

WINU PROJECT VISUAL IMPACT ASSESSMENT

Rio Tinto



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Winu Project Visual Impact Assessment
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EXECUTIVE SUMMARY

Rio Tinto Winu (RTW) engaged Ecoscape to prepare a technical report to describe the potential visual impacts of the Winu Project to support consultation with Traditional Owners and the approvals application process.

Given the remote location of the Winu project, the focus for the Visual Impact Assessment (VIA) is on large pieces of infrastructure that can be seen from a substantial distance, which are the:

- + waste rock landform (WRL)
- + tailings storage facility (TSF)
- + wind turbines.

Ecoscape applied the methodology described in the *Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design* (WAPC, 2007) to undertake the visual impact assessment (VIA) of the proposed development. The manual specifies a two-stage process to the visual assessment:

1. visual landscape evaluation
2. visual impact assessment.

The Visual Landscape Evaluation (VLE) stage is undertaken to understand the context of the project and the surrounding landscape. It is also undertaken to set objectives for managing the visual landscape character. The Visual Impact Assessment (VIA) describes the potential impacts in context of the landscape evaluation. The stages of the assessment are outlined below:

- + A description of the proposed project and visual elements of proposed infrastructure (**Section 1.1**)
- + Landscape Character Analysis: The identification and evaluation of the existing landscape and Landscape Character Types which is done from desktop and site analysis (**Section 3.2**)
- + View Experience: The assessment of viewing locations, view experience and valued landscape characteristics to identify appropriate visual management objectives for the study area for the purpose of assessing visual impacts (**Section 3.3 – 3.5**)
- + Visual Management Objectives: used as criteria for assessing visual impacts on the landscape (**Section 3.6**)
- + Visual Impact Analysis: an assessment of viewsheds and photo montages to identify the level of visibility and potential visual impacts on the landscape (**Section 4.4**)
- + Visual Impact Summary: a summary of impacts with regard to the visual management objectives and visual management recommendations (**Section 5**).

BACKGROUND

Rio Tinto is evaluating the potential development of mineralised deposits within the Winu Mine Infrastructure Area (MIA), located approximately 320 km east of Port Hedland in the northwest of Western Australia. Rio Tinto is also proposing to utilise an existing access road (hereafter Road Access Corridor (RAC)) to link the MIA with the Great Northern Highway. The RAC is about 140 km in length, extending from the Great Northern Highway to the western end of the MIA. The RAC largely involves the widening of existing road infrastructure known as the Nyangumarta Highway and Wirikirr Wirikirr Road (previously known as Old Dump Road), and includes potential borrow source areas along its length.

The Winu Project will comprise the following key pieces of infrastructure:

- + Single open pit
- + Waste Rock Landform (WRL)
- + Tailings Storage Facility (TSF)
- + Ore and topsoil stockpiles
- + Ore processing facilities
- + Power generation including wind turbines, solar panels and battery storage
- + Support facilities including an accommodation camp and aerodrome.

The Nyangumarta Hwy provides the only public access near the Project. The existing turn off from the Nyangumarta Hwy to Wirikirr Wirikirr Road is approximately 60km directly to the edge of the Mining Lease.

Given the remote location of the Winu Project, the key stakeholders concerned with the visual impact are the Traditional Owners; the Nyangumarta people and the Martu people, who are exclusive native title holders of the country on which the Project is based.

LANDSCAPE CONTEXT

The landscape surrounding the Winu Project is predominately natural in character with little disturbance evident. The landform is flat to gently undulating with a repeating pattern of low linear dune ridges (seif dunes) that are orientated NW to SE. Two landscape character units were identified within the vicinity of the Winu Project. Both of the LCUs share similar visual characteristics with some variation in topography and vegetation diversity:

- + LCU 1 - Open grassland/shrubland plain
- + LCU 2 - Gently undulating grassland/shrubland plain.

Many areas contained multiple view types depending on the variations in topography and presence of tall shrubs. At any given point the view can be enclosed by a dune ridge in one direction and open in another direction over flat terrain. All views assessed at Winu are 'Level 3: Local Significance' as per the WAPC guidelines (**Appendix Two**) as they have been identified as significant view locations by Rio Tinto in consultation with Traditional Owners. These locations are not categorised as 'Level 2: Regional Significance' or 'Level 1: National / State Significance' as they are not located on main roads or highways and some areas would not be accessible to the public.

As all views surrounding the Winu Project are categorised as Level 3 significance, the recommended Visual Management Objective (VMO) for all Landscape Character Units is **best practice siting and design**. To meet this VMO, it is expected that any proposed development is blending; that is, development may be evident but generally not prominent in that it borrows from the existing landscape setting. Strategies to meet this objective may include:

- + the application of practical and sensitive siting and design techniques
- + retaining dominant landscape features and characteristics
- + enhancing or restoring landscape features.

VISUAL IMPACT ASSESSMENT FINDINGS

The following 15 key view locations were chosen in consultation with Traditional Owners and Rio Tinto:

- | | |
|--|--------------------------------|
| 1. Camp 1 | 9. Proposed Accommodation Camp |
| 2. Nyangumarta Hwy & Wirikirr Wirikirr Rd | 10. Winu Soak |
| 3. Wirikirr Wirikirr Rd & Copperhead Rd (on road) | 11. Near mine East |
| 4. Copperhead Road (NW Approach) | 12. Airstrip West |
| 5. Copperhead Rd intersecting mining lease | 13. Texas |
| 6. Magnum Camp | 14. Rimfire |
| 7. Airstrip | 15. Magnum West |
| 8. Martu Native Title Determination (NTD) Boundary | |

Of the 15 view locations that were assessed, the proposed Winu Project was at variance from the VMO at six sites (3, 4, 5, 8, 9 and 11). Sites 3, 4, 5 and 9 are located on the western site of the development with a direct line of site to the wind turbines and site 8 is the closest location southeast of the WRL. Site 11 also has a clear north west view of the WRL and wind turbines. The remaining sites are unlikely to be at variance with the VMO of best practice siting and design.

The greatest impact to the natural landscape character is expected from the view locations that were assessed as a Level 1 visual impact (see **Table 2** for definitions), these are:

- + 3 – Wirlkirr Wirlkirr Rd & Copperhead Rd
- + 4 – Copperhead Road (NW Approach)
- + 5 – Copperhead Road (intersecting mining lease)
- + 8 – Martu NTD Boundary
- + 9 – Proposed Accommodation Camp
- + 11 – Near Mine West.

The impacts to landscape character are summarised for each visual impact level below:

- + **Level 1** – infrastructure in particular the wind turbines are highly visible and introduce a new element to the view in contrast to the existing visual characteristics of the landscape. The infrastructure is a dominant element that alters the natural landscape character.
- + **Level 2** – no view points were rated as a Level 2 impact
- + **Level 3** – infrastructure is visible but does not dominate the view and the natural character of the existing landscape is retained.
- + **None** – no impact to the existing landscape character.

The proposed Winu Project does not greatly change the view categories that are experienced in the landscape. Many of the panoramic and elevated views are experienced in the background zone and the proposed development does not restrict any of these views.

VISUAL IMPACT RECOMMENDATIONS

Complete mitigation of visual impacts arising from the Winu Project is impractical, given the scale and nature of the development and the relatively low relief of the landscape. The viewpoints with greatest visual impact are locations where the development is highly visible, particularly the wind turbines. While it is impractical to screen wind turbines, the following strategies may be considered to reduce the visual impact of the turbines:

- + use muted colours and non-reflective materials
- + avoid the use of logos and text on the turbines
- + minimise the height of ancillary buildings, place behind landform where possible and use low reflective materials (WAPC, 2007).

It is recommended that the acceptability of visual impacts is discussed in consultation with the Traditional Owners.

ACRONYMS AND ABBREVIATIONS

Table 1: Acronyms and abbreviations

Acronyms	
AGL	Above Ground Level
AHD	Australian Height Datum
CALM	Western Australian Department of Conservation and Land Management (1985-2006, now DBCA)
DBCA	Western Australian Department of Biodiversity, Conservation and Attractions
DE	Development Envelope
DEC	Western Australian Department of Environment and Conservation (2006-2013, now DBCA)
DPaW	Western Australian Department of Parks and Wildlife (2013-2017, now DBCA)
EPA	Environmental Protection Authority
EP Act	Environmental Protection Act 1986
Ecoscape	Ecoscape (Australia) Pty Ltd
GDA 94	Geographic Datum of Australia 1994
GIS	Geographic Information System
GPS	Global Positioning System
ha	hectare/hectares
km	kilometre/kilometres
LCT	Landscape Character Type
LCU	Landscape Character Unit
m	metre/metres
MDE	Mine Development Envelope
MGA	Map Grid of Australia
MIA	Mine Infrastructure Area
NTD	Native Title Determination
RTW	Rio Tinto Winu
RAC	Road Access Corridor
SoW	Scope of Works
sp.	Species (generally referring to an unidentified taxon or when a phrase name has been applied)
TSF	Tailings Storage Facility
UTM	Universal Transverse Mercator
VAC	Visual Absorbance Capacity
VIA	Visual Impact Assessment
VLE	Visual Landscape Evaluation
VMO	Visual Management Objective
VP	View Point
WAPC	Western Australian Planning Commission
WRL	Waste Rock Landform

1 INTRODUCTION

1.1 PROJECT DESCRIPTION

Rio Tinto is evaluating the potential development of mineralised deposits within the Winu Mine Infrastructure Area (MIA), located approximately 320 km east of Port Hedland in the northwest of Western Australia. Rio Tinto is also proposing to utilise an existing access road (hereafter Road Access Corridor (RAC)) to link the MIA with the Great Northern Highway. The RAC is 140 km in length, extending from the Great Northern Highway to the western end of the MIA. The RAC largely involves the widening of existing road infrastructure known as the Nyangumarta Highway and Wirikirr Wirikirr Road (previously known as Old Dump Road), and includes potential borrow source areas along its length.

The current Winu Development Envelope (DE) is displayed below in **Figure 1**.

The Winu Project will comprise the following key pieces of infrastructure:

- + Single open pit
- + Waste Rock Landform (WRL)
- + Tailings Storage Facility (TSF)
- + Ore and topsoil stockpiles
- + Ore processing facilities
- + Power generation including wind turbines, solar panels and battery storage
- + Support facilities including an accommodation camp and aerodrome.

The expectation is that the VIA will complete viewshed analyses for each infrastructure of interest. However, given the remote location of the Winu Project, the focus of the VIA is on the large pieces of infrastructure that can be seen from a substantial distance which are:

- + a waste rock landform approximately 80 m high
- + a tailings storage facility approximately 65 m high
- + 11 x wind turbines approximately 236 metres high to the blade tip.

1.2 CULTURAL HERITAGE

The Nyangumarta Hwy provides the only public access near the Winu Project. The existing turn off from the Nyangumarta Hwy to Wirikirr Wirikirr Road, is approximately 60km from the edge of the Mining Lease.

Given the remote location of the Winu Project, the key stakeholders concerned with the visual impact are the Traditional Owners and exclusive native title holders of the country on which the Winu Project is based.

The mine infrastructure and access road is located on the lands of the Nyangumarta people, whilst the airport and remote bore fields are situated on the lands of the Martu people (**Figure 2**).

The following 15 key view locations were chosen in consultation with Traditional Owners and from the site investigation:

- | | |
|--|--------------------------------|
| 1. Camp 1 | 9. Proposed Accommodation Camp |
| 2. Nyangumarta Hwy & Wirikirr Wirikirr Rd | 10. Winu Soak |
| 3. Wirikirr Wirikirr Rd & Copperhead Rd (on road) | 11. Near mine East |
| 4. Copperhead Road (NW Approach) | 12. Airstrip West |
| 5. Copperhead Rd intersecting mining lease | 13. Texas |
| 6. Magnum Camp | 14. Rimfire |
| 7. Airstrip | 15. Magnum West |
| 8. Martu Native Title Determination (NTD) Boundary | |

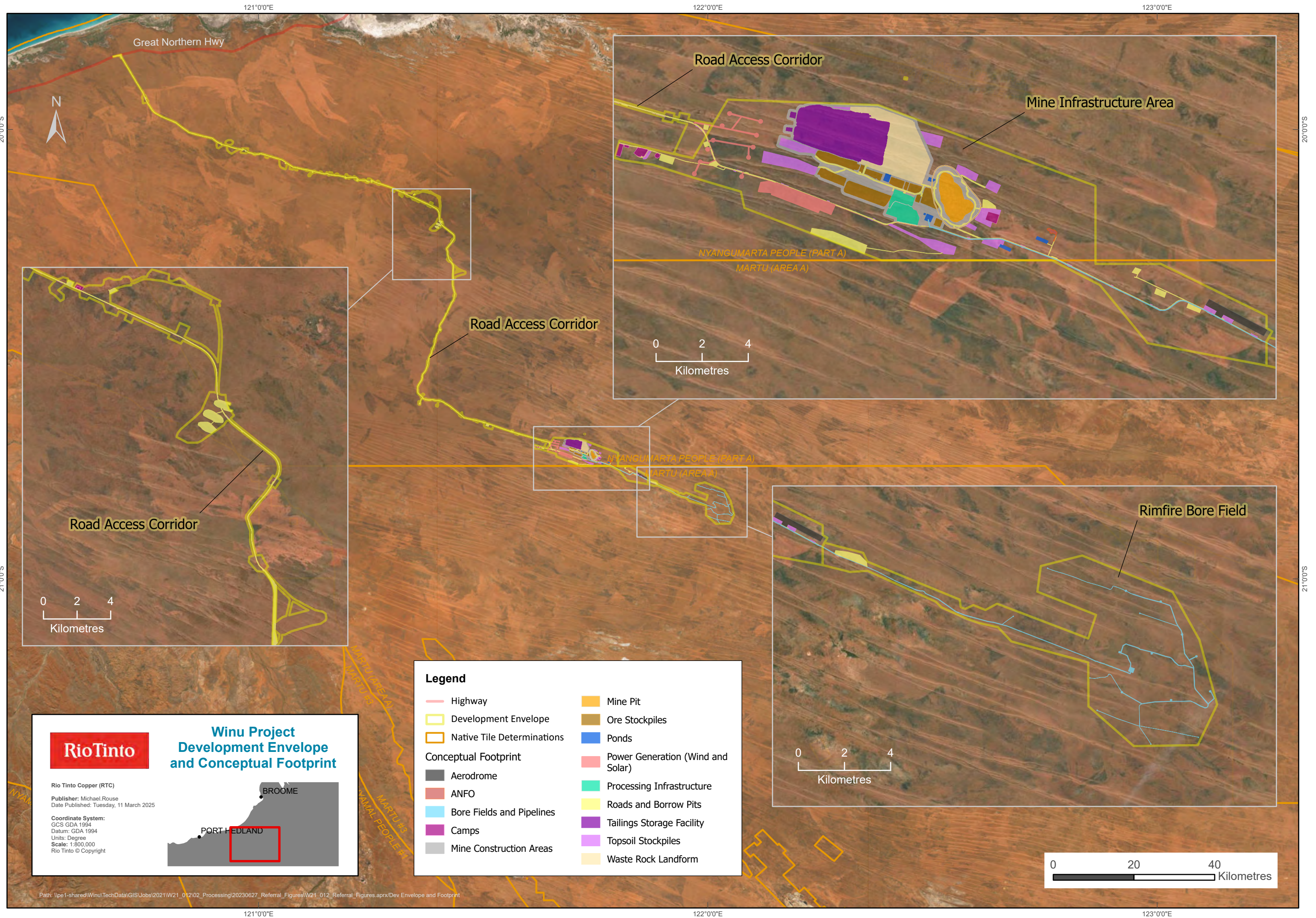


Figure 1: Winu Project Development Envelope

1.3 PROJECT SCOPE

Rio Tinto engaged Ecoscape to conduct a Visual Impact Assessment (VIA) of the 10 key view locations. The purpose of the assessment is to show the visual impact of the MIA to support consultation with Traditional Owners and future approval applications. The principal objectives of the assessment are:

- + to describe existing visual landscape character
- + to describe the proposed development
- + to describe and evaluate the potential visual impacts
- + to develop visual management measures and recommendations (if required).

Given the remote location of the Winu Project the focus for the VIA is on large pieces of infrastructure that can be seen from a substantial distance. These are:

- + Waste Rock Landform
- + Tailings Storage Facility
- + Wind Turbines.

1.4 VISUAL PLANNING CONTEXT

The following documents provide guidance on visual landscape planning in Western Australia.

1.4.1 VISUAL LANDSCAPE PLANNING IN WESTERN AUSTRALIA

This manual released by the Western Australian Planning Commission (WAPC) (2007) has been developed to help public and private sector planners address visual landscape in the planning process. The manual explains the fundamental planning tools of visual landscape evaluation and visual impact assessment. It provides guidelines for siting and design in relation to a range of landscape types and land uses, including infrastructure corridors. The methodology used for this assessment follows the guidelines set out in the manual.

1.4.2 ENVIRONMENTAL GUIDANCE FOR PLANNING AND DEVELOPMENT

Environmental Protection Authority (EPA) Guidance Statement Number 33 (EPA, 2008) is a document relevant for land use planning and was developed to assist government agencies, proponents and consultants to achieve environmentally acceptable outcomes. The EPA's position on Visual Amenity is addressed in Part B (Landscape and Landforms) and Part D (Social Surroundings).

The EPA's objective for the protection of landscape and landform is:

to maintain their integrity, ecological functions and environmental values.

The EPA's objective for visual amenity is:

to ensure that visual amenity is considered and measures are adopted to reduce adverse visual impacts on the surrounding environment as low as reasonably practicable.

The key principles that the EPA considers when assessing visual impacts of a proposal include:

- + *the retention of natural landscape character in areas of high conservation significance*
- + *the visual harmony of new development with the natural surrounds, where the development is in proximity to areas of high conservation significance*
- + *the visual harmony of new development with the surrounds, where the development may be visually dominant.*

1.5 STUDY AREA

The Winu Project is located approximately 130km northwest of Telfer, Western Australia (**Figure 2**). The Project is located within the Great Sandy Desert IBRA bioregion and Landscape Character Type (CALM, 1994). The landscape is characterised by red sand plains, dunefields and remnant rocky outcrops. Vegetation is predominantly spinifex grasslands, low woodlands and shrubs.

The landscape surrounding the Winu Project is on flat to gently undulating land at an elevation of 30-310 metres Australian Height Datum (AHD). The terrain where the mining will occur ranges from about 215 – 310 m AHD (**Map 1**).

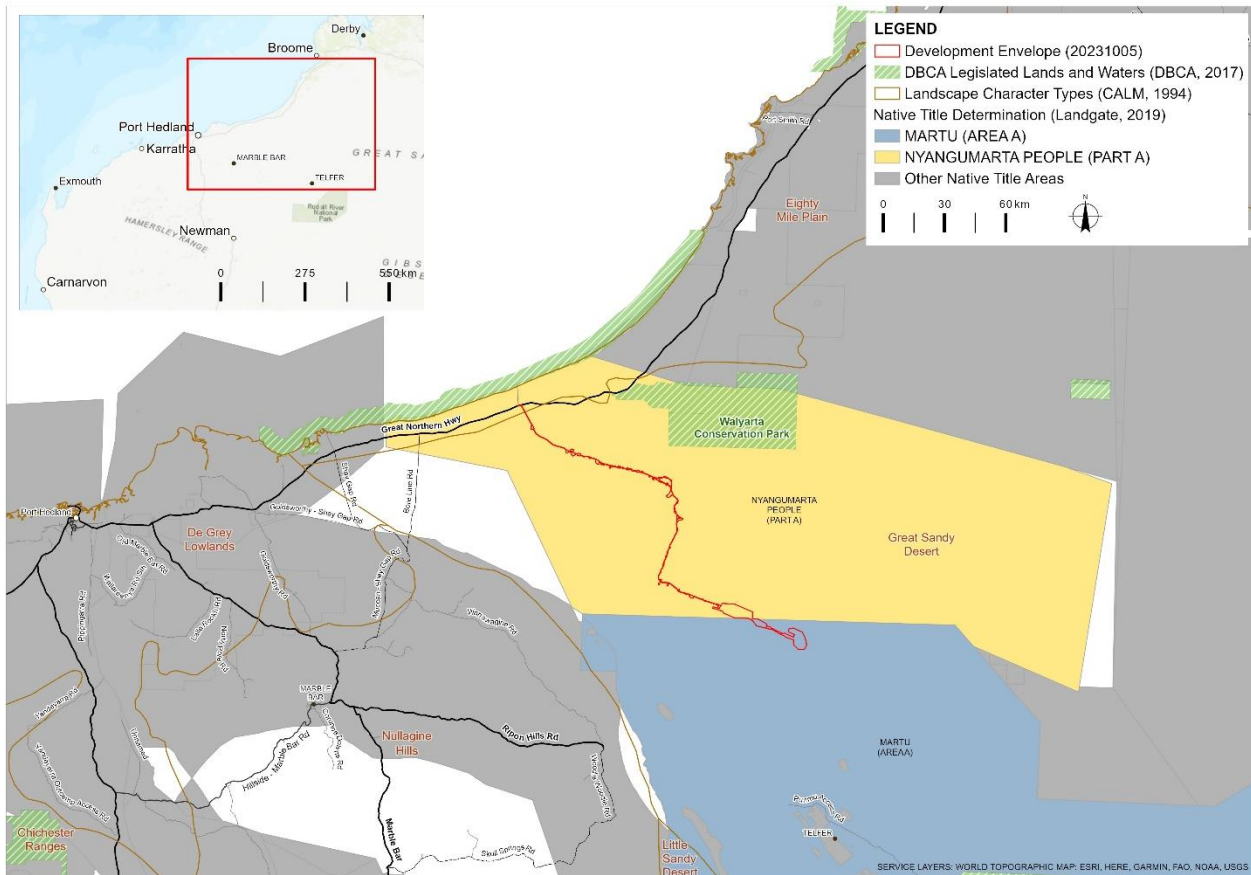


Figure 2: Study area

2 METHOD

2.1 VISUAL ASSESSMENT METHOD

Ecoscape applied the methodology outlined in the Visual Landscape Planning Manual (WAPC, 2007) to undertake the visual impact assessment (VIA) of the proposed development. The manual specifies a two-stage process to the visual assessment:

1. visual landscape evaluation
2. visual impact assessment.

The Visual Landscape Evaluation (VLE) stage is undertaken to understand the context of the project and the surrounding landscape. It is also undertaken to set objectives for managing the visual landscape character. The Visual Impact Assessment (VIA) describes the potential impacts in context of the landscape evaluation. The stages of the assessment are outlined below:

- + A description of the proposed project and visual elements of proposed infrastructure (**Section 1.1**)
- + Landscape Character Analysis: The identification and evaluation of the existing landscape and Landscape Character Types based on desktop and site analysis (**Section 3.1 – 3.2**)
- + View Experience: The assessment of viewing locations, view experience and valued landscape characteristics to identify appropriate visual management objectives for the study area for the purpose of assessing visual impacts (**Section 3.3 – 3.5**)
- + Visual Management Objectives: used as criteria for assessing visual impacts on the landscape (**Section 3.6**)
- + Visual Impact Analysis: an assessment of viewsheds and photo montages to identify the level of visibility and potential visual impacts on the landscape (**Section 4.3**)
- + Visual Impact Summary: a summary of impacts regarding the visual management objectives and visual management recommendations (**Section 5**).

