MT FYANS
WIND FARM

APPENDIX N

TRAFFIC IMPACT ASSESSMENT

GHD

AUGUST 2022

Mount Fyans Wind Farm

Transport Impact Assessment

Hydro Tasmania

5 August 2022

→ The Power of Commitment

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Printed date	5/08/2022 1:29:00 PM
Last saved date	05 August 2022
File name	https://projectsportal.ghd.com/sites/pp17_06/mountfyanswindfarmju/ProjectDocs/12589081-REP_MFWF_Transport_Impact_Assessment_Aug_2022.docx
Author	Mark Petrusma
Project manager	Mark Petrusma
Client name	Hydro Tasmania
Project name	MFWF Traffic Impact Assessment Update
Document title	Mount Fyans Wind Farm | Transport Impact Assessment
Revision version	Rev 4
Project number	12589081

Document status

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	1	W. Bull	M. Petrusma	On file	T. Cooper	On file	07/04/2020
S4	2	W. Bull	M. Petrusma	On file	T. Cooper	On file	06/05/2020
S4	3	M. Petrusma	T. Cooper	On file	T. Cooper	On file	26/05/2021
S4	4	S. Naik	M. Petrusma	On file	T. Cooper	On file	05/08/2022

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1. Introduction

1.1 Background

Hydro Tasmania Pty Ltd (Hydro Tasmania), acting on behalf of Woolnorth Wind Farm Holdings Pty Ltd (Woolnorth), has engaged GHD to prepare a Transport Impact Assessment (TIA) for the proposed Mount Fyans Wind Farm Project (Mt Fyans).

This latest update to the TIA has been prepared in August 2022 in response to amendments to the proposed layout and number of turbines.

1.2 Purpose of this report

The primary purpose of this report is:

- To document the transport task associated with the construction of the Project including wind turbine parts, construction materials and the workforce, and
- To assess the adequacy of the existing road network to cater for the expected transport requirements and recommend treatments to mitigate any issues that may arise.

It is intended that this report form part of the Planning Permit Application to be submitted to the Victorian State Government for the Mt Fyans project.

1.3 Scope and limitations

This report: has been prepared by GHD for Hydro Tasmania and may only be used and relied on by Hydro Tasmania for the purpose agreed between GHD and Hydro Tasmania as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Hydro Tasmania arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Hydro Tasmania and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.4 Referenced materials

The following documents and materials have been referred to during the preparation of this report:

- *Guide to Road Design – Part 4: Intersections and Crossings: General,* Austroads 2021
- *Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections,* Austroads 2021
- *Guide to Traffic Management – Part 6: Intersections, Interchanges and Crossings Management,* Austroads 2020
- VicRoads traffic volume estimates, 2020
- Classified traffic count data collected by Hydro Tasmania, 2015
- Crash data, VicRoads 2017-2020

- General project information provided by Hydro Tasmania
- Workshop with Moyne Shire Council, VicRoads and Hydro Tasmania held on 27th March 2018
- Discussions with VicRoads up to meeting held on 23rd April 2021

1.5 Project site location

The Mt Fyans project site is located approximately 5 km to the north of the town of Mortlake, Victoria, approximately 190 km west of Melbourne. The site boundaries are presented in Figure 1-1.

1.6 Workshop with Moyne Shire Council and VicRoads

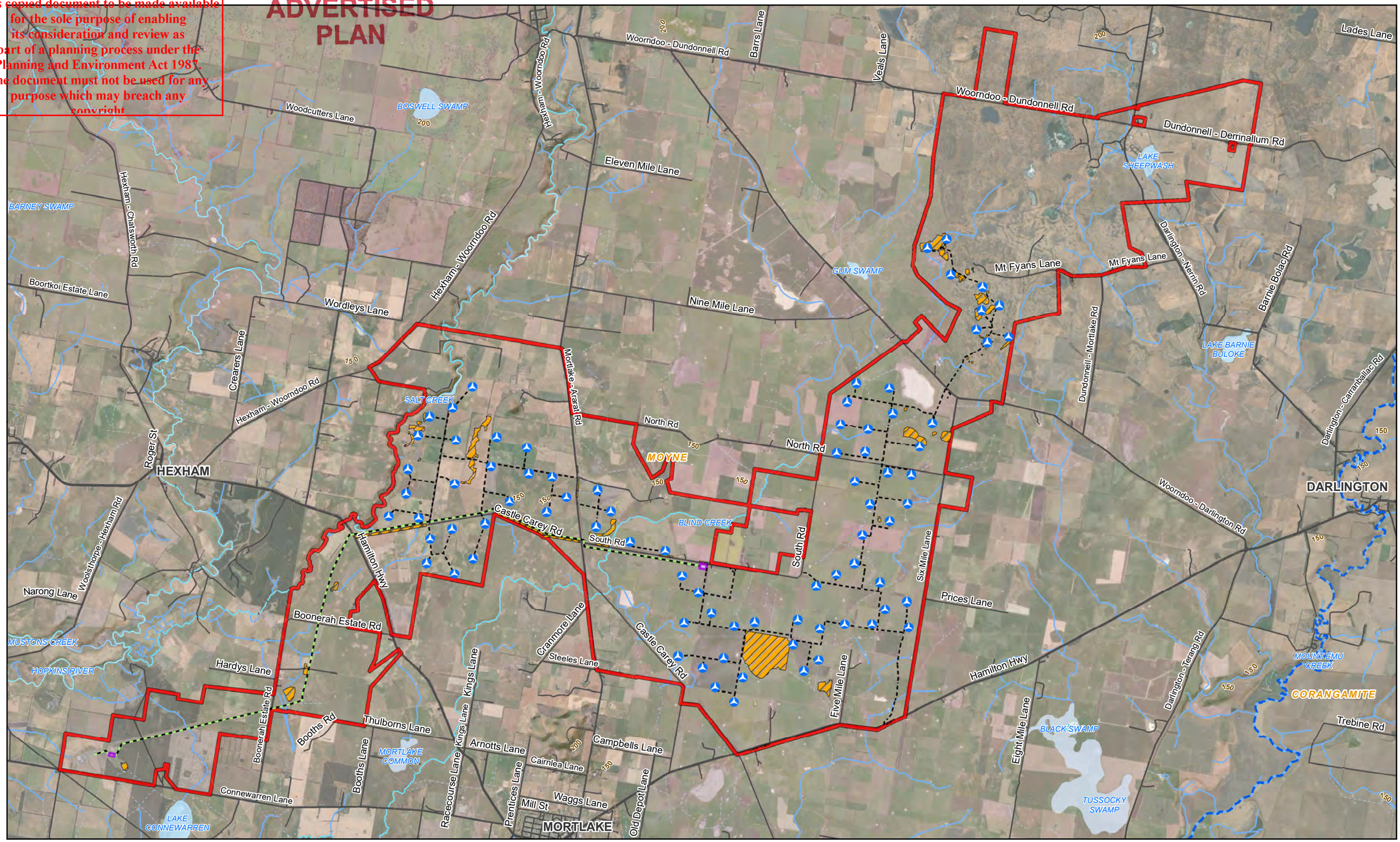
A transport workshop was held on 27th March 2018 with Hydro Tasmania, GHD, Moyne Shire (Council) and VicRoads (now Department of Transport). The purpose of the workshop was to inform Council and VicRoads of the project and to identify preferred access routes for transport to and from the site.

Some of the key outputs from the workshop are summarised as follows:

1. *Council's preference is for road routes between the quarries and the Mt Fyans project site to be designated such that traffic is restricted to State arterial roads. Transport operators are to be contractually bound to these routes. The use of these routes should be monitored and verified throughout the construction period.*
2. *VicRoads no longer seek to obtain direct funding for road maintenance based on a 'per truck' rate, rather VicRoads will request a road maintenance and rehabilitation framework to be developed to mirror any system that would also be in place for Council.*
3. *Council and VicRoads expressed concern that many wind farms underestimate the traffic generation during construction. In response, Hydro Tasmania will adopt a conservative approach and assume all water and quarried materials are transported to the site rather than being obtained on site.*
4. *VicRoads noted that increasing blade sizes was resulting in varying transport routes for different turbine parts (e.g. tower sections vs nacelles vs blades).*
5. *There is an existing bend on Terang-Mortlake Road which leads to a number of truck roll over crashes due to inappropriate speeds. A speed indicator and automated 'slow down' advisory sign during construction would be a safety improvement welcomed by the general public.*
6. *Council and VicRoads both see public safety as the absolute priority with regard to traffic management arrangements and therefore it is preferred to limit mixing of trucks and public traffic on local roads. There is an option for the eastern area of the Mount Fyans project that focuses traffic onto the Hamilton Highway with truck routes through the development site to access for turbines located further east (e.g. around Woorndoo-Darlington Road).*
7. *Other comments related to site access options:*
    - *The current intersection at Six Mile Lane and Hamilton Highway was identified as having poor sight distance and poor geometry and is likely unsuitable for a major truck access point.*
    - *VicRoads would prefer a single access point on Hamilton Highway. If a secondary access point is required, it should be removed post-construction.*
    - *Single lane use of Castle-Carey Road is not a viable option.*

Cables (underground) will be required to cross Mortlake-Ararat Road. VicRoads preference is for direct drill, however it is possible to trench in two sections subject to management of traffic.

Due to the lapsed time between the workshop and submission of the Planning Application, the proponent has undertaken further engagement with Council and Department of Transport on the approach to access routes for transport to and from the site. South Road has been identified as a potential site access in 2021 and the benefits from its inclusion in the project (such as removing the need for over-dimensional vehicles to travel through the Mortlake township) were discussed with Council. A meeting was held with Department of Transport in April 2021 to discuss the potential of using South Road as a site access, the alternative options for site access arrangements and the over-dimensional vehicle access routes.



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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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N

LEGEND

- Proposed Wind Turbines
- Transmission Line
- Project Site Boundary
- Other Local Government Boundaries
- Location of Moyne Shire
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Site Location

Figure 1.1

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Data source: DELWP, VicMap, 2017; Hydro Tasmania, Proposed Infrastructure, 2017 Created by: oso

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2. Existing conditions

2.1 Transport network

The key roads that could be used during the construction of the Mt Fyans project are summarised in Table 2.1.

Table 2.1 Transport network summary

Road name	Location used	Class	Surface condition
State arterial roads			
Princes Highway (A1)	Portland-Terang and Geelong-Terang	Arterial Highway	Sealed
Henty Highway (A200)	Portland to Cavendish	Arterial Highway	Sealed
Hamilton Highway (B140)	Geelong to Mortlake	Arterial Highway	Sealed
Glenelg Highway (B160)	Dunkeld to Lake Bolac	Arterial Highway	Sealed
Dunkeld-Cavendish Road (C188)	Cavendish to Dunkeld	Arterial Road	Sealed
Mortlake-Ararat Road (C148)	Lake Bolac to Mortlake	Arterial Road	Sealed
Terang-Mortlake Road (C156)	Terang to Mortlake	Arterial Road	Sealed
Boundary Road (C156)	Mortlake	Arterial Road	Sealed
Council roads			
Woorndoo-Darlington Road	Hamilton Highway to Woorndoo-Dundonnel Road	Local Road	Sealed
Six Mile Lane	Hamilton Highway to Woorndoo-Darlington Road	Local Road	Sealed
North Road	Six Mile Lane to Mortlake-Ararat Road	Local Road	Partially sealed
South Road	North Road to Mortlake-Ararat Road	Local Road	Unsealed
Castle-Carey Road	West of Mortlake-Ararat Road	Local Road	Unsealed
Manooka Lane	Not used	Local road	Unsealed

Each of the roads listed in Table 2.1 are described in detail in the following sections.

2.1.1 State Arterial Roads

2.1.1.1 Princes Highway (A1)

Princes Highway is a State Arterial Road (named highway) connecting from Princes Freeway at Geelong to the South Australian border east of Mount Gambier. It travels in a predominantly east-west direction, south of Mortlake, and passes through several population centres including Colac, Camperdown, Terang, Allansford, Warrnambool, Port Fairy, Portland and Heywood. The typical speed limit is 100 km/h, with reduced speed limit of 50-60 km/h or 80 km/h through towns.

Princes Highway is typically a two-lane, two-way highway constructed to a typical ‘Class A’ highway standard with sealed shoulders as well as centre and edge line marking. Princes Highway is an approved B-Double and OSOM transport route.

2.1.1.2 Henty Highway (A200)

Henty Highway is a State Arterial Road (named highway) connecting from the Princes Highway, immediately north of Heywood, to Horsham. Beyond Horsham, Henty Highway becomes the Western Highway and continues west towards the South Australian border. Henty Highway travels in a predominantly north-south direction, west of

Mortlake, and passes through several population centres including Hamilton and Cavendish. The typical speed limit is 100 km/h, with reduced speed limit of 50-60 km/h or 80 km/h through towns.

Henty Highway is typically a two-lane, two-way highway constructed to a typical 'Class A' highway standard with sealed shoulders as well as centre and edge line marking. Henty Highway is an approved B-Double and OSOM transport route.

2.1.1.3 Hamilton Highway (B140)

Hamilton Highway is a State Arterial Road (named highway) connecting Geelong and Hamilton via Mortlake. Hamilton Highway travels in a predominantly east-west direction. The typical speed limit is 100 km/h, with reduced speed limit of 50-60 km/h or 80 km/h through towns.

Hamilton Highway is typically a two-lane, two-way highway with gravel shoulders as well as centre and edge line marking. Hamilton Highway is an approved B-Double and OSOM transport route.

Through Mortlake, Hamilton Highway is known as Dunlop Street and has recently been the subject of streetscaping works within the Mortlake Town Centre including dual carriageway highway plus service roads providing local access and on-street car parking. A signalised pedestrian crossing point is also provided. The intersection of Hamilton Highway with Jamieson Avenue (at the eastern end of the Town Centre) is roundabout controlled.

The view along Hamilton Highway from Arnotts Lane intersection is provided in Figure 2-1.

Figure 2-1 Hamilton Highway

2.1.1.4 Dunkeld-Cavendish Road (C188)

Dunkeld-Cavendish Road is a State Arterial Road connecting between Glenelg Highway west of Dunkeld, and Henty Highway south of Cavendish. It has a length of approximately 29 km and is constructed to a rural road standard, sealed, with gravel verge and centre line marking only. The posted speed limit is 100 km/h. Dunkeld-Cavendish Road is an approved B-Double and OSOM transport route.

2.1.1.5 Mortlake-Ararat Road (C148)

Mortlake-Ararat Road is a State Arterial Road connecting between Hamilton Highway at Mortlake, and Western Highway at Ararat via Woorndoo and Lake Bolac. It is constructed to a rural road standard, sealed, with gravel

verge and centre line marking only. The posted speed limit is 100 km/h, reducing to 50-60 km/h or 80 km/h through towns. Mortlake-Ararat Road is an approved B-Double and OSOM transport route.

Mortlake-Ararat Road has a series of tight turns located immediately south of Woorndoo which may require specific consideration as part of transport route assessments.

A typical section of Mortlake-Ararat Road (located 200 m south of Carinlea Lane) is provided in Figure 2-2.

Figure 2-2 Mortlake-Ararat Road

The view along Mortlake Road at the South Road / Castle-Carey Road junction is provided in Figure 2-3.

Figure 2-3 Mortlake-Ararat Road / South Road / Castle-Carey Road junction

2.1.1.6 Terang-Mortlake Road (C156)

Terang-Mortlake Road is a State Arterial Road connecting between Princes Highway at Terang, and Boundary Road at Mortlake. It has a length of approximately 22 km and is constructed to a rural road standard, sealed, with gravel verge and centre and edge line marking. The posted speed limit is 100 km/h. Terang-Mortlake Road is an approved B-Double and OSOM transport route.

Terang-Mortlake Road has a very tight turn immediately south of Mortlake, where it connects to Boundary Road. This turn may require specific consideration as part of transport route assessments.

2.1.2 Local Council Roads

2.1.2.1 Woorndoo-Darlington Road

Woorndoo-Darlington Road connects Hamilton Highway west of Darlington, and Woorndoo-Dundonnell Road east of Woorndoo. It travels in an east-north direction on a relatively straight alignment through level terrain. Woorndoo-Darlington Road is a sealed road with narrow, gravel shoulders. Turbines are proposed to be constructed on both sides of Woorndoo-Darlington Road.

Key intersections within the vicinity of the Subject Site include:

- Hamilton Highway:
  - Give-way controlled crossroads with Darlington-Terang Road slightly offset. Median strip islands are provided on both intersections. There are no restrictions to sight distance on either side of the junction.
- Six Mile Lane:
  - Give-way controlled T-intersection with a relatively wide footprint compared to the nominal width of both Woorndoo-Darlington Road and Six Mile Lane. The intersection is located on the outer edge of the bend such that there are no restrictions to sight distances.

The default rural speed limit of 100 km/h applies.

2.1.2.2 Six Mile Lane

Six Mile Lane is a local road connecting between Hamilton Highway and Woorndoo-Darlington Road. It has a total length of 8.3 km and runs in a straight line, on an approximate north-south alignment. Six Mile Lane effectively forms part of the eastern subject site boundary. Six Mile Lane is sealed for its full length with a marked centre-line. The default rural speed limit of 100 km/h applies.

The intersection of Six Mile Lane with Hamilton Highway is give-way controlled with Six Mile Lane connecting at approximately 60 degrees to the Highway. A Basic Left Turn (BAL) treatment is provided. No right turn treatment is present.

The view from Six Mile Lane looking towards Hamilton Highway is provided in Figure 2-4.

Figure 2-4 Six Mile Lane / Hamilton Highway junction

2.1.2.3 North Road

North Road is a minor access road connecting between Mortlake-Ararat Road and Six Mile Lane on an approximately east-west alignment. It is straight with the exception of a short section approximately 3 km east of Mortlake-Ararat Road, where the alignment of the road diverts slightly to the south.

The western half of North Road is sealed from the intersection of Mortlake-Ararat Road with the eastern half being unsealed, including the Six Mile Lane intersection. Note that vehicles are required to use the shoulder in order to pass in two directions.

The view of North Road looking from Six Mile Lane is provided in Figure 2-5.

Figure 2-5 North Road

2.1.2.4 South Road

South Road connects to North Road, approximately 3.2 km west of Six Mile Lane, and travels approximately 3.2 km south before turning a right angle and connecting to Mortlake-Ararat Road to the west. The western portion of South Road is sealed, including the intersection with Mortlake-Ararat Road, with the remainder being unsealed. The view along the sealed section of South Road is provided in Figure 2-6.

Figure 2-6 South Road

2.1.2.5 Castle-Carey Road

Castle-Carey Road is a minor, unsealed road connecting between Mortlake-Ararat Road (directly opposite the South Road intersection) and Hamilton Highway. A typical section of Castle-Carey Road is provided in Figure 2-7.

Figure 2-7 Castle-Carey Road

2.1.2.6 Manooka Lane

Manooka Lane connects to Mortlake-Ararat Road approximately midway between the North Road and South Road junctions. It is a minor, unsealed road providing access to two dwellings, both of which are located within the Project Site.

2.2 Traffic volume summary

Existing two-way traffic volume estimates for key roads surrounding the site are summarised in Table 2.2 including daily volumes (vpd) and typical peak hourly volumes (vph). Note that Heavy Vehicles (HVs) are typically defined as Austroads Class 3 truck and above.

Table 2.2 Two-way traffic volume estimates

Road	Source	Year	Daily	%HVs	Peak hour
Hamilton Highway (west)	DoT[1]	2020	930	24%	90
Hamilton Highway (east)	DoT	2020	2300	25%	170
Hopkins Highway	DoT	2020	2800	23%	220
Mortlake-Ararat Road	DoT	2020	740	33%	80
Terang-Mortlake Road	DoT	2020	1100	17%	85
Woorndoo-Darlington Road	Hydro Tas	2015	94	13%	12
Six Mile Lane	Hydro Tas	2015	46	11%	6
North Road	Hydro Tas	2015	8	22%	2
South Road	Hydro Tas	2015	15	15%	2
Castle-Carey Road	Hydro Tas	2015	6	8%	1

1. Department of Transport

2.3 Road safety performance

Crash data was obtained from VicRoads (now Department of Transport) for a recent 5-year time period (1 July 2015 to 30 June 2020) for an area within 20 km of the subject site. The locations of crashes are presented in Figure 2-8.

A total of 26 crashes were represented in the data including two fatal crashes, 15 serious injury and nine other injury crashes. The most common crash type was DCA Code 170-179 (off carriageway on straight) with 11 occurrences. DCA Code 180-189 (off carriageway on curve) and DCA Code 167 (struck animal) were also represented with five and four occurrences respectively.

The two fatal crashes were as follows:

- July 2016 at 6:22 PM (night) on Hamilton Highway, north-west of Mortlake. Head on collision between two light vehicles in dry conditions resulting in fatality.
- January 2020 at 7:50 AM (morning) on Shaw Street, just to the east of Mortlake. A vehicle overturned off the carriageway on a right bend in dry conditions resulting in fatality.

Two crashes were recorded on Hamilton Highway along the site frontage, near the proposed access points, neither resulting in serious injury or fatality:

- Other opposing manoeuvres (DCA Code 129) crash at the intersection of Hamilton Highway and Six Mile Lane.
- Collision with an animal approximately 330 metres west of Five Mile Lane.

No crashes were recorded on Mortlake-Ararat Road along the site frontage.

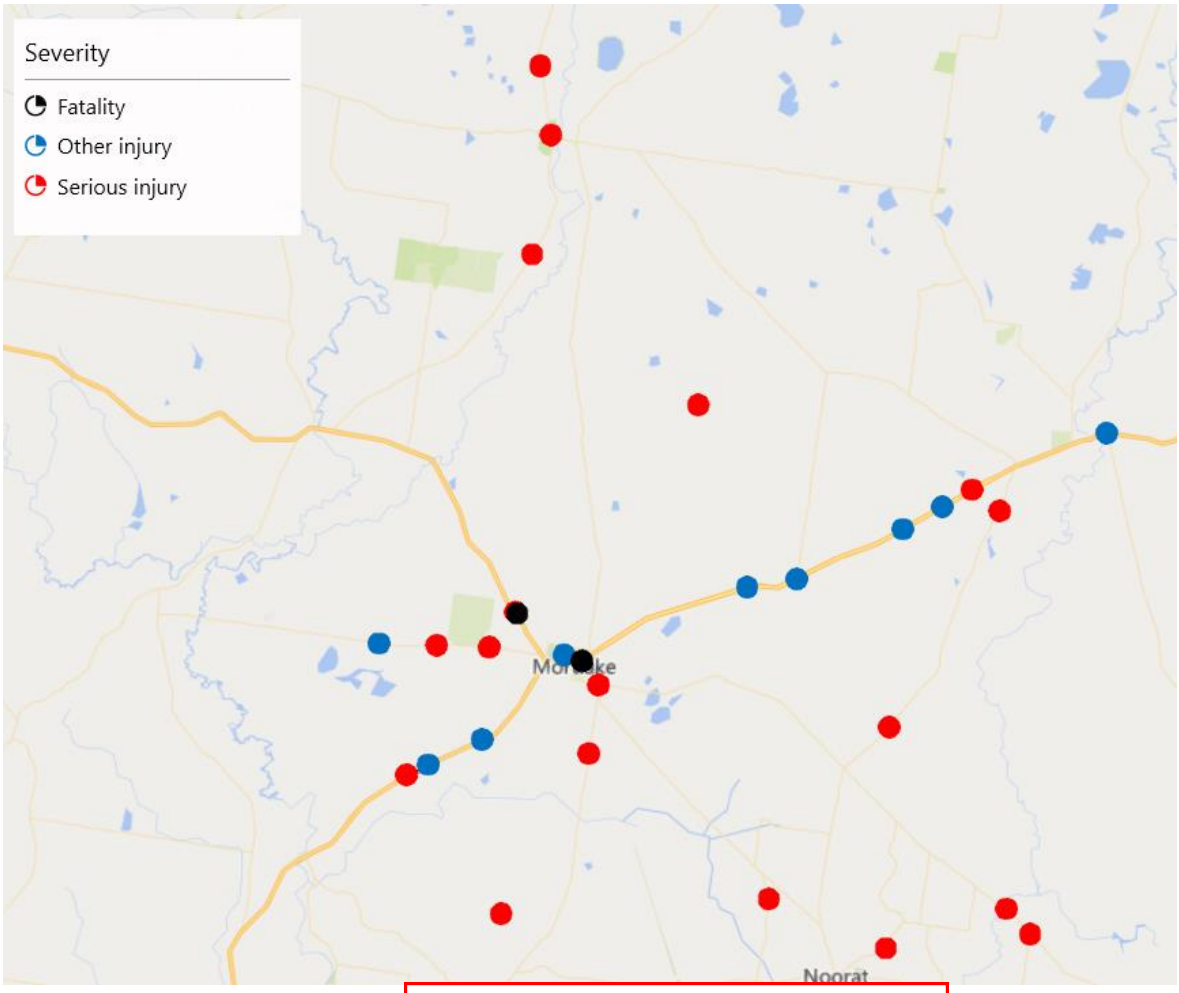


Figure 2-8 Crash map (2015-2020)

Source: Bing Maps, VicRoads

3. Proposed development

3.1 Site layout

The Mt Fyans Wind Farm is comprised of up to 81 wind turbines having a maximum tip height of 200 metres. The turbines will be constructed across a large area north-east of Mortlake as shown in the site layout presented in Figure 3-1. For the purpose of this assessment a blade length of 76 metres has been assumed.

3.1.1 On-site Facilities

The facilities to be constructed on the site as part of the Project may include:

- Up to 81 wind turbines each consisting of reinforced concrete foundation, 5x steel tower sections, nacelle, rotor and 3x turbine blades.
- Hardstands at the base of each turbine to support cranes and other equipment associated with construction and maintenance.
- A network of internal access tracks throughout the site including 12 km upgrades to existing tracks and 67 km of new tracks.
- On-site substation and control building.
- Underground cables to connect groups of 6-10 turbines to the on-site substation (up to 162 km of cabling).
- Overhead transmission line having length of approximately 19 km between the on-site substation to the grid connection at Mortlake Terminal Station.
- Off-site substation to be located adjacent the existing Mortlake Terminal Station.
- Three wind monitoring masts.

In addition to the above permanent facilities to be provided on-site, the following temporary facilities will be required to support construction activities:

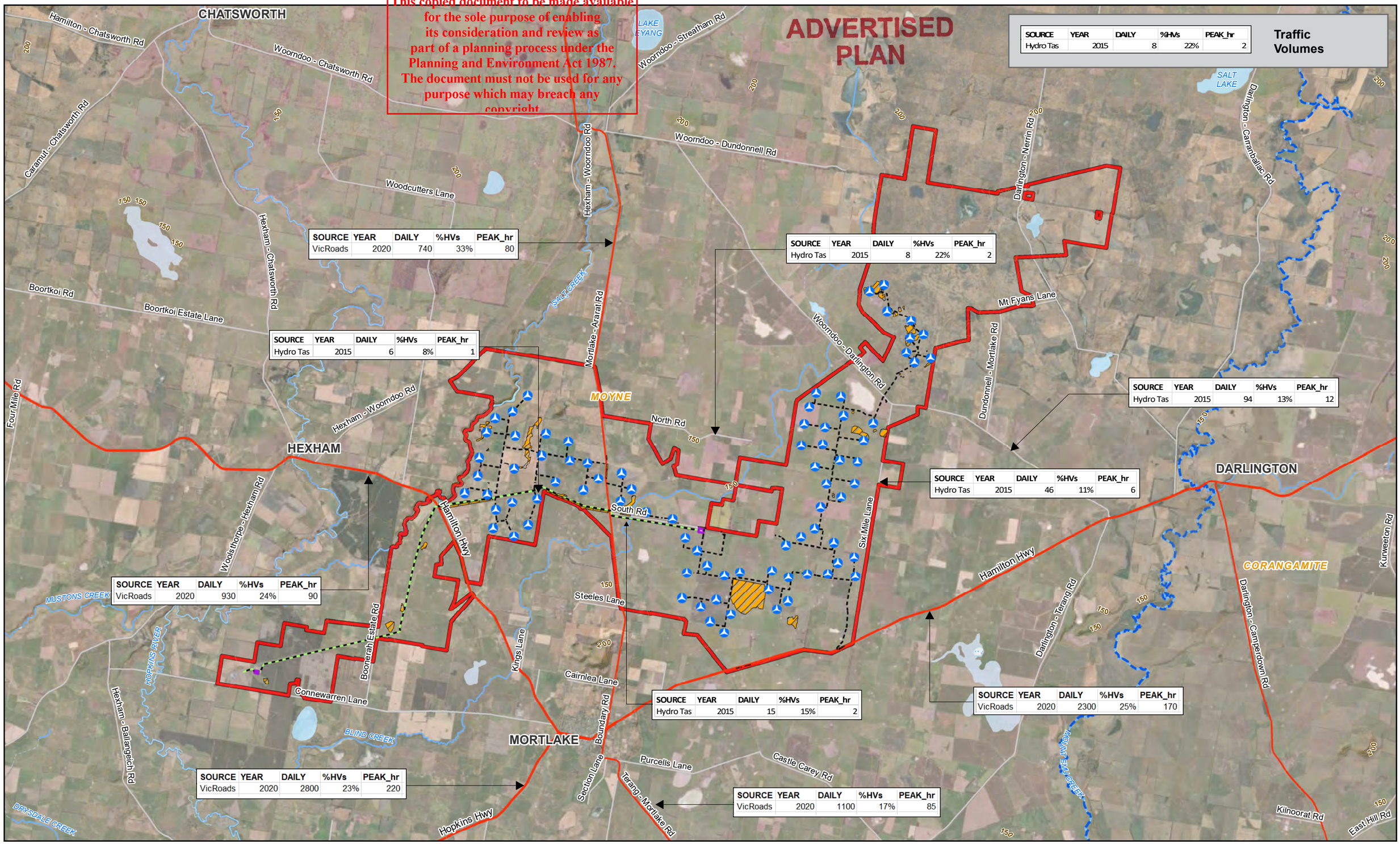
- Construction compound and site offices.
- Laydown areas.
- Two concrete batching plants.

3.2 Anticipated Construction Timeframe

Construction is expected to take place over an approximately 21-month period with three main phases relating to the transport task:

- Phase 1 Roads and Hardstands
- Phase 2 Foundations and Turbines
- Phase 3 Electrical and Substations

There will be some overlap between the phases as shown in Figure 3-2.



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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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LEGEND

- Proposed Wind Turbines
- Transmission Line
- Project Site Boundary
- Other Local Government Boundaries
- Location of Moyne Shire
- On-Site Substation / Control Centre
- Proposed Road Layout
- Works Excluded Area
- Contour 10 m

VicRoads Declared Roads

- Arterial / Highway
- Arterial / Other

Hydro Tasmania
Mt Fyans Wind Farm Update

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Site Layout

Figure 3.1

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Data source: DELWP, VicMap, 2017; Hydro Tasmania, Proposed Infrastructure, 2017 Created by: oso

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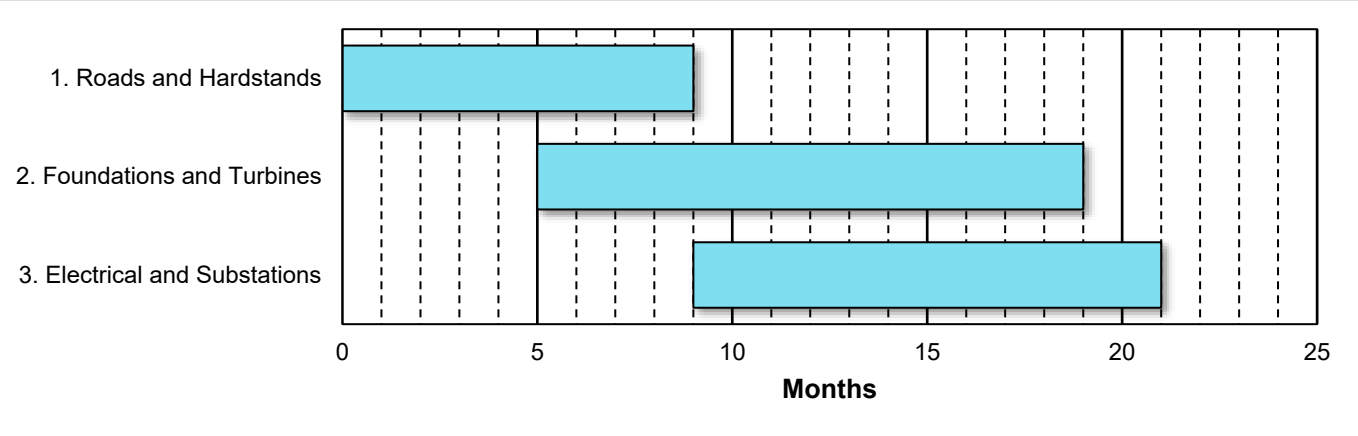

Figure 3-2 Indicative construction timeframe

3.3 Site Access Arrangements

3.3.1 Preferred Arrangements

For the purposes of access to the site during construction, the Mt Fyans project will be separated into four separate construction regions each with its own dedicated access point. Internal connectivity will be provided via a network of access tracks constructed throughout the site. The preferred access arrangements are shown in Figure 3-3 and detailed in Table 3.1 below.

Table 3.1 Preferred access arrangements

Construction region	No. turbines	Primary access point	Location
A	17	Hamilton Highway	West of Six Mile Lane
B.1	2	South Road	Approx. mid-way along road
B.2	5	South Road	Approx. mid-way along road
B.3	30	South Road	East end of road
C	3	Mortlake-Ararat Road	Between Manooka Lane and South Road
D	24	Mortlake-Ararat Road	Opposite Manooka Lane

Note that Region B.3 includes public road crossings at North Road and Woorndoo-Darlington Road and Region D includes two public road crossings at Castle-Carey Road. These roads are not proposed to be used by over-dimensioned heavy vehicles (e.g., extensible trailers and low-loaders), with access by these vehicles being via the internal access roads with a single-point public road crossing. Note that these crossings would likely need to be undertaken under traffic control.

3.3.2 Alternative Options

There are two alternative options for site access arrangements which may be used for the project. It is intended that project approvals also consider the alternatives to allow for flexibility in the use of access points as the planning and design for the project progresses into later stages. Note that none of these alternatives include additional access points over the preferred arrangements, rather they are a subset of the access points listed in Table 3.1 as outlined in the following sections.

3.3.2.1 Alternative Option 1: No access via South Road

Under this option, those turbines that would be accessed via South Road will instead be accessed via either Mortlake-Ararat Road or via Hamilton Highway. There would still be crossing movements between areas of the project site either side of South Road primarily due to concrete agitators moving between the batching plants and turbine construction zones across the project site.

The arrangements under Alternative Option 1 are detailed in Table 3.2 and presented in Figure 3-4.

Table 3.2 Access arrangements Alternative Option 1

Construction region	No. turbines	Primary access point	Location
A	47	Hamilton Highway	West of Six Mile Lane
B	5	Mortlake-Ararat Road	Between Manooka Lane and South Road
C	5	Mortlake-Ararat Road	Between Manooka Lane and South Road
D	24	Mortlake-Ararat Road	Opposite Manooka Lane

Under this option, there would be significantly more traffic utilising direct access onto Hamilton Highway. It is likely that a higher order access design would be required (comprising turn lanes etc.) than for the preferred option (Table 3.1). It is also noted that the removal of South Road as an option for access would require additional truck traffic to travel through the town of Mortlake as vehicles from the north of Mortlake (including Mount Shadwell Quarry) travel to and from the Hamilton Highway access point.

3.3.2.2 Alternative Option 2: No access via Hamilton Highway

Under this option, those turbines that would be accessed directly via Hamilton Highway will instead be accessed via Mortlake-Ararat Road and South Road. The arrangements under Alternative Option 1 are detailed in Table 3.3 and presented in Figure 3-5.

Table 3.3 Access arrangements Alternative Option 2

Construction region	No. turbines	Primary access point	Location
A	0	South Road	Approx. mid-way along road
B	54	South Road	Approx. mid-way along road
C	3	Mortlake-Ararat Road	Between Manooka Lane and South Road
D	24	Mortlake-Ararat Road	Opposite Manooka Lane

Under this option, there would be significantly more traffic utilising South Road for access to the project site. The design of South Road, and its intersection with Mortlake-Ararat Road, may be impacted by the increased traffic flows at this location and appropriate treatment will be required. There is likely to be a minor increase in traffic volumes travelling through Mortlake (compared to the base scenario) due to the removal of the Hamilton Highway access point, however the extent of this increase is likely to be less than for Alternative Option 1 due to the location of primary quarries to be used by the project.

3.4 Car Parking

Car parking for worker vehicles will be provided in the construction compound area. Hardstands for vehicle parking will also be provided at all turbine sites.

