



Traffic & Transportation Direction

Winterbourne Wind Farm

Traffic Impact Assessment

November 2022

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Winterbourne Wind Farm

Traffic Impact Assessment

Prepared for: Environmental Resource Management Australia Pty Ltd

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1. Executive Summary

Amber Organisation Pty Ltd has been engaged by Environmental Resource Management Australia Pacific Pty Ltd on behalf of WinterbourneWind Pty Ltd to conduct a review of the traffic and parking implications of the proposed Winterbourne Wind Farm (the 'Project') and to prepare a Traffic Impact Assessment.

The Project will accommodate 119 turbines with a maximum installed capacity of 700MW. The Project also includes the construction of two substations on-site and approximately 50km of new 330kV overhead transmission line running through the Project Boundary and northwest to a proposed switching station at the point of connection near Uralla, NSW.

The Project is located northeast of Walcha in the Northern Tablelands. It is located approximately 25 kilometres southeast of Uralla, 32 kilometres south of Armidale, and 75 kilometres northeast of Tamworth. It is situated within the Walcha and Uralla Local Government Areas (LGAs). The Project footprint extends over an area of approximately 22,825 hectares, with the land within the Project Area and the surrounding area being predominantly agricultural land use.

Traffic generated by the Project can be separated into three distinct stages: construction, operation and decommissioning. The peak traffic generating potential for the Project is during construction which generates trips associated with staff accessing the site and the delivery of raw materials and plant. During operation the Project is expected to generate a minimal amount of traffic with only a small number of maintenance staff accessing the site each day. Decommissioning of the Project is anticipated to generate a similar level of traffic to the construction stage.

The Project construction is expected to take approximately 24-30 months, with the peak construction period expected to take 10 months. A construction workforce of approximately 400 personnel will be on-site during the peak construction phase, with the workforce likely to be drawn from the nearby towns of Walcha, Uralla, Armidale, and Tamworth.

It is anticipated that during peak construction the Project could generate up to 288 heavy and 270 light vehicle movements per day. The Project is expected to generate approximately 137 vehicle movements during the morning and evening peak hours during the peak construction period, which will reduce to 94 vehicle movements over the typical construction periods.

In order to determine the traffic impact generated during the construction of the Project, an analysis of the operation of the intersection of Thunderbolts Way and Jamieson Street was carried out using the SIDRA computer modelling program. Overall, the construction traffic is expected to have a minimal impact on the operation of the intersection. Accordingly, it is concluded that the road network is able to accommodate the traffic generated by the development during the construction period.

The access route is the route taken by the oversized and overmass vehicles to deliver larger plant to the Project, including the wind turbine and the substation components. The Port of Newcastle has been identified as the preferred port where the large plant will be imported. The preferred access route from the port to the Project has been identified within a Route Assessment prepared by Rex J Andrews which identifies a number of road upgrades required in order to allow the transport vehicles to successfully access the site. These upgrades are presented within Appendix A of this document.

Amber has undertaken a Route Assessment for the local road network and the site accesses. Based on the assessment the following recommendations have been made:

- All local roads are provided with sufficient carriageway widths to allow two opposing vehicles to pass excluding the eastern portion of Bark Hut Road and the full length of Rowleys Creek Road. It is proposed to widen Bark Hut Road to have a minimum carriageway width of 5.5 metres, which would accommodate simultaneous two-way vehicle movement. Given the low level of traffic on Rowleys Creek Road it is proposed to remain as a single lane road;
- The individual Project accesses are proposed to be designed to accommodate the largest construction vehicle and meet the sight distance requirement of the Austroads Guidelines, subject to the adoption of reduced speed limits in the vicinity of several accesses and other minor modifications to the roadside; and
- In order to mitigate the impacts of the Project during construction, a Traffic Management Plan will be prepared which should include the recommendations provided within this document.

Accordingly, based on the assessment above, it is concluded that the proposed access arrangements for the Project are suitable to accommodate the expected construction vehicle types and traffic volumes during the construction, operation, and decommissioning phases of the Project.

2. Introduction

2.1 Background

Amber Organisation Pty Ltd has been engaged by Environmental Resource Management Australia Pty Ltd on behalf of WinterbourneWind Pty Ltd to conduct a review of the traffic and parking implications of the Winterbourne Wind Farm (the 'Project') and to prepare a Traffic Impact Assessment.

The Project will accommodate 119 turbines with a maximum installed capacity of 700MW. The Project also includes the construction of three substations on-site and approximately 50 kilometres (km) of new 330kV overhead transmission line running through the Project Area and continuing northwest to connect into the existing grid approximately 7km south of Uralla.

The Project is located northeast of Walcha in the Northern Tablelands and is roughly bounded by Thunderbolts Way to the west, Oxley Highway to the south, the Oxley Wild Rivers National Park to the east and south, and the Salisbury Plains to the north. The Project is situated within the Walcha and Uralla Local Government Areas (LGAs), with the closest main town centres being Tamworth (75km southwest) and Armidale (30km north).

Vehicular access will be provided via a number of new access roads that will connect directly with a mixture of sealed and unsealed local rural roads, and subsequently Thunderbolts Way and Oxley Highway. All plant associated with the wind turbine components will be delivered from the Port of Newcastle. Construction personnel are expected to be located within the nearby town centres of Walcha, Uralla, Armidale and Tamworth. Materials and equipment will generally be sourced from within the surrounding area with some to be manufactured on-site.

2.2 Environmental Assessment Requirements

NSW Department of Planning, Industry and Environment (DPIE) issued Secretary's Environmental Assessment Requirements (SEARs) for the Project on 17 September 2020. The required traffic and transport matters include the following:

- *Assess the construction, operational and decommissioning traffic impacts of the development on the local and State road network (including New England Highway, Oxley Highway, Thunderbolts Way and all local roads proposed to be used);*
- *Provide details of the peak and average traffic volumes (both light and heavy vehicles) and transport and haulage routes during construction, operation and decommissioning, including traffic associated with sourcing raw materials (water, sand and gravel);*
- *Assess the potential traffic impacts of the project on road network function including intersection performance, site access arrangements, site access and haulage routes, and road safety, including school bus routes and school zones;*
- *Assess the capacity of the existing road network to accommodate the type and volume of traffic generated by the project (including over-mass / over-dimensional traffic haulage routes from port) during construction, operation and decommissioning;*
- *An assessment of the likely transport impacts to the site access and haulage routes, site access point, any rail safety issues, any Crown Land, particularly in relation to the capacity and conditions of the roads; and*

- *Provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authority.*

Transport for NSW (TfNSW) has also provided comments as part of the SEARs which requests that a Traffic Impact Assessment be prepared by suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, and the complementary TfNSW Supplement and RTA Guide to Traffic Generating Developments. A detailed breakdown of the required inputs into the Traffic Impact Assessment are also provided.

2.3 Purpose of Document

This Traffic Impact Assessment has been prepared to assess the construction, operational, and decommissioning traffic impacts, and the access arrangements of the Project. The assessment responds to the SEARs and details how road impacts of the Project traffic, particularly from heavy vehicle use, will be avoided or managed using road-use management strategies.

More specifically, the report addresses the following key matters:

- Details of both light and heavy vehicle traffic volumes and proposed transport routes during construction, operation, and decommissioning;
- An assessment of the potential traffic impacts of the Project on road network function and safety;
- An assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the Project, including oversize and overmass (OSOM) vehicles;
- Details of measures to mitigate and / or manage potential impacts, including construction traffic control, road dilapidation surveys and measures to control soil erosion and dust generated by traffic volumes; and
- Details of access roads within the Project Boundary including how these connect to the existing road network and ongoing operational maintenance.

A detailed Route Assessment for the transportation of the OSOM turbine and transformer components from the Port of Newcastle has been provided in Appendix A which has been completed by Rex J Andrews (RJA).

The traffic assessment has been undertaken in consultation with TfNSW and the surrounding local councils.

3. Project Description

3.1 Site Location

The Project will be located in the New England North West region of NSW, approximately 75km northeast of Tamworth and 30km south of Armidale within the Walcha and Uralla LGAs. The Project layout extends over an area of approximately 22,285 hectares, with the land within the Project Boundary and the surrounding area being predominantly agricultural land use.

3.2 Proposed Works

The Project is proposed to accommodate 119 turbines with a maximum installed capacity of 700MW. The wind turbine model selected for the Project is expected to have an output capacity of 6.2MW and a maximum tip height of 230 metres (m). The Project will operate with approximately 16 employees on-site at any time and has an operational lifespan of 30 years. The Project also includes the following:

- an internal electrical reticulation network (both overhead and underground);
- two on-site substation;
- a new switchyard and other electrical equipment providing connection to the existing 330kV transmission network;
- new and upgraded access roads (combined total length of approximately 113 km);
- temporary construction facilities (including concrete batching plants); and
- operation and maintenance buildings.

The proposed location of the wind turbines and layout of the existing and proposed road network are shown within Figure 1.

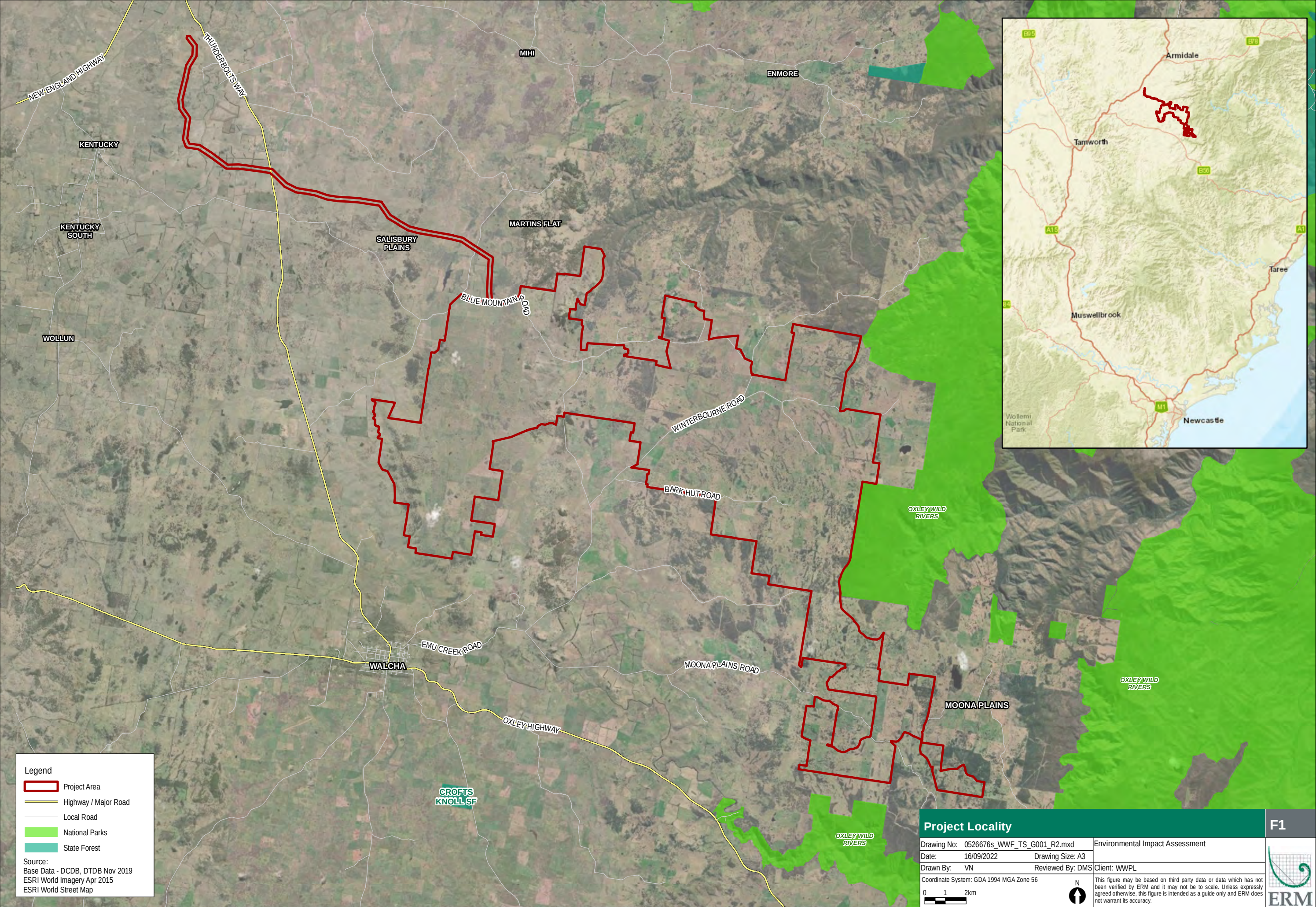
Large-scale battery storage is also proposed on-site to support stabilising the supply of electricity to the national electricity market. Indicatively, the battery unit would have 100MW / 200MWh capacity, and would utilise lithium ion technology.

The Project also includes a new 330kV overhead transmission line running through the Project Area and continuing northwest, connecting to the existing grid network operated by TransGrid at a new switchyard which is to be constructed approximately 7km south of Uralla. The proposed overhead transmission line will primarily run across private land, though it will be necessary to cross Thunderbolts Way and Hillview Road.

Vehicular access will be provided via a number of new access roads that will connect directly with a mixture of sealed and unsealed local rural roads, and subsequently Thunderbolts Way and Oxley Highway.

3.3 Construction Information

The physical construction of the Project is anticipated to take approximately 24-30 months, with the proposed working hours as follows:



Legend

Project Area

Highway / Major Road

Local Road

National Parks

State Forest

Source:

Base Data - DCDB, DTDB Nov 2019

ESRI World Imagery Apr 2015

ESRI World Street Map

Project Locality

F1

Drawing No: 0526676s_WWF_TS_G001_R2.mxd	Environmental Impact Assessment	
Date: 16/09/2022	Drawing Size: A3	
Drawn By: VN	Reviewed By: DMS	Client: WWPL
Coordinate System: GDA 1994 MGA Zone 56		
0 1 2km		N This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

ERM

- Monday to Friday: 7am – 6pm
- Saturday: 8am – 6pm
- No work on Sundays or public holidays.

Approximately 400 staff will be on-site during the peak construction phase and will likely be drawn from the nearby towns of Walcha, Uralla, Armidale, and Tamworth.

All plant associated with the wind turbine components will be delivered from the Port of Newcastle. Materials including gravel and reinforcing steel, and equipment such as cranes, excavators, and trench diggers, as well as water required during construction will be sourced from within the surrounding area where practicable. Construction also includes fixed or mobile concrete batching plant(s), and office buildings and substations for the construction and operational phases (e.g. maintenance) of the Project.

All vehicles are proposed to access the Project via Jamieson Street, Ohio Road, and Emu Creek Road, in order to reach the main site compound at the intersection of Winterbourne Road and Blue Mountain Road. Vehicles will then be able to continue on Blue Mountain Road to access the western portion of the Project, Winterbourne Road to access the northern part of the Project, or they will backtrack and travel along Moona Plains Road to the southern portion of the Project.

4. Transport Environment

4.1 Site Location

The Project is located approximately 425 kilometres (by road) from Sydney, to the northeast of Walcha in the Northern Tablelands. The Project is roughly bounded by Thunderbolts Way to the west, Oxley Highway to the south, the Oxley Wild Rivers National Park to the east and south, and the Salisbury Plains to the north. The nearest town centres include Uralla (25km northwest), Armidale (35km north), and Tamworth (75km west). The location of the Project in relation to the nearby town centres and the surrounding road network is provided within Figure 2.

The Project extends over an area of approximately 22,285 hectares and is situated within the Walcha and Uralla LGAs. The Project Boundary comprises land zoned RU1 – Primary Production, a rural zone primarily intended to promote sustainable primary industry production. The areas surrounding the Project are generally also zoned RU1, with the exception of the E1 National Parks and Nature Reserve (Oxley Wild Rivers National Park) to the east and south of the Project Boundary, and a mixture of land uses within the Walcha town centre located approximately 6km southwest from the closest edge of the Project Boundary.

A review of aerial photography, desktop searches, site inspections and ongoing community consultation has identified 123 residential dwellings within 5km of any of the 119 proposed turbine locations.

An aerial photograph of the Project Boundary showing the surrounding land use is provided within Figure 3.

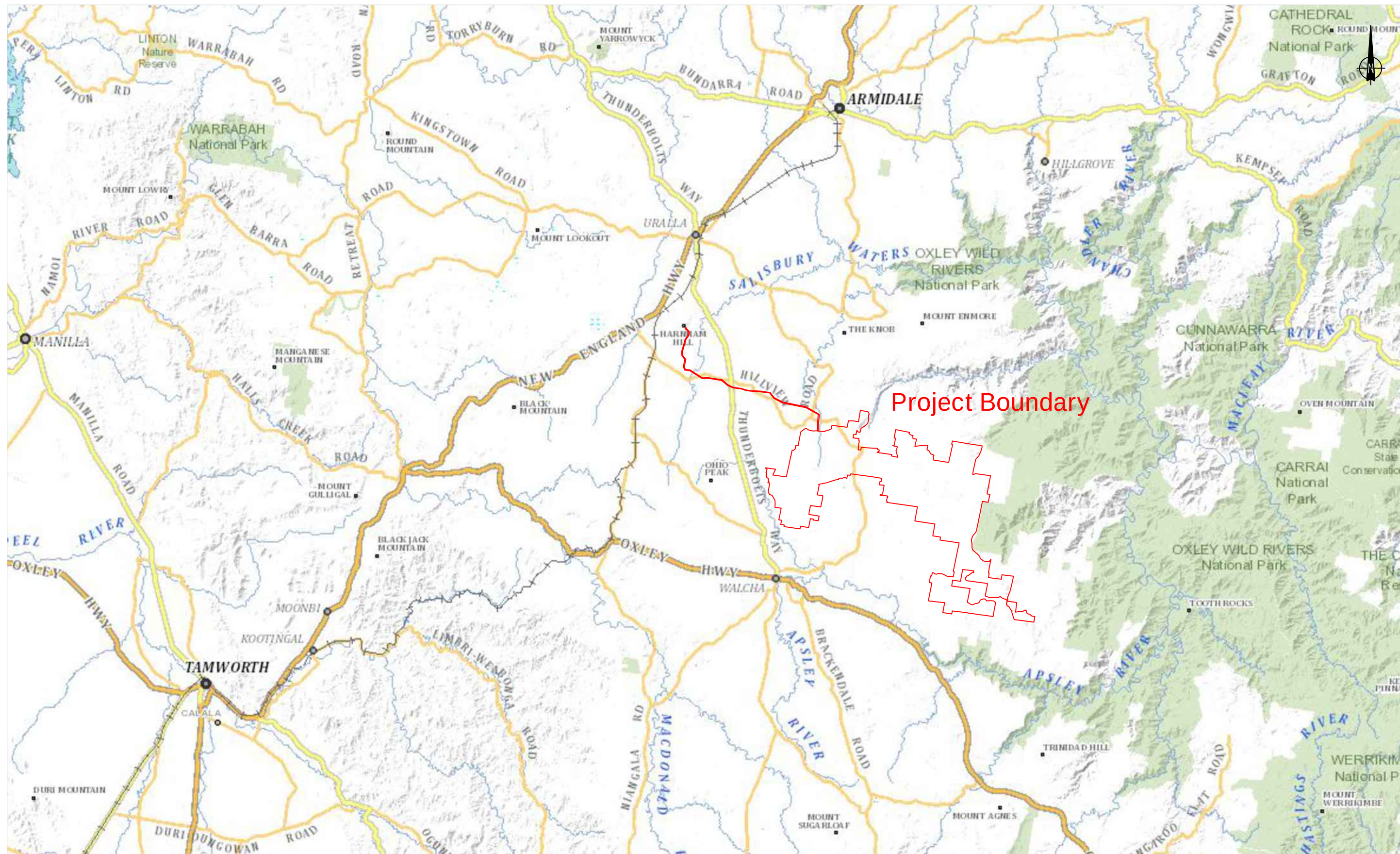
4.2 Road Network

Vehicles accessing the Project from the west (Tamworth) will utilise New England Highway and Oxley Highway, and vehicles travelling from the north (Uralla and Armidale) will utilise Thunderbolts Way. Vehicles will then utilise the relevant local road network and proposed access roads to access the various sections of the Project. The following provides a description of the state and local road network and Figure 2 shows the key state, regional and local road network within the vicinity of the Project.

4.2.1 State / Regional Road Network

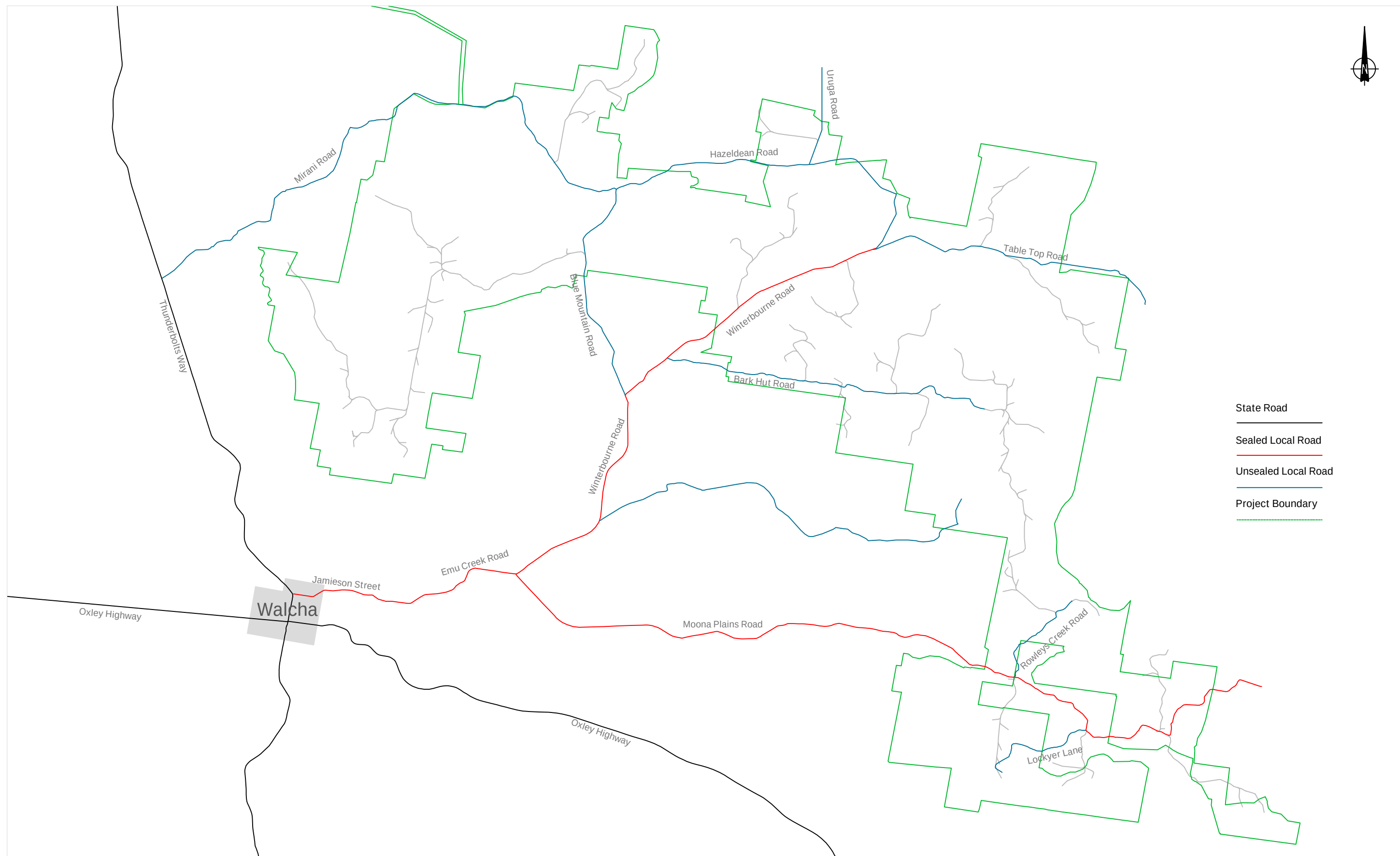
New England Highway is a State Road which runs in a northwest-southeast alignment from Newcastle to Muswellbrook, before running in a general northern alignment to its termination at the Queensland Border. Extending north from Tamworth it has a typical sealed carriageway width of approximately 13m accommodating one lane of traffic in each direction and sealed shoulders on both sides of the road. Two lanes are provided in each direction through the Moonbi Hills where it has a steep alignment, and intermittent passing lanes are provided in both directions between Tamworth and Armidale. It has a speed limit of 100km/hr which is reduced to 50km/hr within built up areas such as Moonbi.

Oxley Highway is also a State Road which runs in a general east-west alignment. It links Port Macquarie and the Pacific Highway to the New England Highway near Bendemeer. The Oxley Highway continues west of Tamworth, through Gunnedah and extends to link with the Newell



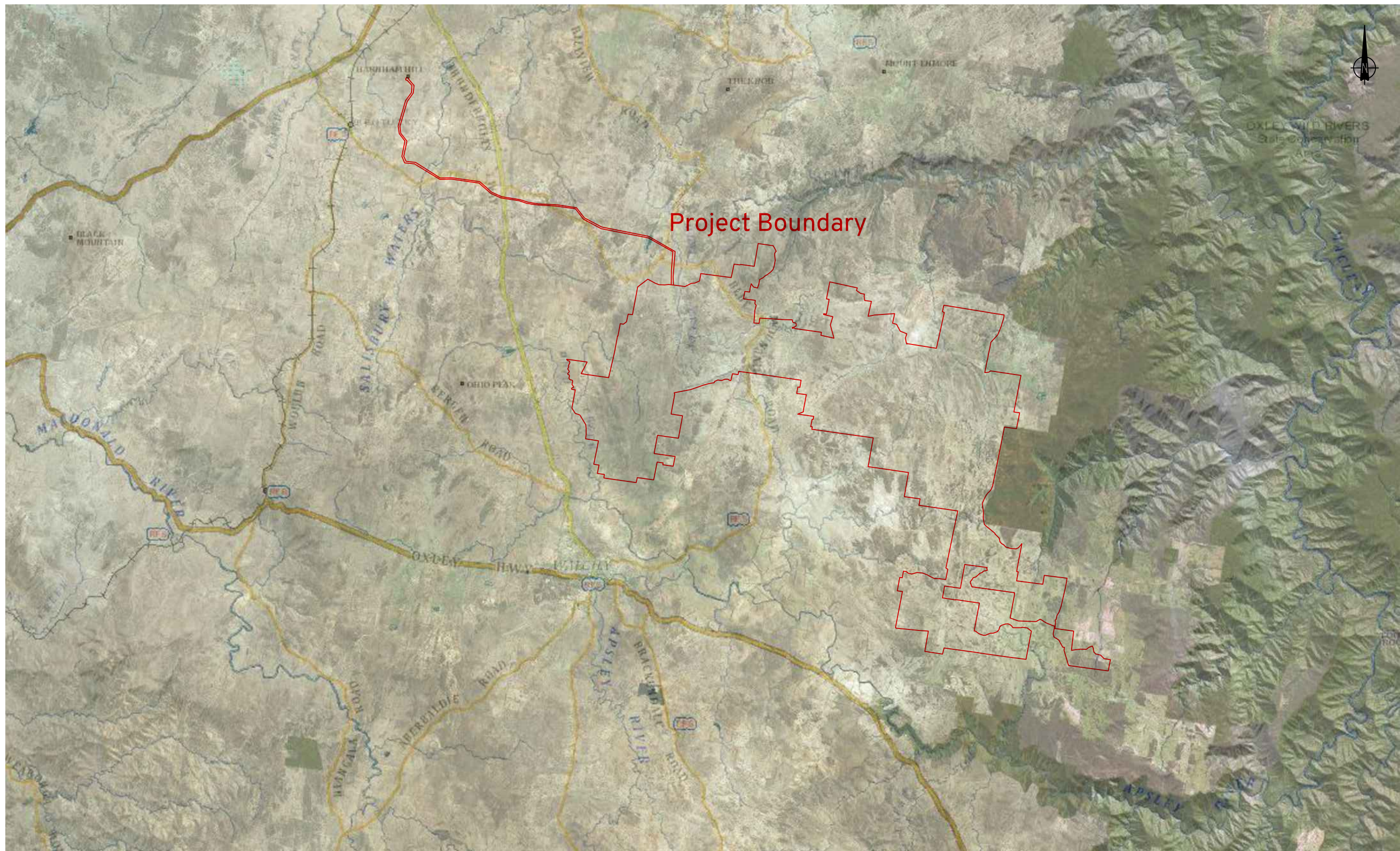
Winterbourne Wind Farm
 Site and Surrounding State and Regional Road Network

DRAWN: MW
 DATE: 29/09/2022
 SCALE: NTS @ A3
 DWG NO: 100-F01B



Winterbourne Wind Farm
Site and Surrounding Local Road Network

DRAWN: MW
DATE: 29/09/2022
SCALE: NTS @ A3
DWG NO: 100-F02H



Winterbourne Wind Farm
Aerial Photograph

DRAWN: MW
DATE: 29/09/2022
SCALE: NTS @ A3
DWG NO: 100-F01B

Highway near Coonabarabran. It terminates at its connection with the Mitchell Highway at Nevertire. Between the New England Highway and Walcha it has a typical carriageway width of 9.0m, accommodating one lane of traffic in each direction. It has a speed limit of 100km/hr which is reduced to 70km/hr within the vicinity of Wollun Road, and 50km/hr within the Walcha township.

Thunderbolts Way is a Regional Road which extends south from Gwyndir Highway, travelling through Uralla and Walcha and terminates at Scone Road in Barrington. Between Uralla and Walcha it accommodates one lane of traffic in each direction and has a typical carriageway width of 9.0m. It has a speed limit of 100km/hr which is reduced to 50km/hr within the Walcha township.

State Roads are the major arterial links throughout NSW and within major urban areas. They are the principal traffic carrying and linking routes for the movement of people and goods within the Sydney, Newcastle, Wollongong and Central Coast urban areas and which connect between these urban centres, the major regional towns, the major regions of the State and the major connections interstate. TfNSW takes responsibility for managing the primary traffic function of State Roads including funding and determining priorities, and regulates the activities of third parties on the road and access to adjoining land to promote road safety, traffic efficiency and protect the road asset.

Regional Roads are routes, together with the State Roads, that provide the main connections to and between smaller towns and districts and perform a sub arterial function in major urban areas. Regional Roads are the responsibility of councils to fund, determine priorities and carry out works. They are capitalised as a council asset.

4.2.2 Local Road Network

Saleyard Road and **Darjeeling Road** are both local roads that have a sealed carriageway width of approximately 7.0m and accommodate two-way vehicle movement. Saleyards Road extends north from Oxley Highway and connects with Darjeeling Road, which in turn connects with Thunderbolts Way. The two roads combine to provide a route around the north western side of Walcha.

Jamieson Street extends east from Thunderbolts Way for approximately 600m before continuing as **Ohio Road** for 300m, and then continues further east as **Emu Creek Road**. Within the Walcha township the roads have a sealed carriageway width of approximately 12m, accommodating two-way vehicle movement, and typically has a speed limit of 80km/hr which reduces to 50km/hr near the township. Further, northeast of the township the speed limit increases to 100km/hr.

East of the Walcha township, Emu Creek Road has a sealed carriageway width of 6.0m and continues as **Winterbourne Road** approximately 9.3km northeast of Walcha. Winterbourne Road crosses the Emu Creek where it has a concrete surface which has a carriageway width of approximately 6.0m. Winterbourne Road becomes a gravel surface at its connection with Table Top Road and maintains a carriageway width of approximately 6.0m. It extends through the Project Boundary and terminates at Cheyenne Boundary Trail.

Moona Plains Road extends southeast from Emu Creek Road. It has a sealed carriageway width of approximately 7.0m and accommodates two-way vehicle movement. It extends through the Project Boundary and terminates at its connection with Bukeiro Road.

The remaining road network has an unsealed surface. A description of the unsealed roads is provided below:

- **Blue Mountain Road** extends north from Winterbourne Road to its connection with Hazeldean Road and then extends in a northwest alignment to its termination at

Hillview Road. It has a carriageway width of approximately 6.0m but in some locations this narrows to 4.2m, including at a sealed causeway which is located approximately 2.5 km northwest of Winterbourne Road.

- **Hazeldean Road** extends in a general east-west alignment between Blue Mountain Road and Winterbourne Road. It has a carriageway width of approximately 7.0m.
- **Uruga Road** extends north from Hazeldean Road for approximately 5.0km to its termination. It has a carriageway width of approximately 7.0m.
- **Bark Hut Road** extends east from Winterbourne Road for approximately 8.2km to its termination. It has a carriageway width of approximately 6.0m for approximately 2.0 km which then narrows to 4.0m.
- **Table Top Road** extends east for 9.3km from Winterbourne Road to its termination at Puppy Hill Trail. It has a carriageway width of approximately 6.5m which narrows to approximately 3.0m. The bridge over the Winterbourne Creek has a trafficable width of 4.1m.
- **Rowleys Creek Road** extends north from Moona Plains Road for approximately 4.1km to its termination. It has a carriageway width of approximately 3.0m.

The sealed local roads generally have a good, sealed surface, although in some locations the seal appears to be thinning. The unsealed roads are generally in good condition. The surrounding landscape is rolling which results in some undulation and moderate corners.

4.2.3 Key Intersections

The following provides a description of the key intersections within the surrounding area of the Project:

- The intersection of New England Highway with Oxley Highway is priority controlled, with a Stop sign and associated line marking provided for vehicles exiting Oxley Highway. A right turn lane and a basic left turn treatment are provided at the intersection to facilitate turning movements from New England Highway.
- The intersection of Oxley Highway and Thunderbolts Way is controlled by a roundabout.
- The intersections of Saleyard Road and Darjeeling Road with Oxley Highway and Thunderbolts Way, respectively, are priority controlled with vehicles exiting onto the state and regional roads required to give way.
- The intersection of Jaimeson Street and Thunderbolts Way is priority controlled with Give Way signage and line marking provided for vehicles exiting Jaimeson Street. No turn facilities are provided at the intersection.

The intersections within the local road network in the vicinity of the site are all priority controlled.

4.3 Road Upgrades or Events

Walcha Council advised that the following road upgrades are currently proposed within the vicinity of the Project:

- Rehabilitation of Thunderbolts Way. The upgrades are anticipated to be completed by summer 2021/2022 and are anticipated to be completed prior to construction commencing.

- Upgrade of the intersection of Jamieson Street and Thunderbolts Way. The proposed design has been provided within Appendix B which shows that the intersection is proposed to be provided with a new seal and linemarking including a dedicated right turn lane from Thunderbolts Way. In addition, the existing barrier in the south-eastern corner of the intersection will be setback from the carriageway.

TfNSW has provided initial comments on the Project following their review of the RJA Route Assessment (Appendix A), and noted there are no current long-term works that are likely to coincide with the project delivery timeframes.

4.4 Traffic Volumes

4.4.1 State and Regional Road Network

Traffic volume data has been collected from the TfNSW Traffic Volume Viewer, which allows you to browse and search for available traffic count data in NSW. Data is available throughout NSW from 2006 up to the current year. The map provides the traffic volume in vehicles per day (vpd) and at some site locations information is provided based on vehicles per hour (vph) and differentiates between light and heavy vehicles. A summary of the traffic volumes is provided within Table 1. In order to calculate the current traffic volumes on the road network, growth rates have been applied to calculate the current estimated traffic volumes.

Table 1: State and Regional Road Traffic Volumes

Road	Survey Location	Station ID	Survey Year	Recorded Volume	Growth Factor	Current Estimated Traffic Volume
New England Highway	140 metres south of Caroline Street	BNMSTC	2019	4,301 vpd 78% light 22% heavy	1.5%	4,365 vpd
	1.66km west of Glenburnie Road	92057	2008	3,623 vpd*	1.5%	4,331 vpd
	100 metres west of Hill Street	92502	2011	8,093 vpd*	1.5%	9,253 vpd
	560 metres west of Arding Road	92060	2011	6,128 vpd 91% light 9% heavy	1.5%	7,007 vpd
Oxley Highway	100 metres west of Tower Street	92695	2011	1,019 vpd 90% light 10% heavy	1.0%	1,114 vpd
	1.66km east of Back Woolbrook Road	92702	2011	622 vpd 83% light 17% heavy	1.0%	680 vpd
Thunderbolts Way	2.45km north of Mirani Road	92677	2011	1,121 vpd 91% light 9% heavy	1.0%	1,226 vpd

* Light and heavy vehicle percentages were not provided

The traffic volume data indicates that the state and regional road network currently carries a modest level of traffic which is well within the existing road capacity. It is noted that the higher traffic volumes recorded on New England Highway west of Hill Street is indicative of the survey

location within the Uralla township. Traffic volumes within the township are expected to be higher given the local traffic and associated vehicles circulating with people accessing the shops and community facilities.

4.4.2 Local Road Network

Traffic volume data was provided by Walcha Council on 2 September 2020 for all local roads within the proximity of the Project. The traffic volume information is summarised in Table 2 and is illustrated in Figure 4.

