Clearing Desktop Report – CPS 818

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New Fitzroy River Bridge

Great Northern Highway (H006) Bridge no. 1131
Kimberley Region/OMTID
EOS no.: 2958

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Document Control

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1 PROPOSAL

1.1 Purpose and Justification

The purpose of this Clearing Desktop Report (CDR) is to provide a report detailing the desktop assessment of native vegetation clearing that is proposed to be cleared using the Statewide Clearing Permit CPS 818 issued to Main Roads Western Australia (Main Roads).

Main Roads is proposing to replace the Fitzroy River bridge (bridge no. 1131) located on the Great Northern Highway Straight Line Kilometre (SLK) 2523.47 to 2526.10, east of Fitzroy Crossing townsite, Kimberley Region Western Australia (WA). The bridge and approaches were severely damaged during the December 2022/January 2023 flooding events and require urgent replacement, as the only sealed means of crossing the Fitzroy River, compromising access into the state and isolating communities.

Clearing of native vegetation associated with the upgrade of the Great Northern Highway either side of the bridge is the subject of this CDR (the Proposal). The Proposal is at concept stage only and the exact extent of ground disturbance at this point in time is unknown. This document assesses the environmental impact of a 42.82 hectare (ha) Development Envelope (DE). Desktop assessment of remnant native vegetation extent (GoWA 2023; DPIRD-005) indicates the DE comprises 38.23 ha of remnant vegetation.

This report outlines the key activities associated with the Proposal, the existing environment and an assessment of native vegetation clearing. The assessment provides an evaluation of the vegetation clearing impacts associated with the Proposal using the ten Clearing Principles, and the strategies used to manage vegetation clearing.

1.1.1 Main Roads Approach to Road Safety and the Environment

Main Roads is committed to minimising the environmental impacts of all of its activities, and manages the State road network to achieve balanced economic, social, safety and environmental benefits for the community. Main Roads recognises that Western Australia's environment is significant from a global perspective and the unique conservation values that are contained within its road reserve. Main Roads road network often adjoins natural areas and, in some locations, the reserve itself hosts remnant vegetation with high environmental values. Although the reserves were not established for this purpose, Main Roads recognises that it has a responsibility to conserve the environmental values that occur within the State's road network and minimise the impact its proposals have on the environment. In addition to providing a safe and efficient road network for all people using the roads under its control, Main Roads is also committed to protecting and enhancing the natural environment.

In accordance with National and State Government road safety policies, Main Roads is also committed to substantially reducing road trauma on the road network through Safe System principles. The Safe System approach acknowledges that more than two thirds of all serious crashes are due to human error rather than deliberate risk taking (e.g. speeding or drink driving) and seeks to improve behaviour through education and enforcement while managing the safety of vehicles, speeds and the road and road infrastructure. It is shown that improving sub-optimal road formation will substantially reduce the likelihood and severity of road crashes. For example, according to the Road Safety Management Guideline, increasing the sealed shoulder from 0.5 m to 2 m will reduce Killed and Seriously Injured numbers by more than 50%.

As the statutory authority responsible for providing and managing a safe and efficient main road network in Western Australia, Main Roads focuses on improving road safety by thoroughly considering all environmental, economic and community benefits and impacts. It operates on a hierarchy of avoiding, minimising, reducing and then, if required, offsetting our environmental impacts. This has been achieved through changes in proposal scope and design. Main Roads regularly reduces its clearing footprint by restricting earthworks limits for proposals, steepening batters, installing barriers, establishing borrow pits in cleared paddocks and avoiding temporary clearing for storage, stockpiles and turn around bays to avoid and minimise its impacts.

Further details on measures to avoid, minimise and reduce are provided in Section 1.5.

1.2 Proposal Scope

The Proposal involves permanent works to construct the approach roads to the New Fitzroy River Bridge and includes:

- Approach roadworks, allowing for:
    - Reconstruction of the western approach from Brooking Channel through to the new bridge, including any intersections
    - Reconstruction of the eastern approach as soon as possible, likely just after the Lodge access
    - It is unknown at this stage whether the road will be lowered or placed at the same height as previous. The road will be reinstated back on the same alignment so the environmental/heritage impact is minimal.
- Services:
    - Establishment of Water Corporation sewer main onto the bridge structure, which may require clearing for a realignment of the sewer pipeline
    - Establishment of Telstra cable as required
    - Possible relocation of Western Power assets within the road reserve
    - Reinstatement of streetlighting within the road reserve on approaches.
- Temporary works within the DE:
    - Camp site
    - Laydowns.

1.3 Proposal Location

The Proposal is located east of Fitzroy Crossing townsite, Kimberley Region WA, within the Shire of Derby-West Kimberley. The Proposal is located on Great Northern Highway (H006) SLK 2523.47 - 2526.10, as shown in Figure 1.

1.4 Clearing Details

Proposed Clearing to be undertaken using CPS 818: Up to 38.23 ha.

Areas of Native Vegetation Clearing:
The areas of native vegetation to be cleared are shown in Figure 2. The spatial extent of remnant native vegetation within the DE is based on Data WA dataset: DPIRD-005 (GoWA 2023).

Type of Native Vegetation:
The type of vegetation to be cleared under this Proposal is vegetation association (VA) no. 61 described as 'Grasslands, tall bunch grass savanna woodland, coolabah over ribbon grass (*Crysopogon spp*.)' and shown in Figure 2.