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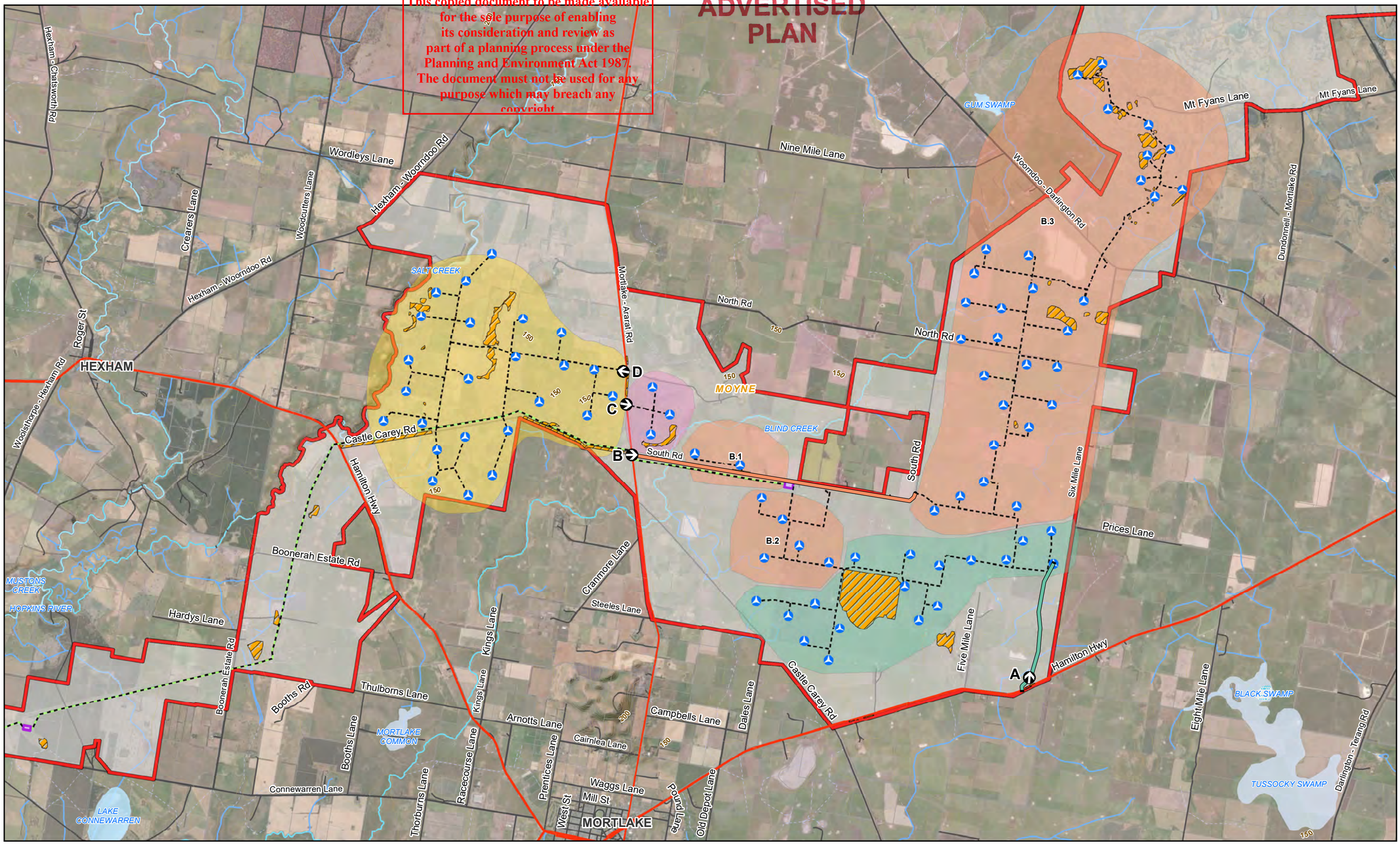

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Kilometers

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LEGEND

Access Area
- Group A
- Group B
- Group C
- Group D

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Internal Site Access
- Group A
- Group B

VicRoads Declared Roads
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Preferred Option Site Access Arrangements Figure 3.3

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Data source: DELWP, VicMap, 2017; Hydro Tasmania, Proposed Infrastructure, 2017 Created by: oso

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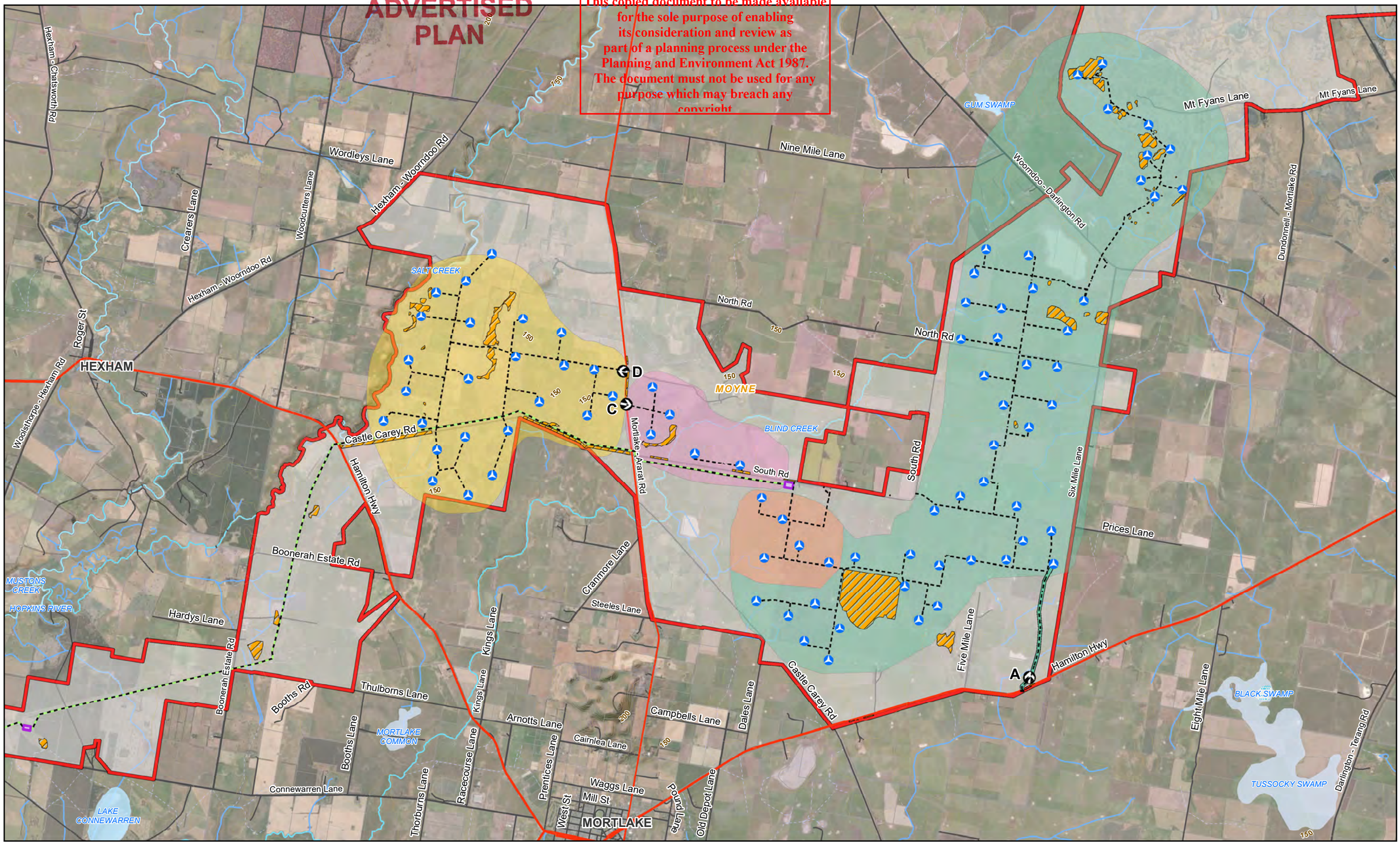

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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

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LEGEND

- Access Entry Point
- **Internal Site Access**
- Group A
- Proposed Wind Turbines
- Transmission Line
- Project Site Boundary
- Location of Moyne Shire
- On-Site Substation / Control Centre
- Proposed Road Layout
- Works Excluded Area
- **Access Area**
- Group A
- Group B
- Group C
- Group D
- Contour 10 m
- **VicRoads Declared Roads**
- Arterial / Highway
- Arterial / Other

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Alternative Option 1 Site Access Arrangements Figure 3.4

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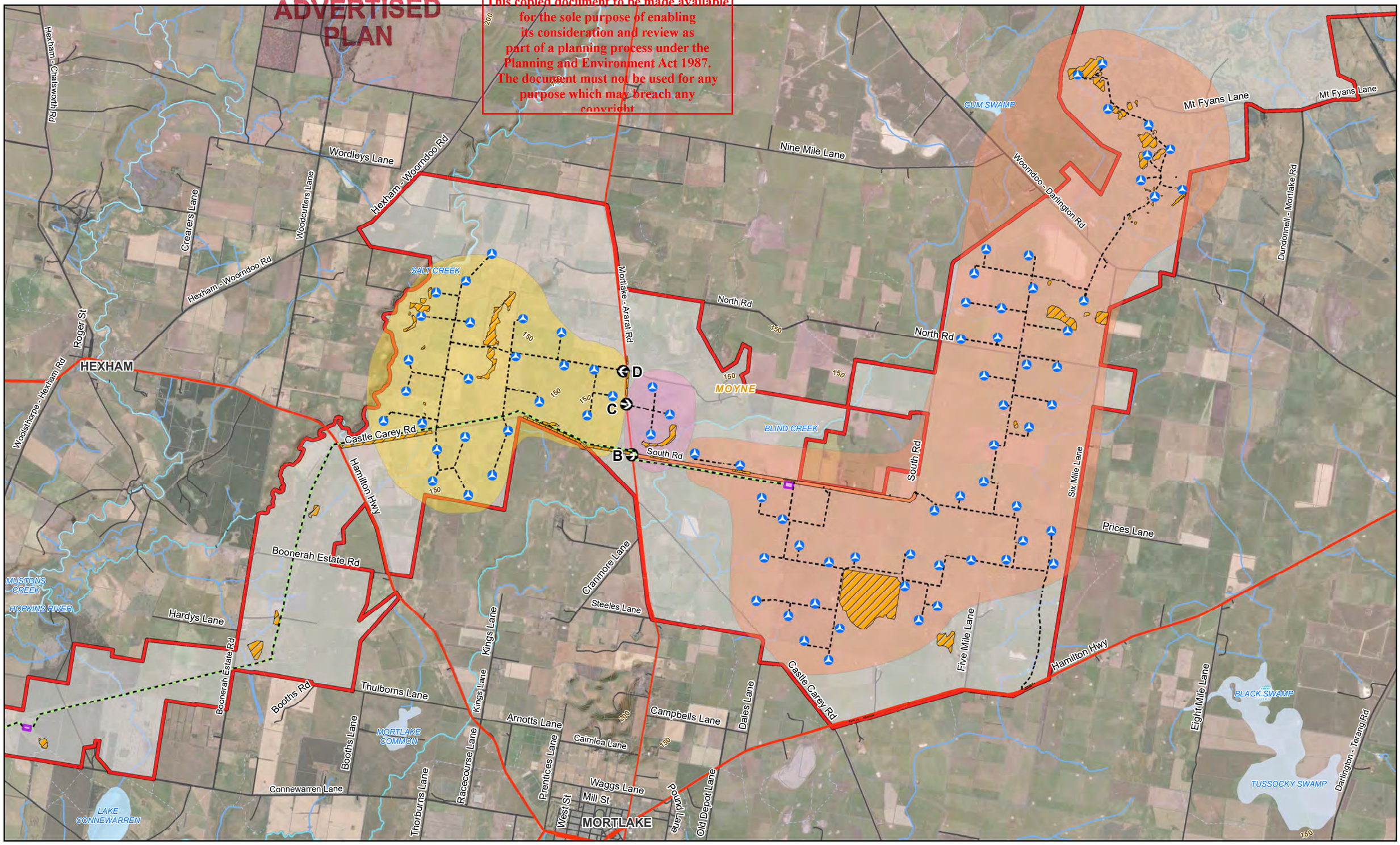

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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

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LEGEND

- Access Entry Point
- **Internal Site Access**
  - Group B
- **Access Area**
  - Group B
- Group C
- Group D
- Proposed Wind Turbines
- Transmission Line
- Project Site Boundary
- Location of Moyne Shire
- On-Site Substation / Control Centre
- Proposed Road Layout
- Works Excluded Area
- Contour 10 m
- **VicRoads Declared Roads**
  - Arterial / Highway
  - Arterial / Other

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Alternative Option 2 Site Access Arrangements Figure 3.5

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4. Access Routes

4.1 Over-Dimensioned Vehicles

4.1.1 Turbine Blades and Tower Sections

The Project is comprised of up to 81 wind turbines with a maximum tip height of 200 metres. Each wind turbine will be made up of 5 steel tower sections, a nacelle, turbine hub and 3 turbine blades. The blades and tower sections will be transported to the site in one piece by prime mover and extensible trailer, resulting in up to 680-over-dimension trips for blades and towers (i.e., 8 trips per turbine).

For the wind turbine blades, the longest single component to be transported to the site, the prime mover and extensible trailer combination would have a total length of up to 83 metres as shown in Figure 4-1. Note that the extensible trailer will be retracted for the return journey, and therefore the over-dimensioned vehicle trip is considered to be one-way only (i.e., towards the site).

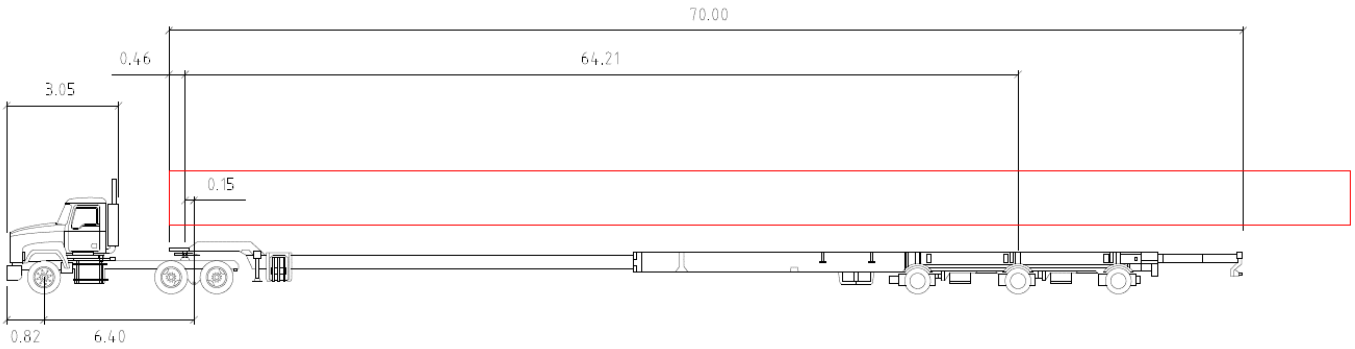


Figure 4-1 Assumed wind turbine transport combination

For the purpose of this report, the preferred route for over-dimensioned vehicles is from Portland via the Henty Highway, Dunkeld-Cavendish Road and Mortlake-Ararat Road approaching Mortlake from the north. Note that some of the smaller tower sections could be transported from Portland, via Princes Highway and Terang-Mortlake Road.

In the event Geelong is used for import of components as an alternative, the route for over-dimension vehicles is via Hamilton Highway as this is the only feasible option for turbine components. Note that due to constraints within the Mortlake township (including trees within the Avenue of Honour at the intersection of Hamilton Highway and Mortlake-Ararat Road) all turbine blades that may approach the site from Hamilton Highway (i.e., Geelong) would be required to use Access A and the internal road network to bypass the township of Mortlake.

The preferred and alternative routes are provided in Figure 4-2. Note that these routes are preliminary only at this stage and will be confirmed closer to commencement of construction.

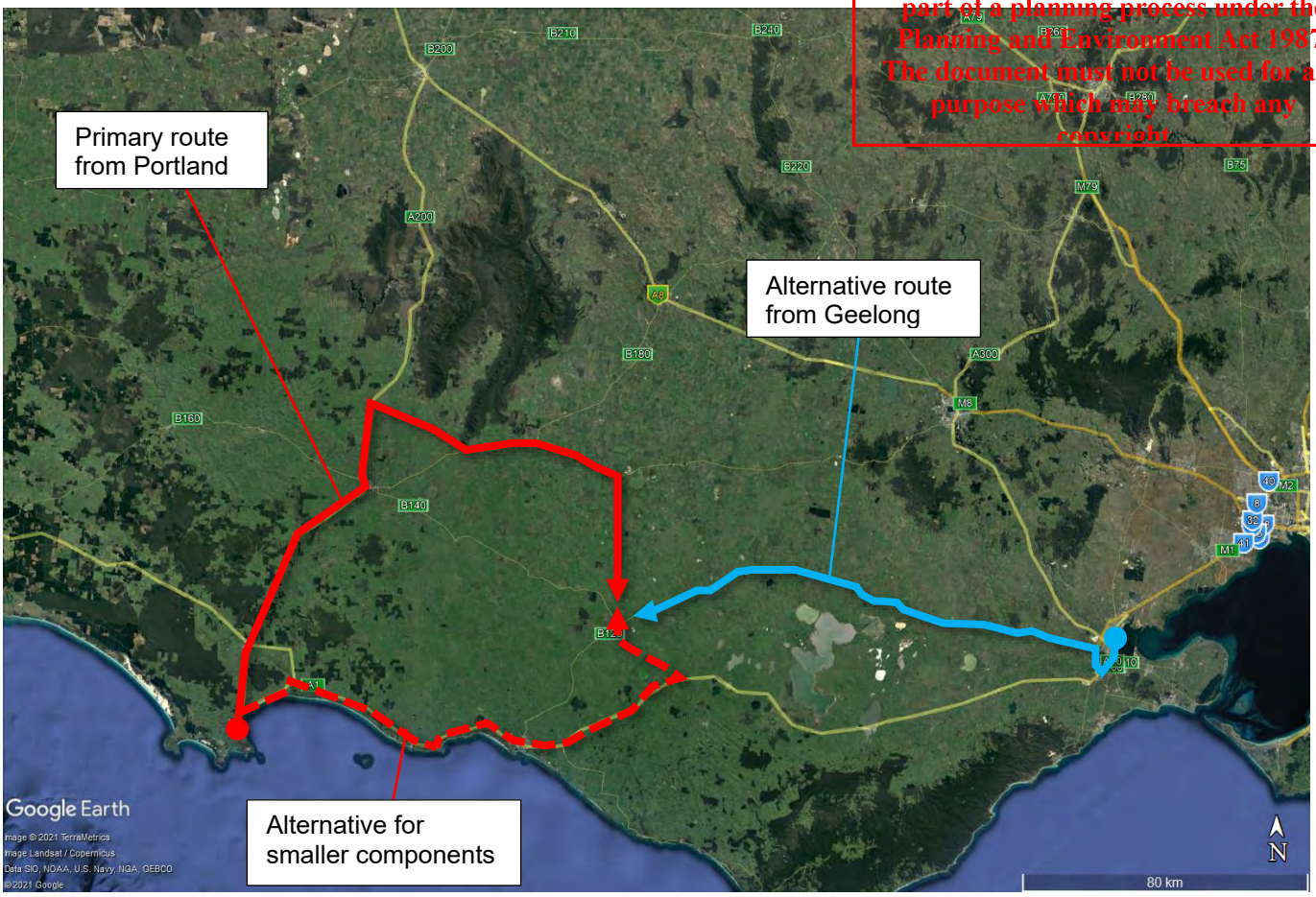


Figure 4-2 Preferred and alternative over-dimension vehicle haulage routes

The preferred and alternative routes for transport from Portland have been assessed in the Rex J Andrews Route Study Rev 01, dated 12/05/2021 (Appendix A).

For the alternative route from Geelong, a preliminary assessment of the preferred routes has been undertaken and no specific constraints have been identified that would exclude use by over-dimensioned vehicles up to 83 metres in length. Notwithstanding, several tight turns were identified, and these are listed as follows:

- Port Access / The Esplanade, North Shore:
  - Transport vehicle required to reverse out of the Port and then turn onto The Esplanade. There is an existing power pole that the vehicle would need to manoeuvre around. Some temporary pavement widening may be required on the north side of the road to accommodate the rear wheel tracking.
- The Esplanade / Sea Breeze Parade, North Shore
  - Right turn from The Esplanade onto Sea Breeze Parade. No major obstructions identified; however, the body of the vehicle will encroach over private property on the inside of the bend.
- Sea Breeze Parade / Abery Road
  - Left turn from Sea Breeze Parade onto Abery Road. The inside of the swept path is restricted by an existing wall. There is a light pole located between the safety barrier and the wall that may require temporary removal to accommodate the turbine blade.
- Abery Road / Corio Quay Road
  - Through movement at existing roundabout. The vehicle can utilise the right traffic lane in order to pass directly through the roundabout. The preliminary assessment indicates that the existing power and light poles would not be impacted.
- Corio Quay Road, North Shore
  - 90-degree right hand bend on Corio Quay Road. The rear overhang of the vehicle may require temporary removal of light points on the outside of the bend.

- Princes Highway / Geelong Ring Road, Waurn Ponds
  - Right turn at traffic signals from Corio Quay Road onto Princes Highway on ramp. One signal lantern may need to be removed temporarily in order to allow the swept path of the transport vehicle along this turn.
- Geelong Ring Road / Hamilton Highway, Fyansford
  - Left turn from Geelong Ring Road off ramp onto Hamilton Highway. Preliminary assessment indicates that existing light poles can be avoided, however there is significant overhang on the inside bend and may require new temporary pavement alongside the existing slip lane to accommodate rear wheel tracking.
- Hamilton Highway / Mortlake-Ararat Road, Mortlake
  - Due to significant oversteer required and rear overhang, the intersection of Hamilton Highway and Mortlake-Ararat Road will not be used by over-dimension vehicles. Rather, over-dimension vehicles accessing turbine Groups A, B and C would all access the site via Access A on Hamilton Highway, east of Mortlake. For access to turbine Group D (west of Mortlake-Ararat-Road) over-dimension vehicles will bypass the township of Mortlake using the internal road network, exiting via South Road and then re-entering the site via Access D.

A preliminary swept path assessment has been undertaken for the locations listed above based on the design vehicle in Figure 4-1 with independent rear steering. These are provided in Appendix B of this report. It is acknowledged that these swept paths are indicative only in nature and a more detailed assessment would need to be undertaken by the haulage contractor prior to commencing work. However, the swept paths appended to this report do demonstrate that transport of wind turbine parts via the preferred route is generally feasible.

Note that the combination will exceed the maximum length requirements to comply with the permit exemptions for the Victoria approved Class 1 Oversize & Overmass (OSOM) Network, and therefore permits will be required to operate along these routes. The final dimensions of each load will determine the specific permit conditions, which may include the following:

- Pre-transport route assessment;
- Warning signs and devices;
- Pilot vehicles and escort vehicles;
- Mass and dimension limits, including rear overhang; and
- Time of operation.

The haulage contractor will ultimately be responsible for obtaining and complying with the permit for each over-size load to be transported. It is noted that over-dimensioned vehicles are not proposed to use Council owned roads for this Project.

4.1.2 Nacelles

Nacelles and drivetrains will be transported to the site using 6x8 platform trailers from Geelong via Hamilton Highway approaching Mortlake from the east, with some vehicles turning right onto Mortlake-Ararat Road to access areas of the Project. Drivetrains may be transported separately, however for the purposes of this report it is assumed that nacelles and drivetrains will be transported together. Each turbine will require one nacelle to be transported, resulting in a total of 81 laden trips to the site and 81 unladen return trips to Geelong.

These loads will have a mass of approximately 125 to 135 tonnes and therefore will exceed the maximum load limit to comply with the permit exemptions for the Victorian approved Class 1 OSOM Network. The haulage contractor will ultimately be responsible for obtaining and complying with the permit for each over-mass load to be transported to the site.

4.1.3 Transformers

Two transformers will be installed at the on-site substation. These will be transported to the site using low loader trailers from Geelong via Hamilton Highway approaching Mortlake from the east, and then turning right onto Mortlake-Ararat Road to access the proposed substation.

These loads will have a mass exceeding the maximum load limit to comply with the permit exemptions for the Victorian approved Class 1 OSOM Network. The haulage contractor will ultimately be responsible for obtaining and complying with the permit for each over-mass load to be transported to the site.

The on-site substation will be accessed via Manooka Lane, with both Manooka Lane and the existing internal access road to be upgraded to accommodate the over-mass loads, including the Blind Creek crossing.

As part of the Project an additional off-site transformer will be transported to the existing Mortlake Terminal Station, accessed via Connewarren Lane west of Mortlake.

In addition to Department of Transport requirements, the use of overmass vehicles on Council roads (including Manooka Lane and Connewarren Lane) will require a permit issued by Moyne Shire Council.

4.1.4 Hubs

Hubs will be transported using low loader trailers with a total of 81 laden trips to the site (1 trip per turbine) and 81 unladen return trips. These vehicles would generally comply with the maximum dimensions and mass requirements to operate on the Victorian approved Class 1 OSOM Network.

The approval to operate is subject to a number of operating conditions including time of day restrictions, seasonal restrictions, notification of authorities and pilot vehicles. More information can be found in the following Commonwealth Government Notices:

- *Heavy Vehicle National Law Multi-State Class 1 Load Carrying Vehicles Dimension Exemption Notice 2016 (No. 1)*
- *Heavy Vehicle National Law Multi-State Class 1 Load Carrying Vehicles Dimension Exemption Notice 2016 Amendment Notice 2017 (No. 1)*
- *Heavy Vehicle National Law Multi-State Class 1 Load Carrying Vehicles Mass Exemption Notice 2016 (No. 1)*

The preferred route for hubs is from Geelong via Hamilton Highway approaching Mortlake from the east with some vehicles turning right onto Mortlake-Ararat Road to access areas of the Project. The full length of Hamilton Highway and Mortlake-Ararat Road are part of the Victorian Approved Class 1 OSOM Network.

Note that the haulage contractor will ultimately be responsible for ensuring that the vehicles and vehicle loads comply with the maximum dimensions and mass requirements to use the Victorian Approved Class 1 OSOM Network and obtaining permits to operate in the event maximum requirements are exceeded.

4.2 General Access Vehicles and B-Doubles

The majority of parts and materials transported to the site will be via general access vehicles, including rigid trucks, semi-trailers and truck & dog trailer combinations, or B-Doubles. The use of B-Doubles will be restricted to Victorian approved B-Double network which includes Hamilton Highway, Hopkins Highway, Terang-Mortlake Road, and Mortlake-Ararat Road.

4.3 Quarry Haulage Routes

A significant proportion of total trips travelling to and from the site will be the import of raw material for concrete and road construction from quarries surrounding the site. It is considered inappropriate at this early stage of the Project to identify specific quarries, and by extension the haulage routes, that will be used as it is not possible to accurately determine which quarries will have sufficient capacity and quality of material to supply the Project.

For modelling purposes, and based on advice provided by Hydro Tasmania, it has been assumed that around 40% of quarried material will be obtained from Mt Shadwell Quarry, with the remainder of trips being distributed evenly around the arterial road network as follows:

- Mt Shadwell 40%
- Mortlake-Ararat Road (north) 20%
- Hamilton Highway (east) 20%
- Terang-Mortlake Road (south-east) 20%

As shown in Figure 4-3 a selection of key quarries in the region have good access to the state road network. Any contract in place to transport materials from these quarries will require designated, suitable routes to be used.

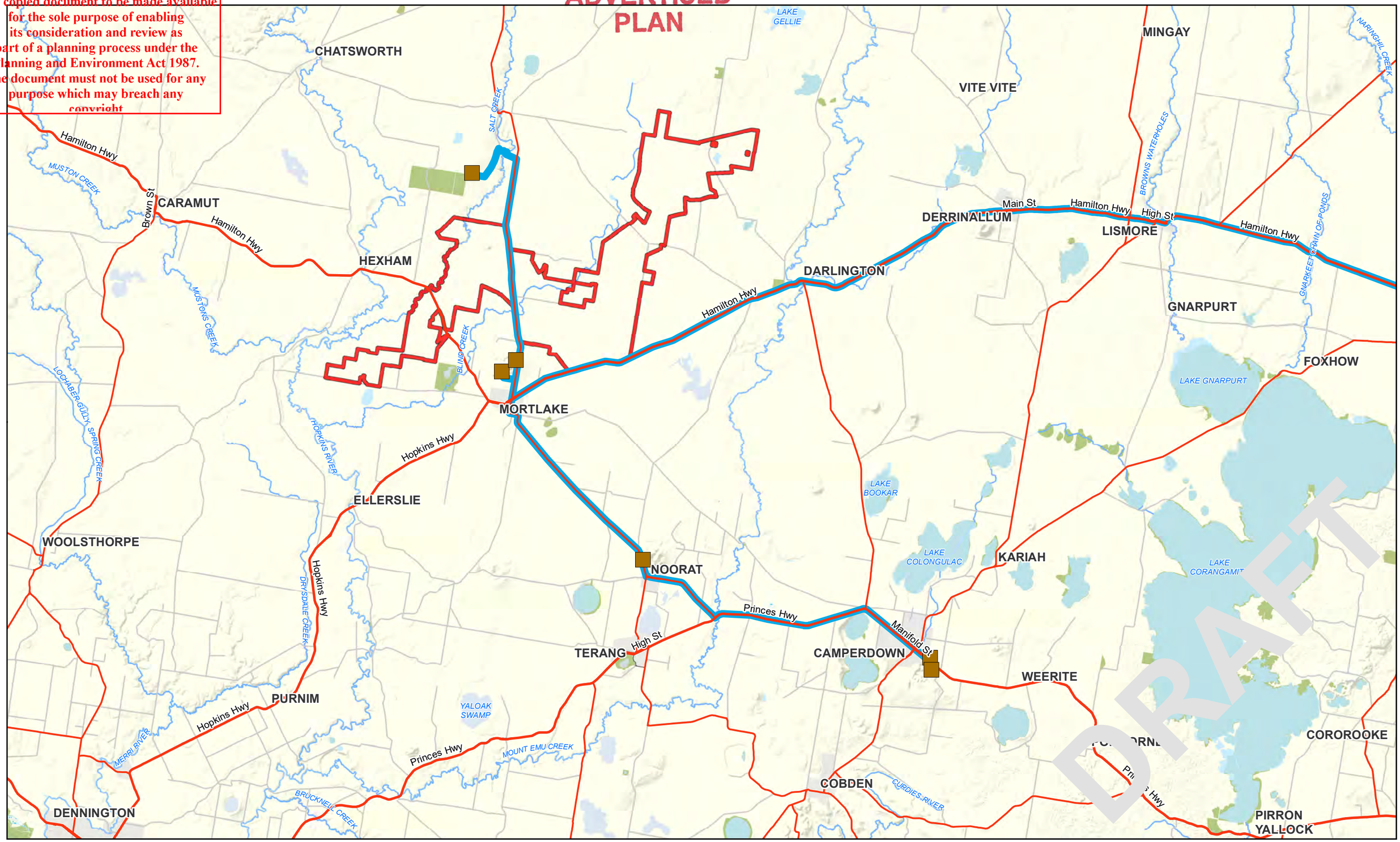
A more detailed assessment of quarry haulage routes, and the impacts of the Project on these roads, will be undertaken as part of Traffic Management Planning closer to commencement of construction.

4.4 Workforce

The workforce required for construction will vary based on the activities being undertake. Hydro Tasmania have advised that the average daily workforce associated with each construction phase will be as follows:

- Phase 1 – 40 workers per day;
- Phase 2 – 70 workers per day; and
- Phase 3 – 50 workers per day.

The construction workforce will travel to the site by private car or light bus. There will be no restrictions placed on these users who will be free to travel via the most convenient route to the site.



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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

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LEGEND

- Quarry Haulage Routes
- Project Site Boundary
- Potential Service Quarries

VicRoads Declared Roads

- Arterial / Highway
- Arterial / Other
- Other Parks

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Mt Fyans Wind Farm Update

Job Number	31-35440
Revision	C
Date	04/05/2021

Quarry Haulage Routes

Figure 4.3

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5. Traffic generation

5.1 Key assumptions

The trip generation estimates and traffic distribution is based on a number of assumptions that have been made for the purposes of this assessment regarding the extent of construction activities, construction program, sources of materials and construction methodology. These assumptions include, but are not limited to, the following:

- Maximum of 81 turbines with a maximum blade length of 76 metres;
- Turbine towers comprise 5 steel tower sections;
- 21-month construction period separated into 3 primary phases relating to the transport task;
- Each turbine requires approximately 650 m^3 concrete foundation;
- Concrete deliveries will be from one of two on-site concrete batching plants to be provided on the site;
- Approximately 67 km of new access tracks are required plus 12 km upgrades to existing access tracks;
- Approximately 79 km of cable trenching at a depth of 500 mm;
- Typical load size assumed 29 tonnes (truck and dog trailer);
- Average daily workforce for each construction phase with 50% travelling by 15-seater bus and 50% travelling with individual car:
  - Phase 1 – 40;
  - Phase 2 – 70; and
  - Phase 3 – 50
- Off-site transformer travelling to Mortlake Terminal Station via Connewarren Lane.

Additional assumptions are detailed in Section 5.2 and Table 5.1.

5.2 Traffic generation estimates

The traffic generation estimates provided in this report have been separated into external and internal trips as summarised in the following sections. Note that these figures exclude traffic associated with the transmission line and grid substation as discussed in Section 6.1 of this report and are concerned primarily with the construction of the Wind Farm.

External Trips

All deliveries of plant and materials from Geelong, Portland or the surrounding area. External trips also include the workforce. In most cases, external trips will be distributed around the site depending on the locations of wind turbines. For concrete, deliveries will be to one of the two batching plants provided on the site. Traffic generation estimates for external trips are provided in Table 5.1.

Internal Trips

The primary generators of internal trips are the concrete batching plants, which will generate trips by concrete agitators to each of the individual turbines to be constructed. Note that internal trips will be confined to the boundaries of the Project Site, using internal access roads, with the exception of public road crossings at North Road, Castle-Carey Road and Woorndoo-Darlington Road. The access distribution including external and internal trips is provided in Figure 5-1 for the preferred access arrangement and in Figure 5-2 and Figure 5-3 for the two alternative options.