Table 2: Local Road Traffic Volumes

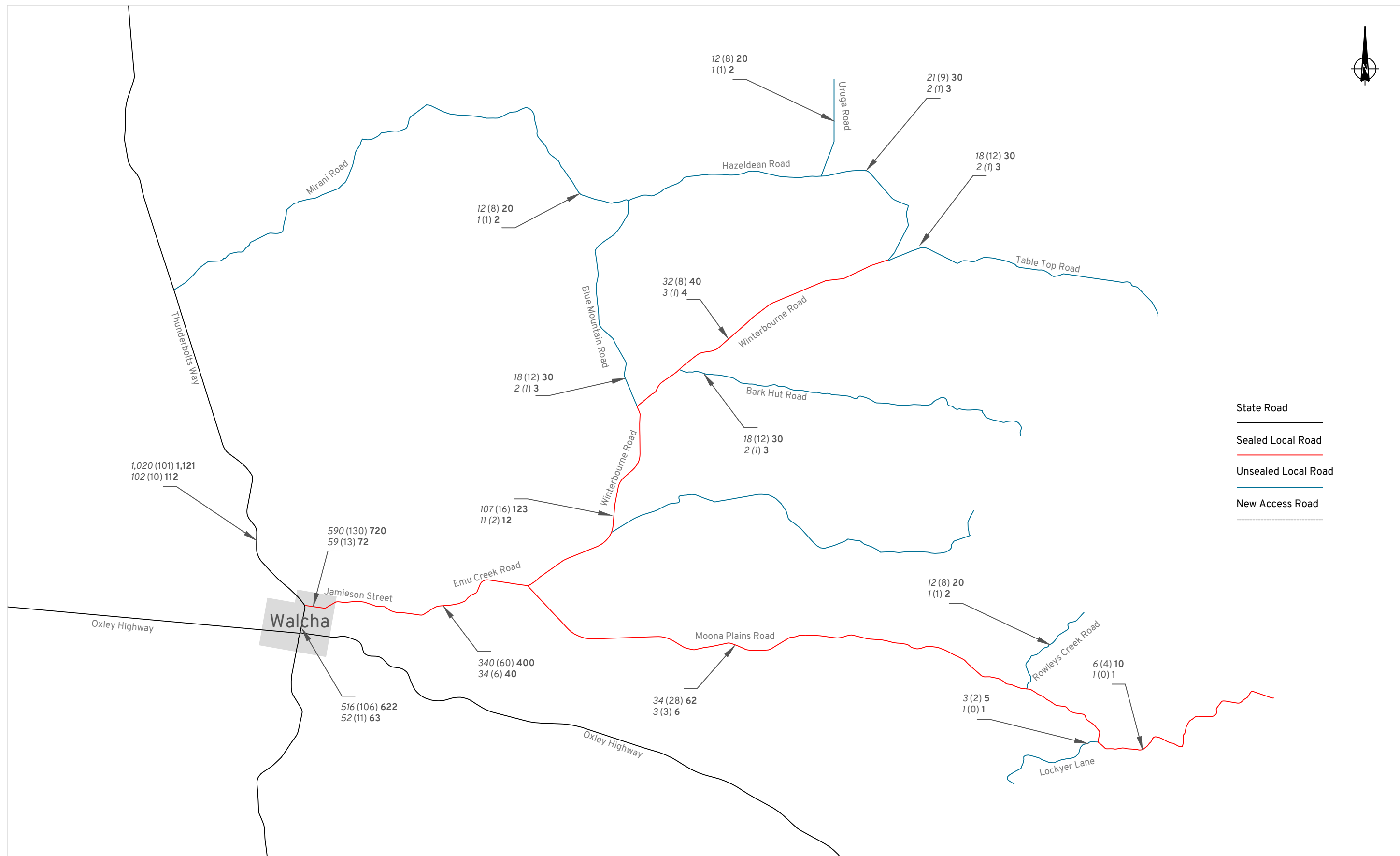
Road	Traffic Volume (vpd)	Heavy Vehicle Percentage
Saleyards Road	90	45%
Darjeeling Road	120	40%
Jaimeson Street	720	18%
Ohio Road	400*	15%
Emu Creek Road	123	13%
Winterbourne Road	40	20%
Moona Plains Road	62	45%
Blue Mountain Road	30*	40%
Bark Hut Road	30*	40%
Hazeldean Road	30*	30%
Table Top Road	30*	40%
Rowleys Creek Road	20*	40%
Uruga Road	20*	40%

* No information available so estimate provided by Council

The traffic volume data suggests that the road network currently carries a low level of traffic, which is not surprising given a number of the local roads are currently unsealed. Jaimeson Street, Ohio Road and Emu Creek Road carry a higher level of traffic as they provide access to nearby residential properties within the Walcha Township. Overall, the local road network generally carries a low level of traffic is well within the operating capacity of the road network.

4.5 Restricted Vehicle Access

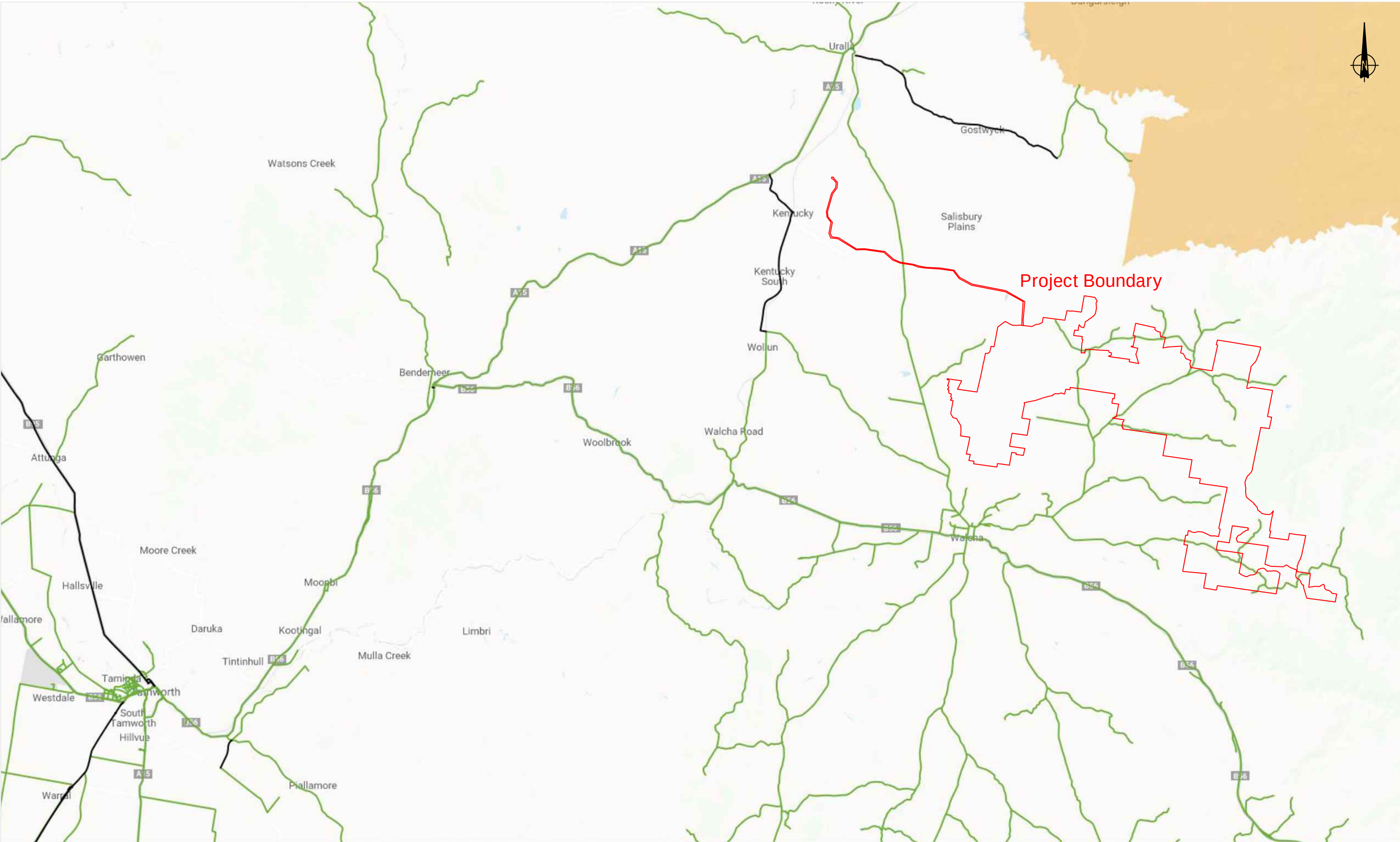
The existing B-double (26m length) approved routes in the broader vicinity of the Project are detailed on the TfNSW combined Higher Mass Limits and Restricted Access Vehicle Map website and is provided within Figure 5. The figure demonstrates that all roads within the vicinity of the Project are rated to accommodate B-double vehicles.



Daily Volumes: *Light Vehicles* (Heavy Vehicles) **Total Vehicles**
Peak Hour Volumes: *Light Vehicles* (Heavy Vehicles) **Total Vehicles**

Winterbourne Wind Farm Existing Traffic Volumes

DRAWN: MW
DATE: 18/09/2021
SCALE: NTS @ A3
DWG NO: 100-F02H



B-double Route
Approved Route with Travel Conditions

Winterbourne Wind Farm
Restricted Vehicle Access Map

DRAWN: MW
DATE: 29/09/2022
SCALE: NTS @ A3
DWG NO: 100-F01B

4.6 Public Transport / School Bus

Oxley Explorer and Moona Bus provide school bus services on the local road network within the vicinity of the Project. Oxley Explorer have advised the following with regards to the local roads within the vicinity of the site:

'...all of the roads noted are utilised by bus services between the hours of 6.50am and 9am and 2.50pm and 5pm Monday to Friday with the exception of school holidays.'*

* - the roads referred to include the roads discussed within Section 4.2 of this report.

Moona Bus have provided the bus route and associated times the bus is anticipated at each bus stop. The school bus is expected to be operating on the local road network from 8:00am to 8:35am and from 3:05pm to 3:40pm. The schedule and bus route are provided within Appendix C which shows the bus route extends from Moona Plains Road to Walcha via Emu Creek Road and Jamieson Street, and vice versa.

4.7 Walking and Cycling

Footpaths are typically provided on both sides of all roads within the Walcha township. Excluding these facilities there are no pedestrian or cyclist facilities provided within the surrounding area nor in the vicinity of the Project Boundary.

4.8 Crash History

Amber has conducted a review of the TfNSW Centre for Road Safety Crash and Casualty Statistics database for all injury crashes within the surrounding area of the Project. The crash database provides the location and severity of all injury and fatal crashes for the five-year period from 2015 to 2019. The search area included the following roads:

- New England Highway between Nundle Road and Oxley Highway;
- Oxley Highway between New England Highway and Thunderbolts Way;
- Thunderbolts Way between Gostwyck Road and Oxley Highway;
- All local roads to be used to access the Project as described within Section 4.2.2 and shown within Figure 2B; and
- The associated intersections.

The results of the crash search are summarised in Table 3.

Table 3: Crash Search Results

Road	Injury Type	Number of Crashes	Crash Type
New England Highway	Fatal	3	2 x off-road to right on right bend, hitting object, located 7.0km south of Oxley Highway and 1.3km south of Moonbi 1 x head on located 15.2km south of Oxley Highway
	Serious	13	3 x rear end 3 x off-road to the left, hitting object 1 x off-road to the left on right bend, hitting object 1 x out of control on bend 1 x off-road to right on right bend, hitting object 1 x off-road to the left, hitting object 1 x right turn sideswipe 1 x right through 1 x off-road to right on left bend, hitting object
New England Highway	Moderate	13	1 x overtaking turning vehicle 1 x off-road to left on left bend 1 x cross traffic 1 x off-road to right on left bend, hitting object 3 x rear end 3 x off-road to left, hitting object 1 x off-road to left on right bend 1 x struck animal 1 x right far crash
	Minor	3	1 x off-road to left on left bend 1 x off-road to the left on right bend, hitting object 1 x accident
Oxley Highway	Fatal	3	1 x off-road to right on left bend, hitting object crash located 6.8km east of New England Highway 1 x head on crash located 8.8km west of Walcha Road 1 x off-road to right crash located 11.9km west of Walcha Road
	Serious	3	1 x out of control on bend 1 x off-road to left on right bend, hitting object 1 x off-road to right on left bend, hitting object
	Moderate	5	2 x off-road to left 1 x off-road to the left on right bend 1 x off-road to right 1 x off-road to left hitting object
Thunderbolts Way	Serious	4	2 x off-road to left hitting object 1 x off-road to left on right bend, hitting object 1 x off-road to the right on left bend
	Moderate	8	4 x off-road to the left on right bend, hitting object 1 x cross traffic crash at the intersection with Hill Street 1 x other opposing crash 1 x head on
	Minor	2	1 x off-road to left on right bend, hitting object 1 x off-road to left hitting object

It is noted that there were no injury crashes recorded at the intersection of Oxley Highway with New England Highway or Thunderbolts Way, and no crashes were recorded on the local road network.

The crash search indicates that there are no discernible crash trends within the surrounding road network, and the crashes are widely distributed on the network with no 'black spots'. Whilst the crash search indicates a large number of crashes, including some resulting in fatalities, the crash results are not unexpected when considering the large search area, the associated traffic volumes on the roads, the road classifications, and the high speed and rural nature of the state and regional road network. Overall, it is concluded that the road network is currently operating in a relatively safe manner.

5. Transport Route Assessment

The access route is the route taken by the OSOM vehicles to deliver larger plant to the Project, including the wind turbine and the substation components. The Port of Newcastle is the preferred port where the wind turbine plant will be imported with all plant then transported by road to the site. The following provides an assessment of the route taken by vehicles transporting the OSOM loads and the impact of the relevant transport vehicles.

5.1 Load Details

Dimensions and loads for the major components of the turbines and associated infrastructure to be transported from the Port of Newcastle to the Project are detailed in Table 4.

Table 4: Load Dimensions and Masses

Component	Height	Width	Length	Weight
Blades	4.0m	4.5m	81.0m	28,100kg
Hub	4.0m	4.4m	5.0m	64,000kg
Nacelle	4.4m	4.2m	18.2m	83,670kg
Power Train	3.0m	2.7m	7.5m	97,500kg
Cooler Top	3.0m	2.3m	5.2m	2,333kg
Tower*	4.4-6.0m	4.4-6.0m	11.5-30.0m	~81,000kg

* The tower is comprised of seven sections with varying diameters and weights

There would also be a small number of OSOM deliveries associated with the following components:

- Large substation equipment, including:
 - Battery storage;
 - Transformers; and
 - Switching equipment.
- Substation, switching station, warehouse and office buildings; and
- Water tanks.

In addition, cranes will be required to move onto the Project to erect the wind turbines. A number of these are expected to be transported using OSOM vehicles.

5.2 Typical Delivery Vehicles

Restricted Access Vehicles (RAVs) (i.e. OSOM vehicles) will be used to deliver the turbine components to the Project. Whilst RAVs will contribute the smallest percentage of trips to the Project during the construction period, they will be the most critical from a vehicle access perspective and will require some road and intersection upgrades to the existing network.

The typical oversize vehicles to be used to transport the tower sections, hub and nacelle, and the blades are illustrated in Pages 7-12 of the RJA Report.

Based on our experience, the most difficult part of the turbine to transport are the blades, which are transported in one piece and form the longest component. The other components such as the tower and the turbine itself can typically be assembled on site.

The use of an independent steerable rear trailer could be used and may benefit manoeuvrability. The final selection of transport vehicle would be considered in consultation with authorities as part of the development of the Traffic Management Plan and route approvals. This assessment has been undertaken based on the vehicles provided within the RJA Report which is understood to represent the worst-case scenario.

It is noted that the blades would be transported using an extendable trailer which would significantly reduce turning constraints on the return journey.

5.3 OSOM Traffic Volumes

The overall traffic generation per wind turbine is expected to be between 15 to 20 trucks. Out of this, it is expected that a maximum of 17 trucks will be OSOM trucks with the remainder being general construction heavy vehicles (e.g. flatbed trucks and articulated vehicles). Overall, the expected number of OSOM deliveries to the Project from the Port of Newcastle is expected to be approximately 1,592 deliveries over 10 months in the middle of the expected 24-30 month construction period of the Project.

A detailed breakdown of the large plant components and associated traffic volumes and OSOM vehicle movements is provided within Appendix D which has been provided by WinterbourneWind Pty Ltd. A breakdown of the OSOM traffic volumes and vehicle arrangements is provided below in Table 5.

Table 5: OSOM Traffic Volumes and Vehicle Arrangement

Component	Vehicle Arrangement	One-Way OSOM Vehicle Trips	Duration	Trips per Week
Blades	Prime mover with 2x4 dolly 3x4 Jinker	357	42 weeks	9 trips/week
Hub	Prime mover with 6x8 Platform	119	42 weeks	3 trips/week
Nacelle	Prime mover with 10x8 Platform	119	42 weeks	3 trips/week
Power Train	Prime mover with 10x8 Platform	119	42 weeks	3 trips/week
Tower	Prime mover with 3x8 4x8 Bookend (lower sections) Prime mover with 5x8 5x8 Bookend (middle sections) Prime mover with 4x4 Dolly and 3x8 Jinker trailer (top section)	833	42 weeks	21 trips/week
Substation Transformers	Prime mover with 1x4-3x4 platform	6	3 weeks	2 per week
Switching Equipment	Prime mover with 1x4-3x4 platform	9	6 weeks	1-2 per week

WTG Erection Cranes	Prime mover with 1x4-3x4 platform	6	3 weeks	2 per week
On-site Buildings	Low Loaders	4	4 weeks	1 per week
Machinery and Civil Equipment	Low Loaders	20	10	2 per week

At least two pilot vehicles will accompany each OSOM vehicle to guide the OSOM vehicle and manage traffic under the direction of police where required. Police vehicles will provide traffic management at 'pinch points' as identified in the Route Assessment. The OSOM vehicles will leave at specific intervals and regroup at specific pinch points to allow police to implement the required traffic management, such as road closures. This will be detailed in a Traffic Management Plan to be prepared prior to the commencement of construction in consultation with TfNSW and relevant councils.

5.4 OSOM Vehicle Access Route - Newcastle to Walcha

The following provides an assessment of the preferred access route from the Port of Newcastle to Walcha. The preferred access route has been identified within a Route Assessment prepared by Rex J Andrews (RJA Report) and is provided within Appendix A. Rex J Andrews is a transportation company that has experience working on similar wind farm projects throughout NSW.

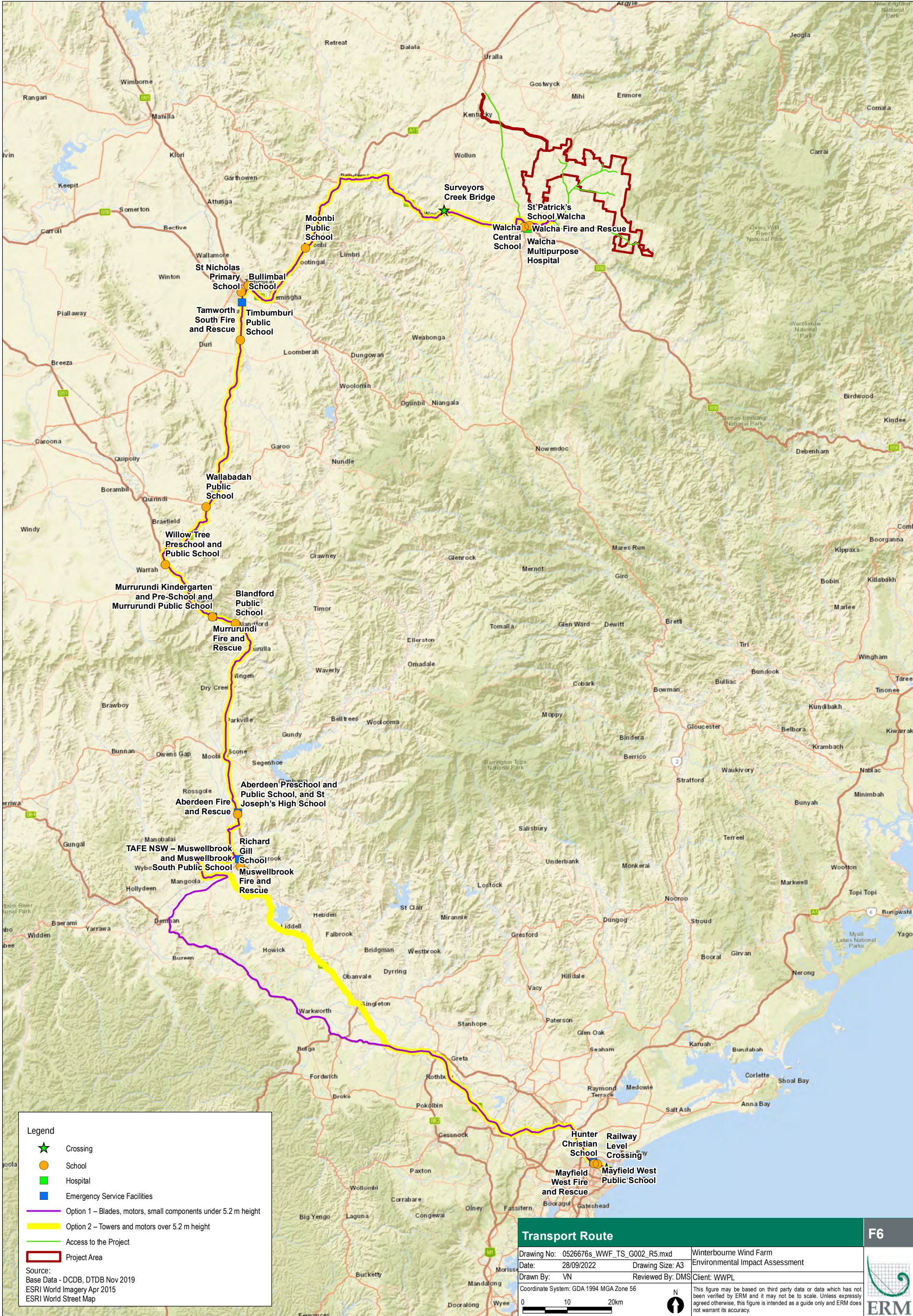
5.4.1 Preferred Access Route

The proposed OSOM vehicle access route from the Port of Newcastle to the Project has been separated into two routes.

- **Blade Route:** The route is proposed to be utilised by vehicles transporting the blades which are transported in one piece and form the longest component.
- **All other components:** A second route is proposed for all other components. Vehicles will be able to utilise Oxley Highway to access the site. However, if the weight capacity of the Surveyors Creek Bridge is insufficient to accommodate the weight of the vehicle an alternative route can be utilised that continues along New England Highway to Uralla and then travels south on Thunderbolts Way via Salisbury Street.

Maps showing the access routes are provided within the RJA Report which illustrates the roads taken from the Port of Newcastle to Jamieson Street in Walcha. The preferred access routes for the blades and the other components are shown within Figure 6.

The access routes will utilise the local road network from the Port of Newcastle to access the state road network. Vehicles will then travel northeast via Industrial Drive, John Renshaw Drive, and the Hunter Expressway, before accessing New England Highway. The other components will then utilise Golden Highway to reach Denman Road while the blade transport vehicles continue on New England Highway to reach Denman Road. All vehicles will then travel along Bengalla Road, Wybong Road, Kayuga Road, Ivermein Street, Stair Street, and the Dartbrook Mine access road to bypass Muswellbrook. All vehicles are then proposed to use New England Highway through Tamworth to reach Oxley Highway, and will then use Saleyards Road and Darjeeling Road to access Thunderbolts Way and subsequently Jamieson Street.



Once vehicles reach Jamieson Street they will access the wider local road network and the individual access locations throughout the Project Boundary.

It is noted that some over dimensional vehicles may be required to access the switchyard. These vehicles would adopt the same route as all other components, excluding the blade transport vehicles. The route would have the vehicles travel via Oxley Highway to reach Walcha. The vehicles would divert around Walcha utilising Saleyards Road and Darjeeling Road, and then travel northbound on Thunderbolts Way to reach the switchyard.

5.4.2 Route Survey – Newcastle to Walcha

RJA completed a route survey along the transportation route from the Port of Newcastle to Jamieson Street in Walcha. This includes a swept path analysis for the transportation of the 81.0 metre-long blades at key locations along the access route in order to identify 'pinch points' and areas where vehicles are able to pull over for fatigue breaks or emergency parking.

As part of the 'pinch point' identification, Rex J Andrews also identified a number of infrastructure upgrades to facilitate the proposed OSOM movements, presented in Appendix A. These identified 'pinch points' have been used to form the required traffic management arrangements including under bridges and through road narrowing (i.e. pedestrian crossing facilities and road bridges/culverts).

Amber has undertaken an assessment and driven the routes identified by RJA to confirm the preferred access route via Oxley Highway. The assessment identified no further upgrades to the road network to that identified in the RJA Report. However, it is recommended that passing opportunities be considered along Oxley Highway between Walcha and Bendemeer to allow through vehicles to pass OSOM vehicles given there are a number of sections along this part of the route that require the OSOM vehicle to utilise the full width of the road. These facilities should be identified as part of any future Traffic Management Plan for OSOM vehicle access that is to be prepared by the appointed contractor prior to construction.

Further assessment is provided below of the railway crossings along the route, an assessment of the impacts to vulnerable road users, and school bus and emergency vehicles. Recommendations are also provided for inclusion within the Traffic Management Plan.

5.4.3 Railway Crossings

The Route Assessment identifies the relevant railway crossing locations which includes:

- Railway level crossing over Selwyn Street near the Port of Newcastle; and
- Railway overbridge on Bell Street in Muswellbrook.

The railway level crossing will be traversed by all plant leaving Port of Newcastle, and the railway overbridge will be limited to all plant excluding the blades which will be diverted around Muswellbrook. Approval will be sought from the relevant rail authority as part of the TMP, and site traffic is expected to have no impact to the operation or safety of the railway crossing.

ARTC have been contacted and have indicated that the level crossing on Selwyn Street will require the attendance of an ARTC accredited Rail Protection Officer for every movement across the level crossing due to the length of the load and the timings on the level crossing not being set for the longer loads.

5.4.4 Vulnerable Road Users

A review of the access route has been undertaken to identify locations where vulnerable road users may be present on the road network. The assessment focuses on facilities such as schools and hospitals that are attended by vulnerable road users such as children or people with disabilities. Table 6 identifies locations where these facilities are provided and the probability of vulnerable road users being present on or adjacent to the access route.

Table 6: Assessment of Vulnerable Road Users Along the Access Route

Site	Location	Likelihood of Vehicle / Pedestrian Conflict
Newcastle		
Hunter Christian School	South of Industrial Drive, with access provided from Bull Street and Kerr Street	No pedestrian footpaths are provided on Industrial Drive and all pedestrian access is from the local road network
Mayfield West Public School	300 metres travel distance south from Industrial Drive	No pedestrian footpaths are provided on Industrial Drive and all pedestrian access is from the local road network
Muswellbrook		
Richard Gill School	Immediately south of New England Highway, west of Bimbadeen Drive	Little residential land use provided on the northern side of New England Highway in the vicinity of the school, and all pedestrian access expected from the south via the local road network
TAFE NSW – Muswellbrook and Muswellbrook South Public School	Immediately south of New England Highway, opposite Bell Street	Both facilities are located on New England Highway. Signalised pedestrian crossing facilities are provided on New England Highway opposite the public school and at the intersection with Bell Street
Regional Towns		
Aberdeen Preschool and Public School, and St Joseph's High School	100-300 metres west of New England Highway between Bedford Street and Graeme Street	New England Highway and the adjacent railway line are expected to create a barrier which would deter people walking to the schools from the east and crossing New England Highway
Blandford Public School	Located on New England Highway opposite Timor Road	The school is located on New England Highway, however given the limited residential land use students are expected to be driven or bused to the school
Murrurundi Kindergarten and Pre-School and Murrurundi Public School	Both located on New England Highway within the township	Both facilities are located on New England Highway, with pedestrian crossing facilities provided adjacent to both schools
Willow Tree Preschool and Public School	Located on Merriwa Road, 200 metres southwest of New England Highway	Given the minimal pedestrian facilities in the area most students are expected to be driven to the schools
Wallabadah Public School	Located on Martyn Street	Given the minimal pedestrian facilities in the area most students are expected to be driven to the school and are not anticipated to cross New England Highway

Timbumburi Public School	Located on Kia Ora Lane just off New England Highway	Given the minimal pedestrian facilities or residential use in the area all students are expected to be driven to the school
Tamworth		
Bullimbal School	Degance Street located 500 metres north of New England Highway	Located away from the access route
St Nicholas Primary School	Located on Carthage Street, 500 metres north of New England Highway	Located away from the access route
Moonbi		
Moonbi Public School	400 metres east of New England Highway on Charles Street	Most students are expected to be driven to the school and are not anticipated to cross New England Highway
Walcha		
St Patrick's School Walcha	Located 240 metres west of Thunderbolts Way on South Street	Potential for children walking to school to cross New England Highway or Thunderbolts Way
Walcha Multipurpose Hospital	Located on Oxley Highway East of Thunderbolts Way	Hospital located east of the access route
Walcha Central School	1.0km from Thunderbolts Way on North Street	Located away from the access route

For locations identified as having medium or high probability for OSOM vehicles to interact with vulnerable road users, effort should be made to identify peak usage times at these locations and, where possible, avoid OSOM transport near these facilities at peak usage times. These locations have been identified on in Figure 6.

5.4.5 Public Transport and School Bus Routes

No public transport services are provided within the vicinity of the Project. However, a number of school bus routes are provided which have been outlined within Section 4.6 of the report. Given the low volume of OSOM vehicle deliveries of the wind turbine components, it is not anticipated that the OSOM deliveries will cause adverse impacts to school bus services. Nonetheless, during the OSOM deliveries, the following mitigation measures shall be incorporated in the Traffic Management Plan for the Project:

- Drivers must reduce their speed and or stop in accordance with the law when passing a school bus which is slowing down, stopped, or accelerating in relation to picking up or setting down children;
- Drivers must reduce their speed in accordance with the law when:
 - Passing children walking, cycling or waiting on the side of the road;
 - Passing an oncoming school bus.
- Truck drivers travelling on school bus routes at the same time as an oncoming school bus to use their CB radio to identify the location of the bus and pull over in a safe location before the school bus reaches and passes them.

Adoption of the above measures will ensure safety is maintained to vulnerable road users alighting the school buses during delivery of larger plant.

5.4.6 Emergency Services

A review has been undertaken to identify locations along the access route where emergency service vehicles require access. The following locations were identified:

- Mayfield West Fire and Rescue;
- Muswellbrook Fire and Rescue;
- Aberdeen Fire and Rescue;
- Murrurundi Fire and Rescue;
- Tamworth South Fire and Rescue;
- Walcha Fire and Rescue.

Access should be maintained to the above properties to ensure continuation of emergency services. When aware of any emergency vehicles, approaching from in front or behind, drivers must pull over well in advance to provide unimpeded movement.

5.5 Other Blade Route Options Assessed

RJA also considered an alternate bypass for blade transport vehicles to avoid travelling through Tamworth. This alternative would utilise Whitehouse Lane, Marsden Park Road, O'Briens Lane and Nundle Road, and would require a short reversing maneuver and two traffic control procedures. This alternative would avoid the requirement to impact private land at the intersection of New England Highway and Scott Road, and may be preferable to Tamworth Regional Council to avoid blade vehicles travelling along primary roads within the town. However, the proposed bypass may be prone to flooding, and the road currently has a 25 tonne limit.

Additional routes were also considered by RJA that have not been included within their report which include:

- **Alternative Route through Kentucky:** In the event that Oxley Highway was not considered appropriate for use by OSOM vehicles an alternative route is proposed through Kentucky that utilised New England Highway, Kentucky Road, Eastern Avenue, Terrible Vale Road, and Thunderbolts Way. The route would require significant upgrades, is prone to flooding, and would likely require Terrible Vale Road to be closed to the public when OSOM vehicles are using the road due to its narrow width. Accordingly, the use of Oxley Highway is the preferred access route.
- **Alternative Route through Uralla:** In the event that Oxley Highway was not considered appropriate for use by larger vehicles an alternative route was proposed through Uralla. However, as the route is required to go through the township, which increases interaction with local traffic and pedestrians, the Oxley Highway route is the preferred option.

Based on the RJA assessment, it is concluded the proposed access route through Tamworth and via Oxley Highway provides the most appropriate option. This route avoids the need for a reversing manoeuvre, avoids a flood-prone section of road, and reduces the roads upgrades required to accommodate the OSOM vehicles. Furthermore, the route is expected to result in the

least impact to other road users. However, the alternative bypass route to avoid Tamworth will be further investigated prior to construction.

5.6 Alternative Muswellbrook Route Options

Amber understands that Muswellbrook Shire Council has objected to the proposed transport route for the proposed Hills of Gold Wind Farm project, which was described in the EIS document submitted for the project in November 2020. Muswellbrook Shire Council provided this objection to Amber and this is provided in Appendix E.

The proposed Hills of Gold project is located approximately 60km southeast of Tamworth and is to include approximately 65 turbines. The turbines proposed for this project will likely be of similar dimensions to those used for the Winterbourne project.

The Route Assessment for both projects was prepared by Rex J Andrews. The proposed transport route for the Winterbourne project would utilise the same roads through Muswellbrook Shire Council as was proposed for the Hills of Gold project. As such, it is expected that Muswellbrook Shire Council will have the same objection to the proposed route for the Winterbourne project as was provided for the Hills of Gold project.

Amber, in coordination with Rex J Andrews, have reviewed alternative access routes that could potentially accommodate the turbine blade transport vehicles. Proposed potential options are summarised below:

- Travel further west to avoid Muswellbrook: Alternative access options have been assessed which look to utilise State and local roads and travel further west to avoid the route around Muswellbrook. However, all of the routes assessed result in the blades being required to travel through small townships (such as Dunedoo, Gilgandra, Coonabarabran, and Gunnedah) which are not able to accommodate the blade vehicle. Alternatively, local roads can be utilised to avoid the towns. However, these routes all generate similar issues to the current access route and would only add to the length of the transport route. This option ultimately results in more towns along the route which increases the number of issues compared to the current option resulting in a less desirable outcome.
- Travel north along the coast: A route has been assessed that would utilise State roads to travel north from Newcastle along the coast. This route is not considered appropriate as there are no suitable roads from the coast up to the Northern Tablelands and subsequently to the site.
- Change delivery port to Brisbane: The route is significantly longer than the current access route and has a number of challenging locations which would require significant road upgrades to be able to accommodate the blade transport vehicle. In particular there are a number of towns (such as Warwick, Stanthorpe, Tenterfield, and Glen Innes) which would be unable to accommodate the blade vehicles. Overall, the route generates similar issues to the Muswellbrook route but results in a significant increase to the length of the route.

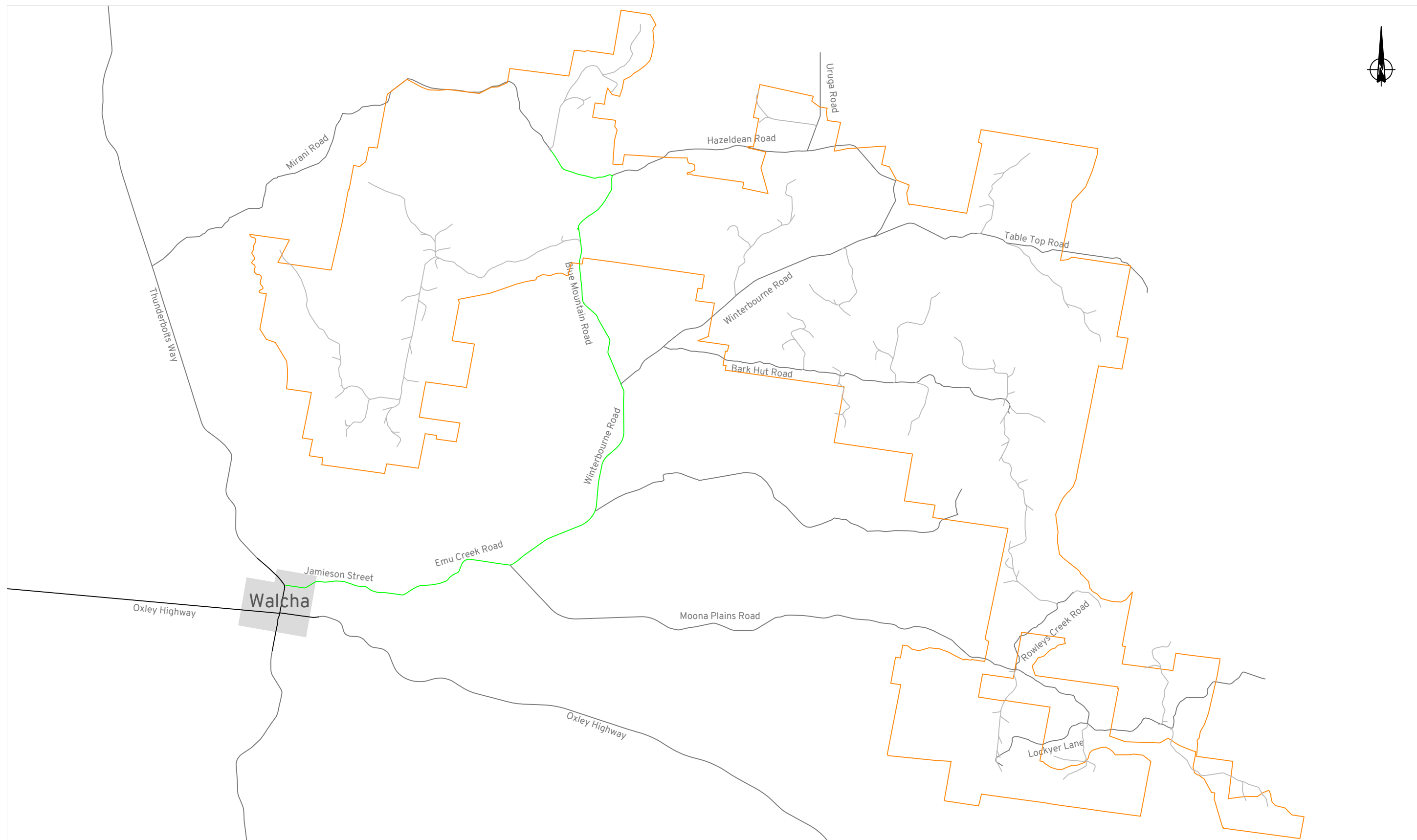
Based on the assessment outlined above, it is concluded that the blade route proposed within the Route Assessment by Rex J Andrews provides the most appropriate route primarily as it results in a shorter travel length, less townships to travel through, and subsequently less road upgrades. The proposed route within the RJA Report is concluded to provide a suitable transport option and as such it is recommended to be adopted for the project subject to approval from the relevant authorities.