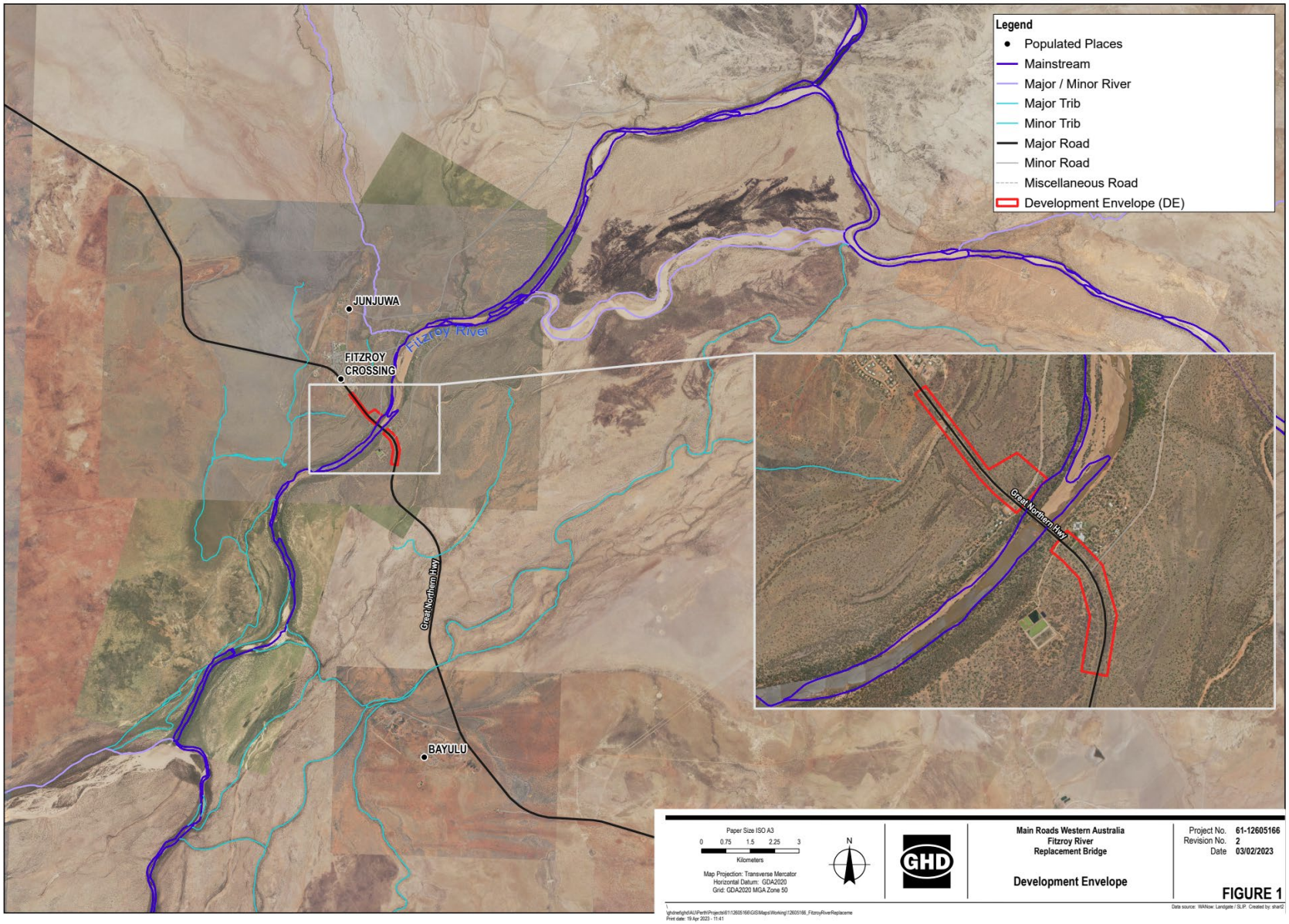

Figure 1. Proposal Development Envelope

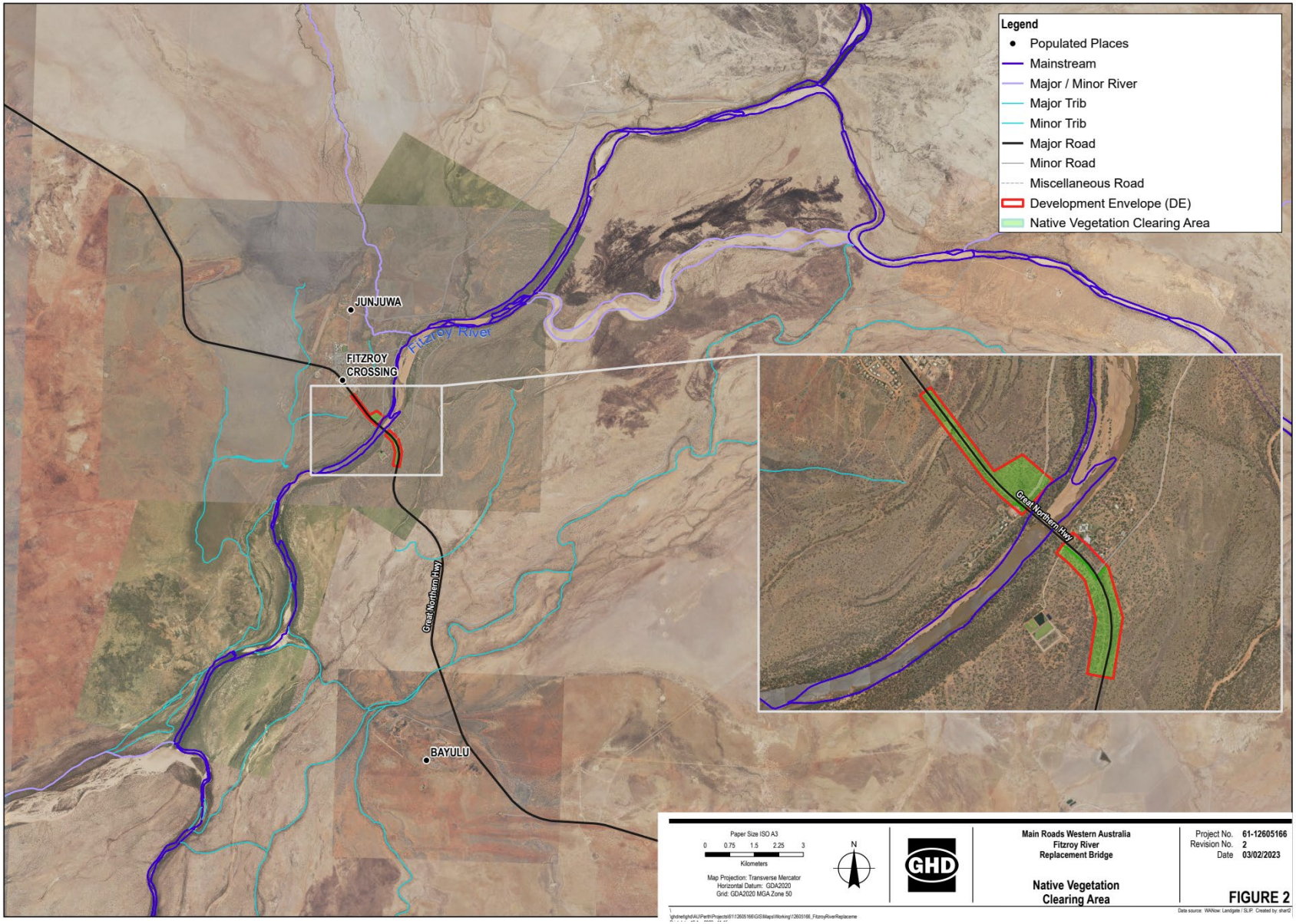

Figure 2. Native Vegetation Clearing Area

1.5 Alternatives to Native Vegetation Clearing Considered During Proposal Development

The following alternatives to clearing were considered during the development of the Proposal:

- Preferentially locating the new bridge and road in areas that are less vegetated and environmentally constrained, however this was considered cost prohibitive and impractical e.g. due to cost of construction of a completely new road, lack of adequate funding, stakeholder engagement, resource requirements. Under this option, clearing would still be required and more extensive.
- Do not reconstruct the bridge or road, however this link is crucial for the local community to cross the Fitzroy River and will potentially result in a poorer safety outcome and stakeholder criticism.

