

Goyder North Renewable Energy Facility:

Heritage Impact Assessment

FINAL REPORT

Prepared for Neoen Australia Pty Ltd

1 February 2024

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Glossary

BESS	Battery Energy Storage System
Biosis	Biosis Pty Ltd
Burra Charter	<i>Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance</i>
CHL	Commonwealth Heritage List
CMP	Conservation Management Plan
DCCEW	Australian Government Department of Climate Change, Energy, the Environment and Water
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GNREF	Goyder North Renewable Energy Facility
GML	GML Heritage Pty Ltd
GRZ	Goyder Renewables Zone
Heritage Act	<i>Heritage Place Act 1993</i>
HIA	Heritage Impact Assessment
kV	Kilovolt
MW	Megawatts
MWh	Megawatt hours
NHL	National Heritage List
NRM	Natural Resource Management
Neoen	Neoen Australia Pty Ltd
NSW	New South Wales
SA	South Australia
WTG	Wind turbine generators

1. Introduction

1.1. Project background

Biosis Pty Ltd (Biosis) has been commissioned by Neoen Australia Pty Ltd (Neoen) to provide heritage advice and a Heritage Impact Assessment (HIA) for the Goyder North Renewable Energy Facility (GNREF) (the project) as part of the wider Goyder Renewables Zone (GRZ) project in Burra, South Australia (SA) (Figure 1 and Figure 2). The proposed project site is located north-east of Burra and east of the Mount Bryan township in the Goyder Regional Council area.

A HIA was prepared for the Goyder South Wind Farm in 2020 by GML Heritage Pty Ltd (GML) and this HIA utilises some information in the previous report to inform this assessment of the GNREF.

1.2. Statutory context

1.2.1. Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The proposed GNREF project is subject to the provisions of the EPBC Act as it is located near to the National Heritage listed Australian Cornish Mining Sites (Burra).

The EPBC Act and associated *Environment Protection and Biodiversity Regulations 2000* provides protection for the environment (including heritage) on Commonwealth land and the protection of Matters of National Environmental Significance which include items on the Commonwealth Heritage List.

Pursuant to s. 26 of the EPBC Act; *The Commonwealth or a Commonwealth agency must not take inside or outside the Australian jurisdiction an action that has, will have or is likely to **have a significant impact on the environment** inside or outside the Australian jurisdiction*.

For proposed actions situated on Commonwealth land or which may impact on Commonwealth land, the guidelines actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies *Significant Impact Guidelines 1.2* apply. The guidelines require the proponent to undertake a self-assessment process to decide whether or not the action is likely to have a significant impact on the environment, including the heritage value of places. If an action is likely to have a significant impact an Environmental Clearance Certificate and/or an EPBC Act referral must be prepared and submitted to the Minister for approval.

What is significant impact?

A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

In assessing impacts on heritage values on Commonwealth land under the *Significant Impact Guidelines 1.2* National Heritage place, the *Significant Impact Guidelines 1.2* present a number of questions to be answered.

Is there a real chance or possibility that the action will:

- Permanently destroy, remove or substantially alter the fabric (physical material including structural elements and other components, fixtures, contents, and objects) of a heritage place.

- Involve extension, renovation, or substantial alteration of a heritage place in a manner which is inconsistent with the heritage values of the place.
- Involve the erection of buildings or other structures adjacent to, or within important sight lines of, a heritage place which are inconsistent with the heritage values of the place.
- Substantially diminish the heritage value of a heritage place for a community or group for which it is significant.
- Substantially alter the setting of a heritage place in a manner which is inconsistent with the heritage values of the place.
- Substantially restrict or inhibit the existing use of a heritage place as a cultural or ceremonial site.

1.2.2. Heritage Places Act 1993

Heritage in SA is principally protected by the *Heritage Place Act 1993* (Heritage Act) which was passed for:

the purpose of the identification, recording and conservation of places and objects of non-Aboriginal heritage significance; to establish the South Australian Heritage Council.

The Act is administered by the South Australian Heritage Council, and provides strategic advice to the Minister for Climate, Environment and Water and to the Minister for Planning on heritage-related matters.

Part 4, division 1, section 16 of the Heritage Act outlines that a place is of heritage value if it satisfies one or more of the following criteria:

- Demonstrates important aspects of evolution of State history.
- Has rare, uncommon or endangered qualities that are of cultural significance.
- May yield information relevant to States history including its natural history.
- Is an outstanding representative of a particular class of places of cultural significance.
- Demonstrates a high degree of creative, aesthetic or technical accomplishment or is an outstanding representative of particular construction techniques or design characteristics.
- Has strong cultural or spiritual associations for the community or group within it.
- Has a special association with the life or work of a person or organisation or an event of historical importance.

Impacts to State Heritage Places are assessed by the Department of Environment and Water and require a Heritage Impact Statement. Works to a State Heritage Place also require development approval under the Heritage Act. The *Development Act 1993* and its successor, the *Planning, Development and Infrastructure Act 2016* requires a planning authority to refer a development application affecting a State Heritage Place or State Heritage Area to the Minister responsible for the Heritage Act for response. Impacts to the state heritage significance of the Burra State Heritage Area have been assessed within this HIA.

1.3. Report methodology

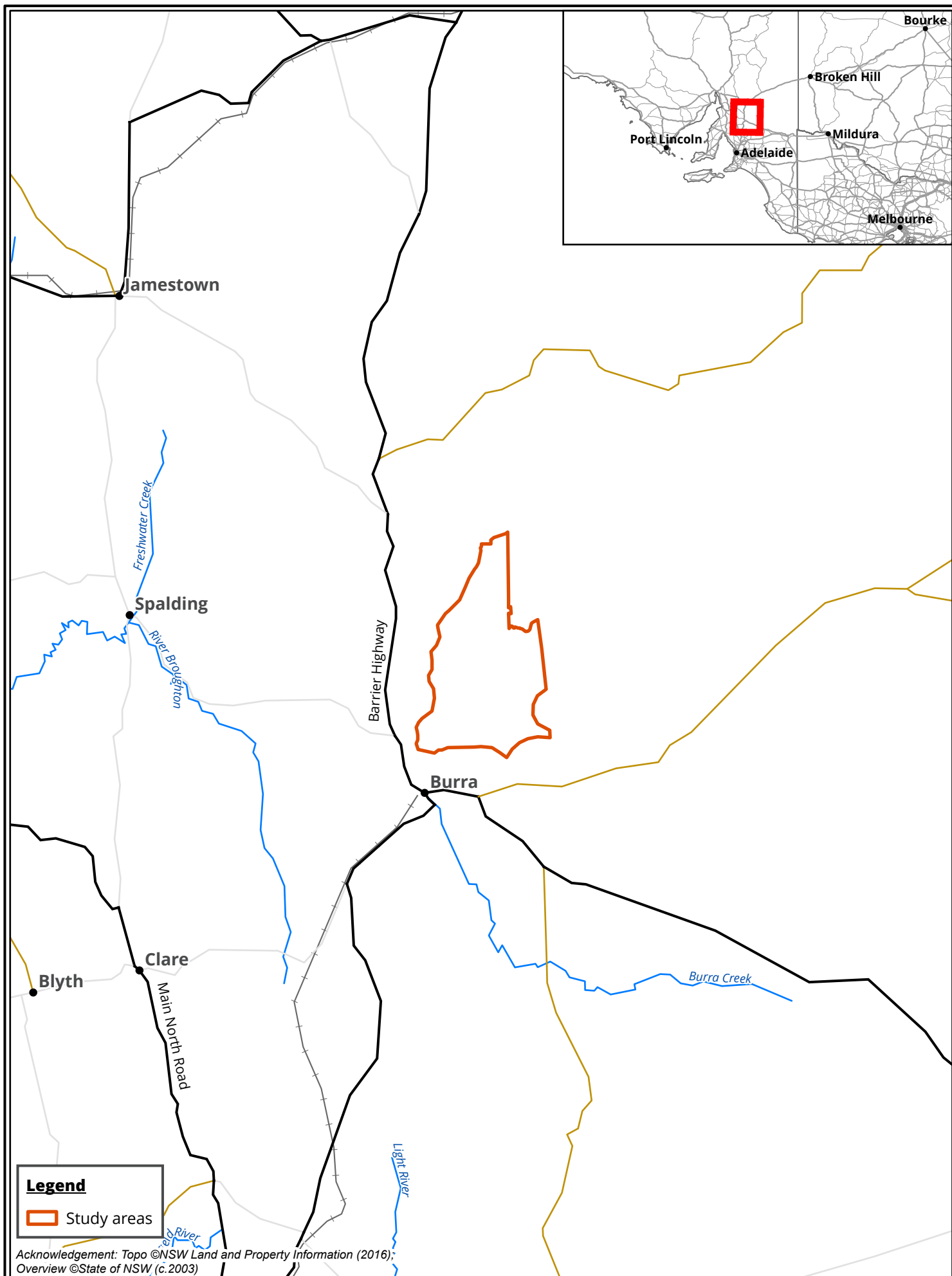
This report was prepared in accordance with the principles outlined in the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (Commonwealth of Australia 2013), *Heritage Impact Statement Guidelines for State Heritage Places* (DEWNR 2013), and the *Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Burra Charter) (Australia ICOMOS 2013).

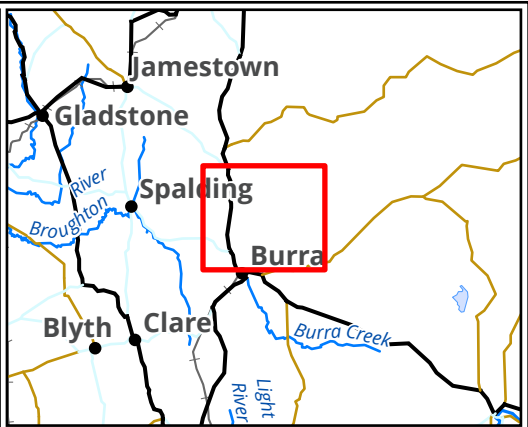
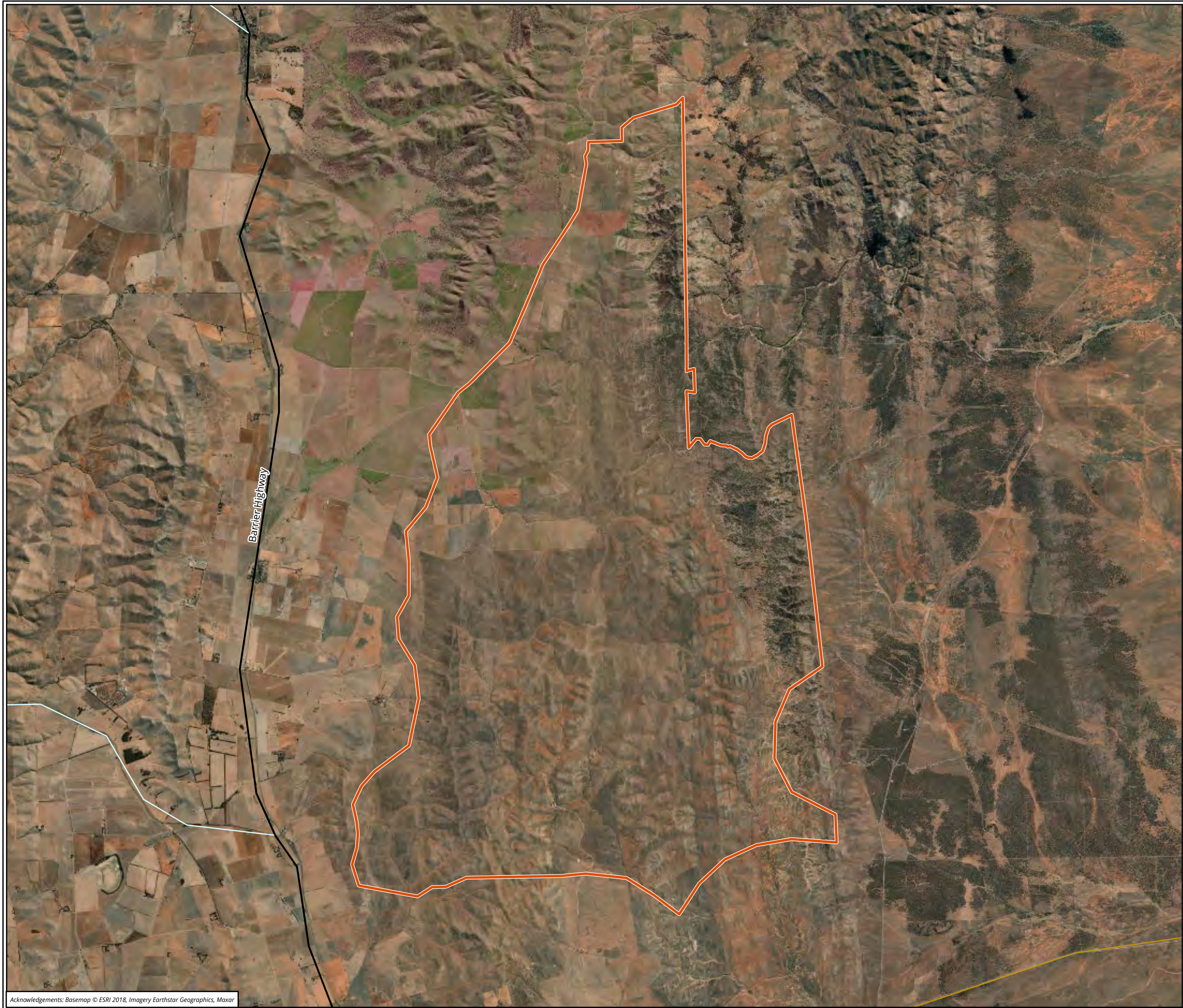
1.4. Investigators and contributors

This report was prepared by Anthea Vella, Senior Heritage Consultant, Biosis. This report has been reviewed by Claire Nunez, General Manager (New South Wales (NSW)).

1.5. Limitations of the report

This HIA has included an assessment of impacts to the National Heritage values of the Australian Cornish Mining Sites (Burra) and on the state heritage significance of the Burra State Heritage Area. This HIA does not address any other local heritage listings or local planning schemes. This HIA has been prepared to undertake an overall assessment of the visual impacts on Burra as this will also capture the individual listings.

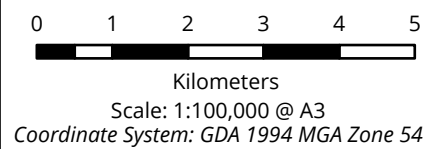




Legend

 Study area

Figure 2 Study area detail



Matter: 37855,
Date: 07 November 2023 ,
Prepared for: AV, Prepared by: AM, Last edited by: amackegard
Layout: 37855_F2_StudyArea
Project: P:\37800s\37855\Mapping\
37855_GoyderNorth.aprx

2. Site character and setting

2.1. Site

The project site is located approximately 5.5 kilometres north-east of the centre of Burra in the Goyder Local Government Area (Figure 1 and Figure 2). The area is located in the eastern portion of the Mount Lofty Ranges and wholly located within the Regional Council of Goyder. The surrounding landscape is characterized by pastoral and grazing land on rolling hills.

In the vicinity of the project there is the National Heritage listed Australian Cornish Mining Sites (Burra), and the Burra State Heritage Area (Figure 3, Appendix 1 and Appendix 2). The Burra State Heritage Area incorporates 70 places and one object on the South Australian Heritage Register.

The history of Burra has been previously detailed in the National Heritage Listing (NHL) for the Australian Cornish Mining Sites (Burra) (Appendix 1) and the state listing (Appendix 2).

2.2. Views to Goyder North from Burra

Views towards the proposed Goyder North site from Burra are included in Photo 1 to Photo 18, also noted on Table 1, and the locations of these photos are also shown on Figure 4. For consistency with the Goyder South HIA, the same locations for the photo viewpoints were used, with photos taken in the direction of the proposed Goyder North site (GML 2020). These locations were also used for the photomontage (see Section 4.1).



Photo 1 **View from Burra Cemetery facing north**



Photo 2 **View from chimney facing north-east**



Photo 3 **View from Church, facing east**



Photo 4 **View from Morphett's Enginehouse facing north (red arrow showing approximate location of the proposed turbines – obstructed view)**



Photo 5 **View from gate facing north-east**



Photo 6 **View from Hampton Township facing north**



Photo 7 **View from Hampton Township facing north**



Photo 8 **View from Mine Lookout facing north**



Photo 9 **View from Mine Lookout facing north-east**



Photo 10 **View from Ore Dressing Tower facing north**



Photo 11 **View to the ranges along the Goyder Highway facing east**



Photo 12 **View from Redruth Gaol facing north**



Photo 13 View from Burra Smelting Works facing north-east



Photo 14 View from Burra along the Barrier Highway facing north



Photo 15 View from Burra along Commercial Street facing east



Photo 16 View from Burra Town Lookout facing east



Photo 17 View from Burra Town Lookout facing north-east



Photo 18 View from Burra Town Hall facing north



Photo 19 View from Morphett's Enginehouse facing north-east (Source: Neoen)

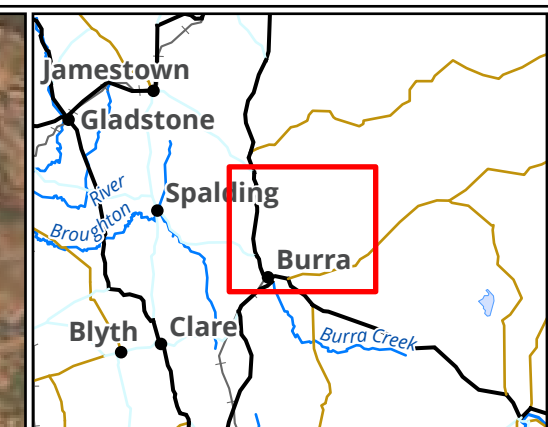
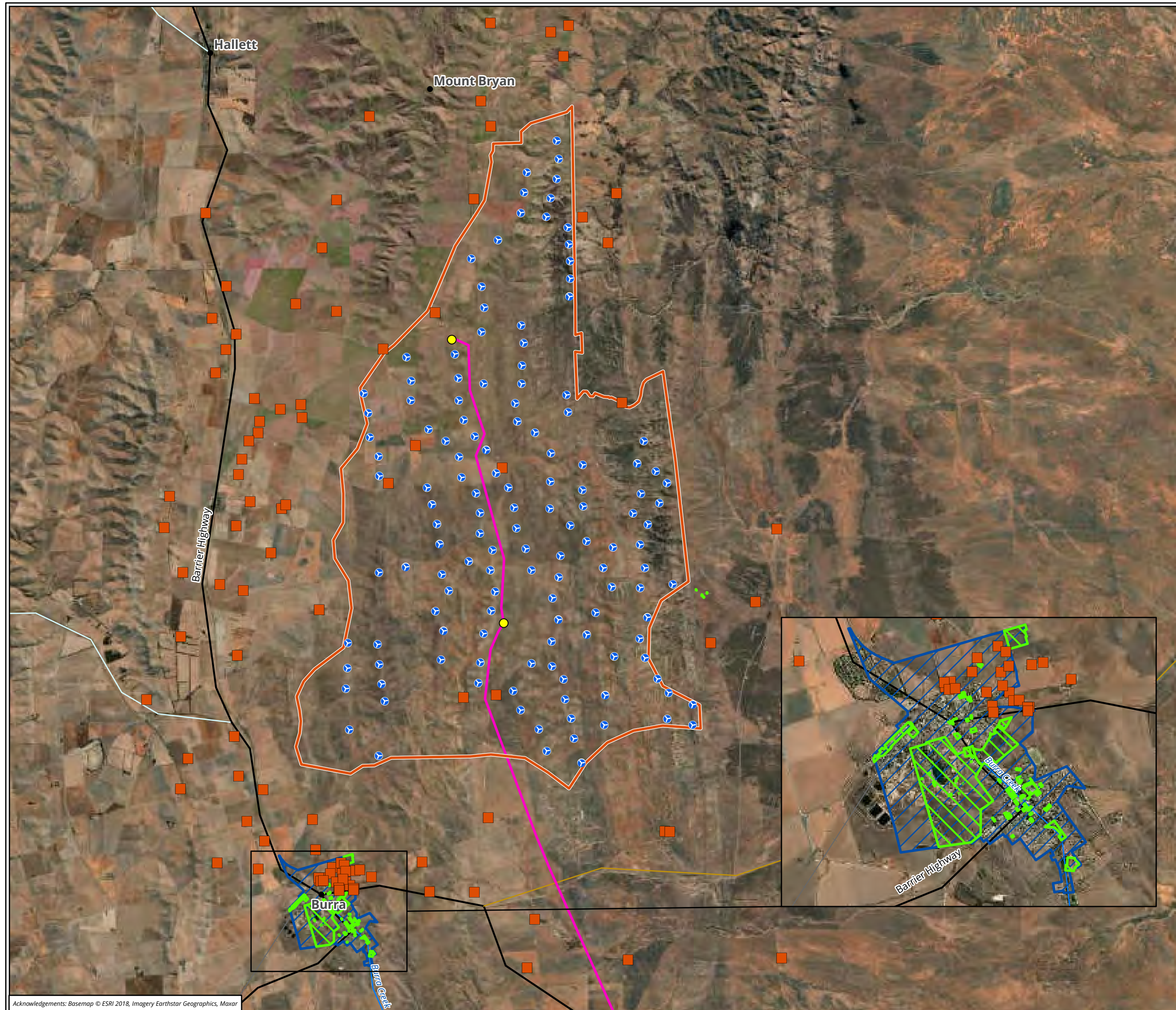