5.7 OSOM Vehicle Route – Local Road Network

An assessment of the local road network has been undertaken by RJA and Amber. The routes can be broken down into the following four sections which each extend from Jamieson Street to the furthest site access locations and is illustrated within Figure 7:

- **Route 1:** Jamieson Street, Emu Creek Road, Winterbourne Road, and Blue Mountain Road (assessed in the RJA Report).
- **Route 2:** Jamieson Street, Emu Creek Road, Winterbourne Road and Table Top Road / Hazeldean Road (assessed in the RJA Report).
- **Route 3:** Jamieson Street, Emu Creek Road and Moona Plains Road (assessed in the RJA Report).
- **Route 4:** Jamieson Street, Emu Creek Road, Winterbourne Road, Bark Hut Road, Internal Access Road, Rowleys Creek Road (assessed below).

Routes 1-3 have been assessed within the RJA Report which has identified a number of potential road upgrades required in order to accommodate the OSOM vehicles. Amber has also assessed Routes 1-3 and have inserted additional swept path diagrams into the RJA Report where appropriate for ease of reference. The additional assessment has identified some minor road widening on Hazeldean Road and otherwise has not identified any further upgrades to the local road network to what has been provided within the RJA Report.



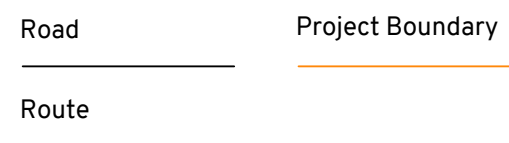
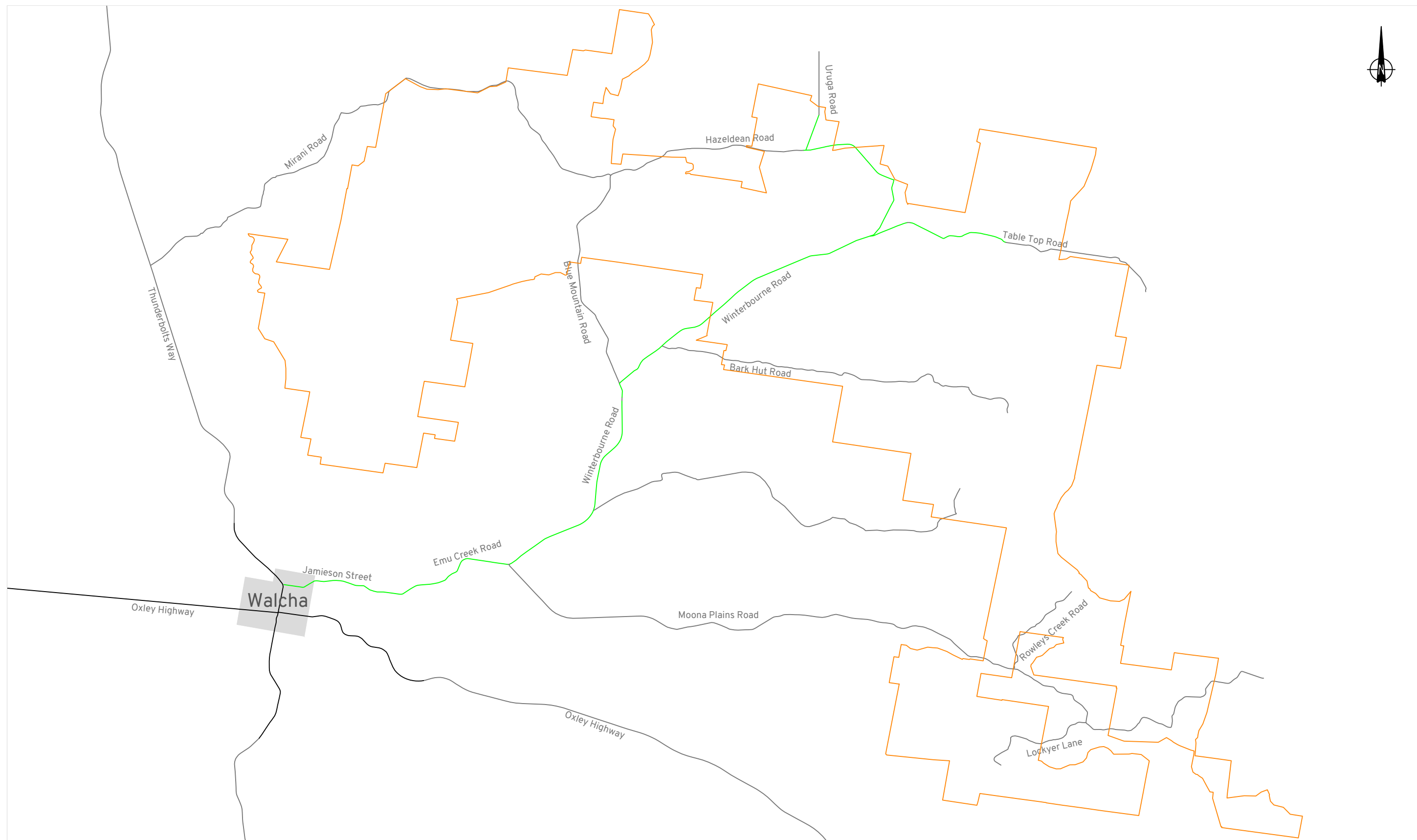
Road
Route

Project Boundary

Winterbourne Wind Farm

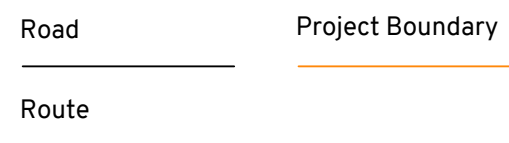
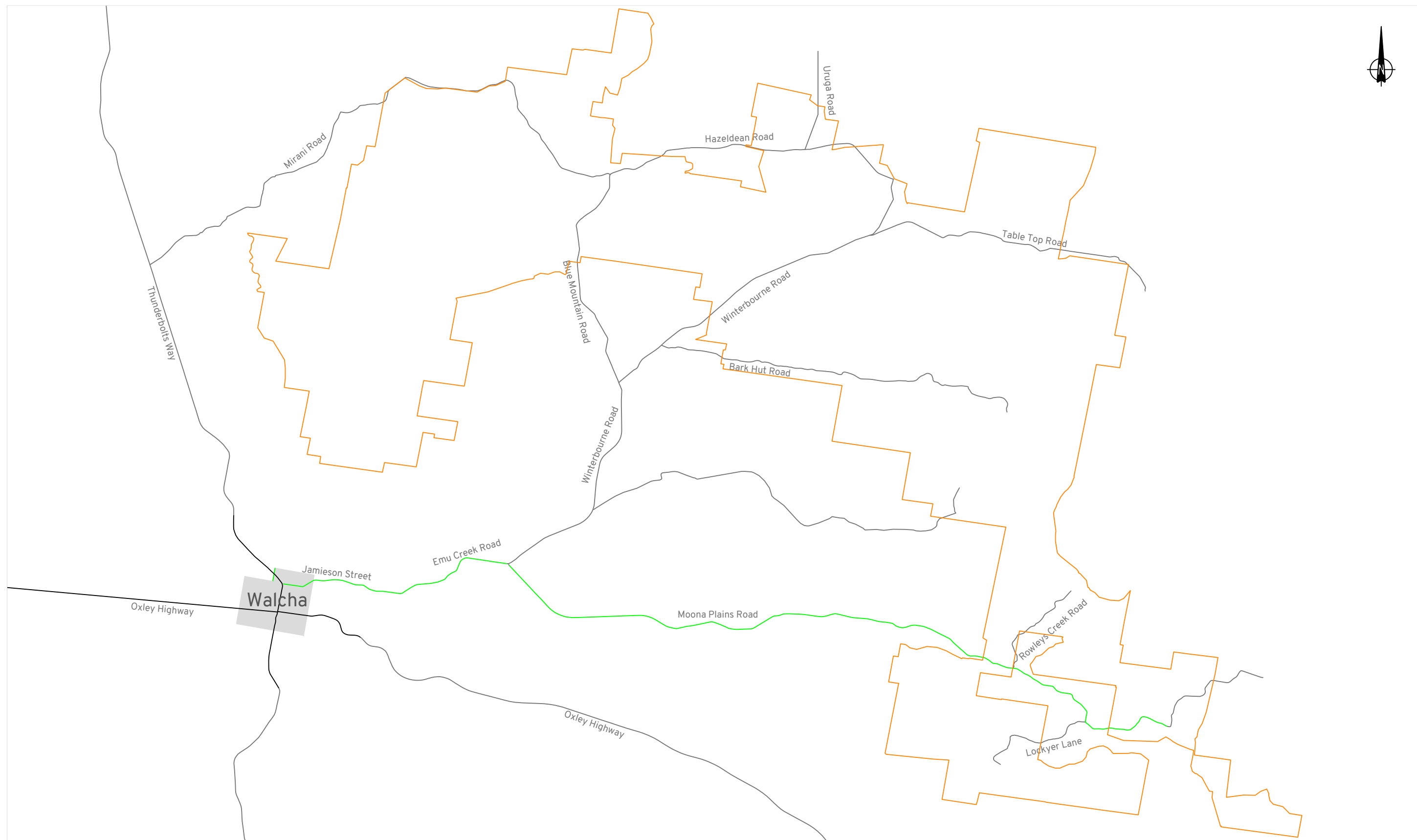
Local Road Access Routes - Route 1

DRAWN: MW
DATE: 18/09/2021
SCALE: NTS @ A3
DWG NO: 100-F02H



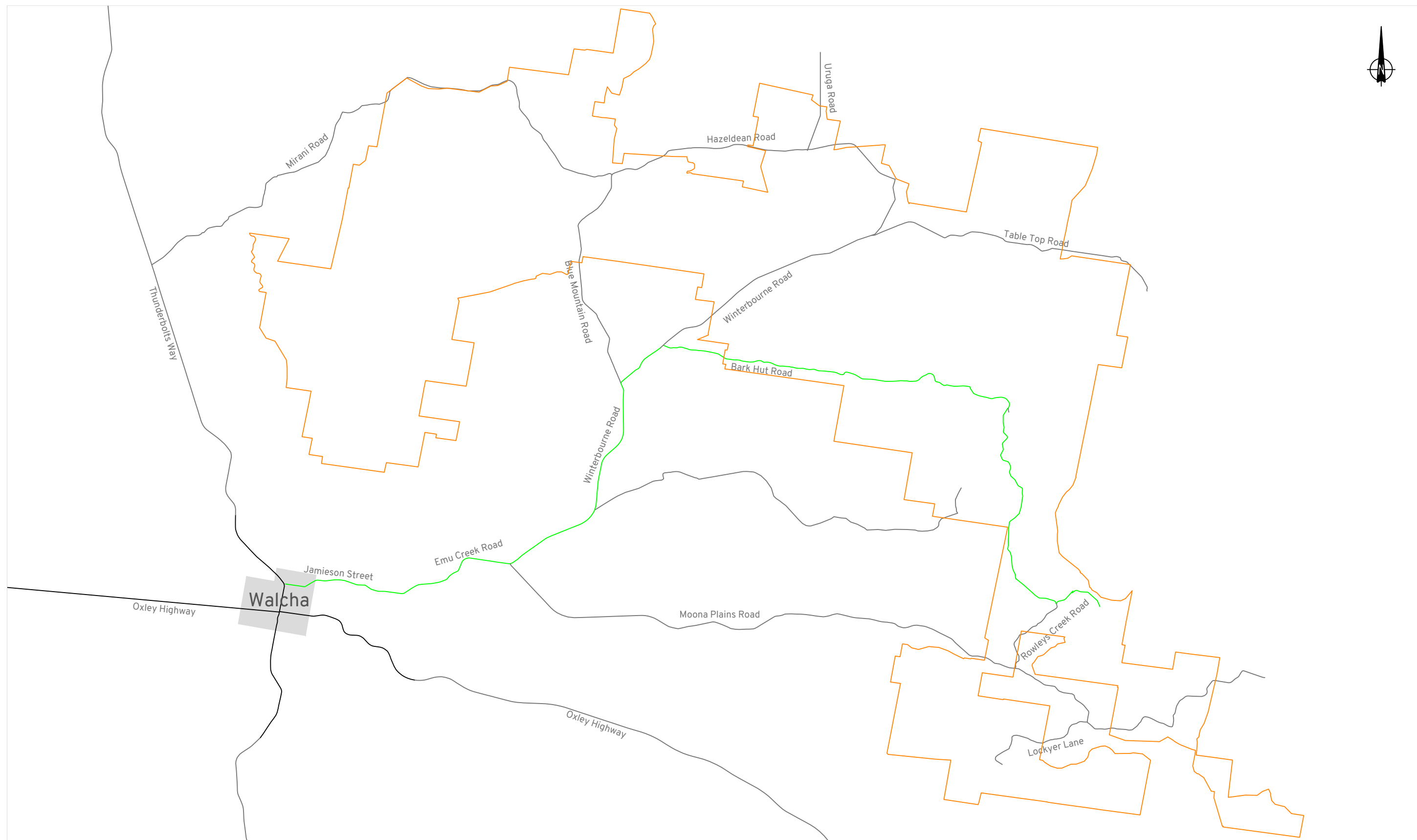
Winterbourne Wind Farm
Local Road Access Routes - Route 2

DRAWN: MW
DATE: 18/09/2021
SCALE: NTS @ A3
DWG NO: 100-F02H



Winterbourne Wind Farm
Local Road Access Routes - Route 3

DRAWN: MW
DATE: 18/09/2021
SCALE: NTS @ A3
DWG NO: 100-F02H



Road
Route

Project Boundary

Winterbourne Wind Farm

Local Road Access Routes - Route 3

DRAWN: MW
DATE: 18/09/2021
SCALE: NTS @ A3
DWG NO: 100-F02H



A summary of the assessment for Routes 1-3 is provided in Table 7 which lists the potential road upgrades required.

Table 7: Route 1-3 Route Assessment Summary

KM Index	Required Road Upgrades
Route 1	
2.0	Add hardstand to inside of corner to avoid trees with tail swing.
14.3	Current road width less than 5.0m in places. Will need to be widened to 5.0-5.5m with 0.5m verge on each side.
19.9	Site entrance to be made suitable for the swept path of the largest loads.
22.0	Widen intersection to accommodate swept path and remove two trees. Relocate two mailboxes.
Route 2	
2.0	Add hardstand to inside of corner to avoid trees with tail swing.
14.3	Current road width less than 5.0m in places. Will need to be widened to 5.0-5.5m with 0.5m verge on each side.
16.1	Significant hardstand required on inside of corner and culvert to be extended.
25.6	Remove cattle grid.
26.6	Road may need to be widened if transport required 5.0m wide wheels to achieve a lower overall height.
35.8	Add hardstand to inside of corner to avoid trees with tail swing.
39.5	Add hardstand to inside of corner to avoid excessive tail swing. Remove tree.
40.2	Add hardstand to the inside and outside of the bend. Remove/relocate cattle grid.
Route 3	
2.0	Add hardstand to inside of corner to avoid trees with tail swing.
6.8	Add hardstand to inside of corner to avoid trees with tail swing.
21.6	Likely tree trimming required.
22.0	Likely tree trimming required.
22.3	Trim and remove trees for tail swing.
23.0	Add hardstand to the inside and outside of corner.
24.9	Hardstand required on the outside of the corner for belly of blade to avoid trees.
25.6	Hard stand required on inside of corner and fence to be relocated.
26.0	Two trees to be removed.
26.3	Significant vegetation to be removed.
27.4	Remove of lower armco on left hand side of bridge.
28.0	Hard stand required on inside of corner and fence to be relocated.
28.8	Site entrance to be made suitable for the swept path of the largest loads.

Route 4 extends from Jamieson Street to Emu Creek Road and Winterbourne Road to access Bark Hut Road. Vehicles are then able to utilise the internal road network of the Project to access the northern end of Rowleys Creek Road. The section of road from Jamieson Street to the intersection

of Winterbourne Road and Bark Hut Road was assessed within the RJA Report. An assessment of the remainder of the route is provided within Appendix F and summarised below.

The Route 4 swept path assessment for the blade transport vehicle is based on the arrangement provided within the RJA Report and assesses the entire length of Bark Hut Road. The solid orange line within the figures represents the outline of the path taken by the vehicle and the extent of road widened required where the line extends outside of the existing carriageway, and the dashed red line represents the vehicle load (wind turbine blades) which can extend outside of the carriageway of the road but requires a minimum height clearance to pass over any obstacles.

A summary of the Route 4 assessment is provided in Table 8 which provides a list of the potential road upgrades required.

Table 8: Route 4 Route Assessment Summary

Figure within Appendix F	Required Road Upgrades
1	Remove tree to allow blade to overswing area south of the road and straighten section of road indicated.
2	Widen or straighten road to avoid tree removal.
3	Remove/widen cattle stop and widen road slightly to the north of the tree to avoid tree removal.
4	Widen road slightly to the north to avoid tree trimming, or trim tree.
5	Remove/widen cattle stop and widen road slightly to the north in location shown.
6	Trim trees in location shown.
7	Remove/widen cattle stop. Potential cut required to side of bank to allow blades to overswing.
8	Two trees opposite each other do not provide sufficient width so one tree will need to be removed.
9	Cut required to bank and minor road widening due to sharp corner.
10	No road upgrades required.
11	No road upgrades required.
12	The vertical alignment should be checked prior to construction to ensure the vertical alignment of the road does not result in the transport vehicle bottoming out. The undulating road can be amended with minor modifications to have a flatter gradient.
13	No road upgrades required.
14	Remove/widen cattle stop and trim tree.
15	Remove/widen cattle stop.
16	Adjacent to the tree indicated in the figure is a sharp change in grade. It is recommended the vertical alignment be assessed prior to construction.
17	Remove/widen cattle stop and widen the road as shown due to the sharp corner.
18	Remove/widen cattle stop.
19	No road upgrades required.
20	No road upgrades required.
21	Widen road on the inside and outside of the bend as shown.

The assessment demonstrates that the design vehicle can be accommodated with minor amendments to the road layout and vegetation. It is noted that Bark Hut Road is proposed to be upgraded to a minimum width of 5.5m to allow two vehicles to pass which is discussed further within Section 5.4 of this report. The proposed road widening is expected to address the majority of the road widening requirements of the route assessment detailed above.

Rowleys Creek Road is proposed to remain as a single lane road. OSOM vehicles are able to see the full length of Rowleys Creek Road required to be driven by the vehicles which spans between the two access roads. As such, the provision of no passing facilities along this section of the route is considered acceptable and can be managed on-site by the drivers and support vehicles in accordance with the Traffic Management Plan to be prepared by the appointed contractor.

Overall, the local road access routes are able to accommodate the blade delivery vehicle with only minor road works, including road widening, tree removal, and the relocation or widening of cattle stops.

6. Traffic Assessment

Traffic generated by the Project can be separated into three distinct stages: construction, operation and decommissioning. The peak traffic generating potential for the wind farm is during construction which generates trips associated with staff accessing the Project and the delivery of raw materials and plant. During operation the Project is expected to generate a minimal amount of traffic with only a small number of maintenance staff accessing the Project each day. Decommissioning of the Project is anticipated to generate a similar level of traffic to the construction stage, although the number of OSOM vehicle movements is able to be reduced by cutting the blades into smaller sections prior to transport.

The following provides an assessment of the potential traffic impacts of the Project on the road network function for each of the three stages.

6.1 Traffic Generation

6.1.1 Construction Traffic

The construction of the Project is anticipated to take approximately 24-30 months, with the proposed working hours as follows:

- Monday to Friday: 7am – 6pm;
- Saturday: 8am – 6pm;
- No work on Sundays or public holidays.

Any construction outside of these normal working hours would only be undertaken with prior approval from relevant authorities and consultation with impact road users.

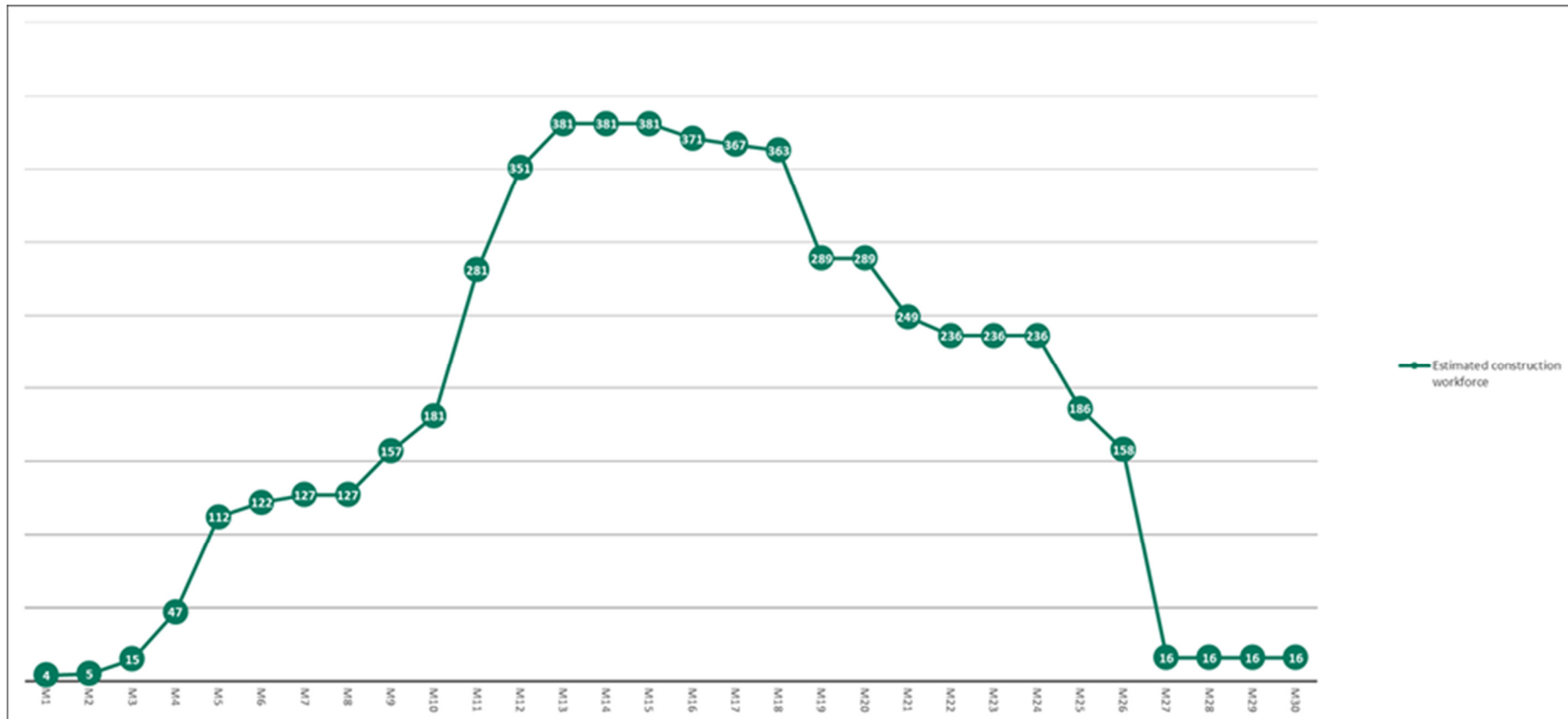
Approximately 400 staff will be on-site during the peak construction phase, with the peak construction period expected to take approximately 10 months. The construction schedule and the number of staff expected on-site throughout the various stages of the Project are provided within Figure 8. The key stages of the project are as follows:

- Site investigations;
- Civil and electrical works;
- Component delivery, cranes and installation; and
- Commissioning.

Construction staff are expected to be drawn from the nearby towns of Armidale, Tamworth, Uralla, and Walcha.

All plant associated with the wind turbine components will be delivered from the Port of Newcastle. Materials including water, gravel and reinforcing steel, and equipment such as cranes, excavators, and trench diggers, will be sourced from within the surrounding area where practicable. Construction also includes establishing fixed or mobile concrete batching plant(s), and office buildings and substations on-site for the construction and operational phases (e.g. maintenance) of the Project.

Figure 8: Construction Schedule



Construction traffic generated by the Project can broadly be separated into the following three categories:

- Light vehicles associated with transporting staff to/from the Project, including shuttle buses and personal vehicles;
- Medium and Heavy Rigid Trucks (MRV and HRV as defined within AS 2890.2:2018) will be used to deliver raw materials and smaller plant and have a typical length between 8-13 metres;
- Truck and Dog vehicles consist of a rigid truck towing either a dog trailer or a pig trailer and are not more than 19 metres in length. A dog trailer is a trailer with axles at either end of the trailer, a pig trailer has the axles centred on the trailer. These vehicles will be utilised to transport the majority of materials to/from the site;
- Articulated Vehicles (AV as defined within AS 2890.2:2018) will be used to transport larger plant and consist of a truck and a single trailer with a total length of 19 metres;
- B-Doubles (B-Double as defined within AS 2890.2:2018) will also be used to transport larger plant. B-Doubles consist of a truck and two trailers and have a maximum length of 26 metres; and
- OSOM vehicles associated with the delivery of the larger plant and equipment.

OSOM vehicles will contribute the smallest percentage of trips to the Project during the construction period and are subject to separate permit applications and regulations. The movement and impact of OSOM vehicles, and the subsequent road upgrades required, have previously been discussed within Section 5. The following assessment focuses on the impacts of the light and heavy vehicles which generate the bulk of the traffic and represent the typical traffic impact of the project on a day-to-day basis.

The traffic volumes for the Project have been determined based on the information provided by WinterbourneWind Pty Ltd which is shown within Appendix D. For the purposes of this assessment a conservative vehicle occupancy of 4.0 people per car has been adopted to calculate the staff traffic generation, with staff expected to be encouraged to carpool and in some instances shuttle buses may be used by specific contractors where a group of people are working in the same area.

Overall, it is anticipated that during peak construction the Project could generate up to 288 heavy and 270 light vehicle movements per day. Table 9 summarises the traffic movements expected to be generated during construction. It is noted that a vehicle movement is classified as a vehicle travelling in one direction (i.e. a truck accessing the site would generate one movement towards the site and one movement away from the site when it departs).

Table 9: Traffic Generation During Construction

Vehicle Type	Average Construction Vehicle Movements		Peak Construction Vehicle Movements	
	Daily (vpd)	Peak Hour (vph)	Daily (vpd)	Peak Hour (vph)
Light Vehicle	200	70	270	105
MRV/HRV	56	8	100	12
Truck and Dog	90	12	142	14
AV	22	2	34	4
B-Double	8	2	12	2
Total	376	94	558	137

Accordingly, the Project is expected to generate approximately 137 vehicle movements during the morning and evening peak hours during the peak construction period, which will reduce to 94 vehicle movements over the typical construction periods.

6.1.2 Operational Traffic

During operation the Project is expected to generate a minimal level of traffic associated with maintenance and operation services. The Project is expected to generate up to 16 vehicle movements per day which would result in a negligible change to the traffic environment.

6.1.3 Decommissioning Traffic

At the end of the operational life of the Project all above ground infrastructure will be dismantled and removed from the Project Boundary. Internal roads, if not required for ongoing farming purposes or fire access, would be removed and the Project Boundary reinstated as close as possible to its original state.

Traffic generation during decommissioning would be similar to traffic generation during the average construction period. A comprehensive Traffic Management Plan would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities. This would aim to ensure adequate road safety and road network operations are maintained.

6.2 Traffic Distribution

Vehicles travelling to Walcha from the west (Tamworth) will utilise New England Highway and Oxley Highway, and vehicles travelling from the north (Uralla and Armidale) will utilise Thunderbolts Way. Heavy vehicles coming from Oxley Highway will utilise Saleyard Road and Darjeeling Road to access Thunderbolts Way.

All vehicles are proposed to access the Project via Jamieson Street, Ohio Road, and Emu Creek Road, in order to reach the main site compound at the intersection of Winterbourne Road and Blue Mountain Road. Vehicles will then be able to continue on Blue Mountain Road to access the western portion of the Project, Winterbourne Road to access the northern portion, or they will backtrack and travel along Moona Plains Road to the southern portion.

The following provides a breakdown of the access distribution for each of the construction vehicle classifications outlined within Table 9:

- **Light Vehicles:** It is estimated that 30% of staff will be drawn from the Tamworth area and 20% will be located near Walcha. These vehicles will access the Project from the west/south. It is anticipated that 40% of staff will be drawn from the Armidale area and 10% will be drawn from the Uralla area and will travel from the north.
- **MRV/HRV:** These vehicles will predominantly be water trucks and vehicles transporting materials such as concrete and steel supplies which will be sourced within the surrounding area. The traffic movements have been assumed to be distributed with 60% from the west and 40% from the north.
- **Truck and Dog/AV/B-Double:** The majority of plant and larger raw materials (such as quarry material) will be transported via Newcastle and Tamworth from the west/south. It has been assumed that 70% will be transported from the west/south and 30% from the north.

The peak hour for Project construction will occur at the start and end of the day when staff are transported to/from the Project Boundary. The majority of staff will typically arrive on-site between 6:00am and 7:00am. However, staff generally have staggered finish times which results in the evening peak hour being less pronounced. For the purposes of this assessment, it has been assumed that all staff depart between 5:30pm and 6:30pm and the evening peak traffic volumes is 80% of the morning peak volume.

During the morning peak, all vehicle movements will be towards the Project and in the evening peak all vehicle movements will be away from the Project. Heavy vehicle movements will be distributed throughout the day and will be split evenly between inbound and outbound movements. The peak construction traffic volumes on the surrounding road network are shown within Figure 9 and the predicted future traffic volume on the road network (existing traffic volumes plus predicted peak construction traffic volumes on the surrounding road network) is shown within Figure 10.

6.3 Intersection Assessment

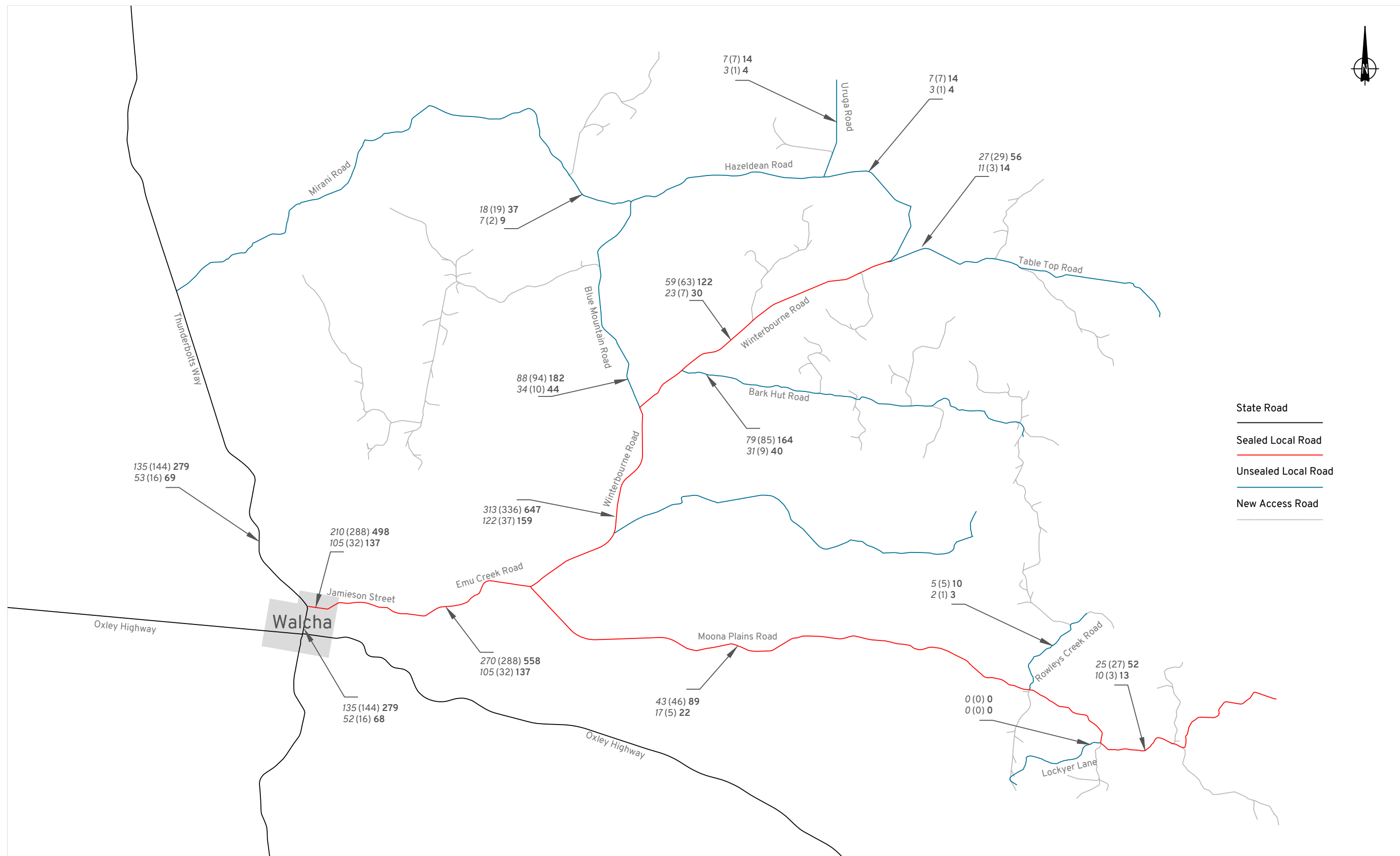
In order to determine the traffic impact generated during the construction of the Project, an analysis of the operation of the intersection of Thunderbolts Way with Jamieson Street was carried out using the SIDRA computer modelling program. The concepts of intersection capacity and level of service, as defined in the guidelines published by the RTA Guide, are discussed in Appendix G together with the criteria for their assessment. The assessment of the level of service for sign-controlled intersections is based on the average delay (seconds/vehicle) of the critical movement.

The traffic volume information which has been provided by Walcha Council and retrieved from the TfNSW Traffic Volume Viewer has been used to estimate the existing traffic volumes at the intersection. The assessment was undertaken for the peak construction traffic which is expected to occur between 6:00am and 7:00am when staff arrive on-site and from 5:30pm to 6:30pm when staff depart.

The traffic volumes used for the assessment are based on the existing traffic volumes plus the Project traffic volumes presented in Table 9. The vehicle movements are shown within Figure 11 and the results of the analysis are summarised below in Table 10.