2.1.1 DESKTOP ANALYSIS

A desktop investigation was undertaken before the site assessment to understand the landscape context of the study area. The following information was analysed in ArcGIS, which is Geographic Information System (GIS) software for working with maps and geographic information:

- + surface elevation (Geoscience, 2010)
- + soil landscape units (DPIRD, 2017)
- + pre-European vegetation (DPIRD, 2017)
- + Landscape Character Types (CALM, 1994)
- + viewsheds from infrastructure (WRL, TSF and wind turbines).

2.1.2 SITE ANALYSIS

Site analysis was undertaken based on the desktop analysis mapping and a site visit undertaken 30-31 August 2023. Site photographs were taken from 10 view locations both in and around the Winu Project. A second site visit was undertaken by Rio Tinto staff to collect an additional 5 view locations (11-15) on 1 February 2025.

Photographs of the general landscape were also taken to assess the landscape character and visual landscape values.

Based on the site analysis, the information noted at each viewpoint includes details of the visual elements of the landscape such as the list below. The terminology used to describe landscape character have been adapted from CALM (1994), WAPC (2007) and The Landscape Institute (2013).

- + view description: general description of view
- + land use: natural, commercial, industrial, residential, recreational, rural
- + topography: flat, undulating, rugged

- + vegetation: description of vegetation type and form
- + waterform: evident or not evident, type of waterform
- + colours: monochrome, muted, colourful, type of colours
- + texture: smooth, textured, rough
- + line: straight, angular, curved, sinuous
- + form: vertical, sloping, rolling, horizontal.

Visual terminology such as line, form, colour and texture are used to describe Landscape character (**Figure 3**). This description allows for the comparison of the visual elements of a proposed development with the surrounding landscape to assist in the visual impact analysis.

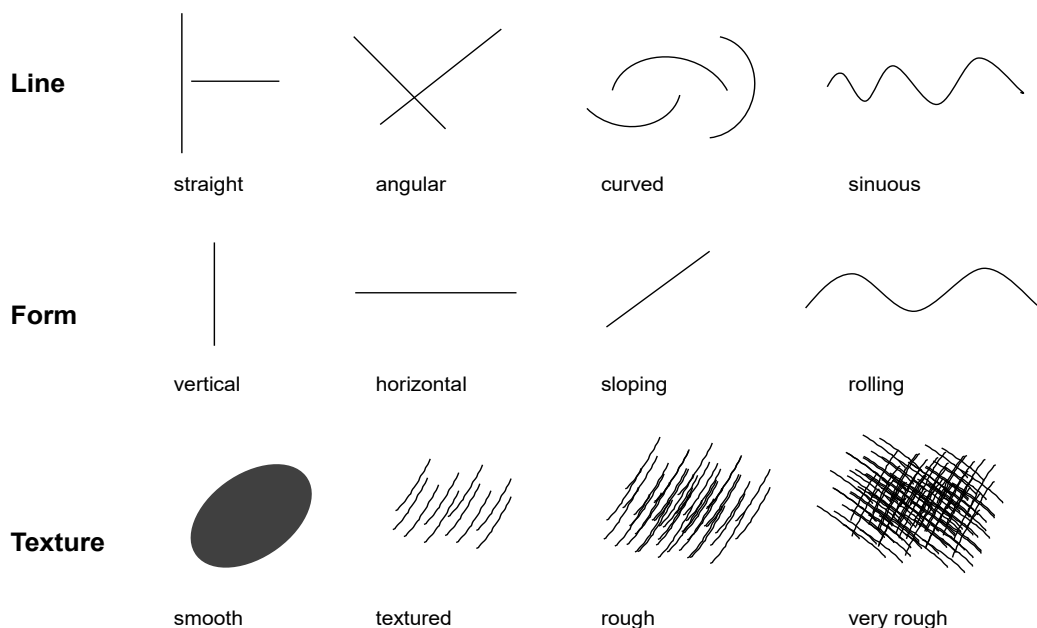


Figure 3: Visual terminology to describe landscape character

2.1.3 PHOTO MONTAGE ANALYSIS

A key component of visual impact analysis is the preparation and analysis of photo montages.

The preparation of photo montages requires the following steps:

- + **Data collation:** to produce a 3D model of the existing conditions, including topography, cadastral boundaries, aerial photography and viewpoint (photograph) locations.
- + **3D modelling:** the existing condition data is imported into 3DS Max and combined with a 3D model of the proposed development area. Virtual cameras are used to produce representative views of each identified viewpoint. Viewshed mapping is used to assist the placement of the model, particularly in flat and featureless landscapes.
- + **Photo montages:** the output of the 3D model is a rendered 3D image of the proposed development. This is overlaid on a photograph which results in a photo montage of the proposed development area.

Photo montages were analysed using visual impact criteria to determine dominant visual elements, which include visibility, line, form, colour and texture. The outcome of this analysis is a percentage score that determines the level of visual impact, either being not visible, moderately visible (blending) or highly visible (prominent). To determine the overall impact level or the significance of the impact, the result of the visual impact analysis is combined with the Significance Level and the Visual Management Objective (VMO) of the study area.

Photo montages were prepared from the 15 view locations sites towards the Winu Project. The photo montages show an indicative view standing at each site of the large-scale mining infrastructure (wind turbines, tailings storage facility and waste rock landform). At view locations 1-9, the photographs were taken on-site by Ecoscape with a digital SLR camera using a 35mm focal length. At view location 10-15, the photos were taken by Rio Tinto personnel also using a digital SLR at 35mm focal length, each photo had a compass bearing recorded.

2.1.4 VISUAL IMPACT ANALYSIS

To assess visual impact, a visual landscape evaluation must be undertaken to understand the landscape values of an area and the significance level of viewing locations. The Landscape Institute (2013) developed criteria to determine the level of impact which were based on landscape values and viewer sensitivity. The criteria are 'sensitivity' and 'magnitude' which are categorised into high, medium and low. Sensitivity being either the significance of the viewing location or the landscape value. Depending on the sensitivity of the landscape and magnitude of change, the impact can be described as either slight, moderate or substantial. The principle of this criteria is similar to the visual impact levels used in this assessment which are Level 1, 2 and 3. These impact levels are based on:

- + Visibility rating which relates to the magnitude of change and the visual prominence of the development
- + Significance Level which refers to the significance of the viewing location and degree of public sensitivity (**Appendix Two**)
- + Visual Management Objective (VMO) which reflects landscape values and public sensitivity.

The visual impact levels outlined in **Table 2** have been developed by Ecoscape to reflect current assessment guidelines with the aim of providing a clear interpretation of visual impact. The impact levels are:

- + Level 1: Visual impact is likely to be at variance with the VMO.
- + Level 2: Visual impact may be at variance with the VMO.
- + Level 3: Visual impact is unlikely to be at variance with the VMO.
- + None: There is no visual impact.

Table 2: Visual impact level matrix table

Visibility rating		Prominent			Blending			Not Visible
Significance Level rating		1	2	3	1	2	3	1-3
Visual Management Objective	Protection and Maintenance	L1	L1	L1	L2	L2	L2	None
	Best Practice Siting and Design	L1	L1	L1	L3	L3	L3	None
	Restoration and Enhancement	L2	L2	L2	L3	L3	L3	None
		VISUAL IMPACT LEVEL						

2.1.5 VISUAL ABSORBANCE CAPACITY

The Visual Absorbance Capacity (VAC) of a landscape will affect the visual impact level of the Winu project. VAC is the ability of the landscape to absorb a visual change, which is associated with the dominance and variable elements which have been used to assess the impact from each viewpoint. Views with simple form and line may be more sensitive to change compared to views that are more detailed in form, line and colour, such as varied and undulating landform and variable vegetation structure (FPA, 1990). In the latter example, infrastructure can be strategically placed within the landscape using the topography and vegetation to minimise its visual impact. Other factors that affect the level of VAC are listed in **Table 3** (FPA, 1990).

Table 3: Factors that influence the Visual Absorbance Capacity (VAC) of a landscape

Factor	Increased VAC	Decreased VAC
Biophysical	+ Landform: variable, undulating landform + Vegetation: greater vegetation diversity in structure, colour and form	+ Slope: increased slope + Soil: greater contrasting soil colour + Site recovery: slower site recovery rate
Perception	+ Increased distance from site + Slope facing away from observer + Lower public sensitivity level	+ Close distance to site + Slope facing the observer + Greater public sensitivity level + Long view duration + Development in direct line of sight
Proposed Development	+ Similar visual elements to surrounding landscape, i.e. shape, colour, texture + Short term activity	+ Large scale development + Longer duration activity

2.1.6 DISTANCE ZONES

The distance between the observer and the proposed development can affect the level of visual impact. The further the distance the less space the target occupies in the observer's field of view and therefore the visual impact may not be as significant (WAPC, 2007). The WAPC (2007) guidelines adopt the following categories which have been based on the amount of colour and textural detail that is visible:

- + Foreground zone: 0-500 metres
- + Mid-ground zone: 0.5-6.5 kilometres
- + Background zone: beyond 6.5 kilometres.

3 VISUAL LANDSCAPE EVALUATION

This section documents how the landscape is viewed and valued, both of which are related to the community's 'sense of place'. The way a landscape is perceived will differ amongst observers, but general valued characteristics can be categorised from the extensive desktop research undertaken by CALM (1994) and WAPC (2007). Understanding the visual landscape is an integral part to developing strategies to manage landscape character.

3.1 LANDSCAPE CHARACTER TYPE

The purpose of characterising the landscape for a visual impact assessment is to understand the visual setting of the landscape surrounding the proposed Project to determine if the proposed infrastructure will visually fit within the landscape. Landscape character is derived from a combination of biophysical and social characteristics.

A Landscape Study undertaken by the former Department of Conservation and Land Management (CALM, 1994) classified Western Australian landscapes into broad Character Types. The main objective was to provide a reference guide to assess the representation and significance of WA's visual landscape to develop appropriate planning and design guidelines and policies to protect and enhance the visual landscape. The term landscape is defined as a combination of physical and cultural features. A Landscape Character Type (LCT) is where there is a common combination of these characteristics such as landform, waterform, vegetation and land use (CALM, 1994).

Most of the landscape surrounding the Winu Project occurs within the Great Sandy Desert LCT. About 4 km of the access road (near Great Northern Highway) is located within the Eighty Mile Plain LCT (CALM, 1994) (**Figure 2**). The dominant characteristics are outlined in **Table 4**.

Table 4: Landscape Character Types at Winu (CALM 1994)

LCT	Landform & Land Use	Vegetation	Waterform
Great Sandy Desert	<i>A rolling plain consisting almost entirely of linear sand ridges in a NNW-SSE orientation. A number of Aboriginal communities are present as well as mining and exploration.</i>	Sparse savannah with desert oaks and scattered trees and /or shrubs with spinifex grasses in the understorey	<i>Ancient drainage system with chains of narrow salt lakes</i>
Eighty Mile Plain	A gently undulating sandplain occurring between the ocean and Great Sandy Desert. E-W oriented Seif Dunes and mudflats. Aboriginal lands and open range cattle grazing.	Tall shrubland and pindan thicket gaining in height further inland. Low mangrove vegetation on mudflats.	Minor intermittent drainage lines, salt lakes and mudflats which are periodically inundated.

3.2 LANDSCAPE CHARACTER UNITS

A Landscape Character Unit (LCU) is a smaller unit than a Landscape Character Type (LCT). While the LCT has common characteristics at a regional scale, there will be variations within an LCT that can be identified at a local scale. An LCU is a geographic area sharing common characteristics such as landform, vegetation, waterform and cultural land use patterns relevant to human interaction and experience.

The landscape surrounding the Winu Project area is predominately a natural character with little disturbance evident. The landform is flat to gently undulating with a repeating pattern of low linear dune ridges (seif dunes) that are orientated NW to SE. These ridges are generally spaced about 600 m to 1.5 km apart and are clearly visible on satellite imagery. The terrain gradually increases in elevation from the north to the south from about 180 – 300 metres above sea level (asl) (**Map 1**). The vegetation consists of low hummock grasses and

scattered shrubs and small trees. The landform and vegetation described in the site analysis is consistent with the Soil Landscape units (**Table 5, Map 2**) and Pre-European Vegetation associations (**Table 6, Map 3**).

Table 5: Soil Landscape Units that intersect with the View Locations

Map Unit	Map Unit Name	Description	Area (Ha) in 20km buffer	View Point	LCU
112a7	AB40 atlas system	Gently undulating plain slightly more elevated than unit AB39, and dominated by longitudinal dunes, many exposures of ironstone gravels and some breakaways capped by ironstone (laterite) duricrust	251,312	6, 14, 15	LCU 2
112Ls	Little Sandy system	Sandplains with linear and reticulate dunes supporting shrubby hard and soft spinifex grasslands	346, 577	3-5; 7-12	LCU 2
117Cl	Callawa system	Highly dissected low hills, mesas and gravelly plains on sandstone and conglomerate supporting soft and hard spinifex grasslands	16,883	1	LCU 1
117Nt	Nita system	Sandplains supporting shrubby spinifex grasslands with occasional trees	401,659	2	LCU 1
112e3	B30 Atlas system	Dune fields--largely stable linear dune fields with swales opening locally into sand plains, considerable areas of clay pans and salt pans	8, 760	13	LCU 2

Table 6: Pre-European Vegetation Associations (DPIRD, 2017) that intersect with the View Locations

Veg Assoc.	System Name	Description	Area (Ha) in 20 km buffer	View Point
101	Mandora-East	Hummock grassland with scattered shrubs or mallee <i>Triodia</i> spp. <i>Acacia</i> spp., <i>Grevillea</i> spp. <i>Eucalyptus</i> species.	142,499	within view of 1-2
117	Great Sandy Desert	Hummock grassland <i>Triodia</i> species.	30,306	1-2
134	Great Sandy Desert	Mosaic: Hummock grasslands, open low tree steppe; desert bloodwood and feathertop spinifex on sandhills / Hummock grasslands, shrub steppe; mixed shrubs over spinifex between sandhills.	597,875	3-15

Two landscape character units (LCU) have been identified from desktop and site analysis (**Table 7**). The identified LCU largely correspond with the Soil Landscape units as shown in **Table 5** and **Map 2**. Both LCUs share similar visual characteristics with some variation in topography and vegetation diversity. The LCUs are described sections below.

Table 7: View Locations site assessment table

View-point	Name	Landscape Character	Values	View Types	Disturbance
1	Camp 1	Hummock grassland and Acacia shrubs	Natural vegetation, expansive north views	Panoramic, filtered, open	Unsealed road, water tanks
2	Nyangumarta Hwy & Wirikirr Wirikirr Rd	Hummock grassland	Natural vegetation and panoramic views	Panoramic, elevated, open	Unsealed road
3	Wirikirr Wirikirr Rd & Copperhead Rd (on road)	Low shrubland over hummock grassland	Vegetation diversity and panoramic views	Panoramic, filtered, enclosed by landform	Unsealed road
4	Copperhead Road (NW Approach)	Natural vegetation, low dune ridge line	Natural vegetation	Enclosed by landform, open	Unsealed road
5	Copperhead Rd intersecting mining lease	Low shrubland over hummock grassland	Natural vegetation, dune ridge	Enclosed by landform, open	Unsealed road partially visible
6	Magnum Camp	Hummock grassland	Natural vegetation	Enclosed by landform, open	Unsealed road, laydown area
7	Airstrip	Hummock grassland, low Acacia shrubs, dune ridge	Natural vegetation	Panoramic, open, enclosed by landform	Airstrip, unsealed road
8	Martu NTD Boundary (west)	Low to medium Acacia shrubland, dune ridgeline	Vegetation diversity, dune ridge	Enclosed by landform, filtered	Unsealed road
9	Proposed Accommodation Camp	Hummock grassland and scattered low Acacia shrubs	Natural vegetation, dune ridges	Open, enclosed by landform	None
10	Winu Soak (dune crest)	Hummock grassland and scattered Acacia shrubs (Photos supplied by Rio Tinto)	Natural vegetation, no disturbance. Near a culturally significant site.	Panoramic, elevated	None
11	Near Mine East	Sparse, scattered shrubs over tussock grasses (Photos supplied by Rio Tinto)	Natural vegetation, dune ridge	Open in foreground, enclosed mid-ground and beyond	Unsealed road
12	Airstrip West	Low shrubs and grasses, dune ridgeline (Photos supplied by Rio Tinto)	Natural vegetation, dune ridge	Open in foreground, enclosed mid-ground and beyond	None
13	Texas	Hummock grassland (Photos supplied by Rio Tinto)	Natural vegetation	Open	Unsealed road
14	Rimfire	Hummock grassland and scattered shrubs (Photos supplied by Rio Tinto)	Natural vegetation, expansive views, dune ridge	Open, enclosed by landform	Old tracks
15	Magnum West	Dense shrubs and tussock grasses (Photos supplied by Rio Tinto)	Natural vegetation, dune ridge	Enclosed by landform, open	Unsealed track

3.2.1 LCU 1 - OPEN GRASSLAND/SHRUBLAND PLAIN

The open grassland/shrubland plain LCU occurs in the northwestern half of the Winu Project area with elevation ranging from 10-220 metres AHD. View Points 1 and 2 occur within this LCU. Defining characteristics are the flat and expansive landform covered in low hummock grassland with tall vertical shrubs punctuating the horizon line (**Figure 4**). Pale green shrubs are scattered amongst the hummock grassland and occasional tall shrubs and small trees with dark bark and darker green foliage (**Figure 5**). Pale yellow and greens and

vibrant orange soils are the dominant colours in the foreground with muted darker greens on the horizon line. A summary of the visual characteristics are provided below:

- + Scale: long range views over the grassland plain result in a vast sense of scale
- + Enclosure: expansive, due to the flat to gradual topography and low vegetation
- + Diversity: visual diversity is limited, with repeating patterns of line, form and colours
- + Texture: the stony soils and spikey grasses and sporadic shrub cover contribute to an overall textured appearance
- + Form: horizontal landform, vertical to sloping branches of scattered trees and shrubs
- + Line: the overall impression is the horizontal linear nature of the landform, punctuated sporadically by the vertical line of trees and shrubs
- + Colour: pale yellow grasses, vibrant orange soils, muted light and dark green shrubs and trees, muted blue sky
- + Balance: the limited palette of elements within the natural environment contributes to a sense of balance
- + Movement: the movement within the natural landscape is still to calm.



Figure 4: LCU 1 at view location 1 (Camp 1)



Figure 5: LCU 1 at view location 2 (Nyangumarta Hwy & Wirikirr Wirikirr Rd)

3.2.2 LCU 2 – GENTLY UNDULATING GRASSLAND/SHRUBLAND PLAIN

The gently undulating grassland/shrubland plain LCU occurs in the southeastern half of the Winu Project area with elevation ranging between 125-310 metres AHD. Most view locations were located in this LCU. The landscape character is defined by the presence of linear dune ridges, the vegetation is similar to LCU 1 with an increase in diversity. Also apparent are the smooth vibrant orange sandy soils that provide a striking contrast with the pale-yellow grasses (**Figure 6**). A summary of the visual characteristics is provided below:

- + Scale: Large to vast scale depending on the view extent
- + Enclosure: varies from expansive to enclosed depending on the position of the observer, vegetation height and surrounding landform. Taller shrubs and the presence of dune ridges create a sense of enclosure (**Figure 7**), compared to an open and expansive character where vegetation is low/sparse and the terrain is flat to gently undulating (**Figure 8**)
- + Diversity: visual diversity is simple, where there are repeating patterns of line, form and colours within the natural environment. Variations occur sporadically where infrastructure is present.
- + Texture: a mix of textures, often smooth sandy soils contrast with textured/spikey vegetation. However the vegetation can also have a ranges of textures such as the taller feathery spinifex flower stalks, and occasionally glossy shrub foliage.
- + Form: horizontal to gently rolling landform, vertical to sloping branches of scattered trees and shrubs and tall grasses
- + Line: the overall impression is the gently undulating lines of the dunes, with straight to angular branches and tall grasses, curved shrub canopy and curved hummock grasses visible in the foreground. Straight and angular lines of infrastructure where present.
- + Colour: vibrant orange soils, pale yellow grasses, muted green shrubs and dark green trees (**Figure 9**), muted blue sky, multi coloured infrastructure where present.
- + Balance: the simple elements within the natural environment contributes to a sense of balance, this is occasionally disrupted by pockets of infrastructure such as the laydown area (**Figure 10**).
- + Movement: the movement within the natural landscape is still to calm.



Figure 6: LCU 2 – vegetation diversity, contrasting orange soils, green foliage



Figure 7: LCU 2 – dune ridge and taller shrubs create a sense of enclosure



Figure 8: LCU 2 – open and expansive character



Figure 9: LCU 2 – dark green foliage of scattered trees



Figure 10: LCU 2 - varied colours at the laydown area

3.3 LANDSCAPE VALUES

The WAPC (1997) identified key character indicators that can be used as a basis for classifying the landscape into two preference categories; 'most' preferred and 'least' preferred landscapes. These preference categories were established for natural, rural and built landscapes. All landscape character units described above fall within the 'natural' category for preference indicators.

'Most' preferred characteristics are defined as landscape features that are highly valued by the community and contribute to the visual character (WAPC, 1997). 'Least' preferred are features not valued by the community and detract from the visual character (WAPC, 1997). The preference indicators for natural environments are summarised in **Appendix One**.

The character preferences found within the vicinity of the Winu Project are:

- + vegetative diversity: distinctive pattern and texture of spinifex grass. Mosaic pattern of vegetation at some view locations within LCU 2.
- + distinctive displays of colour: contrasting colours between vibrant orange sandy soils and vegetation
- + distinctive landscape features (geological formations): longitudinal dunes also known as seif dunes.
- + high degrees of perceived naturalness.

The least preferred characteristics include:

- + drill lines: these were visible from the air but not apparent at ground level during the site assessment.
- + mining exploration infrastructure such as laydown areas and drill rigs.

3.4 VIEW SIGNIFICANCE

How a landscape is viewed is of critical importance in understanding changes in the landscape and how people perceive them. Visual landscapes relayed to peoples' sense of place and quality of life.

The *Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design* (WAPC, 2007) identified components that can be used to document viewing experiences, the significance of the viewing location and specifically what is in the landscape that is valued to understand how people experience a landscape.

The document presents three levels of significance to categories views: national/state, regional and local. Some viewing locations, views and areas visible in views will be considered more important than others by those experiencing the landscape, and some viewers will be more aware of the landscape and more concerned about its appearance depending on their reasons for being in the landscape.

All views assessed at Winu are 'Level 3: Local Significance' as per the WAPC guidelines (**Appendix Two**) as they have been identified as significant view locations by Rio Tinto in consultation with Traditional Owners. These locations are not categorised as 'Level 2: Regional Significance' or 'Level: National / State Significance' as they are not located on main roads or highways and some areas would not be accessible to the public.

3.5 VIEW EXPERIENCE

Many areas contained multiple view types depending on the variations in topography and presence of tall shrubs. At any given point the view can be enclosed by a dune ridge in one direction and open in another direction over flat terrain. The different view categories experienced at Winu are listed below:

- + Panoramic: expansive long range views in all directions.
- + Elevated: a view overlooking the landscape from a high point, usually associated with a panoramic view
- + Open: a clear view that is not restricted by features such as vegetation, views are not as expansive as panoramic views
- + Enclosed by landform: may be an open view in the foreground but long-range views are restricted by dune ridges
- + Filtered: views are filtered through scattered tall shrubs.