Table 5.1 Traffic generation estimates – external trips

Item	Quantity	Unit	Units per vehicle	Total number of vehicles	Vehicle type	Total trips	Comment
Phase 1 – Roads and hardstands							
Site establishment							
Access track construction material	294,264	t	29	10,147	Truck and trailer	20,294	Based on 67 km x 6 m wide x 300 mm deep pavement
Treatment of existing tracks	43,920	t	29	1514	Truck and trailer	3028	Based on 12 km x 6 m wide x 250 mm deep structural overlay
Cabling trenches	48,190	t	29	1662	Truck and trailer	3324	Based on 79 km x 0.5 m wide x 500 mm deep
Delivery of plant for civil works	50	no	1	50	Low loader	100	One-way laden
Site offices	40	no	1	20	Truck	40	Set up site offices and pack up
Underground cabling drums	100	no	2	50	Truck	100	One-way laden
Hardstands	247,050	t	29	8,519	Truck and trailer	17,038	Based on 50 m x 50 m x 500 mm hardstand for each turbine
Operations and management facility							
Pre-fab buildings	2	no	1	2	OSOM truck	4	Based on 2 halves of building to be transported separately
Kit shed (pallets)	32	no	4	8	Truck	16	One-way laden
General deliveries / construction operations							
Water for road building	22,120	kL	18	860	Body truck	1720	Based on 280 kL/km of road with 70% obtained off-site
Water for dust suppression	6197	kL	18	200	Body truck	400	Based on 400 kL/month with 100% obtained off-site
Deliveries	758	no	1	758	Truck	1,517	Based on 5 deliveries per week
Waste disposal	303	no	1	303	Truck	607	Based on 2 trucks per week
Construction personnel	40	pers		4670	Car or 15-seater bus	9340	Based on 5-day work week over Phase 1 with 50% by bus
Phase 2 – Foundations and turbines							
Tower footings							
Cement	19,586	no	29	675	Truck and trailer	1,351	

Item	Quantity	Unit	Units per vehicle	Total number of vehicles	Vehicle type	Total trips	Comment
Sand	38,750	no	29	1,336	Truck and trailer	2,672	Based on 650 m^3 concrete required per turbine for foundations
Aggregate	58,336	no	29	2,012	Truck and trailer	4,023	
Water	9,898	no	29	341	Truck and trailer	683	
Steel	5,265	no	29	182	Truck and trailer	363	
Wind turbines							
Tower sections	405	no	1	425	Extensible trailer	850	Based on 5 per turbine
Nacelles	81	no	1	85	Platform trailer	170	
Hubs	81	no	1	85	Low loader trailer	170	
Blades	243	no	1	255	Extensible trailer	510	Based on 3 per turbine
Miscellaneous	250	no	1-2	200	Semi-trailer	400	Assumes mix of 20' and 40' containers
Equipment							
Main crane	10	no	1	10	Crane	20	
Counterweight	10	no	1	10	Truck	20	
100 T crane	10	no	1	10	Truck	20	
20 T crane	30	no	1	30	Truck	60	
Telehandlers	3	no	1	3	Truck	6	
Met masts (pallets)	3	no	1	3	Truck	6	
General deliveries / construction operations							
Water for foundations	6,196	kL	25	248	Truck and trailer	496	Assume 100% transported from Mortlake
Water for dust suppression	5,600	kL	18	311	Body truck	622	Based on 400 kL/month
Deliveries	303	no	1	303	Truck	606	Based on 5 deliveries per week
Waste disposal	121	no	1	121	Truck	242	Based on 2 trucks per week
Construction personnel	70	pers		12,410	Car or 15-seater bus	24,820	Based on 5-day work week over Phase 2 with 50% by bus

Item	Quantity	Unit	Units per vehicle	Total number of vehicles	Vehicle type	Total trips	Comment
Phase 3 – Electrical and substation							
On-site substation construction / control building							
Pre-fab building	10	no	1	10	OSOM truck	20	Based on building sections, roofing etc. for 2 buildings
Earthgrid	2	no	1	2	Truck and trailer	4	
Slab	20	no	1	20	Concrete truck	40	
Equipment	10	no	1	10	Truck and trailer	20	Delivery of substation equipment
On-site transformer	2	no	1	2	Low loader	4	2x transformers to be provided at on-site substation
Fencing	1	no	1	1	Truck	2	
Miscellaneous electrical	30	cont	1	30	Semi-trailer	60	Electrical equipment
Site disestablishment							
Site offices	20	no	1	20	Truck	40	One-way laden
General deliveries / construction operations							
Water for dust suppression	4800	kL	18	267	Body truck	334	Based on 400 kL/month
Deliveries	260	no	1	260	Truck	520	Based on 5 deliveries per week
Waste disposal	104	no	1	104	Truck	208	Based on 2 trucks per week
Construction personnel	50	pers		7524	Car or 15-seater bus	15,048	Based on 5-day work week over Phase 2 with 50% by bus
Off-site substation							
Off-site transformer	1	no	1	1	Low loader	2	1x transformer to be provided at off-site substation

Table 5.2 Traffic generation estimates – internal trips

Item	Quantity	Unit	Units per vehicle	Total number of vehicles	Vehicle type	Total trips	Comment
Tower footings							
Concrete agitators	52,650	m^3	6	8,775	Concrete agitator	17,550	650 m^2 per turbine

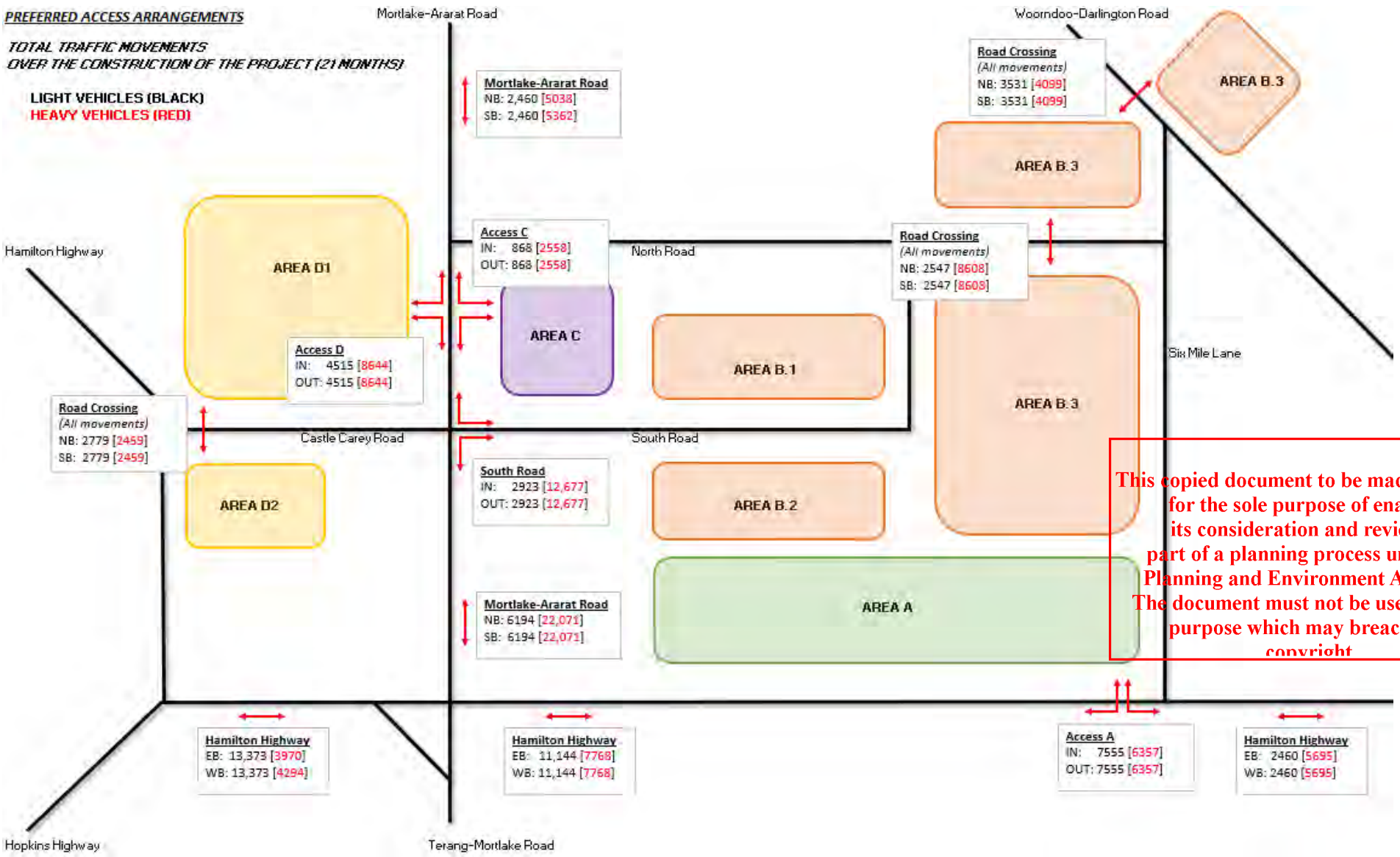


Figure 5-1 Trip generation and access distribution over the construction of the project (21 months) – preferred access arrangements

Note: EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound

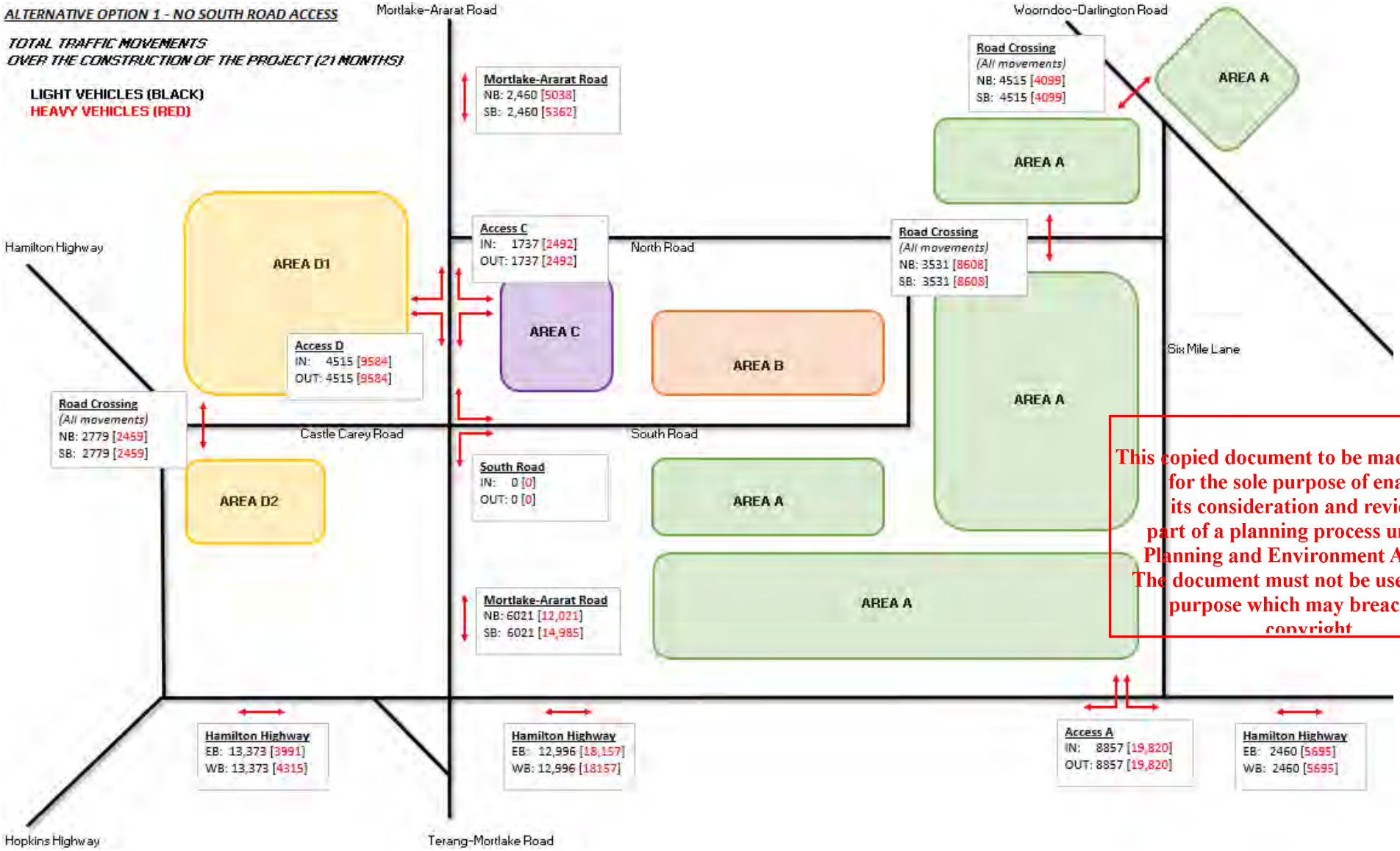


Figure 5-2 Trip generation and access distribution over the construction of the project (21 months) – alternative option 1 – no South Road access

Note: EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound

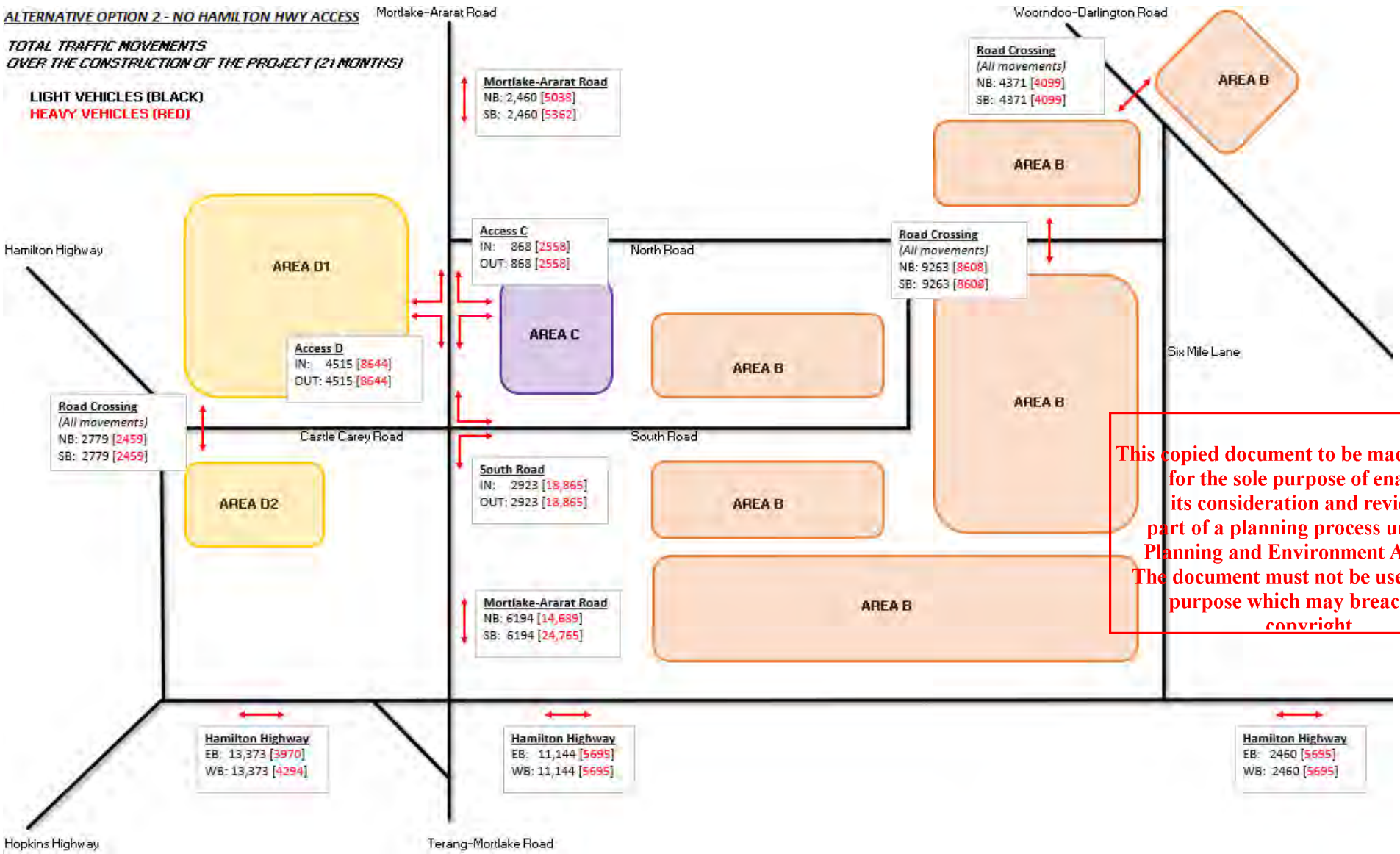


Figure 5-3 Trip generation and access distribution over the construction of the project (21 months) – alternative option 2 – no Hamilton Highway access

Note: EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound

5.3 Summary of traffic generation

The total trip generation associated with each of the key construction phases can be estimated based on the traffic generation calculations provided in Table 5.1 and Table 5.2.

Table 5.3 Traffic generation summary

Project phase	Light vehicles		Trucks		OSOM vehicles		Totals	
	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily
1	9,340	48	46,093	236	2	0	55,435	284
2	24,820	82	12,401	41	810	3	38,031	126
3	15,048	58	1,400	6	13	0	16,461	64
Total	***49,208***	***108***	***59,894***	***132***	***825***	***2***	***109,927***	***242***

Average daily volumes calculated based on:

- *Phase 1 195 days*
- *Phase 2 303 days*
- *Phase 3 259 days*
- *Total 454 days*

Based on Table 5.3 the Project is expected generate around 109,927 total vehicle trips (two-way) over the 21-month construction period, which equates to around 242 trips per weekday on average. Of these trips, there will be approximately 59,894 truck trips and 825 over-dimension vehicle trips. Around 45% of all trips will be daily entry and exit by the construction workforce.

Note that this includes external trips only. Internal trips will be confined to the Project site boundaries and have not been assessed in this report, with the exception of public road crossings at North Road, Woorndoo-Darlington Road and Castle-Carey Road.

The peak activity period will be during the overlap between Phase 1 (roads and hardstands) and Phase 2 (foundations and turbines). Average daily traffic generation during this overlap is expected to be in the order of 410 vehicle movements per day, with 280 of those being trucks or over-dimension vehicles.

Note that the traffic generation described in this report an estimate only at this stage and based on information provided by Hydro Tasmania and a range of assumptions made by GHD. The expected traffic volumes should be reviewed and amended if necessary closer to the commencement of construction when more detailed information is available.

The traffic generation during operation of the wind farm (e.g., after construction) is considered negligible compared to the construction period and has not been assessed in this report.

5.4 Trip Distribution

A detailed spreadsheet model has been developed to forecast traffic generation and the distribution of this traffic through the external road network including public road crossings within the boundaries of the Project site. The model has been developed on the following basis:

- Trips generally distributed throughout the site based on turbine locations and primary site access points;
- Concrete materials delivered to the two batching plants to be provided on the site;
- 40% of quarried material to be sourced from Mt Shadwell Quarry (Mortlake-Ararat Road) with the remainder distributed around the surrounding road network based on potential quarry locations;
- Majority of water to be sourced from Mortlake; and
- 40% of light vehicle trips (construction personnel) from Mortlake with the remainder distributed evenly around the surrounding road network.

6. Impacts Assessment

6.1 Transmission Line and Grid Substation

The overhead transmission line will consist of a single or double circuit line of a 220kV compact pole. The line is located on private land, rather than road reserve and it will be accessed through private land rather than directly via adjacent roads.

The amount of traffic associated with the construction of this line will depend on the pole and the foundation design that is employed. A pile foundation where the pole is embedded to a specified depth will involve far less traffic movements compared to pedestal foundations where poles are bolted onto a concrete plinth.

In total there will be approximately 86 poles over a distance of 18 km. Within the part of the site where turbines are located, access will be as follows:

- To the east off Mortlake-Ararat Road approximately 11 poles
- To the west of Mortlake-Ararat Road approximately 20 poles

The western section of the transmission line between the Hamilton Highway and the Mortlake Terminal Station will involve approximately thirty-five (35) 220 kV poles and two (2) 500 kV lattice towers. There are a number of options to access the transmission line in this area at several locations off Connewarren Lane and Boonerah Estate Road.

The access point for the grid connection substation and the western section of the transmission line is off Connewarren Lane. The access point and track exist. This location was approved as the access for a grid substation as part of the Dundonnell Wind Farm planning permit.

Connewarren Lane is an approved B-Double route and was upgraded for heavy vehicle use as part of the construction of the Mortlake Gas Power Station. It is considered that the existing road network adequately caters for the transport tasks associated with the transmission line and grid substation as the level of traffic associated with this component is negligible in the context of the overall project.

It is noted that the transmission line and grid substation will be considered in the Construction Traffic Management Plan (CTMP) that will be prepared for this project. At that stage, it is expected that the construction methodology for transmission poles will be confirmed.

6.2 Site access points

6.2.1 Region A – Hamilton Highway

Location

The Region A access point will be provided on the Hamilton Highway, approximately 550 metres west of the Six Mile Lane junction. The position of the access has been chosen to provide sufficient separation to the Six Mile Lane junction, to maximise sight distances in both directions and so that access roads avoid wetlands within the Project site boundaries located further to the west.

The approximate location of the access is provided in Figure 6-1. The Hamilton Highway at this point is a two-lane, two-way road with limited shoulder width and grass verge. The road is built-up at this location to allow drainage such that any road widening may require significant fill. The terrain is level and there is no vegetation present on the north side of the road that would restrict sight distances in either direction.

Figure 6-1 Access A – Hamilton Highway

Aerial photography obtained from Google Earth Pro © 2018 CNES / Airbus

This will be the primary access point for up to 17 wind turbines under the preferred arrangement as shown in the site layout in Figure 3-3.

Traffic Volumes

This access is likely to attract around 27,824 total vehicle movements total over the course of the project (21 months) as summarised in Table 6.1 below.

Table 6.1 Access A traffic volumes (two-way)

Project phase	Light vehicles		Trucks		OSOM vehicles		Totals	
	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily
1	2,868	15	11,512	59	0	0	14,379	74
2	7,621	25	559	2	324	1	8,504	28
3	4,620	18	306	1	14	0	4,941	19
Total	***15,109***	***33***	***12,377***	***27***	***338***	***1***	***27,824***	***61***

Average daily volumes calculated based on:

- *Phase 1 195 days*
- *Phase 2 303 days*
- *Phase 3 259 days*
- *Total 454 days*

It is likely that the actual daily traffic using each access (including Access A) will vary throughout the 21-month construction timeline, with peak activity occurring when the turbines near that access are under construction during the overlap between Phase 1 and Phase 2. In order to account for this variation, peak daily traffic volumes for Access A have been adopted at ~150% of the average daily volume as follows:

- Peak Daily Traffic Movements 153 vehicles per day (incl. 92 trucks)
- Peak Hourly Traffic Movements 20 vehicles per hour

In the event South Road is removed from the proposed access arrangements (refer alternative option 1 in Figure 3-4), it is anticipated that significantly more traffic would utilise Access A. This is likely to result in the following peak traffic volumes:

- Alternative Option 1 Peak Day — 345 vehicles per day (incl. 270 trucks)
- Alternative Option 1 Peak Hour — 35 vehicles per hour

It is noted that some over-dimensioned vehicles will be under strict operating hours requiring overnight transport. Based on Table 6.1, there would typically be around 1-2 over-dimension trips per day using Access A during Phase 2.

Turn Treatments

The Austroads publication, *Guide to Traffic Management – Part 6: Intersections, Interchanges and Crossings* (2020), provides warrants for the provision of turn lanes at unsignalised intersections. The warrants for a design speed of 100 km/h or more are provided in Figure 6-2.

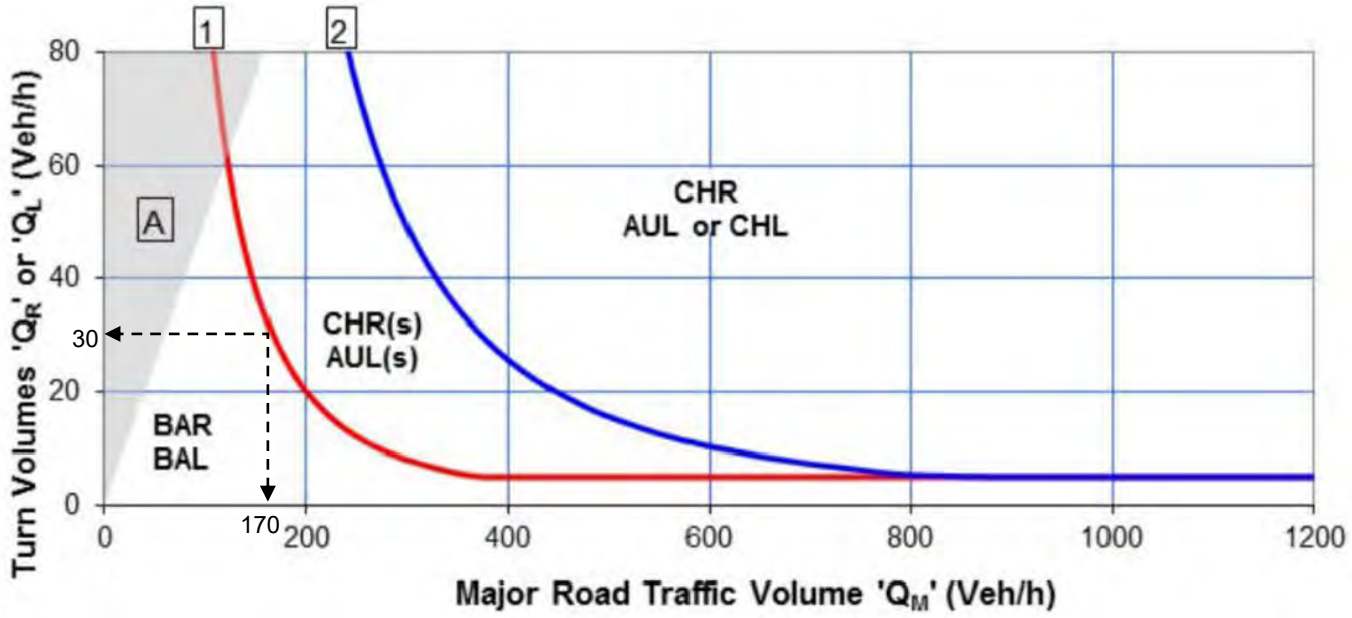


Figure 6-2 Warrants for turn treatments on major roads

Source: Austroads 2020

Hamilton Highway east of Mortlake is estimated to carry up to 170 vehicles per hour during peak times. Based on this, a CHR(s) treatment would be warranted if right-turning volumes exceed around 30 vehicle movements per hour. Based on the expected traffic volumes provided above, this level of right-turning traffic is unlikely to be reached at Access A under the preferred option.

Therefore, it is recommended that Site Access A at Hamilton Highway be upgraded to provide, at a minimum, Basic Left (BAL) and Basic Right (BAR) turn treatments. These treatments should be designed for regular use by B-Doubles and checked against the largest vehicle anticipated to access the site (83-metre wind turbine blade combination) with temporary pavement widening as required to suit the swept path of these vehicles.

However, consideration should be given to a higher order right turn treatment (for example, a CHR(s) treatment) should alternative option 1 be adopted given the higher turn volumes into the site under this scenario.

Sight Distance Assessment

The Austroads publication, *Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections* (2021), provides Safe Intersection Sight Distance (SISD) requirements for the major road at any intersection. For a design speed of 100 km/h on Hamilton Highway and a typical driver reaction time of 2.5 seconds, the minimum SISD is 262 metres.

Given the alignment of Hamilton Highway and the lack of any major obstructions to sight distance on the northern side of the road (e.g., vegetation), the available sight distance is considered to exceed the minimum requirement of 262 metres.

6.2.2 Region B – South Road

Location

The Region B access points will be provided along South Road, with the individual access points for Regions B.1 and B2 located approximately midway along the straight section of South Road and the access point for Region B.3 located on the outside of the bend in South Road approximately 5.7 km east of the Mortlake-Ararat Road junction.

The location of the South Road junction is provided in Figure 20. Mortlake-Ararat Road at the intersection with South Road is a two-lane, two-way road with narrow gravel shoulder and grass verge. The terrain is level and there is no vegetation present on the north side of the road that would restrict sight distances in either direction. There is a recently constructed transmission line on the east side of Mortlake-Ararat Road with one pole located on the north-east corner of the South Road / Mortlake-Ararat Road junction.

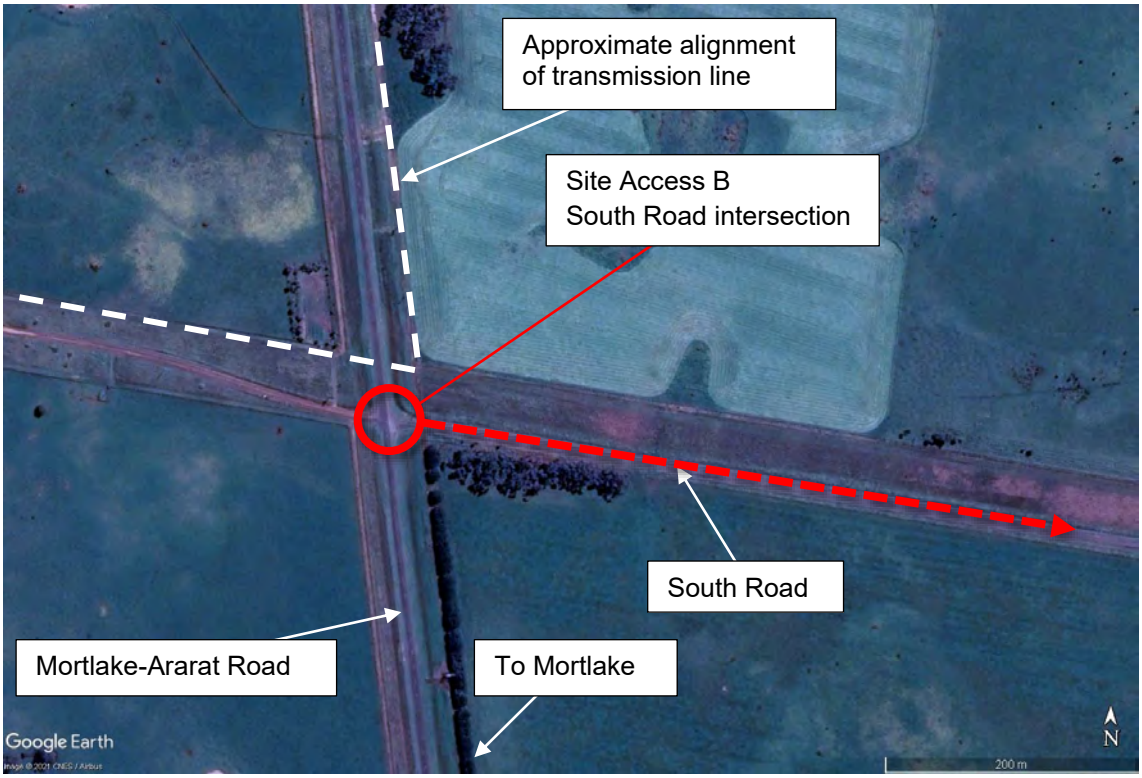


Figure 6-3 Access B – South Road

Aerial photography obtained from Google Earth Pro © 2021 CNES / Airbus

South Road will be the primary access point for up to 41 wind turbines under the preferred arrangement as shown in the site layout in Figure 3-3. In addition, this access will provide the primary access point for the proposed on-site substation and will therefore accommodate heavy low loaders carrying transformers.

Volumes

This access is likely to attract around 32,004 vehicle movements total over the course of the project (21 months) as summarised in Table 6.2 below.

Table 6.2 Access B traffic volumes (two-way)

Project phase	Light vehicles		Trucks		OSOM vehicles		Totals	
	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily
1	1,110	6	20,291	104	2	0	21,403	110
2	2,949	10	4,395	15	791	3	8,136	27
3	1,788	7	668	3	10	0	2,466	10
Total	***5,847***	***13***	***25,354***	***56***	***803***	***2***	***32,004***	***70***

Average daily volumes calculated based on:

- *Phase 1 195 days*
- *Phase 2 303 days*
- *Phase 3 259 days*
- *Total 454 days*

It is likely that the actual daily traffic using each access (including South Road) will vary throughout the 21 month construction timeline, with peak activity occurring when the turbines near that access are under construction during the overlap between Phase 1 and Phase 2. In order to account for this variation, peak daily traffic volumes for Access B have been adopted at ~150% of the average daily volume as follows:

— Peak Daily Traffic Movements 206 vehicles per day (incl. 179 trucks)

— Peak Hourly Traffic Movements 21 vehicles per hour

In the event Access A on Hamilton Highway is removed from the proposed arrangements (refer alternative option 2 in Figure 3-5), it is anticipated that significantly more traffic would utilize South Road. This is likely to result in the following peak traffic volumes:

- Alternative Option 2 Peak Day 299 vehicles per day (incl. 269 trucks)
- Alternative Option 2 Peak Hour 30 vehicles per hour

It is noted that some over-dimensioned vehicles will be under strict operating hours requiring overnight transport. Based on Table 6.2, there would typically be up to 3 over-dimension trips per day using Access B during Phase 2.

Turn Treatments

Warrants for turn treatments at unsignalised intersections with a design speed of 100 km/h or more are provided in Figure 6-2 of this report. Based on the expected traffic volumes and vehicle types provided above, and noting that South Road is an existing junction with some level of established traffic demand, it is likely that formal turn lanes would be warranted at Access B.

Therefore, it is recommended that the intersection of Mortlake-Ararat Road and South Road be upgraded to provide, at a minimum, Short Auxiliary Left (AUL[s]) and Short Auxiliary Right (CHR[s]) turn treatments. These treatments should be designed for regular use by B-Doubles and checked against the largest vehicle anticipated to access the site (83-metre wind turbine blade combination) with temporary pavement widening as required to suit the swept path of these vehicles. A concept layout for the junction is provided in Appendix C.

Sight Distance Assessment

Given the alignment of Hamilton Highway and the lack of any major obstructions to sight distance on the northern side of the road (e.g., vegetation), the available sight distance is considered to exceed the minimum Austroads (2021) requirement of 262 metres for a design speed of 100 km/h.

6.2.3 Region C – Mortlake-Ararat Road

Location

The Region C access point will be located on Mortlake-Ararat Road south of Manooka Lane and north of South Road. The approximate location of the access is provided in Figure 6-4.

Mortlake-Ararat Road at this point is a two-lane, two-way road with limited shoulder width and grass verge. The terrain is level and there is no vegetation present on either side of the road that would restrict sight distances in either direction.

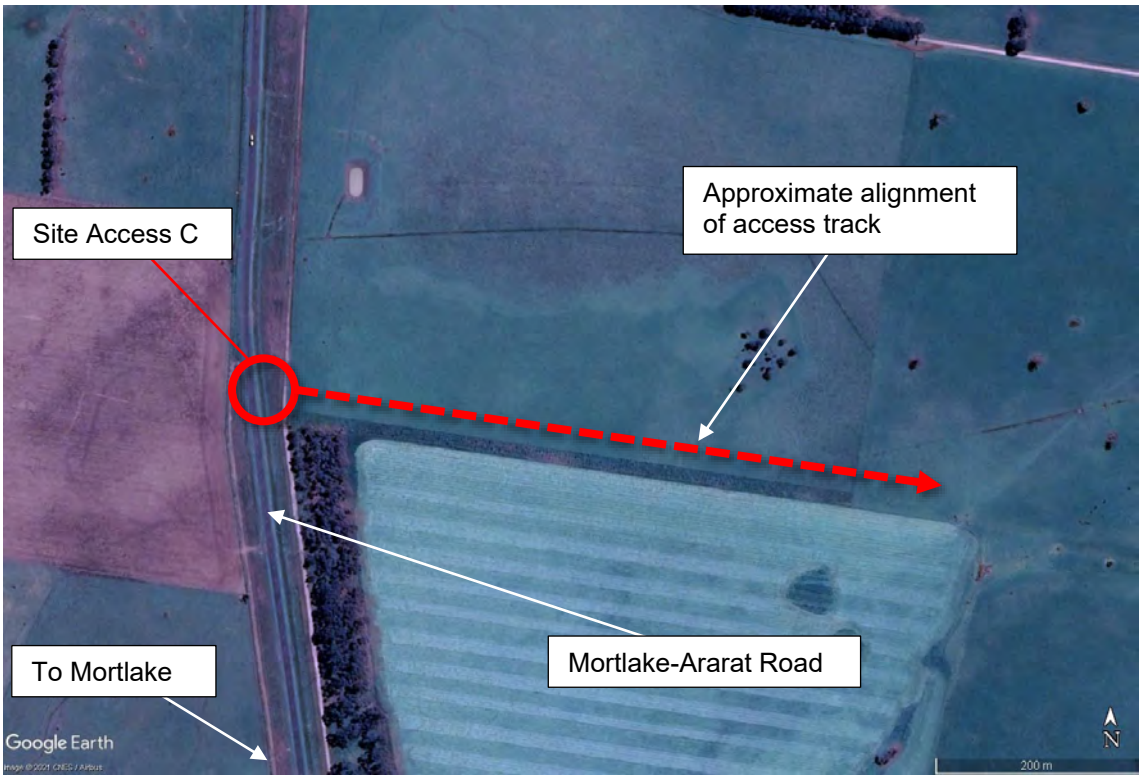


Figure 6-4 Access C – Mortlake-Ararat Road

Aerial photography obtained from Google Earth Pro © 2021 CNES / Airbus

This will be the primary access point for up to 3 wind turbines under the preferred arrangement as shown in the site layout in Figure 3-3.

Volumes

This access is likely to attract around 6,851 vehicle movements total over the course of the project (21 months) as summarised in Table 6.3 below.

Table 6.3 Access C traffic volumes (two-way)

Project phase	Light vehicles		Trucks		OSOM vehicles		Totals	
	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily
1	330	2	1,655	8	2	0	1,977	10
2	876	3	3,350	11	67	0	4,293	14
3	531	2	50	0	0	0	581	2
Total	***1,737***	***4***	***5,045***	***11***	***69***	***0***	***6,851***	***15***

Average daily volumes calculated based on:

- *Phase 1 195 days*
- *Phase 2 303 days*
- *Phase 3 259 days*
- *Total 454 days*

It is likely that the actual daily traffic using each access (including Access C) will vary throughout the 21-month construction timeline, with peak activity occurring when the turbines near that access are under construction during the overlap between Phase 1 and Phase 2. In order to account for this variation, peak daily traffic volumes for Access C have been adopted at ~150% of the average daily volume as follows:

- Peak Daily Traffic Movements 36 vehicles per day (incl. 29 trucks)
- Peak Hourly Traffic Movements 5 vehicles per hour

It is noted that some over-dimensioned vehicles will be under strict operating hours requiring overnight transport. Based on Table 6 3, there might be up to one over-dimension trip per day using Access C during Phase 2.

Turn Treatments

Warrants for turn treatments at unsignalised intersections with a design speed of 100 km/h or more are provided in Figure 6-2 of this report. Based on the expected traffic volumes provided above, it is unlikely that a channelised turn lane would be warranted at Access C.

Therefore, it is recommended that Site Access C at Mortlake-Ararat Road be upgraded to provide, at a minimum, Basic Left (BAL) and Basic Right (BAR) turn treatments. These treatments should be designed for regular use by B-Doubles and checked against the largest vehicle anticipated to access the site (83-metre wind turbine blade combination) with temporary pavement widening as required to suit the swept path of these vehicles.

Sight Distance Assessment

Given the alignment of Mortlake-Ararat Road and the lack of any major obstructions to sight distance on either side of the road (e.g., vegetation), the available sight distance is considered to exceed the minimum Austroads (2021) requirement of 262 metres for a design speed of 100 km/h.

6.2.4 Region D – Mortlake-Ararat Road

Location

The Region D access point will be provided on Mortlake-Ararat Road opposite, and slightly offset from, the existing Manooka Lane junction. It is recommended that Access D be provided south of Manooka Lane in order to minimise conflicts at this location.

The approximate location of the access is provided in Figure 6-5. Mortlake-Ararat Road at this point is a two-lane, two-way road with limited shoulder width and grass verge. Manooka Lane is a minor, unsealed road. The terrain is level and there is no vegetation present on either side of the road that would restrict sight distances in either direction.

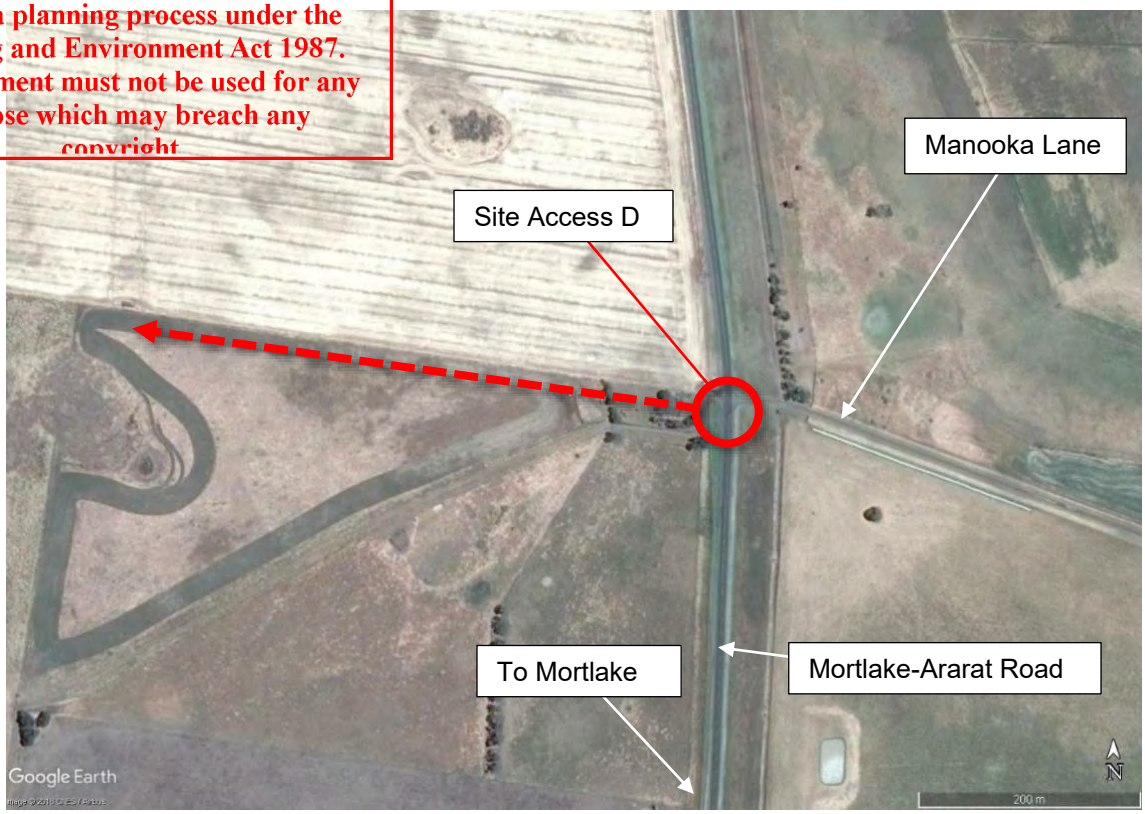


Figure 6-5 Access D – Mortlake-Ararat Road

Aerial photography obtained from Google Earth Pro © 2018 CNES / Airbus

This will be the primary access point for up to 24 wind turbines as shown in the site layout in Figure 3-3. In addition, this access will provide the primary access point for the proposed on-site substation and will therefore accommodate heavy low loaders carrying transformers.

Volumes

This access is likely to attract around 26,318 vehicle movements total over the course of the project (21 months) as summarised in Table 6.4 below.