Table 10: SIDRA Analysis Results Summary –Peak Construction Conditions

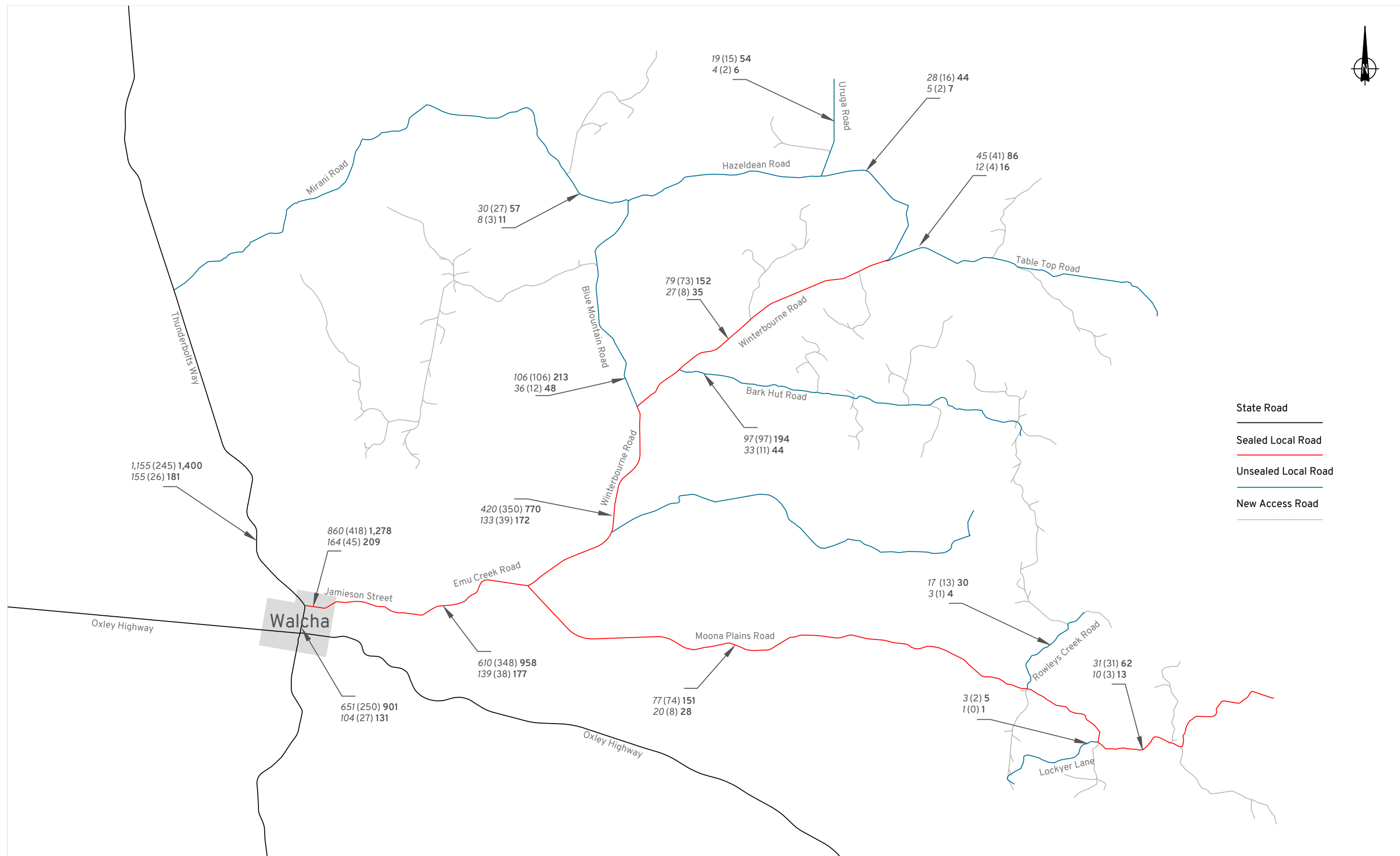
Movement		AM Peak			PM Peak		
		Average Delay (sec)	95% Queue (m)	Level of Service	Average Delay (sec)	95% Queue (m)	Level of Service
Thunderbolts Way Southern Leg	Through	0.3	2.6	A	0.2	1.8	A
	Right	6.1	2.6	A	6.0	1.8	A
Jamieson Street	Right	6.4	1.2	A	6.8	3.1	A
	Left	5.8	1.2	A	6.1	3.1	A
Thunderbolts Way Northern Leg	Through	0.0	0.0	A	0.0	0.0	A
	Left	5.8	0.0	A	5.8	0.0	A



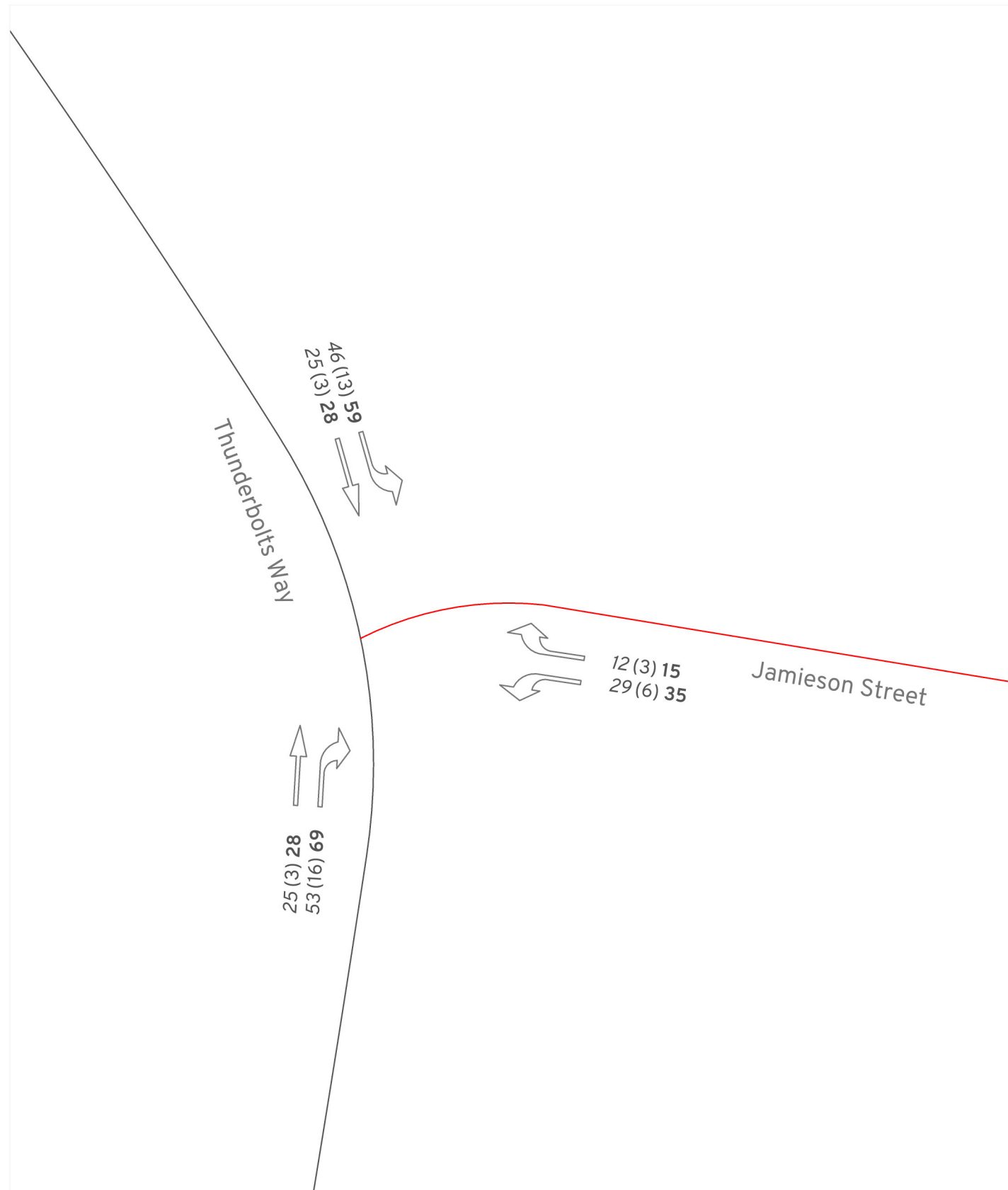
Daily Volumes: *Light Vehicles* (Heavy Vehicles) **Total Vehicles**
 Peak Hour Volumes: *Light Vehicles* (Heavy Vehicles) **Total Vehicles**

Winterbourne Wind Farm Project Traffic Volumes

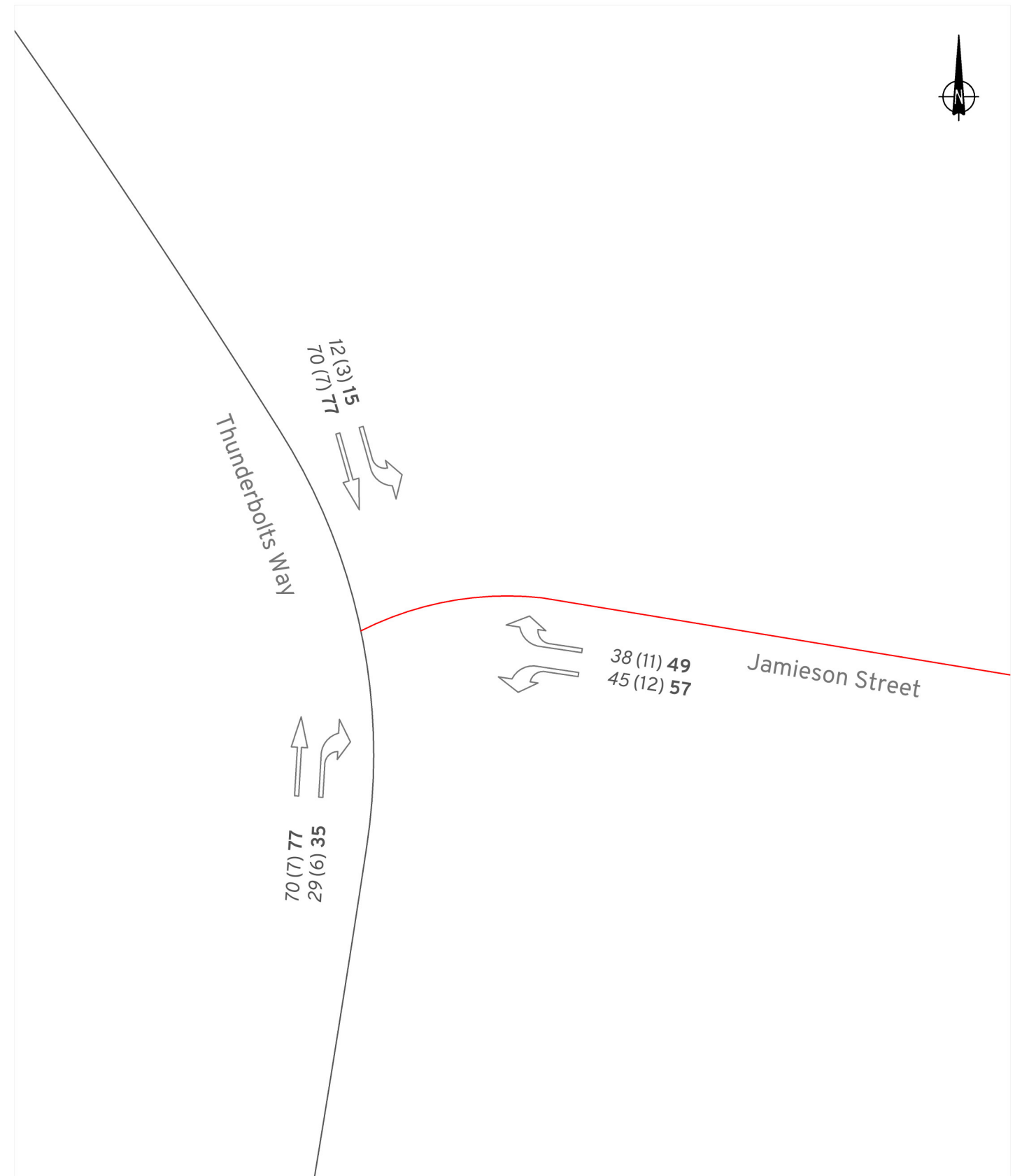
DRAWN: MW
 DATE: 18/09/2021
 SCALE: NTS @ A3
 DWG NO: 100-F02H



Daily Volumes: *Light Vehicles* (Heavy Vehicles) **Total Vehicles**
Peak Hour Volumes: *Light Vehicles* (Heavy Vehicles) **Total Vehicles**



AM Peak - 6:00am to 7:00am



PM Peak - 5:30pm to 6:30pm

Daily Volumes: *Light Vehicles* (Heavy Vehicles) **Total Vehicles**
 Peak Hour Volumes: *Light Vehicles* (Heavy Vehicles) **Total Vehicles**

Winterbourne Wind Farm
 Peak Hour Intersection Volumes During Construction
 Thunderbolts Way / Jamieson Street Intersection

DRAWN: MW
 DATE: 04/05/2021
 SCALE: NTS @ A3
 DWG NO: 100-S01C

In summary, the SIDRA analysis indicates the following:

- The average delay at the intersection during the morning and evening peak hours is 4.6 and 3.2 seconds respectively;
- The degree of saturation at the intersection during the morning and evening peak hours is 0.067 and 0.099 respectively;
- All turn movements are expected to operate with a Level of Service A at all times; and
- The intersection is expected to continue to operate with a good level of service with minimal delays and queue lengths.

Outside of the morning and evening peak hour of the Project the traffic generation is expected to be significantly lower (in the order of 30 vehicles per hour or one vehicle every 2 minutes) and would be able to be readily accommodated on the road network.

Overall, construction traffic is expected to have a minimal impact on the operation of the intersection. Given the intersection accommodates the highest level of traffic of all the intersections used by construction vehicles within the vicinity of the Project it is concluded that the intersections on the local roads northeast of Walcha are all expected to continue to operate with a good level of service.

Accordingly, it is concluded that the road network is able to accommodate the traffic generated by the Project during the construction period.

6.4 Carriageway Level of Service

The concept of carriageway capacity and Level of Service are discussed in Appendix H together with criteria for their assessment. The surrounding road network has been assessed against the criteria during peak construction and is summarised within Table 11.

Table 11: Peak Construction Period Carriageway Capacity Assessment

Road Segment	Existing Traffic Volume (vph)	Project Traffic Generation (vph)	Existing and Project Traffic Volume (vph)	LOS
Oxley Highway	62	68	130	A
Thunderbolts Way	112	69	181	A
Jamieson Street	72	137	209	A
Emu Creek Road (south of Moona Plains Road)	40	137	177	A
Moona Plains Road (west of Rowleys Creek Road)	6	22	28	A
Rowleys Creek Road	2	3	5	A
Moona Plains Road (east of Rowleys Creek Road)	1	12	13	A
Emu Creek Road (north of Moona Plains Road)	12	160	172	A
Winterbourne Road	4	31	35	A
Bark Hut Road	3	41	44	A

Table Top Road	3	13	16	A
Blue Mountain Road	4	44	48	A
Hazeldean Road	3	4	7	A
Uruga Road	2	4	6	A

The assessment demonstrates that all roads will continue to operate with a LOS A and can readily accommodate the construction traffic volumes and the road network is expected to operate under good conditions.

6.5 Passing Facilities

All local roads are provided with sufficient carriageway widths to allow two opposing vehicles to pass excluding the eastern portion of Bark Hut Road and the full length of Rowleys Creek Road.

It is proposed to widen Bark Hut Road to have a minimum carriageway width of 5.5m, which would accommodate simultaneous two-way vehicle movement. This will also allow large trucks associated with the delivery of plant to pass vehicles associated with the surrounding agricultural uses.

The section of Rowleys Creek Road to be utilised by the project is between the two proposed accesses and is only proposed to be used to access the two wind turbines located at the north-eastern end of Rowleys Creek Road (Route 4 as described with Section 5.7). Rowleys Creek Road is expected to accommodate a minimal level of traffic between the accesses which is in the order of 30 vehicles per day and 4 vehicles per hour as illustrated within Figure 10.

Vehicles are able to see the full length of Rowleys Creek Road required to be driven by the vehicles which spans between the two access roads. As such, the provision of no passing facilities along this section of the road is considered acceptable and can be managed on-site by drivers and support vehicles in accordance with a TMP. It is noted that no vehicles are proposed to access Rowleys Creek Road via Moona Plains Road.

Accordingly, the widths of the road network are considered acceptable to accommodate the traffic movements generated by the project subject to the widening of Bark Hut Road at its eastern end.

6.6 Cumulative Impacts

The primary traffic impact of the Project is generated during construction which is anticipated to start in early 2023 and be completed early 2025. The assessment outlined earlier demonstrates that the road network will continue to operate with ample spare capacity even during the peak construction period of the Project. An assessment of the cumulative impacts of major projects that are proposed in the surrounding area is provided within Table 12, which provides a description of each project to determine the potential overlap of construction traffic.

Table 12: Assessment of Cumulative Impacts of Nearby Developments

Project	Description	Potential Vehicle Conflict
Salisbury Solar Farm (Prepare EIS)	Salisbury Solar Farm is located on both sides of Thunderbolts Way approximately 10km south of Uralla. Traffic impacts include increased traffic movements from the nearby towns associated with staff and increased truck volumes delivering plant and equipment. The solar farm is anticipated to generate increased turning movements to/from Thunderbolts Way associated with vehicles accessing the site. The Scoping Report for the proposed project indicated construction would occur between 2021 and 2023, however it seems likely that this timeframe will be later than originally anticipated. No detailed traffic information has been provided and a Traffic Impact Assessment is proposed as part of the EIS.	The construction period for both projects may partially overlap which is when the projects will generate the peak traffic on the road network. Staff for both projects are anticipated to be located in similar locations given the sites proximity to each other. Therefore, the state road network in the vicinity of Armidale, Uralla, Walcha and Tamworth will be utilised by both projects. During operation the projects are both expected to generate a minimal level of traffic.
Thunderbolts Wind Farm (Response to Submissions) and Thunderbolt Solar Farm (Prepare EIS)	The proposed Thunderbolt Energy Hub is located in the Kentucky Area approximately 40km northeast of Tamworth adjacent to New England Highway. The Thunderbolt Energy Hub is proposed to include wind and solar electricity generation and battery storage. Stage 1 of the project will include a 192MW wind farm. Stage 2 will include a wind farm, the size of which is yet to be determined. A 120MW solar plant is also proposed.	The construction periods for the projects could potentially overlap. Both projects are anticipated to have staff located in Armidale, Uralla, and Tamworth and will utilise the same transport route to deliver plant from the Port of Newcastle.
Oxley Solar Farm (Response to Submissions)	Amber Organisation has assisted in the preparation of a Traffic Assessment for the solar farm, which is located approximately 10km southeast of Armidale, to the south of Waterfall Way. Construction workers are proposed to be located in Armidale, with access proposed via Waterfall Way and Gara Road.	There is potential for construction of both projects to overlap. Construction traffic generated by the projects may interact within the township of Armidale where staff for both projects are proposed to be located. During operation the projects are both expected to generate a minimal level of traffic.
Tilbuster Solar Farm (Determination)	Amber Organisation has prepared a Traffic Assessment for the solar farm, which is located approximately 13km north of Armidale. Construction workers are proposed to be located in Armidale, with access proposed via New England Highway.	There is potential for construction of both projects to overlap, though it is possible that construction of the solar farm would be completed prior to commencement of construction of the proposed wind farm. The traffic generated by the projects may interact within the township of Armidale where staff for both projects are proposed to be located.

New England Solar Farm (Construction)	New England Solar Farm is located approximately 6 kilometres east of the township of Uralla. Construction will take approximately 32-36 months and the project's construction workforce will be in the order of 300 people. The project is expected to generate 912 daily vehicle movements (760 by light vehicles and 152 by heavy vehicles) during the peak construction periods.	Construction of the solar farm would be expected to be complete prior to construction of the proposed Winterbourne Wind Farm.
Middlebrook Solar Farm (Prepare EIS)	Amber Organisation has prepared a Traffic Assessment for the solar farm, which is located approximately 16km south of Tamworth. Construction workers are proposed to be located in Tamworth, with access proposed via Middlebrook Road which will connect with New England Highway.	There is potential for construction of both projects to overlap. The traffic generated by the projects may interact within the township of Tamworth where staff for both projects are proposed to be located. Upgrades are proposed to the intersection of Middlebrook Road / New England Highway to allow vehicle to turn safely from the state road.
Tamworth Solar Farm (Determination)	The solar farm will gain access from Soldiers Settlement Road which connects with Oxley Highway west of Tamworth. Construction workers are proposed to be located within Tamworth.	There is potential for construction of both projects to overlap, though it is possible that construction of the solar farm would be completed prior to construction of the proposed wind farm. The traffic generated by the solar farm may interact with transport of wind farm components.
Hills of Gold Wind Farm (Assessment)	The wind farm is located approximately 60km southeast of Tamworth and will provide approximately 65 turbines. Vehicles accessing the site will utilise the local road network that connects with New England Highway.	The construction periods for the projects could potentially overlap. Both projects would likely utilise the same transport route to deliver plant for the Port of Newcastle.
Bowmans Creek Wind Farm (Assessment)	The wind farm will be located approximately 10 kilometres east of Muswellbrook and is expected to accommodate approximately 70-80 wind turbines. The project is located across three Local Government Area boundaries, with wind turbines primarily situated within the Muswellbrook Shire and Singleton Shire, and a small number of turbines proposed in the Upper Hunter Shire. Access to the internal site road network is proposed via Scrumlo Road and Picton Lane.	The transport route for heavy plant from the Port of Newcastle will be used for both projects and has the potential for the construction periods to overlap.
Doughboy Wind Farm (Prepare EIS)	The Project is located about 40 km east of Armidale and involves the construction of approximately 52 wind turbines. Access to the site is proposed from Waterfall Way and Guyra Road.	The construction periods for the projects could potentially overlap. Both projects are anticipated to have staff located in Armidale and will utilise the same transport route to deliver plant from the Port of Newcastle.

Rangoon Wind Farm (Prepare EIS)	The Rangoon Wind Farm comprises two parts, Rangoon Wind Farm South and Rangoon Wind Farm North. The Rangoon Wind Farm includes approximately 25 wind turbines and a battery energy storage system. The Project is near the villages of Ben Lomond and Glencoe NSW approximately 60km north of Armidale and 40km south of Glen Innes.	The construction periods for the projects could potentially overlap. Both projects are anticipated to have staff located in Armidale and will utilise the same transport route to deliver plant from the Port of Newcastle.
Bendemeer Solar Farm (Prepare EIS)	The solar farm is proposed to have a capacity of 210MW and will also include a battery energy storage system with an indicative capacity of 200MW. The site is located at 4409-4461 Oxley Highway and is situated 1.5 kilometres east of Bendemeer, with access to the site is proposed via a new connection with Oxley Highway. Staff are expected to primarily be located in Tamworth, with all plant expected to be delivered from Port of Newcastle.	There is potential for construction of both projects to overlap. The traffic generated by the projects may interact within the township of Armidale or Tamworth where staff for both projects are proposed to be located.
Sundown Solar Farm (Prepare EIS)	The project is a 600MW solar farm located approximately 30km east of Inverell. Access to the site is from Gwydir Highway either via a private road off Gwydir Highway or alternatively through Sturmans Road via Spring Mountain Road.	Given the distance from the site there is expected to be minimal interaction of vehicle movements associated with the solar farm and project traffic.
Sapphire Solar Farm (Construction)	Sapphire Solar Farm is an approved 180 MW(AC) solar farm located alongside the Sapphire Wind Farm in the New England region of northern NSW.	Given the distance from the site there is expected to be minimal interaction of vehicle movements associated with the solar farm and project traffic.

The assessment above reviews whether the cumulative additional traffic of the other projects, particularly from staff vehicles during peak periods, resulted in increased congestion on the road network that would result in the unacceptable delays or queue lengths, and whether there was potential conflict for OSOM vehicles. Based on the assessment, the surrounding major projects have the potential to generate a number of staff vehicle movements during peak construction. In particular, a number of staff will be located in Tamworth, Uralla, and Armidale. Key projects that are expected to generate traffic on the surrounding road network include the Salisbury and New England Solar Farms and the Thunderbolts Energy Hub and Wind Farm.

The traffic assessment provided within this report demonstrates that the local road network is expected to continue to operate with a good level of service with ample spare capacity. As such, the combined increase in traffic generated by the Project and these projects is expected to have a minimal cumulative impact on the road network, including through Walcha, Tamworth, Uralla, and Armidale. Further, it is noted that the peak traffic generated by these projects during construction occurs before 7:00am and after 6:00pm which is outside of the peak times of the road network.

It is recommended that the TMP include making drivers aware of additional turning movements on Thunderbolts Way generated by potential traffic from construction of the Salisbury Solar Farm, if applicable. It is also recommended that any delivery of large plant be coordinated with other proposed wind farm projects to ensure the vehicle movements do not conflict.

7. Access Route Road Surface

The *Australian Road Research Board Best Practice Guide for Unsealed Roads 2* (ARRB Guide), dated October 2020, provides a breakdown of the unsealed road classifications based on a functional classification system which is reflective of the approach taken within the Austroads Guidelines. A summary of the classifications outlined within Table 3.9 of the ARRB Guide is provided in Table 13.

Table 13: Unsealed Roads Classification System (ARRB Guide)

Road Class	Class Type	Service Function Description	Road Type Description
4A	Main Road > 150 vpd	This type of road is used for major movements between population centres and connection to adjacent areas. High traffic volumes occur, and the road can carry large vehicles.	- All weather road, predominantly two-lane and unsealed. Can be sealed if economically justified. - Operating speed standard of 50–80 km/h according to terrain. - Minimum carriageway width is 7m.
4B	Minor Road 50-150 vpd	This type of road is used for connection between local centres of population and links to the primary network.	- All-weather two-lane road formed and gravelled or single-lane sealed road with gravel shoulders. - Operating speed standard of 30–70 km/h according to terrain. - Minimum carriageway width is 5.5m.
4C	Access Road 10-50 vpd	Provides access to low use areas or individual rural property sites and forest areas. Caters for low travel speed and a range of vehicles and may be seasonally closed.	- Substantially a single lane two-way, generally dry weather, formed road. - Operating speeds standard of < 20–40 km/h according to terrain. - Minimum carriageway width is 4m.
4D	Tracks < 10 vpd	Mainly used for fire protection purposes, management access and limited recreational activities.	- Predominantly a single-lane two-way earth track (unformed) at or near the natural surface level. - Predominantly not conforming to any geometric design standards. - Minimum cleared width is 3m.

Unsealed roads would typically be considered for sealing when they accommodate between 200 and 500 vehicle movements per day. The ARRB Guide notes that roads may warrant paving when maintenance costs increase to unacceptable levels, in wet climates, or when economic or social benefits are evident. Given the expected traffic volume on the local roads is less than 500 vehicles per day and the increase in traffic is only temporary it is considered acceptable for the roads to remain unsealed.

The future traffic volumes within the surrounding local road network are provided within Figure 10. This demonstrates that the unsealed road network is not anticipated to accommodate more than 200 vehicle movements per day excluding Blue Mountain Road which is expected to accommodate 213 vehicles per day during peak construction. Accordingly, the existing road surface is considered acceptable to accommodate the traffic generated by the construction of the Project.

A TMP will be prepared prior to construction of the Project. It is recommended that the following form part of the TMP to minimise the impact of construction traffic along the unsealed roads:

- Prior to construction, a pre-condition survey of the relevant sections of the existing road network be undertaken, in consultation with Walcha Council. During construction

the sections of the road network utilised by the Project are to be monitored and maintained to ensure continued safe use by all road users, and any faults attributed to construction of the Project are to be rectified. At the end of construction, a post-condition survey is to be undertaken to ensure the road network is left in the consistent condition as at the start of construction.

- Vehicles will drive at slower speeds when travelling on unsealed road. This can reduce the amount of dust created and the amount of dirt tracked onto the public road network. Standard mitigation measures such as a water trucks to dampen the roads and reduce the amount of dust in the air, can also be considered to reduce dust levels.
- Neighbours of the Project will be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.

Figure 5 demonstrates that all roads within the vicinity of the Project are rated to accommodate B-double vehicles. Therefore, it is concluded that the surface of the road, with the inclusion of the proposed upgrades identified within this report, is suitable to accommodate the future traffic volumes.

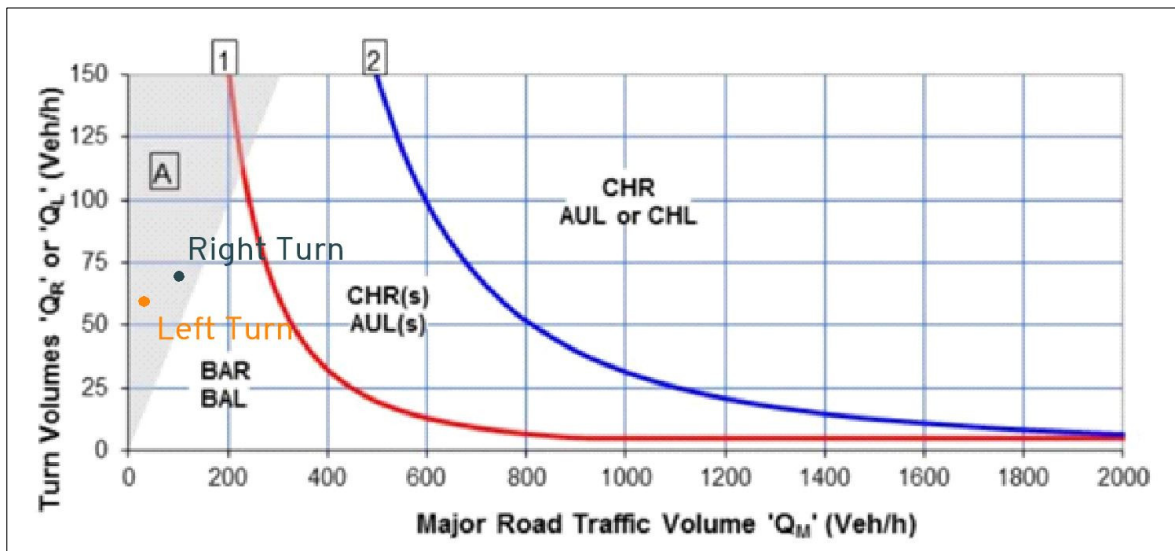
8. Intersection Assessment

8.1 Turning Treatments

An assessment of the turning treatments has been undertaken at the intersection of Thunderbolts Way with Jamieson Street, Walcha. At the intersection, Thunderbolts Way has a speed limit of 50km/hr and as such, a design speed of 60km/hr has been adopted for the purposes of this assessment.

The *Austrroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings* specifies the turning treatments required at intersections. Figure 3.25 of the guide specifies the required turn treatments on the major road at unsignalised intersections, provided below in Figure 12 for a design speed of less than 70km/hr.

Figure 12: Design Speed Less Than 70km/hr



The traffic volumes at the intersection are provided in Figure 11. The peak hour turning volumes will predominantly be generated by staff accessing the Project in the morning peak from 6:00am to 7:00am. The turn movements and subsequent turn treatment requirement is shown in Table 14 and illustrated in Figure 12.

Table 14: Turning Movements from Thunderbolts Way During Peak Construction

Turn Movement	Traffic Volume (vph)		Required Turn Treatment
	Turn Volume	Major Road	
Right Turn	69	115	BAR
Left Turn	59	28	BAL

Given the low level of traffic currently experienced on Thunderbolts Way and Jamieson Street, and the minimal increase in the number of turning treatments generated by the construction traffic, the intersections would require a Basic Right Turn (BAR) and a Basic Left Turn (BAL) turn treatment.

The intersection of Thunderbolts Way and Jamieson Street is essentially provided with the basic turn treatments due to the wide carriageway width of Thunderbolts Way, with each lane having a

width of approximately 6.5m. A swept path assessment has been provided within Appendix I using the software package 'AutoTurn' which shows an AV turning to/from Jamieson Street in a suitable manner. Accordingly, the intersection turning facilities are appropriate and are in accordance with the Austroads requirements.

As discussed in Section 4.3 the intersection is proposed to be upgraded, with the proposed plans provided in Appendix B. The proposed amendments to the intersection are expected to provide a safer environment by providing a new road surface and associated linemarking and setting back the barrier on the south-eastern corner of the intersection. In addition, a dedicated right turn lane is provided for vehicles turning from Thunderbolts Way.

8.2 Sight Distance Assessment

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections specifies the Safe Intersection Sight Distance (SISD) as the minimum sight distance which should be provided along the major road at any intersection. Table 3.1 of the guide specifies the SISD required for various design speeds. The required SISD for a design speed of 60km/hr is 123m. The available sight distance at the intersection of Thunderbolts Way and Jamieson Streets greatly exceeds the Austroads requirements and is illustrated within Figure 13.



Sight Distance - 123 metres

Sight Line

Winterbourne Wind Farm
Thunderbolts Way / Jamieson Street
Sight Distance Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:1250@ A3
DWG NO: 100-F01B

9. Site Access

The Project layout and proposed access roads are detailed in Figure 1. The layout shows the connections with the local road network, including:

- Nine connections with Bark Hut Road;
- Four connections with Moona Plains Road;
- Two connections with Rowleys Creek Road;
- Two connections with Table Top Road;
- Two connections with Winterbourne Road;
- Two connections with Blue Mountain Road; and
- One connection with Uruga Road.

In order to determine the suitability of each of the proposed access locations, an assessment has been undertaken to determine whether suitable sight distance has been provided to allow vehicles to safely enter/exit the road network, and a swept path assessment has been prepared for the OSOM vehicles to confirm the access locations are suitable to accommodate the larger vehicles expected to access the Project.

Figure 15 shows the numbering system for each of the access locations.

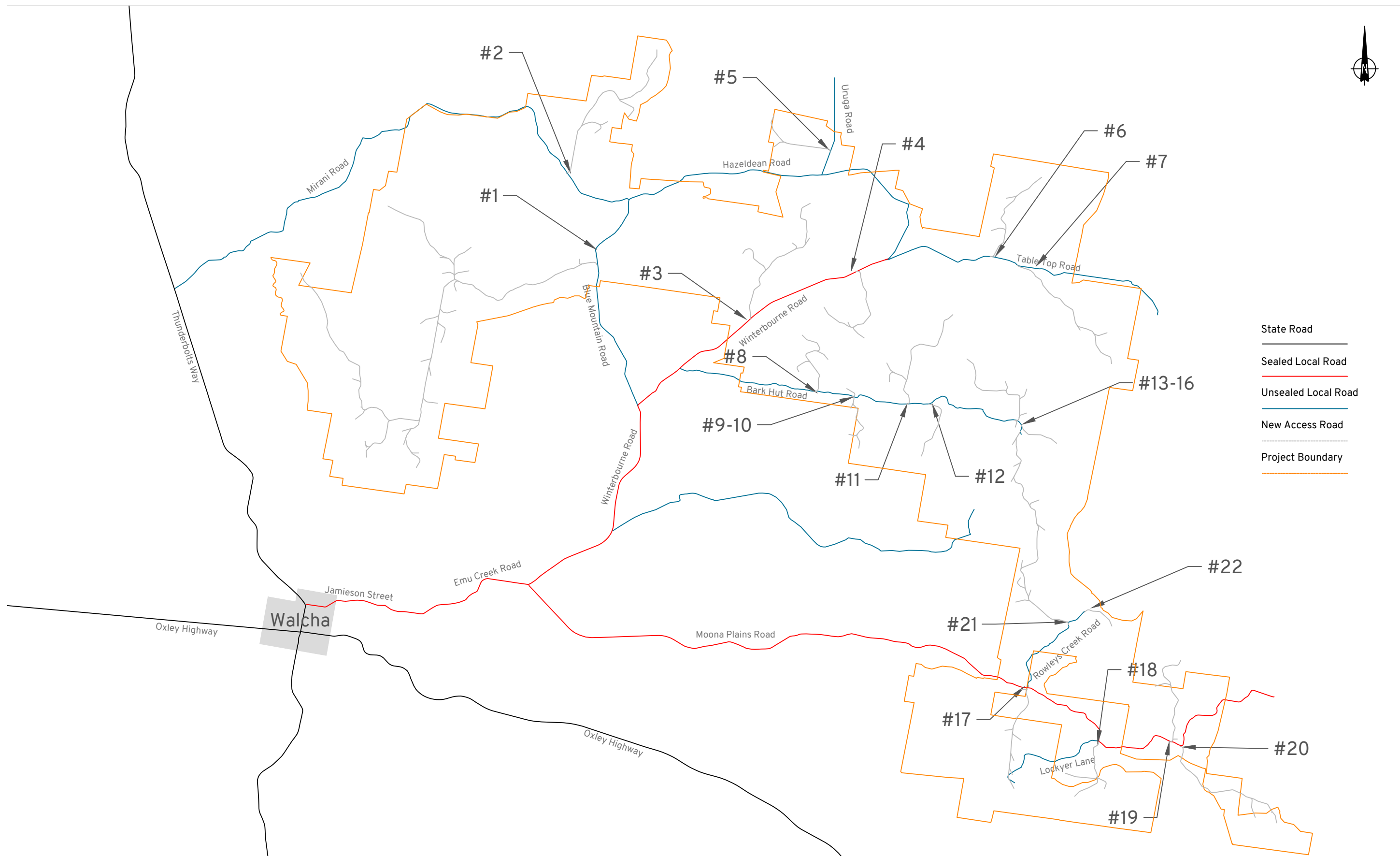
9.1 Sight Distance Assessment

It is recommended that each access be designed to meet the Safe Intersection Sight Distance specified within the *Austrroads Guide to Road Design – Part 4A: Unsignalised Intersections* to ensure the sight distance at each access allows the safe movement of vehicles to/from the road network.

The required sight distance within the Austrroads Guideline is provided within Figure 14. The design speed used for the assessment has been based on the 85th percentile operating speed of the road at the access given the rural and sometimes unsealed nature of the local road network which results in the operating speed being lower than the speed limit. The operating speed has been determined based on on-site observations.