Figures 11-13 below are examples of the multiple view types at Winu.



Figure 11: Panoramic and elevated view



Figure 12: Filtered view through vegetation and enclosed by dune ridge



Figure 13: Varied view from elevated position - open, enclosed and filtered.

3.6 VISUAL MANAGEMENT OBJECTIVES

The aim of Visual Management Objectives (VMOs) is to provide criteria that enable the assessment of visual impacts for each Landscape Character Unit (LCU).

The VMOs adopted by WAPC (2007) to manage landscape character are:

- + best practice siting and design, which should be the baseline objective for all landscapes
- + protection and maintenance
- + restoration of degraded character or enhancement of opportunities.

Best practice siting and design has been identified as the most appropriate VMO for the visual landscape within the vicinity of the Winu Project as discussed below.

3.6.1 BEST PRACTICE SITING AND DESIGN

This VMO was considered appropriate due to the Level 3 sensitivity of the landscape in the vicinity of the Winu Project. To meet this VMO, it is expected that any proposed development is blending; that is, development may be evident but generally not prominent in that it borrows from the existing landscape setting. Strategies to meet this objective may include:

- + the application of practical and sensitive siting and design techniques
- + retaining dominant landscape features and characteristics
- + enhancing or restoring landscape features.

3.6.2 PROTECTION AND MAINTENANCE

Protection and maintenance is the maximum retention of existing visual character which is likely to apply to highly valued visual landscapes. Therefore future development should be planned and designed to have minimal visual impact on landscape character.

Any alterations to the visual landscape character assigned this objective should be planned and designed to have minimal visual impact, in which development would either be not evident (i.e. development may be hidden, screened or not visible, from specified viewing locations) or blending (i.e. development may be evident, but generally not prominent in that it borrows from the existing landscape setting) (WAPC, 2007).

As all view locations are Level 3 significance, this VMO does not apply to the LCUs of the Winu Project Area.

3.6.3 RESTORATION AND ENHANCEMENT

This 'restoration and enhancement' VMO applies to degraded landscapes that require rehabilitation to enhance the visual amenity (WAPC, 2007). This VMO is not applicable to the LCUs of the Winu Project Area.

4 VISUAL IMPACT ASSESSMENT

A Visual Landscape Evaluation (VLE) was undertaken which described landscape character, landscape values and view experience to understand the visual context of the landscape surrounding the proposed mining development and identify appropriate Visual Management Objectives (VMOs) to manage landscape character. The outcomes of the VLE also establishes landscape criteria to enable the assessment of visual impacts.

This section describes the potential visual impacts associated with the development area and assesses these against the recommended VMOs. Through this assessment, the visual impacts to view experience and landscape character can be identified and described.

4.1 VISUAL IMPACT CRITERIA

To determine the level of visual impact of the development on the landscape, visual impact criteria are assessed at a selection of viewpoints within the landscape. These criteria were developed as a conceptual framework for analysing landscapes.

Ecoscape has adapted these criteria into an assessment table (**Table 2**) to categorise visual impacts into three levels. These visibility categories relate to how much the proposed change contrasts with the surrounding landscape:

- + Not visible: development is hidden, screened or not visible, from specified viewing locations.
- + Blending: development is evident, but not a dominant feature and blends with the existing landscape.
- + Prominent: development is a dominant feature in the landscape, drawing attention to itself.

4.2 VIEWSHED ANALYSIS

The objective of the viewshed analysis was to determine the potential visible area from the VIA locations. Seen area or viewshed analysis is a tool performed using a GIS computer program, in this case ArcGIS Pro. It is a conceptual desktop method best complemented by a site visit to confirm the results of the analysis as it does not account for features such as vegetation. A viewshed analysis calculates the areas that are visible from an observation point using a set of user defined parameters such as height of observer, height of target and the extent and angle of the viewing area. The analysis used a surface model of the TSF and WRL that was merged with a 30 m resolution smoothed digital elevation model (DEM-S) derived from the Shuttle Radar Topography Mission (SRTM) 1 second digital elevation model (Geoscience Australia, 2010).

Viewsheds were generated from the wind turbines, TSF and WRL to identify the areas in the landscape that may have views of the development (**Maps 4-8**). The viewshed results were used in conjunction with the photo montages to assess visibility of the proposed development. The accuracy of the viewsheds is not precise, due to the 30 metre scale of the elevation model. Subsequently, some smaller landscape features were not captured within dataset, such as the dune ridges at view location 10. Examples in the variation of topographic accuracy are shown in **Figures 14-15** below.

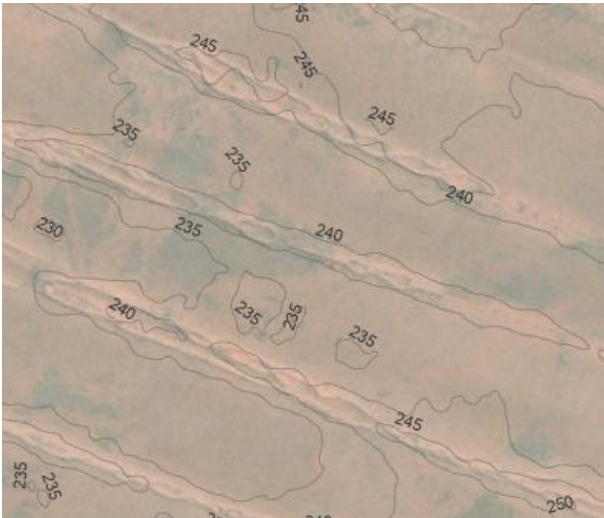


Figure 15: Dune ridges captured within DEM as shown by the contour lines

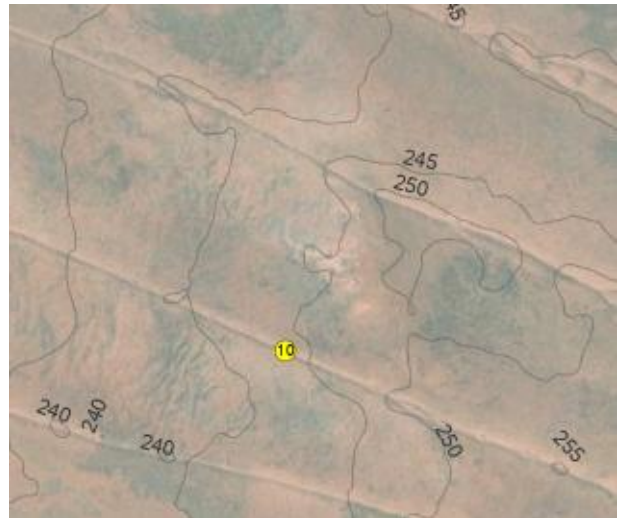


Figure 14: Dune ridges at site 10 not captured within DEM as shown by the contour lines

4.2.1 WIND TURBINES

Three composite viewshed maps were produced from the nine wind turbines to determine the proportion of the turbines that are potentially visible from the view locations as outlined below. These viewsheds are shown on **Maps 4-6**. The wind turbines are located about 1 km west of the TSF, are distributed over an area of about 3km² on terrain ranging between 265-280 m AHD. The total height of the turbines (to blade tip) are 236 m, the height to the rotor hub is 150 m.

Composite viewshed from full height wind turbines (236 m)

The viewshed for the full height turbines extends to most of the view locations with the exception of location 1 and 15 (**Map 4**).

Composite viewshed from rotor hub height (150 m)

The viewshed from rotor hub height also extends to most view locations with the exception of location 1 and 15. The viewshed also just reaches location 6 (**Map 5**)

Composite viewshed from half height turbines (118m)

The viewshed from 0-118m height turbines (half height) does not extend to view locations 1, 2, 6 or 15 (**Map 6**).

4.2.2 WASTE ROCK LANDFORM

A composite viewshed was generated from the crest of the WRL which is proposed to be a maximum height of 323 m AHD (**Map 7**). The WRL is located 5 kms east of the wind turbines and is about 3.5 kms at its widest point.

The viewshed from the crest of the WRL extends to the following view locations:

- + 4: Copperhead Road (NW Approach)
- + 5: Copperhead Rd intersecting mining lease
- + 7: Airstrip
- + 8: Martu NTD Boundary (east)
- + 9: Proposed Accommodation Camp
- + 10: Winu Soak (Southern Dune Ridge)
- + 11: Near Mine East
- + 12: Airstrip West
- + 13: Texas (only one observer point on the WRL crest is visible)

- + 14: Rimfire

The WRL viewshed does not extend to:

- + 1: Camp 1
- + 2: Nyangumarta Hwy & Wirikirr Wirikirr Rd
- + 3: Wirikirr Wirikirr Rd & Copperhead Rd (on road)
- + 6: Magnum Camp
- + 15: Magnum West

4.2.3 TAILINGS STORAGE FACILITY

A composite viewshed was generated from the crest of the TSF which is proposed to be a maximum height of 328 m AHD (**Map 8**). The TSF is located directly west of the WRL and about 1 km east of the wind turbines and is about 4.2 km at its widest point.

The viewshed from the crest of the TSF extends to the following view locations:

- + 4: Copperhead Road (NW Approach)
- + 5: Copperhead Rd intersecting mining lease
- + 8: Martu NTD Boundary (east)
- + 10: Winu Soak
- + 14: Rimfire.

The TSF viewshed does not extend to:

- + 1: Camp 1
- + 2: Nyangumarta Hwy & Wirikirr Wirikirr Rd
- + 3: Wirikirr Wirikirr Rd & Copperhead Rd (on road)
- + 6: Magnum Camp
- + 7: Airstrip
- + 9: Proposed Accommodation Camp
- + 11: Near Mine East
- + 12: Airstrip West
- + 13: Texas
- + 15: Magnum West.

4.3 VISUAL IMPACT ANALYSIS

This section presents an analysis of the potential visual impacts based on the analysis of photo montages. A summary of the view location and existing view experience is provided along with images from each view location depicting the existing view and proposed view (photo montage).

4.3.1 VIEW LOCATION 1 – CAMP 1

- + Location (UTM): 331495E; 7771936N
- + Elevation: 182.6 m AHD
- + View direction to development: south-southeast
- + Distance from development: 67 kms (background)
- + Viewsheds: none
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is within the open grassland/shrubland plain LCU and the view point is located on a slight rise in the landscape. The eastern view overlooks a vast flat grassland plain that extends into the background. Towards the south, there are filtered long range views through tall, scattered shrubs and towards the west are

views to a low ridgeline which restricts long range views. There is very little development visible except for an unsealed road and a water tank. The existing view is shown on **Figure 16**.

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low capacity due to simple natural landscape character with an open view experience
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 1, the viewshed analysis and photo montage has shown that the proposed mining development will be **not visible** as it is screened by landform. The photo montage analysis is summarised in **Table 8** below with the proposed view shown on **Figure 17**.

Table 8: VP 1 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	T, TSF, WRL		
Line	T, TSF, WRL		
Form	T, TSF, WRL		
Colour	T, TSF, WRL		
Texture	T, TSF, WRL		
Total Score (%)	100% (T, TSF, WRL)		
Overall Visibility Rating	NOT VISIBLE (T, TSF, WRL)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

There will be no visual change associated with the mining development from this view point. However, some change may occur with the upgrade of the road access corridor, such as vegetation clearing and an increase in light and heavy vehicle use along this road. The visual impact rating is summarised below:

- + Visibility rating: Not visible
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: None (TSF, WRL, wind turbines)



Figure 16: VP1 – Existing southeast view

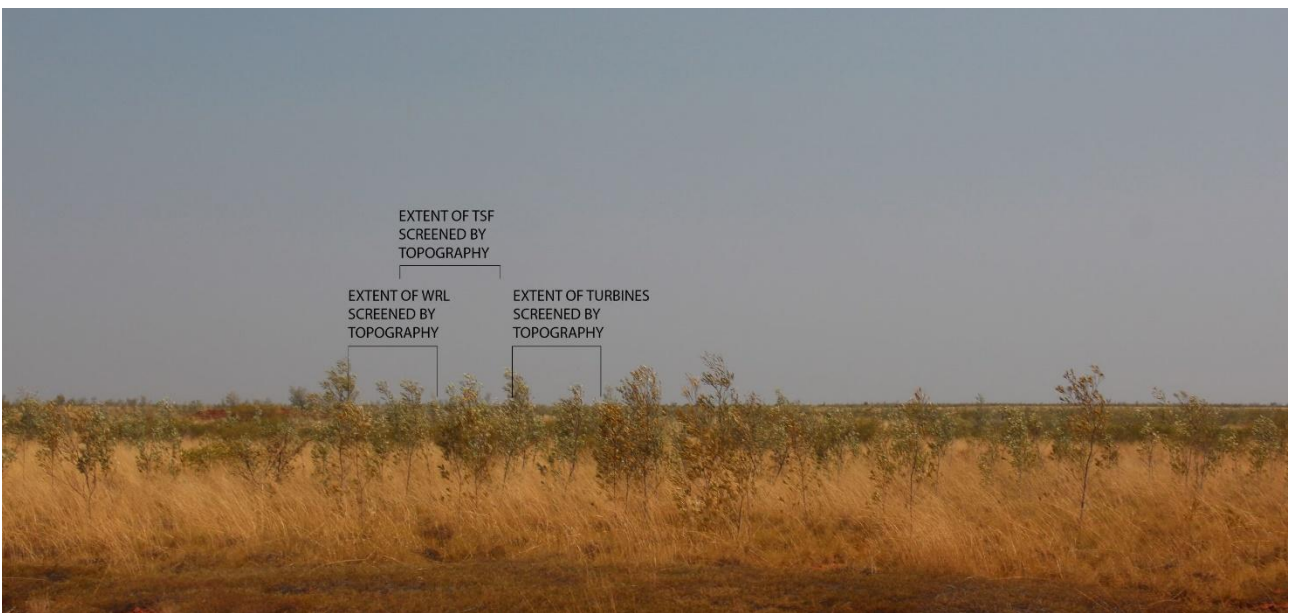


Figure 17: VP1 – Proposed southeast view

4.3.2 VIEW LOCATION 2 – NYANGUMARTA HWY & WIRLKIRR WIRLKIRR RD

- + Location (UTM): 338733E; 7767664N
- + Elevation: 190.4 m AHD
- + View direction to development: south south east
- + Distance from development: 60 kms (background)
- + Viewsheds: wind turbines (rotor hub height and full height)
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is within the open grassland/shrubland plain LCU and the view point is located on a slight rise in the landscape. The elevated observer position and low height of vegetation result in long range views

in most directions. The southeastern view overlooks a vast flat grassland plain that extends into a dark green shrubland plain on the horizon. There is very little development visible except for an unsealed road. The existing view is shown on **Figure 18**.

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low capacity due to simple natural landscape character with an open view experience
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

The photo montage (**Figure 19**) and viewshed analysis has shown that the wind turbines may be visible from the rotor hub height and above, however at this distance it is likely that the blades of the turbines will not be highly noticeable. The TSF and WRL are **not visible** as they are screened by landform. The photo montage analysis has rated the visibility of the turbines as **blending** (**Table 9**) as summarised below:

- + Visibility – the wind turbine blade above the rotor hub may be visible on the distant horizon line, however it is unlikely that they will be very noticeable at this distance.
- + Line, form, colour, texture – these visual elements are not noticeable at this distance particularly for the small portion of the turbine that may be visible.

Table 9: VP 2 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	TSF, WRL	T	
Line	TSF, WRL	T	
Form	TSF, WRL	T	
Colour	TSF, WRL	T	
Texture	TSF, WRL	T	
Total Score (%)	100% (TSF, WRL)	100% (T)	
Overall Visibility Rating	NOT VISIBLE (TSF, WRL) BLENDING (T)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

It is unlikely that there will be a significant visual change to the view experience and existing character from this view point due to the distance to the proposed mining development (60 kms) and the low visibility of the wind turbines. The road access corridor is about 5 kms west of this viewpoint, indirect visual impacts such as dust clouds may be visible from increased road use. The visual impact rating is summarised below:

- + Visibility rating: Blending (wind turbines) and Not Visible (TSF, WRL)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 3 (wind turbines) and None (TSF, WRL).



Figure 18: VP 2 - Existing south west view

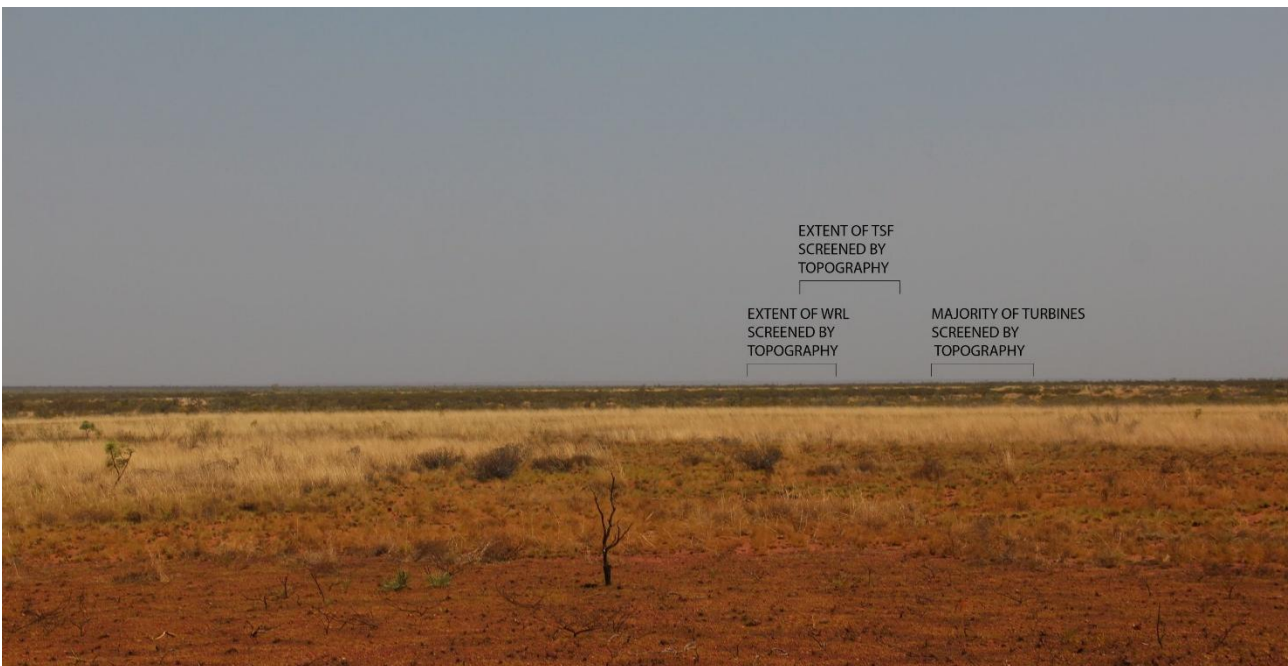


Figure 19: VP 2 – Proposed south view

4.3.3 VIEW LOCATION 3 – WIRLKIRR WIRLKIRR RD & COPPERHEAD RD

- + Location (UTM): 339858E; 7716687N
- + Elevation: 268.3 m AHD
- + View direction to development: east-southeast
- + Distance from development: 20 kms (background)
- + Viewsheds: wind turbines (all heights)
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is within the gently undulating grassland/shrubland plain LCU and overlooks a mosaic of grasses and scattered shrubs on an undulating plain. The view to the east is enclosed by landform which becomes more open to the southeast and more so to the south with long range views to a distant horizon line. There is very little development visible except for an unsealed road. The existing view is shown on **Figure 20**.

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low capacity due to simple natural landscape character
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 3, the viewshed analysis and photo montage (**Figure 21**) has shown that the wind turbines are likely to be highly visible while the TSF and WRL are **not visible** as they are located behind the ridgeline. The photo montage analysis has rated the visibility of the turbines as **prominent** (**Table 10**) as the visual characteristics of the turbines contrast with the existing view as summarised below:

- + Visibility – the wind turbines introduce a new element to the existing view. From this view point the terrain gradually rises up to the horizon line where tall vertical structures protrude the gently rolling horizon line. They will also add movement to the otherwise still to calm existing view. It is anticipated that the eye will be drawn to the new element for observers using this road, however the visibility may change at times depending on local atmospheric conditions such as dust, haze, cloud cover and time of day.
- + Line – the predominantly straight lines of the wind turbines contrast with the curved, sinuous lines of the landform and curved shrubland canopy that sit on the horizon line.
- + Form – the predominant vertical form of the wind turbines contrasts the gently rolling to horizontal landform
- + Colour – it is assumed the turbines will be white, this contrasts with existing colours of the landscape which are muted tones of pale yellow, dark green and vibrant orange. The colours of the sky are likely to be variable depending on time of day and prevailing atmospheric conditions which can have an impact on the visibility of the wind turbines.
- + Texture – at this distance textural details are less noticeable compared to form, line and colour.

Table 10: VP 3 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	TSF, WRL		T
Line	TSF, WRL		T
Form	TSF, WRL		T
Colour	TSF, WRL		T
Texture	TSF, WRL	T	
Total Score (%)	100% (TSF, WRL)	20% (T)	80% (T)
Overall Visibility Rating	NOT VISIBLE (TSF, WRL) PROMINENT (T)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located on the approach road to the Winu Project at about 20 kms from the closest wind turbines. The prominent visibility of the turbines results in an obvious change to the view experience from this road as a new element is introduced into the view which contrasts with the existing landscape character. As

the observer travels closer towards the development the wind turbines will become larger and more prominent. The visual impact rating is summarised below:

- + Visibility rating: Prominent (wind turbines) and Not Visible (TSF, WRL)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 1 (wind turbines) and None (TSF, WRL)



Figure 20: VP 3 – Existing east southeast view



Figure 21: VP 3 – Proposed east southeast view – turbines visible

4.3.4 VIEW LOCATION 4 – COPPERHEAD ROAD (NW APPROACH)

- + Location (UTM): 356952E; 7711479N
- + Elevation: 288.3 m AHD
- + View direction to development: east south east
- + Distance from development: 3 kms (mid-ground)
- + Viewsheds: wind turbines (all heights), WRL, TSF
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is within the gently undulating grassland/shrubland plain LCU and overlooks a grassland plain with scattered medium to tall shrubs. The view experience is generally enclosed by the surrounding low dune ridges. For observers travelling south, there is a long range view to the distant horizon line. There is very little development visible except for an unsealed road. **Figure 22** shows the existing east southeast view.