1.6 Measures to Avoid, Minimise, Reduce and Manage Proposal Clearing Impacts

The design and management measures implemented to avoid and minimise the potential clearing impacts of the Proposal are provided in Table 1.

Table 1. Measures Undertaken to Avoid, Minimise, Reduce and Manage the Proposal Clearing Impacts

Design or Management Measure	Discussion and Justification
Alignment to one side of existing road	Not relevant. The Proposal involves the construction of approaches along the Great Northern Highway either side of the new bridge. Road works will occur predominantly along the existing road alignment which will minimise impact to the environment.
Alternative alignment located within pasture or degraded areas	The Proposal will be constructed on the existing alignment, connecting the Great Northern Highway north and south of Fitzroy River. Construction will occur predominantly along the existing road alignment. Impact to adjacent native vegetation and environmental aspects have been minimised as far as practicable.
Simplification of design to reduce number of lanes and/or complexity of intersections	The Proposal design cannot be further simplified whilst retaining the necessary safety benefits and must consist of a two-lane bridge with a footpath, and a dual carriageway to accommodate heavy and light vehicles, pedestrians and cyclists.
Steepen batter slopes	The design has sought to reduce earthworks as much as possible and to minimise earthworks (fill height/cut depth). The majority of the battering for road improvement has been restricted to existing cleared areas.
Installation of barriers	Clearing of vegetation and ground disturbance has been maintained within the existing disturbance footprint as much as possible. Safety barriers were not applicable to the design.
Use of existing cleared areas for access tracks, construction storage and stockpiling	Turnaround locations, site office and stockpile locations will be established in historically cleared areas within the DE as much as practicable.
Drainage modification	Drainage design will seek to maintain existing flow lines/watercourses to avoid impacting existing vegetation and hydrology of the Fitzroy River.

1.7 Approved Policies and Planning Instruments

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act, Main Roads has also had regard to the below instruments where relevant.

Other Legislation potentially relevant for assessment of clearing and planning/other matters:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Country Areas Water Supply Act 1947* (WA) (CAWS Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Soil and Land Conservation Act 1945* (WA)
- *Rights in Water and Irrigation Act 1914*
- *Aboriginal Heritage Act 1972* (WA).

Environmental Protection Policies:

- Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992
- Environmental Protection (Western Swamp Tortoise Habitat) Policy 2011.

Other relevant policies and guidance documents:

- Environmental Offsets Policy (Government of Western Australia 2011)
- A guide to the assessment of applications to clear native vegetation (Department of Environment Regulation (DER) 2014)
- A guide to the exemptions and regulations for clearing native vegetation (Department of Water and Environmental Regulation (DWER) 2019)
- Procedure: Native vegetation clearing permits (Government of WA 2021)
- Environmental Offsets Guidelines (Government of WA 2014)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016)
- Technical guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2020)
- Commonwealth Listing Advice on Northern Quoll (*Dasyurus hallucatus*) (Threatened Species Scientific Committee (TSSC) 2005)
- Conservation Advice *Macrotis lagotis* greater bilby (TSSC 2016a)
- Conservation Advice *Macroderma gigas* ghost bat (TSSC 2016b)
- Conservation Advice *Trichosurus vulpecula arnhemensis* Northern Brushtail Possum (TSSC 2021).

2 SCOPE AND METHODOLOGY OF CLEARING DESKTOP

Native vegetation will be cleared to accommodate this Proposal. This clearing will be undertaken using the Main Roads Statewide Clearing Permit CPS 818.

To comply with CPS 818, Main Roads must prepare a Clearing Desktop Report (CDR) (this document).

The CDR outlines the key activities associated with the Proposal, the existing environment and an assessment of native vegetation clearing. This assessment provides an evaluation of the vegetation clearing impacts associated with the Proposal using the ten Clearing Principles listed under s51 of the *Environmental Protection Act 1986* (EP Act) and strategies used to manage vegetation clearing.

2.1 Report Terminology and Sources

The following terms are used in this CDR:

- **Native Vegetation Clearing Area (NVCA)** – The maximum amount (38.23 ha) of native vegetation to be cleared for the Proposal that will accommodate the designed earthworks and, typically, a nominal buffer to allow for the safe movement of machinery during construction.

- **Development Envelope (DE)** – The maximum extent (42.82 ha) within which the clearing of native vegetation will be contained. The larger DE allows for minor changes to the Proposal footprint as the design process continues, and to account for minor and unexpected changes that may occur during construction, such as working to avoid a large tree or encountering buried boulders or services. This flexibility allows the site personnel to make modifications to the Proposal to avoid areas that may contain better environmental values. The CDR has assessed all environmental values within the DE as though all of these values will be impacted, up to the amount specified within the clearing area.

- **Study Area** – Area covered by the desktop assessment. The Study Area for the Proposal is confined to a local area of a 10 km radius (Figure 3).

2.2 Desktop Assessment

A desktop assessment of the DE was undertaken by viewing internal datasets and other government agency managed databases, and consulting with relevant stakeholders where necessary. Results from searches can be found in Appendix 1.

GIS layer viewing and mapping is done using ArcMap and/or Main Roads corporate mapping system known as iMaps. Referencing of the GIS layers accessed is done under the relevant methodology section of each clearing principle. Government managed databases were searched to locate additional information.

No current site assessment information or surveys are available for the Proposal.