Photo 20 View from Mine Lookout facing south (Source: Neoen)

Table 1 Photo point directions

Photo no.	Date	Description	Orientation
1	12/10/2022	View from Burra Cemetery	N
2	12/10/2022	View from chimney	NE
3	12/10/2022	View from Church	E
4	12/10/2022	View from Morphett's Enginehouse	N
5	12/10/2022	View from gate	NE
6	12/10/2022	View from Hampton Township	N
7	12/10/2022	View from Hampton Township	N
8	12/10/2022	View from Mine Lookout	N

Photo no.	Date	Description	Orientation
9	12/10/2022	View from Mine Lookout	NE
10	12/10/2022	View from Ore Dressing Tower	N
11	12/10/2022	View to the ranges along the Goyder Highway	E
12	12/10/2022	View from Redruth Gaol	N
13	12/10/2022	View from Burra Smelting Works	NE
14	12/10/2022	View from Burra along the Barrier Highway	N
15	12/10/2022	View from Burra along Commercial Street	E
16	12/10/2022	View from Burra Town Lookout	E
17	12/10/2022	View from Burra Town Lookout	NE
18	12/10/2022	View from Burra Town Hall	N
19	30/01/2024	View from Morphet's Enginehouse	NE
20	30/01/2024	View from Mine Lookout	S



Legend

- Study area
- ⚓ Wind turbine
- Dwellings
- GN substations
- Overhead transmission line

Historical heritage

- National heritage item
- State heritage item

Figure 3 Heritage items in the vicinity of the study area

0 1 2 3 4 5

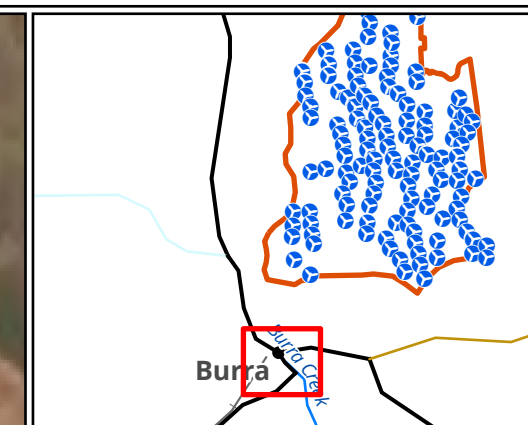
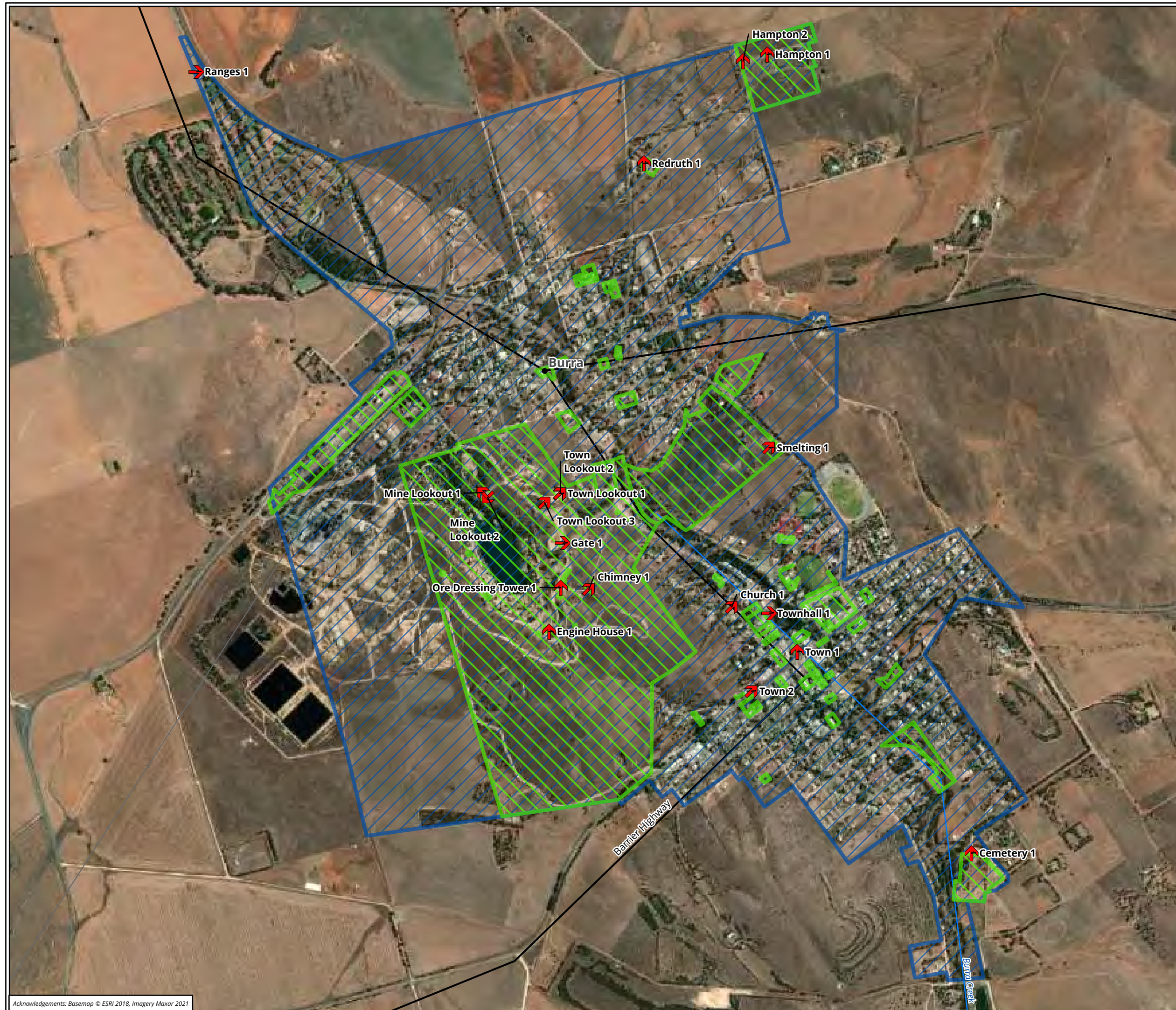
Kilometers

Scale: 1:120,000 @ A3

Coordinate System: GDA2020 MGA Zone 54



Matter: 37855,
Date: 22 January 2024 ,
Prepared for: AV, Prepared by: AM, Last edited by: jtowndsend
Layout: 37855_F3_HeritageItems
Project: P:\37800s\37855\Mapping\
37855_GoyderNorth.aprx



Legend

- Study area
- Wind turbine
- ↑ Photo point

Historical heritage

- National heritage item
- State heritage item

Figure 4 Photo points

0 100 200 300 400 500
Meters
Scale: 1:14,000 @ A3
Coordinate System: GDA 1994 MGA Zone 54



Matter: 37855,
Date: 08 January 2024 ,
Prepared for: AV, Prepared by: AM, Last edited by: jtownsend
Layout: 37855_F4_PhotoPoints
Project: P:\37800s\37855\Mapping\
37855_GoyderNorth.aprx

3. Proposed project

The information in the following sections (3.1, 3.2, 3.4, 3.4 and part of 3.5) has been provided by Neoen.

3.1. Description

Neoen is developing the GNREF as a part of its wider GRZ concept. As a part of this concept, the Goyder South Hybrid Renewables Energy Project was granted Development Approval in 2021 with construction of stage 1 beginning in 2022, consisting of 412 megawatts (MW) of wind generation. The GRZ represents one of the most ambitious renewable energy developments proposed in South Australia and is ideally located to complement Project EnergyConnect, a large interconnector to New South Wales currently under construction by ElectraNet and TransGrid.

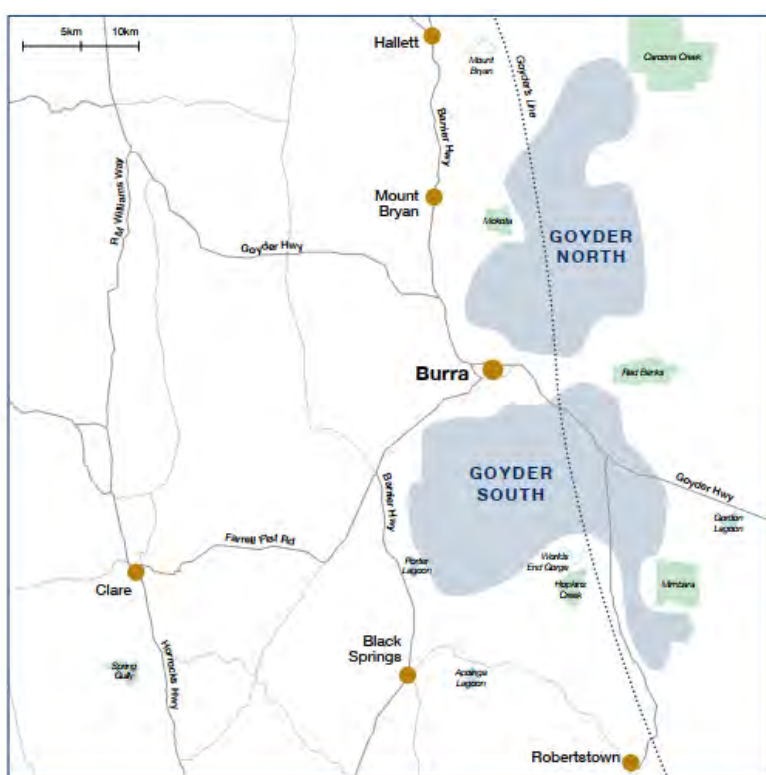


Photo 21 Goyder Renewables Zone concept (Source: Neoen)

Neoen aims to build on the success of the Goyder South project and continue the progress of the GRZ concept with the GNREF development. The proposed project site is located north-east of Burra and east of the Mount Bryan township in the Goyder Regional Council area. The project will comprise of up to 1000MW of wind generation and 900 MW/3,600 megawatt hour (MWh) of Battery Energy Storage Systems (BESSs); including wind turbine generators (WTGs), BESS technology, meteorological masts, buried collector cables, electrical substations, operations and maintenance buildings and an overhead transmission line to connect the wind farm to the existing ElectraNet Transmission network. The overhead transmission line is proposed to connect into the Bunday substation which is being built for the SA-NSW interconnector (Project EnergyConnect). Given the scale of wind energy generation that would be achieved by the development of the GNREF, it will likely be developed in stages, though it is not yet possible to determine the size of each stage as it is dependent on demand from electricity customers. The Goyder North site is characterised by

world-class wind resources and complimentary land uses (comprising primarily of marginal grazing land located on the edge of Goyder's Line).

3.2. Project location

The southern boundary of the proposed development is approximately 5.5 kilometres north-east of the centre of Burra. It extends approximately 22 kilometres to the north, with the northern tip being a distance of approximately 10.2 kilometres north-west of the centre of Hallett. Its western-most boundary is also positioned approximately 4.4 kilometres west of the centre of the Mount Bryan township. It is approximately 14.5 kilometres east to west at its greatest width at the south of the site, tapering to its narrowest width of 3 kilometres in the northern portion. The land within the development site is generally privately owned and comprises predominantly dryland cropping and grazing.

The area is located in the eastern portion of the Mount Lofty Ranges and wholly located within the Regional Council of Goyder. From a transport and access perspective, the region is serviced by the Barrier Highway and the Burra-Morgan Highway (Goyder Highway). The project is located within the Mid North Region and the SA Murray-Darling Basin Natural Resource Management (NRM) Area. This area is generally described as a transitional zone between cropping and pastoral country. It is noted that the project is not located within a prescribed water resources area.

3.3. Timing

Each construction stage is expected to take approximately 24-36 months. Depending on the assessment process, it is proposed that construction of Stage 1 of the GNREF will commence during mid- to late 2025. Stage 2 is proposed to start after completion of Stage 1 construction and commissioning. These timelines are subject to the timing of each stage to reach financial close, which is dependent on several factors such as the availability of Power Purchase Agreements.

3.4. Project components

The GNREF development comprises:

- A multi-stage wind farm of up to 135 turbines (previously 138) with a capacity of approximately 1000 MW, a maximum hub height of 160 metres, a maximum blade length of 90 metres, and an overall maximum height (tip height) of 240 metres.
- BESS facilities comprising a total of 900 MW / 3,600 MWh within four fenced compounds of approximately 9.769 hectares each.
- Associated infrastructure for connection to the electricity grid including substations, access tracks, underground connection cabling and transmission lines.
- Temporary construction compounds for wind components, including concrete batching plants.
- A number of meteorological masts (in addition to those already on site) to record wind speed and other meteorological data, both pre- and post- construction.

It is envisaged that the project would be built in stages in response to the market demand and Power Purchase Agreement availability. While the size of each stage is not yet certain, the current intention is to construct two stages of up to approximately 500 MW of wind generation and 450 MW / 1,800 MWh storage per stage.

More specifically, the project will comprise:

1. **Wind turbine generators:** Up to 135 turbines with a maximum tip height of 240 metres. The final sizing will depend on the specific wind resource characteristics of each portion of the site and the requirements of individual power purchasers and may be less than these maximums.
2. **Collector substations:** The project will include at least two 'collector' substations located centrally to each stage of wind farm development. This likely includes a substation in the southern portion of the project area and one in the northern portion. These substations will be connected by an overhead transmission line as described below. The footprint of the substations has been developed to encompass the substation, switchyard, control room(s), switchroom(s), and maintenance shed. Additional land near these substations has been included to accommodate operations and maintenance facilities and temporary construction-phase facilities.
3. **BESSs:** Up to four BESS locations, each comprising of a fenced compound of approximately 9.769 hectares.
4. **Overhead transmission line:** There will be a multi-circuit 275 or 330 kilovolts (kV) overhead transmission line connecting the two substations and then extending from the southern substation to ElectraNet's Bunday Substation. Each BESS will also be connected to a substation via an overhead transmission line.

Temporary construction facilities will also be required and include the following:

- Up to three wind construction compounds (200 metres x 200 metres).
- Up to four battery construction compounds (150 metres x 150 metres).
- The construction compounds will include office, staff amenities, and carparking facilities.
- Temporary batching plant facilities (150 metres x 150 metres).
- Temporary Overhead Transmission Line construction compounds (150 metres x 150 metres).
- Temporary civil contractor compounds.
- Other temporary construction areas including storage and laydown areas (150 metres x 150 metres).
- Laydown areas will also be required at the base of each turbine.

All construction facilities and construction impact areas will be decommissioned at the conclusion of the construction phase.

Neoen are seeking a 200 metre micro-siting allowance for all of the permanent project elements in order to ensure that the project maximises shared land use opportunities and generation efficiencies, whilst minimising impacts on landform, flora, fauna, and residents.

Details of the site and component dimensions are provided in Table 2 and Photo 22.

Table 2 GNREF site details and maximum component dimensions

Project name	Goyder North Renewable Energy Facility
Capacity	Up to approximately 1000 MW wind generation and 900MW / 3,600 MWh energy storage.
Staging	Estimated 2 stages of up to approximately 500 MW wind generation and 450MW / 1,800 MWh energy storage each.

Project name	Goyder North Renewable Energy Facility
Wind Turbine Generators	• Max number – 135 • Max height – 240 metres • Max blade length – 90 metres • Max rotor diameter – 180 metres Footings may be either a mass concrete footing (raft style), piled type rock anchors, or a combination of both at approximately 30 metres in diameter.
Battery Energy Storage Systems	• Max total capacity – 900 MW / 3,600 MWh • Four fenced compounds of approximately 9.769 hectares
Transmission lines	275 or 330 kV multi-circuit overhead line connecting the wind farm substations and then to the grid (Bundey substation). Transmission towers of up to 65 metres height with a footprint of approximately 26 metres x 26 metres. Spaced approximately 200-400 metres apart.
Met masts	3 existing approved met masts (all installed for prior Mount Cone project) Likely to include an additional 10 met masts with a height similar to the hub height of the proposed turbines and including appropriate aviation safety markers. The specific locations have yet to be identified as this depends on the final micro-siting of the turbines.
Collector substations	A fenced compound of approximately 200 x 200 metres. Including substation and ancillary equipment.
Operations & Maintenance	A fenced compound adjacent to both substations of approximately 75 x 50 metres. Comprising buildings (office, staff amenities), car park area, workshop, and laydown area.
Access tracks	Access tracks will be up to 10 metres wide to accommodate construction activities and cranes and designed to be of acceptable gradient. Following construction these tracks will be rehabilitated under the advice of the Country Fire Service.
Underground cabling	Underground cabling for transmission (33-66 kV) and communications (fibre). Generally located adjacent to access tracks. Trench width approx. 500 millimetres per circuit and depth approx. 1.2 metres (900 millimetre coverage on top). Impact areas of 5 metre width for single cable plus 2 metre for additional cable.