Figure 14: Safe Intersection Sight Distance Requirements from the Austrroads Guide

Design speed (km/h)	Based on safe intersection sight distance for cars ⁽¹⁾ $h_1 = 1.1$; $h_2 = 1.25$, $d = 0.36$ ⁽²⁾ ; Observation time = 3 sec					
	$R_T = 1.5 \text{ sec}^{(3)}$		$R_T = 2.0 \text{ sec}$		$R_T = 2.5 \text{ sec}$	
	SISD (m)	K	SISD (m)	K	SISD (m)	K
40	67	4.9	73	6	–	–
50	90	8.6	97	10	–	–
60	114	14	123	16	–	–
70	141	22	151	25	–	–
80	170	31	181	35	–	–
90	201	43	214	49	226	55
100	234	59	248	66	262	74
110	–	–	285	87	300	97
120	–	–	324	112	341	124
130	–	–	365	143	383	157



Winterbourne Wind Farm Access Locations

DRAWN: MW
DATE: 18/09/2021
SCALE: NTS @ A3
DWG NO: 100-F02H

An assessment of the safe stopping distances for unsealed roads has been undertaken by G F Koorey and P D Cenek in 1999 which was published by the Australian Transport Safety Bureau. The experiment assessed the typical friction coefficients when calculating braking distances on unsealed roads in Australasia in various conditions. The measurements established that dry and wet friction coefficients of unsealed roads are independent of speed. Ultimately, the study found that the stopping distance for unsealed roads was on average 15m greater than sealed roads. Accordingly, the recommended SISD for unsealed roads has been increased by 15m against the values outlined within the Austroads Guideline.

An assessment of the sight distance at the access points for the Project is provided below within Table 15.

Table 15: Sight Distance Assessment

Access Location	Access Road	Design Speed (km/hr)	Recommended Sight Distance (m)	Available Sight Distance (m)
1	Blue Mountain Road	80km/hr	196m	350m+ south 217m north
2		70km/hr	166m	350m north 220m south
3	Winterbourne Road	100km/hr	248m	331m north 272m south
4		110km/hr	285m	350m+ north 350m+ south
5	Uruga Road	70km/hr	166m	320m north 181m south
6	Table Top Road	70km/hr	166m	304m west 350m+ east
7		60km/hr	138m	184m west 170m east
8	Bark Hut Road	70km/hr	166m	198m west 307m east
9-10		70km/hr west 50km east^	166m	108m west 97m east
11		80km/hr	196m	246m west 196m east
12		60km/hr	138m	127m west 143m east
13-16		80km/hr	196m	All exceed the requirement
17	Moona Plains Road	90km/hr west 70km/hr east^	214m 151m	350m+ west 74m east
18		60km/hr	123m	350m west 291m east

Access Location	Access Road	Design Speed (km/hr)	Recommended Sight Distance (m)	Available Sight Distance (m)
19	Moona Plains Road	80km/hr	181m	255m west 127m east
20		80km/hr west 40km/hr east	181m 73m	201m west 73m east
21	Rowleys Creek Road	50km/hr	112m	350m+ north* 71m south
22		50km/hr	112m	321m north 350m+ south*

^ - Some approach speeds from opposite directions differ due to adjacent vertical or horizontal alignment

* - Sight distance extends between the two accesses on Rowleys Creek Road

Based on the above assessment, several accesses do not provide sufficient sight distances to meet the recommended provisions outlined within the Austroads Guideline. The following provides a summary of the proposed mitigation measures to address each of the identified access locations that do not meet the sight distance requirements:

- Accesses 9 and 10: A 40km/hr speed limit is proposed in the vicinity of Accesses 9 and 10 in order to meet the requirements of the Austroads Guideline. The accesses are located west of several tight bends on Bark Hut Road which also have a steep vertical alignment. Given the increase in traffic generated by the Project, it is recommended that the speed reduction be extended further east to include the tight bends and provide a safer road environment. The approximate area to be reduced to 40km/hr is shown within Figure 16.
- Access 12: The sight distance to the west of Access 12 falls short of the sight distance requirement by 9m but exceeds the requirement by 5m to the east. It is recommended that the access be located so that the sight distance is only 2m short of the requirement in either direction which is considered to an acceptably small reduction from the Austroads Guideline.
- Access 17: The sight distance to the east does not meet the requirements of the Austroads Guideline. The access is located opposite the intersection of Rowleys Creek Road with Moona Plains Road which is currently operating in a safe manner given there are no existing crashes recorded at the intersection. Given the low traffic volumes at the intersection, it is expected that the intersection will continue to operate in a safe manner and the available sight distance is acceptable. It is noted that the vegetation to the west of the access on the northern side of Moona Plains Road should be maintained at a low height to ensure suitable sight distances are maintained.
- Access 19: The sight distance to the east of Access 19 does not meet the requirements of the Austroads Guideline. The northern side of the road, just to the east of the access, is proposed to be amended to provide a minor cut to the sloped berm. The amendment to the berm allows suitable sight lines to ensure the sight distance exceeds the requirements of the Austroads Guideline. The area where the minor modification is required is provided shown within Figure 17.
- Access 21: Due to the horizontal bend on Rowleys Creek Road the required sight distance to the south is unable to be provided. Rowleys Creek Road is expected to accommodate a low level of traffic (approximately 30 vehicles per day) and as such, it is proposed to provide a convex mirror on the outside of the bend in order for drivers to see oncoming vehicles and meet the required sight distance. The proposed arrangement is shown within Figure 18.



Winterbourne Wind Farm

Access 8 and 9

40km/hr Speed Zone

DRAWN: MW

DATE: 06/05/2021

SCALE: 1:2500 @ A3

DWG NO: 100-S01E



View from access looking east



View from opposite access looking east

Area to be Amended

Winterbourne Wind Farm
Access 20 Sight Distance
Proposed Berm Amendment

DRAWN: MW
DATE: 06/05/2021
SCALE: NTS @ A3
DWG NO: 100-S01C



Winterbourne Wind Farm
Access 22 Sight Distance
Convex Mirror Arrangement

DRAWN: MW
DATE: 06/05/2021
SCALE: 1:750 @ A3
DWG NO: 100-S01A

Subject to the adoption of the mitigation measures detailed above, the accesses are expected to operate in an efficient manner and allow vehicles to safely enter and exit the road network.

9.2 Access Assessment

Project accesses are proposed to be designed as part of the detailed design for the access roads and are to suitably accommodate all vehicles that are expected to access the Project. The following provides an assessment of the OSOM vehicle used to deliver the blades to ensure the proposed locations of the accesses (previously shown in Figure 15) are able to accommodate the design vehicle. A swept path assessment for each access has been provided within Appendix J and a summary of the assessment is provided within Table 16.

Table 16: Summary of Swept Path Assessment for the Proposed Access Locations

Access Location	Access Road	Comment
1	Blue Mountain Road	The access will require minimal changes to the road network with a potential cut required to the east of the access in order for the blade to swing over the area indicated within the swept paths.
2		No changes required to the road network. Project access is located in a flat area with no vegetation.
3	Winterbourne Road	No changes required to the road network. Project access is located in a flat area with no vegetation and is an existing farm access.
4		Widen road opposite the access as shown within Figure 4 of Appendix L to limit the amount of vegetation removal. Remove tree on southern side of road.
5	Uruga Road	Widen cattle grid and Uruga Road to accommodate the vehicle swept path. The blade is proposed to overhang the opposing fence which will need to be checked prior to construction to ensure there is sufficient height clearance.
6	Table Top Road	The access will require the removal of one tree, and it is recommended the vertical alignment of the access road be reviewed as part of the detailed design due to the sag when entering the property.
7		The access is located in an area with little vegetation which results in no tree removal. No changes required to the road network.
8	Bark Hut Road	No changes required to the road network. The Project access is located in a flat area with no vegetation and is an existing farm access.
9-10		The accesses are located on a flat section of road with limited vegetation and have been positioned opposite each other to limit the impact to traffic along Bark Hut Road. Potential cut required to the southern side of the road to allow access to Access 8. Otherwise, no changes are proposed to the road network.
11		No changes required to the road network. The Project access is located in a flat area with no vegetation and is an existing farm access.
12		The access is located on the outside of a bend on a gradual vertical slope. No changes proposed to the road network and no vegetation requires removal.
13-16		No changes proposed to the road network. The accesses are located in a wide, flat, grassed area that can easily be designed to suit the needs of the project and as such, no swept path diagrams have been prepared.

17	Moona Plains Road	The access utilises an existing rural access associated with the adjacent farmland and is located opposite Rowleys Creek Road. Several trees will require removal to allow the blade to swing out to the northern and southern side of Moona Plains Road west of Rowleys Creek Road to facilitate access.
18		Access requires removal of trees at the access location to create the new access road. No other changes required to the road network.
19		The access requires removal of trees on the northern side of the road as outlined by the red dashed line. Alternatively, the access could be provided at a perpendicular angle which would require removal of trees on both sides of the road but in a more confined area. Further, the verge to the east of the access on the northern side of Moona Plains Road is required to be setback as detailed within Section 8.1.
20		The swept path assessment for the access is provided within the RJA Report (refer Page 154 of the document). The access requires significant removal of trees and the carriageway of the access is required to be widened to accommodate the design vehicle shown.
21	Rowleys Creek Road	No changes required to the road network. The access is proposed to be aligned to allow larger vehicles to easily enter the road network.
22		The access is located in a flat and unvegetated area. As such, no changes are required to the road network.

The above assessment indicates that all of the accesses can be designed to accommodate the maximum design vehicle expected to access the Project with only minor amendments required to the roadside. Therefore, the proposed access locations are concluded to be suitable with the design to be further reviewed during detailed design.

10. Mitigation Measures

A TMP will be prepared prior to construction commencing by the appointed transport contractor. The contractor would be responsible for obtaining all required approvals and permits from TfNSW and local Councils and for complying with conditions specified in the approvals. The TMP will provide additional information regarding the traffic volumes and distribution of construction vehicles that is not available at this time, including:

- Road transport volumes, distribution and vehicle types broken down into:
 - Hours and days of construction.
 - Schedule for phasing/staging of the Project.
- The origin, destination and routes for:
 - Employee and contractor light traffic.
 - Heavy vehicle traffic.
 - OSOM traffic.

The following provides recommended measures that should be adopted within the TMP to minimise the impact of construction traffic along the road network.

10.1 Information and Communications

The implementation of a community information and awareness program will assist in managing the traffic impacts. Prior to construction commencing and during the construction period, a program of consultation shall be initiated to ensure local residents are aware of construction traffic accessing the Project. This program may include elements of the following as appropriate to the phase of works:

- Press releases in local newspapers;
- Specific emails, newsletters and individual letter drops to neighbouring residents along the access route to the Project;
- Provision of a website providing details of the status of works and contact details for complaints or enquiries;
- Provide key contact personnel and contact details, including out of hours contact information to residents, schools, public activities and business operating alongside the local route; and
- Consultation and providing information to the Winterbourne Wind Farm Community Consultation Committee.

Neighbours of the Project should be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.

10.2 Signage

Temporary signage within the township of Walcha should be provided, including directional signage for construction vehicles to Project access points, and will be maintained in consultation with Walcha Council. General sign posting of the access roads with appropriate heavy vehicle and construction warning signs shall also be undertaken.

Specific warning signs advising of the changed traffic operations and heavy vehicle movements are to be appropriately located on approaches to and from the transport routes on Council roads. These should warn existing road users of changed traffic conditions. The use of day warning notices where signs are activated on a specific day to warn local road users of construction activities is also recommended.

10.3 On-site Mitigation Measures

On-site mitigation measures targeted at safety and reducing the impact of on-site transport will include:

- On-site speed restrictions;
- Transport access control to and from the Project;
- On-site transport movement communications protocols;
- OSOM vehicle movement plans;
- Construction of access track routes in proximity to environmentally sensitive areas to be guided by relevant specialists;
- Appropriate dust suppression measures be implemented, including:
 - Vehicles will drive at slower speeds when travelling on unsealed roads. This can reduce the amount of dust created and the amount of dirt tracked onto the public road network. Standard mitigation measures such as a water trucks to dampen the roads and reduce the amount of dust in the air, can also be considered to reduce dust levels.
 - Vehicles entering/exiting the Project loaded with loose materials shall be covered.
- Maintenance program for on-site access tracks to ensure safe access;
- Implementation of a proactive erosion and sediment control plan for on-site roads, hardstands and laydown areas;
- Loading and unloading is proposed to occur within the Project. No street or roads will be used for material storage at any time;
- Sufficient car parking is to be provided on-site to ensure vehicles do not park on the surrounding road network;
- All car parking and loading areas to be designed in accordance with the relevant Australian Standard (2890 series) and Council requirements; and
- At the conclusion of the construction phase, any tracks not required for subsequent operation and maintenance of the Project will be restored and revegetated.

10.4 Driver Protocols

Exemplar on-site driver protocols shall be considered for implementation and a driver code of conduct established including the following:

- Drivers travelling to or from the Project must do so safely, in full compliance with the law, including in respect of speed limits, following distances, forward sight when overtaking, being able to stop within the length of road visible (or half the length on roads without centrelines), and not driving carelessly or dangerously;

- When aware of any emergency vehicles (including vets responding to emergency calls), approaching from in front or behind, drivers must pull over well in advance to provide unimpeded movement;
- Drivers must reduce their speed and/or stop in accordance with the law when passing a school bus which is slowing down, stopped, or accelerating in relation to picking up or setting down children;
- Drivers must reduce their speed in accordance with the law when:
 - Passing children walking, cycling or waiting on the side of the road;
 - Passing an oncoming school bus;
 - Passing someone riding or leading a horse along the road;
 - Approaching an area where a stock shift is known to be occurring.
- Truck drivers must not use engine brakes in built up areas, except where the load being carried and the grade of the road make use of such braking absolutely necessary for safe driving;
- Truck drivers travelling on school bus routes at the same time as an oncoming school bus to use their CB radio to identify the location of the bus and pull over in a safe location before the school bus reaches and passes them;
- Truck drivers are to let traffic behind them pass at regular locations including those opportunities that occur at intersections, wide driveways, sections of road with adequate forward sight distance, gravel pits etc; and
- Disciplinary procedures shall include consideration of a requirement that a vehicle tracking system (with driver behaviour functionality) be installed in the vehicle of any driver who is the subject of a credible complaint or identified breach of the road rules or the Traffic Management Plan. Any subsequent breaches identified by the system shall result in disciplinary action.

10.5 Oversize/Overmass Operating Protocols

Management of vehicular access to and from the Project is essential in order to maintain the safety of the general public as well as the labour force. Driver protocols for delivery of larger plant shall include the following:

- The arrangements for the delivery of OSOM loads and turbine components to the Project should avoid peak periods of traffic on the network and minimise as far as practicable disruption and disturbance to residents;
- OSOM load permits for turbine components shall be appended to the TMP;
- Pilots shall be in radio contact with other trucks to ensure passing occurs at safe and convenient locations;
- In the event of a breakdown, accident or road failure, the transporter crew shall do the following:
 - Park the pilot vehicles in locations where they maximise safety, considering overhanging components, and blind bends on approaches;
 - Contact emergency services (including Police) as is appropriate in the case of an accident;
 - Contact the project manager;

- Contact the Council or other road controlling authority as may be appropriate in the case of the incident;
 - Contact the site manager to advise all other project traffic, and local traffic via CB radio as appropriate in the case of the incident; and
 - Follow all instructions from Police and the road controlling authority.
- In the case of an accident, the vehicles involved should not be moved until instructed by Police;
- Utilisation of only the designated transport routes; and
- Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities.

10.6 Shuttle Bus Pick-up / Drop-off Locations

Shuttle buses may be used to transport staff to and from the Project site during construction. The exact location of the pick-up and drop-off points will be detailed within the TMP to be prepared by the appointed contractor. It is recommended that the locations be chosen in consultation with the relevant local councils.

Armidale Regional Council has proposed the pick-up and drop-off location within the town centre adjacent to the information building, which provides ample parking (including for larger vehicles such as campervans) and public bathrooms. Uralla Regional Council have proposed the location be adjacent to Fuller Park which provides car parking and bus stop facilities. Alternatively, large public car parking areas can be adopted. No recommendations have been provided by Tamworth Regional Council. Shuttle buses will pick staff up from within the Walcha town centre when travelling to and from the Project.

10.7 Other Considerations

The following provides a summary of the TMP recommendations provided within the assessment and additional measures that should be adopted to minimise the impact of construction traffic along the road network:

- Prior to construction, a pre-condition survey of the relevant sections of the existing road network be undertaken in consultation with Walcha Council. During construction the sections of the road network utilised by the Project are to be monitored and maintained to ensure continued safe use by all road users, and any faults attributed to construction of the Project would be rectified. At the end of construction, a post-condition survey would be undertaken to ensure the road network is left in the consistent condition as at the start of construction;
- Delivery of larger plant to preferably occur outside of school bus service times to prevent larger vehicles interacting with the school bus;
- All vehicles will enter and exit the Project access locations in a forward direction;
- Implementation of a proactive erosion and sediment control plan for on-site roads, hardstands and laydown areas;
- All permits for working within the road reserve must be received from the relevant authority prior to works commencing;
- Include a map in the TMP of the primary haulage routes highlighting critical locations;

- Establish an induction process for vehicle operators and regular toolbox meetings;
- Establish a complaint resolution and disciplinary procedure;
- Due to the location of the Project, there is an inherent risk that adverse conditions may impact on the movement of transportation vehicles and transport of staff. Consideration for driving in the rain, fog, frost, icy conditions, bright sunlight and within/near a bush fire is required, especially during the transportation of OSOM vehicles. The following mitigation measures are to be considered when travelling in adverse conditions:
 - Inspection of roads prior to using them to ensure that the road is safe. If there is black ice on the road, depending on the location, signage shall be installed and/or transportation movements will be stopped until it is safe to proceed;
 - Ban or restrict vehicle movements during periods where adverse conditions may impact on the operation of the road and the safety of workers and other road users;
 - Reduce the speed along the transportation route;
 - Provide additional warning for drivers on the road network;
 - Train and inform staff on how to drive in adverse conditions relevant to the Project location;
 - Ensure that vehicles are fitted with equipment to assist them during adverse conditions (first aid kit, fire extinguisher, chains if required) and that drivers are able to communicate to one another to either warn each other or call for assistance; and
 - Chains will not be permitted to be used on local roads for the commencement of a journey, for emergency use only.
- The requirements of the TMP must be followed. The site manager will ensure that Project inductions occur on a regular basis or as deemed necessary; and
- Include a detailed program to monitor and report on the effectiveness of these measures and the code of conduct.

The above recommendations will ensure the construction traffic will create a minimal impact to the capacity and safety of the surrounding road network.

10.8 Schedule of Road Upgrades

Prior to the commencement of the relevant phase of construction the Applicant will undertake any road upgrades developed in consultation with and to the satisfaction of the relevant road authority. Works will be undertaken by a suitably qualified contractor subject to the relevant authorisation. Site establishment and construction works may be undertaken in parallel with the road upgrades subject to preparation, approval and implementation of a TMP in consultation with the relevant road authority. Project access points would be gated and secured, and appropriate warning signs erected.

The specific road infrastructure upgrades that may be required and/or would need to be considered by the chosen transport contractor prior to commencement of construction would be developed in consultation with the relevant Council and designed to their satisfaction. Reference should also be made to the Rex J Andrews Route Assessment and its findings for potential road infrastructure upgrades along the transport route from the Port of Newcastle. It is acknowledged that some of the works identified by the RJA Report may have already been undertaken recently due to other projects in the area and thus an updated site assessment in consultation with TfNSW

and the relevant Councils would identify the required road infrastructure upgrades dependant on the actual road conditions pre-construction.

The proposed road upgrades that have previously been outlined in this report have been combined into the following Schedule.

Table 17: Road Upgrade Schedule

KM Index	Road	Required Road Upgrades
Route 1		
2.0	Jamieson Street	Add hardstand to inside of corner to avoid trees with tail swing.
14.3	Winterbourne Road	Current road width less than 5.0m in places. Will need to be widened to 5.0-5.5m with 0.5m verge on each side.
19.9	Blue Mountain Road	Site entrance to be made suitable for the swept path of the largest loads.
22.0		Widen intersection to accommodate swept path and remove two trees. Relocate two mailboxes.
Route 2		
2.0	Jamieson Street	Add hardstand to inside of corner to avoid trees with tail swing.
14.3	Winterbourne Road	Current road width less than 5.0m in places. Will need to be widened to 5.0-5.5m with 0.5m verge on each side.
16.1		Significant hardstand required on inside of corner and culvert to be extended.
25.6	Table Top Road	Remove cattle grid.
26.6		Road may need to be widened if transport required 5.0m wide wheels to achieve a lower overall height.
35.8	Hazeldean Road	Add hardstand to inside of corner to avoid trees with tail swing.
39.5		Add hardstand to inside of corner to avoid excessive tail swing. Remove tree.
40.2	Uruga Road	Add hardstand to the inside and outside of the bend. Remove/relocate cattle grid.
Route 3		
2.0	Jamieson Street	Add hardstand to inside of corner to avoid trees with tail swing.
6.8	Moona Plains Road	Add hardstand to inside of corner to avoid trees with tail swing.
21.6		Likely tree trimming required.
22.0		Likely tree trimming required.
22.3		Trim and remove trees for tail swing.
23.0		Add hardstand to the inside and outside of corner.
24.9		Hardstand required on the outside of the corner for belly of blade to avoid trees.
25.6		Hard stand required on inside of corner and fence to be relocated.
26.0		Two trees to be removed.
26.3		Significant vegetation to be removed.
27.4		Remove of lower armco on left hand side of bridge.

28.0	Moona Plains Road	Hard stand required on inside of corner and fence to be relocated.
28.8		Site entrance to be made suitable for the swept path of the largest loads.
Figure within Appendix F	Required Road Upgrades	
Route 4 – Bark Hut Road		
1	Remove tree to allow blade to overswing area south of the road and straighten section of road indicated.	
2	Widen or straighten road to avoid tree removal.	
3	Remove/widen cattle stop and widen road slightly to the north of the tree to avoid tree removal.	
4	Widen road slightly to the north to avoid tree trimming, or trim tree.	
5	Remove/widen cattle stop and widen road slightly to the north in location shown.	
6	Trim trees in location shown.	
7	Remove/widen cattle stop. Potential cut required to side of bank to allow blades to overswing.	
8	Two trees opposite each other do not provide sufficient width so one tree will need to be removed.	
9	Cut required to bank and minor road widening due to sharp corner.	
10	No road upgrades required.	
11	No road upgrades required.	
12	The vertical alignment should be checked prior to construction to ensure the vertical alignment of the road does not result in the transport vehicle bottoming out. The undulating road can be amended with minor modifications to have a flatter gradient.	
13	No road upgrades required.	
14	Remove/widen cattle stop and trim tree.	
15	Remove/widen cattle stop.	
16	Adjacent to the tree indicated in the figure is a sharp change in grade. It is recommended the vertical alignment be assessed prior to construction.	
17	Remove/widen cattle stop and widen the road as shown due to the sharp corner.	
18	Remove/widen cattle stop.	
19	No road upgrades required.	
20	No road upgrades required.	
21	Widen road on the inside and outside of the bend as shown.	
Access Location	Access Road	Comment
1	Blue Mountain Road	The access will require minimal changes to the road network with a potential cut required to the east of the access in order for the blade to swing over the area indicated within the swept paths.
4	Winterbourne Road	Widen road opposite the access as shown within Figure 4 of Appendix L to limit the amount of vegetation removal. Remove tree on southern side of road.

5	Uruga Road	Widen cattle grid and Uruga Road to accommodate the vehicle swept path. The blade is proposed to overhang the opposing fence which will need to be checked prior to construction to ensure there is sufficient height clearance.
6	Table Top Road	The access will require the removal of one tree, and it is recommended the vertical alignment of the access road be reviewed as part of the detailed design due to the sag when entering the property.
8	Bark Hut Road	No changes required to the road network. The Project access is located in a flat area with no vegetation and is an existing farm access.
9-10		The accesses are located on a flat section of road with limited vegetation and have been positioned opposite each other to limit the impact to traffic along Bark Hut Road. Potential cut required to the southern side of the road to allow access to Access 8. Otherwise, no changes are proposed to the road network.
17	Moona Plains Road	The access utilises an existing rural access associated with the adjacent farmland and is located opposite Rowleys Creek Road. Several trees will require removal to allow the blade to swing out to the northern and southern side of Moona Plains Road west of Rowleys Creek Road to facilitate access.
18		Access requires removal of trees at the access location to create the new access road. No other changes required to the road network.
19		The access requires removal of trees on the northern side of the road as outlined by the red dashed line. Alternatively, the access could be provided at a perpendicular angle which would require removal of trees on both sides of the road but in a more confined area. Further, the verge to the east of the access on the northern side of Moona Plains Road is required to be setback as detailed within Section 8.1.
20		The swept path assessment for the access is provided within the RJA Report (refer Page 154 of the document). The access requires significant removal of trees and the carriageway of the access is required to be widened to accommodate the design vehicle shown.
21	Rowleys Creek Road	No changes required to the road network. The access is proposed to be aligned to allow larger vehicles to easily enter the road network. It is proposed to provide a convex mirror on the outside of the bend in order for drivers to see oncoming vehicles and meet the required sight distance.

11. Road Safety

Based on the above assessment it is concluded that the traffic generated by the construction, operation and decommissioning of the Project can be accommodated on the road network in a safe manner. A summary of the key safety matters is provided below:

- One railway crossing is located on the access route on Selwyn Street near the Port of Newcastle which can be crossed in a safe manner;
- The access route for OSOM vehicles is proposed to avoid areas during peak times where vulnerable road users are present;
- Peak school bus times are proposed to be avoided where possible by OSOM and heavy vehicles to limit the impact to vulnerable road users;
- Access to key properties accommodating emergency service vehicles is proposed to be maintained at all times;
- The road network will continue to operate with a good level of service;
- Suitable sight distance is generally provided at key intersections and accesses and where insufficient sight distance has been identified mitigation measures are proposed to ensure the road network continues to operate in a safe manner;
- A TMP will be prepared by the appointed contractor with the following key safety initiatives to be adopted:
 - Driver Code of Conduct;
 - OSOM vehicle operating protocols;
 - Key information relating to road safety to be provided to all staff;
 - Consultation with neighbours and local authorities regarding delivery of OSOM plant;
 - Regular dilapidation reports to be provided to ensure the road network is kept in a safe condition; and
 - Suitable signage provided to advise road users.
- The surrounding road network currently operates in a relatively safe manner given the road classifications and there are no crash trends. Accordingly, Project traffic is anticipated to be able to be accommodated in a safe manner subject to the adoption of the above measures.

Accordingly, the proposed operation of the Project and the management of development traffic is concluded to be in line with TfNSW Future Transport 2056 and the Towards Zero vision.

12. Response to SEARs

A response to each of the traffic related SEARS has been provided below.

Table 18: Response to SEARs

SEARs	Response
Assess the construction, operational and decommissioning traffic impacts of the development on the local and State road network (including New England Highway, Oxley Highway, Thunderbolts Way and all local roads proposed to be used).	The traffic assessment provided within this report demonstrates that the local and state road network is expected to continue to operate with a good level of service with ample spare capacity during construction, operation, and decommissioning. Refer to Section 6 for the full assessment of the traffic impacts of the Project.
Provide details of the peak and average traffic volumes (both light and heavy vehicles) and transport and haulage routes during construction, operation and decommissioning, including traffic associated with sourcing raw materials (water, sand and gravel).	Overall, it is anticipated that during peak construction the site could generate up to 288 heavy and 270 light vehicle movements per day. Section 6.1 and Section 6.2 summarise the traffic movement and distribution generated by the Project.
Assess the potential traffic impacts of the project on road network function including intersection performance, site access arrangements, site access and haulage routes, and road safety, including school bus routes and school zones.	The Project is expected to generate a minimal impact on the surrounding road network, including intersection capacity. Project accesses are proposed to be designed in accordance with the relevant Council and Austroads standards to ensure suitable access to the local road network. School bus times have been detailed within this report and heavy vehicle deliveries are proposed to be timed so that they do not coincide with the school bus times.
Assess the capacity of the existing road network to accommodate the type and volume of traffic generated by the project (including over-mass / over-dimensional traffic haulage routes from port) during construction, operation and decommissioning.	The traffic assessment provided within this report demonstrates that the local road network is expected to continue to operate with a good level of service with ample spare capacity during construction, operation, and decommissioning. Refer to Section 6 for the full assessment of the traffic impacts of the Project.
An assessment of the likely transport impacts to the site access and haulage routes, site access point, any rail safety issues, any Crown Land, particularly in relation to the capacity and conditions of the roads.	A Route Assessment has been provided within Section 5, which demonstrates that the transport of large plant can be undertaken in a safe manner, with minimal impact to the road network. No rail safety issues are expected as part of the Project.
Provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authority.	Please refer to Section 10 which details the mitigation measures to be implemented during the construction of the Project. The measures have been developed in consultation with the relevant road authorities.

Accordingly, DPIE issued SEARs are concluded to be suitably addressed within the report.

TfNSW provided a response to DPIE as part of the preparation of the SEARs. A response to their comments has been provided within Appendix K.

13. Conclusion

Amber has undertaken an assessment of the traffic impacts of the proposed wind farm located approximately 7km northeast of Walcha with a total site area of approximately 22,825 hectares. The Project will accommodate 119 turbines with a maximum installed capacity of 700MW. The Project also includes the following key features:

- An internal electrical reticulation network (both overhead and underground);
- Two on-site substations;
- Switching station;
- New and upgraded access roads;
- Temporary construction facilities (including concrete batching plants); and
- Operation and maintenance buildings.

Large-scale battery storage is also proposed on-site to support stabilising the supply of electricity to the national electricity market. The Project also includes a new 330kV overhead transmission line running through the wind farm and continuing north west from the Project site.

Vehicular access will be provided via a number of new access roads that will connect directly with a mixture of sealed and unsealed local rural roads, and subsequently Thunderbolts Way and Oxley Highway.

The Project will operate with approximately 16 employees on-site at any time and has an operational lifespan of 30 years. Accordingly, the traffic impacts of the Project during operation will be minimal.

The main impacts of the Project will be generated during the construction and decommissioning phase of the Project. The construction of the Project is anticipated to take approximately 24-30 months, with the proposed working hours as follows:

- Monday to Friday: 7am – 6pm
- Saturday: 8am – 6pm
- No work on Sundays or public holidays.

Approximately 400 staff will be on-site during the peak construction phase and will likely be drawn from the nearby towns of Walcha, Uralla, Armidale, and Tamworth.

All plant associated with the wind turbine components will be delivered from the Port of Newcastle. Materials including water, gravel and reinforcing steel, and equipment such as cranes, excavators, and trench diggers, will be sourced from within the surrounding area where practicable. Construction also includes establishing fixed or mobile concrete batching plant(s), and office buildings and substations on-site for the construction and operational phases (e.g. maintenance) of the Project.

The above assessment addressed the following key matters:

- Details of both light and heavy vehicle traffic volumes and proposed transport routes during construction, operation, and decommissioning;
- An assessment of the potential traffic impacts of the Project on road network function and safety;

- An assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the Project, including OSOM vehicles;
- Details of measures to mitigate and / or manage potential impacts, including construction traffic control, road dilapidation surveys and measures to control soil erosion and dust generated by traffic volumes; and
- Details of access roads within the Project including how these connect to the existing road network and ongoing operational maintenance.

The report is supported by a Route Assessment provided by Rex J Andrews who specialise in the transport of large plant and have worked on similar wind farm projects. The assessment has been undertaken in conjunction with extensive consultation with TfNSW and the local governments.

Overall, the following conclusions are made:

- The Route Assessment provided within Appendix A details the road upgrades required in order to safely transport the larger plant from the Port of Newcastle to the Project;
- The Project will generate up to 558 vehicle movements per day during peak construction times, including 288 truck movements. The Project is expected to generate approximately 137 vehicle movements during the morning and evening peak hours during the peak construction period, which will reduce to 94 vehicle movements over the typical construction periods;
- The road network can accommodate the traffic generated by the Project during construction and the road network will continue to operate with a good level of service, including when considering the cumulative impact of surrounding major projects;
- All local roads are provided with sufficient carriageway widths to allow two opposing vehicles to pass excluding the eastern portion of Bark Hut Road and the full length of Rowleys Creek Road. It is proposed to widen Bark Hut Road to have a minimum carriageway width of 5.5m, which would accommodate simultaneous two-way vehicle movement. Given the low level of traffic on Rowleys Creek Road it is proposed to remain as a single lane road;
- The intersection of Thunderbolts Way and Jamieson Street has effectively been provided with a basic left and right turn treatment and meets the requirements of the Austroads Guideline;
- The individual Project accesses are proposed to be designed to accommodate the largest construction vehicle and meet the sight distance requirement of the Austroads Guidelines, subject to the adoption of reduced speed limits in the vicinity of several Project accesses and other minor modifications to the roadside;
- The Project is not expected to create any road safety issues;
- In order to mitigate the impacts of the development during construction a TMP will be prepared which should include the recommendations provided within Section 10 of this document.

Accordingly, based on the assessment above, it is concluded that the proposed access arrangements for the Project are suitable to accommodate the expected construction vehicle types and traffic volumes during the construction, operation, and decommissioning phases of the Project.

Appendix A

Route Assessment by Rex J Andrews



ROUTE STUDY

CLIENT: VESTAS

PROJECT: WINTERBOURNE WINDFARM

SITE LOCATION: WALCHA, NSW

PORT OF IMPORT: MAYFIELD #4 BERTH NEWCASTLE

VERSION: REV04 (07/07/2022)

Rev.	Date	Change	Responsible	Checked
00	01/10/20	Route Assessed	J Stokes	✓
00	01/10/20	Report Compiled	J Stokes	✓
00	01/10/20	Report Completed	J Stokes	✓
01	22/10/2020	Routes from Walcha to Site Entries added	J Stokes	✓
02	26/10/2020	Formatting Improvements	J Stokes	✓
03	26/10/2022	Various edits	W Andrews	✓
04	07/07/2022	Various edits	W Andrews	✓

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1.0 Introduction

This document describes observations and previous experience on route and explains the Transport of Wind turbine equipment from Newcastle to Winterbourne Windfarm.

This Route survey took place on 21/09/2020.