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low to moderate capacity due to simple natural landscape character, potential for low development to be screened behind landform
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 4, the viewshed analysis and photo montage (**Figure 23**) has shown that the wind turbines, TSF and WRL are likely to be visible. It is likely that a portion of the TSF will be screened behind the northern horizon line and the TSF may also screen a portion of the WRL. The photo montage analysis (

Table 11) has rated the visibility of the turbines as **prominent** and the TSF and WRL as **blending** as summarised below:

- + Visibility – the wind turbines introduce a new element to the existing view. They are tall vertical structures that protrude above the horizon line. They will also add movement to the otherwise still to calm existing view. The TSF and WRL are also visible on the east southeast horizon line.
- + Line – the straight and angular lines of the wind turbines contrast with the gentle curved, sinuous lines of the landform and curved shrubland canopy that sit on the horizon line. The straight to curved line of the TSF and WRL do not noticeably contrast with the horizon line.
- + Form – the predominant vertical form of the wind turbines contrasts the gently rolling to horizontal landform, whereas the form of the TSF and WRL are more similar to the existing landform.
- + Colour – it is assumed the turbines will be white, this contrasts with existing colours of the landscape which are muted tones of pale yellow, dark green and vibrant orange. The colours of the sky are likely to be variable depending on time of day and prevailing atmospheric conditions which can have an impact on the visibility of the wind turbines. The TSF and WRL are proposed to be a light grey which contrasts with the existing colours of the landscape.
- + Texture – the smooth texture of the wind turbines contrasts with the textured vegetation. The texture of the TSF and WRL do not noticeably contrast with the horizon line, however this may change depending on the atmospheric conditions (e.g. haze, cloud cover, time of day).

Table 11: VP 4 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility		TSF, WRL	T
Line		TSF, WRL	T
Form		TSF, WRL	T
Colour			T, TSF, WRL
Texture		TSF, WRL	T
Total Score (%)		80% (TSF, WRL)	100% (T), 20% (TSF, WRL)
Overall Visibility Rating	BLENDING (TSF, WRL) PROMINENT (T)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located on the approach road within 3 km west of the wind turbines, about 5.5 km west of the TSF and 9.5 km west of the WRL. The prominent visibility of the turbines results in an obvious change to the view experience, as a new element is introduced into the view which contrasts with the existing landscape character. Although the light colour of the TSF and WRL contrast with existing colours of the landscape, the other visual elements such as line and form are more likely to blend with the existing horizon line. The visual impact rating is summarised below:

- + Visibility rating: Prominent (wind turbines) and Blending (TSF, WRL)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 1 (wind turbines) and Level 3 (TSF, WRL)

**Figure 22: VP 4 – Existing east south east view**



Figure 23: VP 4 – Proposed east south east view

4.3.5 VIEW LOCATION 5 – COPPERHEAD RD INTERSECTING MINING LEASE

- + Location (UTM): 359187E; 7710898N
- + Elevation: 273.6 m AHD
- + View direction to development: east
- + Distance from development: 690 m (mid-ground)
- + Viewsheds: wind turbines (all heights), WRL, TSF
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is within the gently undulating grassland/shrubland plain LCU overlooking tall spinifex grasses and scattered tall shrubs. The foreground and mid-ground view is enclosed in all directions by a low dune ridge and the taller shrubs also filter views. Within the enclosed view, the observer is more likely to focus on the details such as the form, colour and textures of the vegetation and soil. There is very little development visible except for an unsealed road. The existing view is shown on **Figure 24**.

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low to moderate capacity due to simple natural landscape character, potential for low development to be screened behind landform
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 5, the viewshed analysis and photo montage (**Figure 25**) has shown that the wind turbines and TSF will be visible. While the viewshed shows a portion of the WRL may be visible, it is likely to be screened by tall shrubland vegetation as shown in the photo montage. At this distance (near mid-ground) the wind turbines are likely to dominate the eastern view due to their size whereas the TSF is more likely to blend

with the existing horizon line. The photo montage analysis (**Table 12**) has rated the visibility of the turbines as **prominent**, the TSF as **blending** and the WRL as **not visible** as summarised below:

- + Visibility – the wind turbines introduce a new large scale element to the existing view. They are tall vertical structures that protrude above the horizon line and dominate the eastern view. They will also add movement to the otherwise still to calm existing view. The TSF is also visible on the eastern horizon line but may be partly obscured by vegetation and landform.
- + Line – the straight and angular lines of the wind turbines contrast with the gently curved, sinuous lines of the horizon line and curved shrub canopy. There are straight and angular lines present in the grasses and branches of the tall shrubs, however the lines of the turbines over-power the subtle variations of the natural landscape. Conversely, the straight lines of the TSF do not noticeably contrast with the natural horizon line at this distance.
- + Form – the predominant vertical form of the wind turbines and sloping form of the wind turbine blades contrasts the gently rolling to horizontal landform, whereas the horizontal form of the TSF is not dissimilar to the gently rolling form of the horizon line.
- + Colour – the white wind turbines and light grey TSF contrast with the colours of the surrounding landscape. At this distance atmospheric conditions are not likely to alter the prominence of the turbines but may have an impact on the visibility of the TSF.
- + Texture – the smooth texture of the wind turbines contrasts with the textured vegetation whereas the texture of the TSF does not noticeably contrast with the textured horizon line.

Table 12: VP 5 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	WRL	TSF	T
Line	WRL	TSF	T
Form	WRL	TSF	T
Colour	WRL		T, TSF
Texture	WRL	TSF	T
Total Score (%)	100% (WRL)	80% (TSF)	100% (T), 20% (TSF)
Overall Visibility Rating	NOT VISIBLE (WRL) BLENDING (TSF) PROMINENT (T)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located 690 m west of the closest wind turbine, 3 km west of the TSF and about 7.2 km west of the WRL. The prominent visibility of the turbines results in an obvious change to the view experience, as a new element is introduced into the view which contrasts with the existing landscape character and at this distance they also take up a large portion of the view. Whereas the TSF is more likely to blend with the existing horizon line and the WRL is likely to be screened by vegetation. The visual impact rating is summarised below:

- + Visibility rating: Prominent (wind turbines), Blending (TSF), Not Visible (WRL)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 1 (wind turbines), Level 3 (TSF), None (WRL)



Figure 24: VP 5 – Existing east view



Figure 25: VP 5 – Proposed east view

4.3.6 VIEW LOCATION 6 – MAGNUM CAMP

- + Location (UTM): 416194E; 7700311N
- + Elevation: 277.5 m AHD
- + View direction to development: west northwest
- + Distance from development: 48 km (background)
- + Viewsheds: wind turbines (rotor hub height and full height)
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view point is located within the gently undulating grassland/shrubland plain LCU with open views across an undulating landscape of low grasses, scattered shrubs and dark green trees (**Figure 26**). There is some development visible with the Mangum Camp located about 1 km northwest, the various colours of the camp are noticeable otherwise it sits discretely within the landscape from this distance. A laydown area is also within view, where the smooth textures, bright colours and blocky forms contrast with the natural landscape (**Figure 10**).

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low to moderate capacity due to simple natural landscape character with an open view experience, low height development may be screened behind undulating landform.
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 6, the viewshed analysis and photo montage (**Figure 27**) has shown that the wind turbine blades may be visible above the horizon line, whereas the TSF and WRL will be screened behind landform. The photo montage analysis (**Table 13**) has rated the visibility of the wind turbines as **blending** and the TSF and WRL as **not visible** as summarised below:

- + Visibility – the wind turbine blade above the rotor hub may be visible on the distant horizon line, however it is unlikely that they will be very noticeable at this distance.
- + Line, form, colour, texture – these visual elements are not noticeable at this distance particularly for the small portion of the turbine that may be visible.

Table 13: VP 6 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	TSF, WRL	T	
Line	TSF, WRL	T	
Form	TSF, WRL	T	
Colour	TSF, WRL	T	
Texture	TSF, WRL	T	
Total Score (%)	100% (TSF, WRL)	100% (T)	
Overall Visibility Rating	NOT VISIBLE (TSF, WRL) BLENDING (T)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located in the background of the Winu Project at about 48 km east of the WRL. A portion of the wind turbine blades may be visible above the horizon line, however at this distance they are unlikely to be highly noticeable and are not likely to alter the view experience or existing character. The TSF or WRL will not be visible from this distance as they are located behind the horizon line. The visual impact rating is summarised below:

- + Visibility rating: Blending (wind turbines) and Not Visible (TSF, WRL)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 3 (wind turbines) and None (TSF, WRL)



Figure 26: VP 6 – Existing west northwest view



Figure 27: VP 6 – Proposed west northwest view

4.3.7 VIEW LOCATION 7 – AIRSTRIP

- + Location (UTM): 381675E; 7702022N
- + Elevation: 269.7 m AHD
- + View direction to development: west northwest
- + Distance from development: 15 km (background)
- + Viewsheds: wind turbines (all heights), WRL
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view point is located at the Airstrip which is within the gently undulating grassland/shrubland plain LCU. The view is mostly of the flat bare airstrip which is bound by low undulating terrain covering in grasses, low shrubs and scattered trees. The view experience is open across the airstrip, to the south and west, a low dune ridge restricts long range views (**Figure 28**) which become more open when looking in a north west direction along the airstrip (**Figure 29**).

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low to moderate capacity due to simple natural landscape character with an open view experience, low height development may be screened behind undulating landform.
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 7, the viewshed analysis and photo montage (**Figure 30**) has shown that the wind turbines and the WRL are likely to be visible, whereas the TSF is likely to be screened by the WRL. The photo montage analysis in **Table 14** has rated the visibility of the wind turbines and the WRL as **blending** and the TSF as **not visible** which is summarised below:

- + Visibility – the wind turbines and WRL are visible above the horizon line to the west northwest. The crest of the WRL is just visible above the vegetated horizon line and while visible it does not dominate the view. Similarly at this distance the wind turbines are not dominating the view, while they are protruding above the horizon line, they are not sitting on top of a bare ridgeline that they eye is drawn to. Instead, the gently undulating terrain that is covered in taller grasses and shrubs helps to blend the visibility of the wind turbines.
- + Line – the predominantly straight lines of the wind turbines do not appear to contrast with the straight lines present in the existing view such as the airstrip. The straight to curved line of the WRL is not dissimilar to the natural horizon line.
- + Form – the predominant vertical form of the wind turbines contrasts the gently rolling to horizontal landform, whereas the horizontal form is similar to the existing landscape.
- + Colour – the colours of the wind turbines and WRL do not appear to greatly contrast with the existing colours of the landscape. The existing view contains white cones along the airstrip and the light grey colour of the WRL appear to blend with the sky. The colours of the sky are likely to be variable depending on time of day and prevailing atmospheric conditions which can have an impact on the visibility of the wind turbines.
- + Texture – at this distance textural details are less noticeable compared to form, line and colour.

Table 14: VP 7 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	TSF	T, WRL	
Line	TSF	T, WRL	
Form	TSF	WRL	T
Colour	TSF	T, WRL	
Texture	TSF	T, WRL	
Total Score (%)	100% (TSF)	80% (T); 100% (WRL)	20% (T)
Overall Visibility Rating	NOT VISIBLE (TSF) BLENDING (T, WRL)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located about 15 kms south east from the WRL and 22 kms south east of the wind turbines. From this distance the wind turbines and WRL do not appear to dominate the existing view. Although the vertical form of the turbines contrast with the predominantly horizontal landform, the other visual aspects are less prominent and do not greatly alter the existing view experience or landscape character. The visual impact rating is summarised below:

- + Visibility rating: Not Visible (TSF) and Blending (WRL, wind turbines)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 3 (WRL, wind turbines) and None (TSF)



Figure 28: VP 7 – Existing south west view of dune ridge



Figure 29: VP 7 – Existing northwest view



Figure 30: VP 7 – Proposed northwest view

4.3.8 VIEW LOCATION 8 – MARTU NTD BOUNDARY

- + Location (UTM): 371939E; 7705189N
- + Elevation: 264.5 m AHD
- + View direction to development: west northwest
- + Distance from development: 5 km (mid-ground)
- + Viewsheds: wind turbines (all heights), WRL, TSF
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is located on the gently undulating grassland/shrubland plain LCU in between two low dune ridges, with the southern ridgeline at 270 m AHD and the northern ridgeline at 260 m AHD. The view point is located on a sand track that is about 100 m north of the closest ridgeline which encloses west and south views. The northern ridge line is about 800 m from the view point, the flat terrain between the track and the ridgeline contains a mixture of tall grasses and tall shrubs creating a filtered view at eye level (**Figure 32**). The existing view is predominantly natural in character but contains a temporary exploration drill rig that is visible to the north (**Figure 31**).

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low to moderate capacity due to simple natural landscape character with filtered to open views towards the horizon line.
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 8, the viewshed analysis and photo montage (**Figure 33**) has shown that the wind turbines, WRL and part of the TSF are likely to be visible. The photo montage analysis in **Table 15** has rated the visibility of the WRL as **prominent** and the wind turbines and TSF as **blending** which is summarised below:

- + Visibility – the wind turbines and WRL are visible above the low ridgeline to the northwest. The WRL is located on a similar elevation to the existing viewpoint and will be up to 80 m in height. At this distance it is a highly visible landmass that extends above the existing dune ridge. The wind turbines are also visible

above the ridgeline, however the existing tall shrubs and grasses help to reduce some of the visibility of the turbines. A small portion of the TSF is visible but mostly screened behind the WRL.

- + Line – the gradual curved profile of the TSF and WRL are not dissimilar from the lines of the existing landform. The vertical lines of the turbines contrast with the surrounding horizontal landscape.
- + Form – the wind turbines introduce a vertical form to the view which contrasts with the predominantly horizontal ridgeline, whereas the horizontal form of the WRL is similar to the existing landscape.
- + Colour – at this distance the colour of the wind turbines are not highly contrasting and appear to blend into the sky, although the colours of the sky are likely to be variable depending on time of day and prevailing atmospheric conditions which can have an impact on the visibility of the wind turbines. The WRL noticeably contrasts with the colours of the existing view as it introduces a solid light grey mass that contrasts with the predominantly orange ridgeline.
- + Texture – at this distance, textural details are less noticeable compared to form, line and colour. However, the overall homogenous texture of the WRL and TSF are likely to contrast with the more varied visual texture of the ridgeline.

Table 15: VP 8 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility		T, TSF	WRL
Line		TSF, WRL	T
Form		TSF, WRL	T
Colour		T	TSF, WRL
Texture		T	TSF, WRL
Total Score (%)		40% (WRL), 60% (T, TSF)	60% (WRL), 40% (T, TSF)
Overall Visibility Rating	PROMINENT (WRL) BLENDING (TSF, T)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located about 5 kms south east from the WRL and 12 kms south east of the wind turbines. From this view point the WRL is highly visible due to the mass of the landform that protrudes above the existing horizon line, however it is not dissimilar in line and form to the surrounding landscape, although the texture appears homogenous compared to the natural landscape. The TSF is also partly visible but most of it is screened behind the WRL. The wind turbines also introduce a new vertical element that protrude above the horizontal dune ridge although they do not appear as visually prominent as the WRL. The addition of a new landform and the wind turbines may alter the existing view experience although the natural character is likely to be retained. The visual impact rating is summarised below:

- + Visibility rating: Prominent (WRL) and Blending (TSF, wind turbines)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 1 (WRL) and Level 3 (TSF, wind turbines)



Figure 31: VP 8 – Exploration drilling activity



Figure 32: VP 8 – Existing northwest view

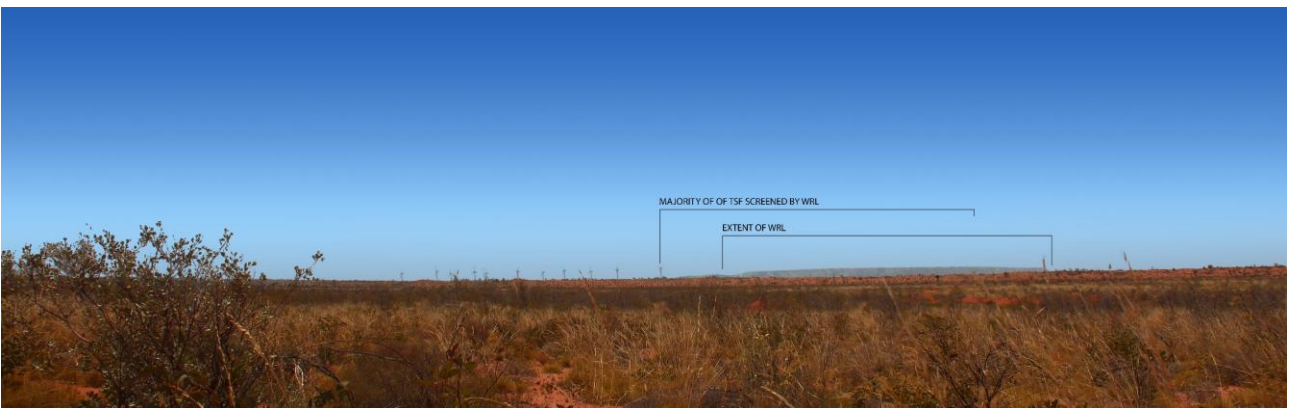


Figure 33: VP 8 – Proposed northwest view

4.3.9 VIEW LOCATION 9 – PROPOSED ACCOMMODATION CAMP

- + Location (UTM): 356953E; 7709472N
- + Elevation: 281.3 m AHD
- + View direction to development: east north east
- + Distance from development: 2 km (mid-ground)
- + Viewsheds: wind turbines (all heights), WRL
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view point is located on the gently undulating grassland/shrubland plain LCU in between two low dune ridges that are about 290 m AHD. The landscape character is natural with no development visible. There are many tall shrubs that provide filtered to enclosed views. The taller vegetation combined with the low ridgelines restrict long range views creating a view experience that is focused on the details of the foreground (**Figure 34**)

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low to moderate capacity due to simple natural landscape character with filtered views towards the horizon line, may be able to accommodate low height development behind the dunes.
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 9, the viewshed analysis and photo montage (**Figure 35**) has shown that the wind turbines are likely to be visible as well as part of the WRL, while the TSF is likely to be screened by topography. The photo montage analysis in **Table 16** has rated the visibility of the wind turbines as **prominent**, the WRL as **blending** and the TSF as **not visible** which is summarised below:

- + Visibility – the wind turbines introduce a new element to the existing view. They are tall vertical structures that protrude above the horizon line. They will also add movement to the otherwise still to calm existing view. The WRL is also visible above the horizon line but may be partially screened by tall shrubs in the foreground.
- + Line – the straight and angular lines of the wind turbines contrast with the curved lines of the shrubland canopy. The straight to curved line while contrasting with the curved shrubs, does not contrast with the horizon line.
- + Form – wind turbines introduce a vertical element to the existing view which contrasts with the horizontal landform. The horizontal form of the WRL does not contrast with the existing landform.
- + Colour – the white colour of the wind turbines contrast with existing colours of the landscape which are predominantly light yellow, various muted greens with an orange undertone. The colours of the sky are likely to be variable depending on time of day and prevailing atmospheric conditions which can have an impact on the visibility of the wind turbines. The grey colour of the WRL contrasts with the dark green horizon line and green shrubs.
- + Texture – at this proximity, the smooth texture of the wind turbines noticeably contrasts with the textured vegetation. The texture of the WRL does not appear to contrast with the textures of the horizon line.

Table 16: VP 9 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	TSF	WRL	T
Line	TSF	WRL	T
Form	TSF	WRL	T
Colour	TSF		T, WRL
Texture	TSF	WRL	T
Total Score (%)	100% (TSF)	80% (WRL)	100% (T), 20% (WRL)
Overall Visibility Rating	NOT VISIBLE (TSF) BLENDING (WRL) PROMINENT (T)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located about 2 kms south west from the wind turbines. From this view point the wind turbines are highly visible and introduce a new element that are likely to dominate the eastern view and alter the existing character. A portion of the WRL is also likely to be visible above the horizon line but is more likely to blend with the horizon line and may also be partially screened by tall shrubs in the foreground. The TSF is not likely to be visible above the dune ridgeline. The visual impact rating is summarised below:

- + Visibility rating: Prominent (wind turbines), Blending (WRL) and Not Visible (TSF)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 1 (wind turbines), Level 3 (WRL) and None (TSF)



Figure 34: VP 9 – Existing east north east view

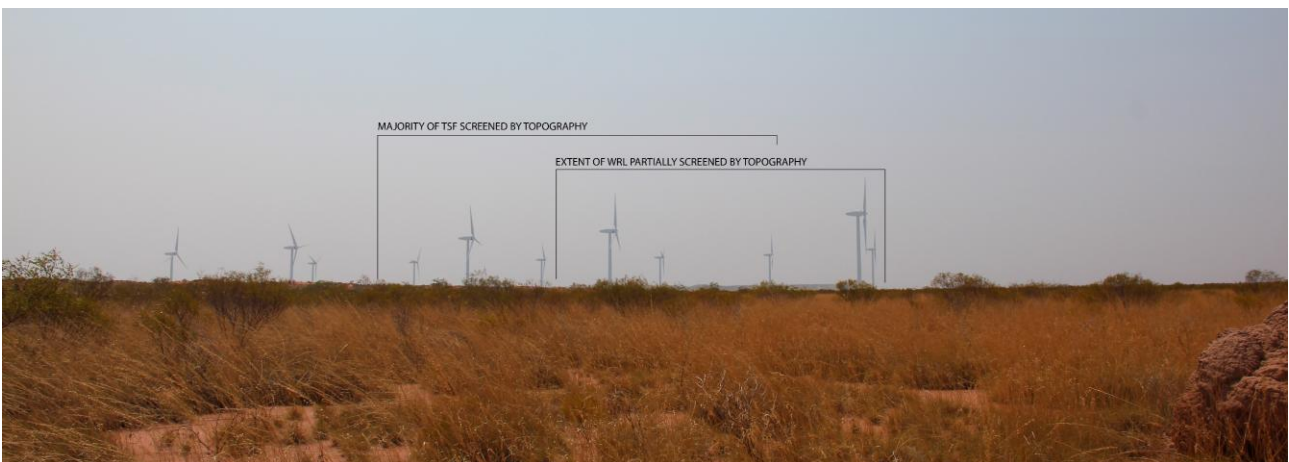


Figure 35: VP 9 – Proposed east north east view

4.3.10 VIEW LOCATION 10 – WINU SOAK

- + Location (UTM): 364130E; 7729688N
- + Elevation: 244.1 m AHD
- + View direction to development: south
- + Distance from development: 18 km (background)
- + Viewsheds: wind turbines (all heights), WRL, TSF
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view point was taken from the dune ridge 500 m south of Winu Soak which is a sensitive cultural site. Rio Tinto personnel accompanied by Traditional Owners, took images of the southern view towards the proposed Winu Project (**Figure 36**). The site is located on the gently undulating grassland/shrubland plain LCU which overlooks a mosaic of grasses and shrubs and scattered orange termite mounds. Due to the elevated position on the ridge the southern view is open and expansive with views to a gently rolling horizon line in the distance.

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low capacity due to simple natural landscape character with an open view experience
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 10, the viewshed analysis and the photo montage (**Figure 37**) has shown that the top portion of the wind turbines may be visible on the horizon line, and a small sliver of the TSF and WRL above the horizon line. The photo montage analysis (**Table 17**) has rated the visibility of the TSF, WRL and wind turbines as **blending** which is summarised below:

- + Visibility – the wind turbines are just visible on the southern horizon line but do not dominate the view. However, the visibility of the turbines may vary depending on time of day and prevailing atmospheric conditions. The WRL and TSF are just visible although they are difficult to see as only a small portion sits above the horizon line.
- + Line – from this distance the sloping lines of the turbine blades are visible which contrast with the horizontal to gently rolling horizon line.
- + Form – from this distance the angular form of the turbine blades are visible which contrast with the straight to gently curved landform.
- + Colour – from this distance the white colour of the turbines appear to blend light blue/grey sky background, however at different times of day they may appear more vibrant.
- + Texture – this distance, textural details are less noticeable compared to form, line and colour.