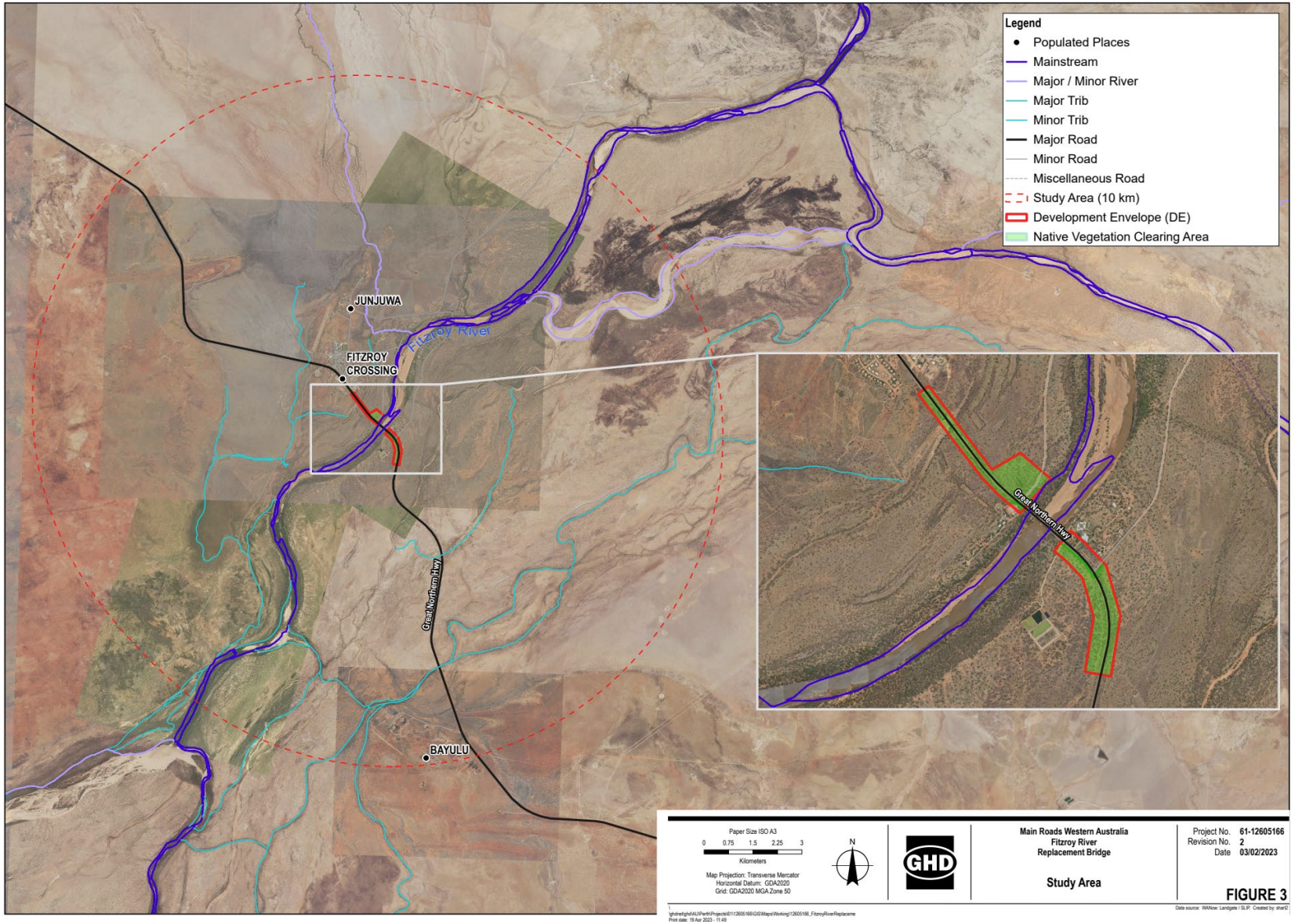

Figure 3. Study Area

3 VEGETATION DETAILS

3.1 Proposal Site Vegetation Description

The NVCA comprises 38.23 ha of native vegetation prior to the flooding event. The NVCA is located within the Dampierland IBRA region and the Fitzroy Trough subregion (DAL01). The Fitzroy Trough subregion is composed of alluvial plains, sandplain and eroded dune surfaces, and extensive coastal mud flats (Graham 2001). Vegetation within the Fitzroy Trough is described as woodlands of Pindan, Boab and Eucalyptus, along with rainforest patches and hummock grassland on limestone (Graham 2001).

There is one VA within the NVCA. Table 2 provides details of the VA and the remaining extent of this association at Statewide, IBRA Bioregion, IBRA Sub-region and Local Government Authority (LGA) scales.

Table 2. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European Extent (ha)	Current Extent (ha)	% Remaining	% Current Extent in DBCA Managed Land (proportion of pre-European Extent)
Veg Assoc No. 61	**Statewide** WA	185,473	185,316	99.92	0.55
	IBRA Bioregion Dampierland	130,881	130,785	99.93	0.77
	IBRA Sub-region Fitzroy Trough	130,664	130,569	99.93	0.77
	LGA Shire of Derby-West Kimberley	182,468	182,311	99.91	0.55

4 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

In assessing whether the Proposal's proposed clearing is likely to have a significant impact on the environment, the Proposal was assessed against the ten Clearing Principles (EP Act, Schedule 5).

Each principle has been assessed in accordance with the former DER (now DWER) '*A Guide to the Assessment of Applications to Clear Native Vegetation*' (DER 2014) and other relevant clearing permit application decision reports prepared by DWER.

The proposed clearing is not likely to be at variance to Clearing Principle (b) and (i) and not at variance to the remaining eight Clearing Principles.

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Proposed clearing is not at variance to this Principle.

Assessment

Vegetation

The NVCA comprises 38.23 ha of mapped native vegetation representative of VA no. 61 (Beard 1975) described as 'Grasslands, tall bunch grass savanna woodland, coolabah over ribbon grass (*Crysopogon spp*.)'.

Significant ecological communities

Desktop searches (EPBC PMST, *NatureMap*, DBCA, WA Herbarium) confirm the DE and Study Area are not located within any Commonwealth or State listed Threatened Ecological Communities (TECs). Review of GoWA (2023; DBCA-038) indicates the presence of a Priority Ecological Community (PEC) within the DE and Study Area. This PEC is listed as Gogo Land System, classified as a Priority 3 ecological community.

The Gogo Land System PEC typically occurs on active floodplains with broad levee zones and moderately extensive alluvial back plains of cracking clays with grasslands and grassy woodlands. The PEC consists of a wide range of soil types, from clayey alluvial soils to loamy alluvial soils, and cracking and heavy clays to self-mulching clays. The PEC also encompasses a wide range of vegetation, including fringing forests, open grassy woodlands, grassland with scattered trees and shrubs, perennial grasslands and annual grasses and forbs. Threats to the ecological community include agricultural expansion, weed invasion (buffel), altered fire regimes, and over-grazing leading to soil loss and loss of vegetation structure (Payne & Schoknecht 2011).