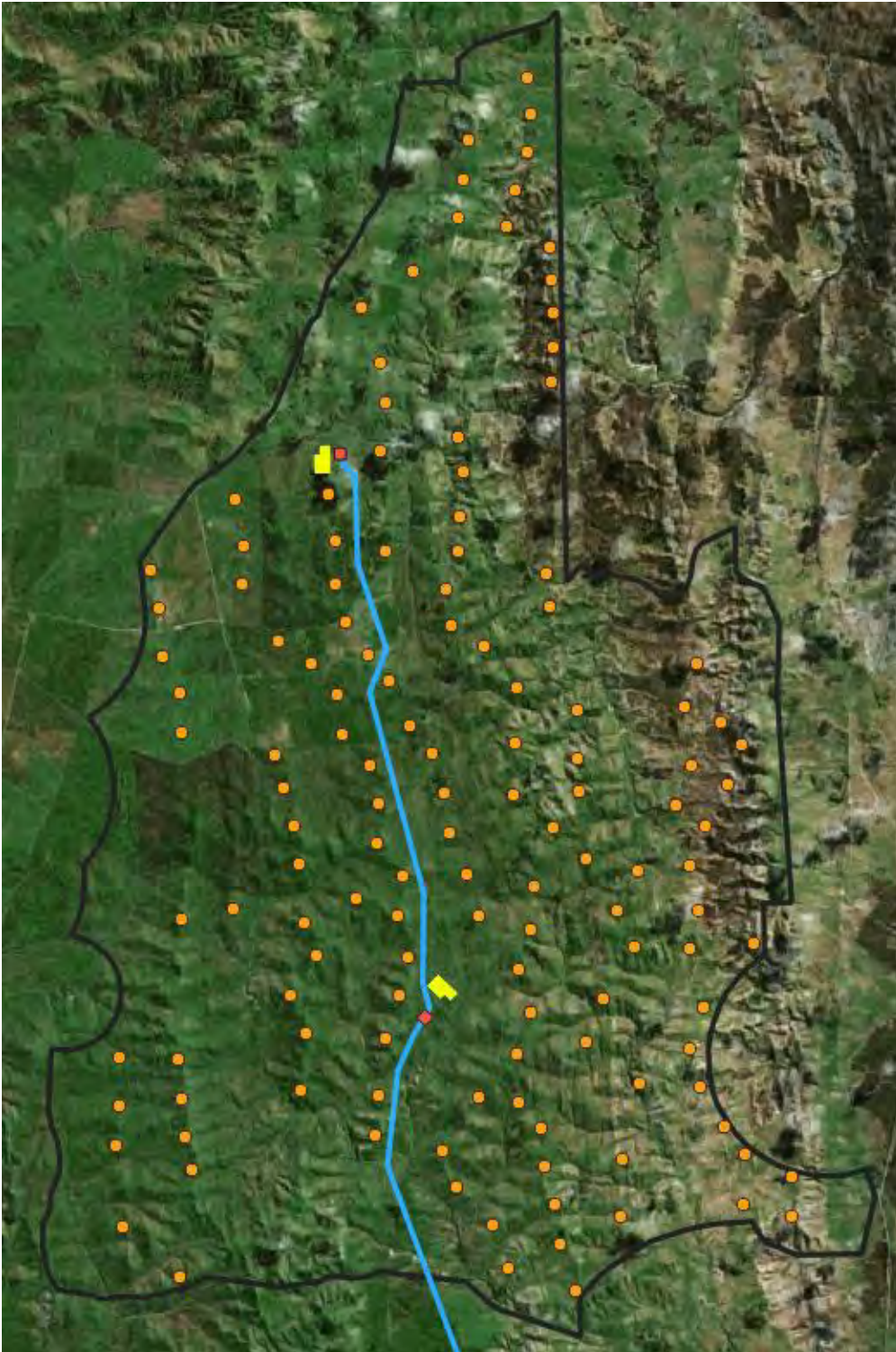


Photo 22 GNREF proposed site boundary and layout (Source: Neoen 2024)

3.5. Heritage input to project

Biosis has provided heritage advice for this project regarding views from the National Heritage listed Australian Cornish Mining Sites (Burra), and the Burra State Heritage Area. This has been summarised in Table 3. Although the project includes BESSs and overhead transmission lines the only impacts are from the wind turbines which have been assessed in this HIA. The heritage input to the project has aimed to minimise

the visual impacts as much as possible on Burra. Advice provided to Neoen has resulted in the removal of several turbines, which has reduced the potential for visual impacts on the town. As noted in the previous section this is comparable to those present for the Goyder South Wind Farm, currently in construction.



Table 3 Summary of heritage advice for the project

Image of layout

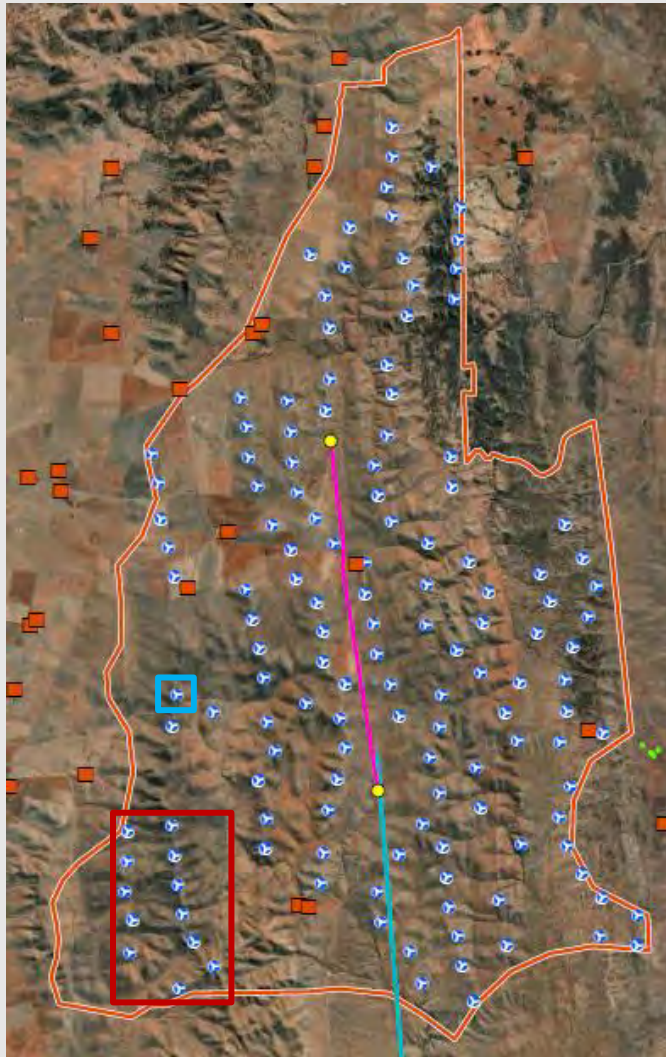


Photo 23 Turbine layout A (September 2022)

Heritage advice and input

The four turbines located in the south-western corner of Goyder North were clearly visible from Burra (T02, T06, T12, T19 – also outlined in red on Photo 23).

Removal of these four turbines were recommended and Neoen removed these from the layout (see Photo 24).

Image of layout**Photo 24** Turbine layout B (October 2023)**Heritage advice and input**

The 12 turbines located in the south-western corner of Goyder North were also considered to be intrusive on views from Burra (GN001 to 006 and GN014 to 019) given their location and proximity to Burra. These are outlined in red on Photo 24. An additional turbine (GN_012) was also recommended for removal (individual turbine outlined in red on Photo 24 and also see Photo 25). Removal of the 13 turbines was recommended. Neoen indicated that the 12 turbines in the south-western corner may not be able to be moved from the proposed layout due to cost/overall performance however this would be considered. The individual turbine outlined in blue on Photo 24 was removed by Neoen.

Image of layout

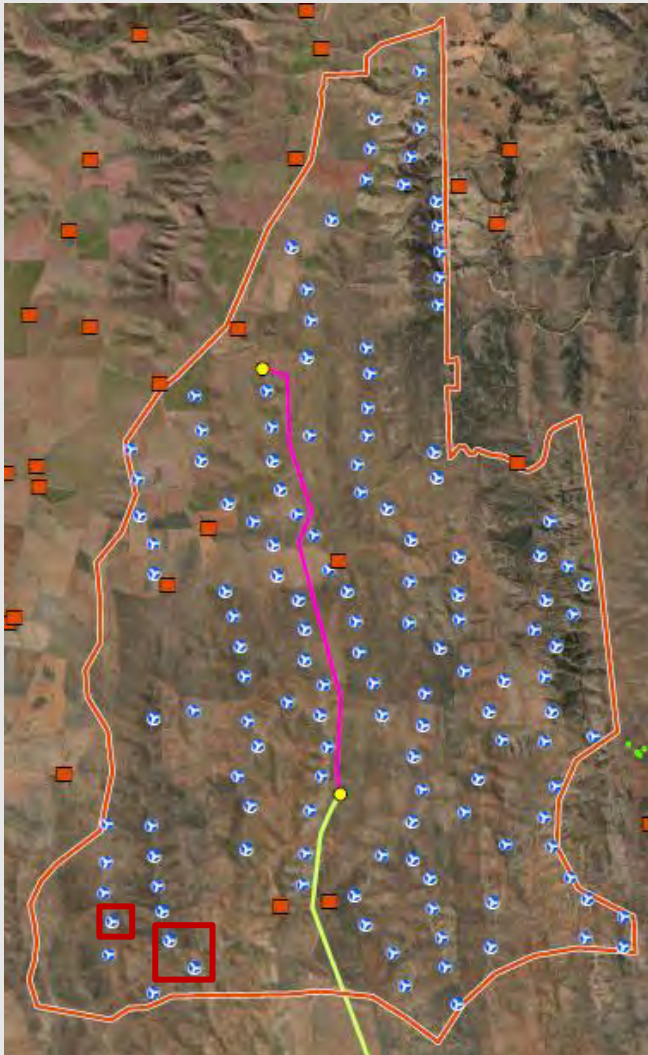


Photo 25 Turbine layout C (October 2023)

Heritage advice and input

Following initial changes to the layout, further review and analysis showed that the number of turbines grouped together in the south-western corner of Goyder North had an increased impact on the view from Burra (WTG_004, WTG_018, and WTG_019). These are outlined in red on Photo 25.

Removal of these three turbines was recommended as they were determined to heavily impact the view from Burra (there were crowding of turbines which made the turbines the focus of the view as compared to the landscape). Neoen agreed to have those three turbines removed from the project (see Photo 26).

Image of layout

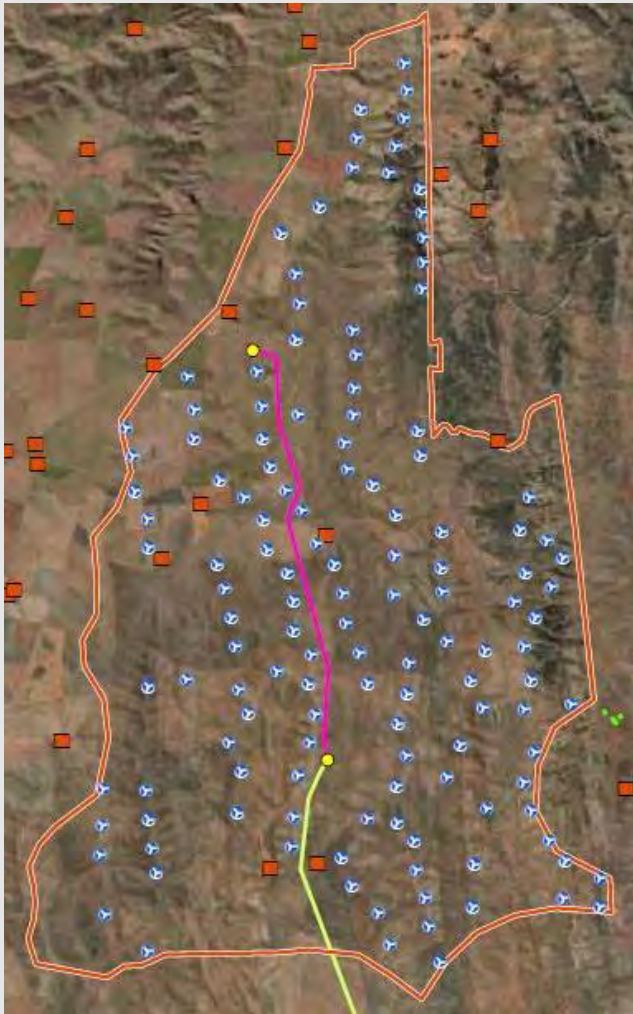


Photo 26 **Turbine layout D – final layout (December 2023)**

Heritage advice and input

The final layout for Goyder North is shown on Photo 26, with a total of eight turbines removed from the initial layout shown on Photo 23. Overall, impacts have been reduced with moderate impacts still present in the south-western corner.

Five WTGs identified as some of the highest performing locations on the site were removed from the initial layouts even though they were compliant with the proposed setbacks. Set upon the ridge closest to the Barrier Highway and Burra Township it was deemed that, despite their expected performance, they provided an unacceptable visual impact to the area and were removed.

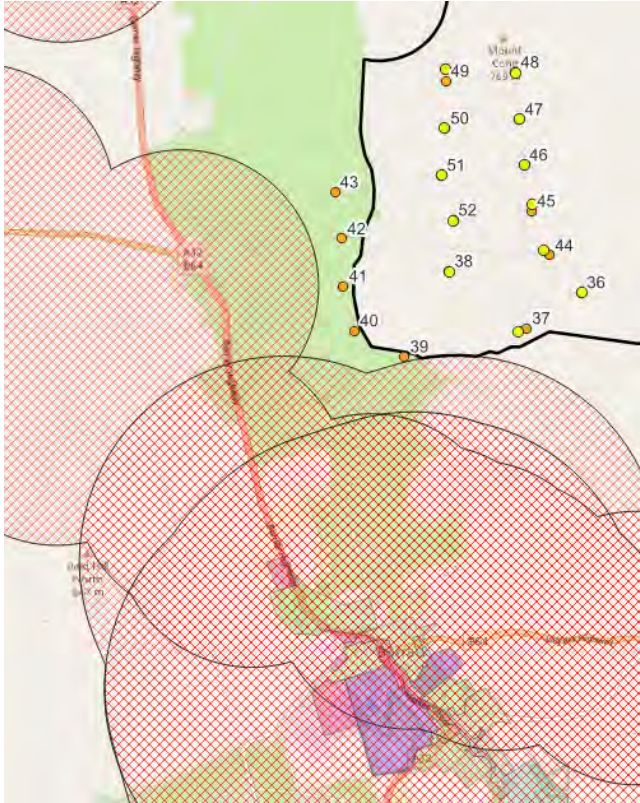
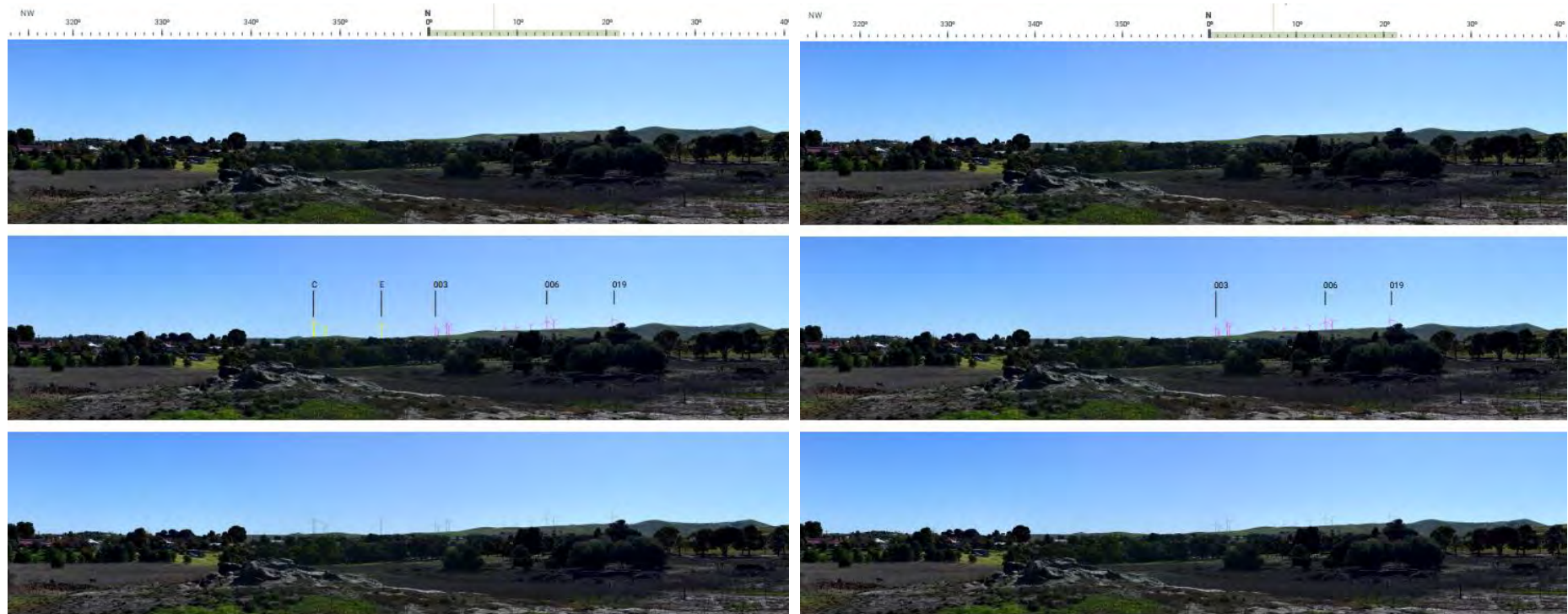


Photo 27 WTG 39 – WTG 43 were removed from the initial layout to reduce the visual impact of the project
(Source: Neoen 2023)



Photo 28 Image (a) shows the view from the Haulage Enginehouse Chimney based on the initial layout (including highest performing turbines). Image (b) shows the view with these turbines removed and the reduced visual impact (Source: Neoen 2023)



(a)

(b)

Photo 29 Image (a) shows the view from the Smelting Works site based on the initial layout (including highest performing turbines). Image (b) shows the view with these turbines removed and the reduced visual impact (Source: Neoen 2023)

Throughout this process, Neoen has sought advice from various consultants, including both visual impact and heritage specialists. The production of wire frame images and photomontages have been instrumental in assisting our advisory teams to provide sound and evidence-based advice. The proposed layout now has a reduced visual impact and has setbacks that exceed those proposed and is comparable to those present for the Goyder South Wind Farm, currently in construction. This has also been detailed further in Section 3.5.

The following images demonstrate the achieved setbacks from both the National Heritage area, State Heritage areas and the Residential Zones of the township of Burra. Please note that Photo 30 and Photo 31 include an earlier layout for the turbines, however the setback is still applicable to the current project boundary and layout.

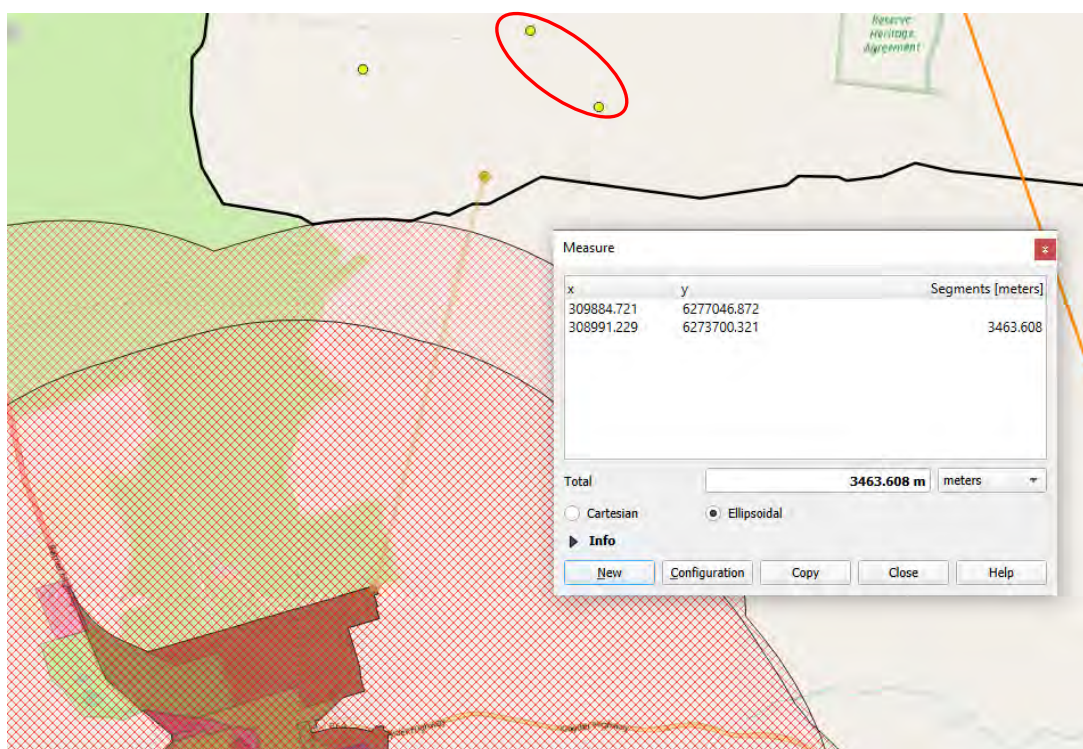


Photo 30 This shows a setback of greater than the proposed 3000 metres from both National and State Heritage Areas near Burra. Turbines circled in red have been removed from the current layout (Source: Neoen 2023)