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: 21/09/2020

Survey undertaken by: (Rex J Andrews P/L)

Project name: Winterbourne Windfarm

Location: Newcastle port (NSW) to Walcha (NSW)

Turbine type: (V162 Enventus 5.6 MW)

Rotor size 162 metre with a hub height of 149 Metres

4.0 Transport combinations (Examples)

Base Towers (15.6l x 5.4 x 4.95 x 85T)

Configuration. Prime mover with 3x8 4x8 Bookend

Overall dimension: 39.0l x 5.5w x 5.5h x 164.5T (+ Push truck)

Section 2 Towers (19.9l x 4.95 x 4.95 x 87T)

Configuration. Prime mover with 3x8 4x8 Bookend

Overall dimension: 44.0l x 5.0w x 5.3h x 164.5T (+ Push truck)

Section 3 Towers (26.9l x 4.95 x 4.65 x 98T)

Configuration. Prime mover with 5x8 5x8 Bookend

Overall dimension: 46.0l x 5.0w x 5.3h x 164.5T (+ Push truck)

Section 4 Towers (28.9l x 4.65 x 4.4 x 84T)

Configuration. Prime mover with 5x8 5x8 Bookend

Overall dimension: 35.0l x 5.0w x 5.3h x 154.5T (+ Push truck)

Top Towers (36.9l x 4.4w x 3.97h x 78T)

Configuration. Prime mover with 4x4 Dolly and 3x8 Jinker trailer

Overall dimension: 54.0l x 5.1w x 4.9h x 152.5T (+ Push truck)

Nacelles (18.1l x 4.2 w x 4.35h x 84.0T)

Configuration. Prime mover with 10x8 Platform

Overall dimensions: 35.0l x 4.2w x 5.35h x 164.5T (+ Push truck)

Drive trains (7.5l x 2.7 w x 3.0h x 97.0T)

Configuration. Prime mover with 10x8 Platform

Overall dimensions: 35.0l x 4.2w x 5.35h x 174.5T (+ Push truck)

Hubs (5.0l x 4.4w x 4.0h x 64.0T)

Configuration. Prime mover with 6x8 Platform

Overall dimension: 26.0l x 4.5w x 5.1h x 108.5T

Cooler tops (5.2l x 2.3w x 3.0h x 2.3T)

Configuration. Prime mover with 3x4 Semi

Overall dimension: 19.0l x 2.5w x 4.3h x 42.5T

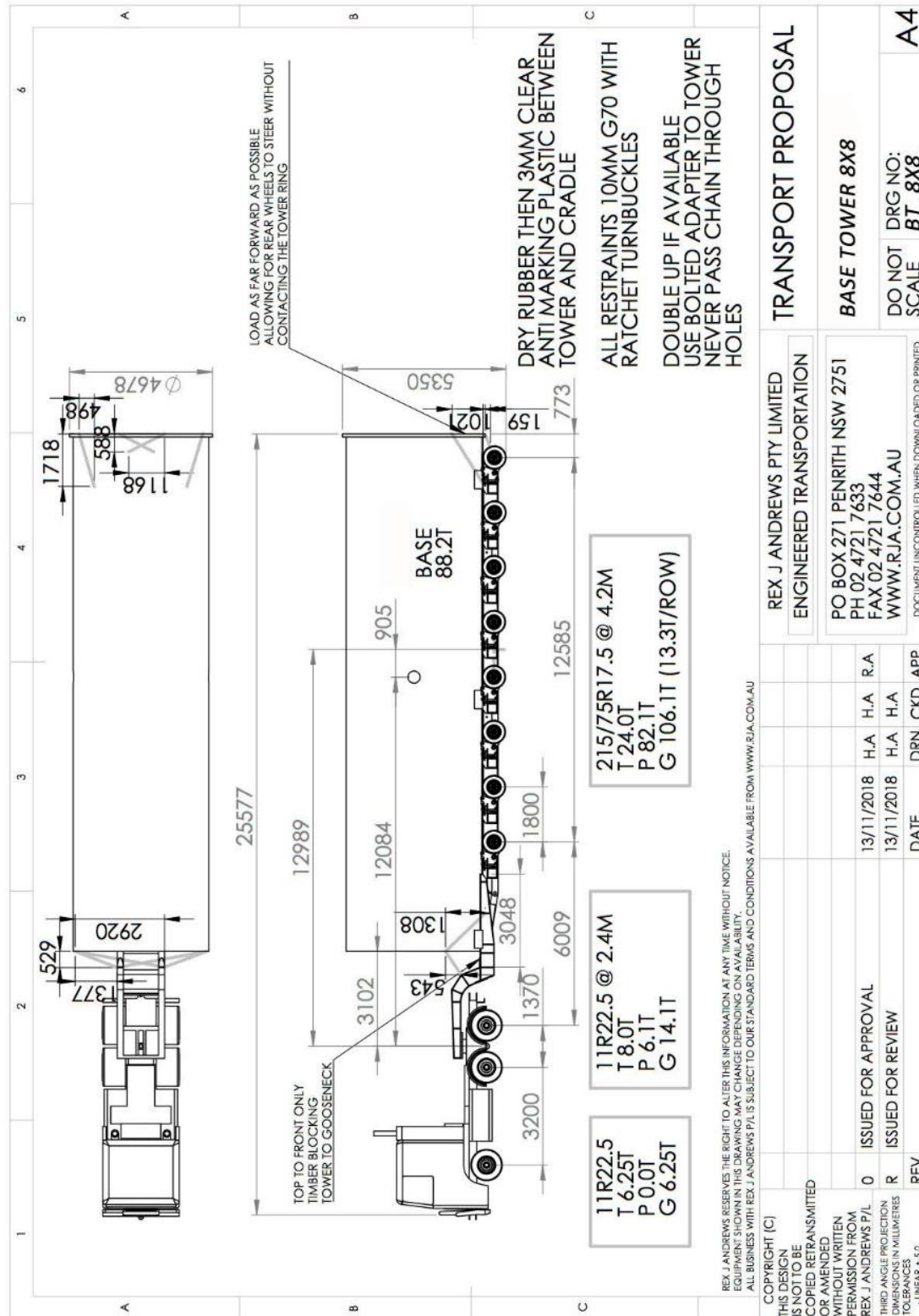
Blades (81.1l x 4.5w x 4.0h x 28.1T)

Configuration. Prime mover with 2x4 dolly 4x4 Jinker

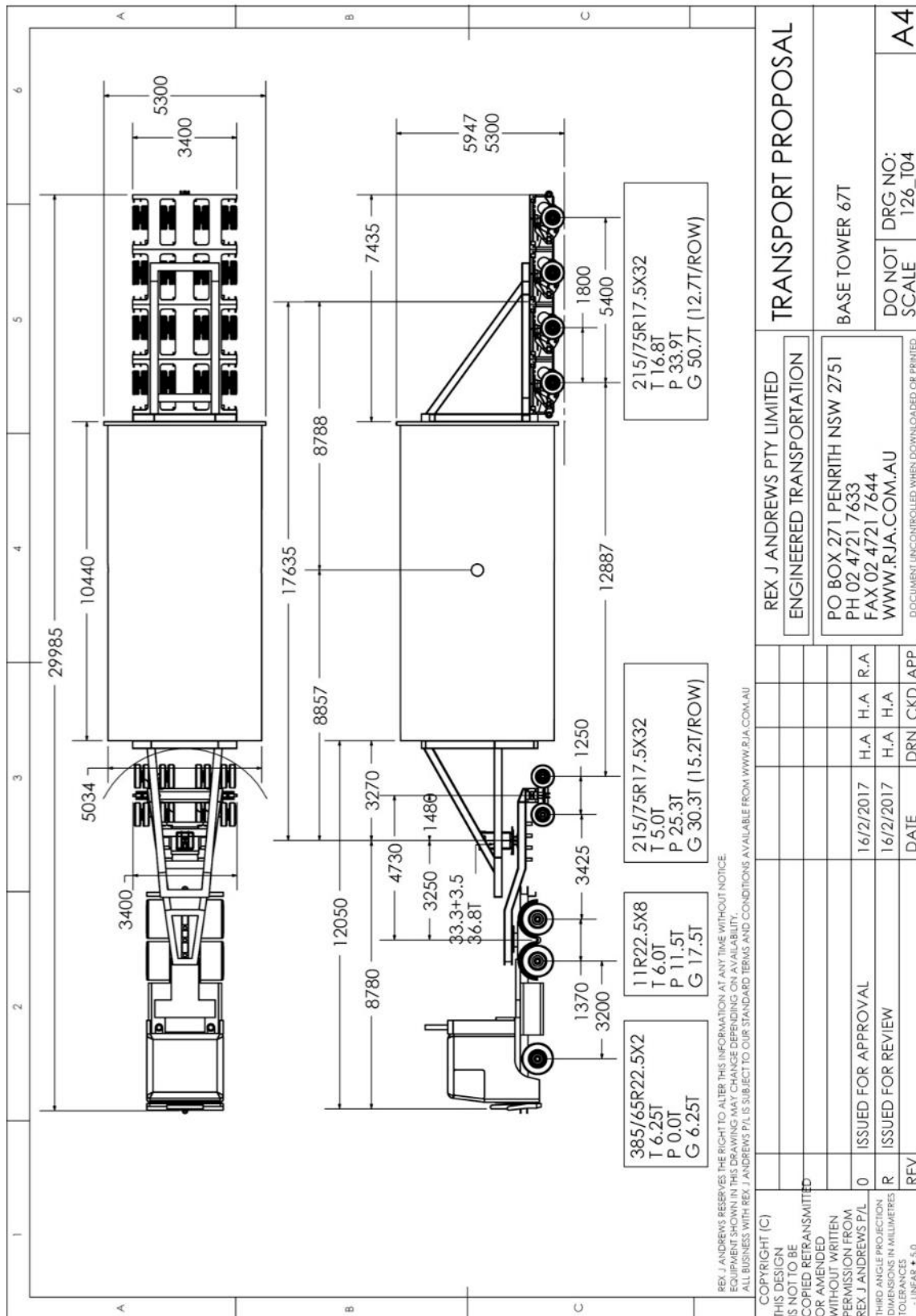
Overall dimension: 90.0l x 4.3w x 4.7h x 67.5T

5.0 Transport drawings (Possible combinations)

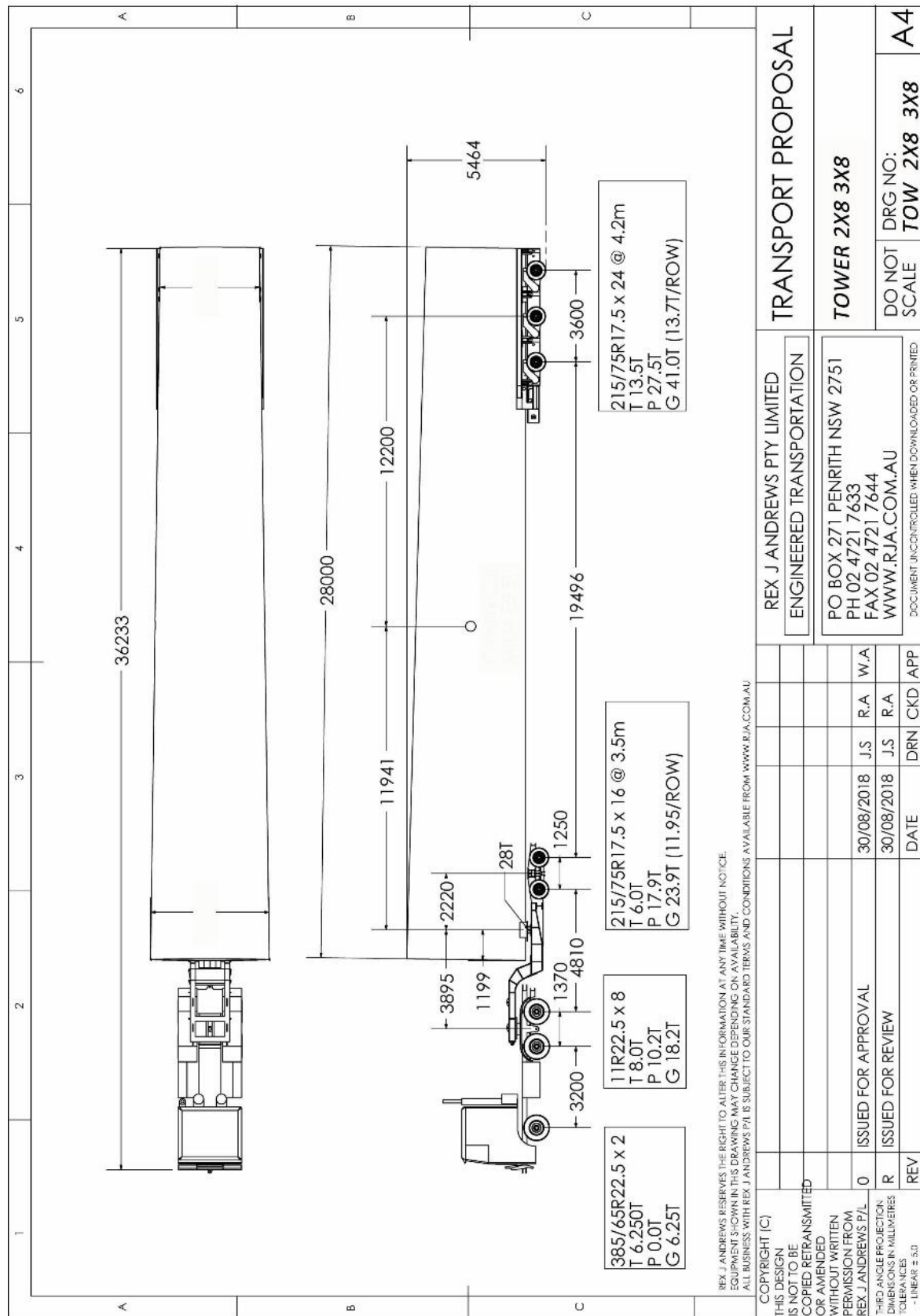
Tower trailer 8x8



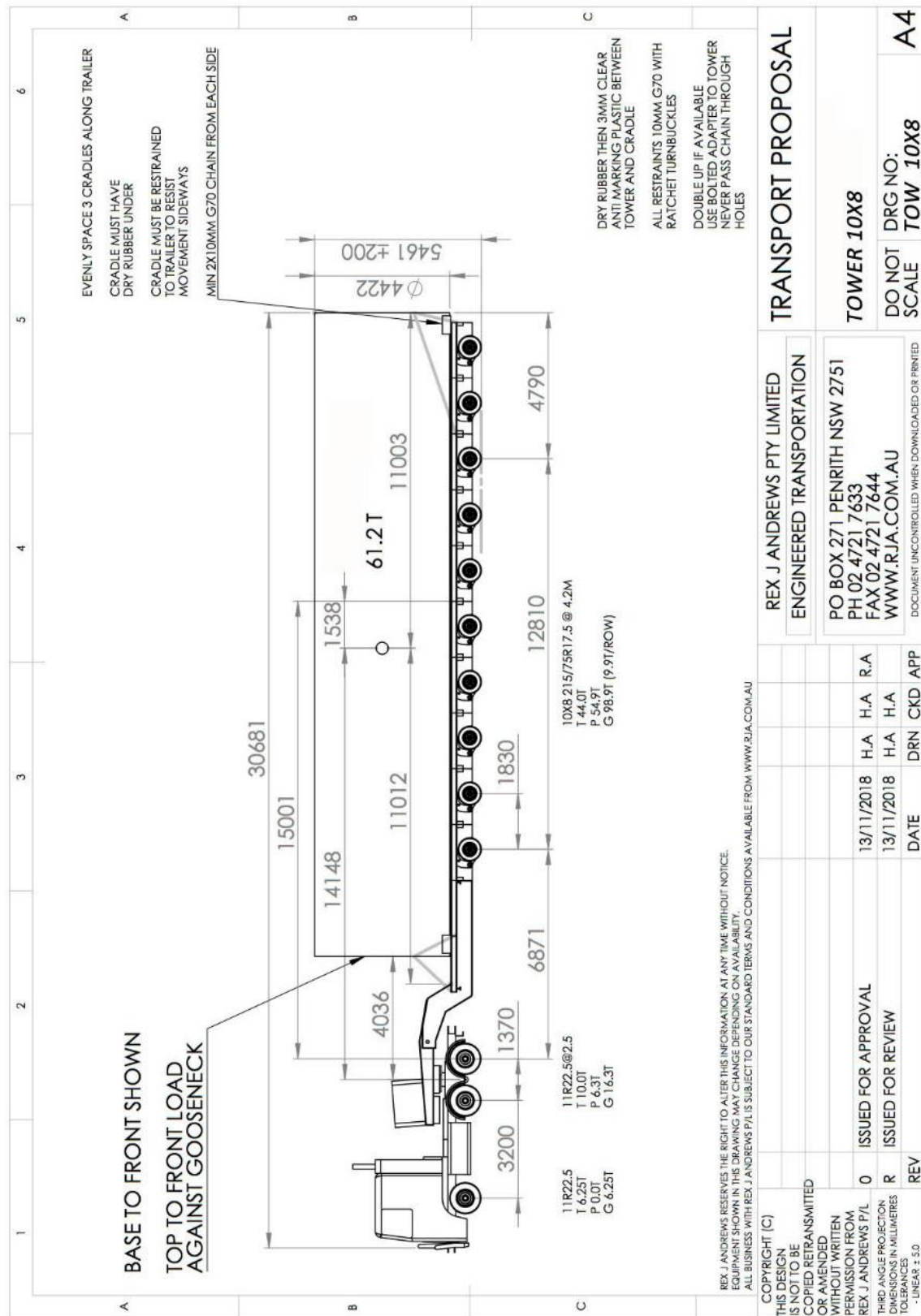
Bookend tower trailer:



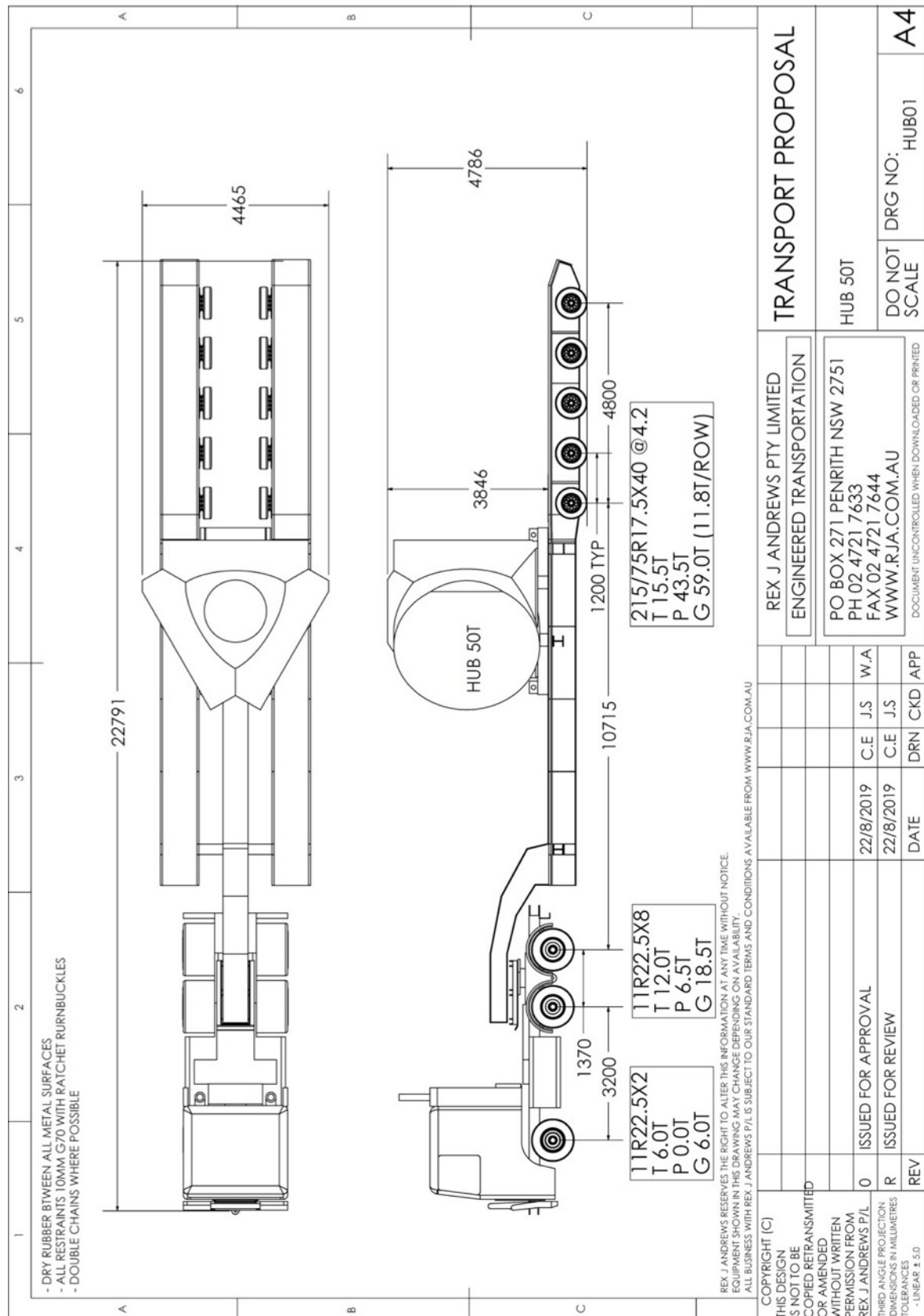
Dolly and Jinker trailer:



Nacelle/Drivetrain trailer 10x8:



Hub trailer:



MIN ROADWAY WIDTH V/S MIN RADIUS

MIN TURNING CIRCLE

BLADE TIP FRAME MUST SUSTAIN 200KN HORIZONTAL LOADING TO MEET BRAKING REQUIREMENTS

REVISIONS

REV	DATE	DESCRIPTION
0	18/3/2018	ISSUED FOR APPROVAL
1	18/3/2018	ISSUED FOR REVIEW

PROJECT INFORMATION

REX J ANDREWS PTY LIMITED
ENGINEERED TRANSPORTATION
PO BOX 271, PENRITH NSW 2751
PH 02 4721 7633
FAX 02 4721 7644
WWW.RJA.COM.AU

TRANSPORT PROPOSAL

82M BLADE

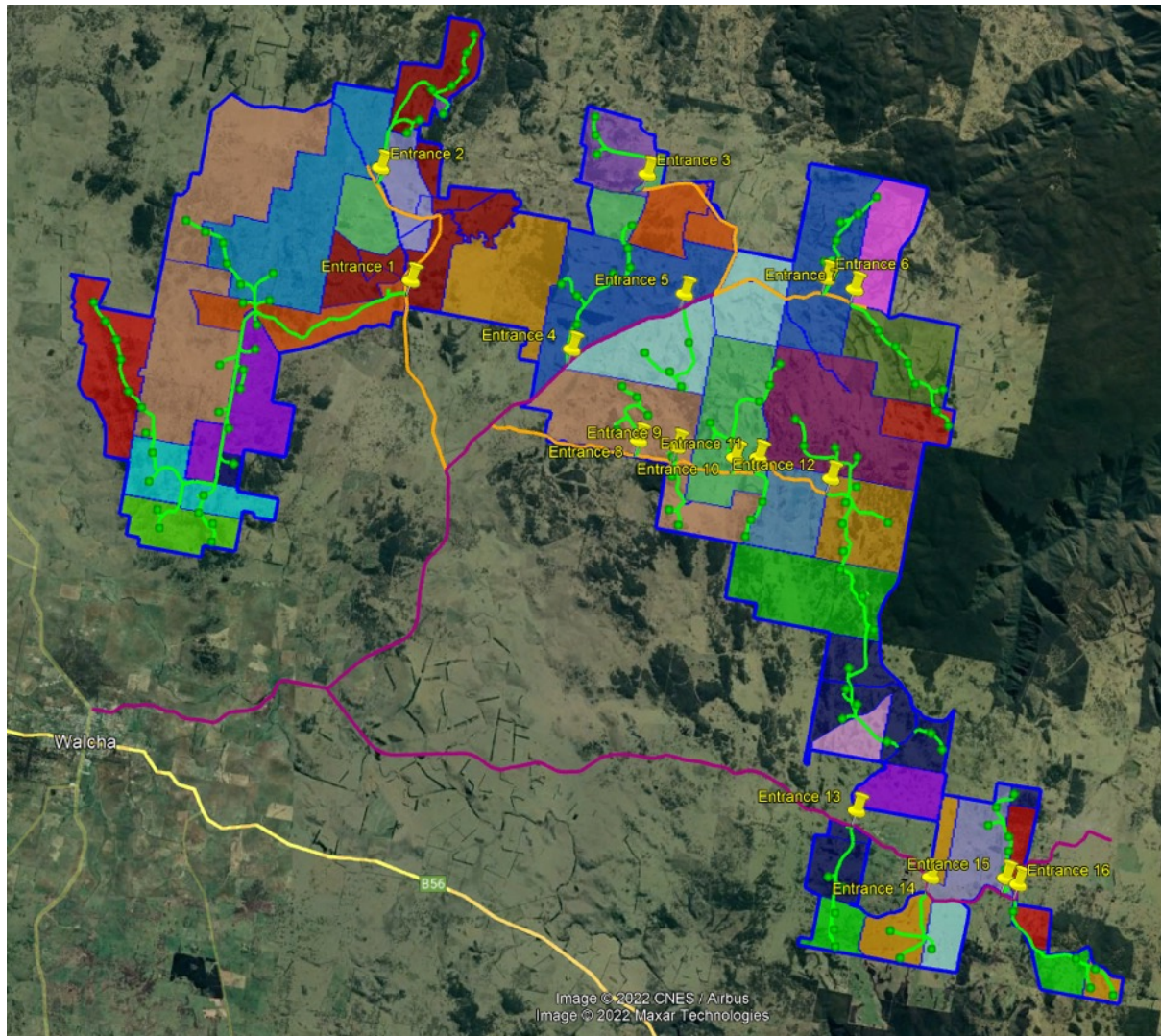
DO NOT SCALE

DRG NO: X 82M 01

A4

6.0 Site Location and layout

The Winterbourne wind farm is located 20 Km's North East of Walcha and 425 Kilometers by road from the Port of Newcastle.



7.0 Port of Import

The wind turbine equipment will be imported from various countries and will arrive on ships into the Port of Newcastle. The client may alternately source local towers. The ideal berth for these shipments is the Mayfield #4 Berth. This facility has a hardstand storage area of roughly 100,000 s/q meters, adjacent to the berth.

Access from the storage to the public roads, is via a port operated road onto Selwyn Street. There will need to be a small amount of road modifications within the port.

Image 1: Port overview

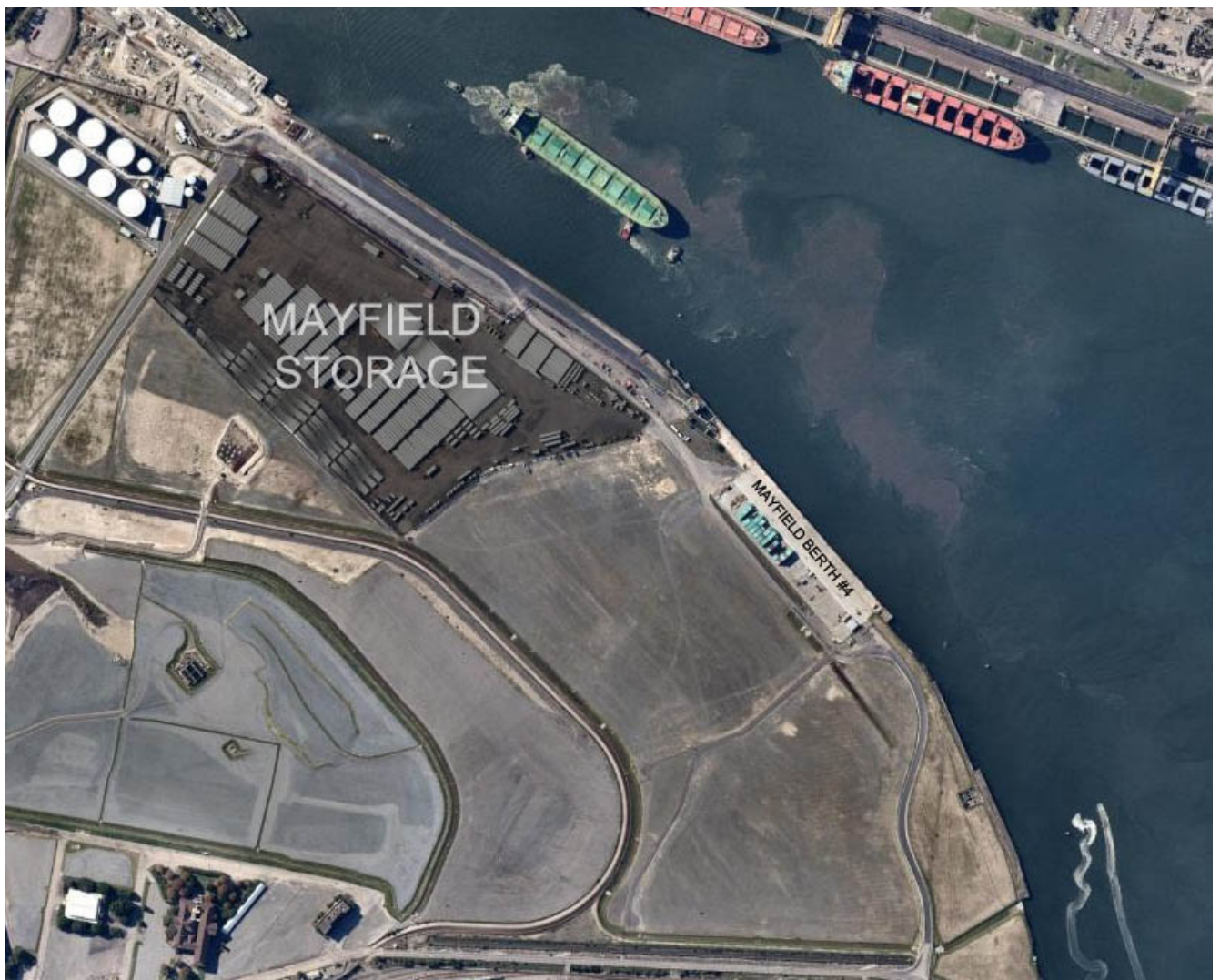


Image 2: Mayfield #4 Port storage area



Image 4: Mayfield #4 Port storage area



8.0 Transport Summary

We have based this study on the turbine components, and towers entering Australia via the Port of Newcastle. The following shows 3 different routes for the components up until Walcha, and a further 3 local routes from Walcha through to the site delivery points.

ROUTE SURVEY 1: PORT OF NEWCASTLE TO WALCHA

COMPONENTS: Blades, Motors and small components under 5.2 metres in overall height.

DISTANCE: 394 kilometres

GPS Link: <https://goo.gl/maps/XXYsQzNjSsTAqY9bA>

Via: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Thomas Mitchell Drive, Denman Road, Bengalla Road, Wybong Road, Kayuga Road, Ivermein Street, Stair Street, Dartbrook mine access Road, New England Highway, Scott Street, Murray Street, Marius Street, New England Highway, Oxley Highway, Saleyards Road, Darjeeling Road, Thunderbolts Way and Jamieson Street.

ROUTE SURVEY 2: PORT OF NEWCASTLE TO WALCHA

COMPONENTS: Towers and Motors over 5.2 metres in overall height.

DISTANCE: 416 kilometres

GPS Link: <https://goo.gl/maps/GNAKuXEBb4RGPjZu7>

Via: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Denman Road, Bengalla Road, Wybong Road, Kayuga Road, Invermein Street, Stair Street, Dartbrook Mine access Road, New England Highway, (Tamworth bypass via Scott Street, Marius Street), New England Highway, Oxley Highway, Saleyards Road, Darjeeling Road, Thunderbolts Way and Jamieson Street.

ROUTE SURVEY 3: ALTERNATIVE ROUTE THROUGH TAMWORTH

COMPONENTS: Blades.

DISTANCE: 11.7 kilometres

GPS Link: <https://goo.gl/maps/iKHEcvAagaESySBHA>

This route is currently limited to 25T GVM, is subject to flooding and would entail 800m of reversing on Nundle Road and the New England Highway.

This route took us via Whitehouse Lane, Marsden Park Road, O'Briens Lane and Nundle Road.

ROUTE SURVEY A: WALCHA TO NORTHERN SITE ENTRIES

COMPONENTS: All components.

DISTANCE: 22.4 kilometres

GPS Link: <https://goo.gl/maps/kYbWw4PvHouqZ6fw6>

This route took us via Jamieson Street, Emu Creek Road, Winterbourne Road, Blue Mountain Road and Hazeldean Road.

ROUTE SURVEY B: WALCHA TO EASTERN SITE ENTRIES

COMPONENTS: All components.

DISTANCE: 28.0 kilometres

GPS Link: <https://goo.gl/maps/ReBSgz3xgF9arY7dA>

This route took us via Jamieson Street, Emu Creek Road, Winterbourne Road and Table Top Road.

ROUTE SURVEY C: WALCHA TO SOUTHERN SITE ENTRIES

COMPONENTS: All components.

DISTANCE: 28.8 kilometres

GPS Link: <https://goo.gl/maps/VrbSJR4GaH6ZzyUd9>

This route took us via Jamieson Street, Emu Creek Road and Moona Plains Road.

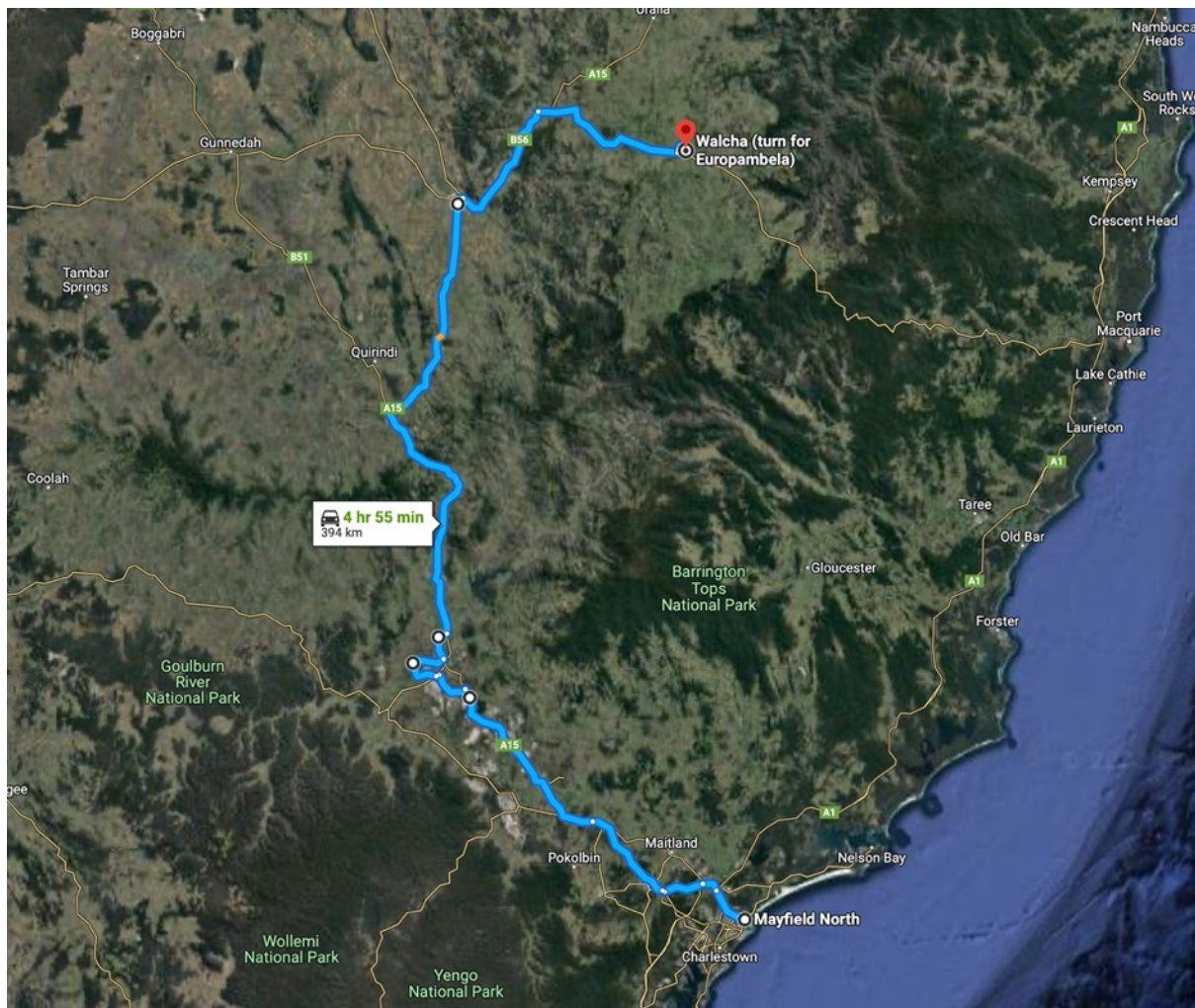
9.0 Route Survey 1: Newcastle Port to Walcha

COMPONENTS: Blades, Motors and small components under 5.2 metres in overall height.

DISTANCE: 394 kilometres

GPS Link: <https://goo.gl/maps/XXYsQzNjSsTAqY9bA>

This route took us via Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Thomas Mitchell Drive, Denman Road, Bengalla Road, Wybong Road, Kayuga Road, Ivermein Street, Stair Street, Dartbrook mine access Road, New England Highway, Scott Street, Murray Street, Marius Street, New England Highway, Oxley Highway, Saleyards Road, Darjeeling Road, Thunderbolts Way and Jamieson Street.



KEY	
MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Current Measurement	Procedure	Comments 162m rotor
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street https://goo.gl/maps/aTLwPYKuNdm	Length: 70.0 metres Width: 8.0 metres	Right hand turn	Requires the fence to be relocated on the left-hand side. Some hardstand will need to be added to the exit of the corner.
0.4	Mayfield	Selwyn Street rail crossing https://goo.gl/maps/AmohE54hKSz	Width: 9.0 metres	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
1.3	Mayfield	Selwyn Street onto George Street https://goo.gl/maps/gXehvBICp4D2	Length: 70.0 metres Width: 8.0 metres	Right hand turn	The unused pole on the outside of the corner will need to be removed.
1.4	Mayfield	George Street onto Industrial Drive https://goo.gl/maps/s4ayrsuoAsD2	Length: 70.0 metres Width: 7.0 metres	Right hand turn	Entering Industrial Drive, the loads will cross from the correct side to the incorrect side. Some hardstands will need to be placed on the south side of the intersection. A spotter would need to help the load through this intersection.
4.9	Mayfield	Industrial Drive under traffic signals https://goo.gl/maps/YmqhiS2iR582	Height: 5.4 Metres	Travel directly ahead	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 metres will need to travel in the right hand lane.
5.5	Mayfield West	Industrial Drive onto Maitland Road https://goo.gl/maps/Kn49dhWG2qG2	Length: 80.0 metres Width: 7.0 metres	Right hand turn	The blades will need to cross to the incorrect side 150 metres prior to the intersection then return to the correct side 120 metres past the intersection.
14.8	Tarro	New England Highway https://goo.gl/maps/aED5Y4ccdW3A47x37	Length: 90.0m Width: 8.0m	Left hand bend	No problems with this section of road.
17.4	Tarro	New England Highway onto John Renshaw Drive https://goo.gl/maps/SRDr5JigkBP	Width: 12.0 metres	Left hand merge	No problems with this section of road.

