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Dr Sarah Rankin
Moonies Hill Energy Pty Ltd

MCPL Reference: MHE2101/026/21

IMPACT FOOTPRINT ASSESSMENT, FLAT ROCKS WIND FARM, KOJONUP WA.

Introduction

Mattiske Consulting Pty Ltd (MCPL) was commissioned in December 2021 by Moonies Hill Energy Pty Ltd to undertake a targeted survey of the Wind Turbine Footprint area of the proposed Flat Rocks Wind Farm.

The objective of this survey was to undertake a targeted survey of the proposed wind turbine footprints of the flat rocks including:

- Undertake a targeted survey of the proposed wind turbine footprint area;
- Define and map the location of any threatened and priority flora located within the survey area;
- Define any management issues related to flora and vegetation values;
- Provide recommendations on the local and regional significance of the vegetation communities; and
- Prepare a report summarising the findings.

Regional Context

The Flat Rocks Wind Farm survey area is located within the Southern Jarrah Forest subregion within 5km of the border of the Avon Wheatbelt region. The Southern Jarrah Forest subregion is characterised by Jarrah forest on duricrusted plateaus and loam soils of valleys, with Marri-Wandoo woodlands on laterite-free soils (Beard 1990). Typical vegetation of the Avon Wheatbelt region includes scrub-heath on sandplains, *Acacia-Casuarina* thickets on ironstone gravels, woodlands of *Eucalyptus loxophleba*, *Eucalyptus salmonophloia* and *Eucalyptus wandoo* on varying soil types (Beard 1990). The proximity of Moonies Hill Wind Farm to the border of the Avon Wheatbelt region indicates that characteristics of both regions are likely to be present in the survey area.

Mattiske Consulting Pty Ltd was commissioned in September 2010 by Moonies Hill Energy to undertake a flora and vegetation survey of the proposed Flat Rocks Wind Farm. In April 2016, Mattiske Consulting Pty Ltd was commissioned by the Moonies Hill Energy to undertake a review of the flora, vegetation and fauna values on the proposed Flat Rocks Wind Farm location, and update findings from the 2010 assessment. The prepared reports MHE1001/113/2010 and MHE1601/10/16 are available

One Threatened Ecological Community is recorded to occur in the Flat Rocks Wind Farm. This is Eucalyptus Woodlands of the Western Australian Wheatbelt Critically Endangered Threatened Ecological Community (TEC) and Priority 3 (iii) Protected Ecological Community (PEC) (DBCA 2021c and DBCA 2021d)

The WA Wheatbelt Woodlands ecological community is a woodland in which the trees typically are spaced and the canopy is relatively open. The understorey is highly variable in structure and composition. There can be localised variation in vegetation structure as a consequence of disturbance, for instance fire, or change in site characteristics that allows for gaps in tree canopy cover, a higher density of trees e.g. dense sapling regrowth, or change in the nature of the understorey (DAWE 2015). The minimum patch size of woodland required is 2 hectares with a condition rating of Pristine/Excellent/Very good (DAWE 2015).

It is intended that the condition thresholds will exclude degraded patches from any requirement for protection, for instance:

- isolated paddock trees on farms;
- small or narrow stands of trees that serve as windbreaks or shelterbelts on farms and other properties; or
- roadside and other woodland remnants that are too small and narrow, or where the tree canopy has become too patchy and discontinuous (effectively <10% cover), or the understorey has lost considerable elements of its native structure and diversity (DAWE 2015).

Methods

A targeted field assessment of the flora and vegetation of the Flat Rocks Wind Farm was undertaken by one experienced botanist from MCPL, on Wednesday December 9th 2021. The botanist held a valid collection licence to collect flora for scientific purposes, issued under the BC Act.

The geographic co-ordinates defining the Flat Rocks Wind Farm were supplied by Moonies Hill Energy. Aerial photographic maps of the proposed wind turbine footprint areas were prepared and supplied by CAD Resources. All 18 proposed wind turbine footprints for stage one were surveyed. Each footprint was an 80-meter radius from the proposed wind turbine tower base location.

At each footprint two photographs were taken from the boundary or centre of the proposed impact areas. At the photographed locations the vegetation was surveyed and recorded. Additional photographs were taken of trees within the proposed footprint.

All plant specimens collected during the field surveys were dried and processed. The plant species were identified based on taxonomic literature and through comparison with pressed specimens housed at the WAH. Where appropriate, plant taxonomists with specialist skills were consulted. Nomenclature of the species recorded is in accordance with the WAH (1998- 2021).

