations and surveys

General and targeted flora and fauna investigations and surveys have been undertaken by the proponent in and around the disturbance footprint. These consist of:

- desktop literature review of vegetation, threatened species and weeds within and surrounding the proposal area in 2021.
- threatened species likelihood of occurrence and preliminary risk assessments in 2021
- vegetation community mapping of the proposal area by Connect Environmental from surveys conducted between February and April, 2021.
- targeted surveys of *Cycas armstrongii*, *Typhonium jonesii* and *T. mirabile* habitat in proposed roadworks and gravel extraction areas between 20 February and 1 March 2021.
- biodiversity surveys of terrestrial fauna<sup>8</sup> between 20 February and 30 April 2021 including, but not limited to:
  - camera and pitfall trapping
  - red goshawk nest transects.

This work builds on recent and ongoing flora and fauna surveys conducted on the Tiwi Islands by AECOM<sup>9</sup>, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the NT Power Water Corporation and through the National Environmental Science Program (NESP)<sup>10</sup>.

The proponent's surveys were undertaken in accordance with standards set out in the NT EPA Guidelines for Assessment of Impacts on Terrestrial Biodiversity<sup>11</sup> and other relevant guidelines<sup>12</sup>.

The proponent identified the presence of large trees (diameter at breast height greater than 40 cm) with hollows suitable for fauna in the proposal area.

### 6.2.3. Consultation

Matters raised during consultation on the referral relating to potentially significant impacts to terrestrial ecosystems include:

- information gaps and uncertainty relating to the potential risk to some threatened species
- pre-clearance survey requirements for red goshawk nests if vegetation clearing occurs during the breeding season (August to November)
- buffer requirements between vegetation clearing and known threatened species locations to avoid impacts on:

<sup>8</sup> [Connect Environmental Biodiversity Report](#) (Appendix B to Referral)

<sup>9</sup> Referral and Supplementary Environmental Report prepared for DIPL - [Paru Road Upgrade](#)

<sup>10</sup> NESP [Resource Hub](#)

<sup>11</sup> [NT EPA Guidelines for Assessment of Impacts on Terrestrial Biodiversity](#)

<sup>12</sup> [A guide for the use of remote camera for wildlife survey in northern Australia](#)

- nesting red goshawks (100 m)
- pale field rat (100 m)
- northern brush-tailed phascogale (200 m)
- brush-tailed rabbit-rat (200 m)
- those associated with site selection of gravel pits as they relate to:
  - proposed relocation of GP\_1 to the south of Pirlangimpi Road in gravel pit area TIFP10 to avoid brush-tailed rabbit-rat records
  - additional survey requirements for large and very large trees with hollows suitable for Tiwi Masked Owl, brush-tailed phascogale, black-footed tree-rat and the brush-tailed rabbit-rat to justify that the configuration of gravel pit locations avoids high density areas of large and very large trees
  - the reconfiguration of gravel pit locations to avoid high density areas of large and very large trees still maintains the buffer requirements for specified threatened species
  - the reconfiguration of gravel pits to avoid slopes greater than 2%, the application of increased erosion sediment control measures for slopes up to 6% and recommendation for no clearing of areas greater than 3% slope
  - the configuration of gravel pit sizes so that some may exceed land clearing limit of less than 1 ha of native vegetation
- potential for impacts on fauna reliant on habitat provided by large trees with hollows from vegetation clearing for gravel extraction
- further detail required on the content and duration of the proposed weed management program to clearly demonstrate that the measures put in place to monitor the establishment, spread and control of weeds will minimise any risk to threatened species and their habitat
- a requirement for weed management and invasive species surveys prior to clearing and the inclusion of a post construction surveillance schedule of disturbed sites to ensure weeds have not established and/or spread once rehabilitation has occurred
- the use of hay bales for environmental control is not supported and no hay bales should be introduced to the Tiwi Islands
- limiting gravel pits to 1 ha and implementing retained vegetation buffers between each 1 ha gravel pit
- permitting of proposed vegetation clearing for gravel pits greater than 1 ha under the *Planning Act 1999*.

#### 6.2.4. Potentially significant impacts

Terrestrial ecosystem values have the potential to be significantly impacted through:

- loss of habitat from vegetation clearing, in particular:
  - *Typhonium* habitat
  - large and very large trees with hollows that provide shelter and breeding habitat for threatened fauna.
- causing a decrease in the population of a threatened species, in particular:
  - *Typhonium jonesii* and *T. mirabile*
  - interrupting nesting birds (red goshawk and Tiwi masked owl)

- arboreal mammals (northern brush-tailed phascogale, black-footed tree-rat and brush-tailed rabbit-rat)
- small ground dwelling mammals (Butler's dunnart and pale field-rat).
- habitat degradation or loss from:
  - erosion in a high rainfall environment and on high risk slopes (> 3%)
  - introduction or spread of invasive exotic plants and weeds.

### 6.2.5. Avoidance and mitigation of impacts

The proponent's Standard Specification for Environmental Management (DIPL SSEM)<sup>13</sup> documents minimum environmental management requirements for its contractors. The proponent has identified additional proposal specific measures to minimise impact on terrestrial ecosystems:

- avoid vegetation clearing consistent with the referral documents, NT Land Clearing Guidelines<sup>14</sup>, section 7.1.4 of the referral and DIPL SSEM section 26.3, in particular avoid clearing:
  - high density patches of *Cycas armstrongii* including those identified in the referral at gravel pit area TIFP1 and water point PR7
  - within 50 m of *Typhonium* patches (preferred), or at minimum, within 20 m of *Typhonium* patches<sup>15</sup>
  - high density areas of large hollow bearing trees where possible
  - within 200 m of northern brush-tailed phascogale records
  - within 200 m of brush-tailed rabbit-rat records
  - within 300 m of red goshawk or Tiwi masked owl nests.
- minimise requirements to clear native vegetation to the extent practicable
- minimise the number and extent of gravel pits in gravel pit areas TIFP4, TIFP2 and TIFP and ensure new gravel pits are constructed adjacent to existing clearing, to minimise impact on northern brush-tailed phascogale,
- conduct surveys for red goshawk and Tiwi masked owl nests immediately prior to construction and during the breeding season and ensure no vegetation is cleared within 300 m of nests – consistent with section 7.1.4 of the referral
- minimise water extraction from surface waters by sourcing from existing and new bores as a priority to avoid impacts on sensitive and/or significant vegetation (riparian and rainforest)
- minimise impact on threatened fauna by having fauna spotters present to conduct pre-clearing inspections for clearing of large trees that have a high risk of nesting or roosting fauna - consistent with section 7.1.4 of the referral and DIPL SSEM section 27
- implement a Gravel Pit Management Plan with measures to minimise vegetation clearing impacts on threatened fauna in gravel pits through informed site selection and progressive rehabilitation of extraction areas - consistent with the referral and DIPL SSEM section 35

<sup>13</sup> Northern Territory Government Department of Infrastructure, Planning and Logistics [Standard Specification for Environmental Management Version 2](#)

<sup>14</sup> [Northern Territory Land Clearing Guidelines](#)

<sup>15</sup> The referral defines a 'patch' as a group of five or more individuals within 50 m

- implement an Erosion and Sediment Control Plan (ESCP), developed and monitored by a certified professional in erosion and sediment control (CPESC) to minimise habitat degradation due to vegetation clearing
- implement weed control and hygiene procedures for vehicles and equipment coming onto, or returning to, the site for construction activities to prevent the spread and introduction of invasive exotic species and plant diseases – consistent with the proponent’s CEMP Framework, Appendix E to the referral.

### 6.2.6. Assessment of impacts to environmental values

#### Loss of threatened species and threatened species habitat from vegetation clearing

The proponent conducted targeted field surveys within the proposal area across 14 map areas (including the 10 gravel pit areas comprising 1170 ha) to:

- identify habitat availability and threatened species presence within the proposal area
- inform site selection of the gravel pits (maximum clearing of 234 ha) roadworks and realignment (maximum clearing of 28 ha) and water access (maximum clearing 34 ha).

As a result of these surveys the proponent has located the 23 gravel pits, 13 road alignment areas and water access areas to minimise the planned disturbance areas and avoid impacts from clearing native vegetation. The proponent has committed to clear and rehabilitate the extraction areas 1 ha at a time, progressively in line with its Gravel Pit Management Plan.