Table 6.4 Access D traffic volumes (two-way)

Project phase	Light vehicles		Trucks		OSOM vehicles		Totals	
	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily
1	1,714	9	13,160	68	0	0	14,874	76
2	4,555	15	3,267	11	457	2	8,280	27
3	2,762	11	403	2	0	0	3,165	12
Total	***9,031***	***20***	***16,830***	***37***	***457***	***1***	***26,318***	***58***

Average daily volumes calculated based on:

- *Phase 1 195 days*
- *Phase 2 303 days*
- *Phase 3 259 days*
- *Total 454 days*

It is likely that the actual daily traffic using each access (including Access D) will vary throughout the 21-month construction timeline, with peak activity occurring when the turbines near that access are under construction during the overlap between Phase 1 and Phase 2. In order to account for this variation, peak daily traffic volumes for Access D have been adopted at ~150% of the average daily volume as follows:

- Peak Daily Traffic Movements 155 vehicles per day (incl. 119 trucks)
- Peak Hourly Traffic Movements 20 vehicles per hour

It is noted that some over-dimensioned vehicles will be under strict operating hours requiring overnight transport. Based on Table 6.4, there would typically be up to 2 over-dimension trips per day using Access D during Phase 2.

Turn Treatments

Warrants for turn treatments at unsignalised intersections with a design speed of 100 km/h or more are provided in Figure 6-2 of this report. Based on the expected traffic volumes provided above, it is unlikely that a channelised turn lane would be warranted at Access D.

Therefore, it is recommended that Site Access D at Mortlake-Ararat Road be upgraded to provide, at a minimum, Basic Left (BAL) and Basic Right (BAR) turn treatments. These treatments should be designed for regular use by B-Doubles and checked against the largest vehicle anticipated to access the site (83-metre wind turbine blade combination) with temporary pavement widening as required to suit the swept path of these vehicles.

Sight Distance Assessment

Given the alignment of Mortlake-Ararat Road and the lack of any major obstructions to sight distance on either side of the road (e.g., vegetation), the available sight distance is considered to exceed the minimum Austroads (2021) requirement of 262 metres for a design speed of 100 km/h.

6.3 Public Road Crossings

In addition to the four primary access points described in Section 6.2 of this report, there will be a number of public road crossings where the project site includes areas on both sides of these roads including:

- Woorndoo-Darlington Road;
- North Road; and
- Castle Carey Road.

Accesses will be required on each of these roads to accommodate the crossings. The primary purpose of these accesses would be for truck crossings (i.e. internal movements), however it is acknowledged that it would be difficult to restrict all movement into and out of these accesses, and therefore there may be some additional lighter vehicle movements expected between these access points and the public road. These are likely to be minimal and have not been explicitly assessed in this report.

6.3.1 Woorndoo-Darlington Road

Location

The Woorndoo-Darlington Road crossing would be provided approximately 300 metres north-west of the Six Mile Lane junction, adjacent to the existing stock underpass as shown in Figure 6-6. Woorndoo-Darlington Road at this point is a two-lane, two-way road with gravel shoulder. There is a large radius bend in the road commencing immediately west of the road crossing, however the terrain is level and there is no vegetation present on either side of the road that would restrict sight distances in either direction.

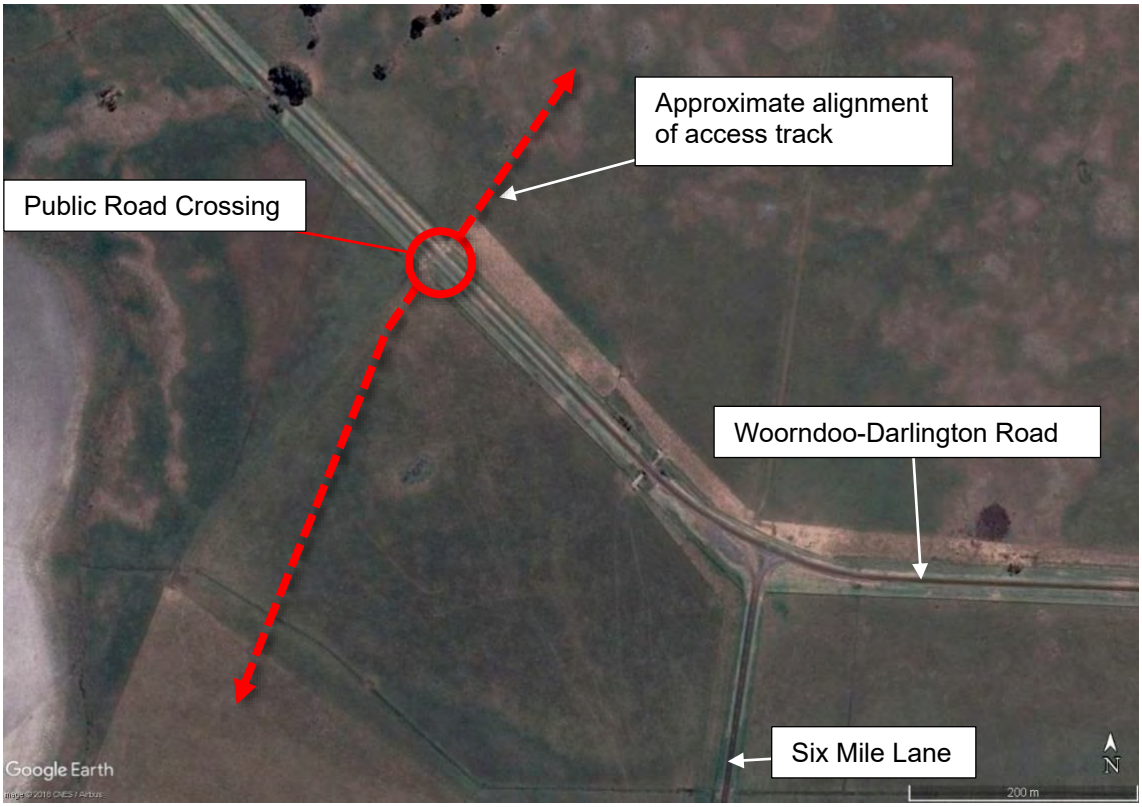


Figure 6-6 Crossing 1 – Woorndoo-Darlington Road

Aerial photography obtained from Google Earth Pro © 2018 CNES / Airbus

There are a total of 10 wind turbines located north of Woorndoo-Darlington Road as shown in the site layout in Figure 3-3.

Volumes

This road crossing is likely to attract around 15,261 vehicle movements total over the course of the project (21 months) as summarised in Table 6.5 below. Note that these figures include heavy vehicle volumes crossing from one side of Woorndoo-Darlington Road to the other as well as light vehicles not subject to the same restrictions turning into and out of the site at this location.

Table 6.5 Woorndoo-Darlington Road crossing volumes (two-way)

Project phase	Light vehicles		Trucks		OSOM vehicles		Totals	
	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily
1	1,341	7	5,483	28	0	0	6,824	35
2	3,562	12	2,356	8	191	1	6,109	20
3	2,160	8	168	1	0	0	2,328	9
Total	***7,063***	***16***	***8,007***	***18***	***191***	***0***	***15,261***	***34***

Average daily volumes calculated based on:

- *Phase 1 195 days*
- *Phase 2 303 days*
- *Phase 3 259 days*
- *Total 454 days*

It is likely that the actual daily traffic using this crossing will vary throughout the 21-month construction timeline, with peak activity occurring when the turbines north of Woorndoo-Darlington Road are under construction. In order to account for this variation, peak daily traffic volumes for the Woorndoo-Darlington Road crossing have been adopted at ~150% of the average daily volume as follows:

- Peak Daily Traffic Movements 83 vehicles per day (incl. 54 trucks)
- Peak Hourly Traffic Movements 10 vehicles per hour

It is noted that some over-dimensioned vehicles will be under strict operating hours requiring overnight transport. Based on Table 6.5, there might be up to one over-dimension trip per day crossing Woorndoo-Darlington Road during Phase 2.

Sight Distance Assessment

Given the alignment of Woorndoo-Darlington Road and the lack of any major obstructions to sight distance on either side of the road (e.g., vegetation), the available sight distance is considered to exceed the minimum Austroads (2021) requirement of 262 metres for a design speed of 100 km/h.

6.3.2 North Road

Location

There is likely to be one public road crossing at North Road. This crossing point will be located between Six Mile Lane and South Road. North Road at this point is a two-way unsealed road. The terrain is level and there is no vegetation present on either side of the road that would restrict sight distances in either direction.

There are a total of 11 turbines between North Road and Woorndoo-Darlington Road and an additional 10 turbines located north of Woorndoo-Darlington Road as shown in the site layout in Figure 3-3.

Volumes

There is expected to be up to 22,310 vehicles crossing North Road over the course of the project (21 months) as summarised in Table 6.6 below. Note that these figures include heavy vehicle volumes crossing from one side of North Road to the other as well as light vehicles not subject to the same restrictions turning into and out of the site at this location.

Table 6.6 North Road crossing volumes (two-way)

Project phase	Light vehicles		Trucks		OSOM vehicles		Totals	
	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily
1	967	5	11,515	59	0	0	12,482	64
2	2,570	8	4,948	16	400	1	7,918	26
3	1,558	6	353	1	0	0	1,910	7
Total	***5,094***	***11***	***16,816***	***37***	***400***	***1***	***22,310***	***49***

Average daily volumes calculated based on:

- *Phase 1 195 days*
- *Phase 2 303 days*
- *Phase 3 259 days*
- *Total 454 days*

It is likely that the actual daily traffic using this crossing will vary throughout the 21-month construction timeline, with peak activity occurring when the turbines north of North Road and/or Woorndoo-Darlington Road are under construction. In order to account for this variation, peak traffic volumes for the North Road crossings have been adopted as follows:

- Peak Daily Traffic Movements 135 vehicles per day (incl. 113 trucks)
- Peak Hourly Traffic Movements 15 vehicles per hour

It is noted that some over-dimensioned vehicles will be under strict operating hours requiring overnight transport. Based on Table 6.6, there might be up to one over-dimension trip per day crossing North Road during Phase 2.

Sight Distance Assessment

Given the straight alignment of North Road and the lack of any major obstructions to sight distance, it is considered that the available sight distance would exceed the minimum requirements for 100 km/h at any point between Six Mile Lane and South Road.

6.3.3 Castle-Carey Road

Location

There may be up to two (2) public road crossings at Castle Carey Road. These crossing points will be located west of Mortlake-Ararat Road on the straight section of Castle Carey Road between Hamilton Highway and the bend. Castle Carey Road at this point is a two-way unsealed road. The terrain is level and there is no vegetation present on either side of the road that would restrict sight distances in either direction.

There are a total of six turbines south of Castle Carey Road as shown in the site layout in Figure 3-3.

Volumes

There is expected to be up to 10,476 vehicles crossing Castle Carey Road over the course of the project (21 months) as summarised in Table 6.7 below. Note that in the event two crossings are provided on Castle Carey Road, these volumes would likely be distributed approximately evenly between them.

Table 6.7 Castle-Carey Road crossing volumes (two-way)

Project phase	Light vehicles		Trucks		OSOM vehicles		Totals	
	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily	Phase total	Average daily
1	1,055	5	3,290	17	0	0	4,345	22
2	2,803	9	1,414	5	114	0	4,331	14
3	1,699	7	101	0	0	0	1,800	7
Total	***5,558***	***12***	***4,804***	***11***	***114***	***0***	***10,476***	***23***

Average daily volumes calculated based on:

- *Phase 1 195 days*
- *Phase 2 303 days*
- *Phase 3 259 days*
- *Total 454 days*

It is likely that the actual daily traffic using this crossing will vary throughout the 21-month construction timeline, with peak activity occurring when the turbines south of Castle Carey Road are under construction. In order to account for this variation, peak daily traffic volumes for the Castle Carey Road crossings have been adopted at ~150% of the average daily volume as follows:

- Peak Daily Traffic Movements 54 vehicles per day (incl. 33 trucks)
- Peak Hourly Traffic Movements 5-6 vehicles per hour

It is noted that some over-dimensioned vehicles will be under strict operating hours requiring overnight transport. Based on Table 6.7, there might be up to one over-dimension trip per day crossing North Road during Phase 2.

Sight Distance Assessment

Given the straight alignment of the western section of Castle Carey Road and the lack of any major obstructions to sight distance, it is considered that the available sight distance would exceed the minimum requirements for 100 km/h at any point between Hamilton Highway and the bend.

6.4 Road Network Impacts

6.4.1 Change in Traffic Flows

A spreadsheet model was developed to understand the expected change in average daily traffic flows on key public roads surrounding the Project site. The model was based on the traffic generation and distribution assumptions described in Section 5 of this report. The outputs for key roads are provided in Table 6.8.

Table 6.8 Average daily traffic

Road	Existing volume	Phase 1	Phase 1+2	Phase 2+3	Phase 3
		5 months	*4 months*	*10 months*	*2 months*
Hamilton Highway (west)	820	827	845	846	828
Hamilton Highway (site frontage)	2,200	2,286	2,334	2,274	2,228
Hamilton Highway (east)	2,200	2,250	2,267	2,222	2,206
Hopkins Highway	2,600	2,605	2,613	2,614	2,606
Mortlake-Ararat Road	700	866	922	775	719
Terang-Mortlake Road	1,000	1,051	1,065	1,021	1,007
Woorndoo-Darlington Road	94	98	106	107	99
Six Mile Lane	46	56	73	75	58
North Road	8	14	25	26	16
South Road	15	125	152	51	25
Castle-Carey Road	6	8	12	12	8

Based on Table 6.8, the Project will have a relatively minor impact on the average daily traffic flows on key roads over the duration of the Project with the largest increases expected on South Road (+137 vehicles per day) and Mortlake Ararat Road (+222 vehicles per day or +32%) over a four-month period during the Phase 1 & 2 overlap.

Some minor access roads, including Six Mile Lane, North Road, South Road and Castle Carey Road will experience a large proportional increase in traffic, however these roads currently carry very low traffic volumes, and the increase is well within the capacity of the road.

Alternative Access Scenarios

Traffic volumes on key roads will be slightly different in the event any of the alternative access scenarios are adopted (refer Section 3.3.2). In particular:

- Under Alternative Option 1 there would be no access via South Road. It is expected that traffic volumes on Hamilton Highway along the site access would be in the order of 2,436 vehicles per day on average during the Phase 1 & 2 overlap. This represents an additional 102 vehicles per day compared to the preferred arrangement. Traffic volumes on other roads would be effectively the same.
- Under Alternative Option 2 there would be no direct access via Hamilton Highway. It is expected that traffic volumes on South Road would be around 218 vehicles per day on average during the Phase 1& 2 overlap. This represents an additional 66 vehicles per day compared to the preferred arrangement. Other roads experiencing higher traffic volumes under Option 2 include Mortlake-Ararat Road (+39 per day), Six Mile Lane (+33 per day) and North Road (+33 per day).

Overall, the change in traffic volumes on key roads under either alternative option are not significant compared to the preferred arrangements and either could be suitable. The actual arrangements will be confirmed as the project design and planning progresses through the next stages.

6.4.2 Arterial Network Impacts

Given the relatively small proportional increase in traffic on key arterial roads, there are not expected to be significant network impacts due to the Project. Any traffic impacts would generally be localised to the areas immediately surrounding the proposed site access points on Hamilton Highway and Mortlake-Ararat Road.

Sections 6.2.1 to 6.2.4 of this report discussed each access point in detail. The key findings were as follows:

- Each access point should be upgraded to provide, at a minimum, Basic Left (BAL) and Basic Right (BAR) turn treatments
- The intersection of South Road and Mortlake-Ararat Road should be upgraded to provide Short Auxiliary Left (AUL[s]) and Short Channelised Right (CHR[s]) turn treatments
- The design vehicle is the 26 metre B-Double, however the access points must be checked against the largest vehicle anticipated to access the site (83-metre turbine blade combination)
- Each of Hamilton Highway and Mortlake-Ararat Road have a relatively straight alignment, flat terrain and limited obstructions to sight distances

Note that over-dimension vehicles will be subject to permit conditions on arterial roads.

Mitigation Measures

In order to minimise the impacts of construction traffic on the arterial network, the following mitigation measures are recommended:

- Oversize & overmass (OSOM) vehicles transport to the site via the routes identified in Section 4.1 of this report, assessed in Appendix A and summarised below:
  - The preferred route for over-dimension vehicles is from Portland via Henty Highway, Dunkeld-Cavendish Road and Mortlake-Ararat Road approaching the site from the north.
  - An alternative route for smaller components is from Portland via Princes Highway and Terang-Mortlake Road.
  - In the event Geelong is used for import of components, the route is via Hamilton Highway as the only feasible option. All over-dimension vehicles from Geelong would be required to enter the site via Access A and use the internal road network to bypass the township of Mortlake.
- Several locations have been identified in Appendix A and Section 4.1.1 of this report where temporary removal of road furniture may be required to accommodate transport of wind turbine blades to the site. A full transport route assessment will be required to be undertaken by the haulage contractor prior to commencement of construction.
- The haulage contractor will be required to obtain a permit for any OSOM vehicles which do not comply with the dimension and mass limits to operate on the Victorian gazetted OSOM transport route and to comply with any conditions attached to the permit including, but not necessarily limited to, time of day restrictions, traffic management signage and escort vehicles.

6.4.3 Local Network Impacts

Local roads include Woorndoo-Darlington Road, Six Mile Lane, North Road, South Road and Castle Carey Road. The majority of these roads would experience a relatively high proportional increase in traffic over the construction period. However these roads currently carry very low traffic volumes as described in Table 6.8.

B-doubles and OSOM vehicles will be restricted from using local roads with the exception of South Road (for access to turbine construction zones) as well as public road crossings at Woorndoo-Darlington Road, North Road and Castle Carey Road as described in Sections 6.3.1 to 6.3.3 of this report.

Mitigation Measures

In order to minimise the impacts of construction traffic on the local road network, the following mitigation measures are recommended:

- Heavy vehicles (i.e. B-doubles and above) should be restricted to the arterial road network only with the exception of South Road (refer Section 6.2.2), public road crossings (refer Sections 6.3.1 to 6.3.3) and

Connewarren Lane for access to the Mortlake Terminal Station. Note that Connewarren Lane is a gazetted Council B-double route.

- Localised strengthening of pavement at public road crossing points on Woorndoo-Darlington Road, North Road and Castle Carey Road to accommodate heavy truck movements.
- Truck warning signage on approach to all public road crossing points.

6.5 Safety

The Project is not expected to cause any significant road safety impacts based on the following:

- The key roads that will be used by traffic accessing the Project site have sufficient capacity to accommodate the anticipated increase in traffic volumes over the construction period (approximately 21 months) without significant loss of performance.
- Heavy vehicles (i.e., B-doubles and above) would generally be restricted to the arterial road network which is generally designed to accommodate such vehicles.
- Transport of large components (such as wind turbine blades and transformers) would need to be undertaken in accordance with any permit conditions, which may include time of day restrictions, traffic management and escort vehicles, intended to mitigate potential safety impacts.
- Each of the proposed site access points and public road crossings has sufficient Safe Intersection Sight Distance in accordance with Austroads (2021) requirements.
- The recent crash history (Section 2.3) does not indicate any specific road safety deficiencies in the immediate surrounding area that might be exacerbated by the types of activities generated by the Project.

6.6 Road and Access Upgrades

6.6.1 Typical Site Access Arrangement

Typical site access designs have been provided in Appendix D. These concepts demonstrate the extent of road widening works required to accommodate BAL and BAR turn treatments for the 26-metre B-Double design vehicle. Over-dimension vehicles can be accommodated by providing additional gravel road widening as indicated depending on the turns required.

It is recommended that at a minimum the first 50 metres of the internal access road be sealed as shown in order to minimise the potential for dust to be tracked onto public roads.

6.6.2 Public Road and Intersection Upgrades

The only public road and intersection upgrades that are deemed to be required to support the project are as follows:

- AUL(s) and CHR(s) treatments at the intersection of Mortlake-Ararat Road and South Road (refer Appendix C)
- Upgrade of South Road between Mortlake-Ararat Road and the Region B.3 site access point to accommodate heavy vehicle traffic
- BAL and BAR treatments at primary access points on Hamilton Highway and Mortlake-Ararat Road.
- Temporary removal of roadside furniture at some locations to allow passage of large vehicles (e.g. wind turbine blades).
- Pavement strengthening works at public road crossings on Woorndoo-Darlington Road, North Road and Castle Carey Road.

6.7 Traffic Management

A Construction Traffic Management Plan (CTMP) will be required for the Project. The CTMP should be prepared in consultation with Hydro Tasmania, Department of Transport and Moyne Shire Council and include additional detail relating to the project including, but not necessarily limited to, the following:

- Confirmation of site layout, wind turbine models and construction methodology for the Project as more detail will be available at this later stage of the Project.
- Review of the traffic generation and distribution estimates contained in this report and amendment as necessary. A particular consideration of the CTMP will be the sourcing of raw materials from quarries around the site and key transport routes for these vehicles.
- Any required road construction works to support the Project including pavement strengthening works that may be required at public road crossings on Woorndoo-Darlington Road, North Road and Castle Carey Road.
- A program of regular inspections throughout the construction period in order to identify any ongoing road maintenance works that may be required as a result of the increased truck activity in the area.

7. Conclusions

This report has investigated the transport related impacts of the proposed Mount Fyans Wind Farm (the Project) to be constructed north-east of Mortlake. The Project would comprise up to 81 wind turbines, with a maximum tip height of 200 metres, plus related infrastructure including access roads, underground cables and on-site substation.

7.1 Traffic Generation

The Project is expected to generate around 109,927 vehicle trips (two-way) over the 21-month construction period, which equates to around 242 trips per weekday on average. Of these, there would be approximately 59,894 truck trips and 825 over-dimension vehicle trips with the remainder being light vehicles (construction workforce). In addition to the above movements, there are expected to be around 17,550 internal movements by concrete agitators travelling between the concrete batching plants and the turbine sites.

Under the preferred access arrangement, traffic movements would be split across four primary access points as presented in Table 7.1.

Table 7.1 Access distribution

Site access	Access location	Total trips	Peak daily trips
A	Hamilton Highway	27,824	153
B	South Road	32,004	206
C	Mortlake-Ararat Road	6,851	36
D	Mortlake-Ararat Road	26,318	155

It is noted that:

- Under alternative option 1, Access B (South Road) is removed from the proposed access arrangements and Access A would accommodate the majority of these trips; and
- Under alternative option 2, Access A (Hamilton Highway) is removed from the proposed access arrangements and Access B would accommodate the majority of these trips.

In addition to the external movements, there would be a number of public road crossings where the project site includes areas on both sides of the road including Woorndoo-Darlington Road, North Road and Castle Carey Road. Traffic movements at each of these crossings are presented in Table 7.2.

Table 7.2 Crossing volumes

Crossing	Access location	Total trips	Peak daily trips
1	Woorndoo-Darlington Road	15,261	83
2	North Road	22,310	135
3	Castle Carey Road	10,476	54

Note that this report makes a number of assumptions regarding traffic generation and distribution estimates, in particular with regard to quarry haulage. A more detailed assessment will be undertaken as part of Traffic Management Planning closer to commencement of construction.

7.2 Road Network Impacts

The Project is expected to have a relatively minor impact on the average daily traffic flows on key roads over the duration of the Project, with the largest increases expected on South Road (+137 vehicles per day) and Mortlake-Ararat Road (+223 vehicles per day or +32%) over a four month period during the Phase 1 & 2 overlap.

Given the relatively small proportional increase in traffic on key arterial roads and the low existing base volumes, there are not expected to be significant network impacts due to the Mt Fyans Project. Any traffic impacts would generally be localised to the areas immediately surrounding the proposed site access points.

Some minor access roads, including Six Mile Lane, North Road, South Road and Castle Carey Road will experience a large proportional increase in traffic, however these roads currently carry very low traffic volumes, and the increase is well within the capacity of the road.

7.3 Key Recommendations

This report makes the following recommendations:

- Oversize & overmass (OSOM) vehicles transport to the site via the routes identified in Section 4.1 of this report and summarised below:
  - The preferred route for over-dimension vehicles is from Portland via Henty Highway, Dunkeld-Cavendish Road and Mortlake-Ararat Road approaching the site from the north.
  - An alternative route for smaller components is from Portland via Princes Highway and Terang-Mortlake Road.
  - In the event Geelong is used for import of components, the route is via Hamilton Highway as the only feasible option. All over-dimension vehicles from Geelong would be required to enter the site via Access A and use the internal road network to bypass the township of Mortlake.
- Note that route options exist from both Portland and Geelong for a range of components (including over-dimension components). Internal logistics with ports will be the final determinant of road transport routes. This report has assumed the majority of components being transported from Portland.
- Several locations have been identified in Appendix A and Section 4.1.1 of this report where temporary removal of road furniture may be required to accommodate transport of wind turbine blades to the site. A full transport route assessment will be required to be undertaken by the haulage contractor prior to commencement of construction.
- A Construction Traffic Management Plan (CTMP) will be required for the Project. The CTMP will be prepared in consultation with Hydro Tasmania, VicRoads and Moyne Shire Council. Both VicRoads and Moyne Shire Council will have a role in approving and administering the CTMP for the project.
- The CTMP should establish a road maintenance and rehabilitation framework that covers Moyne Council Roads and some State Arterials (excluding Highways) that trigger the Major Event requirements of the Road Act.
- The CTMP will designate suitable roads that will be used for transport of quarry materials. Any contract in place to transport materials from quarries will require these routes to be used.
- The haulage contractor will be required to obtain a permit for any OSOM vehicles which do not comply with the dimension and mass limits to operate on VicRoads' gazetted OSOM transport route and to comply with any conditions attached to the permit including, but not necessarily limited to, time of day restrictions, traffic management signage and escort vehicles.
- Heavy vehicles (i.e. B-doubles and above) should be restricted to the arterial road network only with the exception of South Road (refer Section 6.2.2), public road crossings (refer Sections 6.3.1 to 6.3.3) and Connewarren Lane for access to the Mortlake Terminal Station. Note that Connewarren Lane is a gazetted Council B-double route.
- Localised strengthening of pavement at public road crossing points on Woorndoo-Darlington Road, North Road and Castle Carey Road to accommodate heavy truck movements.
- Truck warning signage should be provided on approach to all public road crossing points.

- Short Auxiliary Left (AUL[s]) and Short Channelised Right (CHR[s]) turn treatments should be provided at the intersection of Mortlake-Ararat Road and South Road along with gravel widening to accommodate oversize vehicles. A concept layout is provided in Appendix C.
- Basic Left (BAL) and Basic Right (BAR) turn treatments should be provided at each of the other primary access points identified in this report. Typical access designs are provided in Appendix D.
  - In the event the alternative option for access is adopted, whereby Access B (South Road) is removed and redistributed to other access points, then a Short Channelised Right Turn (CHR[s]) treatment may be required at Access A on Hamilton Highway.

Subject to the recommendations listed above, the Project is supported on traffic and safety grounds.

Appendices

Appendix A

Rex J Andrews Route Study report

REX J ANDREWS
ENGINEERED TRANSPORTATION

ADVERTISED PLAN

ROUTE STUDY: WOOLNORTH RENEWABLES

PROJECT: MT FYANS WIND FARM

EX PORT OF PORTLAND.

12/05/2021 REV 01

Rev.	Date	Change	Responsible	Checked
00	26/04/21	Route Assessed	C Ewin	✓
00	30/04/21	Report compiled	C Ewin	✓
00	06/05/21	Report completed	C Ewin	✓
01	12/05/21	Various edits	W Andrews	✓

Index:

1.0 Introduction

This document describes observations and previous experience on selected routes and explains the Transport of Wind turbine equipment from Portland to Mt Fyans Windfarm. Also included is a section showing possible routes from Geelong Port to the Mt Fyans project.

This Route survey took place on 26-04-21.

2.0 Evaluation

1	No Cost
2	Some Work
3	Moderate Amount of Work
4	Extreme Amount of Work

(Mark below boxes with an X)

		1	2	3	4
A	Harbour	X			
B	Road Modification			X	
C	Road Furnishings		X		
D	Trees		X		
E	Site Entrance				X
F	Bridge Calculations		X		
G	Traffic Control		X		

3.0 Project data.

Date of latest Route Assessment. 26/04/2021
Survey undertaken by. (Rex J Andrews P/L)
Project name. Mt Fyans Wind Farm
Port of import. Port of Portland (VIC)
Site location. Mortlake (VIC)

Turbine limits.
Maximum Rotor size: 155 metres Diameter
Maximum Hub height: 149 Metres

4.0 Transport combinations (Examples).

GOLDWIND GW155 TURBINE:

Generator (5.5l x 5.5w x 3.0h x 100T)
Configuration. Prime mover with 10x8 Platform trailer + Backup truck
Overall dimensions: 30.0l x 5.5w x 4.6 x 160.5T + Backup truck

Nacelles (10.2l x 4.5w x 4.4h x 42T)
Configuration. Prime mover with 6x8 Platform trailer
Overall dimensions: 33.0l x 5.5w x 5.4h x 114.5T

Hubs (5.4l x 4.7w x 5.1h x 40.0T)
Configuration. Prime mover with 4x4 Low loader.
Overall dimensions: 26.0l x 4.8w x 5.0h x59.5T.

Blades (76.2l x 4.8w x 4.0h x 22T)
Configuration. Prime mover with 2x8 dolly 3x4 Jinker.
Overall dimension: 95.0l x 4.4w x 5.5h x 80.5T.

155 METRE TOWER EXAMPLE:

Base Towers (12.0l x 5.44w x 4.95 x 88T)
Configuration. Prime mover with 8x8 low platform.
Overall dimension: 35.0l x 5.5w x 6.0h x 144.5T.

Mid 1 Towers (17.1l x 4.95w x 4.95 x 85T)
Configuration. Prime mover with 8x8 low platform.
Overall dimension: 39.0l x 5.5w x 6.0h x 136.5T.

Mid 2 Towers (17.9l x 4.95w x 4.95 x 75T)
Configuration. Prime mover with 8x8 low platform.
Overall dimension: 35.0l x 5.5w x 6.0h x 126.5T.

Mid 3 Towers (17.9l x 4.95w x 4.65 x 65T)
Configuration. Prime mover with 8x8 low platform.
Overall dimension: 35.0l x 5.5w x 6.0h x 116.5T.

Mid 4 Towers (27.7l x 4.65w x 4.65 x 77T)
Configuration. Prime mover with 4x8-4x8 Extending low platform.
Overall dimension: 45.0l x 5.0w x 5.5h x 120.5T.

Mid 5 Towers (29.9l x 4.65w x 3.9 x 60T)
Configuration. Prime mover with 4x4-3x8 Dolly & Jinker.
Overall dimension: 45.0l x 5.0w x 5.5h x 92.0T.

Top Towers (30.0l x 3.9w x 3.3h x 45T)
Configuration. Prime mover with 3x4 Dolly 2x8 Jinker
Overall dimension: 42.0l x 4.0w x 5.1h x 71.5T.

120 METRE TOWER EXAMPLE:

Base Towers (14.0l x 5.0w x 4.65h x 79T)
Configuration. Prime mover with 7x8 or 8x8 Platform trailer.
Overall dimension: 30.0l x 5.1w x 6.0h x 122.5T.

Mid 1 Towers (20.0l x 4.65 x 4.65 x 80T)
Configuration. Prime mover with 10x8 Platform trailer.
Overall dimension: 36.0l x 5.1w x 5.7h x 144.0T.

Mid 2 Towers (27.8l x 4.65 x 4.65h x 57T)
Configuration. Prime mover with 10x8 Platform trailer.
Overall dimension: 36.0l x 5.1w x 5.7h x 120.5T.

Mid 3 Towers (29.9l x 4.65 x 3.9h x 50T)
Configuration. Prime mover with 3x4 Dolly 3x8 Jinker
Overall dimension: 38.0l x 4.5w x 5.3h x 76.5T.

Top Towers (33.0l x 3.9w x 3.3h x 49T)
Configuration. Prime mover with 3x4 Dolly 2x8 Jinker
Overall dimension: 39.0l x 4.2w x 5.0h x 74.5T.

INDICATIVE ERECTION CRANES:

LG1750 carrier (19.2l x 3.0 x 4.0 x 96T)
Configuration. Prime mover with 10x8 Platform trailer
Overall dimensions: 36.0l x 4.2w x 5.2h x 174.5T

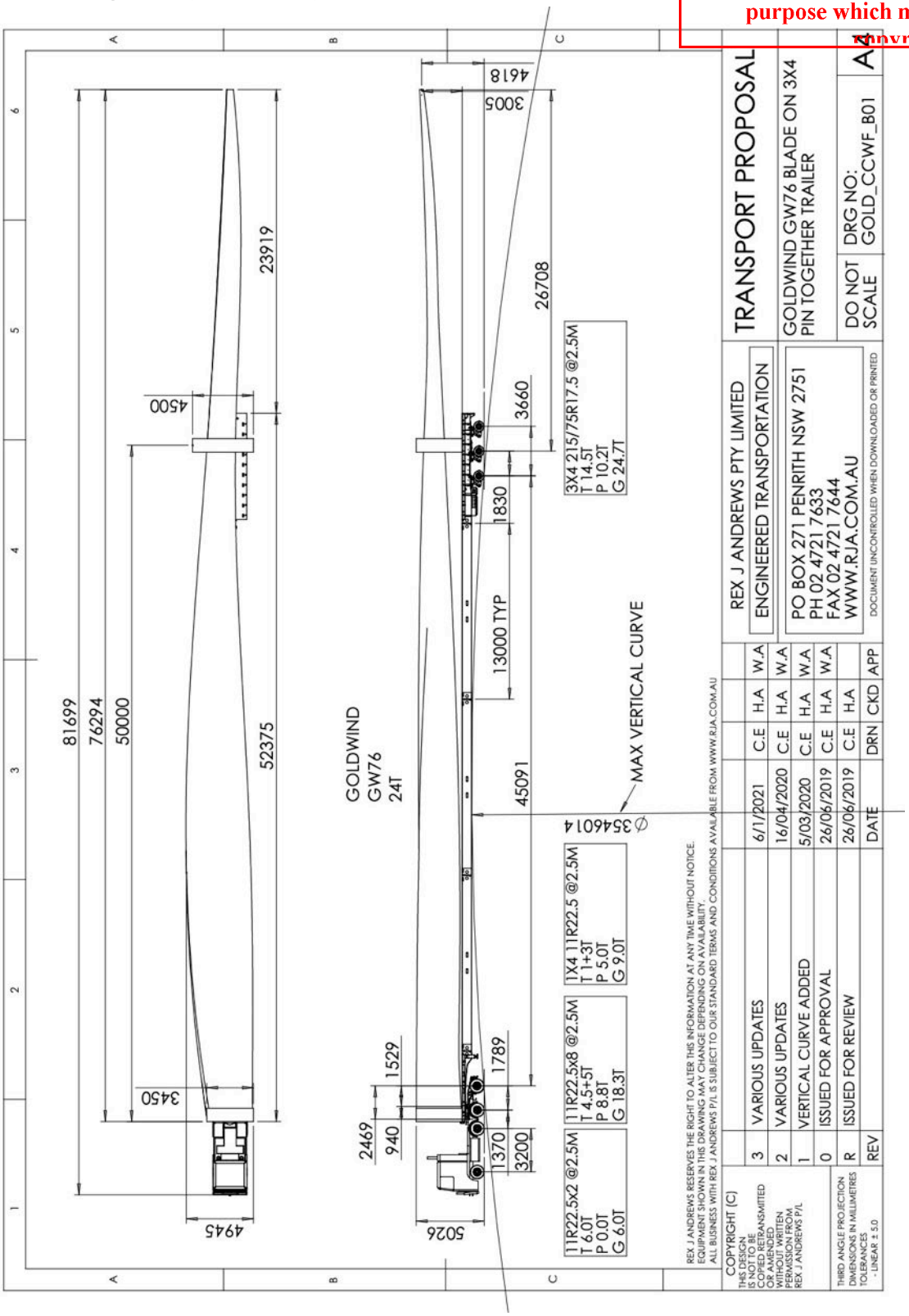
LTM1500 carrier (21.0l x 3.0 x 4.0 x 96T)
Configuration. Prime mover with 10x8 Platform trailer + Backup truck
Overall dimensions: 36.0l x 5.0w x 5.2h x 174.5T + Backup truck

INDICATIVE TRANSFORMER:

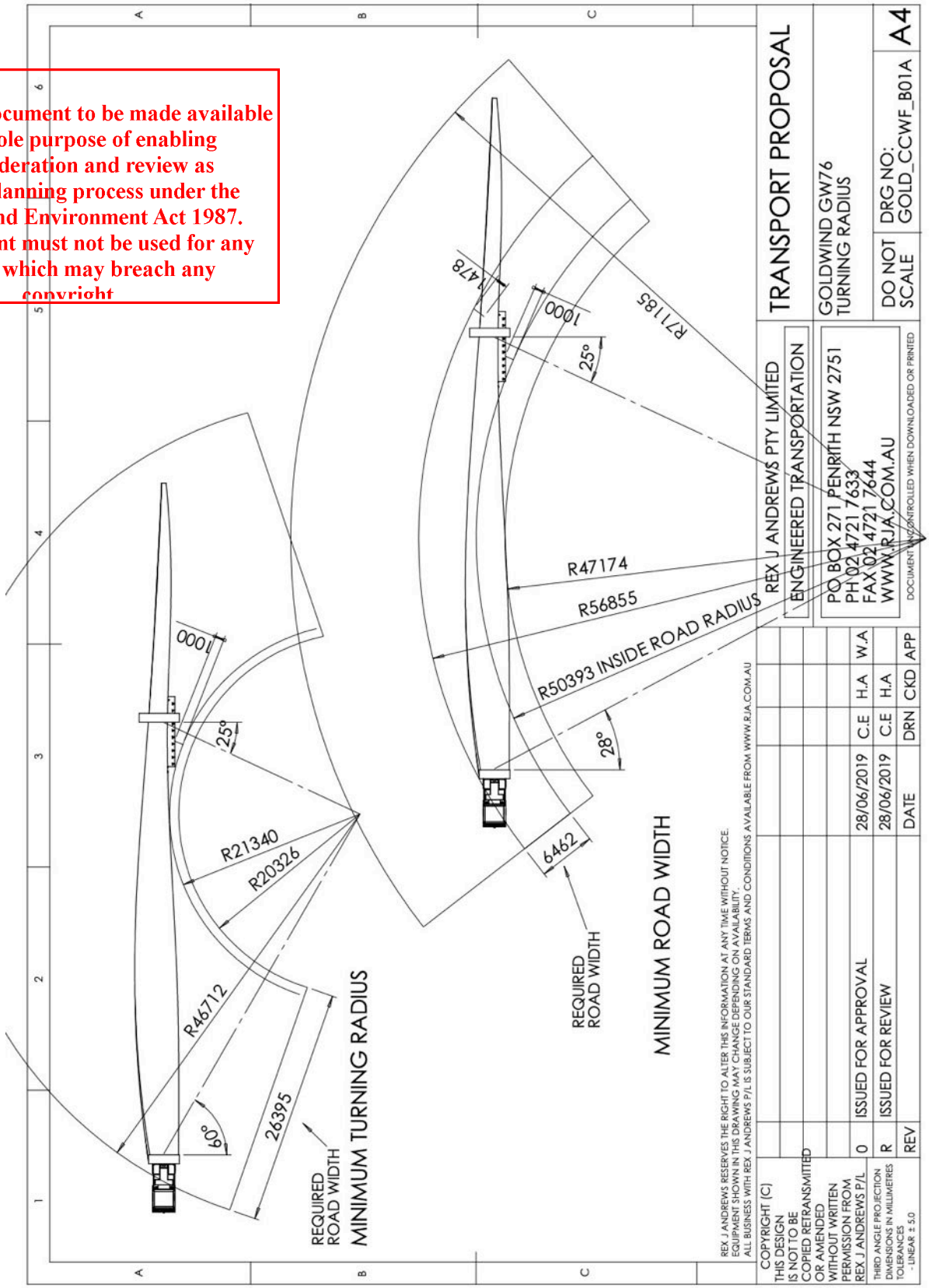
Transformer main tank (9.2l x 4.0 x 4.35 x 167T)
Configuration. Prime mover with 10x8-10x8 Beamset + 3 x Backup trucks
Overall dimensions: 45.0l x 4.3w x 5.4h x 324.5T + 3 x Backup trucks
Or
Configuration. Prime mover with 16x8 Platform trailer + 2 x Backup trucks
Overall dimensions: 45.0l x 4.3w x 5.4h x 256.5T + 2 x Backup trucks