A small number of bird species were seen and recorded. Recording time was 0900 to 1500 with the daytime temperature ranging from 28°C to 34°C.

Results

A total of 18 turbine footprints were surveyed and photographed (APPENDIX A). Twelve of the surveyed footprint areas had an understory comprising of a commercial crop species. Commercial crop species included **Triticum* spp. (Wheat) seven footprint areas, **Brassica napus* subsp. *napus* (Canola) three areas, **Pisum sativum* (Field Pea) one area, and **Hordeum vulgare* (Barley) one area. The understorey of the remaining six areas was dominated by pasture grasses and weeds including **Bromus diandrus*, **Lolium rigidum*, **Avena fatua*, **Arctotheca calendula* and **Rumex acetosella*. Also recorded was one population of *Austrostipa compressa.*

Isolated "Paddock" trees were recorded within eleven footprint areas and one footprint area covers a planted windbreak of introduced *Eucalyptus* species (Appendix B). Two footprint boundaries impact vegetation previously mapped (Mattiske 2010) and photographs of those locations have been included in Appendix B.

The mapped vegetation was designated as community E3 and degraded or completely degraded.

E3: Woodland of *Eucalyptus wandoo* with patches and mixtures of *Eucalyptus marginata* subsp. *marginata – Corymbia calophylla* abutting *Eucalyptus loxophleba* subsp. *loxophleba* on sandy gravels and *Allocasuarina huegeliana* on granites over low shrubs of *Acacia lasiocarpa* var. *sedifolia, Bossiaea eriocarpa, Gastrolobium praemorsum, Astroloma compactum (Styphelia compacta), Acacia pulchella, Hibbertia commutata* over low sedges and annuals on sandy-loam gravels on mid and upper slopes.

A small number of birds were recorded. Birds were seen along roadsides and in the isolated paddock trees. Species seen were:

- Australian Magpie, *Cracticus tibicen*
- Australian Ringneck, *Barnardius zonarius*
- Tree Martin, *Petrochelidon nigricans*
- Laughing Kookaburra, *Dacelo novaeguineae*
- Common Bronzewing, *Phaps chalcoptera*

Discussion and Conclusion

There are twelve proposed turbine impact footprints located in commercial crop land, and 6 proposed turbine impact footprints located in pasture. No priority species will be impacted by these footprints.

Eleven footprint areas will require the clearing of isolated paddock trees. These trees also do not represent the TEC and none were priority or threatened species. Regulation 5 Item 19 states that Clearing of a tree on a property that is in an otherwise cleared area on the property and is more than 50 metres from any other native vegetation, being vegetation which does not, together with all other limited clearing carried out on the property in the financial year in which the clearing takes place, exceed five hectares (DWER 2019).

Two turbines are adjacent to vegetation mapped as Community E3 in a previous survey (Mattiske 2010). The impacted vegetation was mapped as degraded and completely degraded. These remnant vegetation communities have an understory dominated by introduced species and therefore do not meet the criteria for the Eucalyptus Woodland TEC.

One Turbine T18 is positioned within the boundary of the TEC. The current land use of the proposed turbine position is completely cleared for commercial crop. The proposed works will not clear any native vegetation nor is it within 50 meters of native vegetation that meets the criteria for the TEC.

None of the proposed wind turbine footprint areas will result in the clearing of any native vegetation.

Dr Libby Mattiske

Mattiske Consulting Pty Ltd

Attachments

Figure 1: Overview of Proposed Turbines - Stage 1

Appendix A: Proposed Turbine Footprint Photographs

Appendix B: Trees within Turbine Footprint Photographs

References

Beard, J.S. (1990)
Plant Life of Western Australia. Kangaroo Press, Kenthurst NSW.

Department of Agriculture Water and the Environment 2015
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
Approved Conservation Advice (including listing advice) for the Eucalypt Woodlands of the Western Australian Wheatbelt
<https://www.awe.gov.au/sites/default/files/documents/guide-eucalypt-woodlands-wa-wheatbelt.pdf>

Department of Agriculture, Water and the Environment (2021b)
EPBC Act List of Threatened Ecological Communities. Accessed 10th December 2021.
<http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl>

Department of Biodiversity, Conservation and Attractions (2021c)
List of Threatened Ecological Communities (TEC's) endorsed by the Minister for the Environment, 28th June 2018. Accessed 10th December 2021. <https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/threatened_ecological_communities_endorsed_by_the_minister_for_the_environment_june_2018.pdf>