The NT EPA considers that the proposal design avoids the direct impacts from vegetation clearing on two *Typhonium* species and high density areas of *Cycas armstrongii*. Additionally, the proponent has identified appropriate pre clearance surveys and implementation of clearing buffers as measures to avoid impacts on red goshawk and Tiwi masked owl.

Based on the information included in the referral, the proponent concluded that activities from the proposal would not result in significant impact to the overall habitat and populations of threatened species on Melville Island. The DEPWS Flora and Fauna Division advises that overall risks to biodiversity from the proposal are likely to be low; however for some species further avoidance measures are required to manage potentially significant impacts.

Surveys to determine density estimates of large and very large trees have not yet been conducted. Specifically, targeted surveys have not been conducted to determine whether the densities of large and very large trees (diameter at breast height greater than 50 cm) with hollows suitable for the Tiwi masked owl occurred in consistent densities inside and outside the disturbance footprint of proposed gravel pits. Advice from DEPWS in its submission on the referral identifies that impacts to threatened species are likely to be reduced where gravel extraction is located where the density of large and very large trees is less than or similar to that in the surrounding habitat. Locating gravel pits to avoid areas of higher density large and very large trees would provide greater certainty that the relatively small area proposed to be cleared will not impact significantly on the populations of threatened species.

The NT EPA considers that it is necessary for the proponent to conduct these surveys to avoid impacts on significant vegetation (large trees with hollows suitable for fauna) and threatened species, and inform the final site selection of gravel pits. Where gravel pits are relocated the new location must also avoid the buffers of threatened species as identified in the proponent’s referral and the DEPWS Flora and Fauna Divisions advice. The NT EPA’s recommended condition for **Terrestrial ecosystems** is consistent with the proponent’s commitments and reflects the NT EPA’s views about the additional requirements necessary to achieve the environmental outcomes for threatened species protection.



The NT EPA acknowledges that while full rehabilitation is not feasible within the life of the action, the proponent has committed to rehabilitation actions which are likely to lead to a stabilised state of the environment. The NT EPA notes that trees on Melville Island are larger than on the mainland leading to a high biomass of cleared vegetation, and the potential for this to compromise standard rehabilitation actions. To achieve a stabilised state the DEPWS Flora and Fauna Division recommends that the redistributed vegetation should be representative of the natural surrounding area and not pose an increased fire risk to the ecological integrity of the rehabilitated gravel pits and proposal area.

The NT EPA considers that the detailed site selection and small area of proposed vegetation clearing combined with the proponent's commitment of rehabilitation actions are likely to result in the avoidance of significant impacts on regional populations of any of the threatened flora or fauna species that may occur in the disturbance footprint and proposal area more broadly.

#### Habitat degradation from erosion

Information provided in the referral show that slopes in some of the proposed gravel pits are between 3% and 6%. The DEPWS Land Management Unit advises that vegetation clearing on slopes greater than 3% is considered to have very high to extreme constraints requiring major management and/or engineered solutions.

The proponent has identified that preference will be given for areas with less than 2% slope where possible, but may use areas up to 6% slope for gravel extraction. The proponent has committed to implement its ESCP and Gravel Pit Management Plan to avoid or manage erosion. The NT EPA considers that implementation of best practice erosion and sediment control measures is required to ensure soil stability to prevent impact on habitat condition and therefore the biodiversity values it supports.

The NT EPA is satisfied that erosion can be avoided or controlled to avoid residual significant impacts by implementing the proponent's commitments in a manner consistent with the NT EPA's recommended condition for **Erosion and sediment control**.

#### Habitat degradation from introduction or spread of invasive exotic plants and weeds

Three grassy weeds of particular concern are known to occur on Melville Island, including one weed of national significance, *Andropogon gayanus* (gamba grass) and two other large perennial grasses *Cenchrus polystachios* (perennial mission grass) and *Megathyrsus maximus* (guinea grass, syn *Panicum maximum* and *Urochloa maxima*). The proponent notes that increased development and traffic across the Tiwi Islands has led to the increased spread of grassy weeds, including along roadsides and within plantations. Weeds are to be managed post construction by the TLC through its Weed Management Program<sup>16</sup>.

Some weeds known to occur on Melville Island are considered to be highly invasive, and there is potential for road works and extractive activities to introduce and increase the spread of weed species. The proponent has committed to constructing the proposal in accordance with the DIPL SSEM which includes the requirement for the contractor to survey for declared weeds and consult with the Northern Territory Government Weed Management Branch.

The NT EPA is of the view that measures to avoid importing exotic species and/or plant diseases, including seed sources such as hay bales, should be included in the Weed Management Plan for the proposal. The DEPWS submission recommends multiple strategies for the proponent to include in its weed management plan and implement as required to protect flora and fauna values. The plan should have particular emphasis on the prevention and spread of invasive exotic grasses such as gamba grass, mission grass, guinea grass and tully grass (*Urochloa humidicola*)

<sup>16</sup> [Tiwi Weed Management Plan](#), Tiwi Land Council

and ensure that all seed stock for stabilisation and rehabilitation works be sourced from local (Tiwi) native stock.

The NT EPA considers that the implementation of the weed and invasive species management plan would minimise establishment of exotic grass species along the road corridor and the Tiwi Islands more broadly. Further to this the NT EPA recognises the importance of post construction weed monitoring and reporting to ensure weed and invasive exotic species do not impact on terrestrial ecosystem values.

The NT EPA considers that the measures proposed by the proponent and recommended by government advisory authorities are appropriate to avoid habitat degradation and indirect impacts on flora and fauna from weeds and other invasive exotic plant species.

The NT EPA is satisfied that any residual impacts remaining after implementation of the proponent’s commitments and additional measures would not be significant. The NT EPA’s recommended conditions: **Terrestrial ecosystems** and **Environmental Performance Report**, provide greater certainty that the proponent’s commitments would achieve the environmental outcomes relating to weed management.

### 6.2.7. Summary of factor assessment and recommended regulation

The NT EPA has considered the potential significant impacts of the proposal on terrestrial ecosystem values. In doing so, the NT EPA has considered whether reasonable conditions could be imposed to ensure the NT EPA’s factor objective is likely to be met. The NT EPA assessment findings are presented in Table 3.

The NT EPA has also taken into account the objects and principles of the EP Act (Appendix 2) in assessing whether the residual impacts will meet its environmental factor objective and whether reasonable conditions can be imposed.

The approval holder is responsible for the commitments made in the CEMP, ESCP and Gravel Pit Management Plan based on the CEMP Framework and the DIPL’s Standard Specifications for Environmental Management.

**Table 3 Summary of assessment for Terrestrial ecosystems**

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Loss of habitat and threatened species from vegetation clearing	<p>Uncertainty about whether the vegetation of the disturbance area has the same qualitative value as the surrounding habitat supporting threatened species can be addressed by preclearance surveys.</p> <p>Uncertainty about the final location of gravel pits can be addressed by the avoidance measures informed by the proponent’s preclearance survey results.</p> <p>Proposal activities conducted in accordance with proposed measures and recommended conditions are not likely to result in direct significant impacts on the habitat and populations of threatened species on Melville Island.</p>	<p>Regulated through recommended conditions:</p> <p><b>Condition 2 Terrestrial ecosystems</b></p> <p><b>Condition 7 Environmental Performance Report</b></p> <p>May be regulated by a land clearing permit under the <i>Planning Act 1999</i></p>

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
	Implementation of the progressive rehabilitation measures, weed and invasive species management plans to avoid and minimise impacts, means impacts are not considered significant and are likely to meet the NT EPA's objective for terrestrial ecosystems.	
Habitat degradation from soil erosion	<p>The Proponent's commitment to erosion and sediment control contains measures to avoid, minimise and mitigate the impact of land clearing on biodiversity.</p> <p>Implementation of the plans to avoid and minimise impacts from vegetation clearing on slopes &gt;3% means impacts are not considered significant and are likely to meet the NT EPA's objective for terrestrial ecosystems.</p>	Regulated through recommended condition: <b>Condition 3 Erosion and sediment control</b>
Habitat degradation from introduction or spread of invasive exotic plants and weeds	<p>The proponent has proposed avoidance and mitigation measures in the referral to manage indirect impacts from weeds on habitat, threatened species and overall biodiversity value.</p> <p>Implementation of a weed management plan that includes government authority recommendations and is in accordance with recommended conditions, means that residual impacts are not considered significant and the environmental outcome is likely to meet the NT EPA's objectives for this factor.</p>	Regulated through recommended conditions: <b>Condition 2 Terrestrial ecosystems</b> <b>Condition 7 Environmental Performance Report</b>

### 6.2.8. Conclusion against the NT EPA objective

With the implementation of relevant management plans and recommended conditions identified in Appendix 1, the NT EPA considers that the proposal could be conducted in such a manner that its objective for terrestrial ecosystems is likely to be met.