5.0 Transport drawings (Examples)

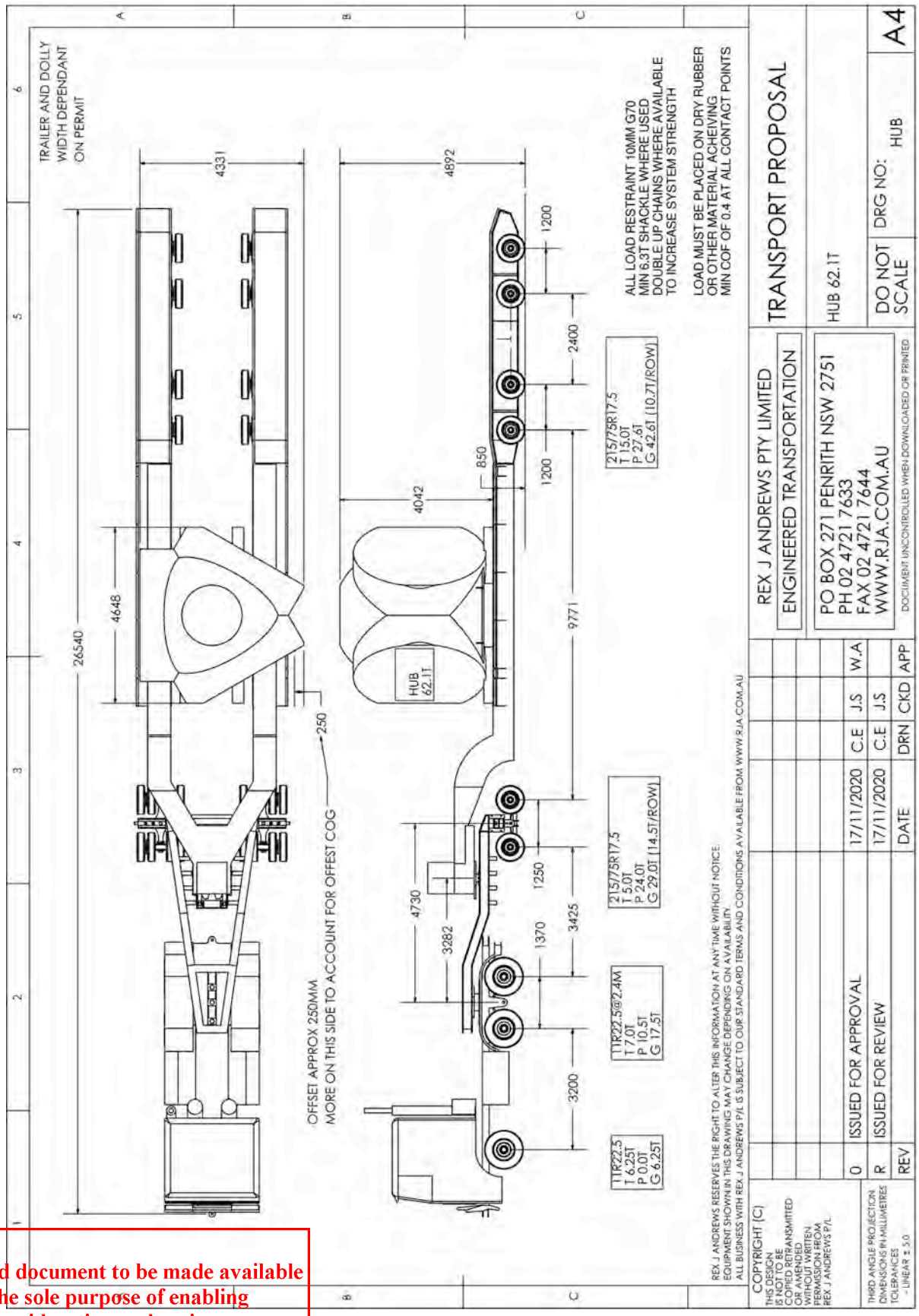
Blade diagram (155 rotor):



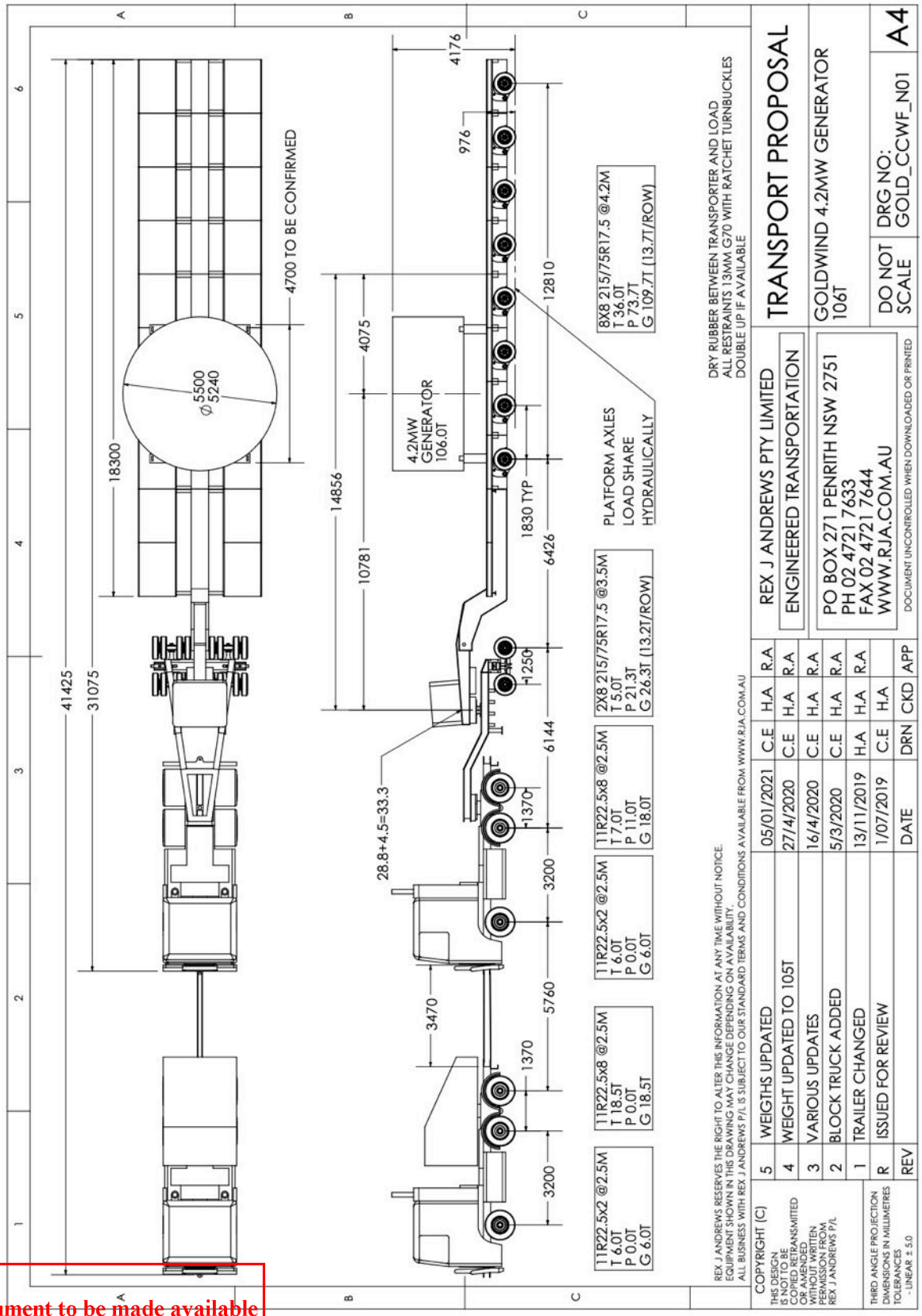
Blade diagram (155 rotor): Swept path



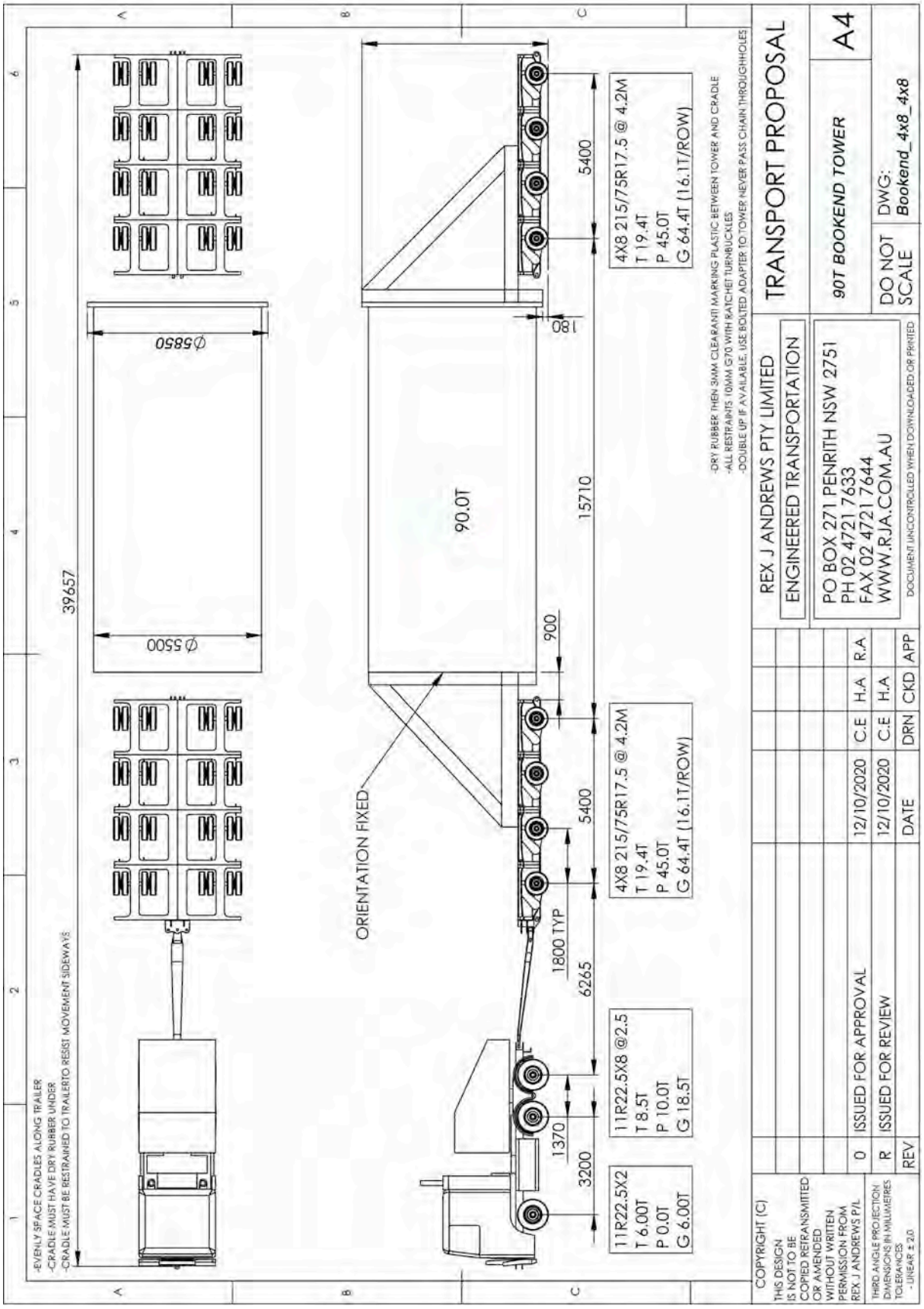
Hub combination example:



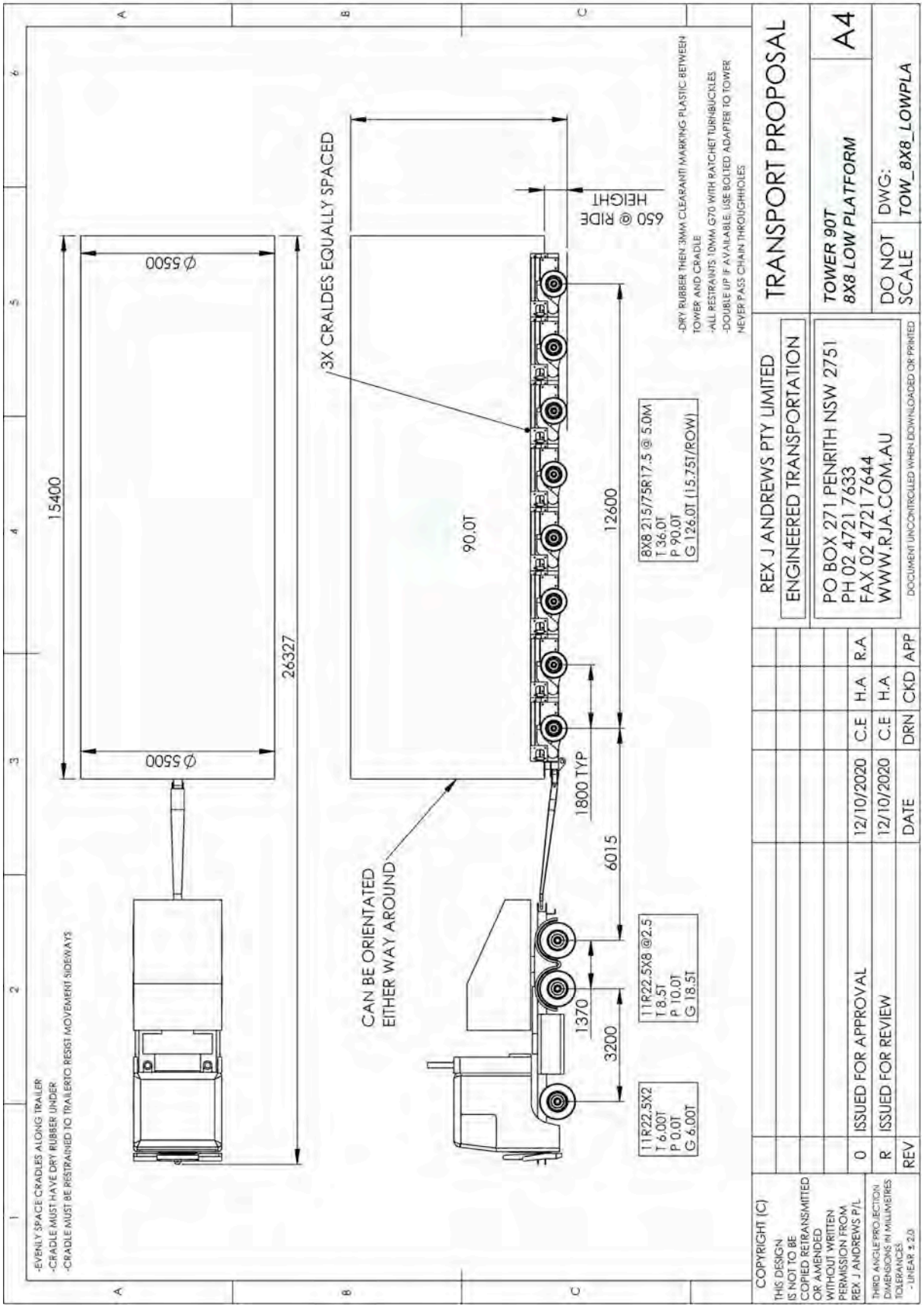
Goldwind Generator combination:



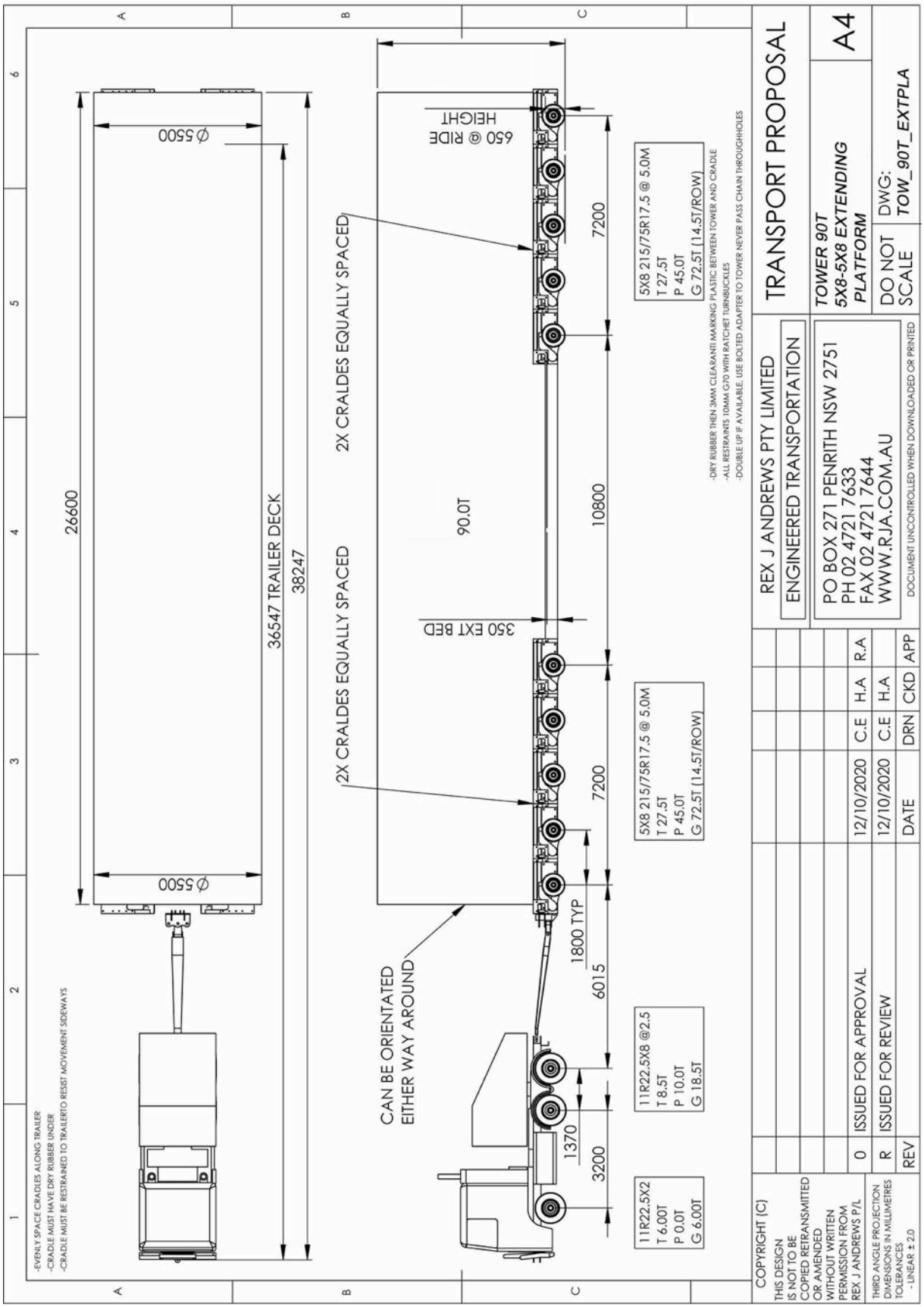
Tower Trailer Bookend:



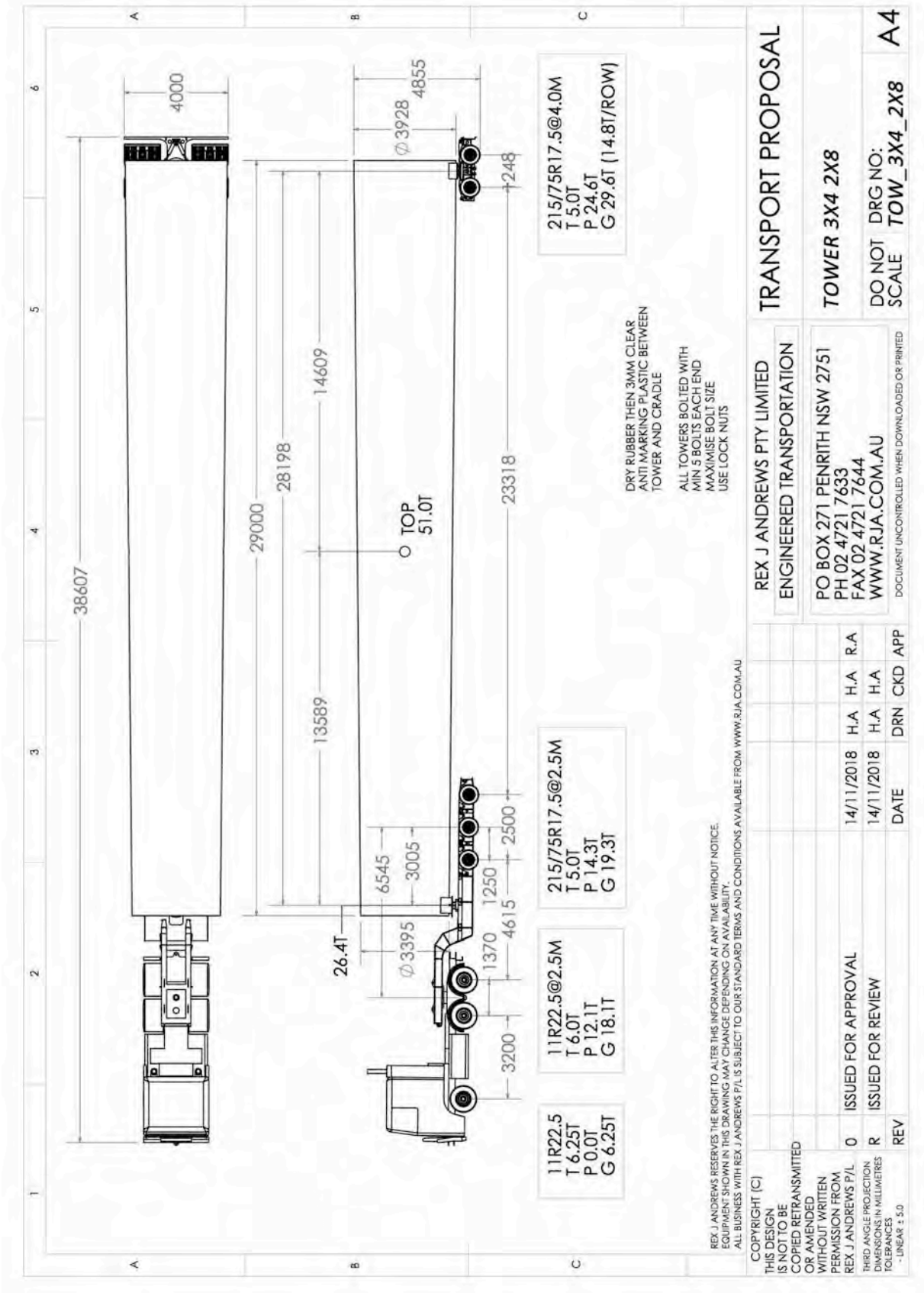
Tower trailer 8x8:



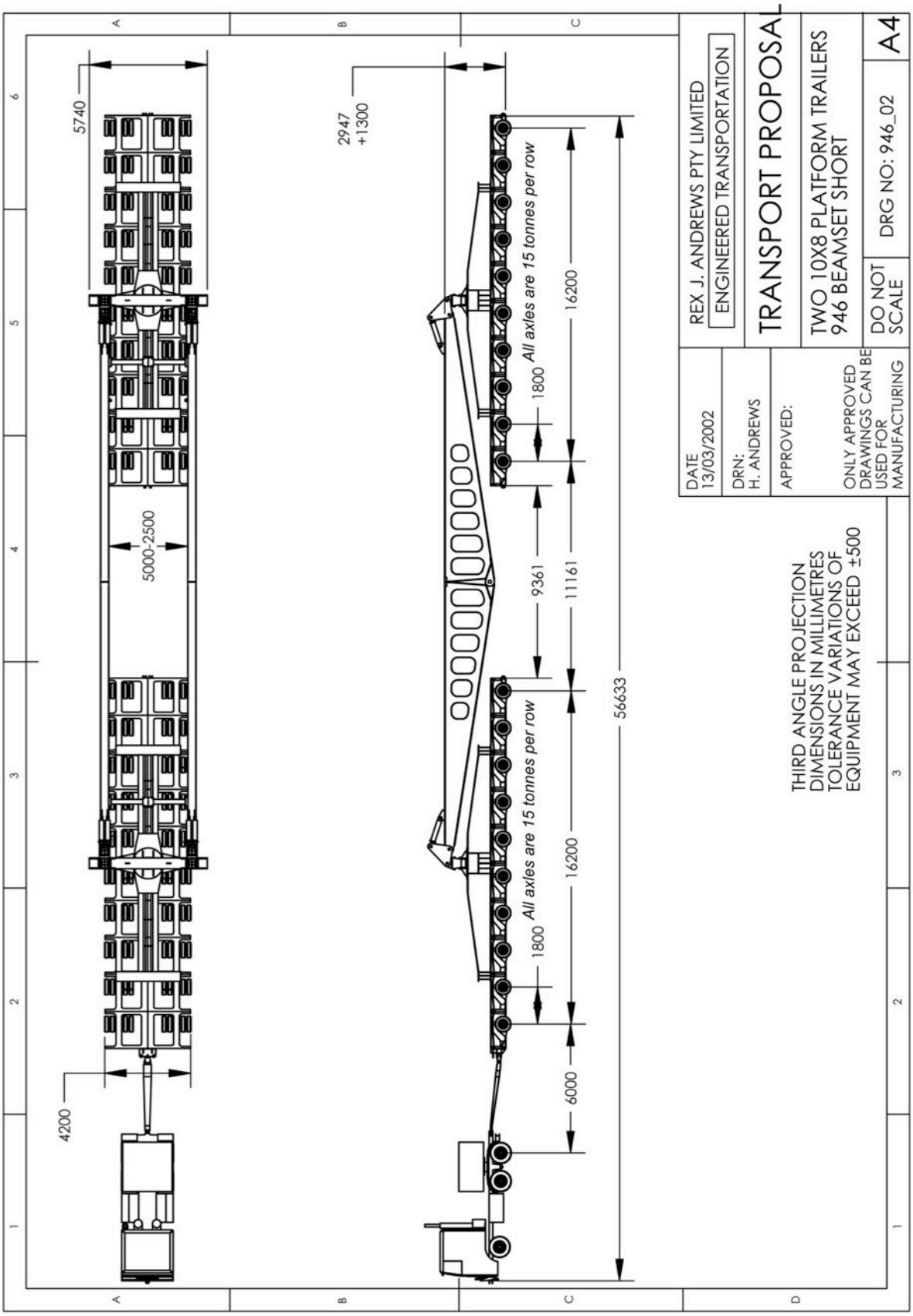
Tower trailer extending 5x8_5x8:



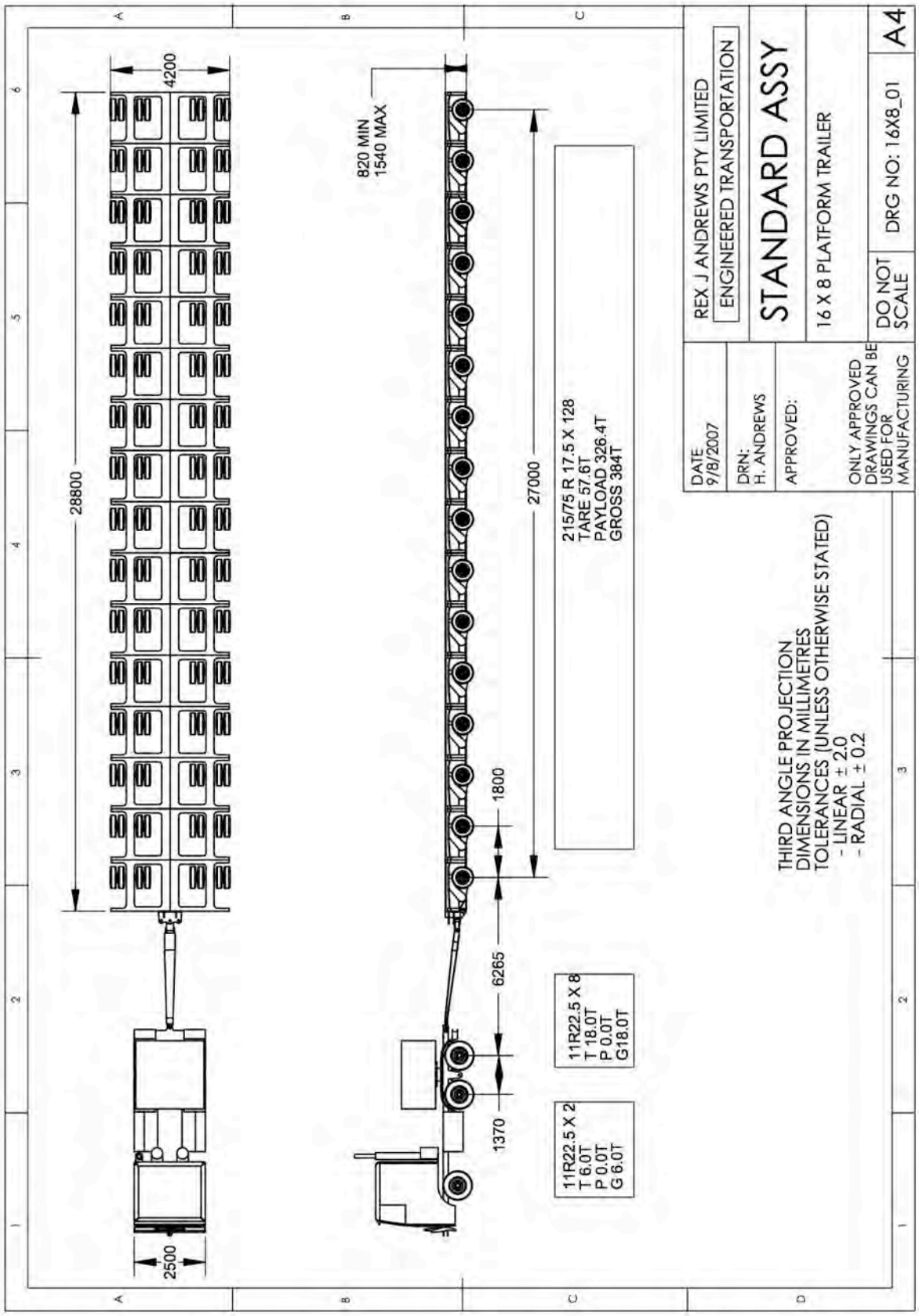
Tower trailer Dolly and Jinker:



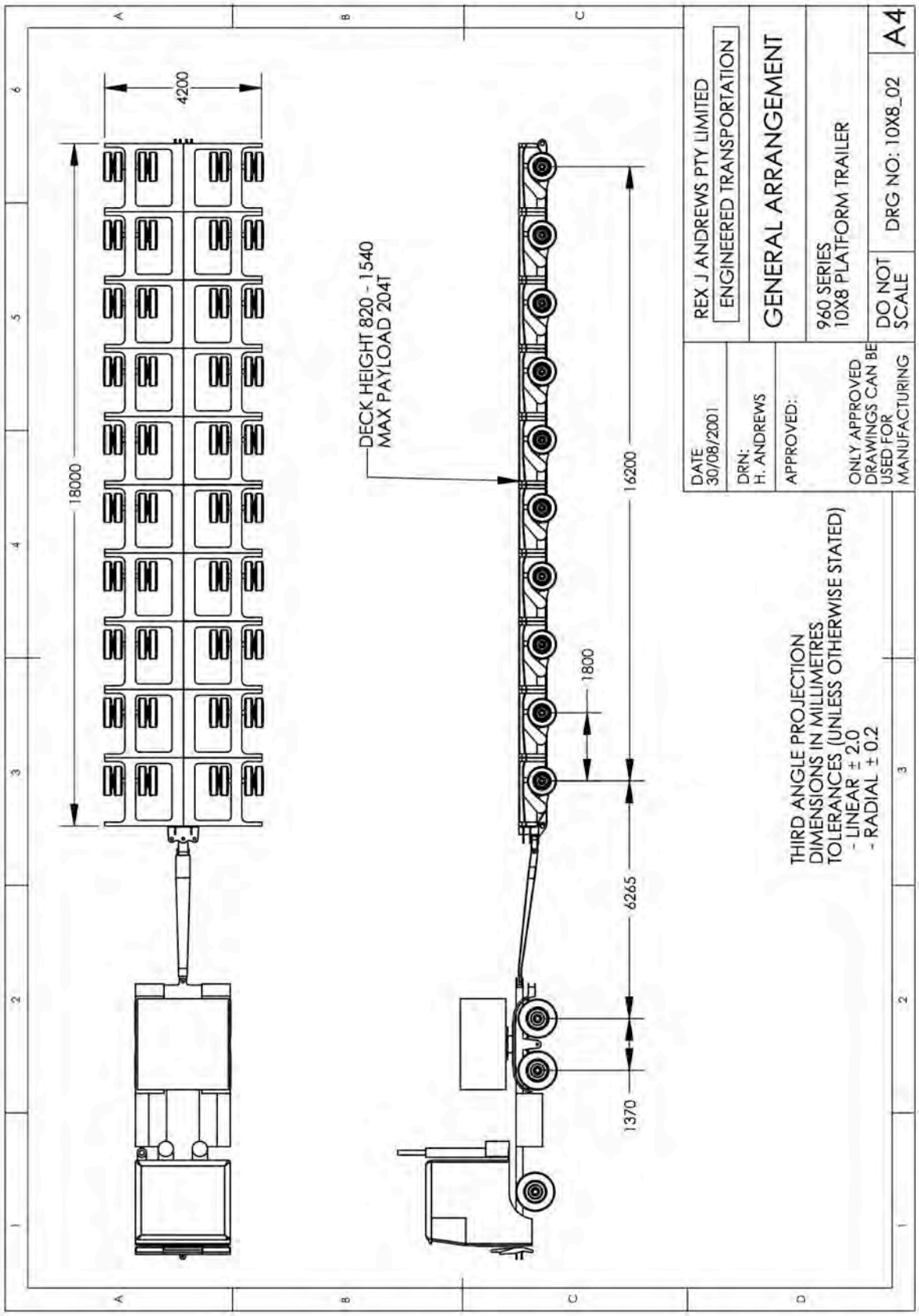
Transformer trailer 10x8-10x8 beamset:



Transformer trailer 16x8 Platform:

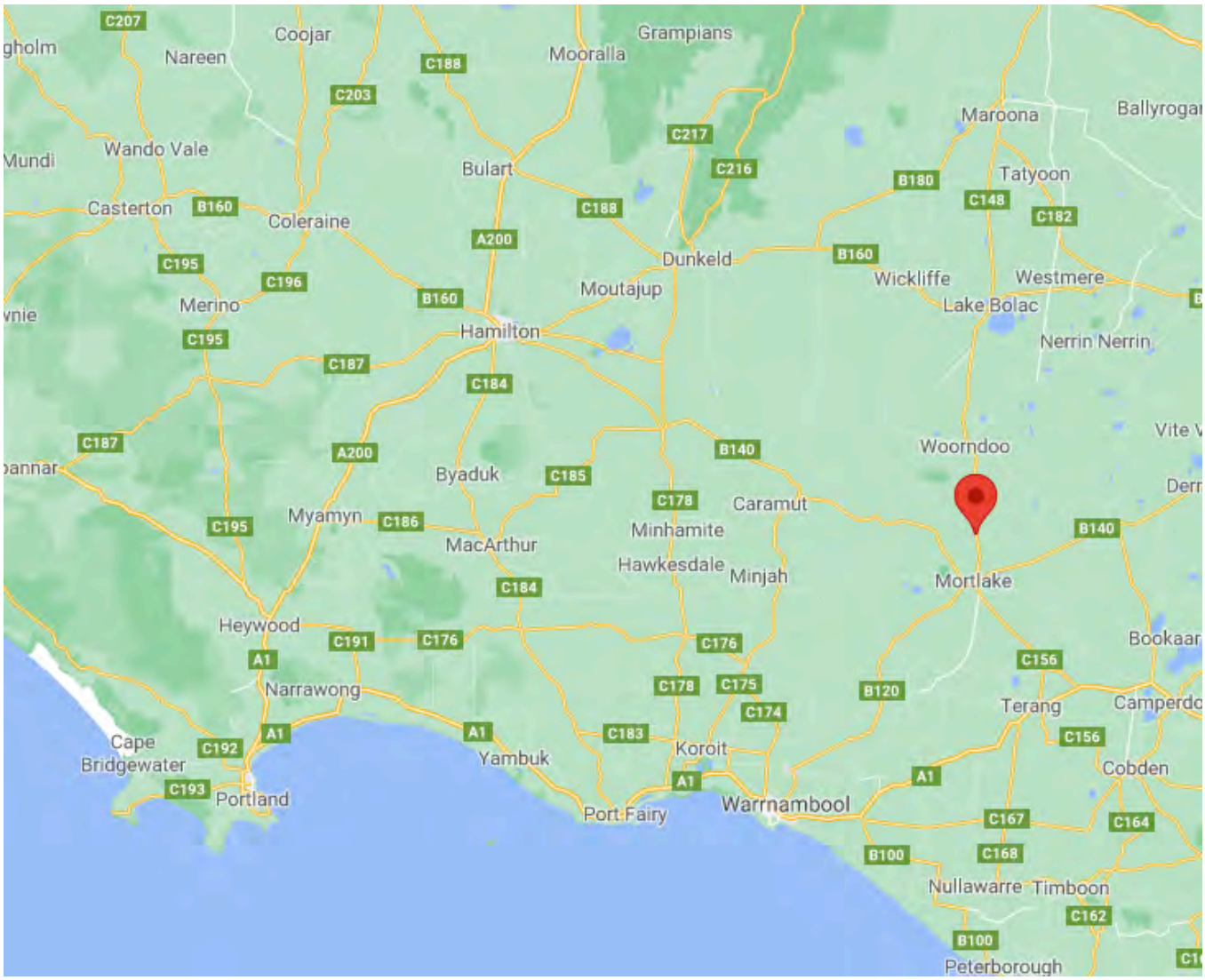


Crane trailer 10x8 Platform:

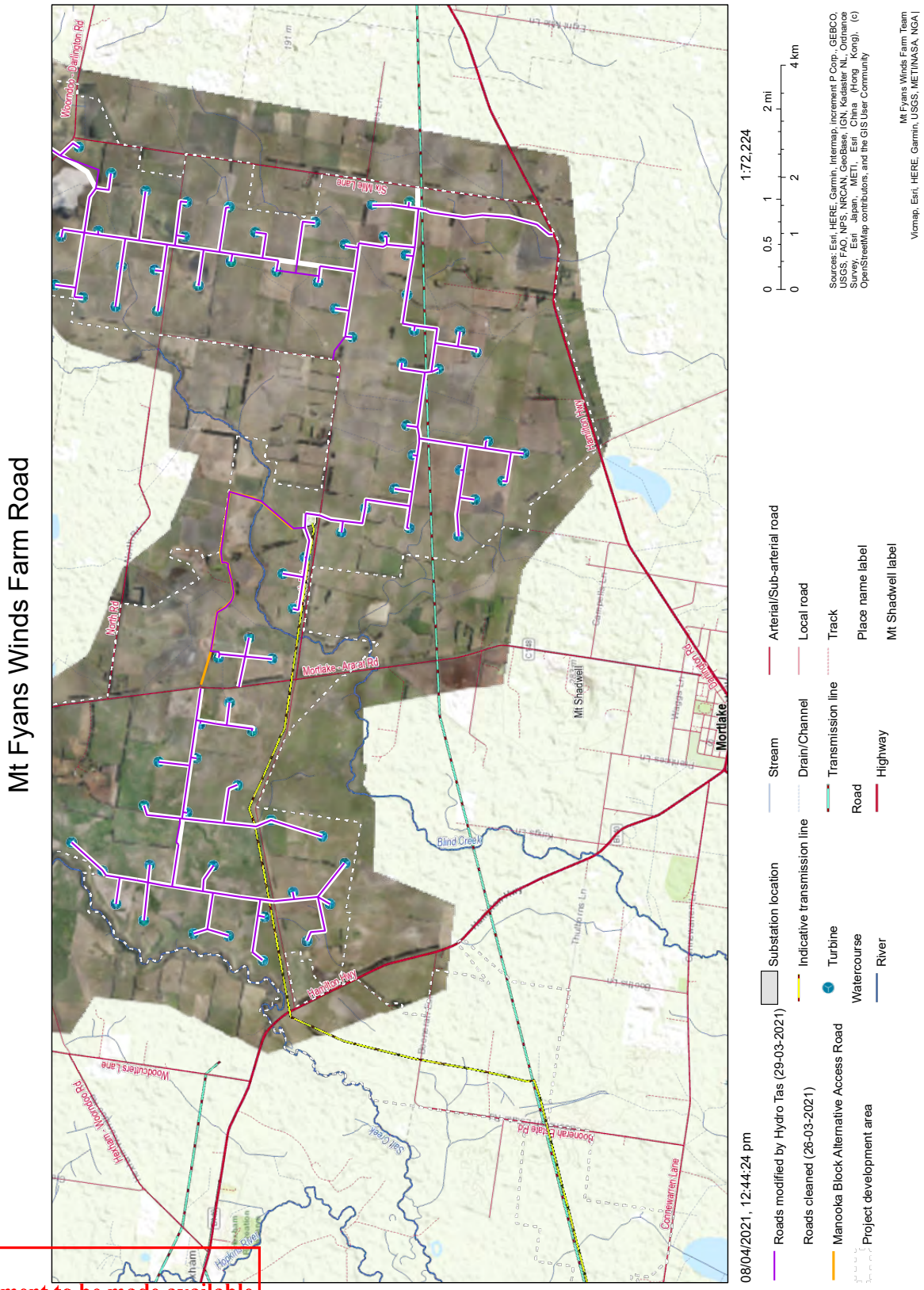


6.0 Site Location.

The Mt Fyan wind farm is located 8 Km's North of Mortlake VIC.