Desktop review of soil types and landforms of the DE indicates the DE is synonymous with land unit 6 of the PEC (Payne & Schoknecht 2011):

- Landform: Minor channels and billabongs; channels up to 3 m deep and 275 m wide; billabongs up to 3.2 km long, often in linked series
- Soil type: Brownish, massive, intractable, silty to heavy clays. Review of GoWA (2023; DPIRD-017) confirms the DE is comprised of soil types 331St (St George system: Stony soil; rocky sandstone plateaux and mountains supporting open spinifex with stunted trees; also lower sandplains with pindan vegetation of acacias with curly spinifex and ribbon grass) and 331Go (Gogo system: Hard cracking clay; active flood-plains with broad levee zones supporting ghost gum and coolibah woodlands with frontage grasses, and cracking clay back plains supporting Mitchell grass and ribbon grass-blue grass grasslands)

- Vegetation: Grassy woodland fringing communities, varying according to conditions of flooding; Eucalyptus microtheca alliance.

There is an estimated 196,600 ha of Gogo Land System PEC within the Kimberley region (Payne & Schoknecht 2011). The entire extent of the DE comprises 0.02% of the PEC. Ground disturbance within the PEC is unlikely to directly or indirectly impact the maintenance of the PEC locally or regionally.

Significant flora

Desktop searches (EPBC PMST, DBCA TPFL, WA Herbarium, *NatureMap*) identified the presence/potential presence of 266 flora taxa within the Study Area including five DBCA-listed Priority species:

- *Corchorus fitzroyensis (*Fitzroy River Corchorus) - Priority 3
- *Goodenia sepalosa var. glandulosa* - Priority 3
- *Cullen candidum* - Priority 1
- *Euploca foveolata* (Craven) - Priority 1
- *Nymphaea kimberleyensis* (Water Lily) - Priority 1.

The desktop search did not record any of the above species within the DE. The closest record to the DE was *Corchorus fitzroyensis* (DBCA-listed Priority 3) located approximately 2.2 km north-east of the DE.

Review of *Florabase* found the following information for population numbers and soil preferences of the above priority species:

- *Corchorus fitzroyensis (*Fitzroy River Corchorus): Over 24 records present across WA. Prefers sandy soil or grey alluvial silt
- *Goodenia sepalosa var. glandulosa*: Over 16 records present across WA. Prefers red sand or loam
- *Cullen candidum*: Five records present across WA. Prefers clayey sand
- *Euploca foveolata* (Craven): Nine records present across WA. Soil type preference unknown
- *Nymphaea kimberleyensis* (Water Lily): Four records present across WA. Soil type preference unknown.

Dominant soil types mapped in the DE are stony soil (331St) and hard cracking clay (331Go) (GoWA 2023; DPIRD-027, DPIRD-076). These soil types are incompatible with *Corchorus fitzroyensis, Goodenia sepalosa var. glandulosa,* or *Cullen candidum* preferred soil types. It is unknown whether the soil type within the DE would support *Euploca foveolate,* however, the small proportion of clearing within the DE compared to vast tracts of soil and vegetation outside of the DE is unlikely to significantly impact Priority flora species. *Nymphaea kimberleyensis* is a floating waterlily and due to the absence of water habitat within the DE this species is unlikely to be present.

Further analysis of GIS data (WA Herbarium) using a 40 km radius of the DE was employed to identify further species of significant flora known to occur in the region. The following additional species were returned from the search:

- *Cucumis* sp. Bastion Range (A.A. Mitchell et al. AAM 10710) - Priority 1_
- *Euploca geocharisI* - Priority 1
- *Cayratia cardiophylla*- Priority 2
- *Hibiscus calcicole*- Priority 2

- *Fimbristylis sieberiana*- Priority 3
- *Goodenia byrnesii*- Priority 3
- *Schoenus punctatus*- Priority 3

None of the additional species identified in the 40 km database search were located within the Gogo land system, and therefore they display a reduced likelihood of being located within the DE.

Significant fauna

Desktop searches (EPBC PMST, *NatureMap*, DBCA) identified the presence/potential presence of 210 fauna taxa within the Study Area, comprising of 154 birds, 36 reptiles, 10 amphibians, six mammals, three invertebrates and one fish. The following significant fauna species were recorded in the Study Area:

- 13 species listed as Threatened under the EPBC Act and/or the BC Act
- 17 species listed as Marine and Migratory (Terrestrial and Wetland) under the EPBC Act
- One species listed as Marine under EPBC Act and Other Specially Protected (OS) under BC Act
- Two DBCA listed Priority species.

Only one significant fauna species was located in desktop searches as a historic record within the DE: the Common Sandpiper (*Actitis hypoleucos*) listed as Marine and Migratory under EPBC Act. The Common Sandpiper is highly mobile and would not rely solely on the DE for survival or persistence.

Conservation Estates

One National Park is located within the Study Area (GoWA 2023; DBCA-011), namely Warlibirri National Park, located approximately 2.5 km north-east of the DE. Danggu (Geikie Gorge) Conservation Park is located approximately 12 km north-east of the DE, outside of the Study Area (GoWA 2023; DBCA-011). Bush Forever is only relevant to the Perth metropolitan area, and therefore not this Proposal.

Environmentally Sensitive Areas (ESAs)

No ESAs are located within the DE or Study Area. One ESA is located 12 km north-east of the DE likely to be associated with Danggu (Geikie Gorge) Conservation Park (GoWA 2023; DWER-046).

Ecological linkages

Ecological linkages have not been mapped for the Shire of Derby-West Kimberley, and it is unlikely that the clearing required within the NVCA will fragment or interrupt any ecological linkages within the vicinity.

The Proposal involves upgrade of the existing Great Northern Highway which is subject to ongoing disturbance due to historical land use, maintenance of the highway and extreme flood events. Proposal clearing of 38.23 ha mapped native vegetation is occurring adjacent to the existing Great Northern Highway within vegetation that is well represented at a local and regional scale. Proposed clearing will not fragment or remove entire corridors of vegetation or supporting habitat for significant flora and fauna species. Vegetation within the DE does not comprise a high biological diversity in the local or regional context.

The proposed clearing is not at variance to this Principle.