Table 17: VP 10 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility		TSF, WRL, T	
Line		TSF, WRL	T
Form		TSF, WRL	T
Colour		TSF, WRL, T	
Texture		TSF, WRL, T	
Total Score (%)		100% (TSF, WRL), 60% (T)	40% (T)
Overall Visibility Rating	BLENDING (T, TSF, WRL)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located about 18 kms north of the Winu Project. From this view point the wind turbines are visible in the background, and the top of the TSF and WRL are barely visible above the horizon line. The visual change is not expected to alter the existing view experience or the natural character as viewed from the dune crest at view location 10. At the Winu Soak site itself (located north of view location 10), the viewshed analysis indicates that all wind turbines may be visible and part of the TSF and WRL. However, due to the 30m

resolution of the DEM, the dune crest that is located to the south does not appear to be captured in the DEM and in reality is likely to prevent views of the Winu mining development. The visual impact rating from the dune crest is summarised below:

- + Visibility rating: Blending (TSF, WRL and wind turbines)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 3 (TSF, WRL and wind turbines)



Figure 36: VP 10 – Existing south view



Figure 37: VP 10 – Proposed south view

4.3.11 VIEW LOCATION 11 – NEAR MINE EAST

- + Location (UTM): 374586E; 7705172N
- + Elevation: 256.3 m AHD
- + View direction to development: west northwest
- + Distance from development: 7.4 km (background)
- + Viewsheds: wind turbines (all heights), WRL
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is within the gently undulating grassland/shrubland plain LCU with views across a landscape of sparse scattered shrubs over low grasses. Long range views occur to the north west that are open to filtered through scattered shrubs. The mid-ground views become enclosed by the surrounding dune ridges directly west and also to the north which creates a focal view towards the north west (**Figure 38**).

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low capacity due to simple natural landscape character with an open view experience
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 11, the viewshed analysis and the photo montage (**Figure 39**) has shown that the wind turbines and WRL will be visible above the horizon line. The TSF is screened by the WRL and is not visible which is confirmed by the viewshed analysis. The photo montage analysis (**Table 18**) has rated the visibility of the WRL and wind turbines as **prominent** and the TSF as **not visible** which is summarised below:

- + Visibility – the WRL and wind turbines introduce a new element to the existing view. The WRL is a highly visible landmass that extends above the horizon line. The wind turbines are situated at least 5 kms beyond the WRL that protrude above the horizon line.
- + Line – the gradual curved profile of the WRL is not dissimilar from the lines of the existing landform. The straight and angular lines of the turbines contrast with the curved line of the horizon line, however there is some similarity to the straight and angular lines of the scattered tall shrubs/low trees in the field of view.
- + Form – the horizontal and rolling form of the WRL is similar to the existing landscape whereas the wind turbines introduce a vertical and sloping form to the view that contrast with the rolling horizon line.
- + Colour – the WRL noticeably contrasts with the colours of the existing view as it introduces a solid grey mass that contrasts with the predominantly green horizon line. The wind turbines contrast with the sky but appear to blend with the foreground vegetation that also protrudes above the horizon line.
- + Texture – at this distance, textural details are less noticeable compared to form, line and colour. However, the overall homogenous texture of the WRL is likely to contrast with the more varied visual texture of the ridgeline

Table 18: VP 11 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	TSF		T, WRL
Line	TSF	WRL	T
Form	TSF	WRL	T
Colour	TSF	T	WRL
Texture	TSF	T	WRL
Total Score (%)	100% (TSF)	40% (T, WRL)	60% (T, WRL)
Overall Visibility Rating	NOT VISIBLE (TSF) PROMINENT (WRL, T)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located about 7.4 kms south east of the WRL and 14.3 kms east southeast of the wind turbines. From this view point the WRL and wind turbines introduce new elements to the north west view distant view. The visual elements of the WRL and the wind turbines share some similarities to the existing landscape, however the view experience will be altered with the addition of a new landform to the horizon line and the tall vertical wind turbines. The visual impact rating is summarised below:

- + Visibility rating: Prominent (WRL and wind turbines), Not Visible (TSF)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 1 (WRL and wind turbines) and None (TSF).

**Figure 38: VP 11 – Existing west north west view**

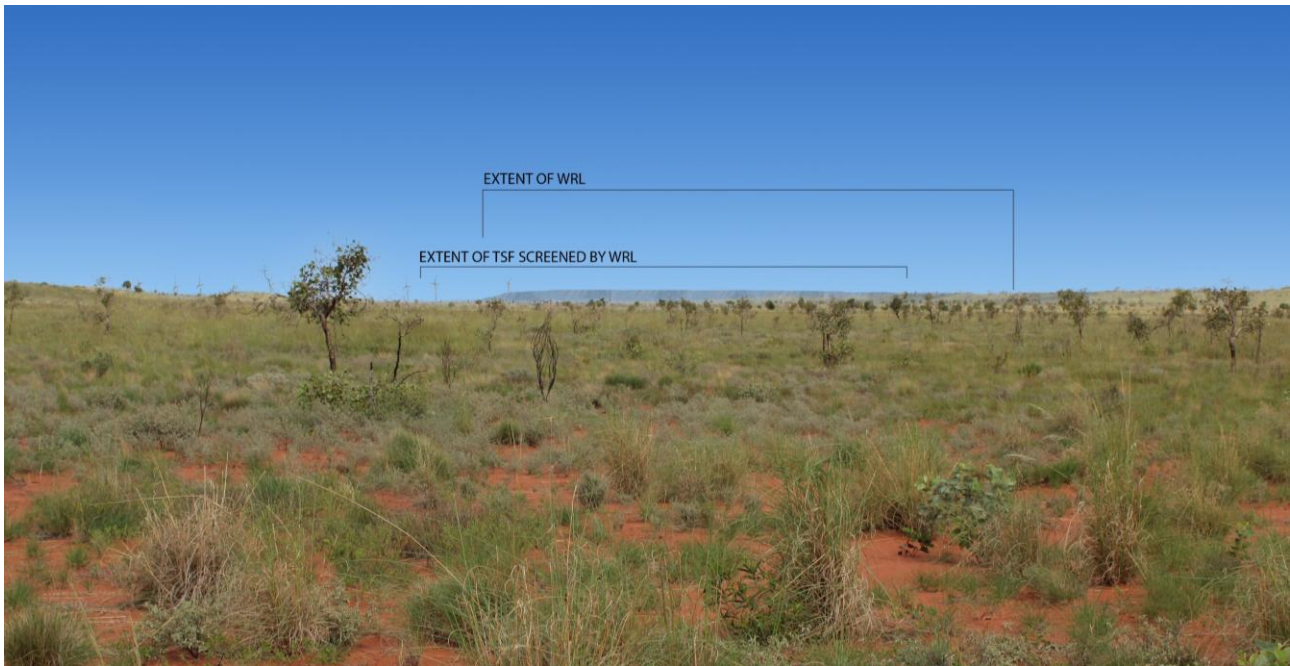


Figure 39: VP 11 – Proposed west north west view

4.3.12 VIEW LOCATION 12 – AIRSTRIP WEST

- + Location (UTM): 379678E; 7703364N
- + Elevation: 267.5 m AHD
- + View direction to development: west northwest
- + Distance from development: 13 km (background)
- + Viewsheds: wind turbines (all heights), WRL
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is within the gently undulating grassland/shrubland plain LCU with open to filtered foreground views across a landscape of low scattered shrubs and grasses. The mid-ground views become enclosed by the surrounding dune ridges to the west and also to the north and north northwest (**Figure 40**).

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low capacity due to simple natural landscape character with an open view experience
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 12, the viewshed analysis and the photo montage (**Figure 41**) has shown that the wind turbines and WRL will be visible above the horizon line. The TSF is screened by the WRL and is not visible which is confirmed by the viewshed analysis. The photo montage analysis (**Table 19**) has rated the visibility of the wind turbines and the WRL as **blending** and the TSF as **not visible** which is summarised below:

- + Visibility –The crest of the WRL is just visible above the vegetated horizon line to the north west and while visible it does not dominate the view. The wind turbines are located about 20 km from the viewpoint and are just protruding above the horizon line. However, the presence of tall grasses and scattered shrubs provide a partial screen.

- + Line – the gradual curved profile of the WRL is not dissimilar from the lines of the existing landform. The vertical lines of the turbines and the angular lines of the turbine blades are visible however at this distance the share similarities with straight and angular lines of the scattered vegetation.
- + Form – the horizontal form of the WRL blends with the horizon line, while the vertical form of the wind turbines protrude above the horizon line, from this distance, they are not dissimilar to the other vertical and sloping forms in the existing landscape.
- + Colour – the grey colour of the WRL does not contrast with the natural landscape at this distance. The wind turbines contrast with the sky but appear to blend with the foreground vegetation that also protrudes above the horizon line.
- + Texture – at this distance, textural details are less noticeable compared to form, line and colour.

Table 19: VP 12 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	TSF	T, WRL	
Line	TSF	T, WRL	
Form	TSF	T, WRL	
Colour	TSF	T, WRL	
Texture	TSF	T, WRL	
Total Score (%)	100% (TSF)	100% (T, WRL)	
Overall Visibility Rating	NOT VISIBLE (TSF) BLENDING (T, WRL)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located about 13 kms east southeast of the WRL and 19.7 kms east southeast of the wind turbines. The TSF is screened from view by the WRL. The effect of distance and the presence of vegetation reduce the visibility of the wind turbines and WRL and therefore do not dominate the existing view. The visual impact rating is summarised below:

- + Visibility rating: Blending (wind turbines and WRL) and Not Visible (TSF)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 3 (wind turbines and WRL) and None (TSF)



Figure 40: VP 12 – Existing west north west view



Figure 41: VP 12 – Proposed west north west view

4.3.13 VIEW LOCATION 13 – TEXAS

- + Location (UTM): 381622E; 7696382N
- + Elevation: 287.5 m AHD
- + View direction to development: north west
- + Distance from development: 18 km (background)
- + Viewsheds: wind turbines (all heights), WRL
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is within the gently undulating grassland/shrubland plain LCU with open foreground views across a landscape over mostly low hummock grassland and scattered low shrubs. The west to north view is open across the low grassland and flat to very gently undulating terrain (**Figure 42**).

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low capacity due to simple natural landscape character with an open view experience
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 13, the viewshed analysis and the photo montage (**Figure 42**) has shown that the wind turbines and the crest of the WRL will be visible above the horizon line. The TSF is screened by the WRL and is not visible which is confirmed by the viewshed analysis. The photo montage analysis (**Table 20**) has rated the visibility of the WRL and wind turbines as **blending** which is summarised below:

- + Visibility – the WRL and wind turbines introduce a new element to the existing view. The crest of WRL is a just visible above horizon line to the north west. The wind turbines are situated beyond the WRL but are tall vertical structures that protrude above the horizon line.
- + Line – the straight profile of the WRL does not contrast with the flat straight horizon line. The wind turbines are protruding above the straight horizon line, their angular blades contrast with the horizon line, however from this distance they do not dominate the view.
- + Form – the horizontal form of the WRL is similar to the existing landscape whereas the wind turbines introduce a vertical and sloping forms to the view. At this distance they do not dominate the view and the presence of scattered vertical tall shrubs also break the flat horizon line.
- + Colour – at this distance the grey colours of the WRL and wind turbines do not contrast greatly with the muted greens of the existing landscape. Different atmospheric and light conditions may alter the appearance of the wind turbines making them appear brighter at times, and therefore they may more visible under these conditions.
- + Texture – this distance, textural details are less noticeable compared to form, line and colour.

Table 20: VP 13 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	TSF	T, WRL	
Line	TSF	T, WRL	
Form	TSF	T, WRL	
Colour	TSF	T, WRL	
Texture	TSF	T, WRL	
Total Score (%)		100%(T, WRL)	
Overall Visibility Rating	NOT VISIBLE (TSF) BLENDING (WRL, T)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located about 18.3 kms south east of the WRL and 24.4 kms south east of the wind turbines. From this view point the WRL and wind turbines are visible although they do not appear to dominate the view which is mostly due to the distance from the development. The TSF is not visible from this view point as it is screened behind the WRL. The visual impact rating is summarised below:

- + Visibility rating: Not Visible (TSF) and Blending (WRL and wind turbines)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 3 (WRL and wind turbines) and None (TSF)



Figure 42: VP 13 – Existing north west view



Figure 43: VP 13 – Proposed north west view

4.3.14 VIEW LOCATION 14 – RIMFIRE

- + Location (UTM): 391315E; 7698951N
- + Elevation: 278.8 m AHD
- + View direction to development: west northwest
- + Distance from development: 25 km (background)
- + Viewsheds: wind turbines (all heights), WRL
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is within the gently undulating grassland/shrubland plain LCU with open foreground views across a landscape of sparse scattered shrubs over low grasses. The view experience is generally open across gently undulating terrain with long range views to the north west. The low dune ridge to the north encloses views in this direction (**Figure 44**).

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low capacity due to simple natural landscape character with an open view experience
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 14, the photo montage (**Figure 44**) has shown that the wind turbines will be visible above the horizon line. While the viewshed shows that some parts of the crest of the WRL are visible, it is likely that the flat form of the WRL will blend in with the vegetated horizon line. The TSF is screened by the WRL and is not visible which is confirmed by the viewshed analysis. The photo montage analysis (**Table 21**) has rated the visibility of the wind turbines as **blending** which is summarised below:

- + Visibility – the wind turbines are just visible on the horizon line but do not dominate the view. However, the visibility of the turbines may vary depending on time of day and prevailing atmospheric conditions.
- + Line – from this distance the straight and angular lines of the turbines and turbine blades do not noticeably contrast with the existing land form.
- + Form – from this distance the straight and angular lines of the turbines and turbine blades do not noticeably contrast with the existing land form.
- + Colour – from this distance the colour of the turbines appear to blend light blue/grey sky background, however at different times of day they may appear more vibrant.
- + Texture – this distance, textural details are less noticeable compared to form, line and colour.

Table 21: VP 14 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	TSF, WRL	T	
Line	TSF, WRL	T	
Form	TSF, WRL	T	
Colour	TSF, WRL	T	
Texture	TSF, WRL	T	
Total Score (%)	100% (TSF, WRL)	100%(T)	
Overall Visibility Rating	NOT VISIBLE (TSF, WRL) BLENDING (T)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located about 32.2 kms southeast of the wind turbines. From this view point the wind turbines are visible above the horizon line. However the crest of the WRL is not likely to be visible and the TSF is screened behind the WRL. The wind turbines are not likely to dominate the view due to the effect of distance from the view point. Different atmospheric conditions may change the appearance of the turbines and make them more visible on occasion such as brighter white colours that contrast against a dark grey sky background.

The visual impact rating is summarised below:

- + Visibility rating: Not Visible (TSF and WRL) and Blending (wind turbines)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: Level 3 (wind turbines) and None (TSF and WRL)



Figure 44: VP 14 – Existing west north west view



Figure 45: VP 14 – Proposed west north west view

4.3.15 VIEW LOCATION 15 – MAGNUM WEST

- + Location (UTM): 404955E; 7705381N
- + Elevation: 265.0 m AHD
- + View direction to development: west northwest
- + Distance from development: 37 km (background)
- + Viewsheds: None
- + Sensitivity: Level 3 – views of local significance

Description of existing view

This view location is within the gently undulating grassland/shrubland plain LCU. The foreground view experience to the west north west is enclosed by landform that is densely covered by tall grasses and shrubs. The view becomes more open to the north, with views extending beyond the dense vegetation to a flat horizon line in the mid-ground and background (**Figure 46**).

Visual Absorption Capacity

The VAC from this view has low to moderate ability to accommodate a visual change depending on where the development is located as summarised below:

- + Foreground: low capacity due to simple natural landscape character with an open view experience
- + Mid-ground and background: low to moderate capacity, development may be screened by landform, however there is potential for taller development to 'skyline' due to the low variability in topography.

Anticipated visual change

At view location 15, the viewshed analysis and the photo montage (**Figure 46**) has shown that the TSF, WRL and wind turbines will not be visible above the horizon line. The photo montage analysis is summarised in **Table 22** below:

Table 22: VP 15 – Photo montage analysis

Category	Not Visible	Blending	Prominent
Visibility	T, TSF, WRL		
Line	T, TSF, WRL		
Form	T, TSF, WRL		
Colour	T, TSF, WRL		
Texture	T, TSF, WRL		
Total Score (%)	100% (T, TSF, WRL)		
Overall Visibility Rating	NOT VISIBLE (T, TSF, WRL)		

T = wind turbines; TSF = tailings storage facility; WRL = waste rock landform

Significance of visual change

This view point is located about 37 kms east southeast of the WRL and 44 kms east south east of the wind turbines. From this view point the all development is not visible as it is screened behind the existing landform. The visual impact rating is summarised below:

- + Visibility rating: Not Visible (TSF, WRL and wind turbines)
- + VMO: Best practice siting and design
- + Significance level: 3
- + Visual impact rating: None (TSF, WRL and wind turbines)



Figure 46: VP 15 – Existing west north west view

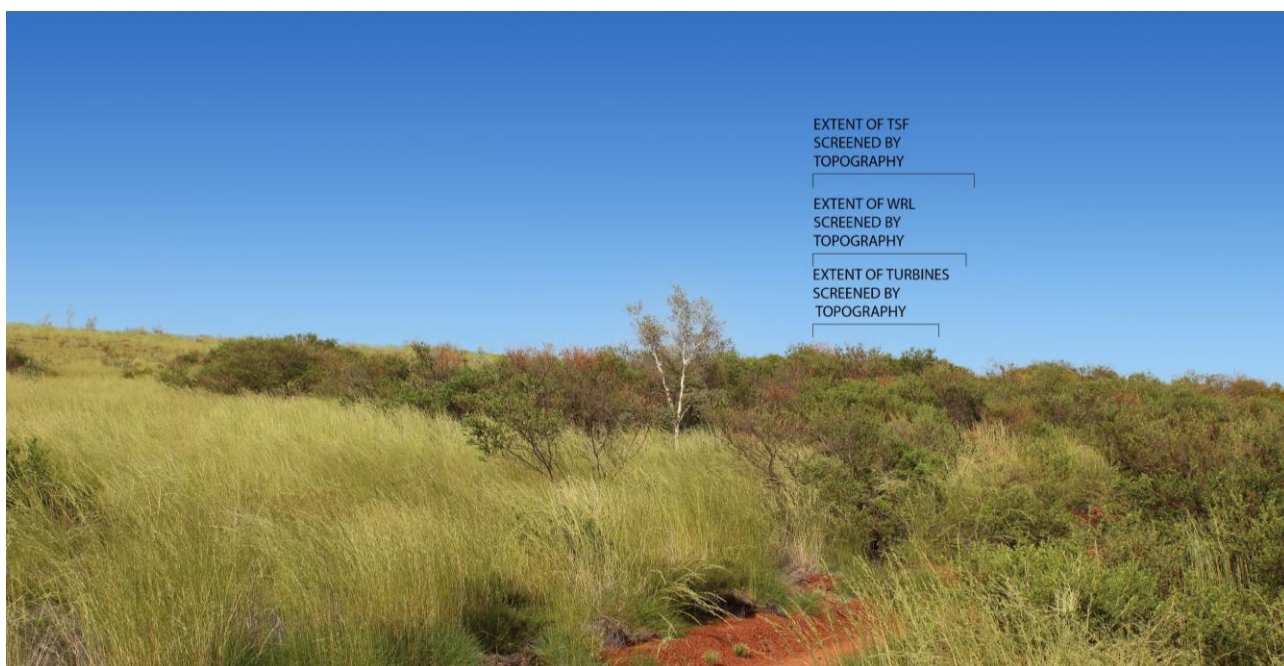


Figure 47: VP 15 – Proposed west north west view

5 SUMMARY OF VISUAL IMPACTS

5.1 VIEW LOCATIONS

The ten view locations have been assessed for visual impacts through the analysis of viewshed mapping and photo montages. The outcome of this assessment is summarised in

Table 19 which provides a visual impact rating. These ratings are based on the significance level of the view location and the visual management objective (VMO) for managing the landscape character (**Table 18**).

Table 18: Visual impact level matrix table

Visibility rating		Prominent			Blending			Not Visible
Significance Level rating		1	2	3	1	2	3	1-3
Visual Management Objective	Protection and Maintenance	L1	L1	L1	L2	L2	L2	None
	Best Practice Siting and Design	L1	L1	L1	L3	L3	L3	None
	Restoration and Enhancement	L2	L2	L2	L3	L3	L3	None
		VISUAL IMPACT LEVEL						

Table 19: Visual impact level at View Locations

View Location		Significance Level	Visual Management Objectives	Distance to Development	Visibility Rating	Visual Impact Level
1	Camp 1	3	Best Practice Siting and Design	67 km Background	Not visible (TSF, WRL, Turbines)	None
2	Nyangumarta Hwy & Wirikirr Wirikirr Rd	3	Best Practice Siting and Design	60 km Background	Blending (Turbines)	Level 3
					Not visible (TSF, WRL, Turbines)	None
3	Wirikirr Wirikirr Rd & Copperhead Rd	3	Best Practice Siting and Design	20 km Background	Prominent (Turbines)	Level 1
					Not visible (TSF, WRL)	None
4	Copperhead Road (NW Approach)	3	Best Practice Siting and Design	3 km Mid-ground	Prominent (Turbines)	Level 1
					Blending (TSF, WRL)	Level 3
5	Copperhead Rd intersecting mining lease	3	Best Practice Siting and Design	690 m Mid-ground	Prominent (Turbines)	Level 1
					Blending (TSF)	Level 3
					Not visible (WRL)	None
6	Magnum Camp	3	Best Practice Siting and Design	48 km Background	Blending (Turbines)	Level 3
					Not visible (TSF, WRL)	None
7	Airstrip	3		15 km	Blending (WRL, Turbines)	Level 3

View Location		Significance Level	Visual Management Objectives	Distance to Development	Visibility Rating	Visual Impact Level
			Best Practice Siting and Design	Background	Not visible (TSF)	None
8	Martu NTD Boundary	3	Best Practice Siting and Design	5 km	Prominent (WRL)	Level 1
				Mid-ground	Blending (TSF, Turbines)	Level 3
9	Proposed Accommodation Camp	3	Best Practice Siting and Design	2 km	Prominent (Turbines)	Level 1
				Mid-ground	Blending (WRL)	Level 3
					Not visible (TSF)	None
10	Winu Soak (Sth Dune Ridge)	3	Best Practice Siting and Design	18 km Background	Blending (TSF, WRL, Turbines)	Level 3
11	Near Mine East	3	Best Practice Siting and Design	7.4 km Background	Not visible (TSF)	None
					Prominent (WRL, Turbines)	Level 1
12	Airstrip West	3	Best Practice Siting and Design	13 km Background	Not visible (TSF)	None
					Blending (WRL, Turbines)	Level 3
13	Texas	3	Best Practice Siting and Design	18 km Background	Not visible (TSF)	None
					Blending (WRL, Turbines)	Level 3
14	Rimfire	3	Best Practice Siting and Design	25 km Background	Not visible (TSF, WRL)	None
					Blending (Turbines)	Level 3
15	Magnum West	3	Best Practice Siting and Design	37 km Background	Not visible (TSF, WRL, Turbines)	None

5.2 LANDSCAPE CHARACTER

The majority of the Winu Project and surrounding landscape occurs within the Great Sandy Desert Landscape Character Type (LCT) which is a rolling plain consisting of linear sand ridges that are arranged in a NNW-SSE direction. Vegetation consists of spinifex grasses with scattered shrubs and scattered trees and desert oaks (CALM, 1994).