7.0 Windfarm site map.



8.0 Port of Import.

The ideal berth for discharge would be the #5 Berth. This berth is situated in Portland harbour, and has road access via Madeira Packet Road Portland.

This berth has handled various wind farm projects in South-West Victoria and has accommodated blades of up to 73 metres in length in the past.

We see no problems with wind turbines exiting the port.

Storage at the port may be available for lease of up to 15,000 S/Q metres; alternatively, Rex J Andrews Pty Ltd currently has 60,000 s/q metres of Hardstand available.

9.0 Transport Routes.

We have based our study on all imported turbine components entering Australia via the Port of Portland. The port has minimal storage available so an external storage yard would be required for this project. This case study will include a route to the Rex J Andrews storage facility on Portland-Nelson Road at Portland.

ROUTE 1: Port of Portland to RJA Storage Portland - Blades, Nacelles, Drive trains and Hubs (7.4 kilometres) (5.3m max loaded height):

This route took us via No 2 Quay Road, Madeira Packet Way, Henty Highway, Portland-Nelson Road.

GPS Link: https://goo.gl/maps/NDGHdqba9sz3KJCw5

ROUTE 2: Port of Portland to RJA Storage Portland- high detour (20.4 kilometres) (6.0m loaded hight):

This route took us via No 2 Quay Road, Madeira Packet Road, Cape Nelson Road, Mailings Road, Thorns Road, Bridgewater Road, Henty Highway, Portland-Nelson Road.

GPS Link: https://goo.gl/maps/VTpyHtcD7Y5Nuq4y9

ROUTE 3: Port of Portland to Mt Fyans windfarm (Northern route) - Blades, larger towers (223.0 kilometres)(6.0m loaded hight):

This route took us via Portland-Nelson Rd, Cashmore Rd, Henty Highway, Scott Street, Dunkeld-Cavendish Road, Glenelg Highway, Mortlake-Ararat Road.

GPS Link: https://goo.gl/maps/rPzdDtvKH9V4opt79

ROUTE 4: Port of Portland to Mt Fyans windfarm (Southern route) - (180.0 kilometres) (5.3m max loaded hight):

This route took us via Portland-Nelson Rd, Cashmore Rd, Henty Highway, Princes Highway, Mackinnons Bridge Road, Terang-Mortlake Road, Boundary Rd, Mortlake-Ararat Road.

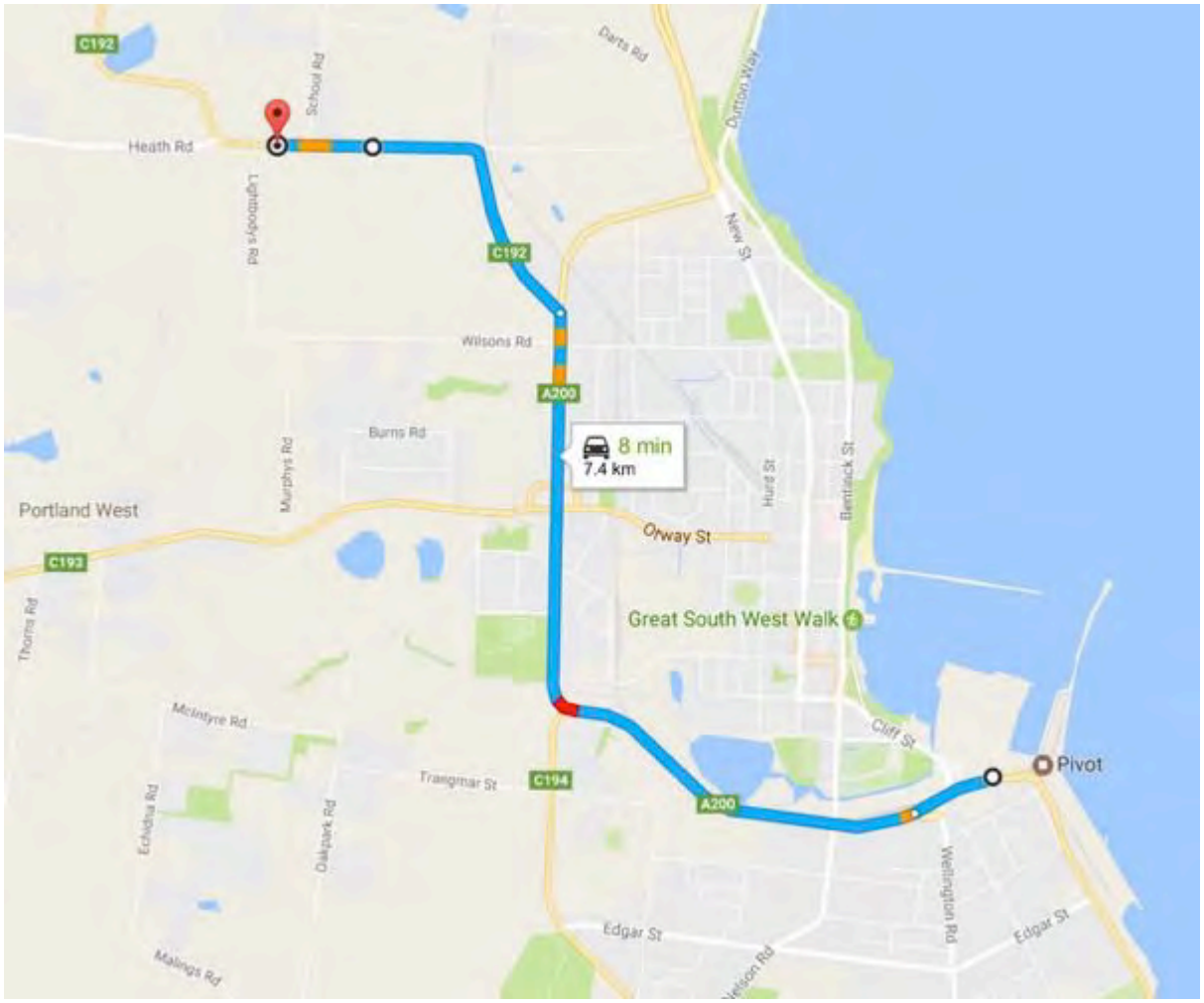
GPS Link: https://goo.gl/maps/fkfThYAuyVvNSsYz7

10.0 Route 1: Port of Portland to RJA storage (Max 5.3 metres overall height).

ROUTE 1: Port of Portland to RJA Storage Portland - Blades, Nacelles, Drive trains and Hubs (7.4 kilometres):

This route took us via No 2 Quay Road, Madeira Packet Way, Henty Highway, Portland-Nelson Road.

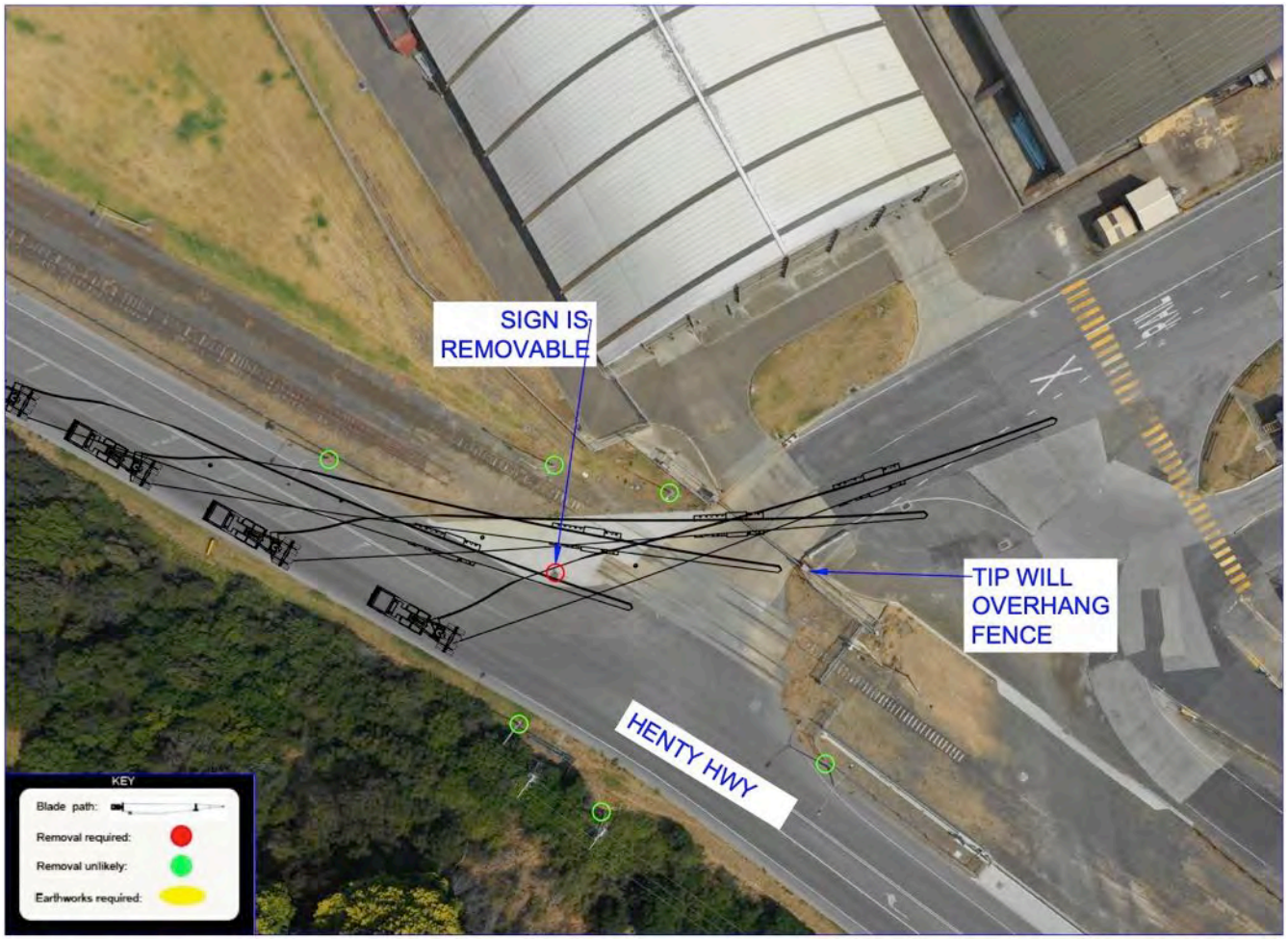
GPS Link: https://goo.gl/maps/NDGHdqba9sz3KJCw5



KEY	
MODIFICATIONS REQUIRED	
PINCH POINT	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Portland	Port of Portland onto Madeira Packet Road GPS Link: https://goo.gl/maps/Dmb15XGtrSK2	9.0m wide at gate	Right hand turn	1x sign needs to be removed and replaced for each load (already removable). A spotter will need to assist with the loads as they exit the gate.
0.2	Portland	Madiera Packet Road under Cliff Street GPS Link: https://goo.gl/maps/RWN8fJMUcpt	L=5.5, R= 5.7	Travel directly under the overbridge	Approach Bridge with caution
4.0	Portland	Henty Highway under Bridgewater Road GPS Link: https://goo.gl/maps/boWmnu6TuUo	L=5.2, R=5.4	Travel directly under the overbridge	The Bridge has a clearance of 5.2 meters high in the right lane. However, if the loads travel on the far right hand side of the bridge, they have a clearance of 5.4 meters high. Loads that exceed 5.3 meters will need to use the high discharge detour.
5.1	Portland	Henty Highway onto Portland-Nelson Road GPS Link: https://goo.gl/maps/unep2nCFK7J2	90.0 Metres	Slight left hand turn	The blades will need to cross from the incorrect side to the incorrect side. Spotter to guide load through the corner.
6.2	Portland	Portland-Nelson Road at the intersection of Cashmore Road GPS Link: https://goo.gl/maps/PQNj2mgLGhm	90.0 Metres	Left hand turn	The blades will need to cross from the incorrect side to the incorrect side. Signs that need to be removed are already removable. Spotter to guide load through the corner and pay close attention to the pole on the inside of the turn.
7.4	Portland	Portland-Nelson Road into RJA storage. GPS Link: https://goo.gl/maps/LMkBd4NyBZ82	9.0 Metres wide at the gate	Left hand turn	Blades will need to cross from the incorrect side of the road into the storage area. Spotter to guide load through the corner.

0.0 Km's: Exiting Port of Portland.



PROCEDURE: Exit port heading south and turn right onto Madiera Packet Road.

COMMENTS: This is a tight right-hand turn that will require a sign to be removed and replaced after each load. The sign is already removable. The height of the blade tip will need to be checked to ensure it will pass over the port exit gates.

ROAD MODIFICATIONS: No works required.

0.2 Km's: Bridge over Madiera Packet Road at Portland.

PROCEDURE: Pass under overhead bridge.

COMMENTS: The Bridge has a clearance of 5.5 metres high in the left lane. Loads can stay in the left-hand lane for this section.

CONCLUSION: No problem with this section of road.

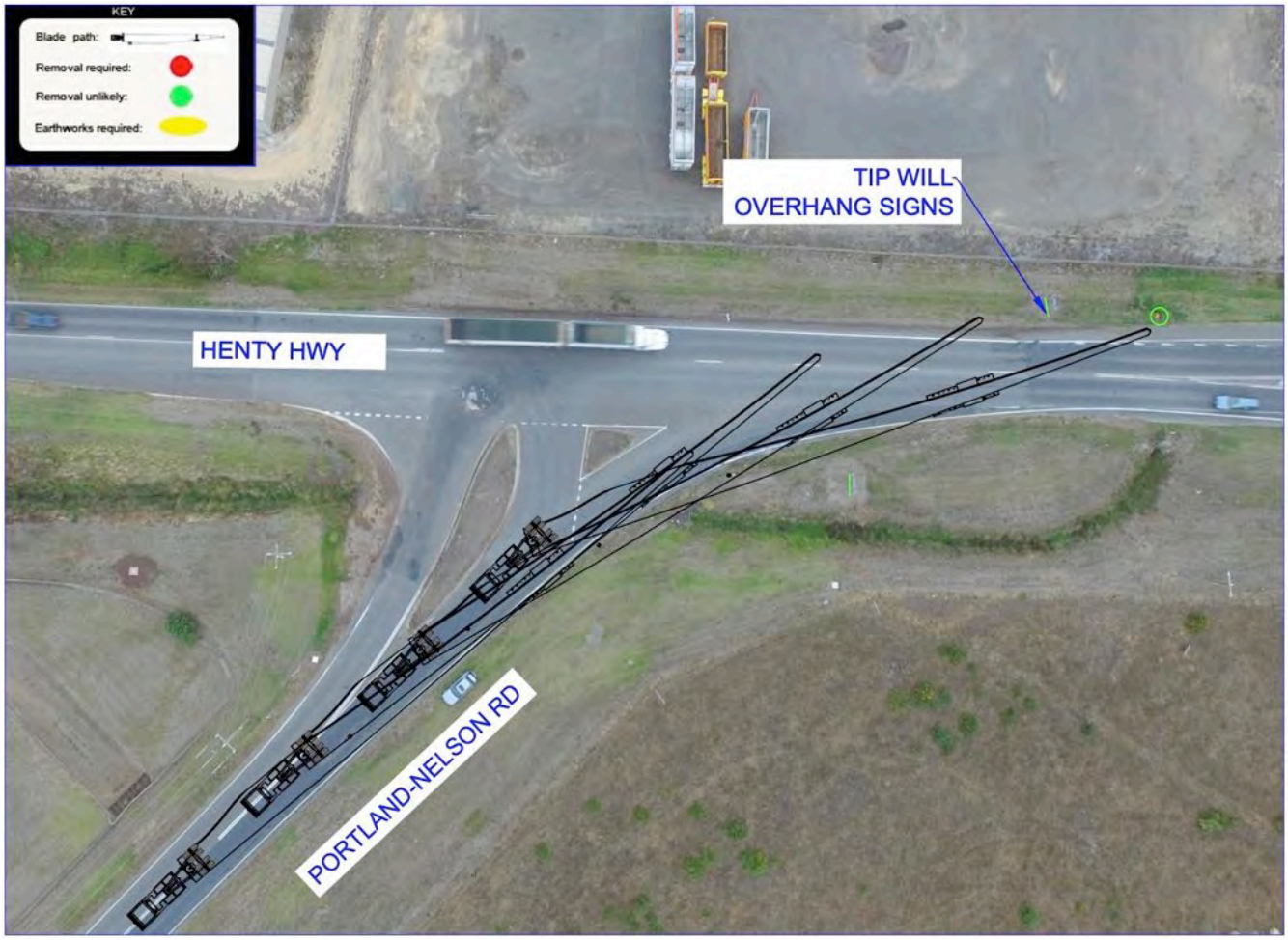
4.0 Km's: Bridge over the Henty Highway at Portland.

PROCEDURE: Pass under overhead bridge.

COMMENTS: The Bridge has a clearance of 5.2 metres high in the left lane and 5.4 metres in the right lane.

CONCLUSION: Care to be taken. Any loads over 5.0m must pass under this structure in the right-hand lane. **Loads that exceed 5.3 metres are to take the turbine detour route.**

5.1 Km's: Henty Highway onto Portland-Nelson Road at Portland.

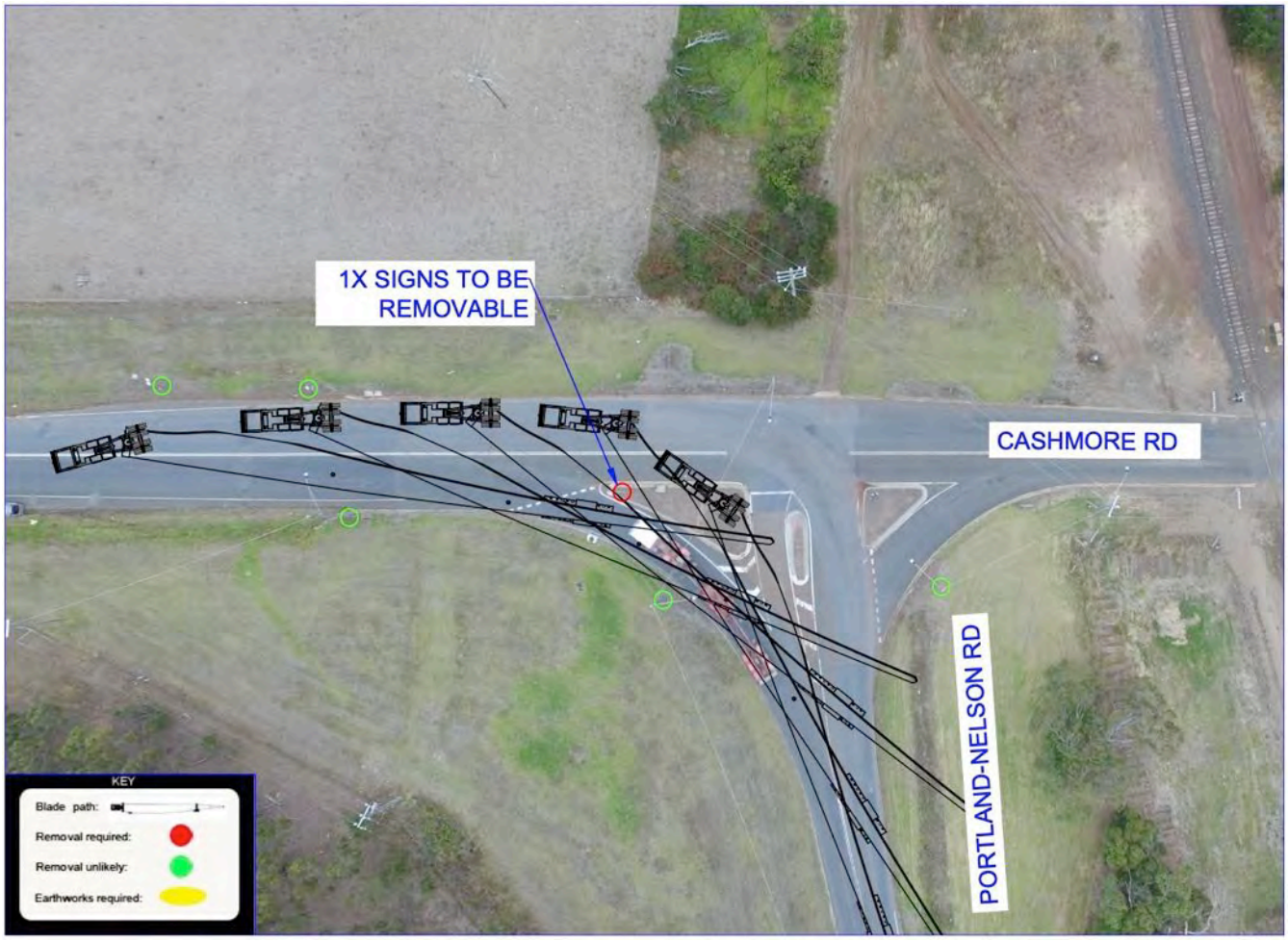


PROCEDURE: Sweeping left hand corner onto Portland-Nelson Road.

COMMENTS: The blades will need to cross to the incorrect side prior to the turn, then enter Portland-Nelson Road back on the correct side. No issues with this corner.

ROAD MODIFICATIONS: No works required

6.2 Km's: Portland-Nelson Road at the intersection of Cashmore Road Portland.



PROCEDURE: Tight left-hand corner at the intersection of Portland-Nelson Road and Cashmore Road.

COMMENTS: The blades will need to cross to the incorrect side prior to the turn and enter Portland-Nelson Rd on the incorrect side. The signs on the centre median strip are currently removable. Spotter to watch light pole on the inside of the corner.

ROAD MODIFICATIONS: No works required

7.4 Km's: Portland-Nelson Road into RJA storage facility at Portland.

Image 1:

Image 2:

PROCEDURE: Moderate left-hand corner into the storage yard from Portland-Nelson Road.

COMMENTS: The blades will need to cross to the incorrect side prior to the turn, before entering the storage yard.

ROAD MODIFICATIONS: No works required

11.0 Conclusion Port of Portland to RJA storage (Max 5.3 metres overall height).

After studying all options and undertaking a route survey, this route in its current condition will not require any upgrades and is deemed suitable for transporting a 76-metre blade. This route has been used previously to transport 73m long blades without issue.
The following are the key points that need to be taken into consideration if the project moves forward with this route.

OVERHEAD STRUCTURES/UTILITIES:

- There are three overhead bridges along this route. The lowest structure is the Bridgewater overpass that has a maximum clearance of 5.4m in the far-right lane. **Loads over 5.3m must take the high route detour.**
- The route has been lifted for a height clearance of 5.4m for previous projects. A power survey will still need to be conducted before deliveries.

VEGETATION:

- The route will need to be checked closer to deliveries commencing but it's expected that vegetation will not be an issue.

LENGTH:

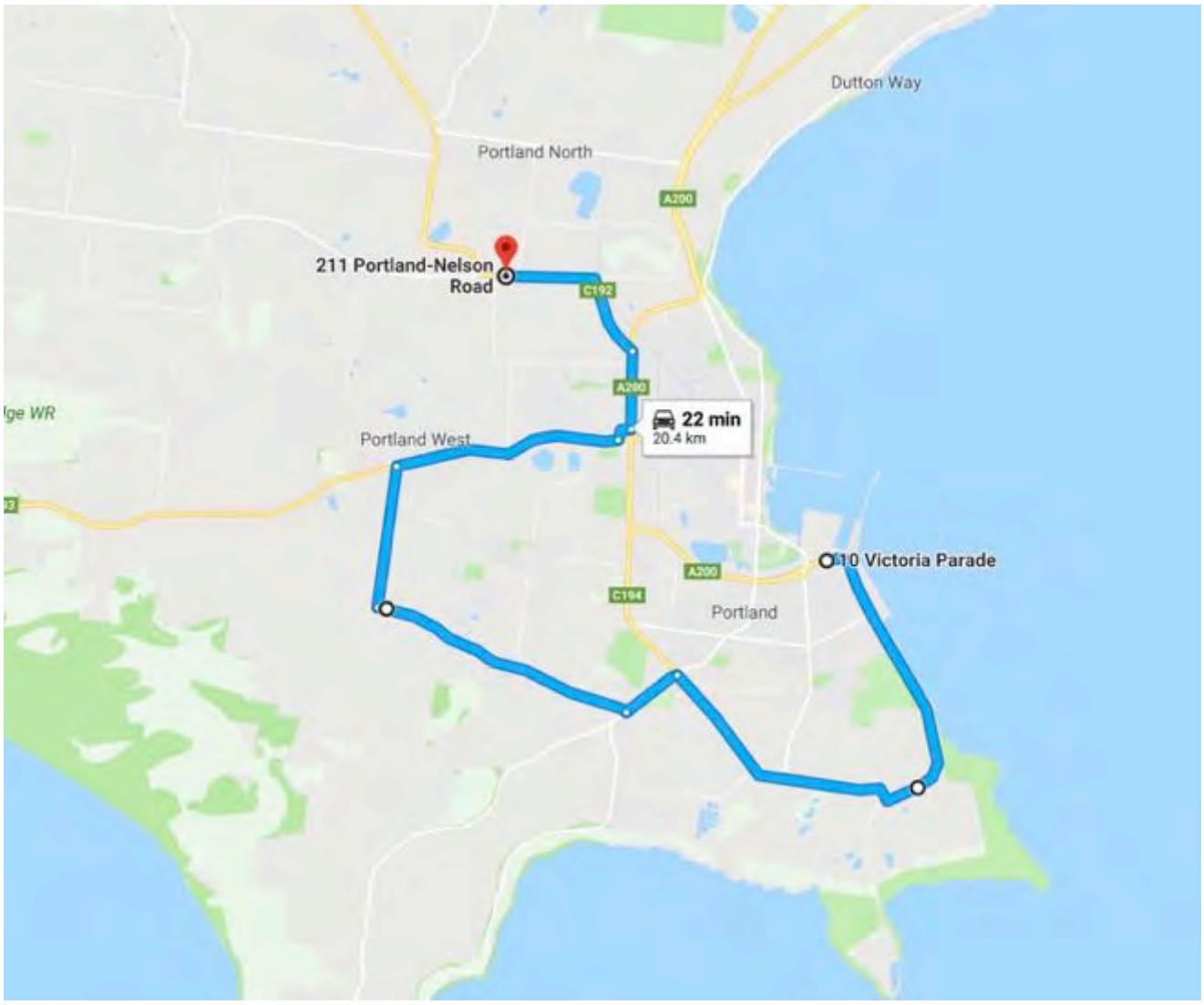
- The route is clear for a 76m long blade in its current state.

12.0 Route 2: Port of Portland to RJA storage (6.0 metres overall height).

ROUTE 2: Port of Portland to RJA Storage Portland- high detour (20.4 kilometres):

This route took us via No 2 Quay Road, Madeira Packet Road, Cape Nelson Road, Mailings Road, Thorns Road, Bridgewater Road, Henty Highway, Portland-Nelson Road.

GPS Link: https://goo.gl/maps/VTpyHtcD7Y5Nuq4y9



KEY	
MODIFICATIONS REQUIRED	
PINCH POINT	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Portland	Port access Road onto Madiera Packet Road GPS Link: https://goo.gl/maps/Dmb15XGtrSK2	9.0m wide at gate	Left-hand turn	No Problems with this section of road.
0.2	Portland	Madiera Packet Road GPS Link: https://goo.gl/maps/5q7JLgBymao	8.5 metres wide 7.0m height clearance	Travel under pipe	No problems with this section of road.
4.1	Portland	Madiera Packet Road, corner of Quarry Road GPS Link: https://goo.gl/maps/WVU9NgB8Utu	8.0 Metres wide	Right than left-hand turn	No problems with this section of road.
7.5	Portland	Madiera Packet Road onto Cape Nelson Road. GPS Link: https://goo.gl/maps/wQ39hnCqzxK2	6.0 Metres wide	Left-hand turn	2x signs need to be removed and replaced for the longer tower sections. No problems with this section of road.
8.4	Portland	Cape Nelson Road onto Mailings Road. GPS Link: https://goo.gl/maps/eM6FTqeoiyE2	7.0 Metres wide	Tight right-hand turn	No problems with this section of road.
9.3 to 12.8	Portland	Mailings Road. GPS Link: https://goo.gl/maps/9ynH1BDn1US2	6.0 Metres wide	Travel directly ahead	Water truck must be used during discharges to suppress dust along the dirt section of Mailing Rd.
12.0	Portland	Mailings Road onto Thorns Road. GPS Link: https://goo.gl/maps/bqigsYLCQDK2	5.0 Metres wide	Tight Right-hand turn	Trucks must crawl around this corner and spotters to watch wheel path.
13.9	Portland	Thorns Road onto Bridgewater Road. GPS Link: https://goo.gl/maps/r525dg63MKr	7.0 Metres wide	Right-hand turn	No problems with this section of road.
15.5	Portland	Bridgewater Road onto Henty Highway GPS Link: https://goo.gl/maps/z2ZGQsSWbG42	8.0 Metres wide	Left-hand turn	2x signs to be removed on the entrance to the Henty Hwy. No problems with this section of road.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
16.3	Portland	Henty Highway onto Portland-Nelson Road GPS Link: https://goo.gl/maps/unep2nCFK7J2	8.0 Metres wide	Left-hand turn	No problems with this section of road.
19.2	Portland	Portland-Nelson Road, intersection of Cashmore Road. GPS Link: https://goo.gl/maps/PQNj2mgLGhm	8.0 Metres wide	Left-hand turn	No problems with this section of road.
20.4	Portland	Portland-Nelson Road into RJA storage. GPS Link: https://goo.gl/maps/LMkBd4NyBZ82	9.0 Metres wide at the gate	Left-hand turn	No problems with this section of road.

13.0 Conclusion Port of Portland to RJA storage (6.0 metres overall height).

After studying all options and undertaking a route survey, this route in its current condition is suitable for transporting large towers or motors with a loaded height over 5.3 metres and less than 6.0 metres. This route has been used previously for transporting towers of up to 6m loaded height without issue.
The following are the key points that need to be taken into consideration if the project moves forward with this route.

OVERHEAD STRUCTURES/UTILITIES:

- The only overhead structure on the route is the Pipe on Madiera-Packet Road. This has a clearance of 7.0m so will not be an issue.
- The route has been lifted for a height clearance of 6.0 for previous projects. A power survey will still need to be conducted before deliveries, and every 3 months during deliveries.

VEGETATION:

- The route will need to be checked closer to deliveries commencing but it's expected that vegetation will not be an issue.

MAILINGS ROAD:

- Mailings Road has a narrow dirt section that needs to be watered to suppress dust while using this section of road on the discharges.

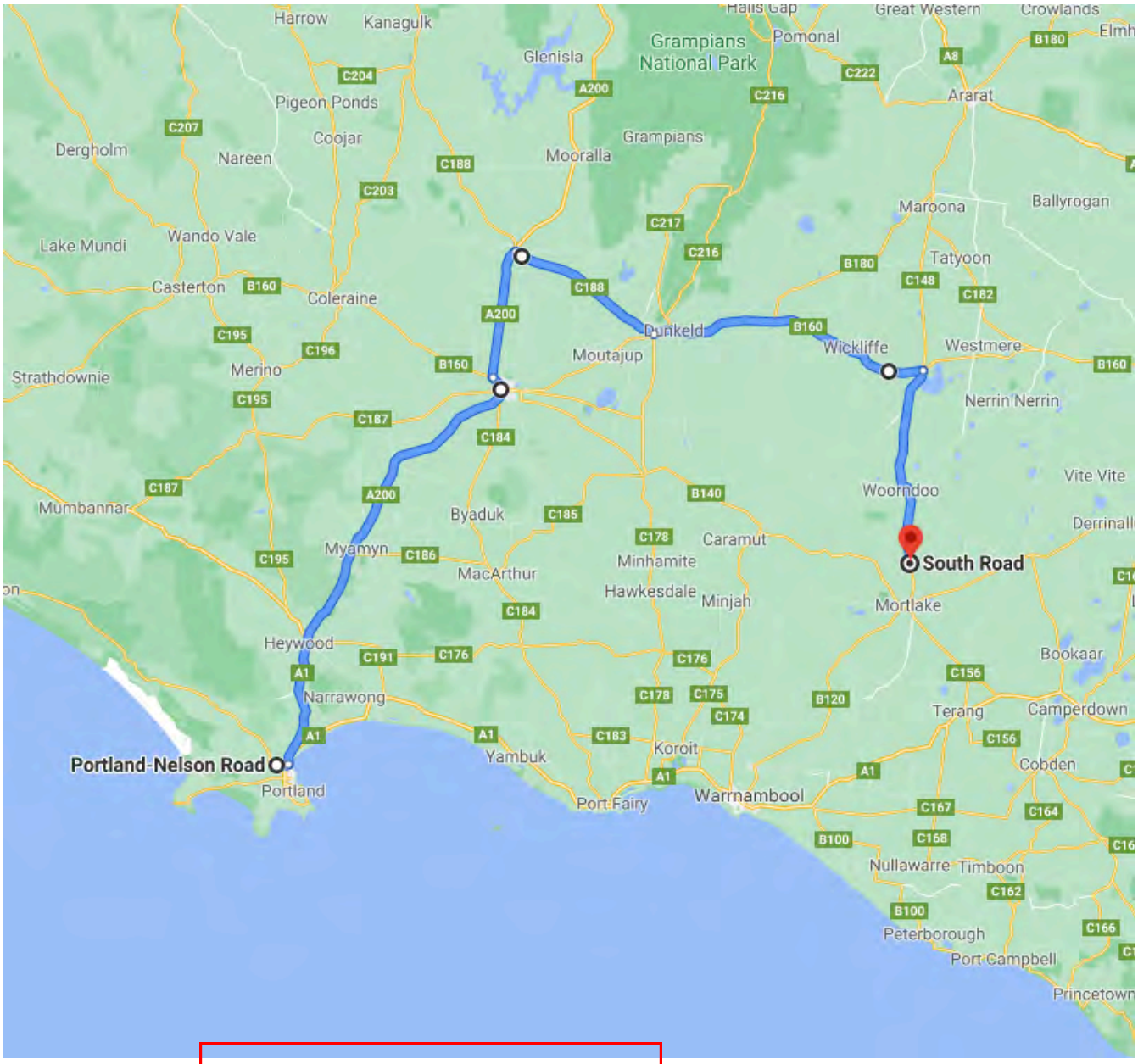
14.0 Route 3: RJA Storage Portland to Mt Fyans Wind Farm - Northern Route.