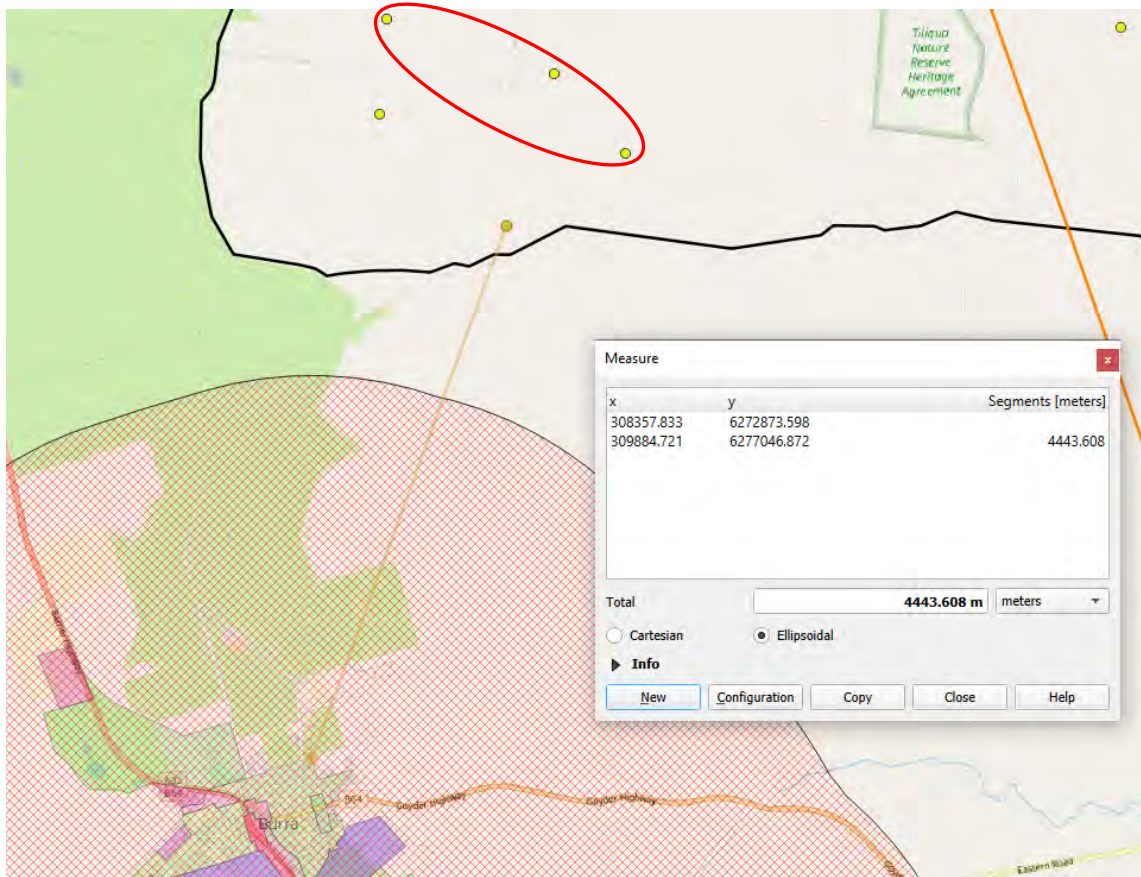


Photo 31 This shows a setback of greater than the proposed 3000 metres from Residential Zone of Burra. Turbines circled in red have been removed from the current layout (Source: Neoen 2023)

4. Assessment of heritage impacts

4.1. Setting of Burra

The proposed project is not located within the curtilage of the state heritage listed Burra or the National Heritage listing of the Australian Cornish Mining Sites (Burra), and therefore there are no direct impacts to the physical fabric of the listed sites. The potential impacts on the National Heritage and State Heritage values are therefore visual and have been assessed in this HIA. The National Heritage listing citation can be found in Appendix 1, and State Heritage listing citation in Appendix 2.

Photomontages showing the landscape and visual impact assessment have been prepared by Green Bean Design Pty Ltd and are included in Appendix 3. These photomontages show how the wind turbines will be viewed from Burra, and an assessment of the view for each photomontage location are included in Table 4.

Table 4 Assessment of views for each photomontage/photo location

Photomontage location	Assessment of views	Impact
PM1 – Kangaroo Street, Burra	Existing object located in line with the proposed turbines. Turbines are located in the distance. View is not crowded by the turbines. This photo location is also located inside of the NHL curtilage and state heritage area.	Moderate
PM2 – Kangaroo and Church Street	Turbines are visible, and predominantly spaced out. Landscape is the main focus of the view. This photo location is also located inside of the NHL curtilage and state heritage area.	Moderate
PM3 – Town Hall steps, Burra	Partially obstructed view with some turbines present. This photo location is also located inside of the NHL curtilage and state heritage area.	Low
PM4 – Mount Pleasant Street, Burra	Obstructed view no turbines present. This photo location is also located inside of the NHL curtilage and state heritage area.	Nil
PM5 – Burra Mine (toward Morphet’s Enginehouse and Windinghouse)	Turbines are visible and are spaced out. Photo location is a high point in the landscape. This photo location is also located inside of the NHL curtilage and state heritage area.	Major
PM6 – Dressing tower	Turbines are visible in the distance and are spaced out. This photo location is also located inside of the NHL curtilage and state heritage area.	Moderate
PM7 – Haulage Enginehouse Chimney	Turbines are visible in the distance and are spaced out. This photo location is also located inside of the NHL curtilage and state heritage area.	Moderate
PM8 – Town Lookout	Turbines are visible in the distance and are spaced out. Photo location is a high point in the landscape. This photo location is also located inside of the NHL curtilage and state heritage area.	Moderate
PM9 – Smelting Works Site	Turbines are visible in the distance and are spaced out. This photo location is also located inside of the NHL curtilage and state heritage area.	Moderate

Photomontage location	Assessment of views	Impact
PM10 – Butterworth Street, Burra	Turbines are visible in the distance and are spaced out. This photo location is also located inside of the NHL curtilage and state heritage area.	Moderate
PM11 – Redruth Gaol	Obstructed view no turbines present. This photo location is also located inside of the NHL curtilage and state heritage area.	Nil
PM14 – East Terrace, Mount Bryan	Turbines are visible in the distance and are spaced out. This photo location is also located outside of the NHL curtilage and state heritage area.	Low
PM18 – Burra Cemetery	Obstructed view no turbines present. This photo location is also located inside of the NHL curtilage and state heritage area.	Nil
PM19 - Josephs Church	Obstructed view no turbines present. This photo location is also located inside of the NHL curtilage and state heritage area.	Nil
PM20 - Burra Square	Obstructed view no turbines present. This photo location is also located inside of the NHL curtilage and state heritage area.	Nil
PM21 - Burra Mine Lookout	Obstructed view no turbines present. This photo location is also located inside of the NHL curtilage and state heritage area.	Nil
PM22 - Hamptons Village	Obstructed view no turbines present. This photo location is also located inside of the NHL curtilage and state heritage area.	Nil

4.2. National Heritage Vales

Table 5 is an assessment of the potential for impacts from the proposed action on the National Heritage values of the Australian Cornish Mining Sites (Burra). The criterion has been taken from the NHL citation (DCCEEW 2017).

Table 5 National Heritage values for the Australian Cornish Mining Sites (Burra)

Criterion	Assessment of Potential Impact
Criterion A – Events, Processes	
The 'Burra' copper mine operated profitably for thirty two years from 1845 to 1877. This mine was one of the early and first copper mines in Australia, established following finds of copper in South Australia. The copper mines at Burra and Kapunda (a much smaller mine) mark the beginning of Australia's base metal mining industry. This new form of deep, hard rock mining required new skills and technology not then present in Australia. Mining for copper required the skills of miners who knew how to establish mines and systematically mine them in a way which created the best return for the effort and cost required to access the ore body. Cornish technology, embodied in the steam engines, work practices and ore processing methods applied in the early copper mines of South Australia, was critical to the establishment and ongoing economic viability of these mines. The application of steam power in particular was essential. Without steam power copper mining was impossible. Over the course of the nineteenth century Australia began to move from a pre-industrial agrarian based society and economy to one which was rapidly industrialising. At Burra, Cornish miners established a system of mining on a 'greenfield' site, transplanting from one of the world's most advanced centres of machine innovation (Cornwall) an emergent form of industry which was being shaped by a new revolutionary machine, the steam engine. South Australia's colonial relationship with Britain enabled access to Britain's steam engine technology which at the time was protected to prevent transfer to competitor nations. Steam power was not just an 'improving' technology - it was revolutionary. The power of one boiler for example replaced the power of one thousand men. Burra is of outstanding importance because Burra remains, with Moonta, one of only two areas in Australia where Cornish mining technology, skills and culture is demonstrated to a high degree. Burra represents the Cornish mining system's successful transplantation in Australia. Features which express these values include an outstanding collection of nineteenth century civic, residential, church and Cornish mining built structures, all located	The proposed Goyder North project will be undertaken approximately 5.5 kilometres north-east from the centre of Burra and approximately 2.7 kilometres from the most northern point of the NHL for the Australian Cornish Mining Sites (Burra). The proposed Goyder North project is not located within the NHL town of Burra. Therefore, there is no physical impact to the NHL for the Australian Cornish Mining Sites (Burra). The views from Burra are not explicitly cited in the National Heritage Criterion A. The location of the proposed project will not disturb, alter or change the events or processes under Criterion A, and will not alter the significant remanent mining technology that is included in Criterion A. There are seven photomontage views from around the township of Burra that have been assessed to have nil impacts as the view to the turbines is obstructed (PM4, PM11, PM18-22). There are some photomontage views from specific locations around Burra and within the Burra mine site, including PM1-3, and PM5-11, that will be moderately impacted. The turbines are clearly visible in the distance and do change the distant setting of the town towards the north-east of the town. The turbines are contained in a group and there are still wider landscape views from Burra to the north and west that are not altered. The distant view from these locations is altered and the turbines are clearly a new element on the horizon, but the immediate setting of the heritage site and immediate vicinity of the significant remanent mining technology is not dominated by the turbines. The mine site can still be understood in a broader rural context while moving through the remnant mining infrastructure. The turbines would be the most obvious when standing at the highest points of the mine site, at look outs and up on hill rises; however, the view to the turbines is mostly obstructed by the topography when exploring the mine site and reading interpretive signage at lower ground level (Photo 4, Photo 19, Photo 20).

Criterion	Assessment of Potential Impact
within the former villages (Kooringa, New Aberdeen, Aberdeen, Llwwchr, Hampton) and mine at Burra. In relation to the demonstration of Cornish mining technology, skills and practice the following items in or near to the Burra Mine Area are significant including but not limited to the former Winding House, the former Ore Sorting Floor, the former Crusher Chimney (Cornish), the former Morphetts Pump House, the former Engine/Crusher House, the former Mine Manager's Dwelling and Office, the former Graves Pump House, the former Haulage Engine Chimney (Welsh), the former Powder Magazine, Peacock's Chimney (Cornish), the former SA Mining Association Store Room, Yard and Walls (Market Street) and the former SA Mining Association Storeman's Dwelling (Market Street). The Burra Mines Historic Site as a whole is also significant as a place which on the surface and underground demonstrates the layout of surface and underground mining operations. The remnant underground shafts including but not limited to Morphetts shaft, Hector shaft and Waterhouse Shaft with their connecting horizontal levels are significant for their ability to demonstrate underground mining practice in association with the arrangement of surface mining structures. In relation to the demonstration of smelting technology used to improve the economic viability of the mine, the following items in the Smelter area to the east of the Burra Mine Area are significant including but not limited to the Former Burra Smeltsynd and Storehouse, the former Burra Smelts Historic Site (including Smelter Ruins, Smelter Furnace Ruins, Smelts Manager's Residence and Office) and the former Smelts Superintendent's Dwelling and Wall. In relation to the demonstration of the Cornish miner's living conditions and ways of life which enabled them to mine, the following items are significant including but not limited to the former Miner's Dugouts (tributary of Burra Creek), the former Dugout Sites (Burra Creek), the small, attached dwellings on Truro Street in Redruth (street numbers 8, 9, 10, 11, 12, 13, 14, 16 and 18), the stone cottages and dwellings on Upper Thames Street in old Kooringa (street numbers 2, 4, 6, 8, 10, 12, 16), the former Burra Primitive Church (9 Upper Thames Street), the Paxton Square cottages (33), the former Burra Bible Christian Chapel (Kingston Street), the former Smelter's Home Hotel (SAHR 10419 ' Market Street), the Burra Hotel (SAHR 10404 ' Market Street), the former Burra Salvation Army Citadel (11 Kingston Street) and a 1840s timber dwelling (39 Commercial Street ' SAHR 10434) and Burra Town Hall (original	The distant rural setting of Burra would be altered to the north-east and therefore the potential impacts have been assessed as moderate adverse.

Criterion	Assessment of Potential Impact
Miners' and Mechanics' Institute). While the Cornish miners were mostly Methodist in faith the following early Anglican Churches are significant for their representative demonstration of the importance of religion in these miner communities including St Mary's Anglican Church and St Mary's Anglican Church Hall. In relation to the demonstration of the speculative nature of mining operations, the former Bon Accord Mine Buildings (SAHR10023) are significant including but not limited to the 1859 mine offices, blacksmith's forge, carpenter's shop and a manager's residence. The following additional features also reflect the Cornish influence within the town of Burra including but not limited to the stone wall located on the east side of Commercial Street and Ware Street, Burra (SAHR 10435) and the stone wall located on the west side of Commercial Street (SAHR 10436) in Burra. Burra is distinctive in its development from a group of smaller townships including Kooringa (Company town), Redruth (Government surveyed town), Aberdeen (Scottish speculators), New Aberdeen (Scottish association), Llwwchwr (Welsh Smelter workers) and Hampton (new mining settlement named after the assayer at the smelting works). The names of these townships reflect the mining history of Burra and the haphazard nature of its development as a mining settlement. The Hampton Township Precinct (SAHR 10359) represents the impact of the decline of the mine and the consequent loss of population when the Burra Mine closed in 1877. The features of significance include but are not limited to Jacka House, the remnant street and allotment layout, fences, walls and remnant stone domestic buildings and introduced trees such as almond, pine, olive and pepper trees and the remains of the quarries that provided stone for the dwellings. Burra Cemetery (SAHR 10432 Spring Street, Burra) is also significant as a place which, through the headstones within the cemetery, chronicles the lives and misfortunes of the mining community up to 1877. These stories are valued as an important complementary record of the life of Cornish miners in Burra.	
Criterion F – Creative or Technical achievement	
At Burra, Cornish miners established a system of mining on a 'greenfield' site, transplanting from Cornwall – one of the world's most advanced centres of machine innovation – an emergent form of industry which was being shaped by a new revolutionary machine, the steam engine. Welsh smelting technology was also successfully established at the mine soon after its establishment.	The proposed Goyder North project will be undertaken approximately 5.5 kilometres north-east from the centre of Burra and approximately 2.7 kilometres from the most northern point of the NHL for the Australian Cornish Mining Sites (Burra). The proposed Goyder North project is not located within the NHL town of Burra.

Criterion	Assessment of Potential Impact
This achievement created a 'prototype' system which could then be repeated and applied in other later significant mining ventures such as Broken Hill in NSW, Bendigo in Victoria, Kalgoorlie in WA and Charters Towers in Queensland. Cornish mining traditions continued to be used and improved as Cornish miners moved from one mine to another across the country. This achievement also demonstrates the important role technology played in the evolution of Australia's industrialised modern economy. Features which express these values include the remnant mining structures within the Burra Mines Historic Site (SAHR 10970) and all of the significant features listed under criterion (a).	Therefore, there is no physical impact to the NHL for the Australian Cornish Mining Sites (Burra). The views from Burra are not explicitly cited in the National Heritage Criterion F. The location of the proposed project will not disturb, alter or change the mining technology or the creative or technical achievement under Criterion F. There are seven photomontage views from around Burra that have been assessed to have nil impacts as the view to the turbines is obstructed (PM4, PM11, PM18-22). There are some photomontage views from specific locations around Burra and within the Burra mine site, including PM1-3, and PM5-11, that will be moderately impacted. The turbines are clearly visible in the distance and do change the distant setting of the town towards the north-east of the town. The turbines are contained in a group and there are still wider landscape views from Burra. The distant view from these locations is altered and the turbines are clearly a new element on the horizon, but the immediate setting of the mine site is not dominated by the turbines. The mine site can still be understood in a broader rural (greenfield) context while moving through the remnant mining infrastructure. The turbines would be the most obvious when standing at the highest points of the mine site, at look outs and up on hill rises; however, the view to the turbines is mostly obstructed by the topography when exploring the mine site and reading interpretive signage at lower ground level (Photo 4, Photo 19, Photo 20). The proposed turbines would also be completely out of view when observing the mine from the Mine Lookout, as the view faces south (Photo 20). The altering of the distant views to the north-east from the mine site would not impact on the understanding of the revolutionary mining technology. The distant rural setting of Burra would be altered to the north-east and therefore the potential impacts have been assessed as moderate adverse.

4.3. State Heritage Values

Table 6 is an assessment of the potential for impacts from the proposed action on the State heritage significance of Burra. The statement of significance has been taken from the State Heritage listing (Government of South Australia 1993).

Table 6 State Heritage values for the State Heritage significance of Burra

Statement of Significance	Assessment of Potential Impact
The Burra State Heritage Area is of significance to the economic and social history of South Australia, and is a testament to the success of copper mining in the area. In the late 1840s, the Burra Mine made South Australia the most prosperous colony in Australia. At one stage the mine was the second largest producer of copper in the world. Comprising the mining area and a complex of what were originally separate townships which are now merged into one, the area provides evidence of early mining, industrial and urban functions with Welsh and Cornish influences.	The proposed Goyder North project will be undertaken approximately 5.5 kilometres north-east from the centre of Burra and approximately 2.7 kilometres from the most northern point of the Hampton Township Precinct (SAHR 17652). The proposed Goyder North project is not located within the town of Burra. Therefore, there is no physical impact to the State Heritage significance of Burra. The proposed project will not physically disturb, alter or change the listed items in the Burra State Heritage Area. There are seven photomontage views from around Burra that have been assessed to have nil impacts as the view to the turbines is obstructed (PM4, PM11, PM18-22). This includes Hamptons Village where the topography would obscure views of the turbines. There are some photomontage views from specific locations around Burra and within the Burra mine site, including PM1-3, and PM5-11, that will be moderately impacted. The turbines are clearly visible in the distance and do change the distant setting of the town towards the north-east of the town. The turbines would be the most obvious when standing at the highest points of the mine site, at look outs and up on hill rises; however, the view to the turbines is mostly obstructed by the topography when exploring the mine site and reading interpretive signage at lower ground level (Photo 4, Photo 19, Photo 20). The proposed turbines would also be completely out of view when observing the mine from the Mine Lookout, as the view faces south (Photo 20). The altering of the distant views to the north-east from the mine site would not impact on the understanding of the revolutionary mining technology. The distant rural setting would be altered to the north-east by the proposed works and therefore the potential impacts have been assessed as moderate adverse.

4.4. Conservation Management Plan

The draft *Burra Township and Historic Mine Site Conservation Management Plan* (CMP) was prepared by Swanbury Penglase (2019). The CMP details how the National Heritage values of the Australian Cornish Mining Sites can be conserved. There is one CMP Policy that relates to the setting of the Burra and this has been discussed below in Table 7.

Table 7 CMP policy for Burra

CMP Policy	Assessment of Potential Impact
Policy 5.9 - Burra's Sense of Place and the visual setting of the Burra Cornish mining sites. Future development should carefully consider the influence on Burra's visual landscape and the historic and spatial relationships of individual places of National value. Views to and from the Burra Mine site and Smelts site are of highest significance to the National Values.	The proposed Goyder North project will be undertaken approximately 5.5 kilometres north-east from the centre of Burra and approximately 2.7 kilometres from the most northern point of the NHL for the Australian Cornish Mining Sites (Burra). The proposed Goyder North project is not located within the NHL town of Burra. Therefore, there is no physical impact to the NHL for the Australian Cornish Mining Sites (Burra). There are seven photomontage views that are located inside the NHL curtilage that have been assessed to have nil impacts as the view to the turbines is obstructed (PM4, PM11, PM18-22). There are some photomontage views from specific locations around Burra and within the Burra mine site, including PM1-3, and PM5-11, that will be moderately impacted. The turbines are clearly visible in the distance and do change the distant setting of the town towards the north-east of the town. The turbines would be the most obvious when standing at the highest points of the mine site, at look outs and up on hill rises; however, the view to the turbines is mostly obstructed by the topography when exploring the mine site and reading interpretive signage at lower ground level (Photo 4, Photo 19, Photo 20). The proposed turbines would also be completely out of view when observing the mine from the Mine Lookout, as the view faces south (Photo 20). The mine site can still be understood in a broader rural (greenfield) context while moving through the remnant mining infrastructure. The altering of the distant views to the north-east from the mine site would not impact on the understanding of the revolutionary mining technology. The distant rural setting would be altered to the north-east by the proposed works and therefore the potential impacts are not generally in accordance with this policy

CMP Policy	Assessment of Potential Impact
	of the CMP. Therefore, the proposed works have been assessed as moderate adverse.