## 7. Whole of environment considerations

The NT EPA has considered connections and interactions between potential significant impacts identified to the Terrestrial ecosystems factor together with potential impacts on other environmental factors, (Terrestrial environmental quality, Inland water environmental quality, Hydrological processes, Aquatic ecosystems, People and economy, Culture and heritage), in its consideration of impacts to the whole of environment. The NT EPA is of the view that these impacts would not lead to any substantial effect on achievement of the NT EPA's environmental objectives.

The NT EPA considers that an environmental performance report is required from the proponent to validate success of rehabilitation and weed prevention measures. The report is to be based on two years monitoring data after construction and rehabilitation activities for the proposal have been finished and the NT EPA has recommended a condition to this effect. The purpose of the environmental performance reporting is to provide the proponent and the Minister with a current evaluation of the performance of the proposal with respect to actual impacts on environmental values over the life of the action compared to those predicted during the environmental impact assessment process.

The NT EPA is satisfied that the potential impacts of the proposal on the whole of environment, with consideration of the intrinsic interactions between environmental factors, would not lead to any significant impacts and that the NT EPA's environmental objectives can be met.

## 8. Conclusion and recommendation

The NT EPA has considered the proposal by DIPL to upgrade Pirlangimpi and Pickertaramoor roads on Melville Island. The NT EPA's assessment of the proposal identified potential for significant residual environmental impact associated with the environmental factor, Terrestrial ecosystems.

The NT EPA considers that the proposal can be implemented and managed in a manner that is environmentally acceptable, and therefore recommends that environmental approval be granted subject to implementation of the proponent's commitments to avoid, minimise, manage and monitor environmental impacts and the NT EPA's recommended conditions in Appendix 1.

# Appendix 1 – Draft environmental approval

# Draft Environmental Approval

PURSUANT TO SECTION 69 OF THE ENVIRONMENT PROTECTION ACT 2019

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Approval number	EP2022/016 - 001
Approval holder	Chief Executive Officer of the NT Department of Infrastructure, Planning and Logistics
Australian Business Number (ABN)	84 085 734 992
Registered business address	Level 3, Manunda Place, 38 Cavanagh Street, Darwin, Northern Territory 0800

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## Action

Upgrade 73 km of road between Pirlangimpi and Pickertaramoor from gravel to bitumen on Melville Island, approximately 80 km northeast of Darwin including:

- **Land clearing** of up to 296.4 hectares (ha) of native vegetation including sensitive vegetation (large trees with hollows for fauna) for gravel extraction (234 ha), road widening and alignment (28 ha) and access tracks to water points (34 ha)
  - **Progressive rehabilitation of approved extent** for gravel extraction
  - Extraction of no more than 20% annual recharge of groundwater from existing (5) and new (9) bores and 20% instantaneous flow from surface waters (11)
  - Works conducted over 3 to 5 years between the months of April and October.
- 

## Advisory notes

Approval is granted under section 69 of the EP Act for the action to be undertaken in the manner described, including with implementation of the environmental management measures, commitments and safeguards documented in the **referral**. If there is an inconsistency between the **referral** and this environmental approval, the requirements of this environmental approval prevail.

This approval does not authorise the approval holder to undertake an activity that would otherwise be an offence under the *Planning Act 1999*, *Waste Management and Pollution Control Act 1998* or the *Water Act 1992*.

Submission of all notices, reports, documents or other correspondence required to be provided to the **CEO** or **administering authority** as a condition of this approval must be provided in electronic form by emailing [environmentalregulation@nt.gov.au](mailto:environmentalregulation@nt.gov.au)

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Address of action	Lands adjacent to and on Pirlangimpi and Pickertaramoor roads, Melville Island NT Portion 1644
NT EPA Assessment Report number	96
Decision maker	NOT FOR SIGNING
	<hr/> <p>Hon Lauren Jane Moss MLA, Minister for Environment, Climate Change and Water Security</p>
Date of approval	

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## Environmental approval conditions

### 1 Limitations and extent of action

1-1 When implementing the action, the approval holder must ensure the action does not exceed the following extent:

Action element	Context	Limitation or maximum extent
Land clearing for gravel extraction	Figures 1-5 Table 1	No more than 234 ha in total to be cleared within proposed <b>gravel pits</b> of the <b>approved extent</b>
Gravel extraction	Figures 1-5 Table 1	No more than three (of 10) <b>gravel pit areas</b> are open for gravel extraction at any point in time
Rehabilitation	Figures 1-5 Table 1	In each open <b>gravel pit area</b> , no more than 3 ha in total of <b>unrehabilitated</b> land is present at any point in time

### 2 Terrestrial ecosystems

2-1 The approval holder must implement, rehabilitate and complete the action to meet the following environmental objective:

- (1) Protect terrestrial habitats to maintain flora and fauna values including biodiversity, ecological integrity and ecological functioning.

2-2 Prior to **substantial implementation**, the approval holder must conduct surveys to determine the density of **large and very large trees**. The surveys must:

- (1) include all native vegetation of the **gravel pit areas**; and
- (2) include land in a 100 m buffer around **gravel pits areas**; and
- (3) be conducted by a suitably qualified person.

2-3 The approval holder must ensure site selection is undertaken such that:

- (1) **gravel pits** are located in areas where the density of **large and very large trees** (determined in accordance with condition 2-2) is no greater than the surrounding area of retained native vegetation; and
- (2) native vegetation buffers are maintained so that no **gravel pits** are within:
  - (a) 100 m of nesting red goshawks (*Erythrotriorchis radiatus*)
  - (b) 100 m of pale field rat (*Rattus tunneyi*) records
  - (c) 200 m of northern brush-tailed phascogale (*Phascogale pirata*) records
  - (d) 200 m from brush-tailed rabbit-rat (*Conilurus penicillatus*) records; and
- (3) gravel pit GP\_1 is relocated within gravel pit area TIFP10 such that no gravel extraction is undertaken north of Pirlangimpi Road in gravel pit area TIFP10; and
- (4) the outcomes of site selection are reported to the **administering authority** prior to **substantial implementation** with:
  - (a) coordinate spatial data for all gravel pits
  - (b) tree density data



(c) justification for any alternative site selection of gravel pits.

2-4 To support achievement of condition 2-1, the approval holder must implement the action in such a manner that:

- (1) at the **completion of the action**, all areas previously subjected to **land clearing** at gravel pits and access tracks are **rehabilitated** and achieve a state that is stable and composed of **local native** plant species; and
- (2) the introduction and spread of **declared weeds** and invasive exotic plants is controlled for the **life of the action**
- (3) no hay bales are transported to the Tiwi Islands.

### 3 Erosion and sediment control

3-1 The approval holder must implement an Erosion and Sediment Control Plan (ESCP) on commencement of the action that is:

- (1) developed by a Certified Professional in Erosion and Sediment Control (CPESC), in accordance with International Erosion Control Association Australasia (IECA) 2008, *Best Practice Erosion and Sediment Control*; and
- (2) implemented for the **life of the action**; and
- (3) monitored by the CPESC and by the approval holder; and
- (4) reviewed by the CPESC within 12 months of commencement of the action, or at any time if:
  - (a) ongoing monitoring identifies a failure of the ESCP; or
  - (b) an accelerated or changed work program is required.

3-2 The approval holder must report on its compliance with the ESCP and condition 3-1. Each report must be:

- (1) prepared by a CPESC; and
- (2) submitted to the **administering authority** by 30 May each year during the **life of the action** unless otherwise directed by the **administering authority** in writing.