Two Landscape Character Units (LCU) have been identified within the Winu Project and surrounding landscape. Both LCUs share similar visual characteristics with some variation in topography and vegetation diversity:

- + LCU 1 - Open grassland/shrubland plain – view locations 1 and 2 occur in this LCU
- + LCU 2 - Gently undulating grassland/shrubland plain – view locations 3-15 occur in this LCU.

The greatest impact to the natural landscape character is expected from the view locations that are rated as a Level 1 impact, these are:

- + 3 – Wirikirr Wirikirr Rd & Copperhead Rd
- + 4 – Copperhead Road (NW Approach)
- + 5 – Copperhead Road (intersecting mining lease)
- + 8 – Martu NTD Boundary
- + 9 – Proposed Accommodation Camp
- + 11 – Near mine East.

With the exception of view point 8 and 11, the view locations are on the western side of the proposed development with a direct line of site to the wind turbines. View Location 3 is within the background zone (20km), whereas location 4, 5 and 9 are in the mid-ground zone and are all less than 3 km from the proposed development. View location 8 is located 5 km (mid-ground zone) to the south east of the development with a clear view of the development, particularly the WRL. View location 11 is located 7.4 km (background zone) to the south east of the proposed development and has a direct line of site to the WRL and wind turbines to the north west.

The impacts to landscape character are summarised for each visual impact level below:

- + **Level 1** – infrastructure in particular the wind turbines are highly visible and introduce a new element to the view which contrast to the existing visual characteristics of the landscape. The infrastructure is a dominant element that alters the natural landscape character.
- + **Level 3** – infrastructure is visible but does not dominant the view and the natural character of the existing landscape is retained.
- + **None** – no impact to the existing landscape character.

5.3 LANDSCAPE VALUES

The landscape within the study area is relatively uniform, however the following preferred landscape characteristics are evident:

- + vegetative diversity: distinctive pattern and texture of spinifex grass. Mosaic pattern of vegetation at some view locations within LCU 2.
- + distinctive displays of colour: contrasting colours between vibrant orange sandy soils and vegetation
- + distinctive landscape features (geological formations): longitudinal dunes also known as seif dunes.
- + high degrees of perceived naturalness.

The least preferred characteristics include:

- + drill lines: these were visible from the air but not apparent at ground level during the site assessment.
- + mining exploration infrastructure such as laydown areas and drill rigs.

The impacts to the landscape values are summarised for each visual impact level below:

- + **Level 1** – most of the landscape values are retained, however the high degree of perceived naturalness is altered from these view locations as the introduction of mining infrastructure impacts the natural character.
- + **Level 3** – there are no impacts to the existing landscape values from these view locations.
- + **None** – no impact to the existing landscape values.

5.4 VIEW EXPERIENCE

Many areas contained multiple view types depending on the variations in topography and presence of tall shrubs. At any given point the view can be enclosed by a dune ridge in one direction and open in another direction over flat terrain. The different view categories experienced at Winu are listed below:

- + Panoramic: expansive long range views in all directions.
- + Elevated: a view overlooking the landscape from a high point, usually associated with a panoramic view

- + Open: a clear view that is not restricted by features such as vegetation, views are not as expansive as panoramic views
- + Enclosed by landform: may be an open view in the foreground but long range views are restricted by dune ridges
- + Filtered: views are filtered through scattered tall shrubs.

The proposed Winu development does not greatly change the view categories that are experienced in the landscape. Many of the panoramic and elevated views are experienced in the background zone and the proposed development does not restrict any of these views.

5.5 VISUAL MANAGEMENT OBJECTIVES

All views assessed are 'Level 3: Local Significance' as per the WAPC guidelines (refer **Appendix Two**). They are views of local importance, having been identified as key view locations by Rio Tinto in consultation with Traditional Owners. They are not categorised as 'Level 2: Regional Significance' or 'Level: National / State Significance', which decreases the potential number of viewers impacted by any development.

The proposed Winu Project is expected to result in visual impacts at some locations. **Table 20** presents a summary of the visual impacts with regard to the VMO of **best practice siting and design**. This VMO was deemed the most appropriate objective to manage the visual landscape which is due to the Level 3 significance of the area.

Of the 15 view locations that were assessed, the proposed Winu Project was at variance from the VMO at six sites (3, 4, 5, 8,9 and 11). Sites 3, 4, 5 and 9 are located on the western site of the development with a direct line of site to the wind turbines and site 8 is the closest location southeast of the WRL. Site 11 also has a clear north west view of the WRL and wind turbines. The remaining sites are unlikely to be at variance with the VMO of best practice siting and design.

It is recommended that the acceptability of visual impacts is discussed in consultation with the Traditional Owners.

Table 20: Summary of visual impacts in relation to the VMO

View Location	Visual Impact Level	Response to the Visual Management Objective
1 Camp 1	None	There will be no visual impact from the wind turbines, TSF or WRL from this view point. However, some change may occur with the upgrade of the road access corridor, such as vegetation clearing to widen the road and an increase in light and heavy vehicle use along this road. The VMO of best practice siting and design is achievable from this view location.
2 Nyangumarta Hwy & Wirikirr Wirikirr Rd	Level 3 (Turbines) None (TSF, WRL)	From this view point it is unlikely that there will be a significant visual change to the view experience and existing character due to the distance to the proposed mining development (60 kms) and the low visibility of the wind turbines. The road access corridor is about 5 kms west of this viewpoint, indirect visual impacts such as dust clouds may be visible from increased road use. The visual impact associated with the wind turbines is unlikely to be at variance with the VMO and there will be no visual impact from the TSF or WRL. The VMO of best practice siting and design is achievable from this view location.

View Location	Visual Impact Level	Response to the Visual Management Objective
3 Wirikirr Wirikirr Rd & Copperhead Rd	Level 1 (Turbines) None (TSF, WRL)	This view point is located on the north western approach road to the Winu Project and is in the background of the mining development. The prominent visibility of the turbines results in an obvious change to the view experience from this road as a new element is introduced into the view which contrasts with the existing landscape character. As the observer travels closer towards the development the wind turbines will become larger and more prominent. The visual impact associated with the wind turbines is likely to be at variance with the VMO and there will be no visual impact from the TSF or WRL. The VMO of best practicing siting and design may not be achievable on this road, however visual impacts will be expected on the approach road to the Winu Project. It is unlikely that mitigation will be practical along this road which is also expected to be widened to service the mining project.
4 Copperhead Road (NW Approach)	Level 1 (Turbines) Level 3 (TSF, WRL)	This view point is located within the mid-ground of the wind turbines and TSF and the background of the WRL on the north western approach. The prominent visibility of the turbines results in an obvious change to the view experience, as a new element is introduced into the view which contrasts with the existing landscape character. Although the light colour of the TSF and WRL contrast with existing colours of the landscape, the other visual elements such as line and form are more likely to blend with the existing horizon line. The visual impact associated with the wind turbines is likely to be at variance with the VMO. The visual impacts associated with the TSF and WRL are unlikely to be at variance with the VMO. The VMO of best practicing siting and design may not be achievable on this road, however visual impacts will be expected on the approach road to the Winu Project. It is unlikely that mitigation will be practical along this road which is also expected to be widened to service the mining project.
5 Copperhead Rd (intersecting mining lease)	Level 1 (Turbines) Level 3 (TSF) None (WRL)	This view point is located within the mid-ground of the wind turbines and TSF and the background of the WRL on the north western approach. The prominent visibility of the turbines results in an obvious change to the view experience, as a new element is introduced into the view which contrasts with the existing landscape character and at this distance they also take up a large portion of the view. Whereas the TSF is more likely to blend with the existing horizon line and the WRL is likely to be screened by vegetation. The visual impact associated with the wind turbines is likely to be at variance with the VMO. The visual impacts associated with the TSF and WRL are unlikely to be at variance with the VMO. The VMO of best practicing siting and design may not be achievable on this road, however visual impacts will be expected on the approach road to the Winu Project. It is unlikely that mitigation will be practical along this road which is also expected to be widened to service the mining project.
6 Magnum Camp	Level 3 (Turbines) None (TSF, WRL)	This view point is located in the background of the Winu Project area at about 48 km east of the WRL. A portion of the wind turbine blades may be visible above the horizon line, however at this distance they are unlikely to be highly noticeable and are not likely to alter the view experience or existing character. The TSF or WRL will not be visible from this distance as they are located behind the horizon line. The visual impact associated with the wind turbines is unlikely to be at variance with the VMO and there will be no visual impact from the TSF or WRL. The VMO of best practice siting and design is achievable from this view location.

View Location	Visual Impact Level	Response to the Visual Management Objective
7 Airstrip	Level 3 (WRL, Turbines) None (TSF)	This view point is located to the south east of the Winu Project in the background. From this distance the wind turbines and WRL do not appear to dominate the existing view. Although the vertical form of the turbines contrast with the predominantly horizontal landform, the other visual aspects are less prominent and do not greatly alter the existing view experience or landscape character. The TSF is not visible as it is screened by the WRL. The visual impact associated with the wind turbines and WRL is unlikely to be at variance with the VMO and there will be no visual impact from the TSF. The VMO of best practice siting and design should be achievable from this view location.
8 Martu NTD Boundary	Level 3 (TSF, WRL, Turbines)	This view point is located south east of the Winu Project in the mid-ground to background. From this view point the WRL is highly visible due to the mass of the landform that protrudes above the existing horizon line, however it is not dissimilar in line and form to the surrounding landscape, although the texture appears homogenous compared to the existing landscape. The TSF is also partly visible but most of it is screened behind the WRL. The wind turbines also introduce a new vertical element that protrude above the horizontal dune ridge although they do not appear as visually prominent as the WRL. While the visibility of the infrastructure has been assessed as blending, the addition of a new landform and the wind turbines may alter the existing view experience although the natural character is likely to be retained. The visual impact associated with the WRL is likely to be at variance with the VMO. The visual impact associated with the wind turbines and TSF is unlikely to be at variance with the VMO. The VMO of best practicing siting and design may not be achievable from this view location.
9 Proposed Accommodation Camp	Level 1 (Turbines) Level 3 (WRL) None (TSF)	This view point is located south west of the Winu development in the mid-ground of the wind turbines. From this view point the wind turbines are highly visible and introduce a new element that are likely to dominate the eastern view and alter the existing character. A portion of the WRL is also likely to be visible above the horizon line but is more likely to blend with the horizon line and may also be partially screened by tall shrubs in the foreground. The TSF is not likely to be visible above the dune ridgeline. The visual impact associated with the wind turbines is likely to be at variance with the VMO. The visual impacts associated with the WRL is unlikely to be at variance with the VMO and there will be no visual impact from the TSF. The VMO of best practicing siting and design may not be achievable from the proposed accommodation camp. However, through strategic design principles the VMO may be achievable and offer a variety of view experiences.
10 Winu Soak	Level 3 (TSF, WRL, Turbines)	This view point is located about 18 kms north of the Winu Project which is in the background zone. The view point in the photo montage was taken from the top of the dune crest north of the actual Winu Soak site. From this view point the wind turbines are visible in the background, and the top of the TSF and WRL are barely visible above the horizon line. The visual change is not expected to alter the existing view experience or the natural character as viewed from the dune crest. At the Winu Soak site itself (located north of view location 10), it is expected that the dune crest will prevent views of the Winu mining development. The visual impact associated with the wind turbines, TSF and WRL is unlikely to be at variance with the VMO. It is expected that there will be no visual impact from the actual Winu Soak site. The VMO of best practice siting and design should be achievable from this view location.

View Location	Visual Impact Level	Response to the Visual Management Objective
11 Near Mine East	Level 1 (Turbines, WRL) None (TSF)	This view location is located 7.4 km in the background to the east south east of the development. The TSF is not visible as it is screened behind the WRL which is confirmed by the viewshed analysis. The WRL is highly visible due to the mass of the landform that protrudes above the existing horizon line, however it is not dissimilar in line and form to the surrounding landscape, although the texture appears homogenous compared to the existing landscape. The wind turbines protrude above the horizon line and their vertical form and angular lines are a noticeable contrast with the gently undulating horizon line. The visual elements of the WRL and the wind turbines share some similarities to the existing landscape, however the view experience will be altered with the addition of a new landform to the horizon line and the tall vertical wind turbines The visual impact associated with the wind turbines and WRL is likely to be at variance with the VMO. The VMO of best practicing siting and design may not be achievable from this view location.
12 Airstrip West	Level 3 (Turbines, WRL) None (TSF)	This view location is located 13 km in the background to the east south east of the development. The wind turbines and the WRL are visible above the horizon line, however the TSF is not visible as it is screened behind the WRL which is confirmed by the viewshed analysis. The effect of distance and the tall shrubs and grasses that punctuate the horizon line help to reduce the prominence of the wind turbines. The line and form of the WRL also blends with the existing horizon line. Subsequently the visual change associated with the development is not expected to alter the existing view experience or natural character. Therefore, the visual impact is unlikely to be at variance with the VMO. The VMO of best practice siting and design should be achievable from this view location.
13 Texas	Level 3 (Turbines, WRL) None (TSF)	This view location is located 18 km in the background to the south east of the development. The wind turbines and the crest of the WRL are visible on the horizon line, however the TSF is not visible as it is screened behind the WRL which is confirmed by the viewshed analysis. From this distance the wind turbines and WRL do not appear to dominate the existing view. The crest of the WRL is likely to be visible but is not dissimilar in line and form to the horizon line. The effect of distance also reduces the scale of the wind turbines that are protruding above the horizon line. The presence of scattered tall shrubs that punctuate the horizon line also break the flat horizon line which help to reduce the contrast of the wind turbines. The visual change associated with the wind turbines and WRL is not expected to alter the existing view experience or the natural character. Therefore, the visual impact associated with the wind turbines is unlikely to be at variance with the VMO. The VMO of best practice siting and design should be achievable from this view location.
14 Rimfire	Level 3 (Turbines) None (TSF, WRL)	This view location is located 25 km in the background to the east south east of the development. The WRL is not likely to be visible at this distance as it will blend in with the vegetated horizon line. The TSF is screened by the WRL and is not visible which is confirmed by the viewshed analysis. From this view point the wind turbines are visible in the background, however, the visual change is not expected to alter the existing view experience or the natural character. Therefore, the visual impact associated with the wind turbines is unlikely to be at variance with the VMO. The VMO of best practice siting and design should be achievable from this view location.

View Location	Visual Impact Level	Response to the Visual Management Objective
15 Magnum West	None	This view point is located 37 km in the background to the east south east of the development. The development is not visible as it is screened by landform. Subsequently, there will be no visual impact from the wind turbines, TSF or WRL from this view point. The VMO of best practice siting and design is achievable from this view location.

5.6 VISUAL IMPACT MITIGATION

Complete mitigation of visual impacts arising from the Winu Project is impractical, given the scale and nature of the development and the relatively low relief of the landscape. The viewpoints with greatest visual impact are locations where the development is highly visible, in particular the wind turbines. While it is impractical to screen wind turbines, the following strategies may be considered to reduce the visual impact of the turbines:

- + use muted colours and non-reflective materials to reduce glare
- + avoid advertising logos on the turbines
- + minimise the height of ancillary buildings, place behind landform where possible and use low reflective materials (WAPC, 2007).

5.7 STUDY LIMITATIONS

The assessment includes the following limitations:

- + Visual Management Objectives - the assessment methodology follows the WAPC (2007) guidelines which aims to guide visual landscape evaluation and impact assessment in the public realm. These guidelines have also undertaken extensive research to ascertain landscape preferences, however the specific cultural preferences of the Traditional Owners may not be captured within these guidelines. Therefore, the outcomes of the assessment should be discussed with the Traditional Owners to determine the acceptability of visual impacts.
- + Viewshed results - the viewsheds are used in conjunction with the photo montages to assess visibility of the proposed development. However, the accuracy of the viewsheds is not precise due to the 30 metre scale of the elevation data. Subsequently, some smaller landscape features were not captured within the dataset, such as the dune ridges near view location 10. This is discussed in **Section 4.3**.
- + Photo montage accuracy – the viewsheds are used to assist in the placement of the model particularly where the terrain is flat to gently undulating. Subsequently the photo montage will not be vertically precise, however provides an illustrative representation of future development.
- + The focus of this assessment was on the large pieces of infrastructure that may be visible at a distance. The assessment did not specifically look at the other elements of the mining operation such as smaller buildings and road infrastructure. However, some comment has been made on the potential impact of upgrading the road access corridor at specific view locations.
- + It can be assumed that there will be some impacts from artificial light emissions which may impact the view locations, such as a glow on the horizon line where the existing sky conditions may have been dark. An assessment of the artificial light impacts are beyond the scope of this report.

REFERENCES

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Department of Primary Industries and Regional Development (2017) Soil Landscape Mapping - Best Available (DPIRD-027) [spatial dataset]. Available: [Soil Landscape Mapping - Best Available \(DPIRD-027\) - Datasets - data.wa.gov.au](https://data.wa.gov.au/datasets/soil-landscape-mapping-dpi-027).

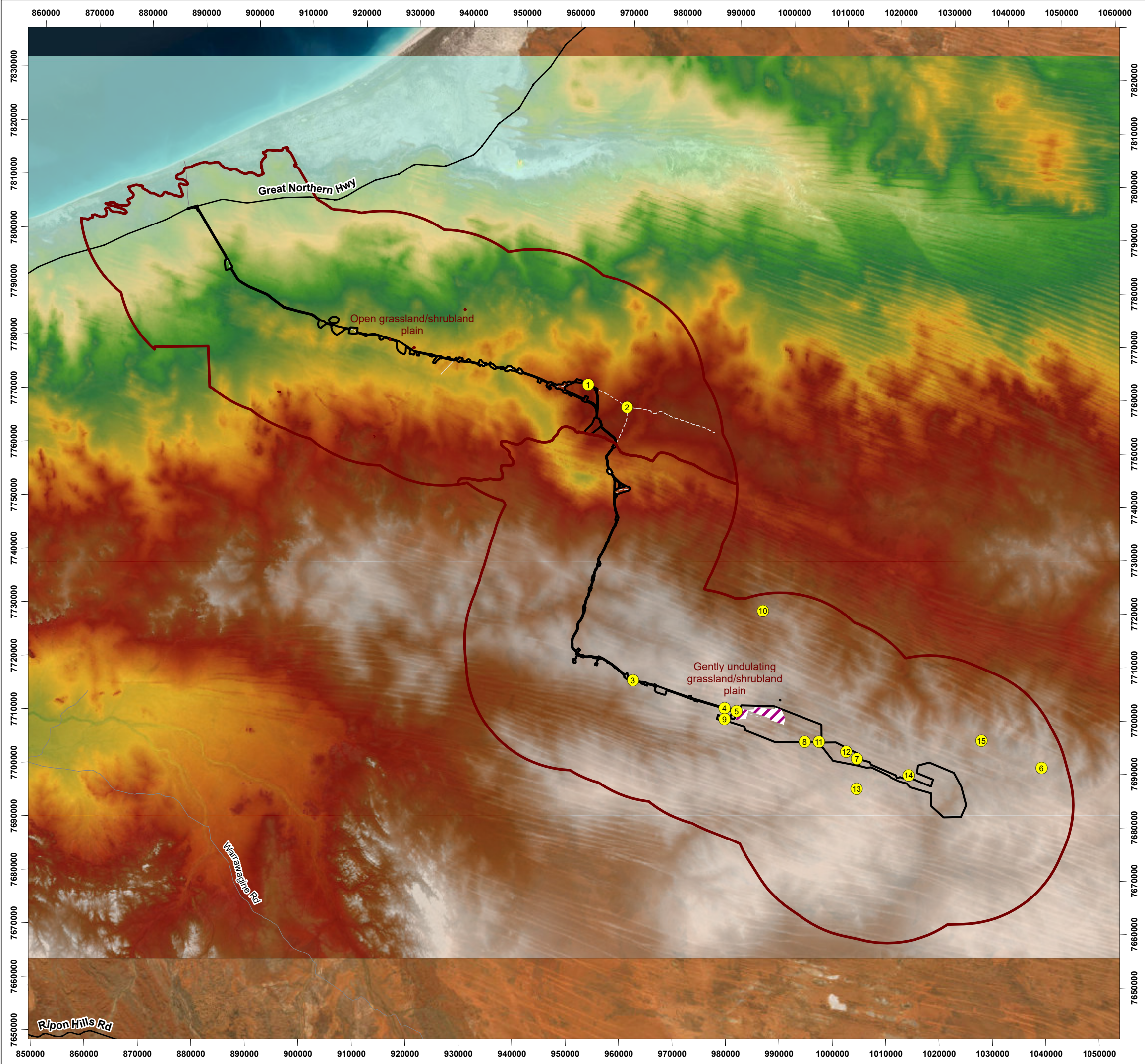
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Geoscience Australia (2010). SRTM-derived 1 Second Digital Elevation Model (DEM-S) Version 1.0. Geoscience Australia, Canberra. Available: [Product catalogue - Geoscience Australia \(ga.gov.au\)](https://ga.gov.au/product-catalogue)

The Landscape Institute and Institute of Environmental Management and Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment* (3rd edition), Routledge, London.

Western Australian Planning Commission (WAPC) (2007) *Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design*. WAPC, Perth.