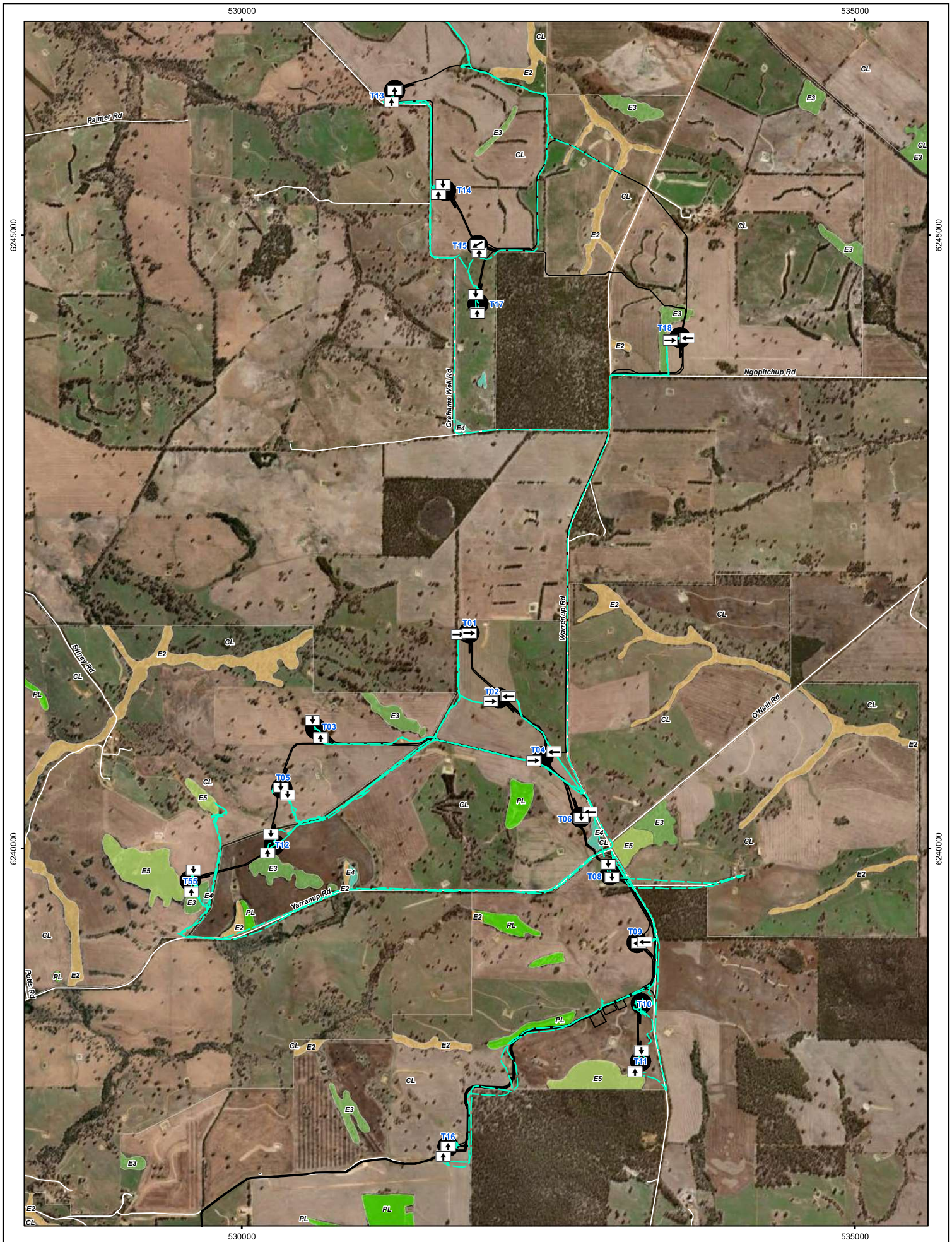
Department of Biodiversity, Conservation and Attractions (2021d)
Priority Ecological Communities for Western Australia Version 31 (28th March 2021). Accessed 10th December 2021. <https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Priority%20Ecological%20Communities%20list.pdf>

Department of Water and Environmental Regulation (2019)
A guide to the exemptions and regulations for clearing native vegetation. Accessed 10th December 2021
< https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/A%20guide%20to%20the%20exemptions%20and%20regulations%20for%20clearing%20native%20vegetation.pdf>

Mattiske Consulting Pty Ltd (2010)
Flora, Vegetation and Fauna assessment of the Flat Rocks Wind Farm survey area. Unpublished report prepared for Moonies Hill Energy Property Limited, November 2010.

Mattiske Consulting Pty Ltd (2016)
Flora, Vegetation and Fauna assessment of the Flat Rocks Wind Farm survey area. Unpublished report prepared for Moonies Hill Energy Property Limited, April 2016.