### 4 Commencement of action

4-1 This approval expires five (5) years after the date on which it is granted, unless **substantial implementation** has commenced on or before that date.

4-2 Within 10 business days of **substantial implementation** of the action the approval holder must provide notification in writing to the **administering authority**.

### 5 Completion of action

5-1 The approval holder must provide notification in writing to the **administering authority** within 10 business days of **completion of the action**.

### 6 Change of contact details

6-1 The approval holder must provide notification in writing to the **administering authority** of any change of its name, physical address or postal address for the serving of notices or other correspondence within 10 business days of such change.

## 7 Environmental Performance Report

- 7-1 The approval holder must submit an Environmental Performance Report to the **administering authority** no later than three (3) years after **completion of the action** unless otherwise directed by the **administering authority** in writing.
- 7-2 The report required by condition 7-1 must be prepared by an **independent qualified person**.
- 7-3 The Environmental Performance Report must report on impacts of the action on the state of **Terrestrial ecosystems values**.
- 7-4 The Environmental Performance Report must:
- (1) include two (2) years monitoring data after **completion of the action**
  - (2) include a comparison of the environmental values identified in condition 7-3 at the **completion of the action** against the state of each environmental value prior to **land clearing**; and
  - (3) include a comparison of the predicted impacts of the action as identified in the **referral** and the actual impacts of the action as verified by environmental monitoring data; and
  - (4) demonstrate that all cleared areas, including roadworks, have been stabilised and **rehabilitated** with **local native** plant species; and
  - (5) demonstrate the actions undertaken at gravel pits and decommissioned roads to control introduction of weeds and exotic plant species; and
  - (6) identify all areas where rehabilitation efforts did not achieve the intended outcome; and
  - (7) recommend further works (if required) that will achieve the intent of this environmental approval; and
- 7-5 The approval holder must demonstrate that, within 12 months of submission of the Environmental Performance Report, any recommendations are fully implemented to achieve the requirements of this environmental approval.

## 8 Provision of environmental data

- 8-1 All environmental monitoring data required to be collected or obtained under this environmental approval and the approval holder's commitments, standards and management plans must be retained by the approval holder for a period of not less than 10 years commencing from the date that the data is collected or obtained.
- 8-2 The approval holder must, as and when directed by the **administering authority**, provide any validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (such as maps)) relevant to the assessment of the action and implementation of this environmental approval, to the **administering authority** in the form and manner, and at the intervals specified, in the direction.

## Definitions

The terms used in this approval have the same meaning as the terms defined in the *Environment Protection Act 2019* and *Environment Protection Regulations 2020*.

<b>administering authority</b>	<p>The Regulation Branch of the Department of Environment, Parks and Water Security [or another name for that department or branch, which may vary from time to time], administering the Environment Protection Act 2019.</p> <p>The <b>administering authority</b> is appointed under Administrative Arrangements Order by the Northern Territory Government.</p>
<b>approved extent</b>	The extent identified in Figures 1 to 5 and Table 1 of this approval which includes equipment, plant and structures, whether stationary or portable, and the land on which the action is situated.
<b>CEO</b>	The Chief Executive Officer of the Department of Environment, Parks and Water Security [or another name for that department, which may vary from time to time], or their delegate.
<b>completion of the action</b>	The point in time that the approval holder has finished construction and rehabilitation activities for the action, including removing all equipment, plant and structures.
<b>declared weeds</b>	A plant declared as a weed or potential weed under the <i>Weeds Management Act 2001</i> .
<b>EP Act</b>	<i>Environment Protection Act 2019</i> .
<b>gravel pits</b>	Any area of land listed in Table 1 or the site selection report to the <b>administering authority</b> from which gravel extraction will occur in accordance with the approved extent.
<b>gravel pit areas</b>	The ten (10) larger areas of land listed in Table 1, surveyed for extractive material and environmental values within which all <b>gravel pits</b> are located.
<b>independent qualified person</b>	<p>A qualified person as defined under section 4 of the <b>EP Act</b>; and who also meets the following requirements:</p> <ul style="list-style-type: none"> <li>a) was not involved in the preparation of the approval holder's <b>referral</b>; and</li> <li>b) is independent of the personnel involved in the design, construction and operation of the action; and</li> <li>c) is independent of the approval holder; and</li> <li>d) has obtained written approval from the <b>CEO</b> to be the qualified person to satisfy the <b>independent qualified person</b> reporting requirements under this approval.</li> </ul>
<b>land clearing</b>	The removal or destruction, by any means, of native vegetation on an area of land. <b>Land clearing</b> includes the selective removal

	of a species of plant, a group of species of plants, a story or group of storeys in whole or in part.
<b>large and very large trees</b>	<p>Represent a significant vegetation type under the NT Planning Scheme 2020 and Land Clearing Guidelines 2021.</p> <p>Large trees with a diameter (at 1.3 m above ground level) greater than or equal to 40 cm) and very large trees (diameter greater than 50 cm) are likely to contain hollows suitable for fauna.</p>
<b>life of the action</b>	<p>The period of time from <b>substantial implementation</b> until the issue of a closure certificate under section 213 of the <b>EP Act</b>, or revocation of the environmental approval by the Minister at the request of the approval holder under section 114 of the EP Act.</p> <p>The criteria for a closure certificate may consider the Environmental Performance Report.</p>
<b>local native</b>	Refers to native plant species with Tiwi provenance, where seed is collected directly from Bathurst or Melville islands.
<b>NT EPA</b>	Northern Territory Environment Protection Authority.
<b>progressive rehabilitation</b>	The sequence of actions as they relate to <b>rehabilitation</b> of gravel pits. Progressive rehabilitation must be completed, so that new or further <b>land clearing</b> may not commence until the previous cleared area is <b>rehabilitated</b> .
<b>referral</b>	<p>The approval holder's <b>referral</b> to the <b>NT EPA</b> under section 48 of the <b>EP Act</b>;</p> <p>Environmental Impact Assessment Melville Island Road Upgrades – NT Portion 1644, Melville Island, dated 21 February 2022.</p>
<b>rehabilitation, rehabilitated</b>	<p>The actions undertaken as they relate to stabilisation of cleared areas resulting from the action, these include extraction areas, detours and access tracks, at a minimum:</p> <ul style="list-style-type: none"> <li>• spread unused rock and gravel material over exposed soil</li> <li>• rip area (to depth of 100 to 200 mm) along contour lines to reduce erosion</li> <li>• spread and scarify top soil and overburden to encourage regrowth from the soil's seed store</li> <li>• broadcast of <b>local native</b> seed if assisted revegetation is specified by the approval holder</li> <li>• spread cleared vegetation across the site in a manner representative of the surrounding area to assist the recolonisation of flora and fauna across the site.</li> </ul> <p>Rehabilitation must occur progressively during the implementation of the action and may be required for the life of the action until the issue of the closure certificate under section 213.</p> <p>See <b>unrehabilitated land</b>.</p>