MAPS



LEGEND

- View Points
- Road Network (MRWA, 2023)
 - State Road
 - Local Road
 - Unsealed track (permit required)
- Winu Project Development Envelope
- Mining Infrastructure (Turbines, TSF, WRL)
- Landscape Character Units
- Elevation (Geoscience Australia, 2010)
Value (m AHD)
 - 392.628
 - 0

DATA SOURCES:
SOURCE DATA: DEVELOPMENT ENVELOPE, TRACKS (RIO TINTO, 2023). ELEVATION (DEMS, GEOSCIENCE AUSTRALIA, 2010).
IMAGERY: ESRI BASEMAP DEC 2021 - JAN 2022.
SERVICE LAYERS: WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, FAO, USGS
WORLD IMAGERY: EARTHSTAR GEOGRAPHICS

ecoscape

ELEVATION

**WINU PROJECT
VISUAL IMPACT ASSESSMENT**

RioTinto

COORDINATE SYSTEM: GDA 1994 MGA ZONE 51
PROJECTION: TRANSVERSE MERCATOR
DATUM: GDA 1994
UNITS: METER

SCALE: 1:700,000 @ A3

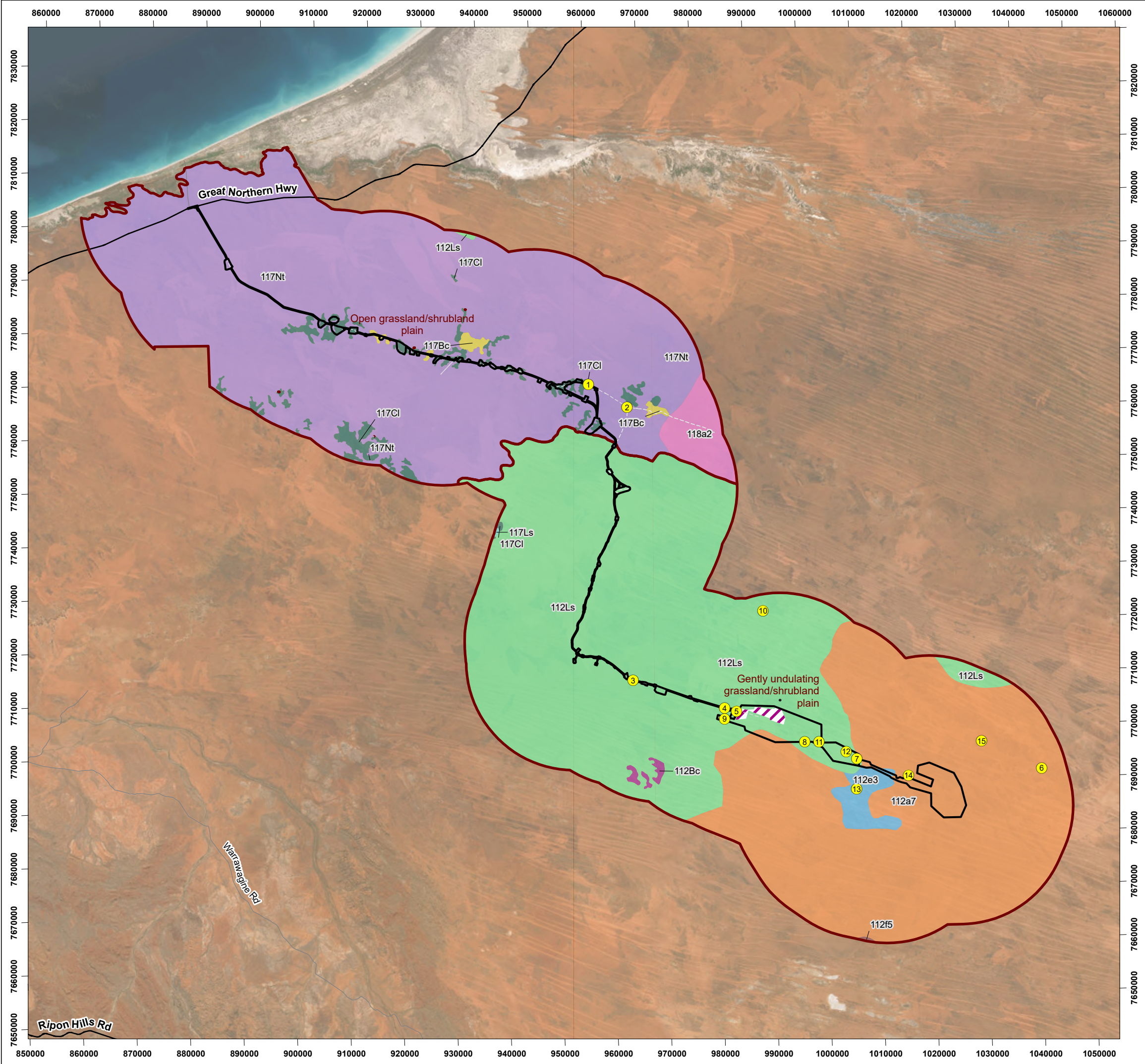
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PROJECT NO: 5107-24

REV	AUTHOR	APPROVED	DATE
0	SB	PJ	13/02/2024

MAP

1



LEGEND

View Points

Road Network (MRWA, 2023)

- State Road
- Local Road
- Unsealed track (permit required)

Winu Project Development Envelope

Mining Infrastructure (Turbines, TSF, WRL)

Landscape Character Units

Soil Landscape Units (DPIRD, 2017)

- 112Bc, Gravelly sandplains and occasional sand dunes supporting shrubby hard spinifex grasslands
- 112Ls, Sandplains with linear and reticulate dunes supporting shrubby hard and soft spinifex grasslands
- 112a7, Gently undulating plain slightly more elevated than unit AB39, and dominated by longitudinal dunes, many exposures of ironstone gravels and some breakaways capped by ironstone (laterite) duricrust
- 112e3, Dune fields—largely stable linear dune fields with swales opening locally into sand plains dune lineation is generally E.-W. but in the area west of 123 deg E. Longitude the trend is NW.-SE.; considerable areas of clay pans and salt pans
- 112f5, Uneven rough calcrete (kunkar) plains with small salt lakes and pans broken by variable proportions of longitudinal sand dunes and occasional low rises or hills
- 113An, Paleo-tidal coastal plains with saline soils supporting tussock grasslands and halophytic low shrublands
- 113Ei, Beach foredunes, longitudinal coastal dunes and sandy plains with buffel grasslands and spinifex grasslands
- 113Mn, Seepage areas on inland margins of paleo-tidal plains (adjacent to sand plain land systems) supporting melaleuca thickets and halophytic low shrublands
- 117Bc, Gravelly sandplains and occasional sand dunes supporting shrubby hard spinifex grasslands
- 117Ci, Highly dissected low hills, mesas and gravelly plains on sandstone and conglomerate supporting soft and hard spinifex grasslands
- 117Ls, Sandplains with linear and reticulate dunes supporting shrubby hard and soft spinifex grasslands
- 117Nt, Sandplains supporting shrubby spinifex grasslands with occasional trees
- 117Nt_3d, The dune phase has linear ridges of aeolian sand about 5a9m high, projecting above the surrounding plain. Soils are mostly Red deep sands, dune phase
- 117Nt_4s, Sandsheets. The dominant soil is Red deep sand, very deep phase plus minor areas of Red deep sand, earthy phase
- 117Nt_5r, Ferruginous sandstone outcrop on low rises and interfluvies. Becomes more prominent towards the coasts Equivalent to Land Unit 1 of van Vreeswyk et al 2004)
- 117Nt_5s, Rises, slopes and broad depressions formed on erosional and colluvial slopes surrounding rocky outcrops. The major soil is Red deep sand, rock substrate phase, with minor areas of very deep sands or earthy sands
- 118a2, Pindan country—gently undulating sand plain with a few small rocky sandstone residuals; no external drainage

DATA SOURCES:

SOURCE DATA: DEVELOPMENT ENVELOPE, TRACKS (RIO TINTO, 2023). SOIL-LANDSCAPE MAPPING WESTERN AUSTRALIA – BEST AVAILABLE SOILS (DPIRD-027) (DPIRD 2022).

IMAGERY: ESRI BASEMAP DEC 2021 - JAN 2022.

SERVICE LAYERS: WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, FAO, USGS

WORLD IMAGERY: EARTHSTAR GEOGRAPHICS

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SOIL LANDSCAPE UNITS

**WINU PROJECT
VISUAL IMPACT ASSESSMENT**

RioTinto

COORDINATE SYSTEM: GDA 1994 MGA ZONE 51
PROJECTION: TRANSVERSE MERCATOR
DATUM: GDA 1994
UNITS: METER

SCALE: 1:700,000 @ A3

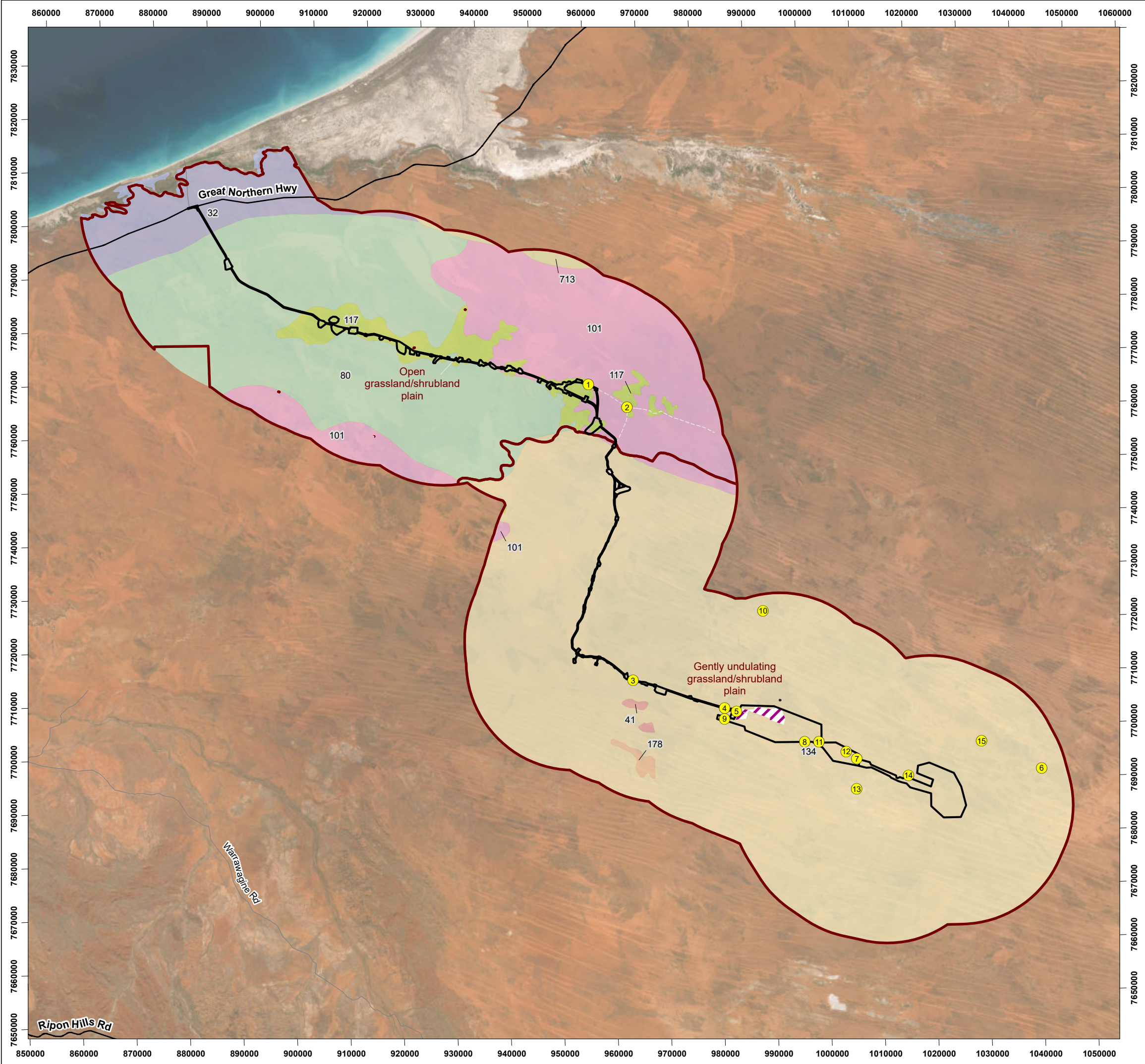
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PROJECT NO: 5107-24

REV	AUTHOR	APPROVED	DATE
0	SB	PJ	13/02/2024

MAP

2



LEGEND

● View Points

Road Network (MRWA, 2023)

— State Road

— Local Road

- - - Unsealed track (permit required)

▭ Winu Project Development Envelope

▨ Mining Infrastructure (Turbines, TSF, WRL)

▭ Landscape Character Units

Pre European Vegetation (DPIRD, 2017)

101: Hummock grassland with scattered shrubs or mallee *Triodia* spp., *Acacia* spp., *Grevillea* spp., *Eucalyptus* spp.

117: Hummock grassland *Triodia* spp.

178: Hummock grassland *Triodia* spp.

32: Acacia thicket with scattered low trees over spinifex *Acacia eriopoda*, *Corymbia dichromophloia*, *Triodia pungens*, *T. bitextura*

41: Wattle, teatree and other species *Acacia* spp. *Melaleuca* spp.

713: Hummock grassland with scattered bloodwoods and snappy gum *Triodia* spp., *Corymbia dichromophloia*, *Eucalyptus leucophloia*

80: Hummock grassland with scattered bloodwoods and snappy gum *Triodia* spp., *Corymbia dichromophloia*, *Eucalyptus leucophloia*

134: Mosaic: Hummock grasslands, open low tree steppe; desert bloodwood and feathertop spinifex on sandhills / Hummock grasslands, shrub steppe; mixed shrubs over spinifex between sandhills.

DATA SOURCES:
SOURCE DATA: DEVELOPMENT ENVELOPE, TRACKS (RIO TINTO, 2023). PRE-EUROPEAN VEGETATION (DPIRD-006)(2019).
IMAGERY: ESRI BASEMAN DEC 2021 - JAN 2022.
SERVICE LAYERS: WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, FAO, NOAA, USGS
WORLD IMAGERY: EARTHSTAR GEOGRAPHICS

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PRE-EUROPEAN VEGETATION

**WINU PROJECT
VISUAL IMPACT ASSESSMENT**

RioTinto

COORDINATE SYSTEM: GDA 1994 MGA ZONE 51
PROJECTION: TRANSVERSE MERCATOR
DATUM: GDA 1994
UNITS: METER

SCALE: 1:700,000 @ A3

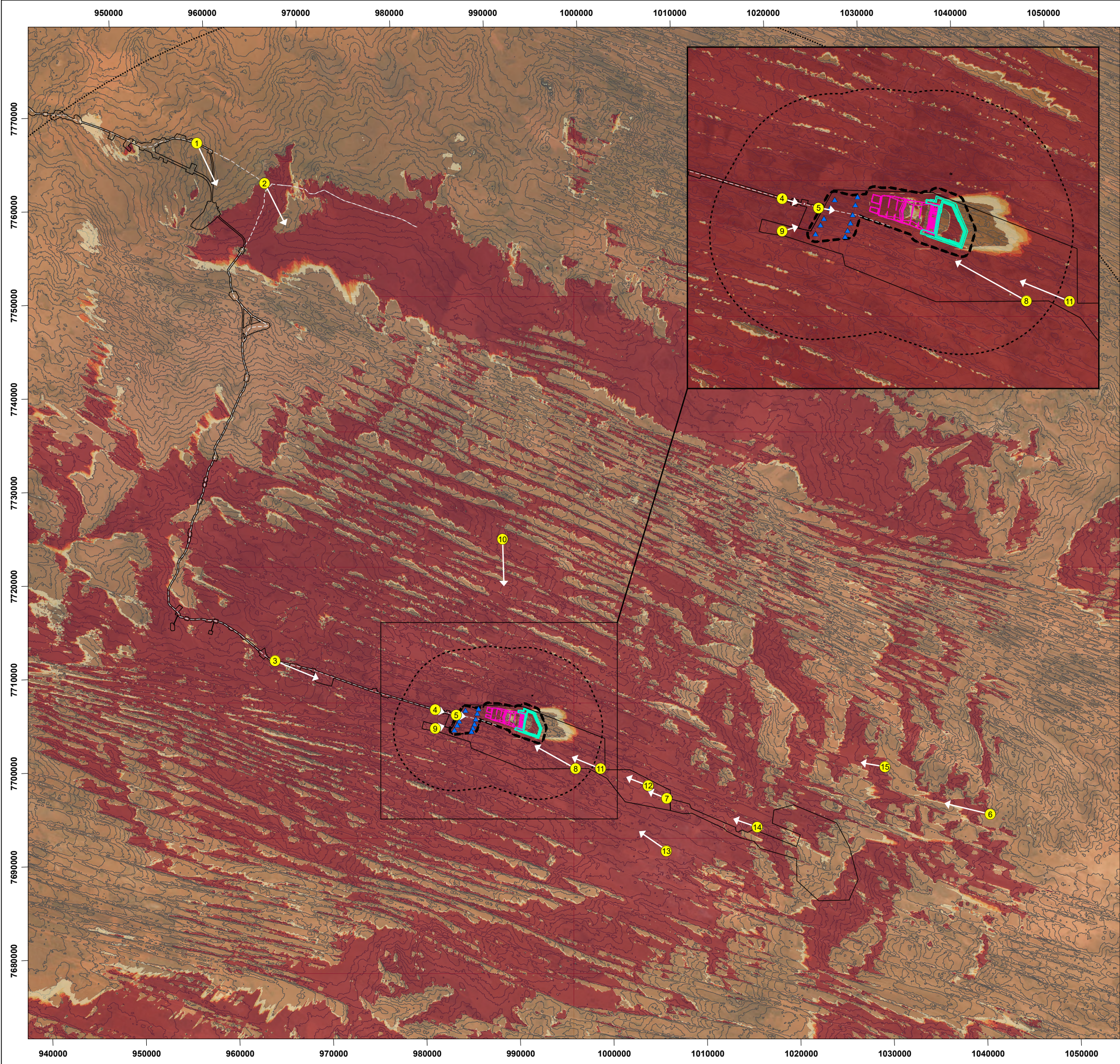
0 5 10 15 20 km

PROJECT NO: 5107-24

REV	AUTHOR	APPROVED	DATE
0	SB	PJ	13/02/2024

MAP

3



LEGEND

- View Points
- Wind Turbine Locations
- Photo Direction
- Contours 5m (Geoscience Australia, 2010)
- Tailings Storage Facility (TSF)
- Waste Rock Landform (WRL)
- Unsealed track (permit required)
- Winu Project Development Envelope

Distance Zones

- Foreground (0-500 m)
- Mid-ground (0.5-6.5 km)
- Background (6.5+ km)

Viewshed - wind turbines (236 m)

Value (visible turbines)

9

1

VP	Name	Elevation (m AHD)	View direction	Distance (km)
1	Camp 1	182.6	SSE	67
2	Nyangumarta Hwy & Wirikirr Wirikirr Rd	190.4	SSE	60.2
3	Wirikirr Wirikirr Rd & Copperhead Rd (on road)	268.3	ESE	20.5
4	Copperhead Road (NW Approach)	288.3	ESE	2.8
5	Copperhead Rd intersecting mining lease	273.6	E	0.6
6	Magnum Camp	277.5	WNW	48.8
7	Airstrip	269.7	WNW	15.1
8	Martu NTD Boundary (east)	264.5	WNW	5.1
9	Proposed Accomodation Camp	281.3	ENE	2.1
10	Winu Soak (ridge)	244.1	S	18
11	Near Mine (east)	256.3	WNW	7.5
12	Airstrip (west)	267.5	WNW	13
13	Texas	287.5	NW	18.5
14	Rimfire	278.8	WNW	25
15	Magnum (west)	265	WNW	37

DATA SOURCES:
SOURCE DATA: WIND TURBINES, TSF, WRL, DEVELOPMENT ENVELOPE, TRACKS (RIO TINTO, 2023).
ELEVATION (DEMS, GEOSCIENCE AUSTRALIA, 2010). CONTOURS DERIVED FROM DEMS (GSA, 2010).
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WITH WRL AND TSF RASTER SURFACE.
IMAGERY: ESRI BASEMAP DEC 2021 - JAN 2022.
SERVICE LAYERS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, FAO, USGS, NGA



VIEWSHED - WIND TURBINES
FULL HEIGHT (236 M)

WINU PROJECT
VISUAL IMPACT ASSESSMENT



COORDINATE SYSTEM: GDA 1994 MGA ZONE 51
PROJECTION: TRANSVERSE MERCATOR
DATUM: GDA 1994
UNITS: METER

N

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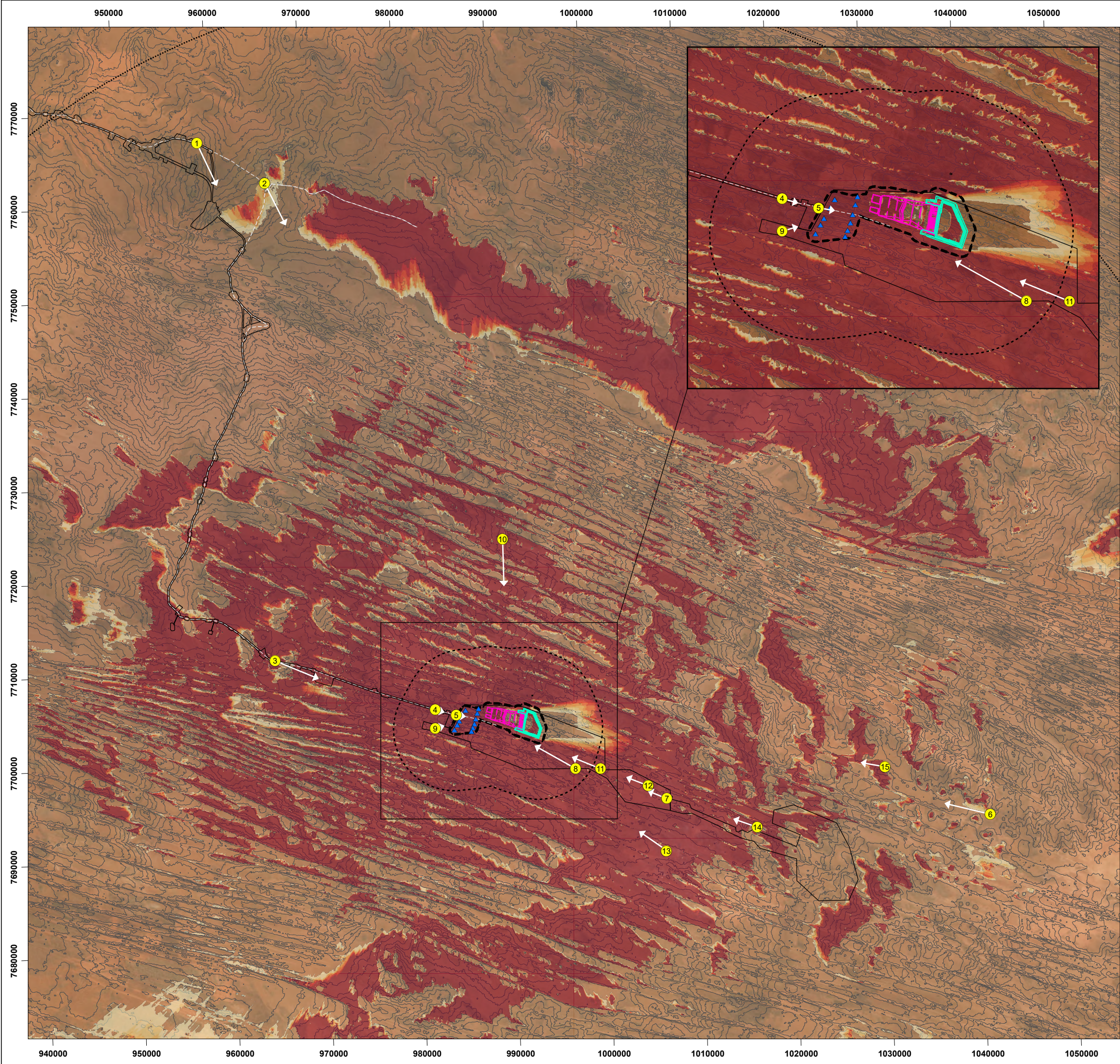
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PROJECT NO: 5107-24

REV	AUTHOR	APPROVED	DATE
0	SB	PJ	13/02/2024

MAP

4



LEGEND

- View Points
- Wind Turbine Locations
- Photo Direction
- Contours 5m (Geoscience Australia, 2010)
- Tailings Storage Facility (TSF)
- Waste Rock Landform (WRL)
- Unsealed track (permit required)
- Winu Project Development Envelope