ROUTE 3: Port of Portland to Mt Fyans wind farm via the Northern route.
Components: Blades, and Towers over 5.3 metres and up to 6.0 metres in loaded height.

Distance: 223 Kilometres

This route took us via Portland-Nelson Rd, Cashmore Rd, Henty Highway, Scott Street, Dunkeld-Cavendish Road, Glenelg Highway, Mortlake-Ararat Road.

GPS Link: https://goo.gl/maps/rPzdDtvKH9V4opt79



KEY	
MODIFICATIONS REQUIRED	
PINCH POINT	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Portland	RJA storage 211 Portland Nelson Road onto Portland Nelson Road. GPS Link: https://goo.gl/maps/Shj2rR9X8Mkq3ed38	75.0 metres length clearance	Right-hand turn	Blade tip will overhang the fence on the outside of the corner.
1.0	Portland	Portland Nelson Road onto Cashmore Road. GPS Link: https://goo.gl/maps/7zEqeKKyDXfAZSAu6	8.0 Metres wide	Travel directly ahead	No problems with this section of road
1.1	Portland	Cashmore Road through rail crossing GPS Link: https://goo.gl/maps/LJSVxr4a75Xmynde6	8.0 Metres wide	Travel directly ahead	Approval required crossing this rail line.
2.3	Portland	Cashmore Road onto Henty Highway GPS Link: https://goo.gl/maps/PdD6WK3xrMsy5mWY6	75.0 metres length clearance	Left-hand turn	Medium strip on Henty Hwy needs to be hardstand for the prime mover to drive over.
14.3	Heathmere	Henty Highway through rail crossing GPS Link: https://goo.gl/maps/zmLHPohRXPGSoVpSA	8.0 Metres wide	Travel directly ahead	Approval required crossing this rail line.
45.4	Condah	Henty Highway through rail crossing GPS Link: https://goo.gl/maps/y6DM8QXbBNyP81XJ7	8.0 Metres wide	Travel directly ahead	Approval required crossing this rail line.
70.9	Branxholme	Henty Highway through rail crossing GPS Link: https://goo.gl/maps/4i5EvT7ozhAFWQdZ6	8.0 Metres wide	Travel directly ahead	Approval required crossing this rail line.
83.3	Hamilton	Henty Highway intersection of Scoresby Street GPS Link: https://goo.gl/maps/LGDnZRKjKkQwUues6	70.0 metres length clearance	Left-hand turn	The existing hardstand on the outside of the corner will need to be upgraded as it is of poor quality. All signs are currently removable.
84.3	Hamilton	Roundabout on Henty Highway GPS Link: https://goo.gl/maps/17zepHdD7CBQ24BC6	80.0 metres length clearance	Take 2nd exit to stay on Henty Highway	The existing hardstand on the centre of the roundabout will need to be upgraded as it is of poor quality. All signs are currently removable.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
86.5	Hamilton	The Henty Highway intersection with West Boundary Road GPS Link: https://goo.gl/maps/W6dTUsSuVCDFUMKF8	80.0 metres length clearance	Right-hand turn to stay on Henty Highway	2x trees to be removed on the outside of the corner and 3x signs to be made removable.
86.7	Hamilton	Henty Highway GPS Link: https://goo.gl/maps/cgGgjjSQukmYxfcs7	80m long 5.0m wide	Merge to the left	Emergency parking outside Mitre 10
108.9	Cavendish	The Henty Highway GPS Link: https://goo.gl/maps/SKmxVRHcKTQR5MUZA	90.0 metres length clearance	Sweeping right-hand bend	Spotter to guide load through this section of road.
109.1	Cavendish	The Henty Highway onto Dunkeld-Cavendish Road GPS Link: https://goo.gl/maps/MQ1YST9G1pg8BrpJ8	8.0 Metres wide	Travel directly ahead	Spotter to guide load through this section of road.
109.6	Cavendish	Dunkeld-Cavendish Road GPS Link: https://goo.gl/maps/qTnoPGVSFNpikY4fA	90.0 metres length clearance	Sweeping right-hand bend	Spotter to guide load through this section of road.
137.7	Dunkeld	Dunkeld-Cavendish Road onto Glenelg Highway GPS Link: https://goo.gl/maps/VfL6FDctCPgJ9c8j8	80.0 metres length clearance	Left-hand turn	2x signs will need to be removed and replaced for each blade movement. A spotter is to guide the loads through this intersection.
159.2	Glenthompson	Glenelg Highway GPS Link: https://goo.gl/maps/G2VcASG98jaHwKpv5	120m long 10.0m wide	Merge to the left	Large parking bay.
160.3	Glenthompson	Glenelg Highway through rail crossing GPS Link: https://goo.gl/maps/EktCrwGekWLUtTMGA	8.0 Metres wide	Travel directly ahead	Approval required crossing this rail line.
187.7	Lake Bolac	Glenelg Highway onto the Mortlake-Ararat Road. GPS Link: https://goo.gl/maps/foLa6UJFxvJ3pMQX8	75.0 metres length clearance	Tight Right-hand turn	Current hardstand area is ok for a 76m blade. Some signs will need to be made removable on the inside of the corner.
209.2	Woorndoo	The Mortlake-Ararat Road GPS Link: https://goo.gl/maps/sHtNreAHUXQNpANa6	90.0 metres length clearance	Sweeping left-hand bend	Spotter to guide load through this section of road.
223.0	**(South Road site entrance)** Mortlake	The Mortlake-Ararat Road onto South Road site entrance GPS Link: https://goo.gl/maps/9VAxPbvmfgfTUgR6	70.0 metres length clearance	Sharp left-hand turn	Current design looks suitable for 76m blades.
231.0	Mortlake	The Mortlake-Ararat Road onto Hamilton Highway GPS Link: https://goo.gl/maps/5j8u6LQK5ESBPnZX7	40.0 metres length clearance	Sharp left-hand turn	This corner would need a complete redesign to allow blades to navigate. (suggest all blades enter Eastern side through South Rd entrance)
239.0	**(Hamilton Highway site entrance)** Mortlake	Hamilton Highway into Site GPS Link: https://goo.gl/maps/xaRYNVukYAYaEX23A	NA	Right-hand turn	This corner needs to be designed to suit components

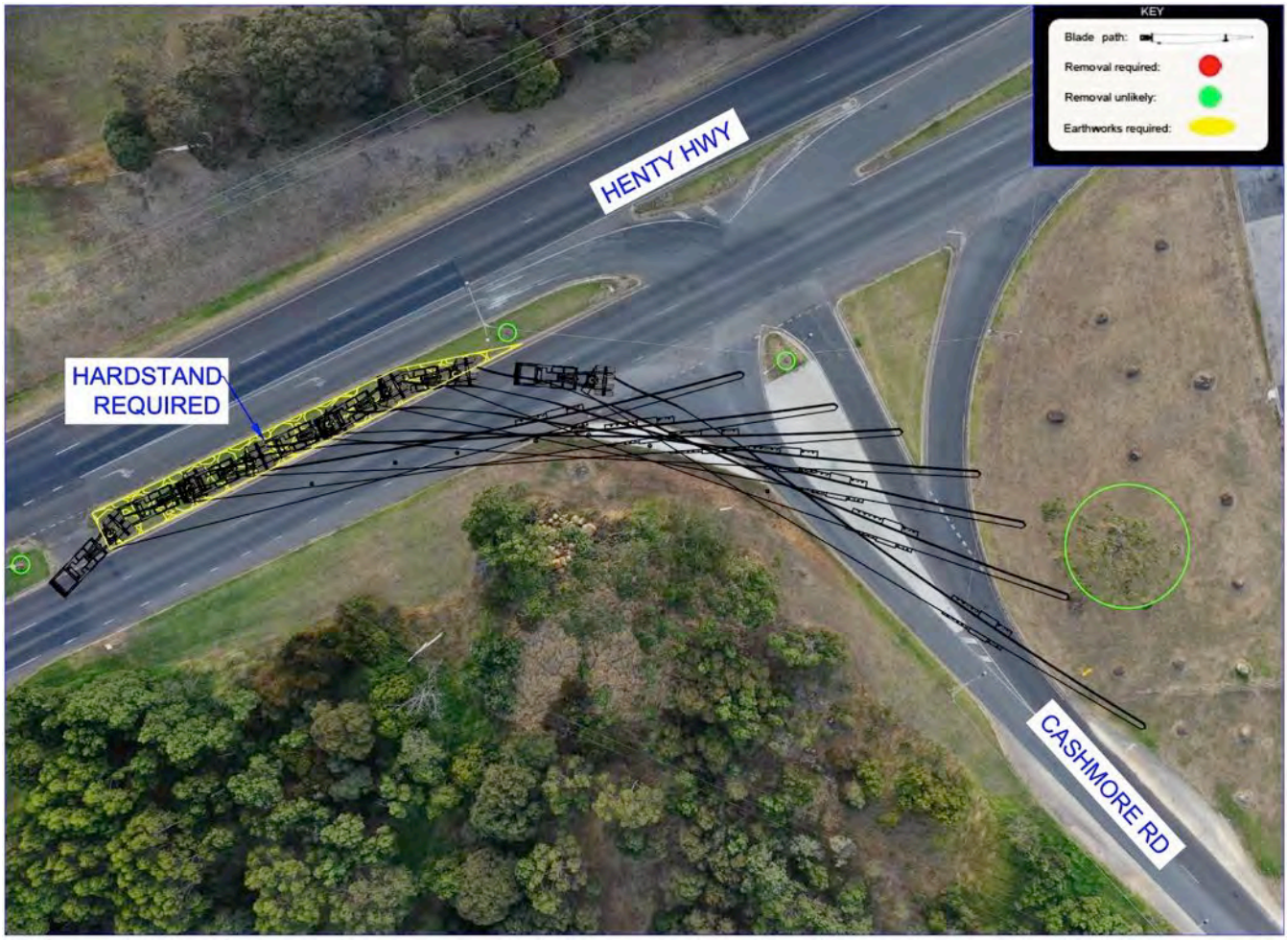
0.0 Km's: RJA storage 211 Portland Nelson Road onto Portland Nelson Road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/Shj2rR9X8Mkq3ed38
PROCEDURE: Exit RJA storage yard onto Portland-Nelson Road

COMMENTS: Blade tip will overhang the fence on the outside of the corner. No issues with this procedure.

ROAD MODIFICATIONS: No works required.

2.3 Km's: Cashmore Road onto Henty Highway.



GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/PdD6WK3xrMsv5mWY6
PROCEDURE: Right-hand turn

COMMENTS: 76m blades will require a large amount of hardstand to be added to the outside of the corner (medium strip of Henty Hwy). Spotter to watch blade tip on the light pole in the medium strip of Cashmore Rd.

ROAD MODIFICATIONS: Yes, moderate works required.

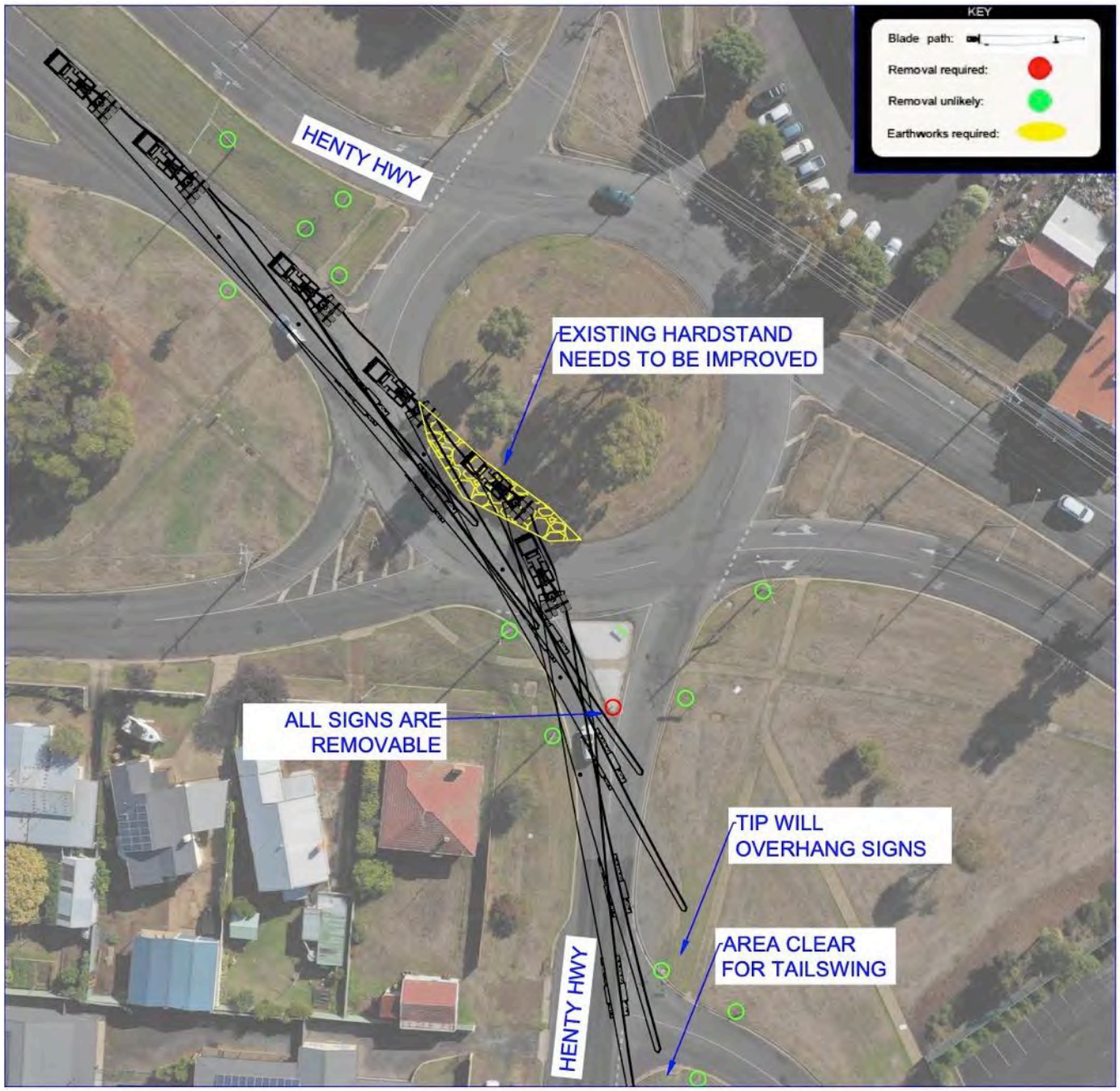
83.3 Km's: Henty Highway intersection of Scoresby Street.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/LGDnZRKjKkQwUues6
PROCEDURE: Tight right-hand turn

COMMENTS: 76m blades will need to use the existing hardstand area on the outside of the corner, this hardstand is light and in poor condition so may need to be upgraded prior to deliveries. All signs are already removable.

ROAD MODIFICATIONS: Yes, minor works required.

84.3 Km's: Roundabout on Henty Highway at Hamilton.

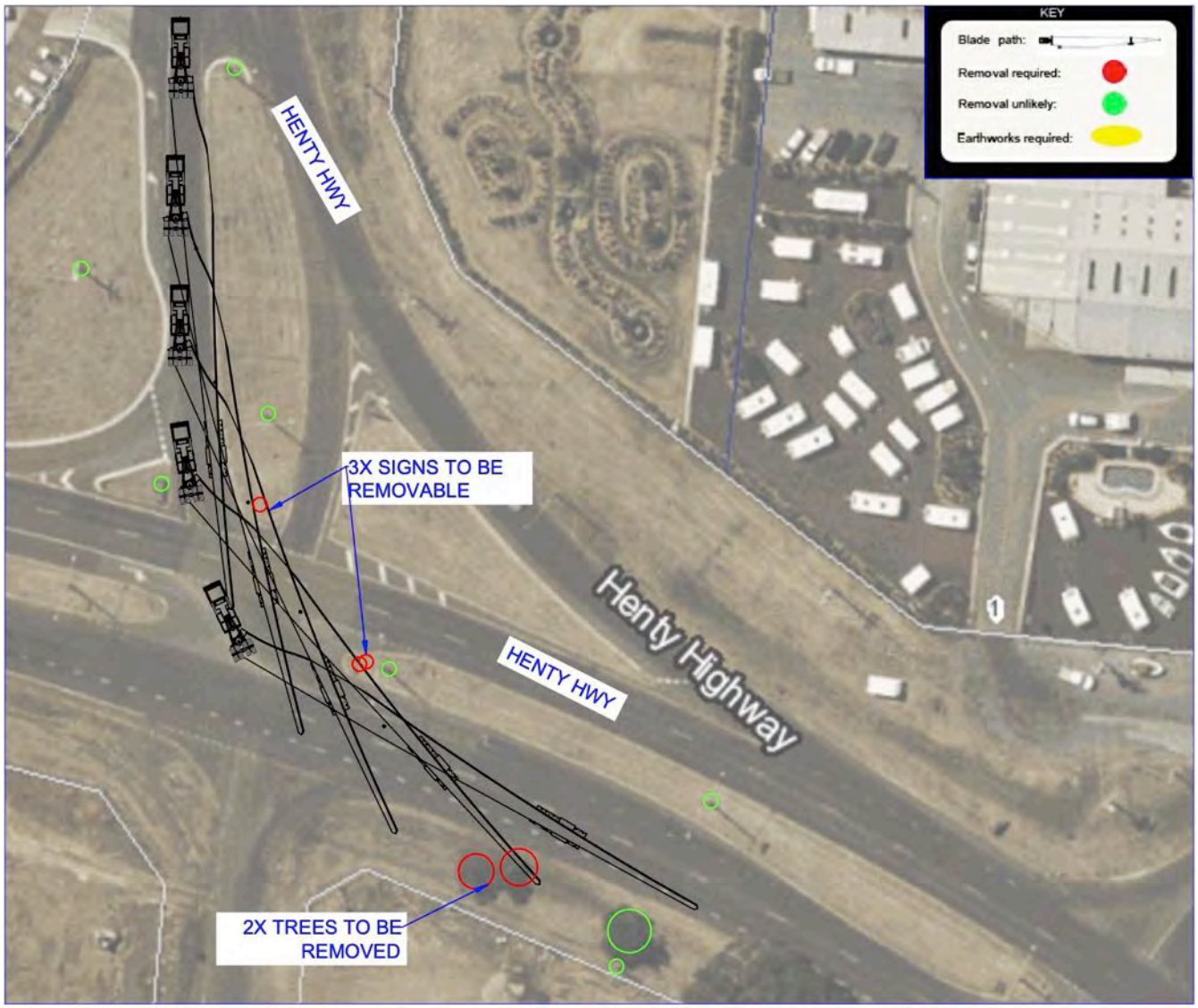


GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/17zepHdD7CBQ24BC6
PROCEDURE: Take the 2nd exit to stay on the Henty Highway

COMMENTS: 76m blades will require hardstand to be added to the centre of the roundabout. Existing hardstand is currently in this area but is of poor quality and will need to be improved prior to deliveries.

ROAD MODIFICATIONS: Yes, minor works required.

86.5 Km's: Henty Highway intersection with West Boundary Road.



GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/W6dTUsSuVCDFUMKF8
PROCEDURE: Left-hand turn to stay on the Henty Highway

COMMENTS: 76m blades will require 2x bushes to be removed on the outside of the corner and 3x signs to be made removable.

ROAD MODIFICATIONS: Yes, minor works required.

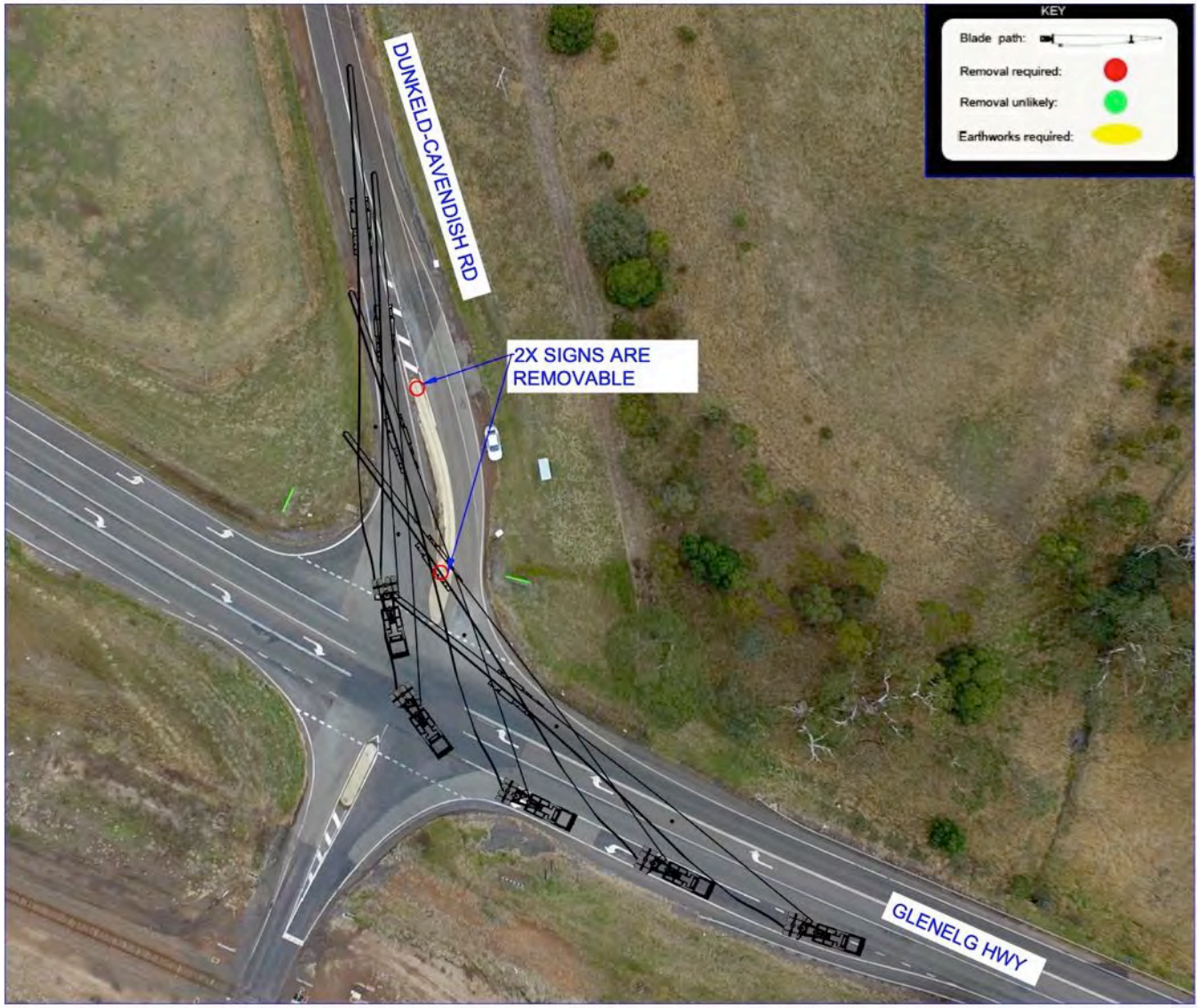
108.9 Km's: Henty Highway at Cavendish.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/SKmxVRHcKTQR5MUZA
PROCEDURE: Sweeping Right-hand bend to stay on the Henty Highway
COMMENTS: Blades will have no issues navigating this corner.
ROAD MODIFICATIONS: No works required.

109.6 Km's: Dunkled-Cavendish Road at Cavendish.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/qTnoPGVSFNpikY4fA
PROCEDURE: Sweeping Right-hand bend to stay on the Dunkeld-Cavendish Road
COMMENTS: Blades will have no issues navigating this corner.
ROAD MODIFICATIONS: No works required

137.7 Km's: Dunkeld-Cavendish Road onto Glenelg Highway.

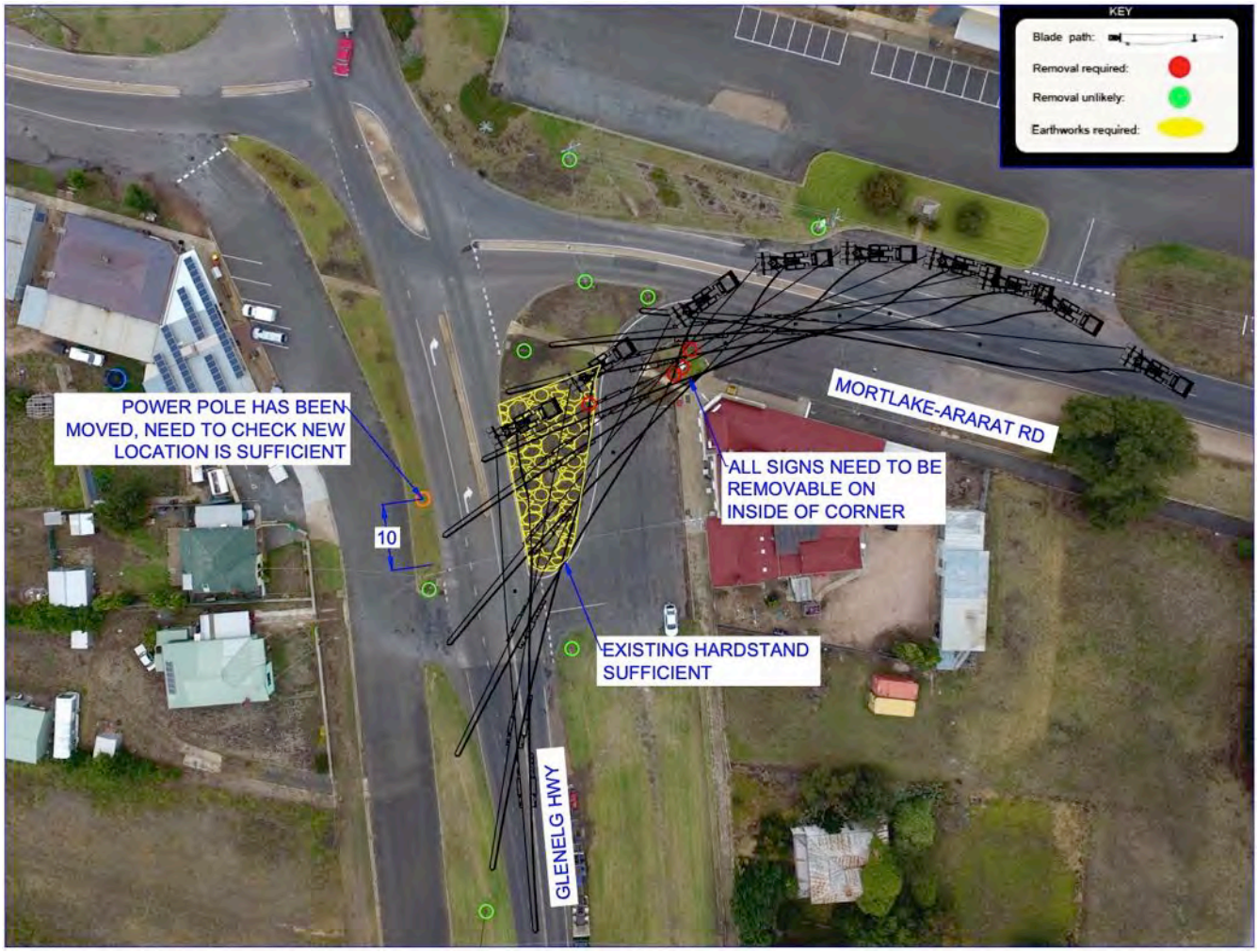


GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/VfL6FDctCPgJ9c8j8
PROCEDURE: Left-hand turn

COMMENTS: Blades will require 2x signs will need to be removed and replaced for each blade movement. These signs are currently removable.

ROAD MODIFICATIONS: No works required.

187.7 Km's: Glenelg Highway onto the Mortlake-Ararat Road.



GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/fnLa6UJFxyJ3pMQX8
PROCEDURE: Tight Right-hand turn

COMMENTS: The existing hardstand in the centre of the corner is sufficient for 76m blades. All signs on the inside of the corner close to the Hotel will need to be made removable.

ROAD MODIFICATIONS: Yes, minor works required.

209.2 Km's: The Mortlake-Ararat Road at Woorndoo.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/sHtNreAHUXQNpANa6
PROCEDURE: Sweeping left-hand bend

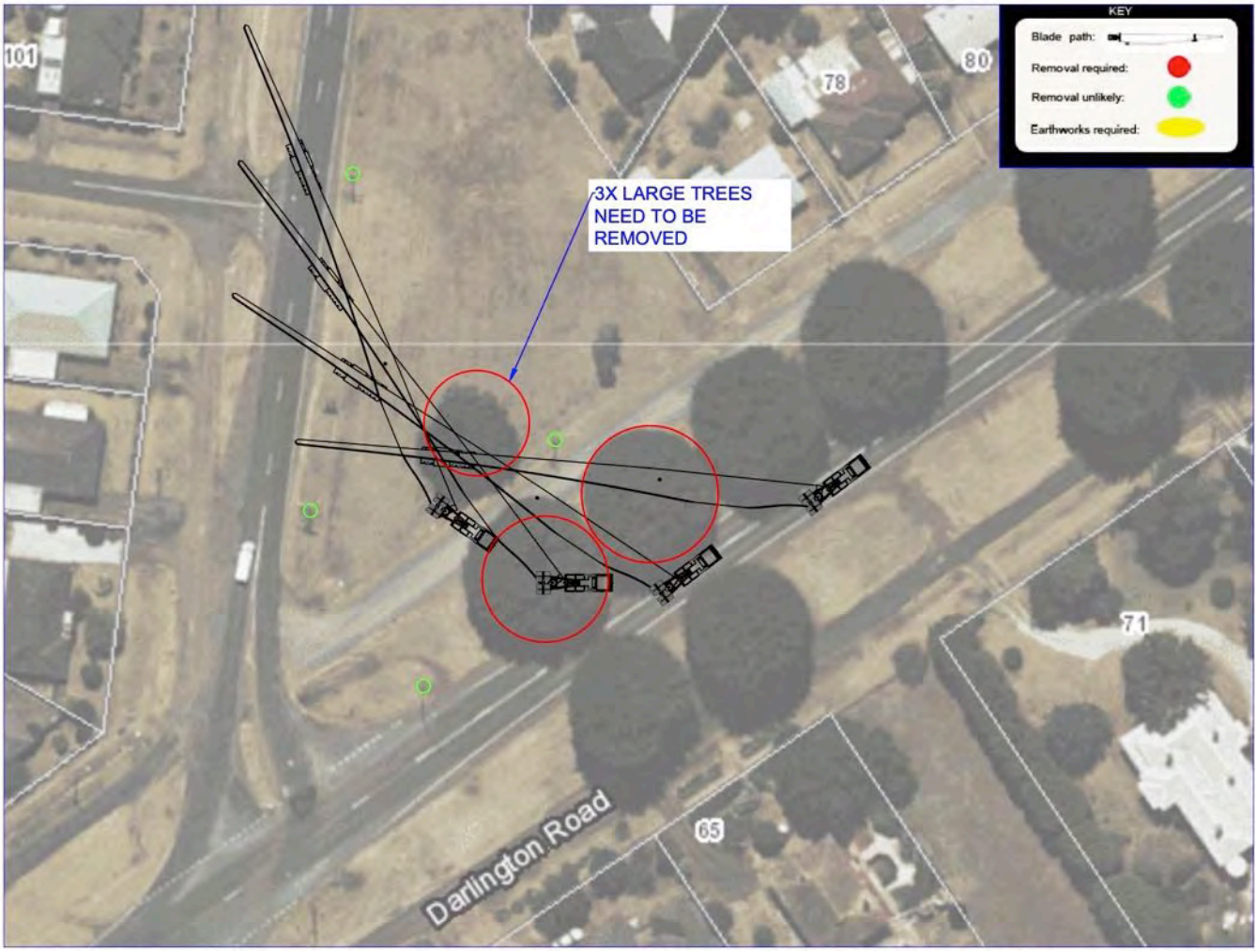
COMMENTS: Blades will have no issues with this corner.

ROAD MODIFICATIONS: No works required.

223.0 Km's Site entrance 1: The Mortlake-Ararat Road onto South Road site entrance.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/9VAxPbvmfgffTUgR6
PROCEDURE: Sharp left-hand turn
COMMENTS: The above overlay includes an initial road design that was done using a 70m long blade. 76m blades will be able to navigate this corner.
ROAD MODIFICATIONS: Yes, major works required.

231.0 Km's: The Mortlake-Ararat Road onto Hamilton Highway.



GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/5j8u6LQK5ESBPnZX7
PROCEDURE: Sharp left-hand turn

COMMENTS: This corner is not suitable for blades without removing minimum 3x large trees and a large area of hardstand. It would be expected the trees cannot be removed so we suggest blades access the Eastern side of the windfarm through the South Rd entrance.

ROAD MODIFICATIONS: Yes, major works required.

15.0 Conclusion Route 3 - Northern Route.

After studying all options and undertaking a route survey, this route in its current condition will require some moderate upgrades at various locations before it could be deemed suitable for transporting a 76metre blade. This route has been used on previous projects for blades up to 73m in length.
The following are the key points that need to be taken into consideration if the project moves forward with this route.

BRIDGES:

- The route has recently been used for the Mortlake Windfarm with similar axle weights that would be expected for Mt Fyans. it would be expected that the bridges will be fine however this shouldn't be taken as a guarantee and a thorough check of all bridges and culverts on route will be required. It would be expected bridge slowdowns will be required and a VMS (variable message signboard) will need to run with majority of the loads.

OVERHEAD STRUCTURES:

- There are no overhead structures on this route.

OVERHEAD UTILITIES:

- The route has been lifted for a height clearance of 6.0m. A power survey will still need to be conducted before deliveries.

VEGETATION:

- The route will need to be checked closer to deliveries commencing but it's expected that vegetation will not be an issue.

LENGTH:

- Some corners will need a moderate amount work before a 76m blade could navigate the route.

WIDTH:

- The route is suitable for a 6m wide load in its current state.

ROADWORKS:

- To be checked closer to the date of movement.

PORTLAND:

- The turn from Cashmore Road onto the Henty Highway will need a moderate amount of work. In its current state it is suitable for a 74m blade. This corner will need some hardstand added to the centre median strip and some signs made removable.

HAMILTON:

- The intersection of the Henty Highway and Scoresby Street, the roundabout on the Henty Highway and the intersection of the Henty Highway and West Boundary Road will all need moderate works as previous detailed to allow large blades to pass.

LAKE BOLAC:

- The intersection of the Glenelg Highway and Mortlake-Ararat Rd is suitable for 76m blades, just some signs on the inside of the corner will need to be made removable.

SITE:

- Site to supply suitable access for the swept path of the largest items.
- Blades will not be able to access the Hamilton Highway site entrance without major work in Mortlake. We suggest all blades access the Eastern side of the wind farm through the South Rd entrance.

16.0 Route 4: RJA Storage Portland to Mt Fyans Wind Farm - Southern Route.

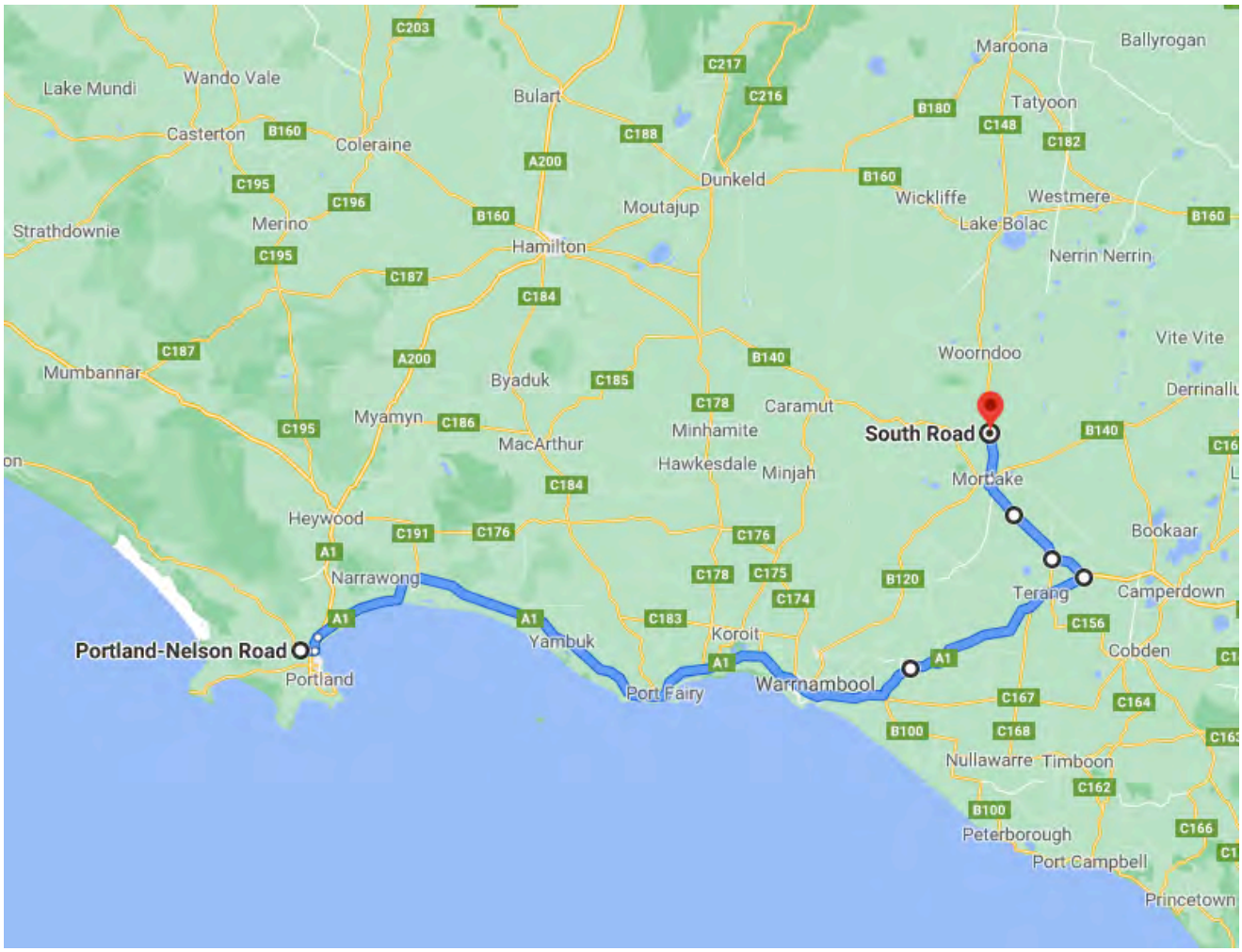
ROUTE 4: RJA storage to Mt Fyans windfarm via the Southern route.