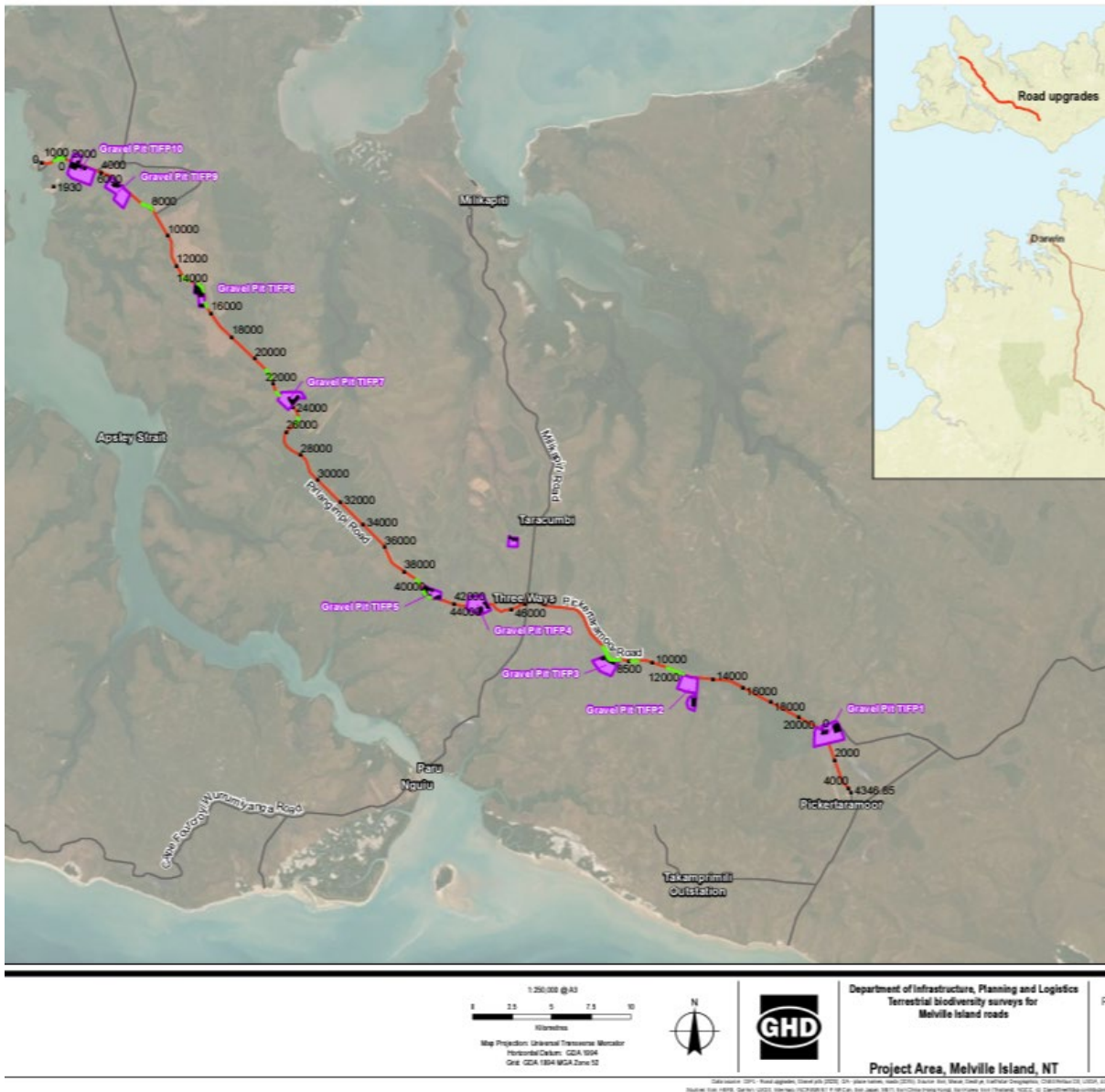
<b>substantial implementation</b>	The first works of the proposed action defined as any ground disturbing activity relating to the <b>action</b> within the <b>approved extent</b> , including, but not limited to, <b>land clearing</b> , civil works or construction works. <b>Substantial implementation</b> does not include preliminary works such as geotechnical investigations and other preconstruction activities where no <b>land clearing</b> is required.
<b>Terrestrial ecosystem values</b>	The values as defined and quantified in the NT EPA's Assessment Report 96 include, but are not limited to: presence and occurrence of threatened plant and animal species and their habitat, <b>local native</b> plant species diversity and low weed and invasive species occurrence.
<b>unrehabilitated land</b>	The land that has been subject to <b>land clearing</b> in accordance with this approval and has not yet been <b>rehabilitated</b> .  See <b>rehabilitated, rehabilitation</b> .

## Location and extent of action

Spatial data depicting information provided in Figures 1 to 5 and Table 1 are held by the Department of Environment, Parks and Water Security as follows:

NTEPA2022/0070-005: 05 Spatial files - Melville Island Road Upgrades - DIPL.

All coordinates are provided in the Universal Transverse Mercator map projection, Map Grid of Australia Zone 52 (MGA Zone 52) and datum Geocentric Datum of Australia 1994 (GDA94).



**Figure 1** Location and approved extent of road works and gravel extraction. Road upgrades (red), road alignments (green x13), potential gravel pit areas (purple x10) and proposed gravel pits (black x23)

**Table 1** Name and size of gravel pit areas (10) and gravel pits (23) of the approved extent

	Gravel pits	Extent (ha)	Gravel pit areas	Extent (ha)	Gravel pits per gravel pit area (ha)
	GP_1	3.5	TIFP10	184.4	33.9 (18.4%)
	GP2_1	10.9			
	GP2_2	19.5			
	GP3_1	13.4	TIFP9	134.3	13.4 (10%)
	GP4_1	13.8	TIFP8	58.5	42.5 (72.7%)
	GP4_2	7.3			
	GP4_3	5.9			
	GP4_4	15.5			
	GP5_1	19.1	TIFP7	111.1	19.1 (17.2%)
	GP6_1	7.7	TIFP5	57.1	28.6 (50.1%)
	GP6_2	7.9			
	GP6_3	5.3			
	GP6_4	7.7			
	GP7_1	11.0	TIFP4	128.6	20.2 (15.7%)
	GP7_2	5.7			
	GP7_3	3.5			
	GP8_1	9.8	TIFP3	115.5	18.7 (16.2%)
	GP8_2	8.9			
	GP9_1	16.0	TIFP2	148.1	16.0 (10.8%)
	GP10_1	4.7	TIFP1	200.0	32.9 (16.5%)
	GP10_2	4.5			
	GP10_3	23.7			
	GP11_1	9.1	TIFP	32.0	9.1 (28.4%)
<b>TOTAL</b>	<b>23</b>	<b>234.4 ha</b>	<b>10</b>	<b>1169.6</b>	<b>234.4 ha (23.8%)</b>



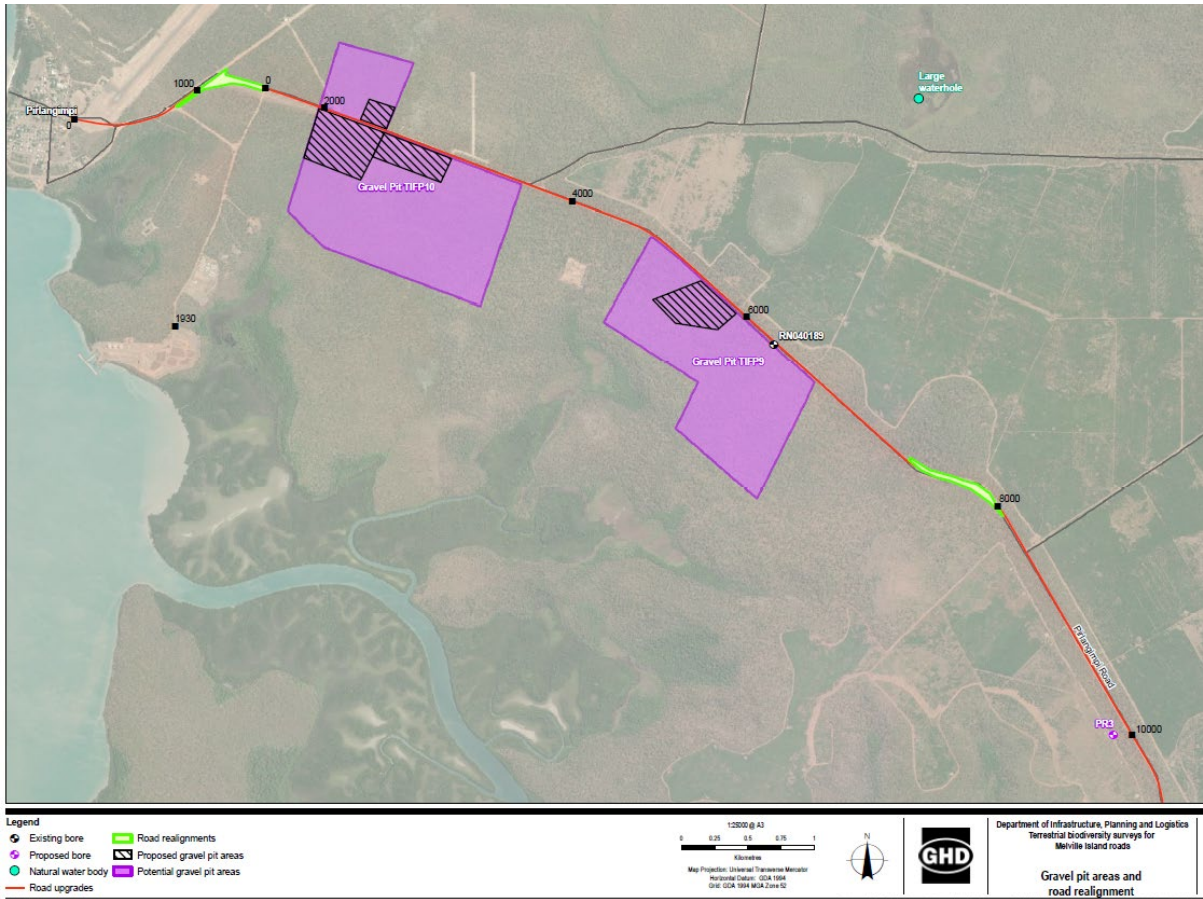


Figure 2 Location and extent of gravel pits (black) within gravel pit areas (purple) TIFP10 and TIFP9