5. Conclusion

The proposed GNREF is located approximately 5.5 kilometres north-east from the centre of Burra and approximately 2.7 kilometres from the most northern point of the NHL for the Australian Cornish Mining Sites (Burra) and the most northern point of the Hampton Township Precinct (SAHR 17652). The proposed project is not located within the NHL town of Burra. Therefore, there is no direct physical impact to the NHL values for the Australian Cornish Mining Sites (Burra). Likewise, there is no direct physical impact to the values of the Burra State Heritage Area.

This HIA has focused on potential impacts to the views from Burra and the setting of the place. As noted in above, the views from Burra are not explicitly cited in the National Heritage criteria or the State Heritage statement of significance.

This HIA has assessed the proposed GNREF project to have a moderate indirect visual impact. The distant rural setting would be altered to the north-east by the proposed works as they are a new element in the currently empty horizon. However, the altering of the distant views to the north-east from the mine site would not impact on the understanding of the revolutionary mining technology.

There is one CMP Policy that relates to the setting of Burra (policy 5.9), and this HIA has noted that the proposed works are not generally in accordance with this policy. However, the view to the turbines is mostly obstructed by the topography when exploring the mine site and reading interpretive signage at lower ground level. The proposed turbines would also be completely out of view when observing the mine site from the Mine Lookout, as the view faces south.

A reduction of the number of turbines has already aided in decreasing the potential for adverse impacts on the heritage values of Burra. Further reduction in the number of turbines that are visible from the mine site in particular would further reduce the adverse visual impacts and should be considered where changes are possible to the turbine layout.

As the views from Burra are not specifically cited in the NHL criteria, the proposed Goyder North project would not have a significant impact as defined by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The proposed project will not have a substantive impact on the National Heritage values of the Australian Cornish Mining Sites (Burra).

The proposed Goyder North project would also likely not have a major adverse heritage impact on the state heritage significance of the Burra State Heritage Area.

Table 8 Significant Impact Guidelines 1.2 - Responses

Significant Impact Guidelines 1.2	Response
Permanently destroy, remove or substantially alter the fabric (physical material including structural elements and other components, fixtures, contents, and objects) of a heritage place.	N/A – the proposed GNREF is not located within the curtilage of the NHL listed town of Burra. There is no physical impact to the NHL for the Australian Cornish Mining Sites (Burra). Therefore, no fabric of a heritage place will be destroyed, removed, or substantially altered.
Involve extension, renovation, or substantial alteration of a heritage place in a manner which is inconsistent with the heritage values of the place.	N/A - the proposed GNREF is not located within the curtilage of the NHL listed town of Burra. There is no physical impact to the NHL for the Australian Cornish Mining Sites (Burra). Therefore, no extension, renovation, or substantial alteration of a heritage place which is inconsistent with the heritage values of the place will occur.
Involve the erection of buildings or other structures adjacent to, or within important sight lines of, a heritage place which are inconsistent with the heritage values of the place.	This HIA has assessed the proposed GNREF project to have visual impacts. These have been classed as moderate adverse in nature as the turbines will be grouped together which will not crowd the view of the landscape from Burra. This is a result of the heritage advice provided for the project. The views from Burra are not included in the National Heritage criteria, and therefore unlikely to significantly alter the listed heritage values. The proposed GNREF will therefore not have a significant impact on the heritage values of the place.
Substantially diminish the heritage value of a heritage place for a community or group for which it is significant.	N/A – the proposed GNREF is not located within the curtilage of the NHL listed town of Burra and does not diminish the heritage value of a heritage place for a community or group for which it is significant.
Substantially alter the setting of a heritage place in a manner which is inconsistent with the heritage values of the place.	This HIA has assessed the proposed GNREF project to have indirect visual impacts. These have been classed as moderate adverse in nature as the turbines will be grouped together which will not crowd the view of the landscape from Burra. This is a result of the heritage advice provided for the project, and therefore the wider landscape will remain the focus of the view. The views from Burra are not included in the National Heritage criteria. The distant wider rural setting and landscape will be altered with the proposed turbines, however the proposed GNREF will not impact the heritage values that Burra is listed for. The proposed GNREF will therefore not have a significant impact on the heritage values of the place.
Substantially restrict or inhibit the existing use of a heritage place as a cultural or ceremonial site.	N/A - the proposed GNREF is not located within the curtilage of the NHL listed town of Burra and does not restrict or inhibit the existing use of a heritage place as a cultural or ceremonial site.

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Appendices

Appendix 1 Australian Cornish Mining Site – Burra NHL Citation

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Australian Cornish Mining Sites: Burra, Barrier Hwy, Burra, SA, Australia

Photographs



List	National Heritage List
Class	Historic
Legal Status	Listed place (09/05/2017)
Place ID	106304
Place File No	3/08/042/0012

Summary Statement of Significance

The former copper mine at Burra represents a milestone in Australia's history of mining. During the nineteenth century the scale and richness of the copper mine at Burra marked the beginning of Australia's metal mining industry.

Using technology and skills transferred from Cornwall to Australia, the 'monster mine', for the first ten years of its life was the largest mine in Australia. Copper wealth at this time was a critical revenue source needed for the survival of the then new colony of South Australia. From 1850 to 1860 the Burra mine produced five percent of the world's copper. South Australia soon became known as the Copper Kingdom in recognition of its substantial industrial development focused on copper mining and the export of copper overseas.

The surface and underground mining operations at the Burra mine were mainly Cornish in nature. Smelting skills, technology and equipment were also imported from Wales and operated by Welsh smelter experts. Cornish technology and skills transferred to Australia and demonstrated at Burra were essential aspects in the establishment of Australia's first copper mines. The Cornish steam engine, as in Cornwall, was revolutionary, enabling for the first time the mining of metals at depths not previously possible. The deep rock mining skills bought to Australia by Cornish miners also facilitated the further expansion and development of Australia's mining industry.

The Cornish Steam engine and its use in the copper mines of South Australia also demonstrates the early course and pattern of Australia's industrialisation. Burra and Moonta former mine areas include the best remaining evidence of these Cornish machines and their application in Australia in the mid to late nineteenth century.

Burra is of outstanding heritage significance to Australia because of its very high capacity to demonstrate this major national industrial milestone. At Burra copper mining was of a substantial scale compared to other previous smaller copper mines. The transfer of Cornish mining skills and technology is best demonstrated here more than any other place in Australia.

Official Values

Criterion A Events, Processes

The 'Burra' copper mine operated profitably for thirty two years from 1845 to 1877. This mine was one of the early and first copper mines in Australia, established following finds of copper in South Australia. The copper mines at Burra and Kapunda (a much smaller mine) mark the beginning of Australia's base metal mining industry.

This new form of deep, hard rock mining required new skills and technology not then present in Australia. Mining for copper required the skills of miners who knew how to establish mines and systematically mine them in a way which created the best return for the effort and cost required to access the ore body.

Cornish technology, embodied in the steam engines, work practices and ore processing methods applied in the early copper mines of South Australia, was critical to the establishment and ongoing economic viability of these mines. The application of steam power in particular was essential. Without steam power copper mining was impossible. Over the course of the nineteenth century Australia began to move from a pre-industrial agrarian based society and economy to one which was rapidly industrialising. At Burra, Cornish miners established a system of mining on a 'greenfield' site, transplanting from one of the world's most advanced centres of machine innovation (Cornwall) an emergent form of industry which was being shaped by a new revolutionary machine, the steam engine.

South Australia's colonial relationship with Britain enabled access to Britain's steam engine technology which at the time was protected to prevent transfer to competitor nations. Steam power was not just an 'improving' technology - it was revolutionary. The power of one boiler for example replaced the power of one thousand men.

Burra is of outstanding importance because Burra remains, with Moonta, one of only two areas in Australia where Cornish mining technology, skills and culture is demonstrated to a high degree. Burra represents the Cornish mining system's successful transplantation in Australia.

Features which express these values include an outstanding collection of nineteenth century civic, residential, church and Cornish mining built structures, all located within the former villages (Kooringa, New Aberdeen, Aberdeen, Llwchwr, Hampton) and mine at Burra.

In relation to the demonstration of Cornish mining technology, skills and practice the following items in or near to the Burra Mine Area are significant including but not limited to the former Winding House, the former Ore Sorting Floor, the former Crusher Chimney (Cornish), the former Morphet's Pump House, the former Engine/Crusher House, the former Mine Manager's Dwelling and Office, the former Graves Pump House, the former Haulage Engine Chimney (Welsh), the former Powder Magazine, Peacock's Chimney (Cornish), the former SA Mining Association Store Room, Yard and Walls (Market Street) and the former SA Mining Association Storeman's Dwelling (Market Street).

The Burra Mines Historic Site as a whole is also significant as a place which on the surface and underground demonstrates the layout of surface and underground mining operations. The remnant underground shafts including but not limited to Morphet's shaft, Hector shaft and Waterhouse Shaft with their connecting horizontal levels are significant for their ability to demonstrate underground mining practice in association with the arrangement of surface mining structures.

In relation to the demonstration of smelting technology used to improve the economic viability of the mine, the following items in the Smelter area to the east of the Burra Mine Area are significant including but not limited to the Former Burra Smeltsyard and Storehouse, the former Burra Smelts Historic Site (including Smelter Ruins, Smelter Furnace Ruins, Smelts Manager's Residence and Office) and the former Smelts Superintendent's Dwelling and Wall.

In relation to the demonstration of the Cornish miner's living conditions and ways of life which enabled them to mine, the following items are significant including but not limited to the former Miner's Dugouts (tributary of Burra Creek), the former Dugout Sites (Burra Creek), the small, attached dwellings on Truro Street in Redruth (street numbers 8, 9, 10, 11, 12, 13, 14, 16 and 18), the stone cottages and dwellings on Upper Thames Street in old Kooringa (street numbers 2, 4, 6, 8, 10, 12, 16), the former Burra Primitive Church (9 Upper Thames Street), the Paxton Square cottages (33), the former Burra Bible Christian Chapel (Kingston Street), the former Smelter's Home Hotel (SAHR 10419 ' Market Street), the Burra Hotel (SAHR 10404 ' Market Street), the former Burra Salvation Army Citadel (11 Kingston Street) and a 1840s timber dwelling (39 Commercial Street ' SAHR 10434) and Burra Town Hall (original Miners' and Mechanics' Institute). While the Cornish miners were mostly Methodist in faith the following early Anglican Churches are significant for their representative demonstration of the importance of religion in these miner communities including St Mary's Anglican Church and St Mary's Anglican Church Hall.

In relation to the demonstration of the speculative nature of mining operations, the former Bon Accord Mine Buildings (SAHR10023) are significant including but not limited to the 1859 mine offices, blacksmith's forge, carpenter's shop and a manager's residence. The following additional features also reflect the Cornish influence within the town of Burra including but not limited to the stone wall located on the east side of Commercial Street and Ware Street, Burra (SAHR 10435) and the stone wall located on the west side of Commercial Street (SAHR 10436) in Burra. Burra is distinctive in its development from a group of smaller townships including Kooringa (Company town), Redruth (Government surveyed town), Aberdeen (Scottish speculators), New Aberdeen (Scottish association), Llwchwr (Welsh Smelter workers) and Hampton (new mining settlement named after the assayer at the smelting works). The names of these townships reflect the mining history of Burra and the haphazard nature of its development as a mining settlement. The Hampton Township Precinct (SAHR 10359) represents the impact of the decline of the mine and the consequent loss of population when the Burra Mine closed in 1877. The features of significance include but are not limited to Jacka House, the remnant street and allotment layout, fences, walls and remnant stone domestic buildings and introduced trees such as almond, pine, olive and pepper trees and the remains of the quarries that provided stone for the dwellings. Burra Cemetery (SAHR 10432 Spring Street, Burra) is also significant as a place which, through the headstones within the cemetery, chronicles the lives and misfortunes of the mining community up to 1877. These stories are valued as an important complementary record of the life of Cornish miners in Burra.
Criterion F Creative or technical achievement At Burra, Cornish miners established a system of mining on a 'greenfield' site, transplanting from Cornwall - one of the world's most advanced centres of machine innovation - an emergent form of industry which was being shaped by a new revolutionary machine, the steam engine. Welsh smelting technology was also successfully established at the mine soon after its establishment. This achievement created a 'prototype' system which could then be repeated and applied in other later significant mining ventures such as Broken Hill in NSW, Bendigo in Victoria, Kalgoorlie in WA and Charters Towers in Queensland. Cornish mining traditions continued to be used and improved as Cornish miners moved from one mine to another across the country. This achievement also demonstrates the important role technology played in the evolution of Australia's industrialised modern economy. Features which express these values include the remnant mining structures within the Burra Mines Historic Site (SAHR 10970) and all of the significant features listed under criterion (a).
Description The place comprises the Burra Mines State Heritage Area including the Burra mine area and the surrounding collection of small historic town settlements associated with the Burra mine. The Burra Smelts works contains one of the earliest major smelting works established in Australia. Burra is made up of a number of former past townships. Kooringa was the company town settled just to the south of the mine. Redruth was one of the government townships laid out in the 1850s; whereas Hampton was one of the privately surveyed villages built to accommodate miners returning from the gold fields in the 1860s. Aberdeen and New Aberdeen were established by Scottish speculators hoping that the mine would extend north. This extension failed to materialise. All these areas contain surviving architecture and archaeological remains dating from a period of Australia's early copper mining (1845-1877). The Burra Mines Historic Site is within the Burra State Heritage Area. It is west of Burra Creek, between Burra and North Burra (the old townships of Kooringa and Redruth and Aberdeen), and encompasses the remaining structures of the former Burra "Monster Mine". This area retains much of Burra's significant mining heritage and includes both the early underground workings and the open-cut mine that dominates the site. The open cut mine feature is a product of a later period of mining undertaken in the 1970s. The barren landscape also contains the 'artificial hills' of mine tailings, as well as abandoned buildings and archaeological sites.
History <u>Indigenous history</u> The Ngadjuri people are the Traditional Owners of the mid north region of South Australia, including the area now known as Burra. Aboriginal people have used the terrain from Burra to Broken Hill extensively over thousands of years. Archaeological evidence of the Ngadjuri's engagement with their land includes campsites, economic sites, such as where tools were made, quarries, stone arrangements, sacred trees, burials, rock engravings (petroglyphs) and painting sites. Several sites in the area represent major gathering places that demonstrate multiple activities, including, domestic, economic and ceremonial evidence. (Warrior et al, 2005:67;67). In 1834 the South Australia Act, also known as the Foundation Act, was passed in the British Parliament. This Act made provision for 300,000 square miles to become the territory in which British settlers could begin the colony of South Australia. The territory was described as 'waste and unoccupied'. However, the Letters Patent related to the Act that was issued in 1836, said that nothing could be done which would: "affect the rights of any Aboriginal natives of the said Province to the actual occupation or enjoyment in their own persons or in the persons of their descendants of any lands therein now actually occupied or enjoyed by such natives." (Cunneen and Libesman 1995 in Warrior et al, 2005:73). The South Australia Act had precedence over the Letters Patent, which appears to have been largely ignored as squatters took land and later sought title for it. Early attempts were made to establish friendly relationships with the Ngadjuri people which included the appointment of a Protector of Aborigines in 1836. Missionaries were sent to teach Christianity and ration stations were set up to issue biscuits, clothing and blankets (Raynes 2002: 7-10). The Mid North region was one of the first areas in South Australia settled by Europeans after colonisation, due to its suitability for farming. Dispossession of Aboriginal people from their land eventually led to resistance. Resistance in the area included taking animals, pulling down fences and lighting bushfires (Warrior et al 2005:77). Auhl (1986:233) states that during the exodus of miners from Burra to the Victorian gold rush in the 1850s, the Ngadjuri took the opportunity to hasten the departure of Europeans and became "more insolent and aggressive". However, the Ngadjuri also filled the labour shortage, and in 1852 the Protector of Aborigines reported that there were over 20,000 sheep in the charge of Aboriginal shepherds. <u>Mining</u> The discovery of silver lead ore, was made in the Adelaide suburbs in 1841 (Both & Drew 2008). With the discovery of minerals, it became South Australian practice to recruit experienced teams of miners direct from Cornwall to open new mines; this also happened at Kapunda in 1844, and at Reedy Creek (Tungkillo) and Glen Osmond in 1847. There is a strong historical connection between the Cornish in Australia and the mining industry, but South Australia's Cornish community was established before any metalliferous mining industry existed on the Australian continent. The utopian free-enterprise ethos of early South Australia attracted a high proportion of immigrants from Cornwall and the West Country generally, where the Methodist faith, political liberalism and anti-establishment beliefs had a strong following. One in ten applications for passage to South Australia in the first five years of the introduction of the free Migration Scheme – representing 941 families – came from Cornwall (Migration Museum 1995: 97); 3-4% of today's Australians claim Cornish descent (Cornish Association of Western Australia 2014). Even before a single mine had been opened, the population of South Australia was about 8-10% Cornish-born, the largest enclave of Cornish immigrants in Australia (Payton 1984: 12). Precisely because these immigrants included a large number of people with experience in mining, they were able to play a major role in establishing enterprises very early in South Australia's history (Blainey 1969: 106). In 1842, regulations were introduced stipulating that the minimum amount of land that could be purchased in unsurveyed districts was 20,000 acres at one pound per acre. This became, therefore, the only way to acquire mineral rights on unsurveyed Crown land. Four such special mineral or "Monster Surveys" were made and purchased before the system was abolished in 1851. Those were Burra Creek and Mt. Barker in 1845, and Mt. Remarkable and Reedy Creek in 1846. The first discoveries of minerals outside the surveyed districts were near Burra Burra Creek in 1845, by two shepherds at two separate localities (Auhl 1986: 85). To acquire the mineral rights, the Burra Creek Special Survey was jointly purchased in late 1845 by two parties that were formed to raise the purchase sum of £20,000. These parties were the South Australian Mining Association (SAMA) and the Princess Royal Mining Company (PRMC). After purchase, the survey, measuring eight miles by four miles, was laid out to incorporate the two discoveries, one in each half; and lots were drawn to determine ownership of the two halves. SAMA gained the northern half and what was to become the Burra Burra Mine (Fuss & Satchell 2011: 4). The nature of the mine's foundation significantly influenced the development of the settlements on and around it. The settlement patterns of the Burra Burra became strikingly different from those established later in the Copper Triangle districts on the Yorke Peninsula. Rather than being a planned town, the Burra Burra comprised a cluster of towns during the mining era (and, indeed, for much of the following century) around the mine property of the SAMA (Auhl 1986: 4). Kooringa was the first and largest settlement, located south of the mine site entirely on the mining company's land. Allotments could only be obtained on a maximum 21-year lease. This had profound implications for the physical and social development of the township, and its residential and commercial properties, as individuals were not prepared to invest their capital in substantial houses or business premises until they could obtain freehold. As a result, none of the better quality houses in the town were erected before 1870. There were also doubts over the permanency of the mine as there seemed to be no regular stratification in the copper seams (Fisher 1851: 11). Other townships developed adjacent to the northern boundary of the SAMA company property. This included the government township of Redruth, laid out on a grid pattern centred on a Police Reserve which contained a police station built in 1847. Several other speculative private townships were also laid out, including Aberdeen, Llchwyr and Hampton (Auhl 1986: 101). In 1876, the three main townships, Kooringa, Redruth and Aberdeen, were formed into the Corporation of the Town of Burra but retained their separate identities until 1940, when the name Burra was officially adopted. This settlement pattern is clearly evident in present-day cadastral plans and aerial photographs. Even at Redruth and the township of Hampton, where freehold was available, there were few substantial homes before 1870 and certainly none at Hampton. Miners were wary of investing in a town where the mine might have only a brief life (Fisher 1851: 11). Freehold only became available in Kooringa from 1869, when mine income was failing and the company saw that selling the land (while retaining the mineral rights) would best serve its interests. For most of the life of the mine, the town had no local government at all and, hence, virtually no capital investment in normal town amenities. Only when the mine faced closure did the SAMA decide that improvements to the town would increase its value as an asset. Neither did the townsfolk generally want local government if it meant merely paying rates to improve the value of the mining company's property, rather than their own. When the government did lay out the grid pattern township, it was at Redruth immediately north of the mine property, a convenient location for such government institutions as the police station, lock-up, stables, court and gaol. Hampton was subdivided in 1857, next to the local quarry. It consisted of about 30 dwellings and a Bible Christian Chapel (Government of South Australia 2014n: 4-5), and was largely occupied by miners who had returned from the gold fields in Victoria in the 1860s (Auhl 1986: 101). Hampton lay beyond the reach of the 1880s water supply and also of the 1920s electrification. It contributed little to the Town Council's revenue and so received virtually no capital investment in roads, drainage, kerbing or footpaths. Over a century, it gradually withered away to become a ghost town (Auhl 1986: 101). Its relative remoteness contributed to its decline; but this, in turn, meant it was virtually untouched by any modernisation or modification and was not redeveloped for other use. The biggest mines naturally attracted the largest concentrations of Cornish miners (Auhl 1986: 1). The discovery of the Burra Burra copper deposit in 1845 set in train what was becoming the usual response. Captain Roberts, the Cornish manager of a small mine in the Adelaide Hills, was recruited along with a team of nine experienced Cornish miners to open the mine. "The Monster Mine" proved to be vastly richer than any earlier discovery, bringing fabulous wealth to the shareholders and the colony in general. "Copper Roads" were constructed between 1845 and 1870 to export the copper (Fuss & Satchell 2011: 43) not only to England but to Singapore, Calcutta, Bombay, Madras, Batavia and Mauritius (Auhl 1986: 11). The operations attracted an influx of Cornish miners already in the colony and prompted a recruiting drive to bring more from Cornwall (Birt 2001: 11). Cornish miners knew how to excavate with hand tools and explosives, to design safe and efficient underground workings, to recognise valuable ore, to extract it and raise it to the surface for crushing and processing. Their boots and tools, helmets and candles, along with their systems including "Tutwork" (payment was dependent upon the volume of ground dug) and "Tribute" (whereby a miner or group of miners was remunerated according to the value of the ore won), management structure, industrial relations, company finances, book-keeping, language and folklore, all arrived with them from Cornwall (Fisher 1851: 8; Auhl 1986: 83). As the mines went deeper they ordered machinery from Cornwall to pump out water and raise ore. For fifty years the Cornish mines in Cornwall had been the world leaders in steam-powered industrial technology, and steam engines and pumps from Cornish foundries were exported all over the world. The Burra workforce had grown to over 2,000 people by 1850 and it became the largest inland town in Australia (Auhl 1886: 1). Henry Roach from Redruth in Cornwall was appointed mine captain (Fisher 1851: 7) and surrounded with staff whose surnames identify their Cornish origins: Osbourne, Trevorrow, Andrewartha, Tremewan, Santo, Boswarva, Spargo, Tregear (Payton 2007: 43-4). The Burra Burra soon had an industrial landscape that arriving Cornish immigrants recognised instantly: tall stone engine houses with their enormous slow-moving iron bobs working the pump rods in the shafts and boiler houses