KM index	Location	Section of road	Current Measurement	Procedure	Comments 162m rotor
18.4	Beresfield	John Renshaw Drive through M1 intersection https://goo.gl/maps/N19vJih1Fgr	Width: 9.0 metres Height: 5.9 metres	Travel directly ahead	No problems with this section of road.
28.7	Buchanan	John Renshaw Drive onto the Hunter Expressway https://goo.gl/maps/1STJ1PfQI9E2	Length: 70.0 metres Width: 7.0 metres	Right hand turn	The blades will need to cross to the incorrect side then down the off-ramp onto the incorrect side of the expressway. Approx 600 metres along the expressway there is a break in the road, which will allow the blades to cross back to the correct side of the expressway. The signs on the right in the off ramp will need to be made removable and likely to require hardstand to cross the expressway.
58.9	Branxton	The Hunter Expressway onto New England Highway https://goo.gl/maps/7rauNuxzqiq	Width: 9.0 metres	Travel directly ahead	No problems with this section of road.
83.0	Rix's creek	New England highway https://goo.gl/maps/aDTchvkQxq7mm7zx7	110.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
104.0	Liddell	New England highway https://goo.gl/maps/tuASD4mJ8vFFqgmU7	Height: 5.2 Metres	Travel under this structure in the right-hand lane	Loads over 5.2 metres in overall height are not to travel on this route. They are to use Route 2. Loads over 5.0 metres but not 5.2 metres are to travel under this structure in the right-hand lane, and at walking speed with the use of a spotter.
116.0	Muswellbrook	The New England Highway onto Thomas Mitchell Drive https://goo.gl/maps/z5RDS5LpJR2Asdd39	Length: 70.0 metres Width: 8.0 metres	Left Hand turn	The loads are to turn from the correct side onto the incorrect side of Thomas Mitchell Drive. Some signs will need to be made removable.
126.0	Muswellbrook	Thomas Mitchell Drive onto Denman Road https://goo.gl/maps/aMGR7kGSoNWEKSA7	Length: 70.0 metres Width: 8.0 metres	Left Hand turn	Loads to turn from the incorrect side to the incorrect side. Some signs will need to be made removable, and a light pole relocated.
127.0	Muswellbrook	Denman Road onto Bengalla Road https://goo.gl/maps/CJYhSMTrU2	Length: 65.0 metres Width: 8.0 metres	Right hand turn	Blades to cross from the correct side to the correct side. Some signs will need to be made removable and some hardstand added to the outside of the corner.
136.5	Muswellbrook	Bengalla Road onto Wybong Road https://goo.gl/maps/vibQvHkxXE2	Length: 70.0 metres Width: 8.0 metres	Right hand turn	Blades to cross from the correct side to the correct side. Some signs will need to be made removable.
146.1	Muswellbrook	Wybong Road onto Kayuga Road https://goo.gl/maps/xVackUT1iaJ2	Length: 40.0 metres Width: 7.0 metres	Left hand turn	Loads to cross from the incorrect side to the incorrect side. Permission will be required from the landowner to travel over the private land. This will require removal and realigning the fence and adding hardstand. Additionally, some hardstand will be required on the exit of the corner.

KM index	Location	Section of road	Current Measurement	Procedure	Comments 162m rotor
151.0	Muswellbrook	Kayuga Road onto Ivermein Street https://goo.gl/maps/JpTfmcsZ6Sk	Width: 8.0 metres	Travel directly ahead	No problems with this section of road.
152.0	Muswellbrook	Ivermein Street onto Stair Street https://goo.gl/maps/ddMHa4CmXk32	Length: 50.0 metres Width: 7.0 metres	Right hand turn	Blades to cross from the correct side to the correct side. Some signs will need to be made removable and some hardstand added to the inside and outside of the corner. Additionally, a pipe will need to be extended on the inside of the corner.
152.8	Muswellbrook	Stair Street onto Dartbrook Road access https://goo.gl/maps/u9v5Xi5V7Jt	Length: 60.0 metres Width: 8.0 metres	Right hand turn	Blades to cross from the correct side to the correct side. Some signs will need to be made removable and some hardstand added to the inside and outside of the corner.
155.0	Muswellbrook	Dartbrook access Road onto New England Highway https://goo.gl/maps/twTamUKaED82	Length: 60.0 metres Width: 7.0 metres	Left hand turn	Blades to cross from the incorrect side to the incorrect side. Some signs will need to be made removable on the corner and some hardstand added.
211.0	Murrurundi	New England highway (Township) https://goo.gl/maps/Sj3ixAkhujt	60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
215.0	Murrurundi Hill	New England highway Nowlands Gap https://goo.gl/maps/R5yufobPeMG2	120.0 x 12.0 metres	Parking Bay	Emergency parking only.
223.0	Willow Tree	New England highway https://goo.gl/maps/XLTq7CRV7EU2	Width: 7.0 metres Length: 35 metres Height: 5.2 metres	Kankool weighbridge	It is likely that the towers and defiantly the blades will not fit into this facility. Engineered documentation showing correct weights for all loads will be required.
230.0	Willow Tree Township	New England highway https://goo.gl/maps/qw38qmvVfTC2	60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
231.0	Willow Tree Truck Stop	New England highway https://goo.gl/maps/RRdPVHupGCs	120.0 x 12.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
247.0	Wallabadah	New England highway https://goo.gl/maps/QWCyeHQSoH2	80.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
279.0	Goono Goono	New England highway https://goo.gl/maps/im4QhUfW24D2	100.0 x 8.0 metres	Parking Bay	Emergency parking only. Incorrect side of the road
298.0	Tamworth	Standard roundabout on the New England https://goo.gl/maps/j1tpfb8JJf83jtt2A	Length: 66.0 metres Width: 6.0 metres	Drive directly ahead	Several signs will need to be made removable.

KM index	Location	Section of road	Current Measurement	Procedure	Comments 162m rotor
299.0	Tamworth	Standard roundabout on the New England https://goo.gl/maps/UM9a6UEw14GhSAXm8	Length: 66.0 metres Width: 6.0 metres	Drive directly ahead	Several signs need to be made removable and a tree removed.
299.30	Tamworth	Standard roundabout on the New England https://goo.gl/maps/3J9dCHxtYim	Length: 66.0 metres Width: 6.0 metres	Drive directly ahead	The roundabout has delineators at approx. 800mm high, and small shrubs at a similar height. These signs may need to be relocated or made removable. Additionally, the tail swing will travel close to the roundabout warning signs, these will also need to be made removable.
300.0	Tamworth	New England Highway onto the heavy vehicle bypass at Scott Road. https://goo.gl/maps/BXdwaSjL5Bw	Length: 66.0 metres Width: 6.0 metres	Right hand turn	The swept path for the loads will require the blade to travel through the landowners' boundaries on the north side of the intersection and would require 1 pole to be relocated. Additionally, extra hardstand would be required on the centre median strip as well as the landowners' boundaries and some signs made removable. Some trees will need to be removed from the tailswing.
302.0	Tamworth	Scott Road onto Murray Street https://goo.gl/maps/nix2cRFeh6H2	Length: 66.0 metres Width: 6.0 metres	Drive directly ahead	Blades swept path will travel over the edge of the roundabout. To do these 2 palm trees will need to be removed along with numerous signs to be made removable. Alternatively, the Light Pole could be relocated to allow blade to steer around the palm trees.
302.2	Tamworth	Murray Street onto New England Highway https://goo.gl/maps/45dffqHmUcs	Length: 66.0 metres Width: 6.0 metres	Right hand turn	Loads to cut across the wrong side of the roundabout from correct side to correct side. This intersection will require the 2 median strips to be hardstand, and several signs made removable.
303.0	East Tamworth	New England highway https://goo.gl/maps/9cpBrT5qUAU2	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks
322.0	Moonbi	New England highway https://goo.gl/maps/E3TL2KkEctG2	80.0 x 6.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
329.0	Moonbi	New England highway https://goo.gl/maps/pv1wtcjqB91a1iLM6	8% gradient	Travel directly ahead	This section of road has a steep mountain range that will require additional pull trucks to assists loads that exceed 80T gross weight.

KM index	Location	Section of road	Current Measurement	Procedure	Comments 162m rotor
334.0	Moonbi range	New England highway https://goo.gl/maps/rwJQaAYkLTQ2	120.0 x 12.0 metres	Parking Bay	Suitable parking for Fatigue breaks
342.0	Bendemeer	New England Highway onto Oxley Highway https://goo.gl/maps/rCy2jRCBovngHRfd8	Length: 80.0 metres Width: 7.0 metres	Right hand turn	Spotter to guide load through this pinchpoint.
349.2	Bendemeer	Oxley Highway at Bendemeer https://goo.gl/maps/UdcawRw9ZTASwMnQ7	Length: 75.0 metres	Right hand curve	Potential for tree trimming closer to the project
349.6	Bendemeer	Oxley Highway at Bendemeer https://goo.gl/maps/6KmbfkS8Psfu6skH6	Length: 75.0 metres	Right hand curve	Potential for tree trimming closer to the project
349.9	Bendemeer	Oxley Highway at Bendemeer https://goo.gl/maps/rA5SLZmutFKd4Ra68	Length: 80.0 metres	Left hand curve	Proceed with caution
350.1	Bendemeer	Oxley Highway at Bendemeer https://goo.gl/maps/rVLRWkrR6BRCTw2tb9	Length: 75.0 metres	Right hand curve	Proceed with caution
350.7	Bendemeer	Oxley Highway at Bendemeer https://goo.gl/maps/HiNUqbD5Xj6w6kh7A	Length: 75.0 metres	Left hand curve	Potential for tree trimming closer to the project
372.4	Walcha Road	Surveyors Creek Bridge on Oxley Highway https://goo.gl/maps/Uxo3dVwJfNAQcVA77	Length: 45.0 metres Width 5.5 metres	Right hand turn before crossing bridge and right hand turn at exit	Excavation for blade tip swing. Armco to be removed or lowered for trailer chassis. Fence to be relocated. Signs to be relocated and/ or made removable.
373.4	Walcha Road	Oxley Highway https://goo.gl/maps/BQd79HCm4ggmQwVG6	Length: 85.0 metres	Right hand Curve	Blades tip will swing over chevrons.
389.4	Walcha	Oxley Highway onto Saleyard Road https://goo.gl/maps/5FvDc94h67dFY3p9	Length: 45.0 metres Width 6.0 metres	Left hand turn	Hardstand required Use of road reserve eliminates impact on vegetation

KM index	Location	Section of road	Current Measurement	Procedure	Comments 162m rotor
390.3	Walcha	Saleyad Road onto Darjeeling Road https://goo.gl/maps/TURdE2NcccXWJRy7	Length: 55.0 metres Width 6.0 metres	Left hand turn	Hardstand required on inside of corner
392.3	Walcha	Darjeeling Road onto Thunderbolts Way https://goo.gl/maps/MpDG2AaCKSiWpRXw7	Length: 65.0 metres Width 6.0 metres	Right hand turn	Option 1: Hard stand required on the inside of the corner, and some vegetation needs to be removed. Option 2: Hard stand required on the inside and outside of the corner
394.0	Walcha	Thunderbolts way onto Jamieson Street https://goo.gl/maps/qwhPw65k3M7tFRg6	Length: 65.0 metres Width 6.0 metres	Left hand turn	Several signs to be relocated or made removable.

0.0 Km's: Mayfield #4 onto Selwyn Street at Mayfield



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/afLwPYKuNdm>

PROCEDURE: Right hand turn.

COMMENTS: Some hardstand will need to be added to the exit of the corner. Some signs will need to be relocated and or made removable and some fence will need to be relocated.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

0.4 Km's: Rail crossing over Selwyn Street at Mayfield



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/864FhMSaF9P2>

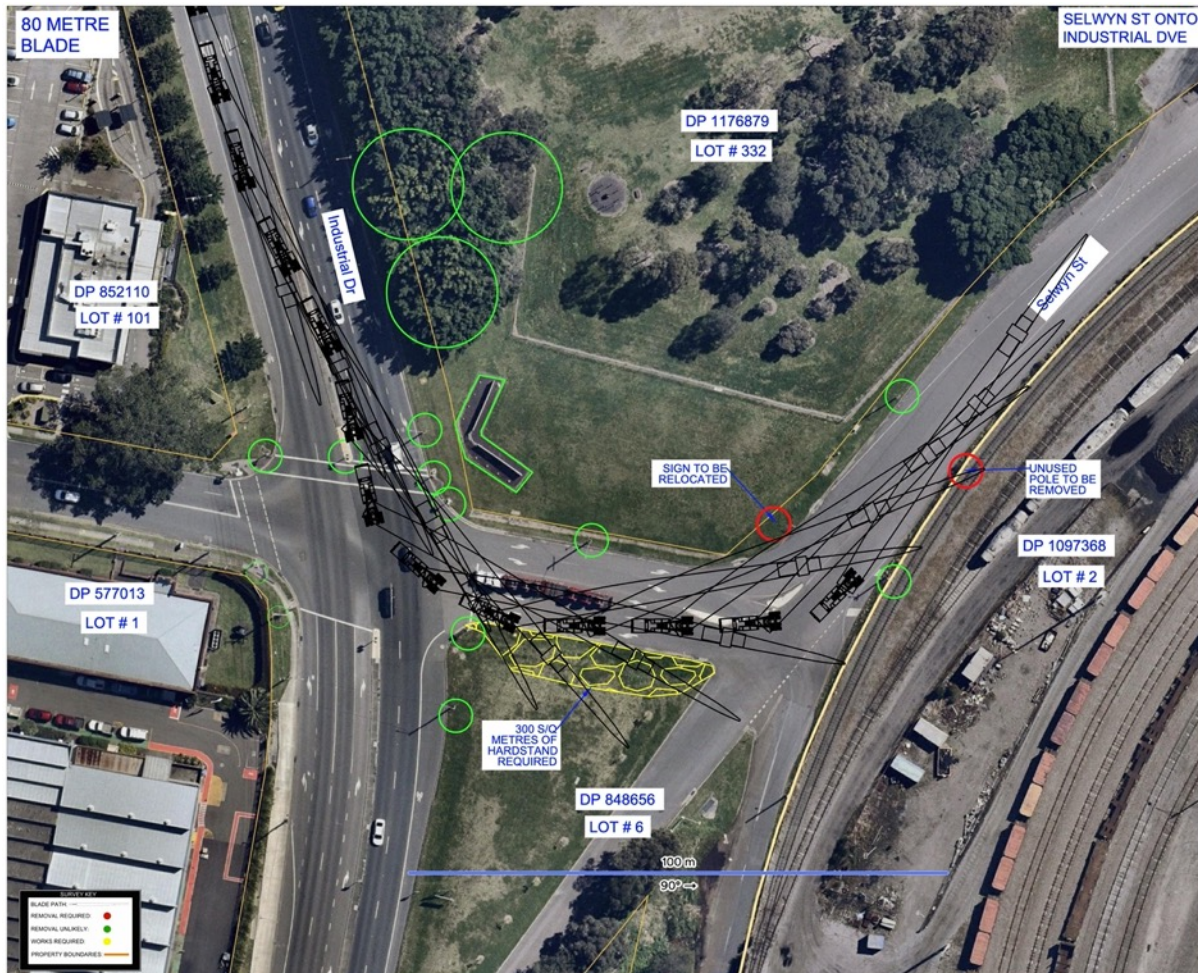
PROCEDURE: Travel directly ahead over the crossing.

COMMENTS: Large width clearance and good ground clearance over this crossing.

Police and escorts to control local traffic either side of the crossing. ARTC approval will need to be obtained to travel over this crossing. Likely to cross with caution, no escort required.

ROAD MODIFICATIONS: No works are required.

1.3 Km's: Selwyn Street onto Industrial Drive, via George Street at Mayfield



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/brPRACKLr572>

PROCEDURE: Right hand turn from Selwyn Street through George Street and onto Industrial Drive.

COMMENTS: The first right hand turn through George Street will need a sign made removable. Entering Industrial Drive, the loads will cross from the correct side to the incorrect side. Some hardstands will need to be placed on the south side of the intersection. A spotter would need to help the load through this intersection.

ROAD MODIFICATIONS: A large amount of work is required.

4.9 Km's: Standard overhanging Traffic signals Mayfield to Hunter Expressway



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/5DpD3b7KnT72>

PROCEDURE: Overhanging signals while travelling through the intersection.

COMMENTS: The lowest traffic signal on route has 5.4 metres clearance. This signal is on the corner of Steel River Blvd at Mayfield West. Loads with an overall height of 5.3 or higher, can avoid this signal by travelling in the centre lane. Loads to slow down while doing this manoeuvre. All other signals exceed 5.6 metres high on this section of road.

ROAD MODIFICATIONS: No works are required.

5.5 Km's: Industrial Drive onto Maitland Road at Mayfield West



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/Kn49dhWG2qG2>

PROCEDURE: Right hand turn from Industrial Drive onto Maitland Road.

COMMENTS: The loads will need to cross to the incorrect side of the intersection, before crossing back over 200 metres to the north.

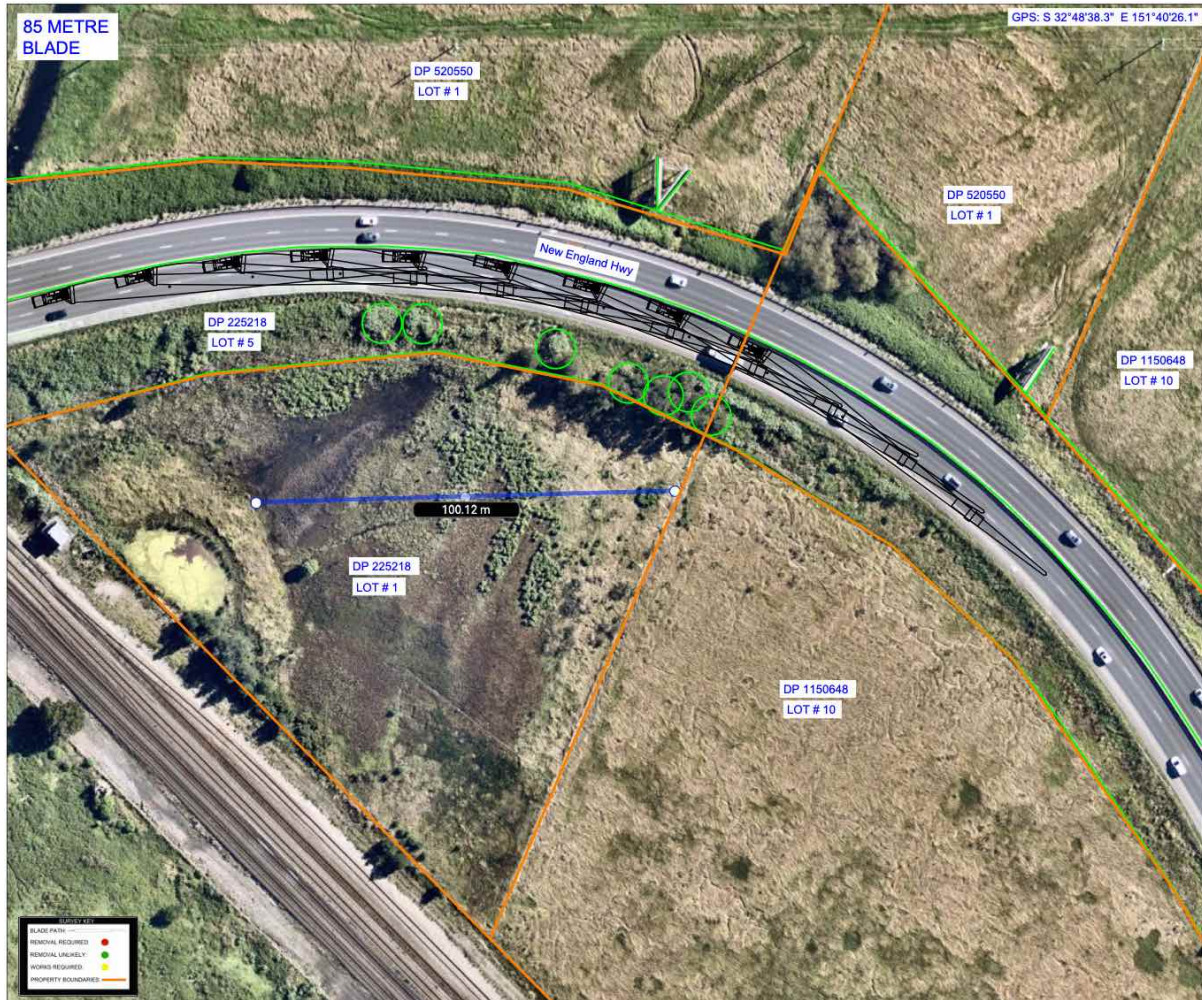
Spotter to keep the driver informed throughout the procedure.

Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: No work required.

14.8 Km's: New England Highway at Tarro.

Image 1:



GPS LINK FOR THIS LOCATION: <https://goo.gl/maps/aED5Y4ccdW3A47x37>

PROCEDURE: Right hand turn from Industrial Drive onto Maitland Road.

COMMENTS: Prime mover to travel around the corner in the right-hand lane.

Spotter to keep the driver informed throughout the procedure.

ROAD MODIFICATIONS: No works required.

28.7 Km's: John Renshaw Drive onto the Hunter Expressway at Buchanan.

Image 1:



Image 2:



PROCEDURE: Right hand turn onto the incorrect side of the Motorway, before crossing back onto the correct side at the crossover bay.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/cEnuC5th1p52>

COMMENTS: Cross to the incorrect side then down the off-ramp onto the incorrect side of the expressway. Approx 600 metres along the expressway there is a break in the road, which will allow the blades to cross back to the correct side of the expressway.

Spotter to keep the driver informed throughout the procedure.

Traffic control and or police will be required to perform this procedure.

ROAD MODIFICATIONS: No works required.

116.0 Km's: New England Highway onto Thomas Mitchell Dve at Muswellbrook.

Image 1:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/z5RDS5LpJR2Asdd39>

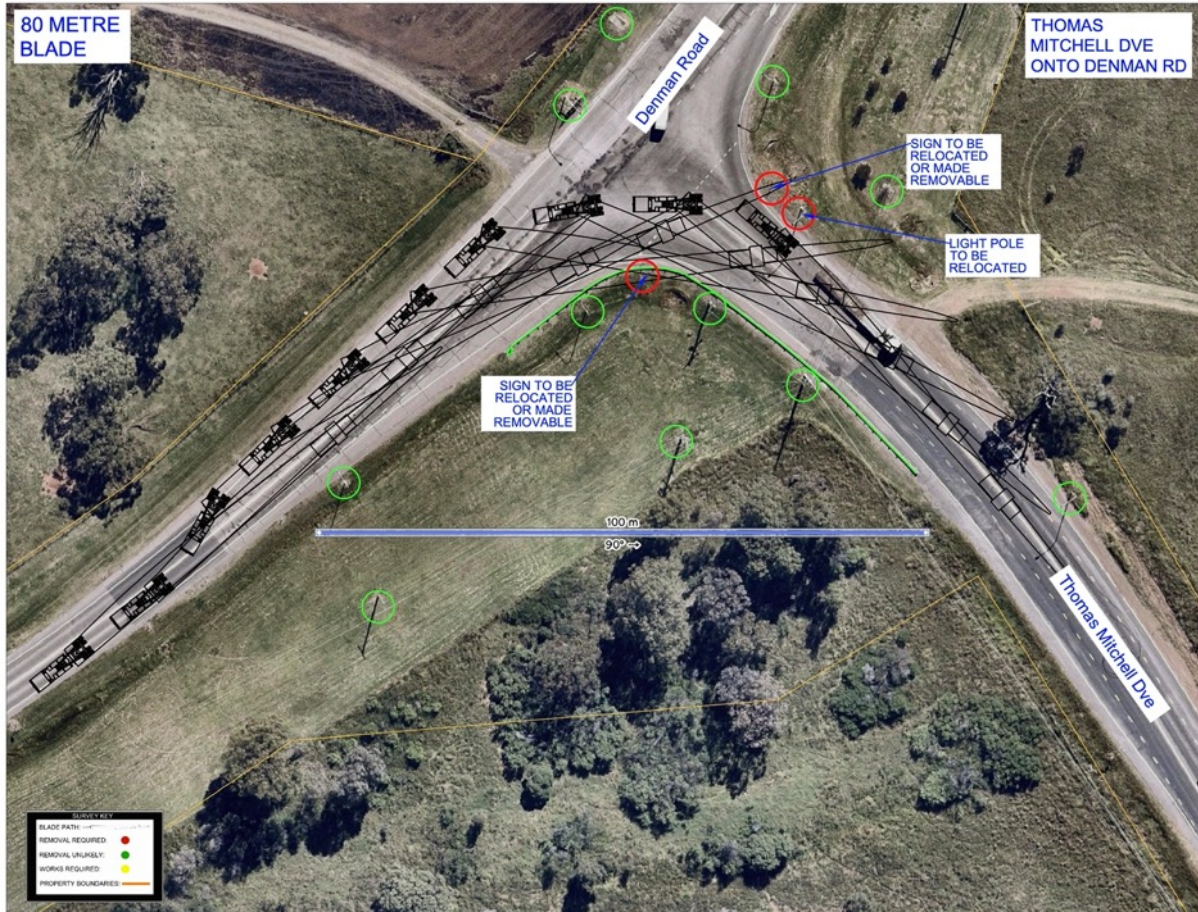
PROCEDURE: Left hand turn from the New England Highway onto Thomas Mitchell Drive.

COMMENTS: Loads to turn from the correct side to the incorrect side. The signs in the center median will need to be made removable.

ROAD MODIFICATIONS: Yes, a small amount of work is required.

126.0 Km's: Thomas Mitchell Dve onto Denman Road at Muswellbrook.

Image 1:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/z5RDS5LpJR2Asdd39>

PROCEDURE: Left hand turn from Thomas Mitchell Drive onto Denman Road.

COMMENTS: Loads to turn from the incorrect side to the incorrect side. Some signs will need to be made removable, and a light pole relocated.

ROAD MODIFICATIONS: Yes, a moderate amount of work is required.

127.0 Km's: Denman Road onto Bengalla Road at Muswellbrook



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/CJYMtSMTttJ2>

PROCEDURE: Left hand turn from Denman Road onto Bengalla Road.

COMMENTS: Blades to cross from the correct side to the correct side. Some signs will need to be made removable and some hardstand added to the outside of the corner. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

136.5 Km's: Bengalla Road onto Wybong Road at Muswellbrook



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/vibQtvHkxXE2>

PROCEDURE: Right hand turn from Bengalla Road onto Wybong Road.

COMMENTS: Blades to cross from the correct side to the correct side. A sign will need to be made removable.

Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A small amount of work is required.

146.1 Km's: Wybong Road onto Kayuga Road at Muswellbrook



PROCEDURE: Left hand turn from Wybong Road onto Kayuga Road.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/xVscKUT1isJ2>

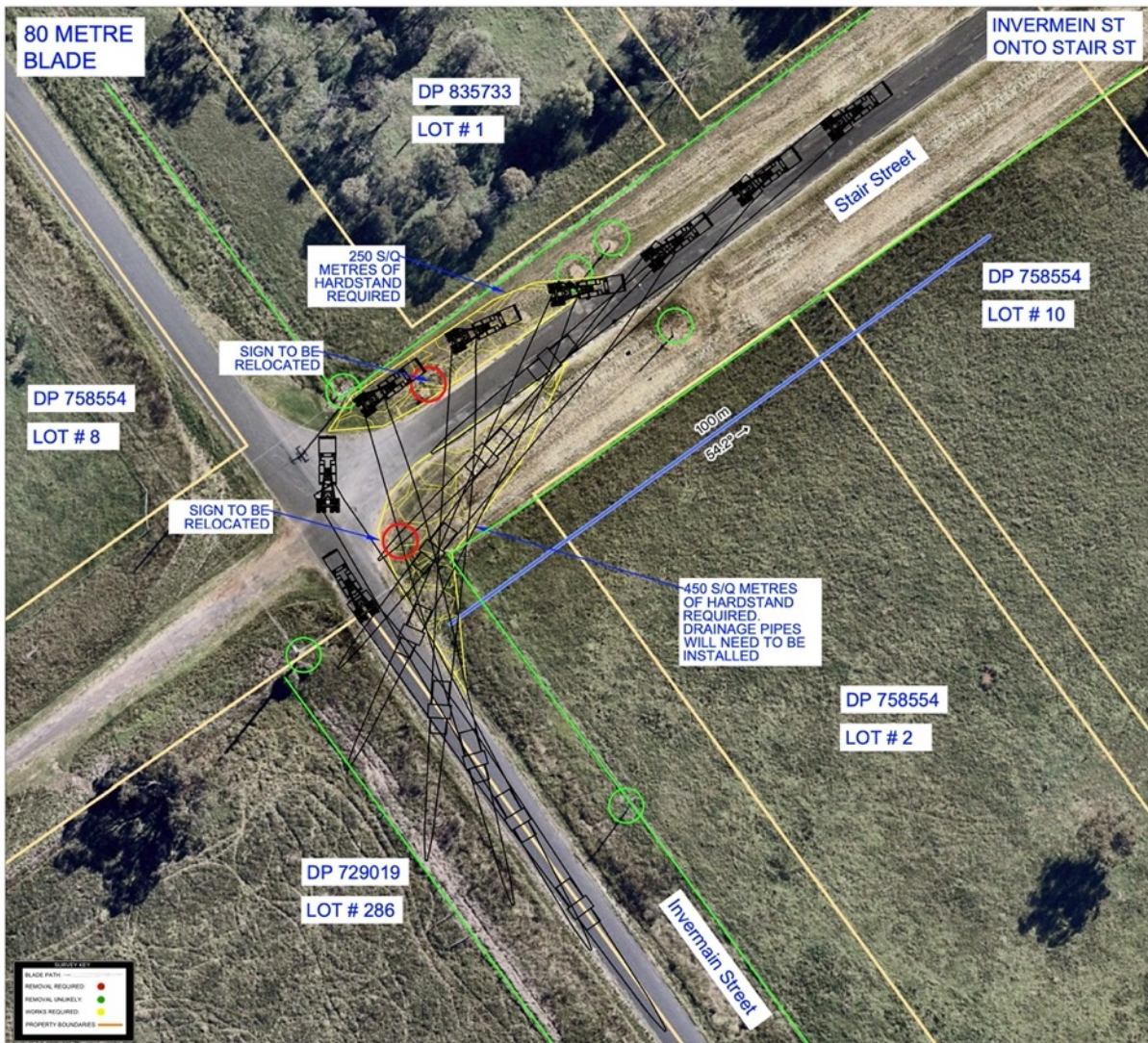
COMMENTS: Loads to cross from the incorrect side to the incorrect side.

Permission will be required from the landowner to travel over the private land. This will require removal and realigning the fence and adding hardstand. Additionally, some hardstand will be required on the exit of the corner.

Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A large amount of work is required.

152.0 Km's: Invermein Street onto Stair Street at Muswellbrook



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/ddMHa4CmXK32>

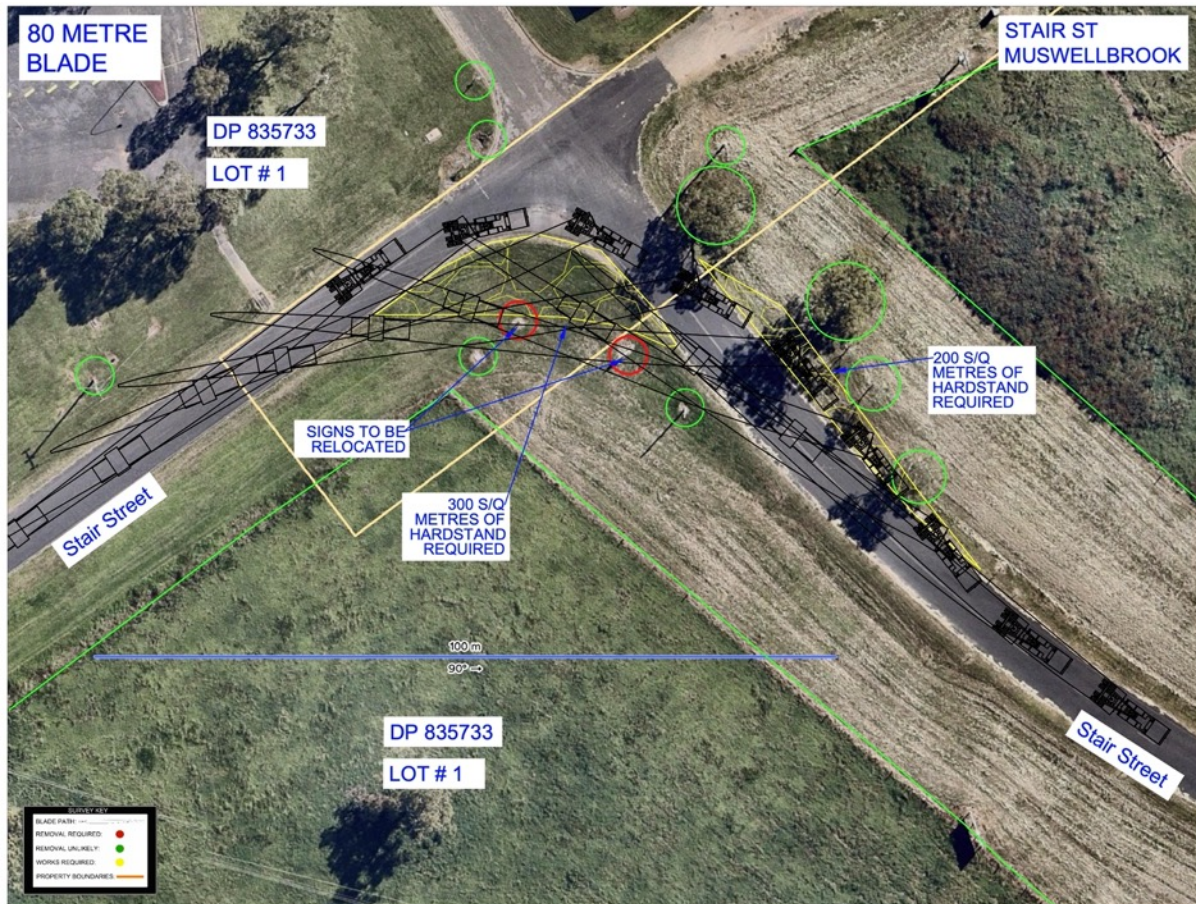
PROCEDURE: Right hand turn from Ivermain Street onto Stair Street.

COMMENTS: Blades to cross from the correct side to the correct side. Some signs will need to be relocated or made removable and some hardstand added to the inside and outside of the corner. Additionally, a pipe will need to be extended on the inside of the corner.

Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A large amount of work is required.

152.8 Km's: Stair Street onto Dartbrook access Road at Muswellbrook



PROCEDURE: Right hand turn from Stair Street onto the Dartbrook mine access Road.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/u9vSXiSV7Jt>

COMMENTS: Blades to cross from the correct side to the correct side but cut across the inside of the corner. Some signs will need to be relocated or made removable and some hardstand will need to be added to the inside and outside of the corner.

Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A Large amount of work is required.

155.0 Km's: Dartbrook access Road onto the New England Highway at Muswellbrook



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/twTsmUKaED82>

PROCEDURE: Left hand turn from the Dartbrook mine access Road onto the New England Highway.

COMMENTS: Blades to cross from the incorrect side to the incorrect side. Some signs will need to be relocated or made removable, and some hardstand added to the inside of the corner.

Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

298.0 Km's: New England Highway and Jack Smyth Drive at Tamworth



PROCEDURE: Loads to travel straight ahead through the roundabout.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/j1tpfb8JJf83jtt2A>

COMMENTS: Several signs need to be made removable.

ROAD MODIFICATIONS: A small amount of work is required.

299.0 Km's: New England Highway and Calala Lane at Tamworth



PROCEDURE: Loads to travel straight ahead through the roundabout.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/UM9a6UEw14GhSAXm8>

COMMENTS: Several signs need to be made removable and a tree removed.

ROAD MODIFICATIONS: A small amount of work is required.

299.3 Km's: New England Highway and Wilburtree Street at Tamworth



PROCEDURE: Loads to travel straight ahead through the roundabout.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/jnxxpqLbWfoKyp5dA>

COMMENTS: The roundabout has delineators at approx. 800mm high, and small shrubs at a similar height. These signs may need to be relocated or made removable. Additionally, the tail swing will travel close to the roundabout warning signs, these will also need to be made removable.

ROAD MODIFICATIONS: A moderate amount of work is required.

300.0 Km's: New England Highway onto Scott Road at Tamworth



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/EBDySH8meKgYWuPL8>

PROCEDURE: Loads to cut across the wrong side of the roundabout from correct side to correct side.

COMMENTS: The swept path for the loads will require the blade to travel through the landowners' boundaries on the north side of the intersection and would require 1 pole to be relocated.

Additionally, extra hardstand would be required on the centre median strip as well as the landowners' boundaries and some signs made removable. Some trees will need to be removed from the tailswing.

ROAD MODIFICATIONS: A significant amount of work is required.

302.0 Km's: Scott Road onto Murray Street at Tamworth



PROCEDURE: Loads to travel through the roundabout on the correct side.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/nix2oREeh6H2>

COMMENTS: The blades swept path will travel over the edge of the roundabout. To do this some trees will need to be removed along with numerous signs to be made removable.

Some hardstand will also need to be added inside the roundabout.

ROAD MODIFICATIONS: A large amount of work is required.