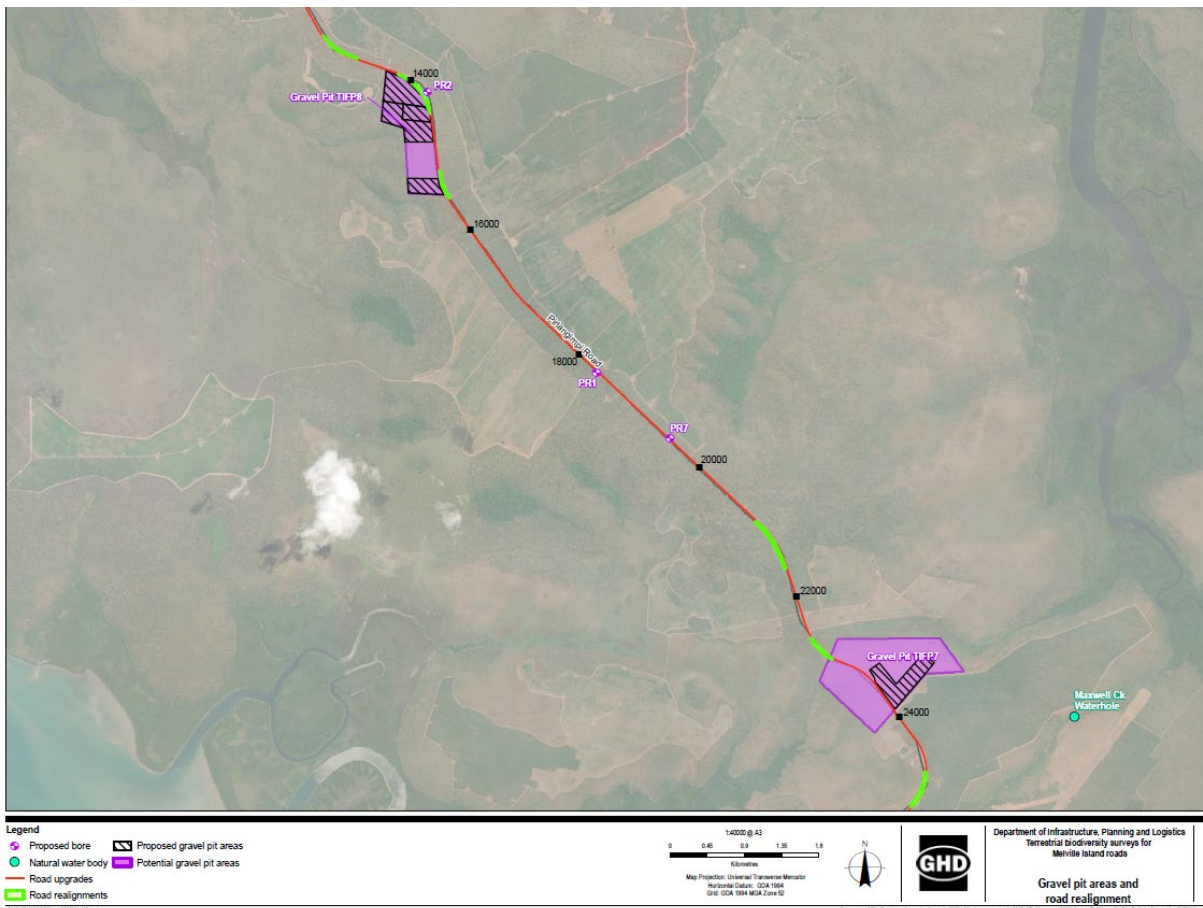


Figure 3 Location and extent of gravel pits (black) within gravel pit areas (purple) TIFP8 and TIFP7



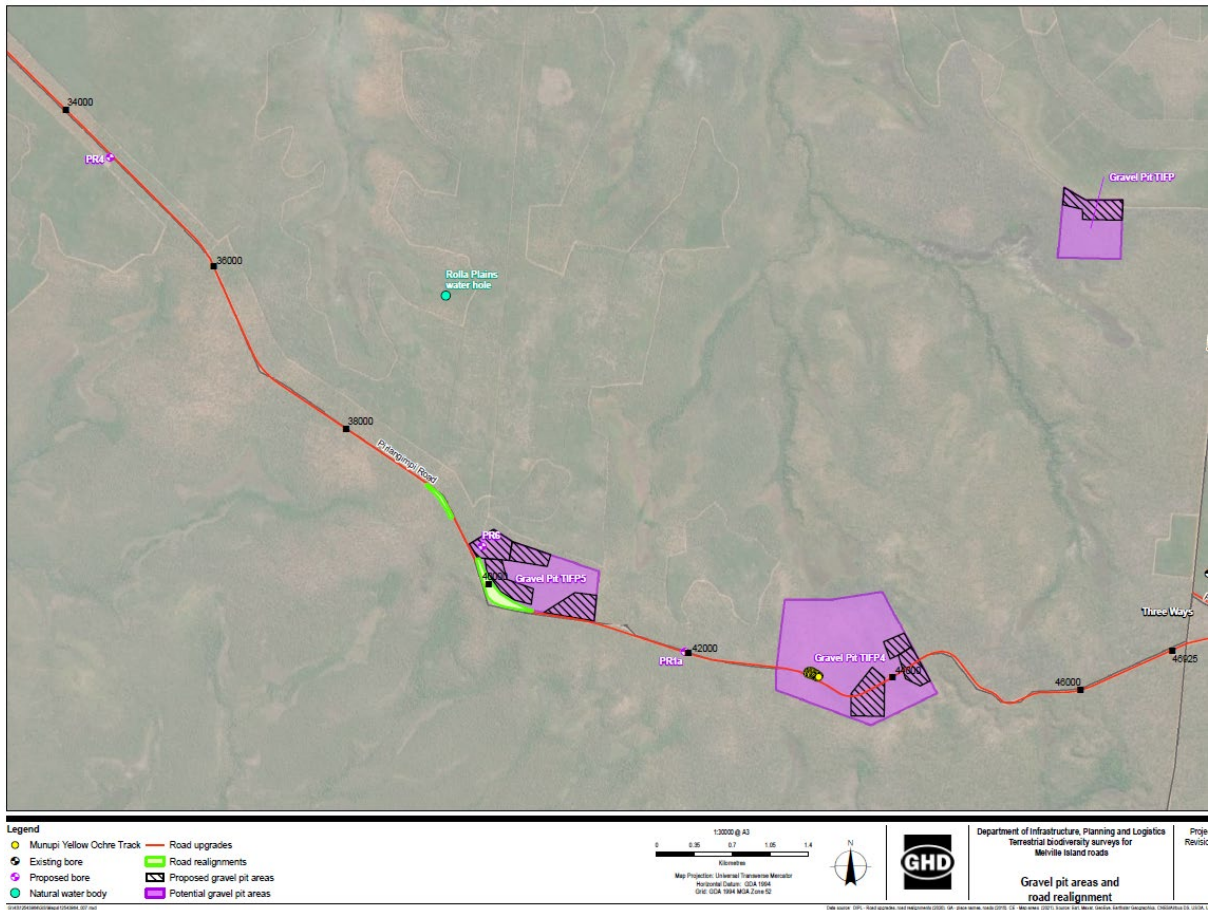


Figure 4 Location and extent of gravel pits (black) within gravel pit areas (purple) TIFP5, TIFP4 & TIFP