Methodology

- Beard JS (1975). Vegetation Survey of Western Australia: Pilbara, Western Australia, map and explanatory memoir 1:250,000 series, Apple Cross, Vegmap Publications.
- DCCEEW Protected Matters Search Tool Report
- Government GIS Shapefiles:
  - Clearing Regulations – Environmentally Sensitive Areas (DWER-046) (Accessed February 2023)
  - DBCA Legislated Lands and Waters (DBCA-011) (Accessed February 2023)
  - DBCA Threatened and Priority Ecological Community database search (Accessed February 2023)
  - Soil landscape mapping – Best Available (DPIRD-027) (Accessed February 2023)
  - Soil Landscape Mapping – Western Australia attributed by WA Soil Group (DPIRD-076) (Accessed February 2023)
  - Threatened and Priority Flora (WA Herbarium and TPFL) (Accessed February 2023).
- *NatureMap* (Accessed February 2023)
- Payne, A., Schoknecht, N. (2011). Technical Bulletin Land Systems of the Kimberley Region, Western Australia No. 98. Prepared for Department of Agriculture and Food, Western Australia.
- Statewide Vegetation Statistics (Government of Western Australia 2019).

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Proposed clearing is not likely to be at variance to this Principle.

Assessment

Desktop searches (EPBC PMST, *NatureMap*, DBCA) identified the presence/potential presence of 210 fauna taxa within the Study Area, comprising of 154 birds, 36 reptiles, 10 amphibians, six mammals, three invertebrates and one fish. The following significant fauna species were recorded in the Study Area:

- 13 species listed as Threatened under the EPBC Act and/or the BC Act
- 17 species listed as Marine and Migratory (Terrestrial and Wetland) under the EPBC Act
- One species listed as Marine under EPBC Act and Other Specially Protected (OS) under BC Act
- Two DBCA listed Priority species.

Only one significant fauna species was located in desktop searches as a historic record within the DE: the Common Sandpiper (*Actitis hypoleucos*) listed as Marine and Migratory under EPBC Act. The Common Sandpiper is highly mobile and would not rely solely on the DE for survival or persistence.

Based on species biology, habitat requirements, the likely quality and availability of suitable habitat (based on VA no. 61 within the Study Area) and records of the species in the vicinity of the DE, the following species have some potential of occurring within the DE:

- Northern Quoll (*Dasyurus hallucatus)* – EPBC Act and BC Act Endangered
- Ghost Bat (*Macroderma gigas)* – EPBC Act and BC Act Vulnerable
- Northern Brushtail Possum (*Trichosurus vulpecula arnhemensis)* – EPBC Act and BC Act Vulnerable
- Greater Bilby (*Macrotis lagotis)* – EPBC Act and BC Act Vulnerable.

Northern Quoll
The DE is located within the mapped distribution of the Northern Quoll (TSSC) (2005). The Northern Quoll is a nocturnal predator, with historical distribution across northern Australia, that has declined dramatically, especially in the more arid parts of its range. Surviving populations exist within the Pilbara, Kimberley, parts of the Northern Territory and near-coastal Queensland. In the Kimberley, records are scattered discontinuously from just south of Derby across to Wyndham (TSSC 2005). The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, Eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert (Braithwaite & Griffiths 1994). The nearest official record of a Northern Quoll is 90 km to the east of the DE in the Meuller Ranges (DBCA datasets). Due to the large distance to the nearest record of the species, the absence of denning habitat locally and the lack of preferred foraging habitat in the DE, this species is unlikly to occur.

Ghost Bat
The DE is located within the mapped distribution of the Ghost Bat (TSSC 2016b). The ghost bat is a monotypic species endemic to northern Australia. It comprises isolated populations extant in the semi-desert Pilbara region of WA, the mesic Kimberley and Top End of the Northern Territory, along with north-western Queensland, and the central Queensland coastal and hinterland regions (TSSC 2016b). In the Kimberley, ghost bats are widespread across ecosystems associated with rocky landscapes, both sandstone and limestone, including offshore islands with well-developed riparian zones (McKenzie et al. 2020). Ghost bats move between a number of caves seasonally or as dictated by weather conditions and/or foraging opportunities, so they require a range of cave sites. There are several documented permanent roost caves and underground mines in northern Australia, for example, Tunnel Creek in the Kimberley (McKenzie et al. 2020). There are no caves within the DE. Whilst the DE may represent supporting habitat for the species, it is likely limited as there are no known roosting caves in the vicinity of the DE. The nearest record of a Ghost Bat is 77 km to the south east of the DE in the Meuller Ranges and 80 km north west in the King Leopold Ranges (DBCA datasets). Due to the lack of suitable roosting caves locally and the large distance from the nearest records, this species is unlikly to occur within the DE.

Northern Brushtail Possum
The DE is located within the mapped distribution of the Northern Brushtail Possum habitat (TSSC 2021). The Northern Brushtail Possum is a nocturnal semi-arboreal marsupial. It occurs discontinuously across the Northern Territory, westward to the Western Australian Kimberley. Most of the current population appears to be in the Northern Territory, with limited sightings recorded in WA, spanning the Kimberley. The northern Brushtail Possum prefers tall Eucalypt open forests or mangrove communities with large hollow-bearing trees, as well as some rainforests and semi-urban areas. The subspecies is found in higher abundance where shrub density is high (TSSC 2021). There are no known records of the species in the vicinity of the DE (DBCA datasets). The open savannah woodland habitat type within the DE is not the preferred habitat for this species, and due to the lack of local records it is unlikely to be present.

Greater Bilby
The DE is located within the mapped distribution of the Greater Bilby (TSSC 2016a). The Bilby is a long tailed, long eared desert bandicoot that formerly occurred across larger areas of Australian in the arid and semiarid zones. The distribution of this species is now restricted to 20 % of its former range, mainly in parts of the Tanami Desert, Pilbara and southern Kimberley. Bilbies

shelters in burrows and occupy a range of habitats from grassland on clayey and stony soils or sandplains to mulga scrub and woodlands on red earths, however, this species requires sandy or loamy soil in which to burrow (TSSC 2016a). The nearest record is 80 km south of the DE at Cherabun (DBCA datasets). The stoney soils and cracking clays mapped as dominant within the DE (GoWA 2023; DPIRD-027, DPIRD-076) are unlikely to be suitable to support Bilby burrows, and due to the distance to known records the species is unlikely to occur within the DE.

Listed bird species are mobile and would not rely solely on the DE for survival or persistence. Some significant fauna species may infrequently visit the DE, however, the small scale of proposed clearing is unlikely to be necessary for the maintenance of significant fauna due to the following:

- The DE comprises habitat that is well represented locally and regionally and not spatially restricted
- Surrounding vegetation and habitat is likely to provide preferable habitat for the maintenance of the significant fauna species
- Fauna species are mobile and can relocate outside the DE to good or better vegetation and habitat.

Proposed clearing does not comprise of vegetation that is the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia and is therefore not likely to be at variance to this Principle.