Components: Load's under 5.3 metres in overall height, and under 40 metres in overall length.

Distance: 180.0 kilometres

This route took us via Portland-Nelson Rd, Cashmore Rd, Henty Highway, Princes Highway, Mackinnons Bridge Road, Terang-Mortlake Road, Boundary Rd, Mortlake-Ararat Road.

GPS Link: https://goo.gl/maps/fkfThYAuyVvNSsYz7



KEY	
PINCH POINT	
CAUTION	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Portland	RJA storage 211 Portland Nelson Road onto Portland Nelson Road. GPS Link: https://goo.gl/maps/Shj2rR9X8Mkq3ed38	Length: 75.0m Width: 10.0m	Right-hand turn	No problems with this section of road
1.0	Portland	Portland Nelson Road onto Cashmore Road. GPS Link: https://goo.gl/maps/7zEqeKKyDXfAZSAu6	8.0 Metres wide	Travel directly ahead	No problems with this section of road
1.1	Portland	Cashmore Road through rail crossing GPS Link: https://goo.gl/maps/LJSVxr4a75Xmynde6	8.0 Metres wide	Travel directly ahead	Approval required crossing this rail line.
2.3	Portland	Cashmore Road onto Henty Highway GPS Link: https://goo.gl/maps/PdD6WK3xrMsv5mWY6	Length: 74.0m Width: 6.0m	Left-hand turn	No problems with this section of road. Spotter to watch light pole on the longer loads. 1x sign to be removed and replaced for each load.
3.9	Portland	Henty Highway onto Princes Highway GPS Link: https://goo.gl/maps/iLsV9m8nvUA2	50.0 Metres in length	Right hand turn	No Problems with this section of road.
24.0	Tyrendarra	Princes Highway GPS Link: https://goo.gl/maps/3KHpMPKM5JP2	Length: 50.0m Width: 6.0m	Merge to the left	Moderate sized parking bay
62.0	Port fairy	Princes Highway GPS Link: https://goo.gl/maps/A43xCuVtzt42	Length: 40.0m Width: 5.0m	Merge to the left	Moderate sized parking bay
74.5	Port Fairy	Princes Highway GPS Link: https://goo.gl/maps/p4P9NrszZBL2	50.0 Metres in length	Left hand bend	No Problems with this section of road.
98.4	Warrnambool	Princes Highway GPS Link: https://goo.gl/maps/QfqDjMQuNAH2	6.5 Wide	Travel directly ahead	The road is divided through the city; the narrowest point is 6.5 metres in width.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
107.0	Allansford	Princes Highway GPS Link: https://goo.gl/maps/9NuUBmBHAzv	Length: 60.0m Width: 5.0m	Merge to the left	Moderate sized parking bay
149.0	Noorat East	Princes Highway onto McKinnon's Bridge Road GPS Link: https://goo.gl/maps/Ne53q2ibaKs3kJ8j6	40.0 Metres in length	Left hand turn	Corner has recently had centre median strengthened, and signs made removable. Pilots to remove and replace signs for each load.
149.1	Noorat East	Mckinnons Bridge Road GPS Link: https://goo.gl/maps/XsbnK9FTmMcUatdt9	Height: 6.0 Metres clearance	Travel under rail crossing	No Problems with this section of road.
155.0	Noorat	Mckinnons Bridge Road onto Terang Mortlake Road GPS Link: https://goo.gl/maps/5Mof57Chs5S3VdCYA	50.0 Metres in length	Left hand turn	No Problems with this section of road.
180.0	Mortlake	Intersection of Castle Carey Rd, South Rd and the Mortlake-Ararat Rd GPS Link: https://goo.gl/maps/DAtMobAi86APGfRE7	25.0 Metres in length	Turn into site roads	Site to redesign corners to allow longer towers to turn into site from a southern approach. Initial designs look suitable for towers.

17.0 Conclusion Route 4 - Southern Route.

After studying all options and undertaking a route survey, this route in its current condition is suitable for transporting components other than blades with a loaded height less that 5.3 metres and an overall length not exceeding 40 metres.
The following are the key points that need to be taken into consideration if the project moves forward with this route.

BRIDGES:

- The route has recently been used for the Dundonnell and Mortlake South Windfarms with similar axle weights that would be expected for Mt Fyans. it would be expected that the bridges will be fine however this shouldn't be taken as a guarantee and a thorough check of all bridges and culverts on route will be required. It would be expected bridge slowdowns will be required and a VMS (variable message signboard) will need to run with most loads.

OVERHEAD STRUCTURES:

- The only overhead structure on the route is the rail overpass on the McKinnons Bridge Road. This has a clearance of 6.0m so will not be an issue.

OVERHEAD UTILITIES:

- The route has been lifted for a height clearance of 5.3m for previous projects. A power survey will still need to be conducted before deliveries.

VEGETATION:

- The route will need to be checked closer to deliveries commencing but it's expected that vegetation will not be an issue.

LENGTH:

- The route has been used on previous projects for towers of lengths up to 35m in length.

WIDTH:

- The route is suitable for a 6m wide load in its current state.

ROADWORKS:

- To be checked closer to the date of movement.

18.0 Alternate option from Port of Geelong

If Geelong Port was to be used as the port of import, there would be two route options. The main blade route and a high tower route. Both routes have height restrictions. All blades would need to enter site from the Hamilton Highway site entrance.

GEELONG ROUTE 1: Geelong Port to Mt Fyans- Blades and Towers less than 5.4m Loaded Height

Distance: 154.0 kilometres

GPS Link: https://goo.gl/maps/nB55CUaGms9GVcc66

This route took us via The Esplanade, Sea Breeze Parade, Albery Road, Corio Quay Road, Princes Highway, Geelong Ring Road, Hamilton Highway.

GEELONG ROUTE 2: Geelong Port to Mt Fyans- Towers greater than 5.4m Loaded Height, but less than 5.6m Loaded Height

Distance: 144.0 kilometres

GPS Link: https://goo.gl/maps/hqVrQLmyFDv2CjV5A

This route took us via The Esplanade, Madden Avenue, Seabeach Parade, St Georges Cres, Cox Road, Anakie Road, Geelong Ring Road, Hamilton Highway.

19.0 References:

Australian Load Restraint Guide
Rex J Andrews P/L
Rex J Andrews route survey # 314 REV00
GE Renewables
Goldwind
Siemens Renewables
Vestas
Google Earth/Maps
Nearmaps
NHVR (OSOM)
NHVAS Maintenance Management (NHVAS21193) NHVAS Basic Fatigue Management (NHVAS21193)

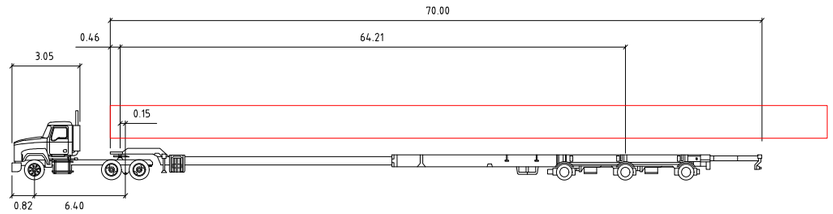
Disclaimer: This route study is a guide only; government approvals would be required before these routes could be deemed suitable for transporting the components over the listed routes.

This study was undertaken using data supplied by Rex J Andrews P/L. Equipment and swept paths might vary if using transport methodology other than the data supplied by Rex J Andrews.

Appendix B

Preliminary swept path assessments

ADVERTISED PLAN



76m Blade

	meters		
First Unit Width	: 2.44	Lock to Lock Time	: 6.0
Trailer Width	: 0.91	Steering Angle	: 40.0
First Unit Track	: 2.44	Articulating Angle	: 70.0
Trailer Track	: 2.44		

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

N

GHD

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

Swept Path Assessment
Port Access / Esplanade

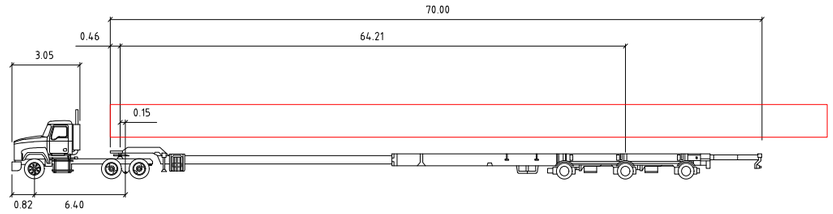
Job Number 32-35440
Revision B
Date July 2018

Figure B1

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 25 July 2018 - 9:53 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg

ADVERTISED PLAN



76m Blade

	meters		
First Unit Width	: 2.44	Lock to Lock Time	: 6.0
Trailer Width	: 0.91	Steering Angle	: 40.0
First Unit Track	: 2.44	Articulating Angle	: 70.0
Trailer Track	: 2.44		

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

N

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

Swept Path Assessment
Esplanade / Sea Breeze Parade

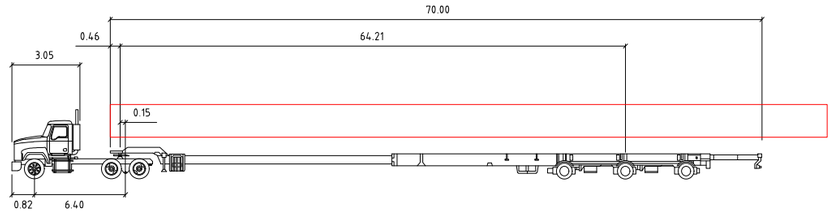
Job Number 32-35440
Revision B
Date July 2018

Figure B2

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 25 July 2018 - 9:53 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg

ADVERTISED PLAN



76m Blade

	meters		
First Unit Width	: 2.44	Lock to Lock Time	: 6.0
Trailer Width	: 0.91	Steering Angle	: 40.0
First Unit Track	: 2.44	Articulating Angle	: 70.0
Trailer Track	: 2.44		

0 20 40 60m
SCALE 1:2000 AT ORIGINAL SIZE

N

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

Swept Path Assessment
Sea Breeze Parade / Abery Road

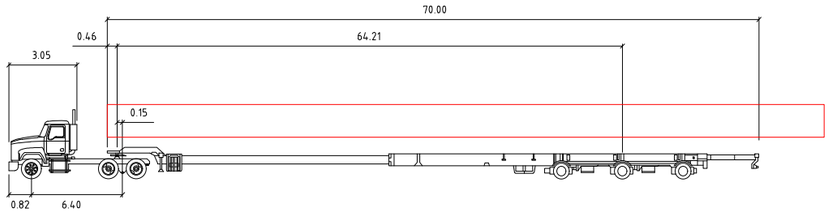
Job Number 32-35440
Revision B
Date July 2018

Figure B3

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com.au W www.ghd.com

Plot Date: 25 July 2018 - 9:53 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg

ADVERTISED PLAN



76m Blade

	meters		
First Unit Width	: 2.44	Lock to Lock Time	: 6.0
Trailer Width	: 0.91	Steering Angle	: 40.0
First Unit Track	: 2.44	Articulating Angle	: 70.0
Trailer Track	: 2.44		

0 20 40 60m
SCALE 1:2000 AT ORIGINAL SIZE

N

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

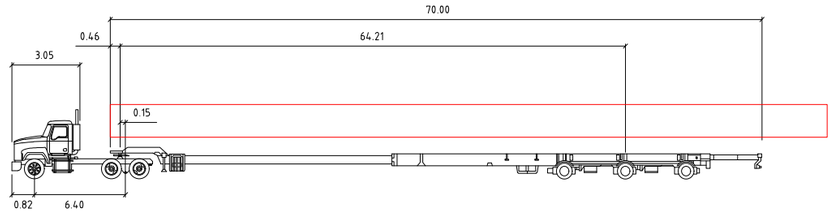
Swept Path Assessment
Abery Road / Corio Quay Road

Job Number 32-35440
Revision B
Date July 2018

Figure B4

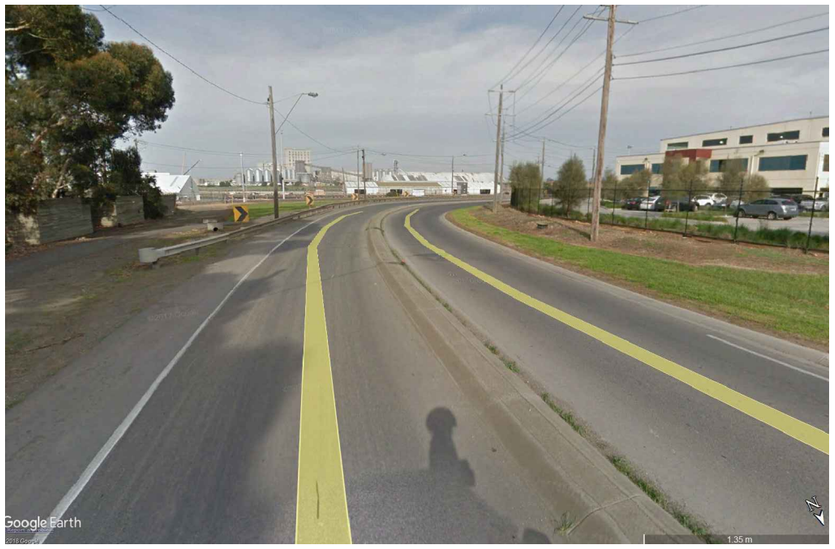
Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com.au W www.ghd.com

Plot Date: 25 July 2018 - 9:54 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg



76m Blade

	meters		
First Unit Width	: 2.44	Lock to Lock Time	: 6.0
Trailer Width	: 0.91	Steering Angle	: 40.0
First Unit Track	: 2.44	Articulating Angle	: 70.0
Trailer Track	: 2.44		



0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

N

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

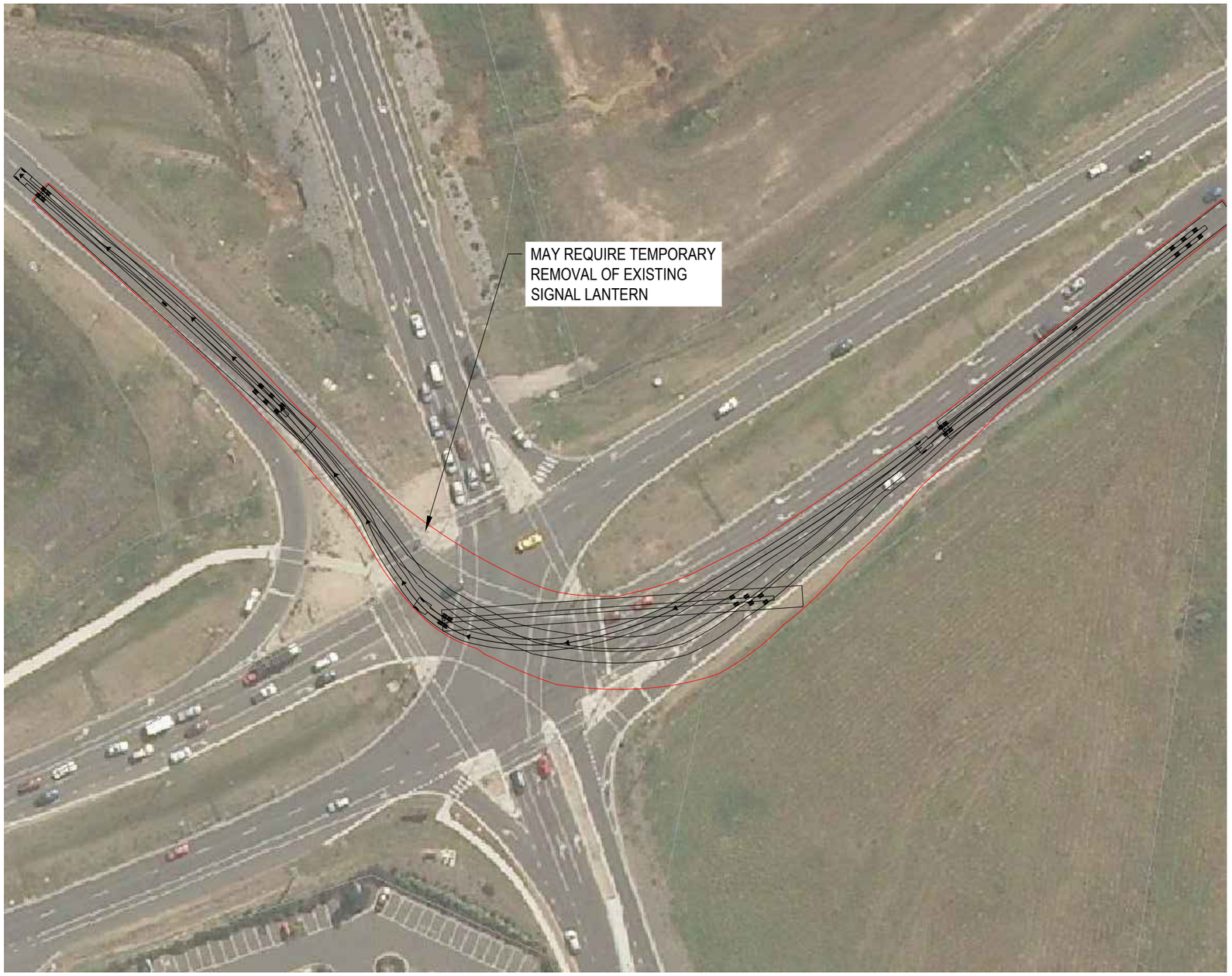
Swept Path Assessment
Corio Quay Road, North Shore

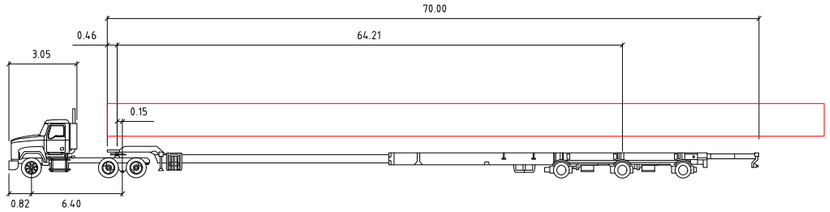
Job Number 32-35440
Revision B
Date July 2018

Figure B5

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 25 July 2018 - 9:54 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg





76m Blade

	meters		
First Unit Width	: 2.44	Lock to Lock Time	: 6.0
Trailer Width	: 0.91	Steering Angle	: 40.0
First Unit Track	: 2.44	Articulating Angle	: 70.0
Trailer Track	: 2.44		

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

N

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

Swept Path Assessment
Princes Highway / Geelong Ring Road

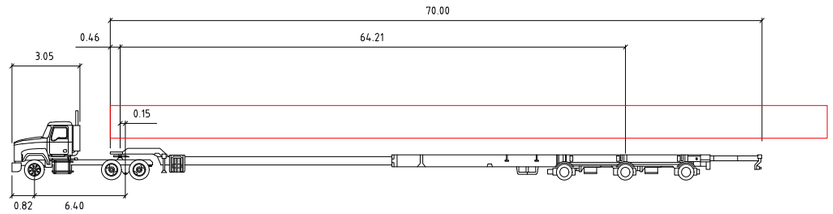
Job Number 32-35440
Revision B
Date July 2018

Figure B6

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 25 July 2018 - 9:54 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg

ADVERTISED PLAN



76m Blade

	meters		
First Unit Width	: 2.44	Lock to Lock Time	: 6.0
Trailer Width	: 0.91	Steering Angle	: 40.0
First Unit Track	: 2.44	Articulating Angle	: 70.0
Trailer Track	: 2.44		

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

N

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

Swept Path Assessment
Geelong Ring Road / Hamilton Highway

Job Number 32-35440
Revision B
Date July 2018

Figure B7

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com.au W www.ghd.com

Plot Date: 25 July 2018 - 9:54 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg

Appendix C

Concept layout – South Road

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

N

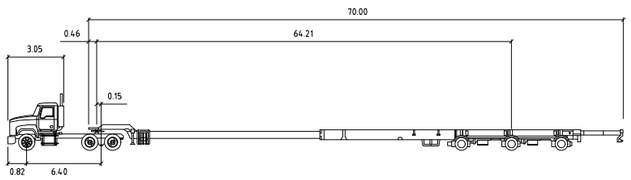
HYDRO TASMANIA
MOUNT FYANS WIND FARM
TRANSPORT IMPACT ASSESSMENT
CONCEPT LAYOUT
SOUTH ROAD JUNCTION

Job Number	12549182
Revision	B
Date	APRIL 2021

Figure C1

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 23 April 2021 - 1:44 PM Plotted by: Mark Petrusma Cad File No: G:\31\12549182\CADD\Drawings\12549182-SK001.dwg



76m Turbine Blade

	meters		
First Unit Width	: 2.44	Lock to Lock Time	: 6.0
Trailer Width	: 0.91	Steering Angle	: 40.0
First Unit Track	: 2.44	Articulating Angle	: 70.0
Trailer Track	: 2.44		

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

N

HYDRO TASMANIA
MOUNT FYANS WIND FARM
TRANSPORT IMPACT ASSESSMENT
76m BLADE ACCESS
SOUTH ROAD JUNCTION

Job Number 12549182
Revision B
Date APRIL 2021

Figure C2

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

0 5 10 15m
SCALE 1:500 AT ORIGINAL SIZE

N

HYDRO TASMANIA
MOUNT FYANS WIND FARM
TRANSPORT IMPACT ASSESSMENT

CONCEPT LAYOUT SOUTH ROAD JUNCTION

Job Number 12549182
Revision B
Date APRIL 2021

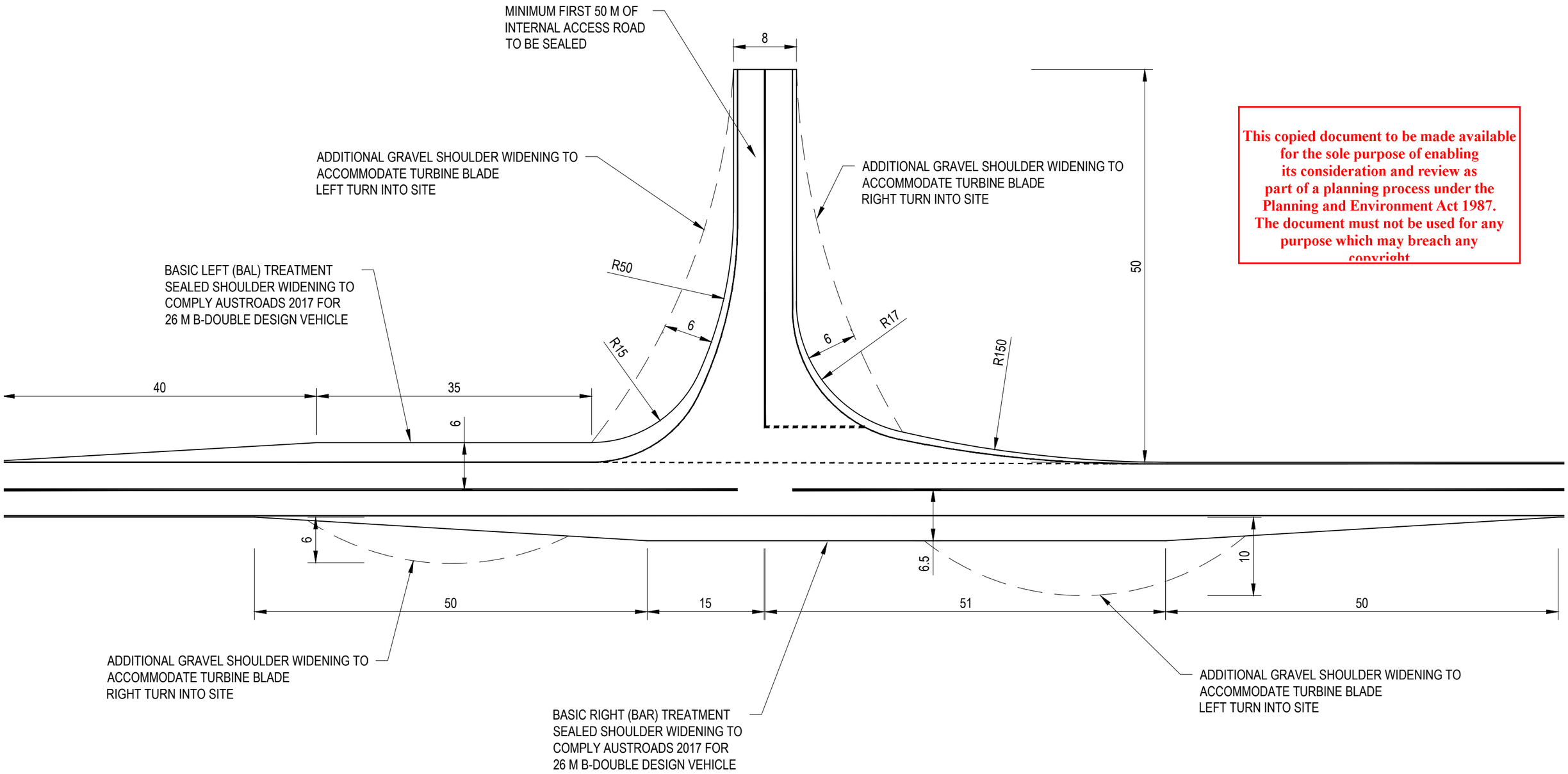
Figure C3

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 23 April 2021 - 1:45 PM Plotted by: Mark Petrusma Cad File No: G:\31\12549182\CADD\Drawings\12549182-SK001.dwg

Appendix D

Potential access design



0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

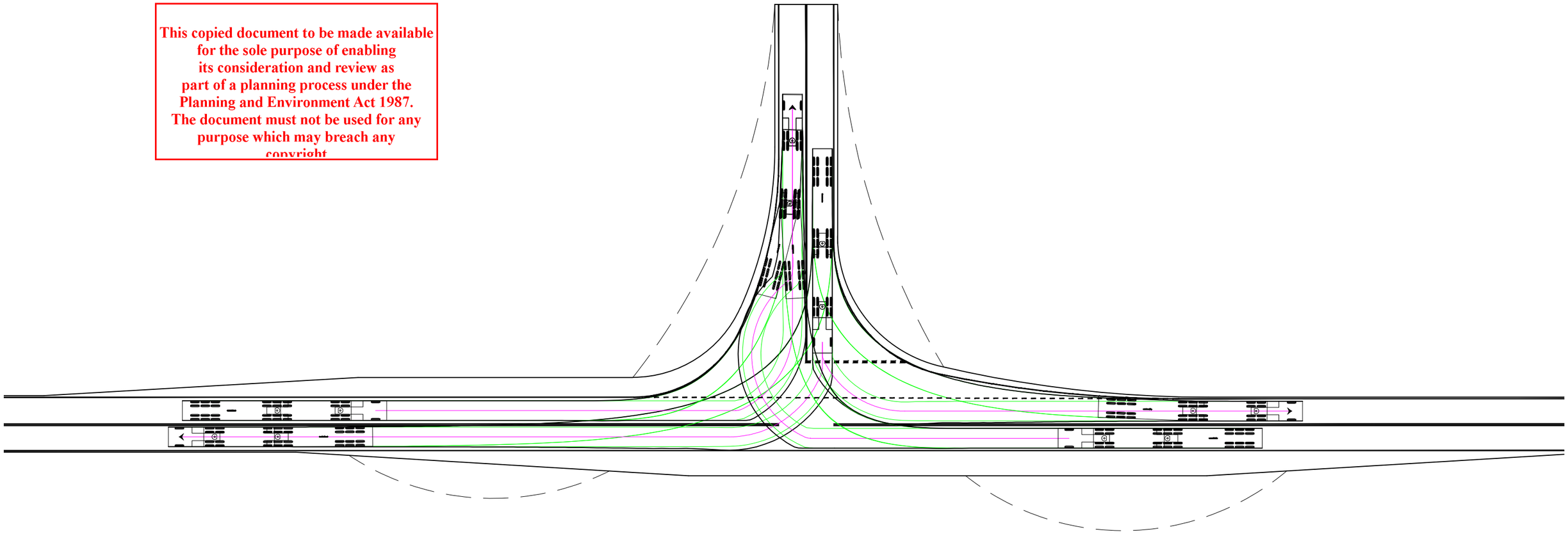
Typical Access Design BAL and BAR Treatments

Job Number 32-35440
Revision A
Date June 2018

Figure D1

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 14 June 2018 - 9:58 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg



0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

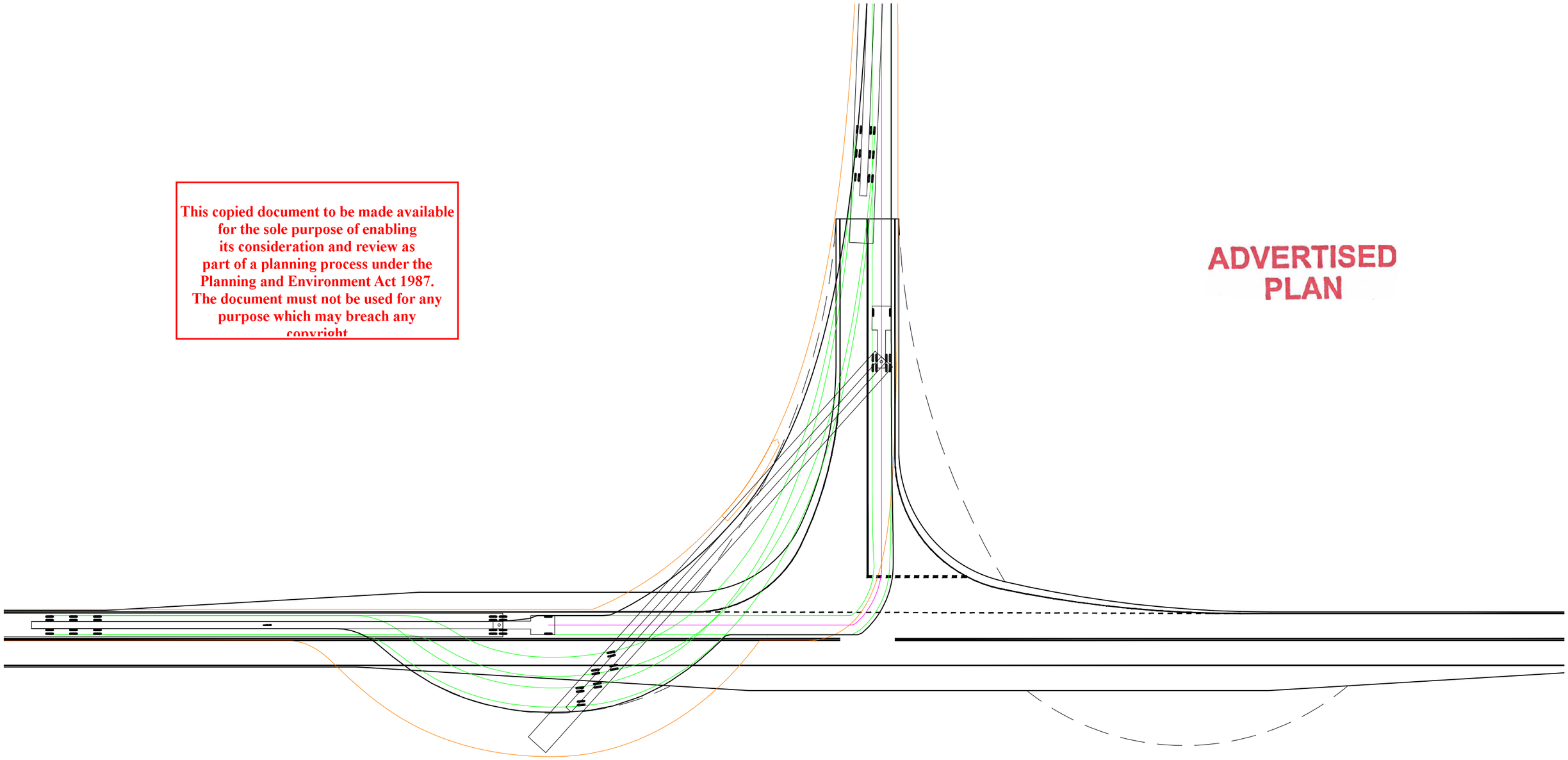
Access Swept Path Assessment
26 m B-Double

Job Number 32-35440
Revision A
Date June 2018

Figure D2

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 14 June 2018 - 9:58 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg



0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

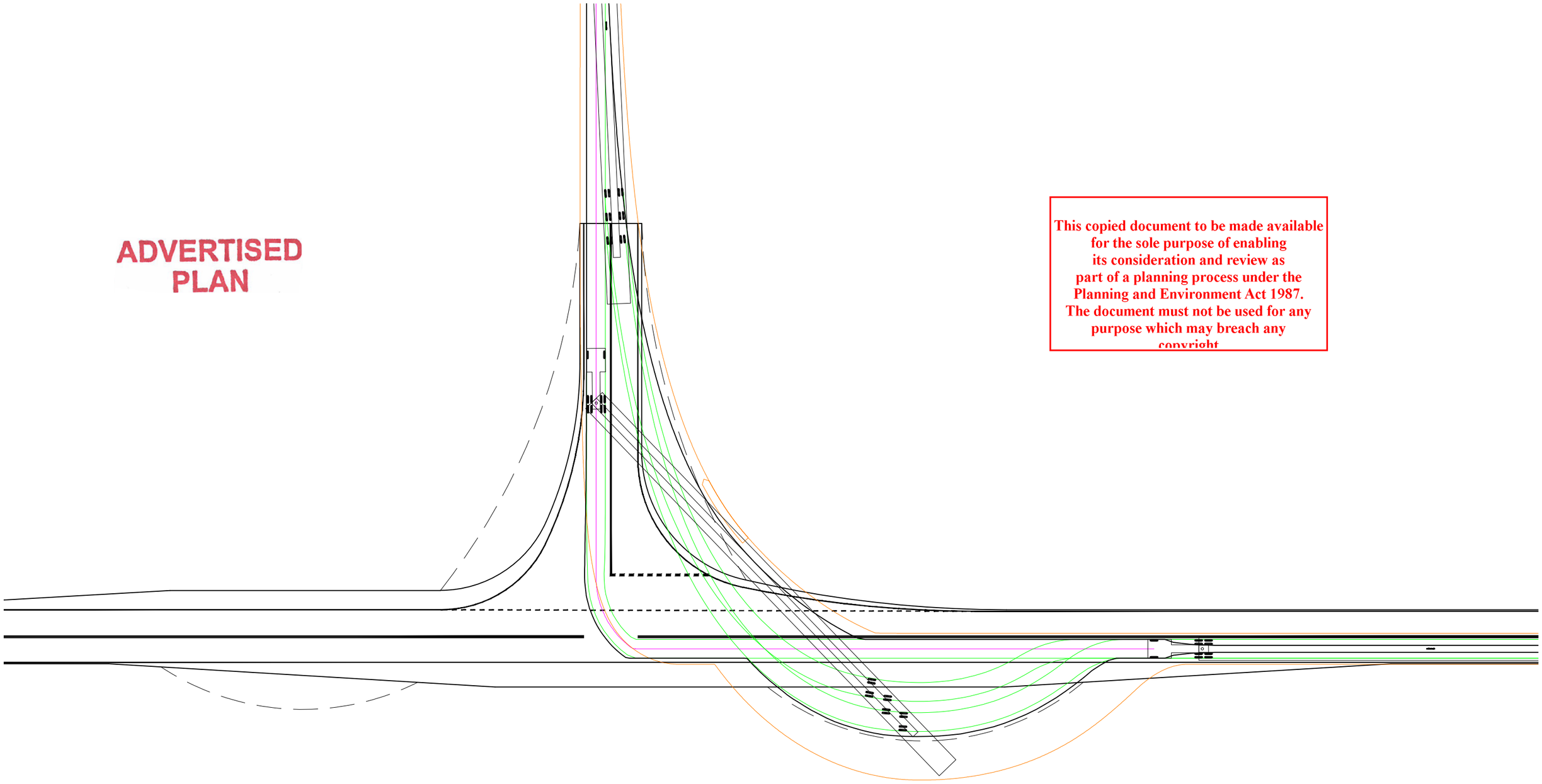
Access Swept Path Assessment
73 m Turbine Blade Combination Left

Job Number	32-35440
Revision	A
Date	June 2018

Figure D3

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 14 June 2018 - 9:59 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg



0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

Hydro Tasmania
Mt Fyans Wind Farm
Transport Impact Assessment

Access Swept Path Assessment
73 m Turbine Blade Combination Right

Job Number 32-35440
Revision A
Date June 2018

Figure D4

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 14 June 2018 - 9:59 AM Plotted by: Mark Petrusma Cad File No: G:\31\35440\CADD\Drawings\31-35440-FIGS.dwg

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