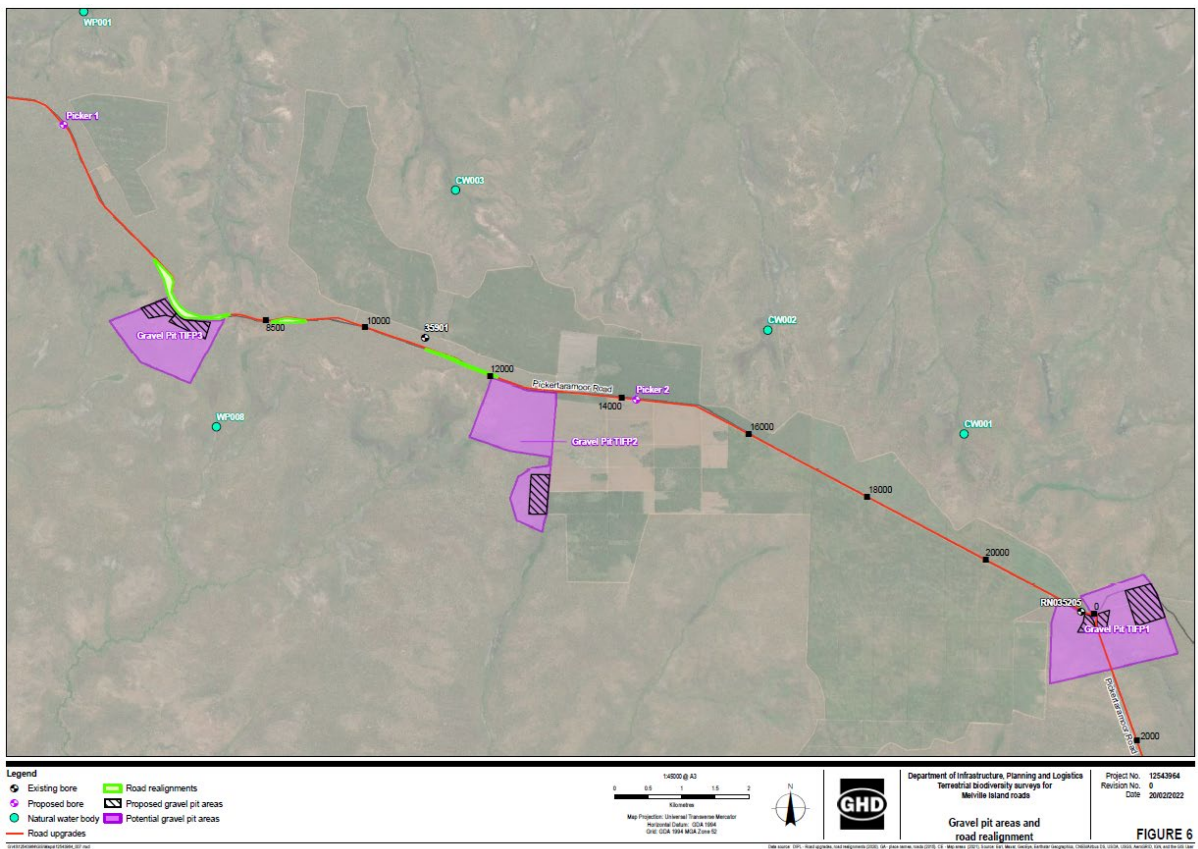


Figure 5 Location and extent of gravel pits (black) within gravel pit areas (purple) TIFP3, TIFP2 & TIFP1

## Appendix 2 – Matters taken into account during the assessment

Matters	NT EPA's consideration
<i>Objects of the EP Act</i>	
To protect the environment of the Territory	The proponent's referral and this assessment report, including the NT EPA's recommended conditions for an environmental approval, provide detail about how the environment of the Territory would be protected from potentially significant environmental impacts that could occur as a result of implementation of the proposal.
To promote ecologically sustainable development so that the wellbeing of the people of the Territory is maintained or improved without adverse impact on the environment of the Territory	The NT EPA's consideration of the principles of ecologically sustainable development in relation to the proposal is addressed below.
To recognise the role of environmental impact assessment and environmental approval in promoting the protection and management of the environment of the Territory	The NT EPA recognises the importance of the environmental impact assessment and approval processes in the protection and management of the environment of the Territory. The NT EPA has assessed the potential environmental impacts of the proposal to inform an environmental approval decision by the Minister that, in the NT EPA's view, promotes the protection and management of the Territory.
To provide for broad community involvement during the process of environmental impact assessment and environmental approval	<p>The NT EPA's public consultation undertaken during its assessment of the proposal provides for community involvement during the environmental impact assessment process.</p> <p>The proponent's ongoing consultation with the TLC and TIRC also provided for community involvement during the environmental impact assessment and approval process.</p>
To recognise the role that Aboriginal people have as stewards of their country as conferred under their traditions and recognised in law, and the importance of participation by Aboriginal people and communities in environmental decision-making processes.	<p>The NT EPA recognises the role of Aboriginal people as stewards of their country and the importance of participation by Aboriginal people and communities in environmental decision-making.</p> <p>The proponent has consulted and engaged with Tiwi organisations and businesses to maximise Aboriginal employment and training opportunities. Opportunities exist for the proposal workforce to employ the Tiwi Rangers in site demarcation, fauna spotting and monitoring activities, while road construction and maintenance actions</p>

Matters	NT EPA's consideration
	will include Tiwi contractors and staff to enable positive environmental outcomes during and post construction.
<b>Principles of ecologically sustainable development</b>	
<p><b>Decision-making principle</b></p> <p>(1) Decision-making processes should effectively integrate both long-term and short-term environmental and equitable considerations.</p> <p>(2) Decision-making processes should provide for community involvement in relation to decisions and actions that affect the community.</p>	<p>The NT EPA has considered the decision-making principle in its assessment and has had particular regard to this principle in its assessment of terrestrial ecosystems.</p> <p>The NT EPA acknowledges that design requirements are a combination of the application of the environmental decision-making hierarchy under section 26 of the EP Act, the waste management hierarchy under section 27 of the EP Act, and the principles of ecologically sustainable development.</p> <p>The NT EPA has recommended conditions for environment protection outcomes to be achieved through design, construction and rehabilitation phases of the proposal.</p> <p>While the proposal is short term, the NT EPA considers that its environmental impact assessment and recommended conditions for an environmental approval have identified and mitigated both short-term and long-term environmental impacts, and that this has not resulted in any compromise between short and long term environmental and equitable considerations.</p> <p>The broader community has been provided the opportunity for involvement in the environmental impact assessment process during the NT EPA's public consultation on the proposal. The Tiwi community has maintained involvement with decision making process through proponent led engagement with the TLC and TIRC. Government authority submissions received have been taken into account in the preparation of this report and the recommended conditions to inform the Minister's decision on environmental approval.</p>
<p><b>Precautionary principle</b></p> <p>(1) If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</p> <p>(2) Decision-making should be guided by:</p>	<p>This principle was considered by the NT EPA when assessing the impacts of the proposal on its environmental factors.</p> <p>The proponent has identified appropriate measures to avoid or minimise impacts on the environment.</p> <p>The NT EPA has considered these measures during its assessment and has recommended conditions for environment protection outcomes to be achieved. From its assessment of this proposal the NT EPA has concluded that environmental values</p>