with their tall characteristically Cornish, round stone and brick smokestacks. There are ten Cornish engine houses still standing in Australia out of 33 built during the nineteenth century (Drew & Connell 1993). Three engine houses are still standing within the Burra Mines, and the archaeological remains of more also survive. All the boilers, engines and pumps came from foundries in towns like Hayle, Cranbourne and Redruth, Cornwall (Birt 2001: 11). Immigrants also recognised the landscape of the town alongside the mines. The housing, mostly small attached and row cottage and the simple Methodist chapels were modelled on the buildings of the mining towns of Cornwall (Fisher 1851: 4-6). The entire culture of a Cornish town was present: the social structure, religion, politics, educational practices, cuisine, sport and recreation, festivals, music and burial practices.

The railway arrived in 1870; and it was hoped, in vain, that the reduced transport costs would enable the mine to remain viable despite falling copper prices and rising costs of raising ore (Auhl 1986: 389). The goods platforms originally included an ore platform (Auhl 1986: 403), and the size of the station reflected the town's importance as it made the transition from mining town to rural agricultural service centre (Fuss & Satchell 2011: 88). The stripping of the bush to service the mine had created a cleared landscape ripe for agriculture and the construction of the copper transport network had opened up South Australia's mid-north. Burra was on the main line to Broken Hill and, from 1917 to 1937, the line from Adelaide to Port Wakefield and Perth. From thereon, Burra's production was connected to the rest of the world.

Burra Charter

In 1979, the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance was adopted at a meeting of Australia ICOMOS in Burra (Government of South Australia 2014c). It was given the short title of the 'Burra Charter'. The Charter defines the basic principles and procedures to be followed in the conservation of Australian heritage places. The Charter accepted the philosophy and concepts of the ICOMOS Venice Charter but developed and documented them in a form which would be practical and useful in Australia. The Burra Charter has been called Australia's most significant document on the basic principles and procedures for the conservation of heritage places (Heritage Perth 2011).

The Cornish steam engine

Steam power was transformative. The introduction of the steam engine into Australia marks a significant milestone in the industrialization of Australia. Through its colonial relationship with Britain technology transfers like the importation of the Cornish engine, were significant in enabling Australia to keep pace with the broader industrial transformation of Europe.

The Cornish engine was based on Watt's pumping engine with improvements made by Cornish engineers working in Cornwall. The effects of the Cornish Beam Engine on mining and ore processing technology were revolutionary and this revolution was transferred to Burra in the 1840s and Moonta in 1860s, Cadia Copper Mine in New South Wales in 1870s, and gold mines in Victoria in 1860s. It was during a period of rapid development in steam technology that Australia moved into the industrial era as its early mining ventures became mechanised. Before this transfer of Cornish steam technology, Australia was still largely an agricultural economy. This was the Industrial Revolution moving to Australia. As mining in Cornwall fell into terminal decline, South Australia became the largest producer of copper in the world (Drew 2011:11-12).

Cornish Mining Technology

In the early eighteenth century, Cornwall became the world's biggest producer of copper with the arrival of steam power. As Cornish mining boomed, Cornish engineers influenced the development of steam power. Most notable was Richard Trevithick, a Cornish engineer who pioneered the use of high-pressure steam and made great contributions to the efficiency of steam engines. Because of their high efficiency many of these machines were installed for pumping in Cornish mines and exported worldwide. Cornwall became the major centre for the manufacture of engines and large horizontal boilers for the remainder of the nineteenth century. The period of greatest development was between 1825 and 1850, when a more or less standardised Cornish beam engine came into general use. At the peak of the Cornish mining industry between 1850 and 1860, hundreds of beam engines were working in Cornwall. Several large foundries in Cornwall manufactured these Cornish engines at that time (Drew 2011:19).

In the mid eighteenth century, the Cornish system of working mines was established along with the new techniques which allowed mining to progress underground. The form and arrangement of a mine depends on the nature of the mineral deposit to be excavated. Cornish mines worked tabular or rectangular mineral deposits known as veins or loads. Depending on the dip of the lode, a shaft was sunk vertically to intersect the lode at a given depth or inclined following the lode. These shafts were rectangular and of two types; small winding or whim shafts which were often inclined or larger vertical engine shafts used for pumping (Drew 2011:2).

Opening up the mine by sinking shafts and driving levels was called 'tut work', which prepared the lode for extraction of ore or tribute. Hence two kinds of mining activity were undertaken: development of the mine and ore extraction, which were generally carried out simultaneously. The Cornish system of mining was the first to develop the concept of ore reserve, which they called the 'eyes' and their removal was referred to as 'picking out the eyes of the mine' (Drew 2011:3).

Governance and Management

The Cornish innovation is also evident in their associated traditional methods of mine management and employment systems. Cornish employment systems were known as 'Tribute and Tut work Contracts'. This method of working constituted and advanced the Cornish technical mining achievement. Tut workers were contracted by the fathom and the rate depended on the nature of the rock to be excavated. Tribute on the other hand involved the excavation of ore and removal to the surface and was paid as a proportion of the value of ore mined. Individual Cornish miners organised themselves into self-selected teams called 'pares' which were usually four to eight men and/or boys. The underground workings were surveyed into blocks or pitches. Each pitch and tut work contract or take was numbered and let by public auction on Survey or Setting Day for a period of two months.

Evidence of the application of the Cornish employment systems in South Australian mines is abundant in newspaper reports throughout the second half of the nineteenth century. There are advertisements for the letting of tut work bargains and tribute pitches at the Burra and Moonta mines in the late 1840s and 1860s. Detailed descriptions are provided of Survey Day at the Burra and Moonta mines which are strikingly similar to accounts from Cornwall (Drew 2011: 8).

Ore Dressing

The ore dressing process was first developed by Cornish miners in the eighteenth Century which initially involved breaking by hand (spalling) followed by hand picking. This was undertaken at the surface on extensive dressing floors which were a characteristics feature of Cornish mines throughout the nineteenth century. In the early 1800s, mechanical improvements to rock breaking and concentration were introduced in Cornwall and soon this innovation became the standard technology at mines throughout the world during the next 100 years. Cornish beam engine technology was quickly adopted to power this new technology. Cornish crushing rolls replaced hand picking and consisted of two cast iron rolls about 60cm in diameter running against each other. Ore was fed between the rolls, crushed and passed through a sieve below but any undersized ore was lifted by a raft wheel and tipped back for re-crushing. Two storey Cornish crush houses were distinctive features of nineteenth century copper mining landscape along with beam engine houses. More than 20 were erected at mines throughout South Australia including five at Moonta and Burra (Drew 2011:8).

Condition and Integrity

Burra is a town recognised for its mining heritage. The town and mine features vary in their condition. The town buildings are mostly in good condition and the remnant mining structures are mainly in situ in the Burra Mines Historic Site. Many of these mining structures are remnant features in now a relict mining landscape.

All of the mining and town features noted are listed on the South Australian Heritage Register and are afforded heritage protection under South Australian law. All of the remnant surface mining features remain outdoors with variable maintenance.

Location

Approximately 640ha at Burra comprising the Burra State Heritage Area (Heritage Number 27549 and State Heritage ID 16183) designated as a state heritage area in 1993.

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Appendix 2 Burra State Heritage Area Citation

SA HERITAGE PLACES DATABASE SEARCH

- Search by Location
- Search by ID
- Search by Keywords
- Extract by Development Plan
- About Heritage Places

HERITAGE PLACES

Heritage Place Details

LOCATION

Map	Show Map
Address	BURRA
Locality	
Accuracy	H - high level confidence
Development Plan	Goyder Council
Polygon Type	D - item has been digitised (generally because it doesn't exist in a DCDB parcel, eg. bridge)

DESCRIPTION

Details (Known As)	Burra State Heritage Area [see also National Heritage Place ID: 106304]
Registered Name	
Significance	The Burra State Heritage Area is of significance to the economic and social history of South Australia, and is a testament to the success of copper mining in the area. In the late 1840s, the Burra Mine made South Australia the most prosperous colony in Australia. At one stage the mine was the second largest producer of copper in the world. Comprising the mining area and a complex of what were originally separate townships which are now merged into one, the area provides evidence of early mining, industrial and urban functions with Welsh and Cornish influences.
Subject Index	Urban area - State Heritage Area [Urban]; Mining and mineral processing - Mine
Class	State Her Area

STATUS

Status Code	SHA - State Heritage Area (SA Heritage Act 1978)
Status Date	28-JAN-1993

REFERENCE

LGA	
State Heritage ID	16183
Heritage Number	27549

SECTION 16 INFORMATION

Section 16

PLAN PARCEL & TITLE

As listed in the SA Heritage Register	
Plan Parcel & Title Information	

DISCLAIMER

While due care has been taken to ensure that the SA Heritage Places Database accurately reflects the South Australian Heritage Register and listings of Local Heritage Places in Development Plans, the State of South Australia does not accept liability for the use of the SA Heritage Database for any purpose. Users should consult the [Department for Environment and Water - Heritage South Australia](#) to confirm the listing of State Heritage Places and the relevant [Development Plan](#) for Local Heritage Places/Contributory Items.

In the majority of cases, the maps of State Heritage Places on this web site show the footprints of the most significant structures on a registered Place. However, sometimes they simply indicate the complete area of land comprising the Place. Work is proceeding to further refine the mapping of such places. It is also important to note that development control is not limited to the registered structures but extends to their setting and structures nearby (what is termed ‘development affecting’ a State Heritage Place). Hence it is vital that exact details of the listed place and implications for any proposed development be discussed with Heritage South Australia staff, as they cannot be deduced solely from the information on this web site. The inclusion of a place in the SA Heritage Register gives no right of public access. Permission to visit properties must be sought from the owners. The accuracy of the mapping of State Heritage Places is not guaranteed. Please contact Heritage SA (<https://www.environment.sa.gov.au/topics/heritage/sa-heritage-register>) if you believe there is an error.

GIS FILES

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Burra State Heritage Area

Burra was declared a State Heritage Area on 28 January 1993.

HISTORY

Copper ore was discovered near Burra Burra creek in June 1845 and, before the end of the year, the South Australian Mining Association had established its 'Monster Mine' in the region. During its first six years nearly 80,000 tonnes of rich ore were shipped to England to be smelted, boosting South Australia's flagging economy and making the colony the most prosperous in Australia.

The mine employed more than 1 000 men and boys, most of them Cornish. From 1849 smelting was done on-site by the Patent Copper Company, who brought the smelters from Wales. The ore was initially carted to Port Wakefield by bullocks, and later by teams of mules. By 1860 Burra was recognised as the second largest producer of copper in the world.

Production declined after 1860 and eventually, in 1867, underground mining ceased. From 1870, until the mine's closure in 1877, it was worked by an open-cut system, but this proved unprofitable. Between 1845 and 1877 the Burra 'Monster Mine' had produced about 50,000 tonnes of copper metal, valued at approximately £5,000,000.

The town of Burra began in 1846 as the company settlement of Koorunga. As the population and the demand for freehold land increased, other villages were surveyed further north. These settlements - Redruth, Llŵchwr, Aberdeen and Hampton - reflected the cultures of the various immigrants who flocked to the Burra Mine. In 1876 the individual townships were formed into the Corporation of the Town of Burra, but retained their identity until 1940, when the name Burra was adopted.

From the 1870s, when copper production ceased and the town's population declined, Burra developed as a service town for the district's rapidly expanding agricultural and pastoral industries. New public buildings appeared, but much of Burra's mining era was retained. Today Burra attracts attention as a cultural tourist destination, displaying a unique mix of mining heritage and well-preserved 19th century architecture.

CHARACTER

Burra today is a vibrant community offering one of Australia's finest historic precincts. The town retains many mid-nineteenth century buildings and structures from the years when the Burra mine was one of the world's great copper producers. It also displays many later Victorian buildings reflecting the town's secondary role as a regional centre for agriculture, pastoralism and local government.

Experienced miners, smelters, labourers, tradesmen and businessmen flocked to Burra from Cornwall, Wales, England, Scotland, Ireland and Germany. There were also Chinese market gardeners and Chilean muleteers. Many brought their families and attempted to preserve a familiar lifestyle. The cultural diversity of Burra's early days is evident in the street names and the distinctive architectural styles that developed in the original villages.

Burra's built environment is clearly derived from the two historical phases of its development. The mining phase from 1845-1877 gave rise to the mining and industrial architecture at the Burra and Bon Accord mine sites, and provided the impetus for both company and private housing, much of which was timber and has not survived. Many of the stone cottages that remain (such as Paxton Square and Tiver's Row) are based on company housing in Cornish towns, and are some of the oldest buildings remaining in Burra. The architecture of this era mostly followed the 'Old World' models, with designs coming unaltered from Europe. For example, many of the early structures do not have verandahs.

The later agricultural and pastoral phase brought a new prosperity, which stimulated the use of Australian colonial architecture. This style is particularly evident in the buildings of the commercial core of Koorunga, at Commercial Street and Market Square, in public buildings such as the Town Hall and the school, and in the gracious hillside houses with spreading verandahs.

One important element in Burra's architecture is the distinctive use of rich, local bluestone that gives a unifying effect to many buildings, regardless of their form or age.

Burra's built heritage remains largely intact, thanks to a caring community and the efforts of the National Trust. This historic town is now one of South Australia's best-conserved reminders of industry and every day life in the nineteenth century. While the town's economy is now linked to the surrounding agricultural and pastoral communities, its copper heritage is evident everywhere. The town's character has become a key in the success of a developing local industry - tourism. Today many people in Burra volunteer to interpret heritage sites for visitors or provide services and facilities specifically targeting the cultural heritage tourism market.



FEATURES

The town of Burra consists of two precincts, linked by the Burra Creek, the main road (Market Street) and the topography of the valley: the old Kooringa township and Burra north.

The old Kooringa township to the south includes early company housing, Market Square, a section of the Burra Creek dugouts, and both residential and commercial buildings of the post-mining era.

Burra North encompasses the former government and private settlements of Redruth and Aberdeen. It includes terrace houses and cottages built by miners and smelts workers, along with the original courthouse, police station, gaol and later Victorian dwellings. The railway station is located in this section, and the ruins of the Hampton township are located on the state heritage area's north-eastern boundary.

The two precincts are separated by the Burra mines site to the west and the Burra smelts site across the creek to the east, ensuring that development has not linked the townships over the years.

THE BURRA JINKER

Discussion of Burra's attractions is not complete without mention of the Burra Jinker, displayed near Market Square. This massive 'cart' was purpose-built to transport the mine's huge beam-engines (imported from Cornwall) from Port Adelaide to Burra.

The epic journey, using 36 oxen, took two months and is a part of South Australian folklore. The Burra Jinker was one of eight South Australian items listed on the 2001 BankSA Heritage Icons List and was entered in the South Australian Heritage Register on 16 March 2016.