Western Australian Herbarium 1998-2021, *FloraBase – the Western Australian Flora,* Department of Parks and Wildlife. Available from: https://florabase.dpaw.wa.gov.au. 10 Dec. 21.



Legend

- Photo Location (Showing Direction)
- Turbine Layout - Stage 1
- MCPL Tracks
- Layout
- Vegetation: E2, E3, CL, E5, PL, E4

0 340 680m

Scale: 1:27,500
MGA94 (Zone 50)

CAD Ref: a1868_F001

Date: Dec 2021 | Rev: A | A3

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Moonies Hill Energy Pty Ltd
Overview

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 1: T01 Footprint boundary west facing east

Photograph 2: T01 Footprint centre facing east

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 3: T02 Footprint boundary west facing east

Photograph 4: T02 Footprint boundary east facing west

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 5: T03 Footprint boundary south facing north

Photograph 6: T03 Footprint boundary north facing south

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 7: T04 Footprint boundary west facing east

Photograph 8: T04 Footprint boundary east facing west

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 9: T05 Footprint boundary centre facing north

Photograph 10: T05 Footprint boundary south facing north

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 11: T06 Footprint boundary centre facing south

Photograph 12: T06 Footprint boundary east facing west

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 13: T08 Footprint boundary centre facing south

Photograph 14: T08 Footprint boundary north facing south

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 15: T09 Footprint boundary centre facing west

Photograph 16: T09 Footprint boundary east facing west

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE MPACT FOOTPRINTS, DECEMBER 2021

Photograph 17: T10 Footprint boundary centre facing north

Photograph 18: T10 Footprint boundary south facing north

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 19: T11 Footprint boundary south facing north

Photograph 20: T11 Footprint boundary north facing south

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 21: T12 Footprint boundary south facing north

Photograph 22: T12 Footprint boundary north facing south

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 23: T13 Footprint boundary centre facing north

Photograph 24: T13 Footprint boundary south facing north

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 25: T14 Footprint boundary south facing north

Photograph 26: T14 Footprint boundary north facing south

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 27: T15 Footprint boundary south facing north

Photograph 28: T15 Footprint boundary north facing south-west

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 29: T16 Footprint boundary centre facing north

Photograph 30: T16 Footprint boundary south facing north

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 31: T17 Footprint boundary south facing north

Photograph 32: T17 Footprint boundary north facing south

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 33: T18 Footprint boundary west facing east

Photograph 34: T18 Footprint boundary east facing west

APPENDIX A: PHOTOGRAPHIC RECORD OF PROPOSED FLAT ROCKS WIND FARM TURBINE IMPACT FOOTPRINTS, DECEMBER 2021

Photograph 35: T55 Footprint boundary south facing north

Photograph 36: T55 Footprint boundary north facing south

APPENDIX B: PHOTOGRAPHIC RECORD OF TREES NEAR PROPOSED FLAT ROCKS WIND FARM TURBINE FOOTPRINTS, DECEMBER 2021

Photograph 1: T03 south-east tree group

Photograph 2: T03 south tree group

APPENDIX B: PHOTOGRAPHIC RECORD OF TREES NEAR PROPOSED FLAT ROCKS WIND FARM TURBINE FOOTPRINTS, DECEMBER 2021

Photograph 3: T03 south-west tree

Photograph 4: T05 paddock tree

APPENDIX B: PHOTOGRAPHIC RECORD OF TREES NEAR PROPOSED FLAT ROCKS WIND FARM TURBINE FOOTPRINTS, DECEMBER 2021

Photograph 5: T10 paddock tree

Photograph 6: T12 paddock tree

APPENDIX B: PHOTOGRAPHIC RECORD OF TREES NEAR PROPOSED FLAT ROCKS WIND FARM TURBINE FOOTPRINTS, DECEMBER 2021

Photograph 7: T13 paddock tree

Photograph 8: T16 paddock tree

APPENDIX B: PHOTOGRAPHIC RECORD OF TREES NEAR PROPOSED FLAT ROCKS WIND FARM TURBINE FOOTPRINTS, DECEMBER 2021

Photograph 9: T14 Windbreak trees, outside

Photograph 10: T14 Windbreak trees, inside

APPENDIX B: PHOTOGRAPHIC RECORD OF TREES NEAR PROPOSED FLAT ROCKS WIND FARM TURBINE FOOTPRINTS, DECEMBER 2021

Photograph 11: T12 footprint boundary south facing south to Community E3

Photograph 12: T55 footprint boundary facing Community E3