<b>Matters</b>	<b>NT EPA's consideration</b>
<p>(a) a careful evaluation to avoid serious or irreversible damage to the environment wherever practicable; and</p> <p>(b) an assessment of the risk-weighted consequences of various options.</p>	<p>will be protected provided its recommended conditions, and the proponent's commitments, are implemented.</p> <p>The proposal may result in some irreversible impacts on terrestrial flora and fauna associated with loss of vegetation from clearing; however, those impacts are not considered significant.</p>
<p><b>Principle of evidence-based decision-making</b></p> <p>Decisions should be based on the best available evidence in the circumstances that is relevant and reliable.</p>	<p>The NT EPA has considered the available evidence during the course of its assessment of the proposal, and this scientific and other evidence provides the foundation for its decision making and recommended conditions. The evidence made available to the NT EPA during the course of the assessment was adequate to inform the NT EPA's recommendation to the Minister.</p> <p>Where the NT EPA considered that further evidence was required to inform the management of potentially significant impacts on the environment, the NT EPA recommended conditions requiring the proponent to attain and use this information prior to commencement of the action.</p>
<p><b>Principle of intergenerational and intragenerational equity</b></p> <p>The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of present and future generations.</p>	<p>The NT EPA acknowledges that it is important to protect the sensitive environmental values of the Tiwi Islands for the benefit of future generations. It considers that the recommended conditions for an environmental approval would provide an appropriate degree of protection for these values and not constrain the ability of future generations to access the healthy biodiversity for a range of beneficial uses.</p> <p>Effective rehabilitation and closure of the proposal to maintain biodiversity would ensure that environmental quality is maintained into the future.</p> <p>The NT EPA has considered the principle of intergenerational equity and intragenerational equity in its assessment and concluded that environmental values will be protected so that the health, diversity and productivity of the environment will be maintained for the benefit of future generations.</p>
<p><b>Principle of sustainable use</b></p> <p>Natural resources should be used in a manner that is sustainable, prudent, rational, wise and appropriate.</p>	<p>The NT EPA acknowledges the importance of sustainable use of resources and has considered this principle during the environmental impact assessment process. It considers that this principle is closely linked to the principles of intergeneration and intragenerational equity, and conservation of biological diversity and ecological integrity.</p>

Matters	NT EPA's consideration
<p><b>Principle of conservation of biological diversity and ecological integrity</b></p> <p>Biological diversity and ecological integrity should be conserved and maintained.</p>	<p>This principle was considered by the NT EPA when assessing the impacts of the proposal on the environmental values of the receiving environment. In considering this principle, the NT EPA notes that terrestrial ecosystems could be significantly impacted by the proposal if appropriate measures were not implemented to avoid and mitigate impacts. The assessment of these impacts is provided in this report.</p> <p>Biological diversity and ecological integrity are likely to be conserved due to the avoidance, minimisation and mitigation measures that will be implemented by the proponent and its contractor, and the NT EPA's recommended conditions to ensure that environmental protection outcomes are achieved.</p> <p>From its assessment of this proposal the NT EPA has concluded that the proposal would not compromise the biological diversity and ecological integrity of the affected areas.</p>
<p><b>Principle of improved valuation, pricing and incentive mechanisms</b></p> <p>(1) Environmental factors should be included in the valuation of assets and services.</p> <p>(2) Persons who generate pollution and waste should bear the cost of containment, avoidance and abatement.</p> <p>(3) Users of goods and services should pay prices based on the full life cycle costs of providing the goods and services, including costs relating to the use of natural resources and the ultimate disposal of wastes.</p> <p>(4) Established environmental goals should be pursued in the most cost-effective way by establishing incentive structures, including market mechanisms, which enable persons best placed to maximise benefits or minimise costs to develop solutions and responses to environmental problems.</p>	<p>This principle was considered by the NT EPA when assessing the impacts of the proposal.</p> <p>The NT EPA notes that the proponent would adhere to DIPL Specifications for Environmental Management<sup>17</sup> which includes provisions to manage waste disposal and prevent environmental harm during road construction activities.</p>

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<sup>17</sup> DIPL [Standard specifications for environmental management](#)

Matters	NT EPA's consideration
<b><i>Environmental decision-making hierarchy</i></b>	
<p>(1) In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must apply the following hierarchy of approaches in order of priority:</p> <ul style="list-style-type: none"> <li>(a) ensure that actions are designed to avoid adverse impacts on the environment;</li> <li>(b) identify management options to mitigate adverse impacts on the environment to the greatest extent practicable;</li> <li>(c) if appropriate, provide for environmental offsets in accordance with this Act for residual adverse impacts on the environment that cannot be avoided or mitigated.</li> </ul>	<p>In its assessment of the proposal, the NT EPA considered the extent to which the proponent has applied the environmental decision-making hierarchy in its design of the proposal and the proposed measures to avoid and then mitigate significant impacts. The NT EPA is satisfied that this hierarchy has been applied appropriately to avoid and/or mitigate impacts and has recommended conditions to support the proponent's commitments.</p> <p>The NT EPA recognises the proponent's application of the environmental decision-making hierarchy extends to its contractor during implementation and closure of the proposal.</p> <p>The NT EPA did not identify any residual impacts that would require offsetting.</p>
<p>(2) In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must ensure that the potential for actions to enhance or restore environmental quality is identified and provided for to the extent practicable.</p>	<p>The proposal is located in an area with high natural quality and biodiversity value. Proposed rehabilitation actions to rehabilitate gravel pits and decommissioned roads, as well as improve drainage and erosion controls, may restore the site and adjacent environmental quality if undertaken successfully.</p> <p>The NT EPA has recommended conditions requiring rehabilitation and closure of the site to ensure that environmental quality is restored to meet the NT EPA's objectives.</p>
<b><i>Waste management hierarchy</i></b>	
<p>(1) In designing, implementing and managing an action, all reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.</p>	<p>The NT EPA has considered the waste management hierarchy in its assessment and has had particular regard to this principle in its assessment of inland water environmental quality.</p> <p>The NT EPA is satisfied that the short duration and low magnitude of impacts together with the proponent's commitments in DIPL standard specifications for environmental management will ensure compliance with the waste management hierarchy.</p>

Matters	NT EPA's consideration
<p>(2) For subsection (1), waste should be managed in accordance with the following hierarchy of approaches in order of priority:</p> <ul style="list-style-type: none"> <li>(a) avoidance of the production of waste;</li> <li>(b) minimisation of the production of waste;</li> <li>(c) re-use of waste;</li> <li>(d) recycling of waste;</li> <li>(e) recovery of energy and other resources from waste;</li> <li>(f) treatment of waste to reduce potentially adverse impacts;</li> <li>(g) disposal of waste in an environmentally sound manner.</li> </ul>	
<b><i>Ecosystem-based management</i></b>	
<p>Management that recognises all interactions in an ecosystem, including ecological and human interactions.</p>	<p>The NT EPA acknowledges the importance of ecosystem-based management for achieving both sustainable development and biodiversity protection goals. The NT EPA considered the connections and interactions between parts of the environment to inform a holistic view of impacts to the whole environment.</p> <p>The NT EPA formed the view that the impacts from this proposal can be managed to be consistent with the NT EPA's environmental factors and objectives.</p>
<b><i>The impacts of a changing climate</i></b>	
<p>The effects of a changing climate on the proposal and resilience of the proposal to a changing climate</p>	<p>The NT EPA considered the life of the proposal in the context of resilience to climate change, and how climate change may impact the proposal. The NT EPA had regard to measures and controls relating to extreme weather events such as flooding and high intensity rain events. The NT EPA considered that specific conditions did not need to be recommended to address this requirement. The NT EPA considered that conditions set for erosion and sediment control addressed the effects of a changing climate and no further conditions are necessary to address this requirement.</p> <p>The NT EPA recognises the importance of ensuring impacts from the proposal are managed to acceptable levels to maintain the resilience of the environment to the impacts of a changing climate.</p> <p>The NT EPA had regard to this matter during its assessment of the proposal.</p>



## Appendix 3 – Environmental impact assessment timeline

Date	Assessment stages
29 April 2022	Referral information received
20 May 2022	Referral information accepted
25 May to 22 June 2022	Submission period on referral information
12 July 2022	NT EPA decided environmental impact assessment required – assessment by referral information method
19 Aug to 8 Sept 2022	Consultation with proponent and statutory decision maker
15 September 2022	Statutory timeframe for the NT EPA's assessment report to be provided to the Minister for Environment, Climate Change and Water Security
30 business days after receiving the NT EPA's assessment report	Minister's decision on environmental approval due (If the Minister does not make a decision within 30 business days after receiving the assessment report the Minister is taken to have accepted the NT EPA's recommendation for approval).