Distance Zones

- Foreground (0-500 m)
- Mid-ground (0.5-6.5 km)
- Background (6.5+ km)

Viewshed - wind turbines (150 m)

Value (visible turbines)

9

1

VP	Name	Elevation (m AHD)	View Direction	Distance (km)
1	Camp 1	182.6	SSE	67
2	Nyangumarta Hwy & Wirikirr Wirikirr Rd	190.4	SSE	60.2
3	Wirikirr Wirikirr Rd & Copperhead Rd (on road)	268.3	ESE	20.5
4	Copperhead Road (NW Approach)	288.3	ESE	2.8
5	Copperhead Rd intersecting mining lease	273.6	E	0.6
6	Magnum Camp	277.5	WNW	48.8
7	Airstrip	269.7	WNW	15.1
8	Martu NTD Boundary (east)	264.5	WNW	5.1
9	Proposed Accomodation Camp	281.3	ENE	2.1
10	Winu Soak (ridge)	244.1	S	18
11	Near Mine (east)	256.3	WNW	7.5
12	Airstrip (west)	267.5	WNW	13
13	Texas	287.5	NW	18.5
14	Rimfire	278.8	WNW	25
15	Magnum (west)	265	WNW	37

DATA SOURCES:
SOURCE DATA: WIND TURBINES, TSF, WRL, DEVELOPMENT ENVELOPE, TRACKS (RIO TINTO, 2023).
ELEVATION (DEMS, GEOSCIENCE AUSTRALIA, 2010). CONTOURS DERIVED FROM DEMS (GSA, 2010).
VIEWSHED DERIVED FROM MERGED RASTER SURFACE: DEMS (GEOSCIENCE AUSTRALIA, 2010) MERGED
WITH WRL AND TSF RASTER SURFACE.
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SERVICE LAYERS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, FAO, USGS, NGA

VIEWSHED - WIND TURBINES ROTOR HUB HEIGHT (150 M)

WINU PROJECT
VISUAL IMPACT ASSESSMENT

COORDINATE SYSTEM: GDA 1994 MGA ZONE 51
PROJECTION: TRANSVERSE MERCATOR
DATUM: GDA 1994
UNITS: METER

N

03691215

km

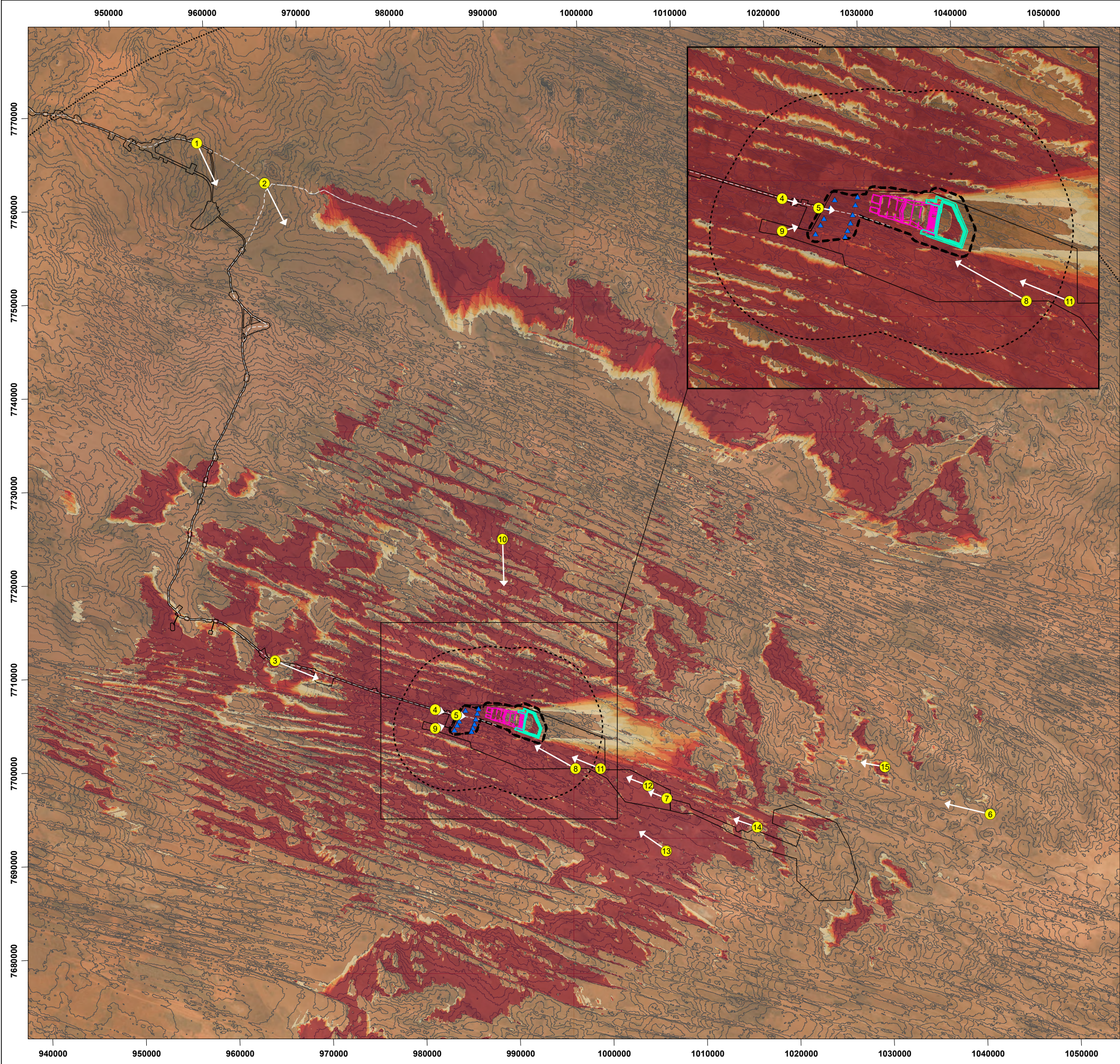
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PROJECT NO: 5107-24

REV	AUTHOR	APPROVED	DATE
0	SB	SB	13/02/2024

MAP

5



LEGEND

- View Points
- Wind Turbine Locations
- Photo Direction
- Contours 5m (Geoscience Australia, 2010)
- Waste Rock Landform (WRL)
- Tailings Storage Facility (TSF)
- Unsealed track (permit required)
- Winu Project Development Envelope

Distance Zones

- Foreground (0-500 m)
- Mid-ground (0.5-6.5 km)
- Background (6.5+ km)

Viewshed - wind turbines (118 m)

Value (visible turbines)

9

1

VP	Name	Elevation (m AHD)	View Direction	Distance (km)
1	Camp 1	182.6	SSE	67
2	Nyangumarta Hwy & Wirikirr Wirikirr Rd	190.4	SSE	60.2
3	Wirikirr Wirikirr Rd & Copperhead Rd (on	268.3	ESE	20.5
4	Copperhead Road (NW Approach)	288.3	ESE	2.8
5	Copperhead Rd intersecting mining lease	273.6	E	0.6
6	Magnum Camp	277.5	WNW	48.8
7	Airstrip	269.7	WNW	15.1
8	Martu NTD Boundary (east)	264.5	WNW	5.1
9	Proposed Accomodation Camp	281.3	ENE	2.1
10	Winu Soak (ridge)	244.1	S	18
11	Near Mine (east)	256.3	WNW	7.5
12	Airstrip (west)	267.5	WNW	13
13	Texas	287.5	NW	18.5
14	Rimfire	278.8	WNW	25
15	Magnum (west)	265	WNW	37

DATA SOURCES:
SOURCE DATA: WIND TURBINES, TSF, WRL, DEVELOPMENT ENVELOPE, TRACKS (RIO TINTO, 2023).
ELEVATION (DEMS, GEOSCIENCE AUSTRALIA, 2010). CONTOURS DERIVED FROM DEMS (GSA, 2010).
VIEWSHED DERIVED FROM MERGED RASTER SURFACE: DEMS (GEOSCIENCE AUSTRALIA, 2010) MERGED
WITH WRL AND TSF RASTER SURFACE.
IMAGERY: ESRI BASEMAP DEC 2021 - JAN 2022.
SERVICE LAYERS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, FAO, USGS, NGA



VIEWSHED - WIND TURBINES
HALF HEIGHT (118 M)

WINU PROJECT
VISUAL IMPACT ASSESSMENT



COORDINATE SYSTEM: GDA 1994 MGA ZONE 51
PROJECTION: TRANSVERSE MERCATOR
DATUM: GDA 1994
UNITS: METER

N

03691215 km

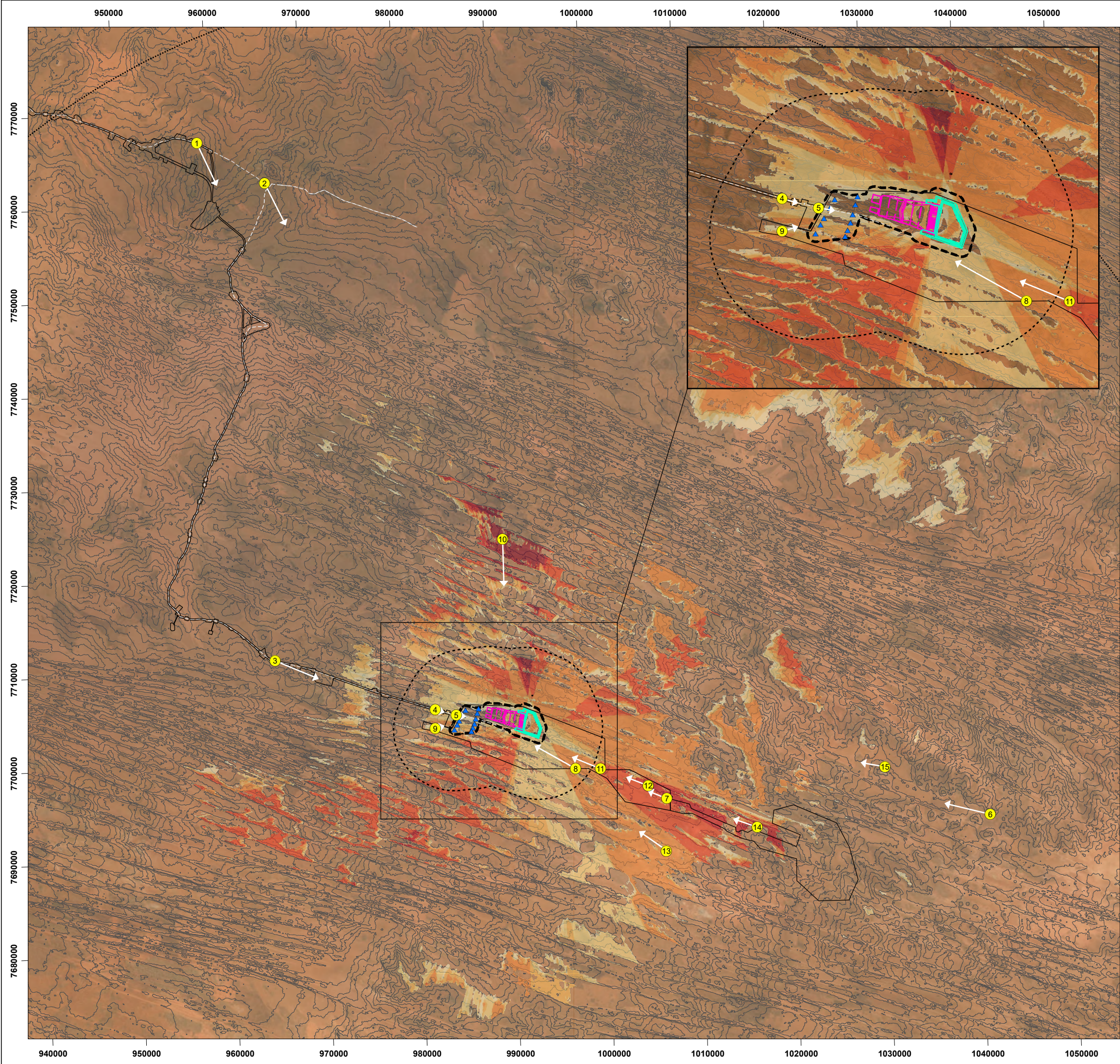
SCALE: 1:400,000 @ A3

PROJECT NO: 5107-24

REV	AUTHOR	APPROVED	DATE
0	SB	PJ	13/02/2024

MAP

6



LEGEND

- View Points
- Wind Turbine Locations
- Photo Direction
- Contours 5m (Geoscience Australia, 2010)
- Waste Rock Landform (WRL)
- Tailings Storage Facility (TSF)
- Unsealed track (permit required)
- Winu Project Development Envelope

Distance Zones

- Foreground (0-500 m)
- Mid-ground (0.5-6.5 km)
- Background (6.5+ km)

Viewshed - WRL crest

Value (visible crest points)

8

1

VP	Name	Elevation (m AHD)	View Direction	Distance (km)
1	Camp 1	182.6	SSE	67
2	Nyangumarta Hwy & Wirikirr Wirikirr Rd	190.4	SSE	60.2
3	Wirikirr Wirikirr Rd & Copperhead Rd (on road)	268.3	ESE	20.5
4	Copperhead Road (NW Approach)	288.3	ESE	2.8
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13	Texas	287.5	NW	18.5
14	Rimfire	278.8	WNW	25
15	Magnum (west)	265	WNW	37

DATA SOURCES:
SOURCE DATA: WIND TURBINES, TSF, WRL, DEVELOPMENT ENVELOPE, TRACKS (RIO TINTO, 2023).
ELEVATION (DEMS, GEOSCIENCE AUSTRALIA, 2010). CONTOURS DERIVED FROM DEMS (GSA, 2010).
VIEWSHED DERIVED FROM MERGED RASTER SURFACE: DEMS (GEOSCIENCE AUSTRALIA, 2010) MERGED
WITH WRL AND TSF RASTER SURFACE.
IMAGERY: ESRI BASEMAP DEC 2021 - JAN 2022.
SERVICE LAYERS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, FAO, USGS, NGA



VIEWSHED - CREST
WASTE ROCK LANDFORM

WINU PROJECT
VISUAL IMPACT ASSESSMENT



COORDINATE SYSTEM: GDA 1994 MGA ZONE 51
PROJECTION: TRANSVERSE MERCATOR
DATUM: GDA 1994
UNITS: METER

N

0 3 6 9 12 15 km

SCALE: 1:400,000 @ A3

PROJECT NO: 5107-24

REV 0

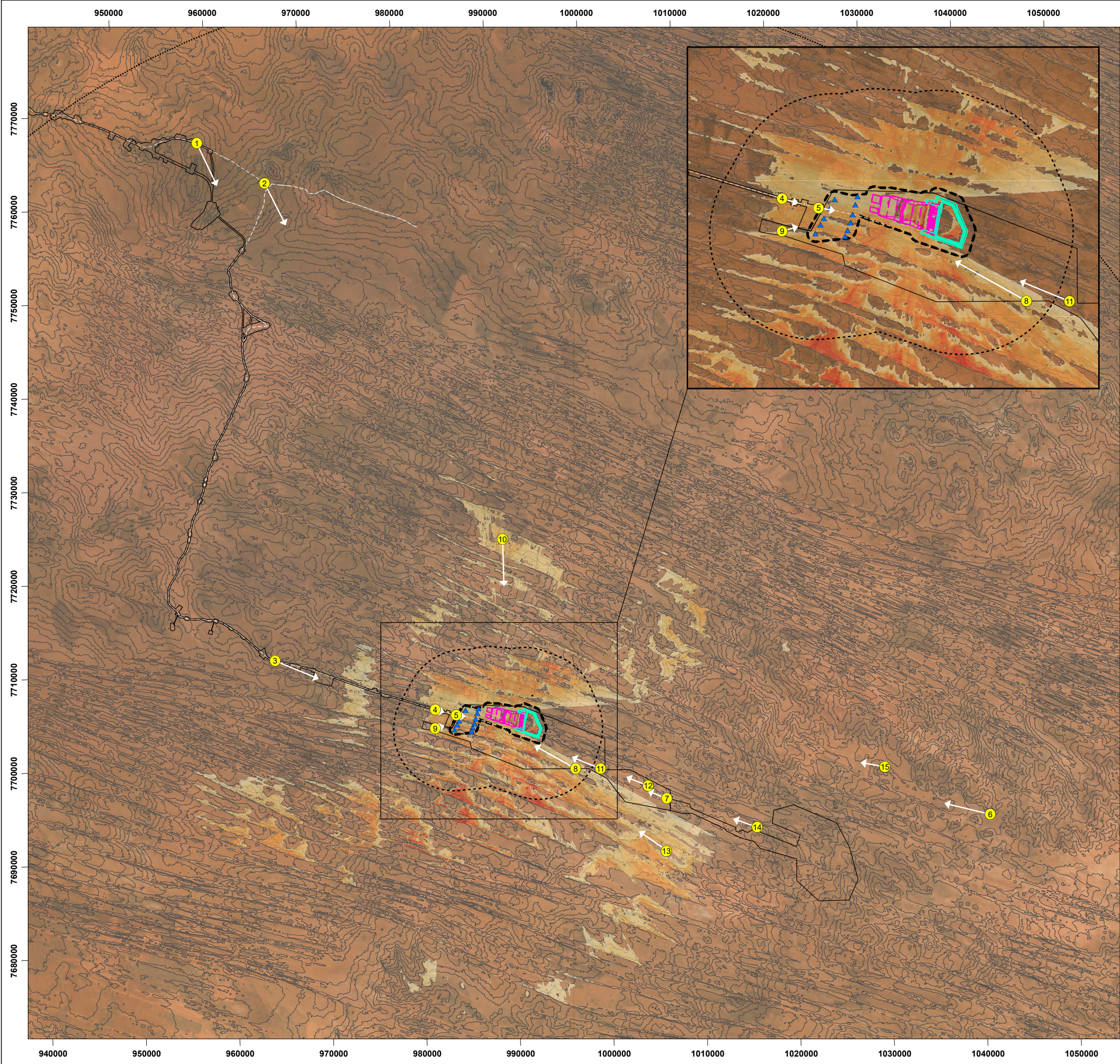
AUTHOR SB

APPROVED PJ

DATE 13/02/2024

MAP

7



LEGEND

- View Points
- Wind Turbine Locations
- Photo Direction
- Contours 5m (Geoscience Australia, 2010)
- Waste Rock Landform (WRL)
- Tailings Storage Facility (TSF)
- Unsealed track (permit required)
- Winu Project Development Envelope

Distance Zones

- Foreground (0-500 m)
- Mid-ground (0.5-6.5 km)
- Background (6.5+ km)

Viewshed - TSF crest

Value (visible crest points)

15 Observers

1

VP	Name	Elevation (m AHD)	View Direction	Distance (km)
1	Camp 1	182.6	SSE	67
2	Nyangumarta Hwy & Wirikirr Wirikirr Rd	190.4	SSE	60.2
3	Wirikirr Wirikirr Rd & Copperhead Rd (on road)	268.3	ESE	20.5
4	Copperhead Road (NW Approach)	288.3	ESE	2.8
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DATA SOURCES:
SOURCE DATA: WIND TURBINES, TSF, WRL, DEVELOPMENT ENVELOPE, TRACKS (RIO TINTO, 2023).
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WITH WRL AND TSF RASTER SURFACE.
IMAGERY: ESRI BASEMAP DEC 2021 - JAN 2022.
SERVICE LAYERS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
WORLD TOPOGRAPHIC MAP: ESRI, HERE, GARMIN, FAO, USGS, NGA



VIEWSHED - CREST
TAILINGS STORAGE FACILITY

WINU PROJECT
VISUAL IMPACT ASSESSMENT



COORDINATE SYSTEM: GDA 1994 MGA ZONE 51
PROJECTION: TRANSVERSE MERCATOR
DATUM: GDA 1994
UNITS: METER

N

SCALE: 1:400,000 @ A3

0 3 6 9 12 15 km

PROJECT NO: 5107-24

REV	AUTHOR	APPROVED	DATE
0	SB	SB	13/02/2024

MAP

8

APPENDIX ONE PREFERENCE INDICATORS

The table below lists the preference indicators for natural landscapes (WAPC, 2007).

Most preferred natural characteristics
+ high degrees of perceived naturalness + high degree of topographic variety (dramatic relief, ruggedness, rock outcrops, outstanding ridgelines and beach forms) + vegetative diversity (distinctive patterns, species composition, height, colour and texture) + diversity of vegetation age and density (structural complexity) + unusually expansive landforms or vast horizontal scale (desert landscapes, beach and dune fields, rolling hills) + presence of water bodies (waterfalls, rivers, estuaries, oceans, lakes, inundated areas) + distinctive displays of colour: soils, vegetation (often seasonal), topography, rock formations or water bodies + distinctive landscape features (waterfalls, unique plants, reefs, geological formations, cliff faces and granite outcrops) + outstanding combinations of landform, vegetation patterns and water features in one area + seascapes (combinations of ocean, reefs, beach, dune formation, coastal rocks, coastal vegetation) + areas frequently prone to ephemeral features (fauna, water or wave conditions, beach erosion scarps, climatic conditions).
Least preferred natural characteristics
+ disturbed areas with little evidence of naturalness + areas of diseased, dead or dying vegetation + areas with severe weed infestations in a natural landscape + areas of soil erosion (especially where human-induced) + water bodies with degraded banks, weed infestations, stagnation, eutrophication, algae or litter + evidence of mining (gravel pits, sand mines, limestone).

APPENDIX TWO SIGNIFICANCE LEVELS

The table below lists the significance levels which also refer to public sensitivity (WAPC, 2007).

Level 1: national / state significance
+ State highways and other main roads (sealed or unsealed) with high levels of vehicle usage + designated tourist routes, scenic drives + recreation, conservation, cultural or scenic sites, areas, viewpoints and Lookouts of state or national significance, including their access routes + walking, cycle or bridle Tracks of national or state significance + towns, settlements or residential areas + passenger rail lines + navigable waterways of national or state recreation importance + ocean sites of national or state recreation importance e.g. surf breaks + views of national or state importance.
Level 2: regional significance
+ main roads with moderate levels of vehicle usage (sealed or unsealed) + recreation, conservation, cultural or scenic sites, areas, viewpoint, and Lookouts of regional or high local significance (including their access routes) + navigable waterways of regional recreation significance + walk, cycle or bridle paths of regional significance + views of regional importance.
Level 3: local significance
+ all remaining roads with low levels of vehicle usage + locally significant roads or tracks + recreation and other use areas of local significance + navigable waterways of local recreational significance + walk, cycle or bridle paths of local significance + views of local importance.
Explanatory note - significance increases with the: + importance of views, including type, features and rarity + volume of use of roads, trails and navigable waterways + degree of sensitivity of viewers; those who are more likely to be more sensitive include wilderness users, other recreational users, tourists, people who choose to live in an area because of its landscape character and views (e.g. assessed by noting how vocal observers are about specific travel routes or use areas, indicated in letters, protests etc.) + degree to which experiencing the landscape is integral to enjoyment of a travel route or site Is it the focus of the use, as in recreational use, or just incidental, as is more likely with people using a route to work? + length of duration of a view; range could include glimpses from a high-speed road, longer duration views obtained from roads used for sightseeing or from recreation sites and Lookouts and very long and frequent views from the main living areas of homes.