Methodology

- Braithwaite, R.W. & A.D. Griffiths (1994). Demographic variation and range contraction in the Northern Quoll, Dasyurus hallucatus (Marsupialia: Dasyuridae).
- DCCEEW Protected Matters Search Tool Report
- Government GIS Shapefiles:
  - DBCA Threatened and Priority fauna database search (Accessed February 2023)
- *NatureMap* (Accessed February 2023)
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(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.

Proposal is not at variance to this Principle.

Assessment

Desktop searches (EPBC PMST, *NatureMap*, DBCA, WA Herbarium) did not identify any Threatened flora within the DE or Study Area.

The proposed clearing is not at variance to this clearing Principle.

Methodology

- DCCEEW Protected Matters Search Tool Report
- Florabase (Accessed February 2023)
- Government GIS shapefiles:
  - DBCA Threatened flora database search (Accessed February 2023)
  - Threatened and Priority Flora (WA Herbarium) (Accessed February 2023)
- *NatureMap* (Accessed February 2023).

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Proposed clearing is not at variance to this Principle.

Assessment

Desktop searches (EPBC PMST, DBCA) did not identify any threatened ecological communities within the DE or Study Area.

The proposed clearing is not at variance to this clearing Principle.

Methodology

- DCCEEW Protected Matters Search Tool Report
- Government GIS shapefiles:
  - DBCA Threatened Ecological Community database search (Accessed February 2023).

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Proposed clearing is not at variance to this Principle.

Assessment

Vegetation Association

The NVCA is located within the Dampierland IBRA region and the Fitzroy Trough subregion (DAL01). The vegetation within the NVCA has been broadly mapped as VA no. 61 described as 'Grasslands, tall bunch grass savanna woodland, coolabah over ribbon grass (Crysopogon spp.)'. The table below summarises the remaining extent of VA no. 61 at Statewide, IBRA Bioregion, IBRA Sub-region and LGA scales.

Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European Extent (ha)	Current Extent (ha)	% Remaining	% Current Extent in DBCA Managed Land (proportion of pre-European Extent)
Veg Assoc No. 61	**Statewide** WA	185,473	185,316	99.92	0.55
	IBRA Bioregion Dampierland	130,881	130,785	99.93	0.77
	IBRA Sub-region Fitzroy Trough	130,664	130,569	99.93	0.77
	Local Government Authority Shire of Derby-West Kimberley	182,468	182,311	99.91	0.55

The national objectives and targets for biodiversity conservation Australia have been set to prevent clearance of ecological communities with less than 30% of their pre-European extent, below which species loss appears to accelerate exponentially (Commonwealth of Australia 2001).

The current extent of VA no. 61 is higher than 30% for pre-European extent at all scales (Statewide, IBRA Bioregion, IBRA Subregion, LGA). Vegetation clearing within the NVCA is occurring in an area that has not been extensively cleared at a local and regional scale and therefore is not significant as a remnant.

The proposed clearing is not at variance to this Principle.

Methodology

- Commonwealth of Australia (2001)
- Government GIS shapefiles:
  - Pre-European vegetation (DPIRD-006) (Accessed February 2023)
  - Native Vegetation Extent (DPIRD-005) (Accessed February 2023)
- Statewide Vegetation Statistics (Government of Western Australia 2019).

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Proposed clearing is not at variance to this Principle.

Assessment

The DE is not located within, and does not intersect:

- Internationally Important Wetlands (i.e. RAMSAR)
- Nationally Important Wetlands
- Geomorphic wetlands of any conservation category.

The Proposal DE is located outside the Fitzroy River and associated riparian vegetation. Vegetation within the DE does not support wetland dependent vegetation or ecosystems and is not growing in association with the Fitzroy River.

The proposed clearing is not at variance to this Principle.

Methodology

- DCCEEW Protected Matters Search Tool Report
- Government GIS shapefiles:
  - Geomorphic Wetlands (Accessed February 2023)
  - Ramsar Wetlands (DBCA-010) (Accessed February 2023)
  - Important Wetlands (DBCA-045) (Accessed February 2023)
  - Native Vegetation Extent (DPIRD-005) (Accessed February 2023).

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Proposed clearing is not at variance to this Principle.

Assessment

The DE is comprised of the road alignment, that intersects flat stretches of grassy woodland located on undulating alluvial plains. Geology within the Fitzroy Trough subregion is composed of alluvial plains, sandplain and eroded dune surfaces, and extensive coastal mud flats (Graham 2001).

The DE is comprised of two dominant soil types (GoWA 2023; DPIRD-027, DPIRD-076):

- 331St - stony soil of the St George system. Rocky sandstone plateaux and mountains supporting open spinifex with stunted trees; lower sandplains with pindan vegetation of acacias with curly spinifex and ribbon grass
- 331Go – hard cracking clay of the Gogo system. Active flood-plains with broad levee zones supporting ghost gum and coolibah woodlands with frontage grasses, and cracking clay back plains supporting Mitchell grass and ribbon grass-blue grass grasslands.

Review of the Australian Soil Resource Information System (ASRIS) indicates the Study Area is mapped as having an Extremely Low Probability of Acid Sulphate Soil (ASS) occurrence (ASRIS 2023).

Soil landscape mapping for salinity, surface acidity, flooding, water erosion, wind erosion, and waterlogging is not available for the Study Area. However, the dominant soil types within the DE (stony soil and hard cracking clays) indicate the DE has low risk of wind erosion, water erosion, acidification, and salinity. The dominant soil types within the DE are naturally susceptible to waterlogging and flooding.

The DE is located in a highly modified area, which is subject to historical land use, road maintenance and extreme flooding events. Clearing of vegetation within the DE is unlikely to cause appreciable land degradation beyond what is currently occurring. Management measures will be implemented to minimise potential erosion, sedimentation and salinity. The road design will aim to maintain existing hydrological flows thereby minimising the risk of waterlogging and flooding.

Proposal clearing is not at variance to this Principle.

Methodology

- ASRIS (2023).
- Government GIS Shapefiles:
  - Soil landscape mapping – Best Available (DPIRD-027) (Accessed February 2023)
  - Soil Landscape Mapping – Western Australia attributed by WA Soil Group (DPIRD-076) (Accessed February 2023)
- Graham (2001). Dampierland 1 (DL1 – Fitzroy Trough subregion). A Biodiversity Audit of WA's 53 Biogeographical Subregions in 2002, pp 170. Department of conservation and Land Management (ed).

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Proposed clearing is not at variance to this Principle.