Further Information

For further information please contact the State Heritage Unit

Department for Environment, Water and Natural Resources

Telephone (08) 8124 4960

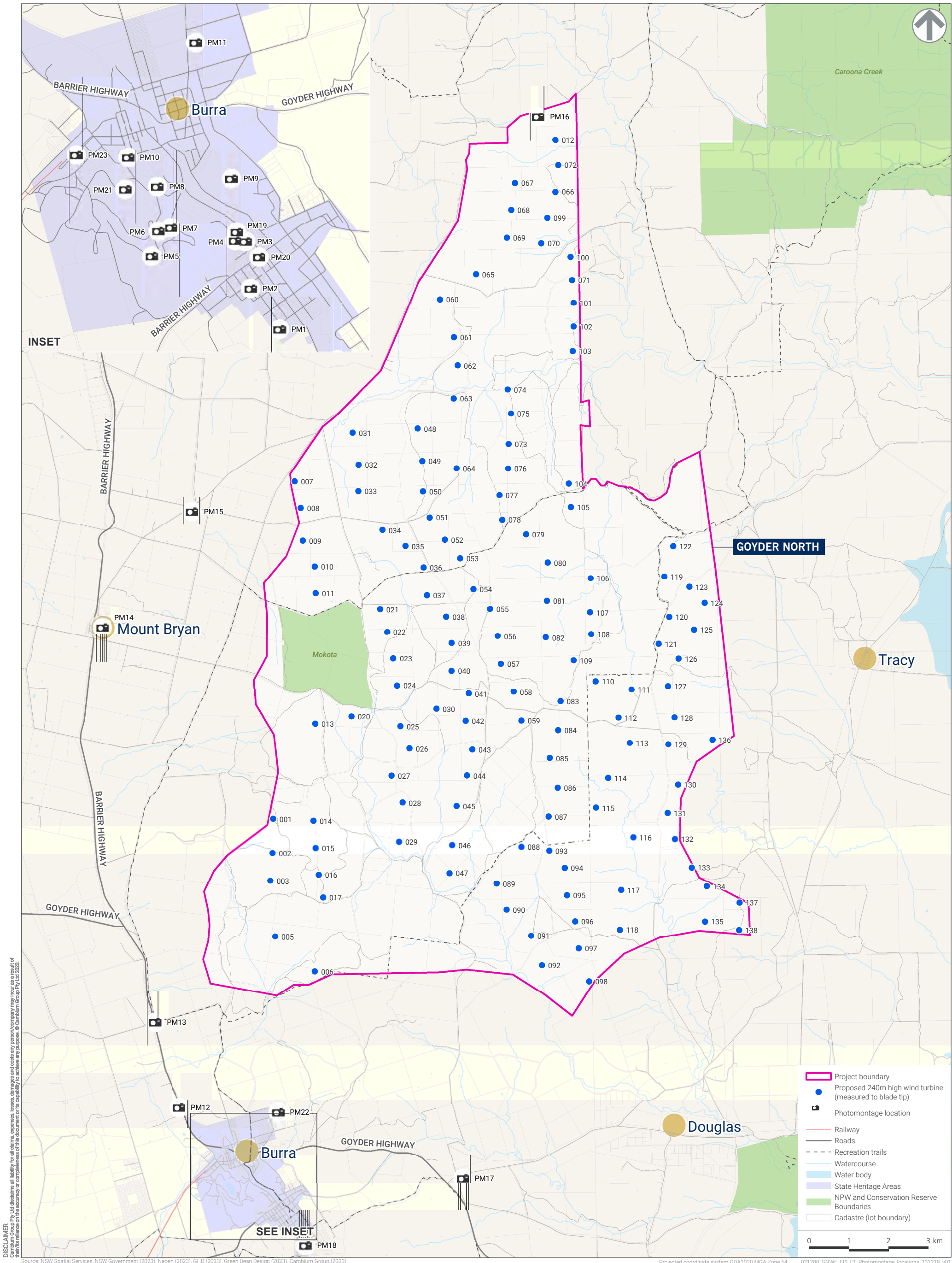
Email DEWNRHeritage@sa.gov.au



Appendix 3 Photomontage of the landscape and visual impact assessment (Green Bean Design Pty Ltd 2023)

Figure 1
Photomontage locations

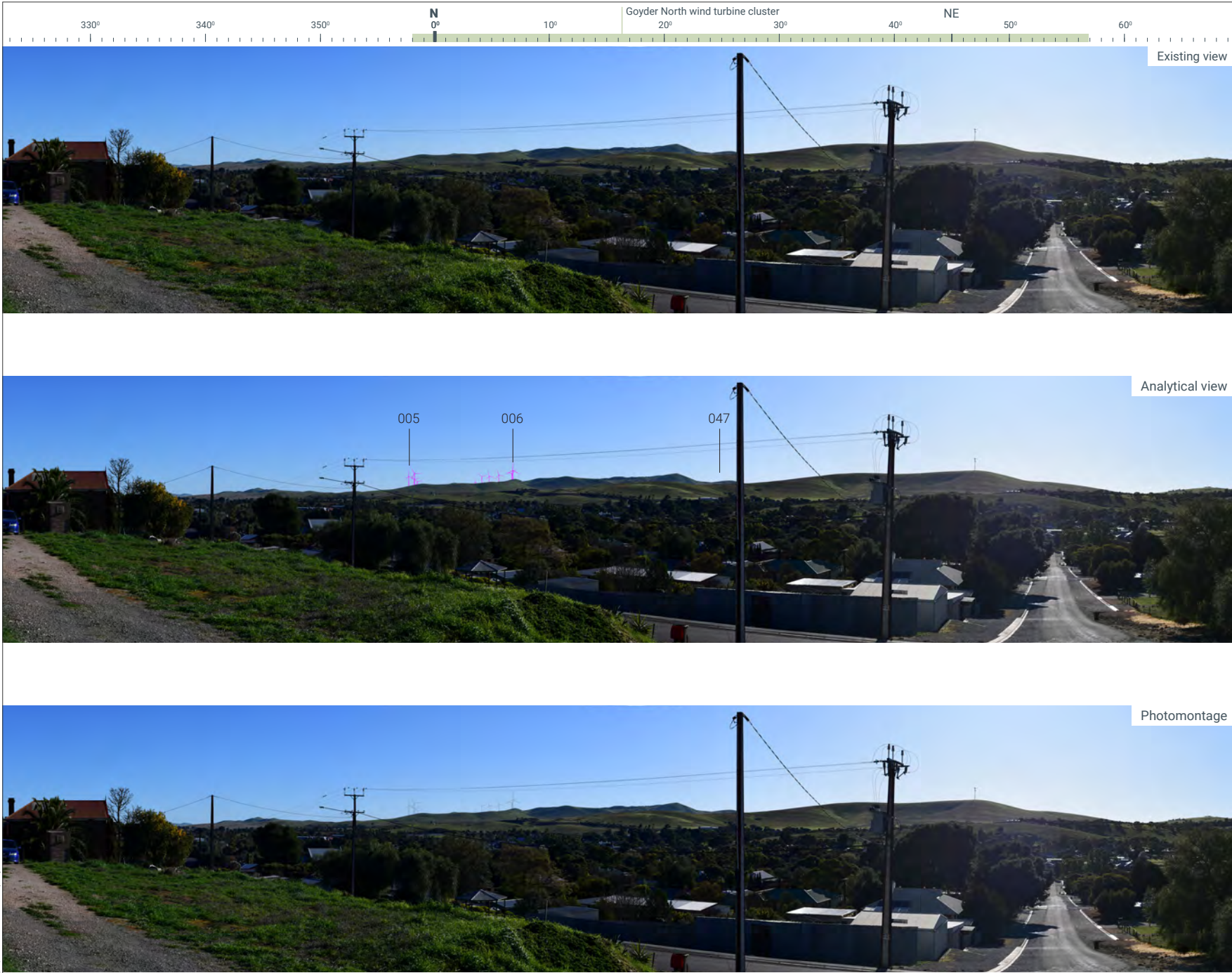
GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



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Figure 2
PM1 | Kangaroo Street, Burra

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



Date	15/08/2023
Time	10:37
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	309115m E, 6270537m S
Camera level	487.8 mAHD
Camera bearing	27°
Vertical field of view	27°
Project horizontal field of view	59°
Distance to nearest turbine	6.57 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 3
PM2 | Kangaroo and Church Street

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT

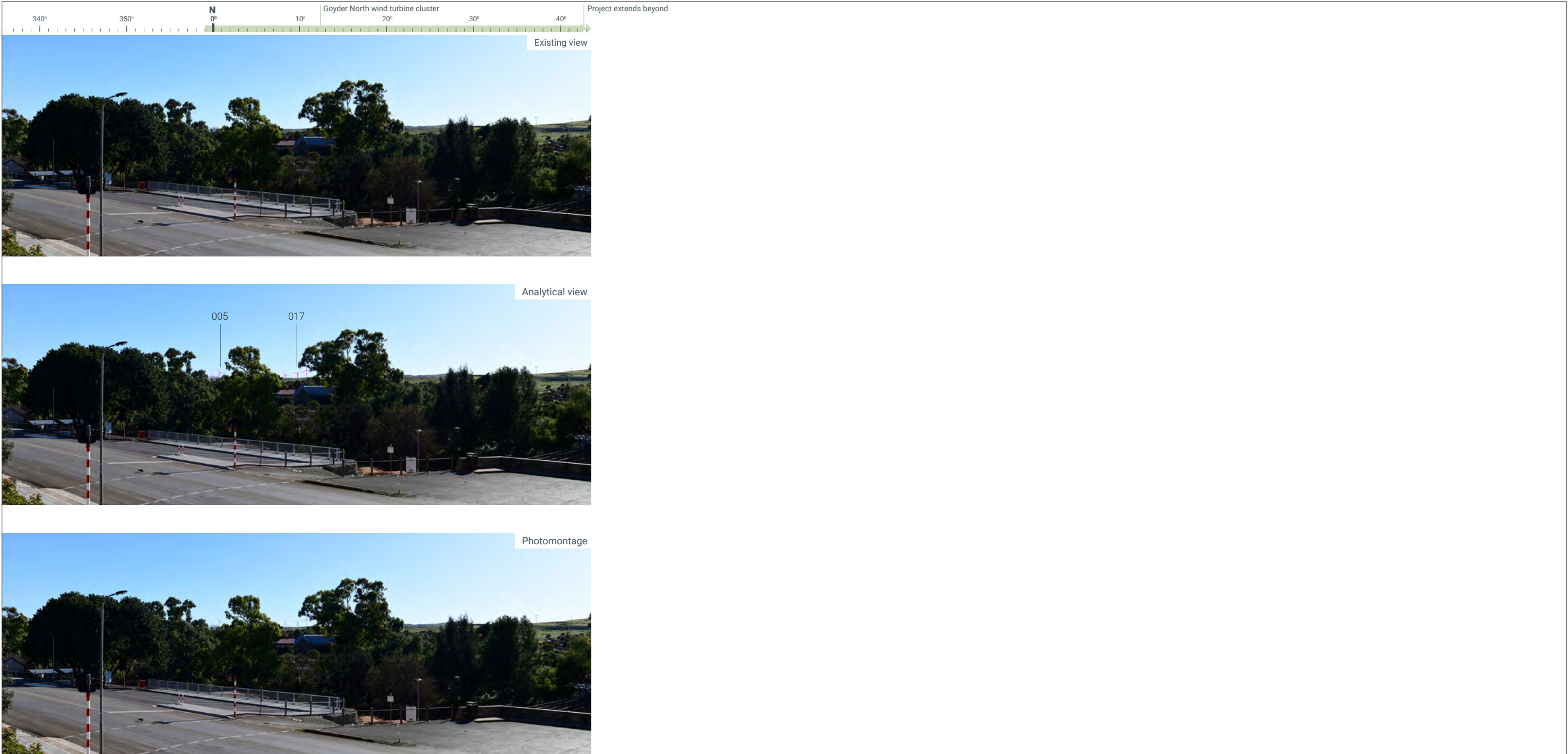


Date	15/08/2023
Time	10:21
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	308850m E, 6270908m S
Camera level	478.1 mAHD
Camera bearing	29°
Vertical field of view	27°
Project horizontal field of view	59°
Distance to nearest turbine	6.22 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 4
PM3 | Town Hall steps, Burra

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT

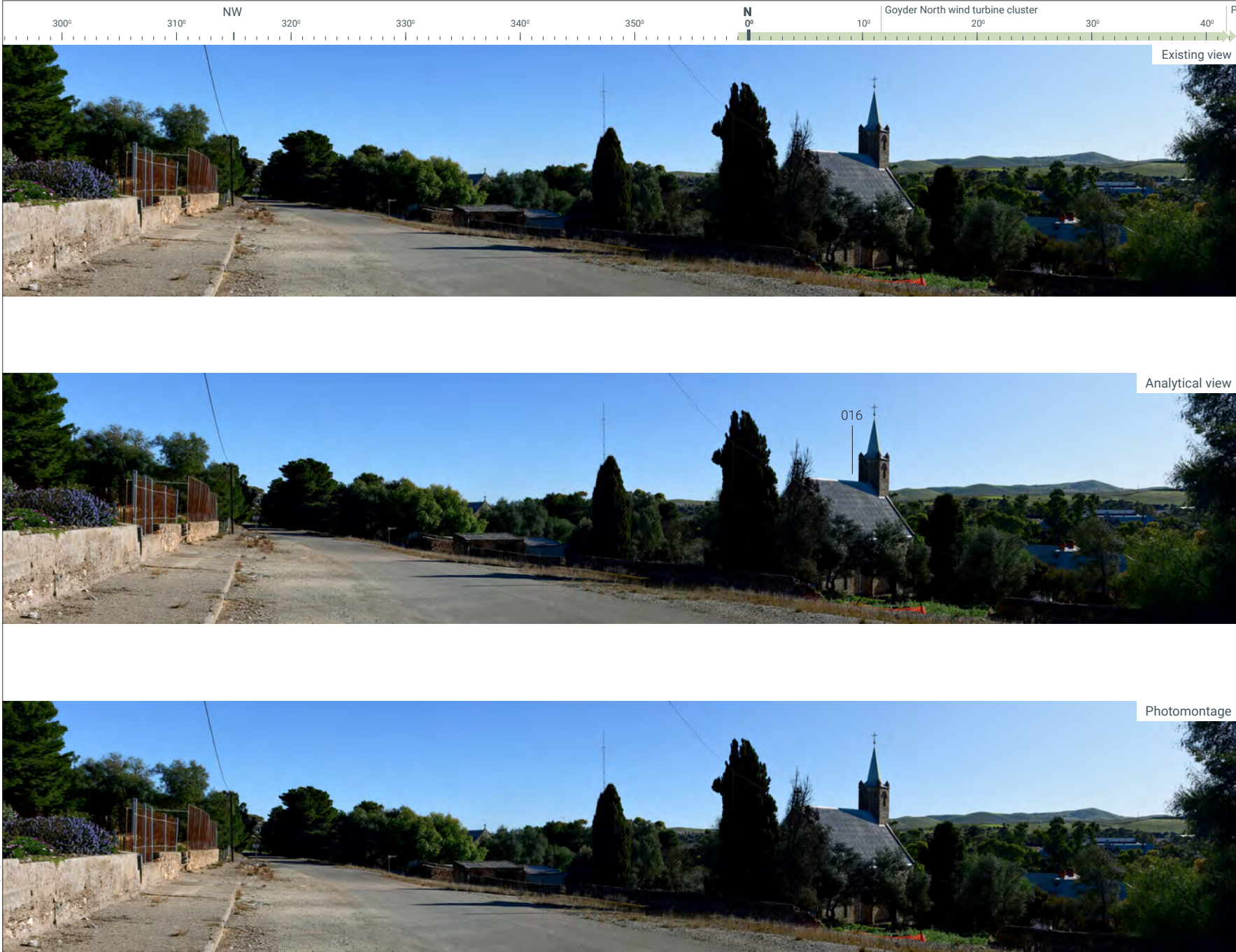


Date	15/08/2023
Time	10:33
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	308804m E, 6271337m S
Camera level	472.17 mAHD
Camera bearing	30°
Vertical field of view	27°
Project horizontal field of view	60°
Distance to nearest turbine	5.83 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 5
PM4 | Mount Pleasant Street, Burra

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT

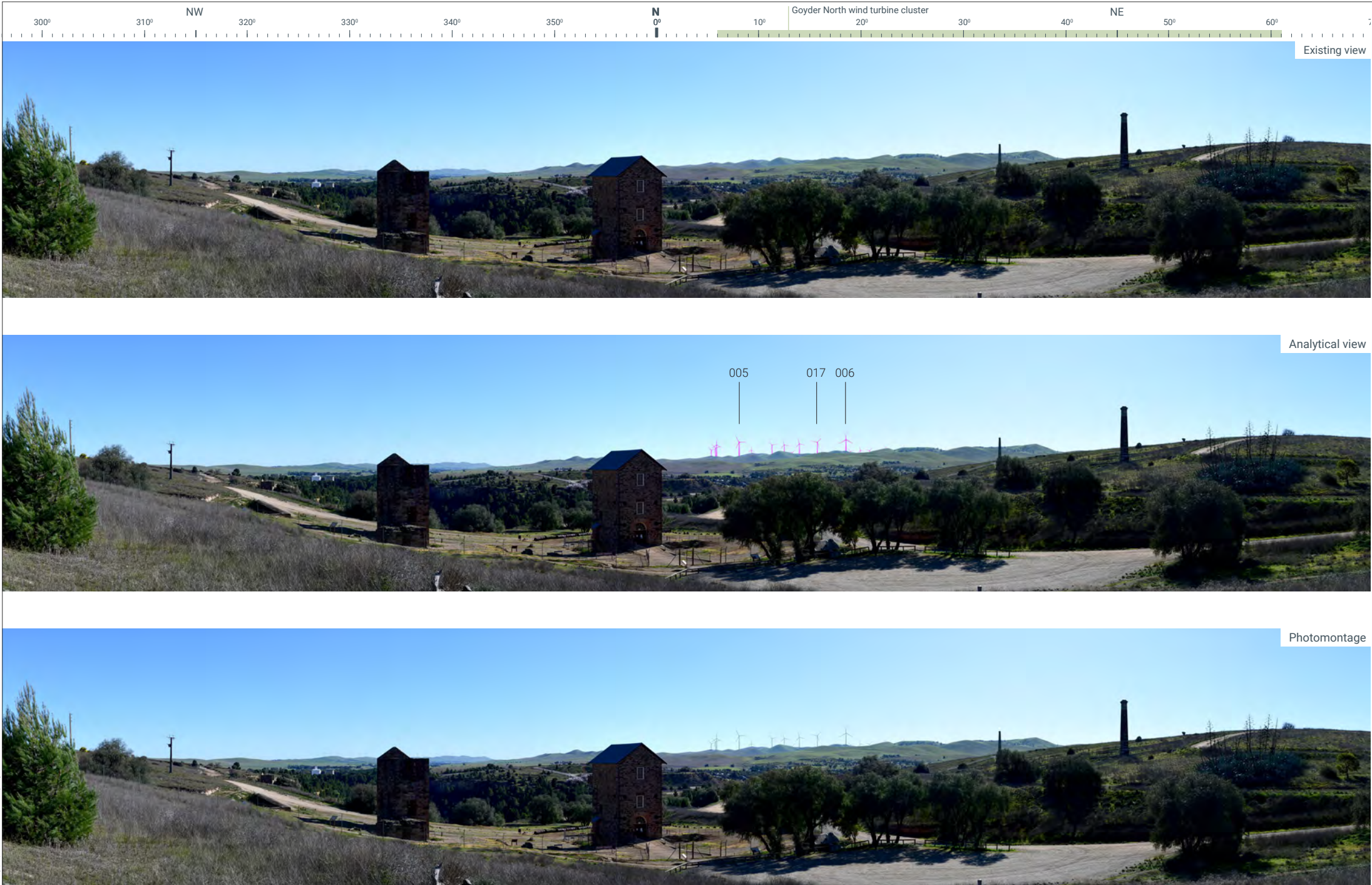


Date	15/08/2023
Time	10:40
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	308709m E, 6271345m S
Camera level	483.88 mAHD
Camera bearing	30°
Vertical field of view	27°
Project horizontal field of view	60°
Distance to nearest turbine	5.84 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 6
PM5 | Burra Mine (toward Morphett’s Enginehouse and Windinghouse)

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



Date	15/08/2023
Time	11:19
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	307945m E, 6271203m S
Camera level	518.41 mAHD
Camera bearing	34°
Vertical field of view	27°
Project horizontal field of view	56°
Distance to nearest turbine	6.17 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 7
PM6 | Dressing Tower

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



Date	15/08/2023
Time	11:39
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	308003m E, 6271432m S
Camera level	507.33 mAHD
Camera bearing	33°
Vertical field of view	27°
Project horizontal field of view	58°
Distance to nearest turbine	5.94 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 8
PM7 | Haulage Enginehouse Chimney

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



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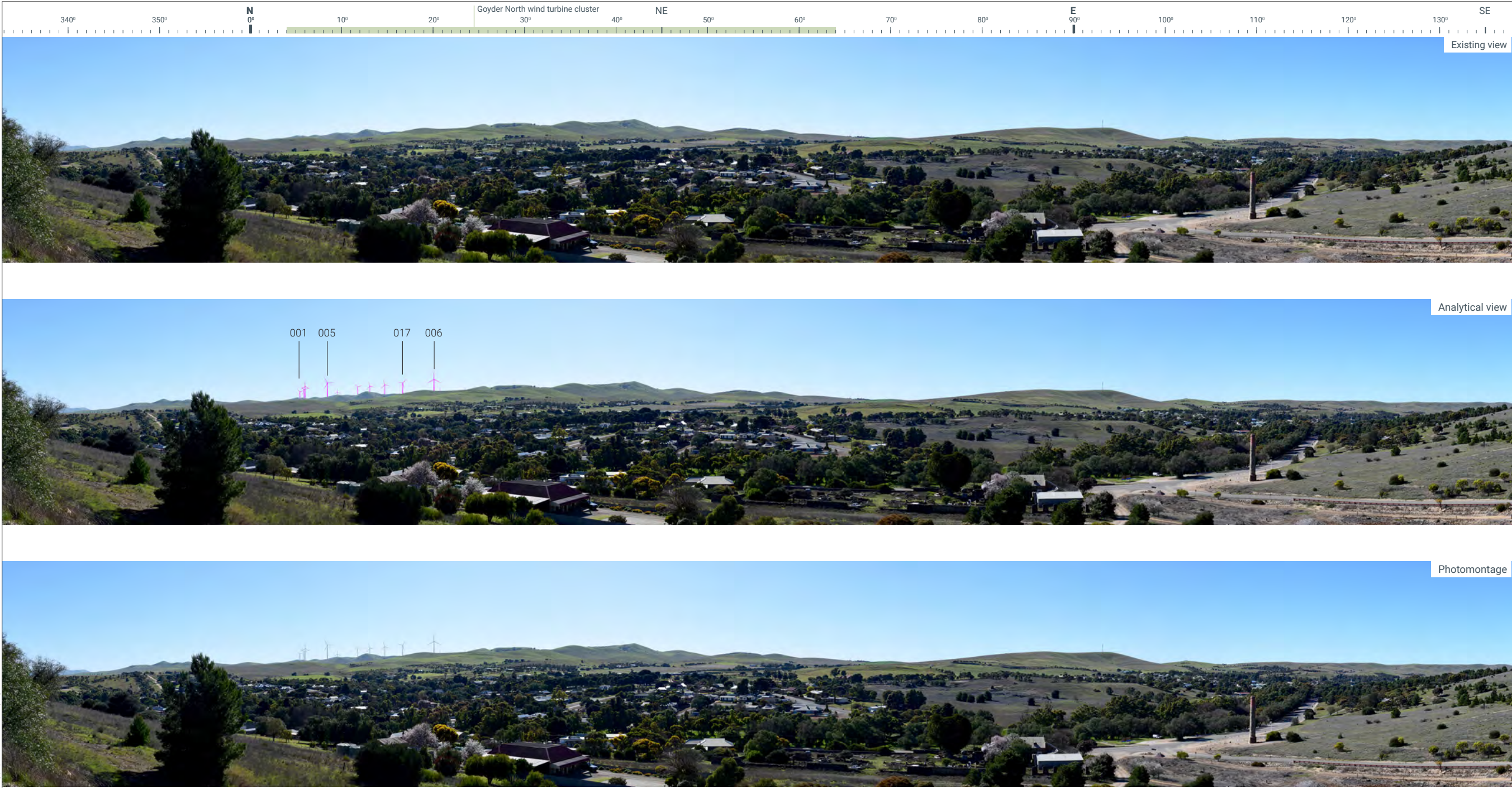
Source: ESRI Maxar, Elvis Elevation and Depth - Foundation Spatial Data (2023), Vestas (2023), Greenbean Design (2023), Cambium Group (2023).

Date	15/08/2023
Time	11:31
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	308121m E, 6271464m S
Camera level	522.57 mAHD
Camera bearing	33°
Vertical field of view	27°
Project horizontal field of view	58°
Distance to nearest turbine	5.87 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

031280_GNWF_LVIA_231219_v01

Figure 9
PM8 | Town Lookout

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



Date	15/08/2023
Time	11:48
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	307996m E, 6271840m S
Camera level	503.9 mAHD
Camera bearing	34°
Vertical field of view	27°
Project horizontal field of view	59°
Distance to nearest turbine	5.56 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 10
PM9 | Smelting Works Site

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



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Date	15/08/2023
Time	12:20
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	308675m E, 6271914m S
Camera level	487.23 mAHd
Camera bearing	32°
Vertical field of view	27°
Project horizontal field of view	62°
Distance to nearest turbine	5.29 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

Figure 11
PM10 | Butterworth Street, Burra

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



Date	15/08/2023
Time	16:16
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	307728m E, 6272109m S
Camera level	496.48 mAHD
Camera bearing	35°
Vertical field of view	27°
Project horizontal field of view	60°
Distance to nearest turbine	5.41 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 12
PM11 | Redruth Gaol

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT

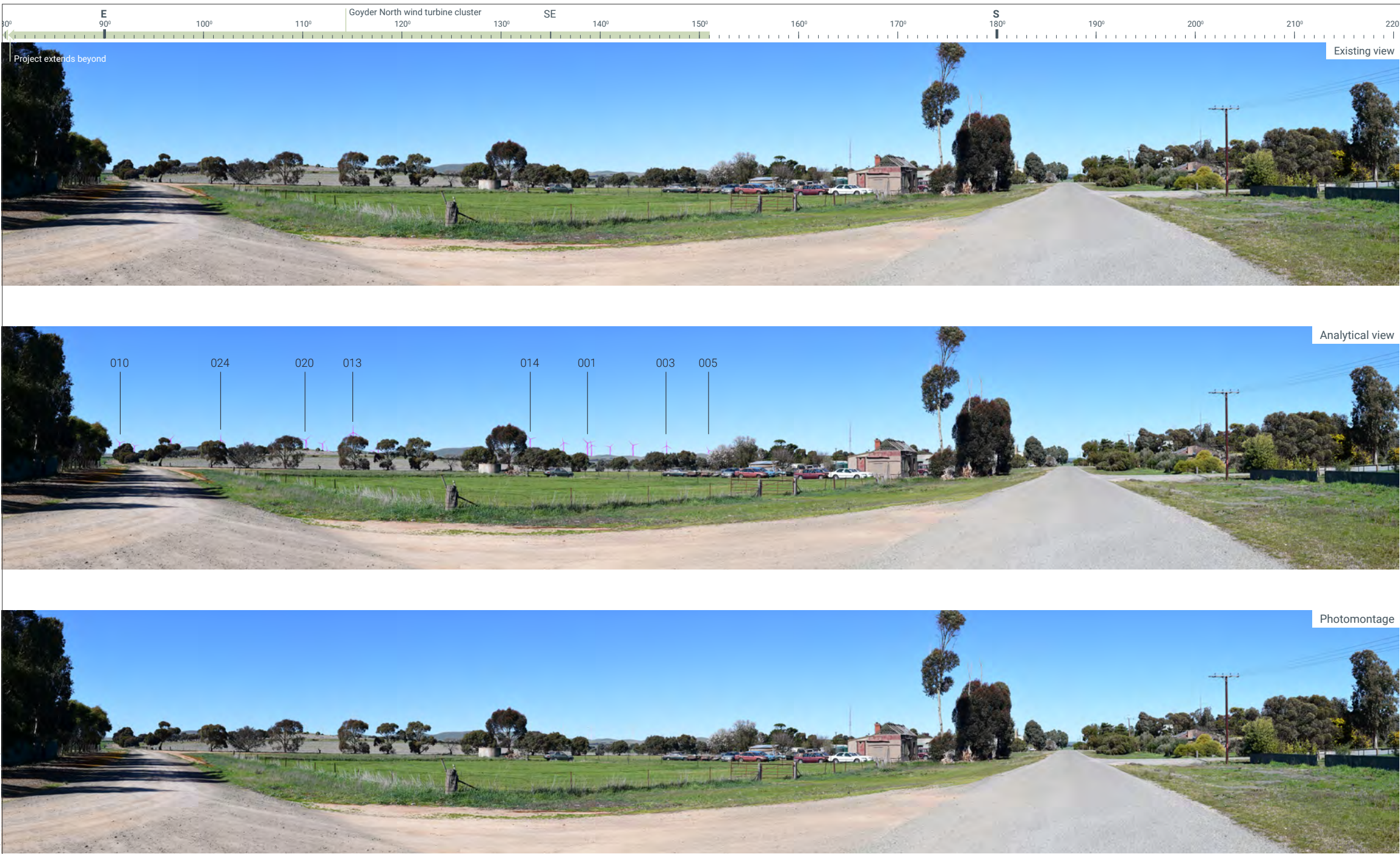


Date	15/08/2023
Time	12:34
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	308346m E, 6273158m S
Camera level	495.5 mAHD
Camera bearing	36°
Vertical field of view	27°
Project horizontal field of view	64°
Distance to nearest turbine	4.21 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 15
PM14 | East Terrace, Mount Bryan

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



Date	15/08/2023
Time	13:33
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	304534m E, 6285818m S
Camera level	523.92 mAHD
Camera bearing	97°
Vertical field of view	27°
Project horizontal field of view	108°
Distance to nearest turbine	5.44 km (011)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 19
PM18 | Burra Cemetery

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



Date	15/08/2023
Time	10:05
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	309646m E, 6270259m S
Camera level	465.8 mAHD
Camera bearing	24°
Vertical field of view	27°
Project horizontal field of view	60°
Distance to nearest turbine	6.79 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 20
PM19 | Josephs Church

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT

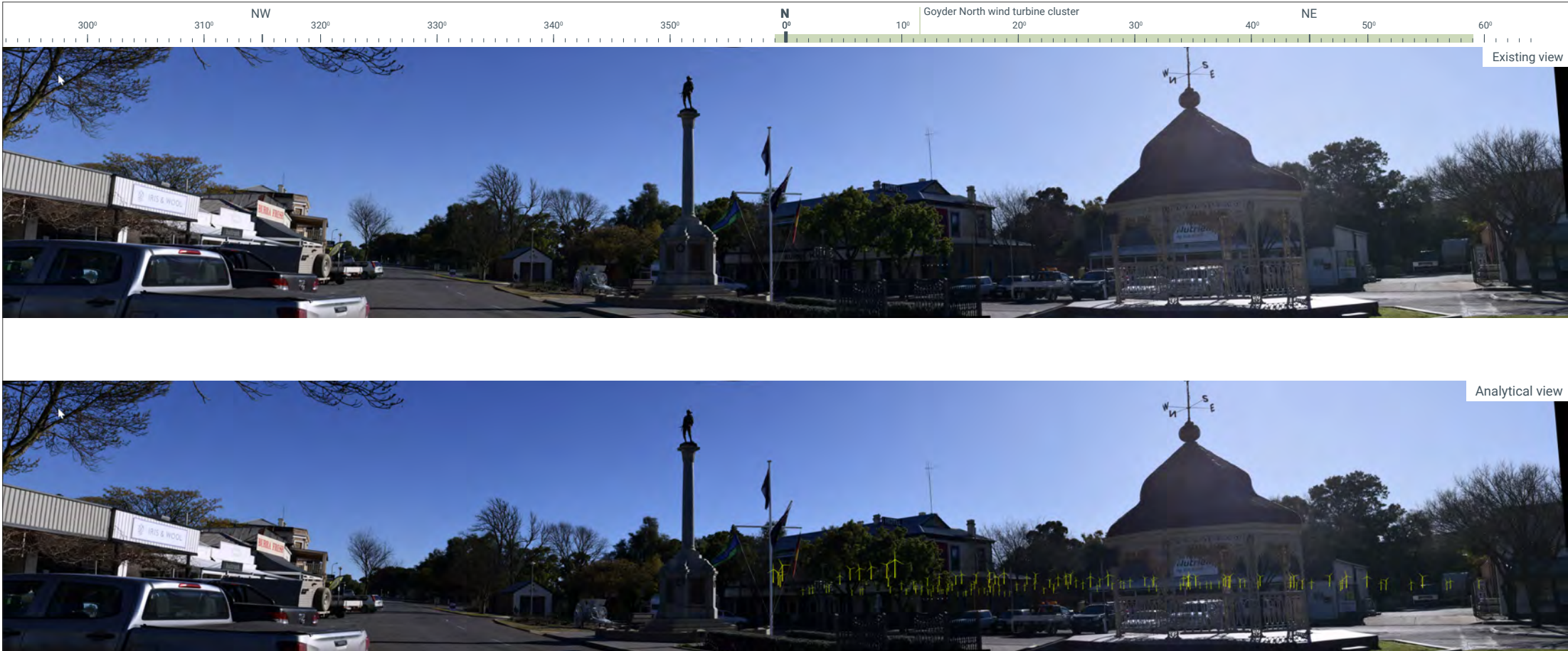


Date	15/08/2023
Time	10:37
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	308724m E, 6271424m S
Camera level	477.8 mAHd
Camera bearing	31°
Vertical field of view	27°
Project horizontal field of view	61°
Distance to nearest turbine	5.74 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 21
PM20 | Burra Square

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT

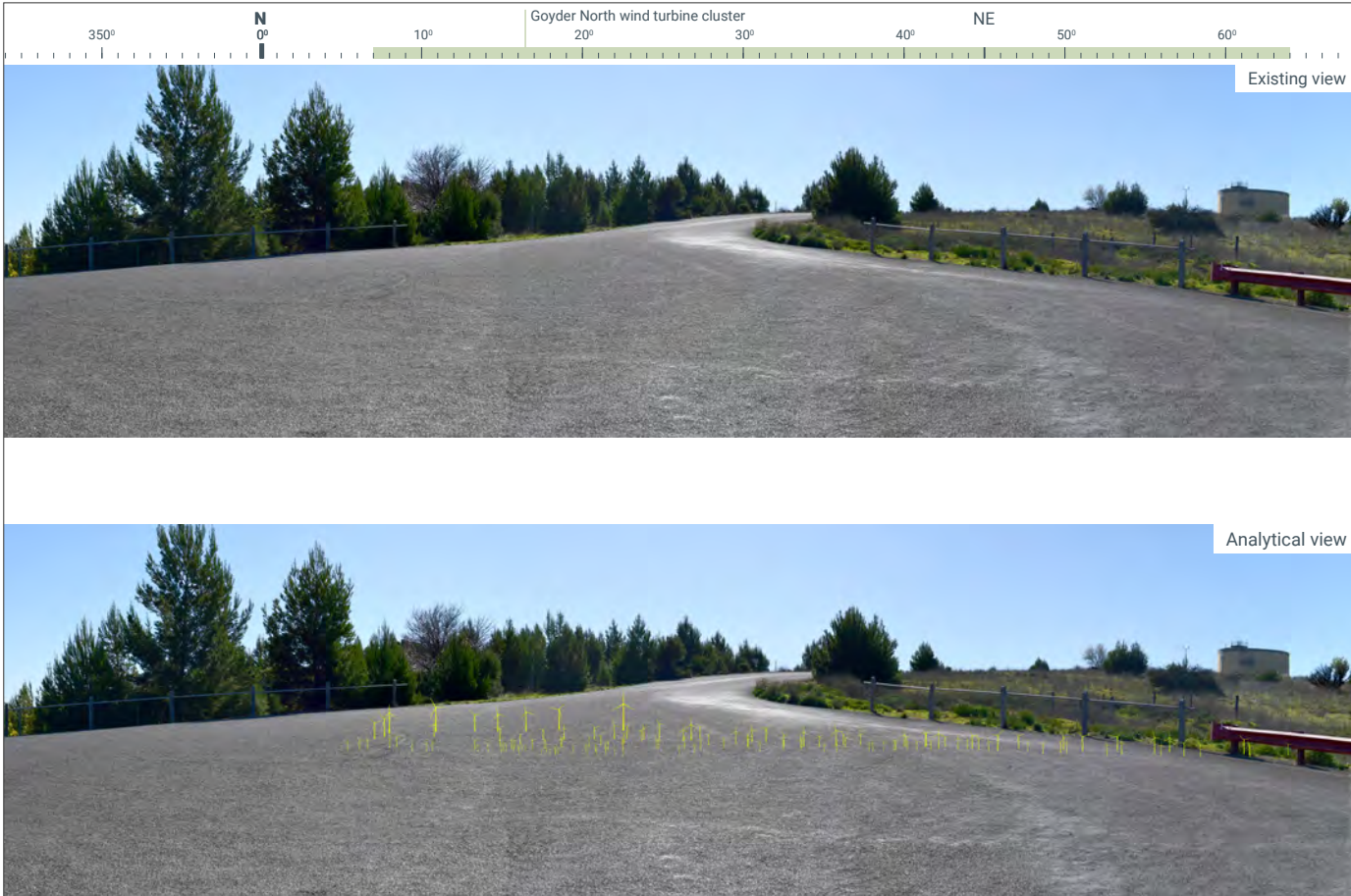


Date	15/08/2023
Time	10:48
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	308927m E, 6271195m S
Camera level	469.6 mAHD
Camera bearing	30°
Vertical field of view	27°
Project horizontal field of view	60°
Distance to nearest turbine	5.9 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 22
PM21 | Burra Mine Lookout

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



Date	15/08/2023
Time	11:59
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	307957m E, 6271799m S
Camera level	498.9 mAHD
Camera bearing	36°
Vertical field of view	27°
Project horizontal field of view	57°
Distance to nearest turbine	5.66 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 23
PM22 | Hamptons Village

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT

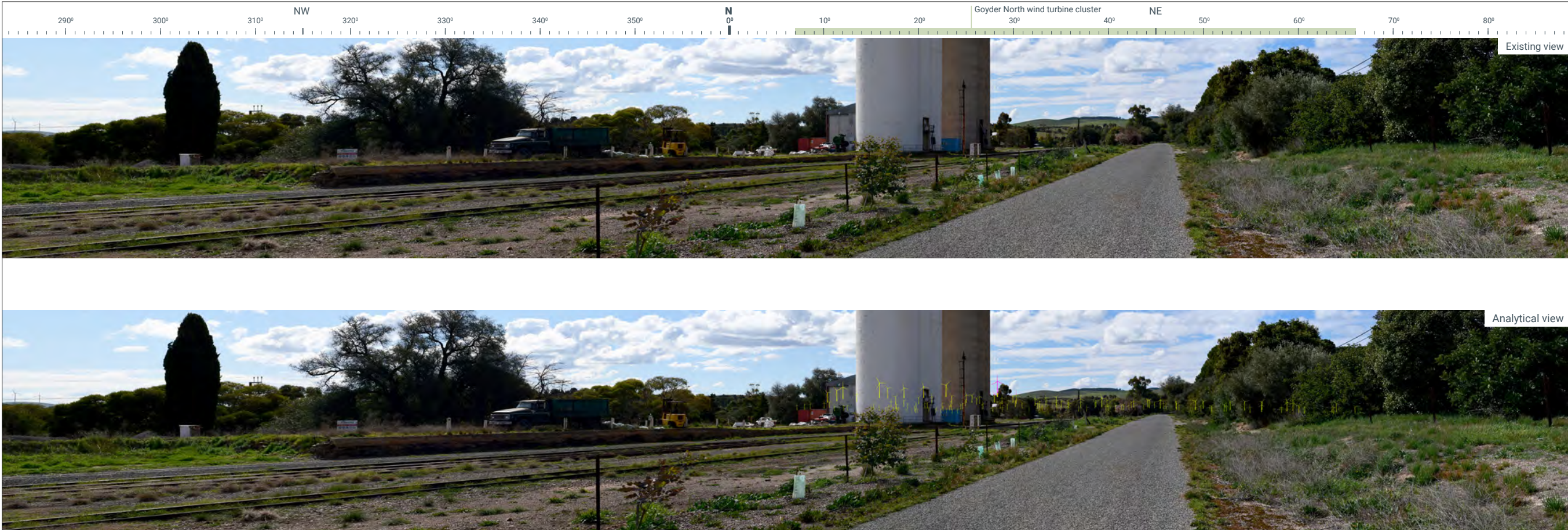


Date	15/08/2023
Time	12:49
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	308956m E, 6273615m S
Camera level	538 mAHD
Camera bearing	34°
Vertical field of view	27°
Project horizontal field of view	71°
Distance to nearest turbine	3.55 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

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Figure 24
PM23 | Railway Terrace, Burra

GOYDER NORTH | LANDSCAPE AND VISUAL IMPACT ASSESSMENT



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Date	16/08/2023
Time	14:53
Camera	Nikon D850 full frame DSLR
Panorama type	Landscape
Camera coordinates	307254m E, 6272130m S
Camera level	480.2 mAHD
Camera bearing	36°
Vertical field of view	27°
Project horizontal field of view	59°
Distance to nearest turbine	5.57 km (006)
Projected coordinate system	GDA2020 MGA Zone 54
Photography	Green Bean Design