Assessment

The DE does not intersect conservation reserves or DBCA managed lands (GoWA 2023; DBCA-011). Warlibirri National Park is located approximately 2.5 km north-east of the DE (GoWA 2023; DBCA-011) and Danggu (Geikie Gorge) Conservation Park is located approximately 12 km north-east of the DE, outside of the Study Area (GoWA 2023; DBCA-011).

Vegetation clearing within the DE will not impact on the environmental values of any adjacent or nearby conservation areas.

The proposed clearing is not at variance to this Principle.

Methodology

- Government GIS Shapefiles:
  - Clearing Regulations – Environmentally Sensitive Areas (DWER-046) (Accessed February 2023)
  - DBCA Legislated Lands and Waters (DBCA-011) (Accessed February 2023)
  - Geomorphic Wetlands (conservation category wetlands only) (Accessed February 2023)
  - Ramsar Wetlands (DBCA-010) (Accessed February 2023)
  - Important Wetlands (DBCA-045) (Accessed February 2023).

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Proposed clearing is not likely to be at variance to this Principle.

Assessment

The DE and Study Area are located within the Fitzroy River and Tributaries, a surface water area proclaimed under the RIWI Act (GoWA 2023; DWER-037).

The DE and Study Area are located within the Fitzroy Crossing Water Reserve Public Drinking Water Source Area (PDWSA), protected under the *Country Areas Water Supply Act 1947* (GoWA 2023; DWER-033). The DE intersects Priority 2 and Priority 3 sections of this PDWSA. In accordance with the DWER Water quality protection notes 25 (DWER 2021) (Land use compatibility tables for public drinking water source areas) road infrastucture is deemed a compatible and acceptable land use with the PDWSA Priority 2 and 3 listings, respectively.

The DE and Study Area are located within the Canning-Kimberley groundwater area proclaimed under the RIWI Act. Depth to groundwater across the Study Area is not mapped.

If the Proposal requires taking of surface water, groundwater abstraction/dewatering and/or bore/well construction/alteration necessary licences under the RIWI Act will be necessary, including appropriate controls and monitoring.

Deterioration in the quality of surface water or underground water is unlikely to occur as a result of native vegetation clearing during construction and operation of the Proposal. It is anticipated that only common substances such as fuel, oil and bitumen will be used during construction of the Proposal. Main Roads will adhere to standard management actions and safety data sheets to manage and potential risk associated with use of any hazardous substances.

The proposed clearing is not likely to be at variance to this Principle.

Methodology

- Government GIS Shapefiles:
  - RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037) (Accessed February 2023)
  - RIWI Act, Groundwater Areas (DWER-034) (Accessed February 2023)
  - Geomorphic Wetlands (conservation category wetlands only) (Accessed February 2023)
  - Ramsar Wetlands (DBCA-010) (Accessed February 2023)
  - Important Wetlands (DBCA-045) (Accessed February 2023).

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Proposed clearing is not at variance to this Principle.

Assessment

Based on climate data from the nearby Bureau of Meteorology (BoM) Fitzroy Crossing Aero weather station (site number: 003093) the region receives an annual average rainfall of 656 mm, with most of the rainfall occurring during the wet season months of December, January and February (BoM 2023).

The DE is comprised of two dominant soil types (GoWA 2023; DPIRD-027, DPIRD-076):

- 331St - stony soil of the St George system. Rocky sandstone plateaux and mountains supporting open spinifex with stunted trees; lower sandplains with pindan vegetation of acacias with curly spinifex and ribbon grass
- 331Go – hard cracking clay of the Gogo system. Active flood-plains with broad levee zones supporting ghost gum and coolibah woodlands with frontage grasses, and cracking clay back plains supporting Mitchell grass and ribbon grass-blue grass grasslands.

Whilst waterlogging and flood risk have not been mapped for the Study Area, the properties of the dominant soil types (stony soil and hard cracking clays) indicate the DE is naturally susceptible to waterlogging and flooding. The recent December 2022/January 2023 flooding event is evidence of this.

Surface water management measures will be implemented as part of the Proposal design to maintain existing hydrological regimes and to avoid impact to adjacent native vegetation. Clearing of native vegetation associated with the Proposal will not cause or exacerbate the incidence or intensity of flooding within, or in the vicinity of, the DE.

The proposed clearing is not at variance to this Principle.

Methodology

- BoM Website (Accessed February 2023)
- Government GIS Shapefiles:
  - Soil landscape mapping – Best Available (DPIRD-027) (Accessed February 2023)
  - Soil Landscape Mapping – Western Australia attributed by WA Soil Group (DPIRD-076) (Accessed February 2023).

5 COMPLIANCE WITH CPS 818

The clearing associated with the Proposal is unlikely or not at variance with the Clearing Principles. Additional management actions under CPS 818 are detailed in Table 3.

Table 3. Summary of Additional Management Actions Required by CPS 818

Impact of Clearing	Yes/No or NA	Further Action Required
1. The CDR indicates that the clearing is 'At Variance' or 'May be at Variance' with one or more of the Clearing Principles.	**No**	No further action required.
2. Clearing is at variance or may be at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality **or** (j) the incidence of flooding.	**No**	No further action required.
3. Clearing is at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality **and** (j) the incidence of flooding.	**No**	No further action required.
4. The Proposal involves clearing for temporary works (as defined by CPS 818).	**No**	No further action required.
5a. Proposal is within a Region that: • has rainfall greater than 400mm; and, • is South of the 26th parallel; and, • works are necessary in 'Other than dry conditions'; and, • works have potential for **uninfested** areas to be impacted.	**No**	Standard Vehicle and Plant management actions from Principal Environmental Management Requirements (PEMRs) and Hygiene Checklists will be applied.
5b. Do the proposed works require clearing within or adjacent to DBCA managed lands in non-dry conditions?	**No**	No further action required.
6. Main Roads has been notified by DWER or an environmental specialist that the area to be cleared is susceptible to a pathogen other than dieback.	**No**	No further action required.
7. Weeds are likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition.	**No**	No further action required.

Impact of Clearing	Yes/No or NA	Further Action Required
8. Did an environmental specialist conduct the survey or field assessment?	**No**	No surveys or field assessments have been completed to support this document.
9. Did an environmental specialist prepare the Assessment Report and any other associated documentation including the VMP, Dieback Management Plan or Offset Proposal?	**Yes**	An Environmental Specialist prepared this CDR. The environmental specialist was suitably qualified and had more than three years' experience.

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7 APPENDICES

Appendix 1: EPBC PMST, *NatureMap* and DBCA Threatened Flora and Fauna Database Searches