302.2 Km's: Murray Street onto New England Highway at Tamworth



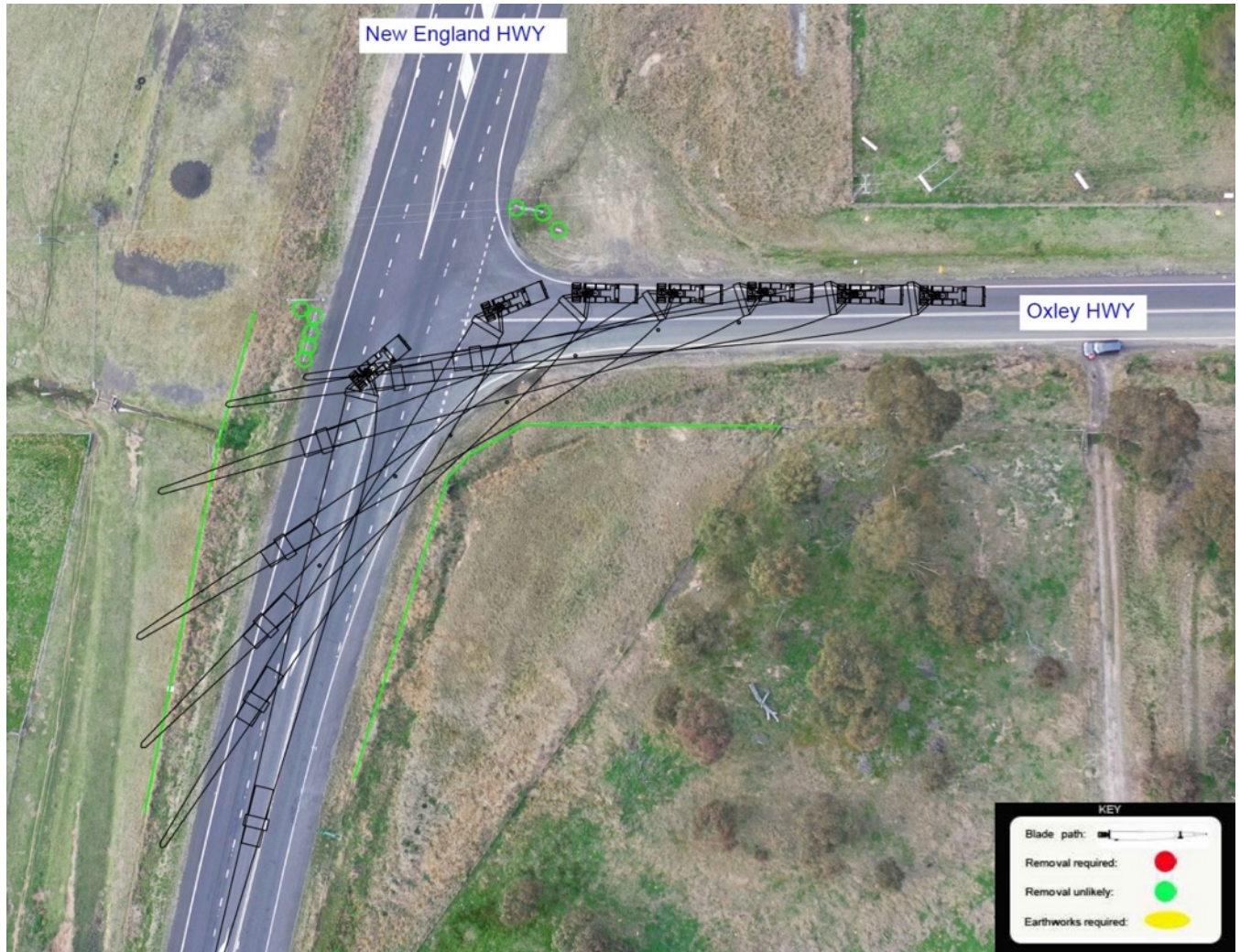
GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/45dffqHmUcs>

PROCEDURE: Loads to cut across the wrong side of the roundabout from correct side to correct side.

COMMENTS: This intersection will require several signs to be relocated, including one large sign. Additionally, a pole will need to be relocated and no parking placed on either side of the road. The 2 Median strips will need extra hardstand added.

ROAD MODIFICATIONS: A large amount of work is required.

342.0 Km's: New England Highway onto Oxley Highway at Bendemeer



PROCEDURE: Right hand turn.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/rCy2jRCBovnqHRfd8>

COMMENTS: Some hardstand will need to be added to the left exit of the corner. Some signs will need to be relocated and or made removable and some fence will need to be relocated as well as a tree.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

349.0 to 351.0 Km's: Oxley Highway through mountain range at Bendemeer

Image 1: Right hand bend

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/UdcawRw9ZTASwMnQ7>



Image 2: Right hand bend

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/6KmbfkS8Psfu6skH6>



Image 3: Left hand bend

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/rA5SLZmutFKd4Ra68>



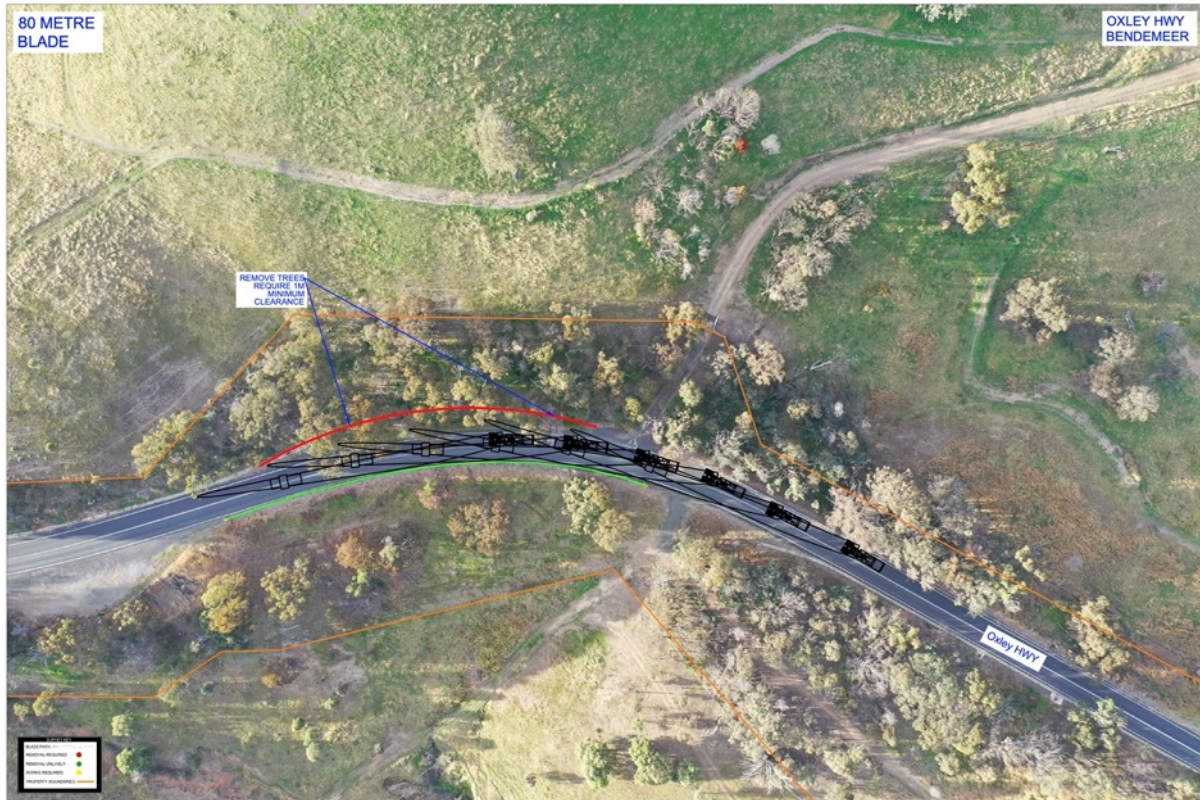
Image 4: Right hand bend

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/rVLRWkR6BRCTw2tb9>



Image 5: Right hand bend

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/77mG4gaFf7zkszRy8>



PROCEDURE: Travel directly ahead around several sweeping corners will ascending the mountain range.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/dJPgoywUjPQxHsaj7>

COMMENTS: A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic along the mountain range.

ROAD MODIFICATIONS: Vegetation to be to be trimmed and removed.

372.4 Km's: Surveyors Creek Bridge on Oxley Highway at Walcha Road.

Image 1:

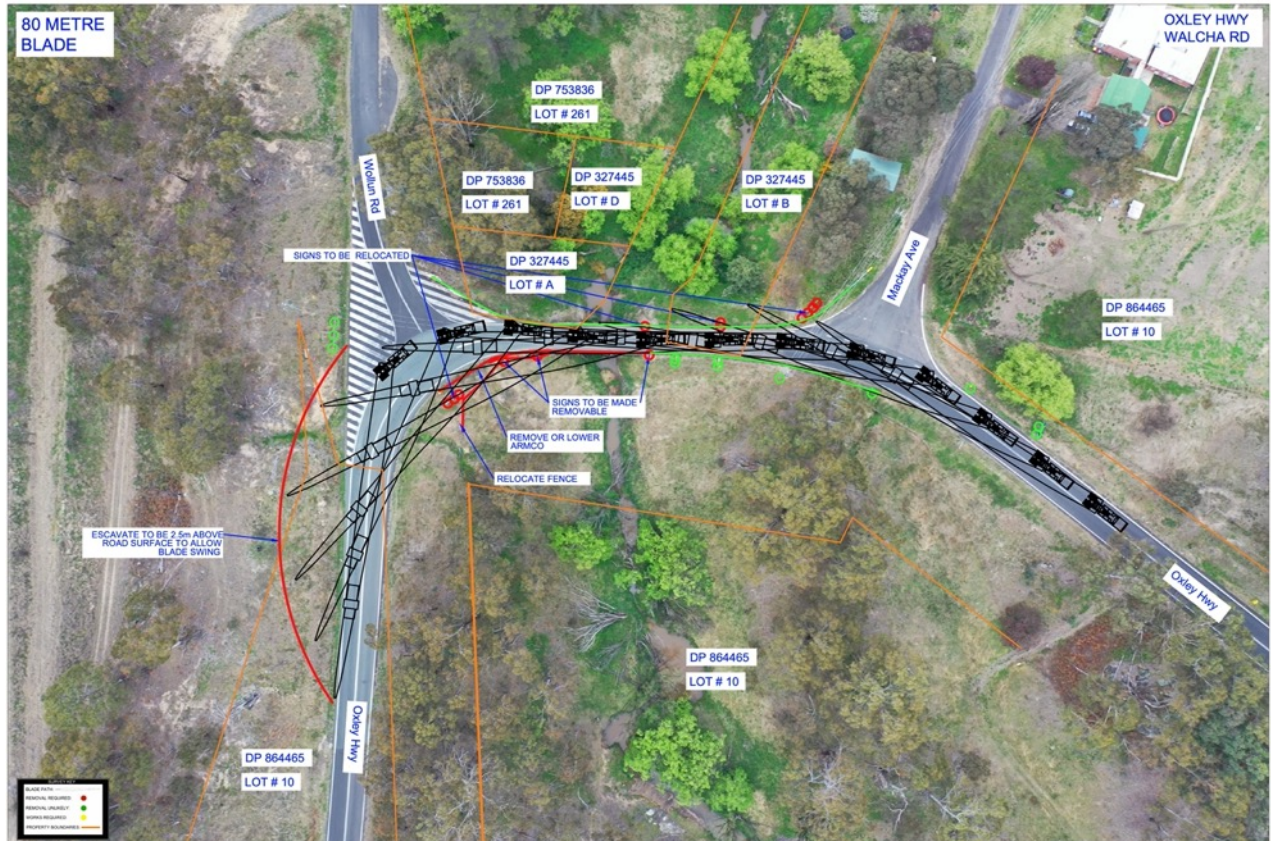


Image 2:



Image 3:



Image 4:



PROCEDURE: Right hand curve before crossing Surveyors Creek Bridge

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/Uxn3dWvjtNAQcVA77>

COMMENTS: Relocate fence, remove armco, excavate bank to allow for blade swing, several signs to be relocated and /or made removable.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

Bridge to be assessed for potential over mass transport route additional to oversize blades and return travel for empty platform trailers.

ROAD MODIFICATIONS: A significant amount of work is required.

389.4 Km's: Oxley Highway onto Saleyard Road at Walcha

Image 1:



Image 2:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/fvFyRr94h67dEYhp9>

PROCEDURE: Left hand turn onto road reserve next to Saleyard Road, return to bitumen adjacent to the saleyards with the break in the trees.

COMMENTS: Significant hardstand required in road reserve and a sign to be made removable.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A large amount of work is required.

390.3 Km's: Saleyard Road onto Darjeeling Road at Walcha

Image 1:



Image 2:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/PURoR2iNcevNWJRv7>

PROCEDURE: Left hand turn.

COMMENTS: Hardstand required on the inside of the corner.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

392.3 Km's: Darjeeling Road onto Thunderbolts Way at Walcha

Image 1:



Image 2: (Option 1)



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/MpDG2AxCKSJWnRXw7>

PROCEDURE: Right hand turn.

COMMENTS: Hardstand required on the inside of the corner. Some vegetation will need to be removed.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

Image 3: (Option 2)



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/MpDG2AxCKSJWnRXw7>

PROCEDURE: Right hand turn.

COMMENTS: Hardstand required on the inside and outside of the corner.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

394.0 Km's: Thunderbolts Way onto Jamieson Street at
Walcha

Image 1:



Image 2:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/qwhPw85k3M7frFRg6>

PROCEDURE: Left hand turn.

COMMENTS: Several signs to be relocated and/or made removable.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A small amount of work is required.

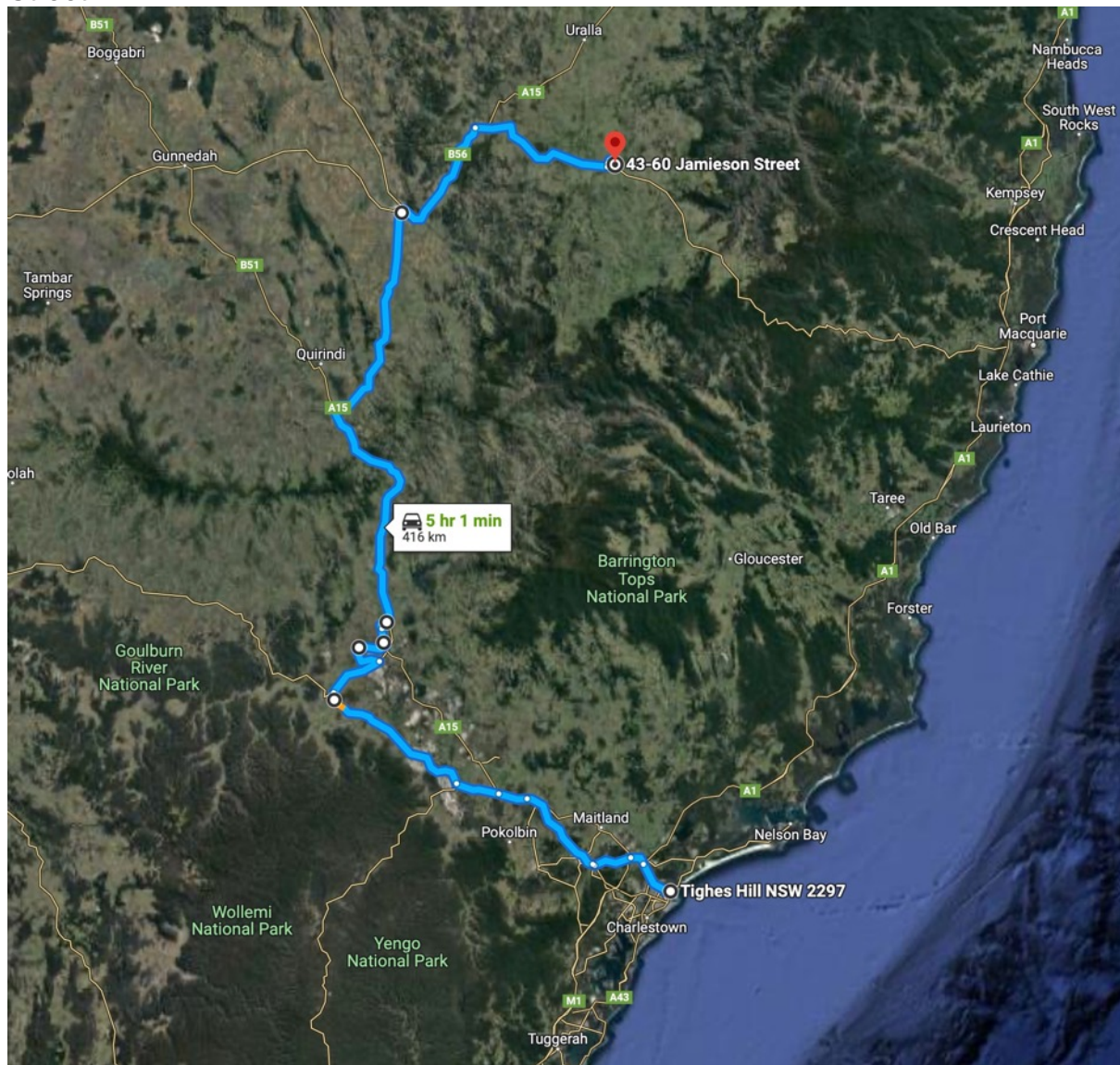
10.0 Route Survey 2: Newcastle port to Walcha

COMPONENTS: Towers and Motors over 5.2 metres in overall height.

DISTANCE: 416 kilometres

GPS Link: <https://goo.gl/maps/GNAKuXEBb4RGPjZu7>

Via: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Denman Road, Bengalla Road, Wybong Road, Kayuga Road, Invermein Street, Stair Street, Dartbrook Mine access Road, New England Highway, (Tamworth bypass via Scott Street, Marius Street), New England Highway, Oxley Highway, Saleyards Road, Darjeeling Road, Thunderbolts Way and Jamieson Street.



KEY	
MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street https://goo.gl/maps/aflwPYKuNdm	Clearance: Length: 70.0 metres Width: 8.0 metres	Right hand turn	No problems with this section of road.
0.4	Mayfield	Selwyn Street rail crossing https://goo.gl/maps/AmohE54hKSz	Clearance: Width: 9.0 metres	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
1.3	Mayfield	Selwyn Street onto George Street https://goo.gl/maps/gXeHvBtCp4D2	Clearance: Length: 70.0 metres Width: 8.0 metres	Right hand turn	No problems with this section of road.
1.4	Mayfield	George Street onto Industrial Drive https://goo.gl/maps/s4ayrsuoAsD2	Clearance: Length: 70.0 metres Width: 8.0 metres	Moderate right hand turn	No problems with this section of road.
4.9	Mayfield	Industrial Drive under traffic signals https://goo.gl/maps/YmqhiS2iR582	Clearance: Height: 5.4 Metres	Travel directly ahead	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 metres will need to travel in the right hand lane.
5.5	Mayfield West	Industrial Drive onto Maitland Road https://goo.gl/maps/Kn49dhWG2qG2	Clearance: Length: 50.0 metres Width: 10.0 metres	Right hand turn	No problems with this section of road.
13.9	Hexham	New England Highway under gantry https://goo.gl/maps/YTMoFe7Aick	Clearance: Height: 5.95 Metres	Travel directly ahead	This is the lowest structure on route. There is no bypass around the gantry. A maximum loaded height of 5.8 metres should not be exceeded.
17.4	Tarro	New England Highway onto John Renshaw Drive https://goo.gl/maps/SRDrs5JigkBp	Clearance: Width: 12.0 metres	Left hand merge	No problems with this section of road.
18.4	Beresfield	John Renshaw Drive https://goo.gl/maps/N19vJih1Fgr	Clearance: Width: 9.0 metres Height: 5.9 metres	Travel directly ahead	No problems with this section of road.
28.7	Buchanan	John Renshaw Drive onto the Hunter Expressway https://goo.gl/maps/1STJ1PfQ9E2	Clearance: Length: 65.0 metres Width: 7.0 metres	Right hand turn	No problems with this section of road.
58.9	Branxton	The Hunter Expressway onto The New England Highway https://goo.gl/maps/7rauNuxzqjg	Clearance: Width: 9.0 metres	Travel directly ahead	No problems with this section of road.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
67.3	Whittingham	The New England Highway onto the Golden Highway https://goo.gl/maps/nAnfkYfeUn42	Clearance: Width: 12.0 metres	Left Hand turn	No problems with this section of road.
67.4	Whittingham	Golden Highway https://goo.gl/maps/R86RFuPnmFU2	Clearance: 115.0 x 9.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
77.3	Whittingham	Golden Highway intersection with the Putty Road https://goo.gl/maps/7hQdEmK1EgE2	Clearance: Length: 85.0 metres Width: 12.0 metres	Left hand turn	No problems with this section of road.
77.4	Mount Thorley	Golden Highway https://goo.gl/maps/zGvdupDuixx	Clearance: 100.0 x 10.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
80.8	Mount Thorley	Golden Highway intersection with Mt Thorley Road. https://goo.gl/maps/VyA42n1CqZx	Clearance: Length: 45.0 metres Width: 8.0 metres Height: 5.6 metres	Right hand turn	Loads over the listed clearances will need to travel along the incorrect side of the road. Loads will need to cross to the incorrect side 100 metres prior to the Mt Thorley Road underpass.
98.0	Warkworth	Golden Highway https://goo.gl/maps/Y6V6EXaCwxq	Clearance: 100.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
107.0	Jerrys Plains	Golden Highway through Jerrys Plains village https://goo.gl/maps/WgSCRsJ9ZGt	Clearance: Length: 70.0 metres Width: 9.0 metres	Dogleg	No problems with this section of road.
126.0	Ogilvy	Golden Highway https://goo.gl/maps/58Tj9ois7CC2	6% gradient	Travel directly ahead	This section of road has a steep mountain range that will require additional pull trucks to assist loads that exceed 80T gross weight. Additionally the NSW Government is currently upgrading this section of road. It is recommended that you monitor the progress of the upgrades, and that any changes are thoroughly looked at.
141.9	Denman	Golden Highway onto Denman Road https://goo.gl/maps/sf4PNnycxB32	Clearance: Length: 60.0 metres Width: 10.0 metres	Right hand turn	No problems with this section of road.
149.0	Muswellbrook	Denman Road onto Bengalla Road https://goo.gl/maps/CJYMtSMTtJ2	Length: 65.0 metres Width: 8.0 metres	Left hand turn	No problems with this section of road.
158.5	Muswellbrook	Bengalla Road onto Wybong Road https://goo.gl/maps/vibQtvHkxXE2	Length: 70.0 metres Width: 8.0 metres	Right hand turn	No problems with this section of road.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
1681	Muswellbrook	Wybong Road onto Kayuga Road https://goo.gl/maps/kVscKUT1jsJ2	Length: 40.0 metres Width: 7.0 metres	Left hand turn	Loads to cross from the incorrect side to the incorrect side. Permission will be required from the landowner to travel over the private land. This will require removal and realigning the fence and adding hardstand. Additionally, some hardstand will be required on the exit of the corner.
173.0	Muswellbrook	Kayuga Road onto Ivermein Street https://goo.gl/maps/JpTfmcS6Z6Sk	Width: 8.0 metres	Travel directly ahead	No problems with this section of road.
174.0	Muswellbrook	Ivermein Street onto Stair Street https://goo.gl/maps/d6MH44QnYK32	Length: 50.0 metres Width: 7.0 metres	Right hand turn	Loads to cross from the correct side to the correct side. Some signs will need to be made removable and some hardstand added to the inside and outside of the corner. Additionally, a pipe will need to be extended on the inside of the corner.
174.8	Muswellbrook	Stair Street onto Dartbrook Road access https://goo.gl/maps/u9vSXiSV7Jt	Length: 60.0 metres Width: 8.0 metres	Right hand turn	No problems with this section of road.
177.0	Muswellbrook	Dartbrook access Road onto New England Highway https://goo.gl/maps/twTsmUKaED82	Length: 60.0 metres Width: 7.0 metres	Left hand turn	No problems with this section of road.
265.8	Murrurundi	New England highway (Township) https://goo.gl/maps/Sj3ixAkhujt	Clearance: 60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
270.4	Murrurundi Hill	New England highway Nowlands Gap https://goo.gl/maps/R5yufobPeMG2	Clearance: 120.0 x 12.0 metres	Parking Bay (small)	Emergency parking only.
276.3	Willow Tree	New England highway https://goo.gl/maps/XLTg7CRV7EU2	Clearance: Width: 7.0 metres Length: 35 metres Height: 5.2 metres	Kankool weighbridge	It is likely that the towers and defiantly the blades will not fit into this facility. We have engineered documentation showing correct weights for all loads.
282.9	Willow Tree Township	New England highway https://goo.gl/maps/gw38gmVfTC2	Clearance: 60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
284.5	Willow Tree Truck Stop	New England highway https://goo.gl/maps/RRdPVHupGCs	Clearance: 120.0 x 12.0 metres	Parking Bay (small)	Suitable parking for Fatigue breaks for small loads only.
294.0	Wallabadah	New England highway https://goo.gl/maps/QWCyeHQSoHS2	Clearance: 80.0 x 5.0 metres	Parking Bay (side of road)	Suitable parking for Fatigue breaks.
299.8	Goono Goono	New England highway https://goo.gl/maps/im4QhUfW24D2	Clearance: 80.0 x 10.0 metres	Parking Bay	Emergency parking only. Incorrect side of the road
341.0	Tamworth	Standard roundabout on the New England https://goo.gl/maps/j1tpfb8Jf83jtt2A	66.0 metres clearance	Drive directly ahead	No problems with this section of road.
343.0	Tamworth	Standard roundabout on the New England https://goo.gl/maps/UM9a6UEwI4GhSAXm8	66.0 metres clearance	Drive directly ahead	No problems with this section of road.
343.3	Tamworth	Standard roundabout on the New England https://goo.gl/maps/3J9dCHxtYim	66.0 metres clearance	Drive directly ahead	No problems with this section of road.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
344.0	Tamworth	New England Highway onto the heavy vehicle bypass at Scott Road. https://goo.gl/maps/BXdwaSiLSBw	66.0 metres clearance	Loads to cut across the wrong side of the roundabout from correct side to correct side	Loads over 30 metres in length will need to cross to the incorrect side of the roundabout.
346.0	Tamworth	Scott Road onto Murray Street https://goo.gl/maps/nix2oREeh6H2	66.0 metres clearance	Drive directly ahead	No problems with this section of road.
346.2	Tamworth	Murray Street onto New England Highway https://goo.gl/maps/45dffqHmUcs	66.0 metres clearance	Loads to cut across the wrong side of the roundabout from correct side to correct side. But travel through the incorrect side of the roundabout.	Loads over 30 metres in length will need to cross to the incorrect side of the roundabout.
347.0	East Tamworth	New England highway https://goo.gl/maps/9cpBrT5qUAU2		Parking Bay	Suitable parking for Fatigue breaks
366.0	Moonbi	New England highway https://goo.gl/maps/E3TL2KkEctG2		Parking Bay	Suitable parking for Fatigue breaks.
378.0	Moonbi range	New England highway https://goo.gl/maps/rwJQaAYkLTQ2		Parking Bay	Suitable parking for Fatigue breaks
364.0	Bendemeer	New England Highway onto Oxley Highway https://goo.gl/maps/rCy2jRCBovnqHRfd8	Length: 80.0 metres Width: 7.0 metres	Right hand turn	No problems with this section of road.
370.0 to 372.8	Bendemeer	Oxley Highway over mountain range at Bendemeer https://goo.gl/maps/5xqRkcBRieokTq2t8	Length: 75.0 metres Width: 6.0 metres	Travel directly ahead	Loads to travel over a mountain range with several sweeping corners. Some trees will need to be trimmed along this section of route.
394.4	Walcha Road	Surveyors Creek Bridge on Oxley Highway https://goo.gl/maps/Uxn3dWvjtnAQcVA77	Length: 45.0 metres Width 5.5 metres	Right hand turn before crossing bridge and right hand turn at exit	Excavation for blade tip swing. Armco to be removed or lowered for trailer chassis. Fence to be relocated. Signs to be relocated and/ or made removable.
395.4	Walcha Road	Oxley Highway https://goo.gl/maps/BQd79HCm4gqmQwVG6	Length: 85.0 metres	Right hand Curve	Blades tip will swing over chevrons.
413.4	Walcha	Oxley Highway onto Saleyard Road https://goo.gl/maps/fvFyRr94h67dEYhp9	Length: 45.0 metres Width 6.0 metres	Left hand turn	Hardstand required Use of road reserve eliminates impact on vegetation
412.3	Walcha	Saleyrd Road onto Darjeeling Road https://goo.gl/maps/PUroR2iNceVNWJRv7	Length: 55.0 metres Width 6.0 metres	Left hand turn	Hardstand required on inside of corner
414.3	Walcha	Darjeeling Road onto Thunderbolts Way https://goo.gl/maps/MpDG2AxCKSJWnRXw7	Length: 65.0 metres Width 6.0 metres	Right hand turn	Hard stand required on the inside and outside of the corner

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
416.0	Walcha	Thunderbolts way onto Jamieson Street https://goo.gl/maps/qwhPw85k3M7frRq6	Length: 65.0 metres Width 6.0 metres	Left hand turn	Several signs to be relocated or made removable.

11.0 Route Survey 3: Alternative Route through Tamworth

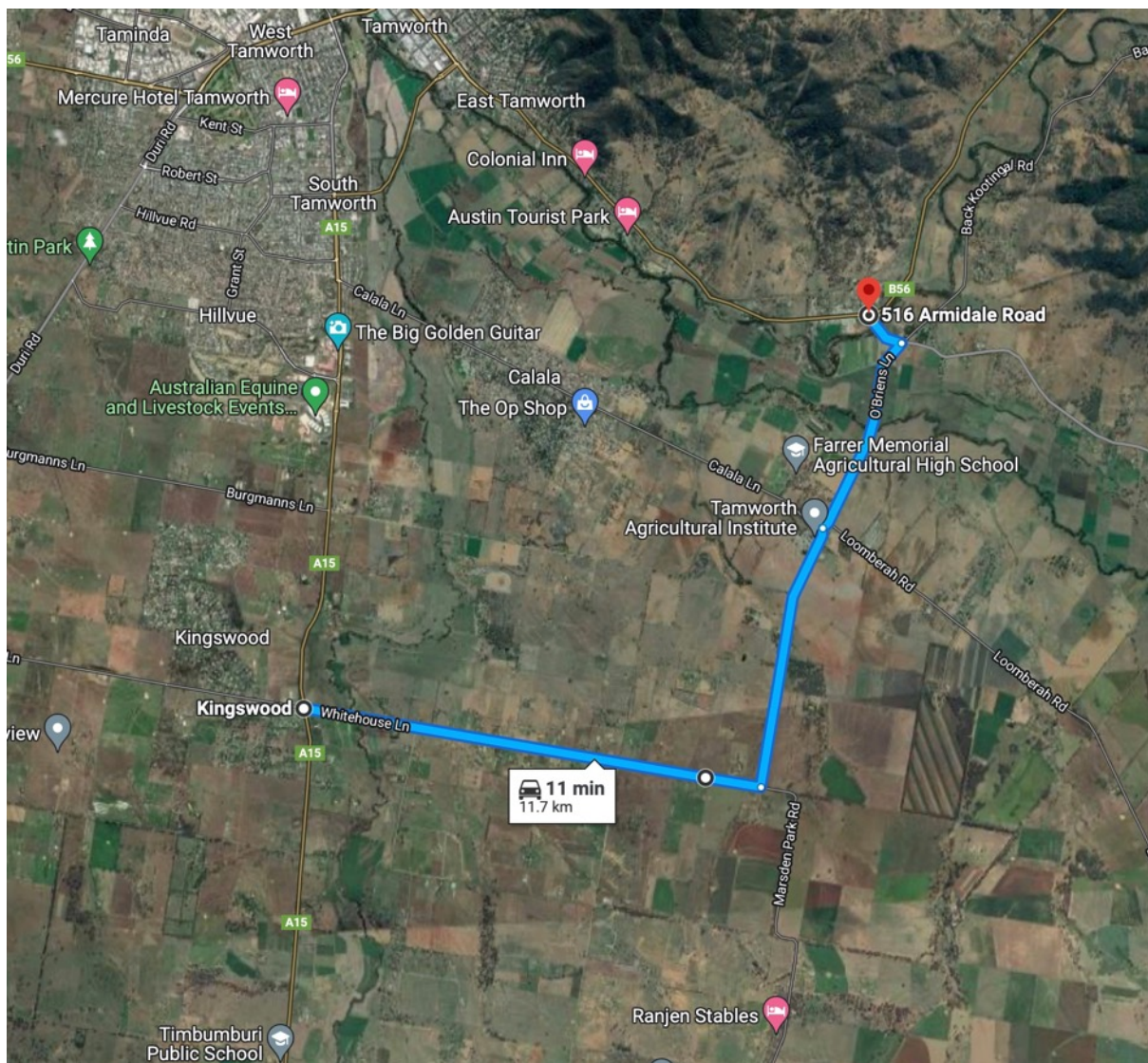
This route is currently limited to 25T GVM, is subject to flooding and would entail two traffic control procedures either side of Tamworth.

COMPONENTS: Blades.

DISTANCE: 11.7 kilometres

GPS Link: <https://goo.gl/maps/GDCLZ8y1X94xJtcH6>

This route took us via Whitehouse Lane, Marsden Park Road, O'Briens Lane and Nundle Road.



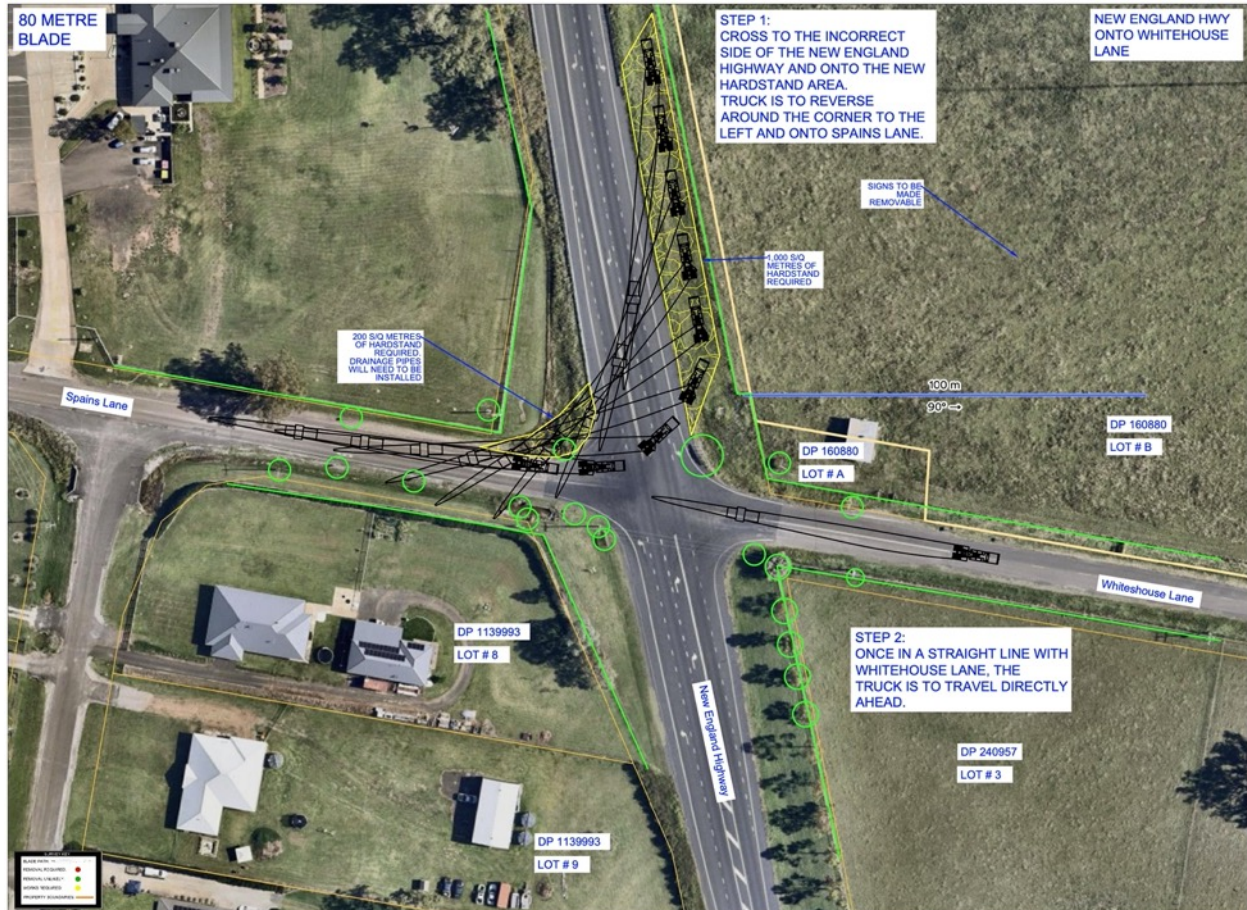
KEY	
MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Current Measurement	Procedure	Notes
0.0	Kingswood	New England Highway onto Whitehouse https://goo.gl/maps/AtsIyarGCaR5zQ8	Length: 50.0 metres Width: 6.0 metres	Right hand turn	Load to travel past the intersection and onto the incorrect side of the New England Highway. Once past the intersection, the load will reverse into Spain's Lane. Once load is in a straight line with Whitehouse Lane, the load will then travel directly ahead. Some hardstand will need to be added to the left-hand side of the New England Highway to the north of the intersection. Some signs will need to be relocated and or made removable. Traffic control to hold traffic for approx. 3 to 5 minutes while this procedure is performed.
0.75	Kingswood	Goonoo Goonoo Creek Bridge https://goo.gl/maps/EDWpGMWsBAuAFs3q9	Width: 6.0 metres	Travel directly ahead	Structure to be checked for capacity.
1.9	Kingswood	Goonang Creel Floodway https://goo.gl/maps/m54q8xSVcquJuaM7	Width: 6.0 metres		Prone to flooding
5.5	Calala	Whitehouse Lane onto Marsden Park Road https://goo.gl/maps/RoXqRR8G8WmYh89C9	Length: 50.0 metres Width: 6.0 metres	Left hand turn	Left hand turn from the incorrect side to the incorrect side of the road. Hardstand will need to be added to the inside and outside of the corner. A power pole will also need to be relocated.
8.7	Calala	Marsden Park Road onto Obrien's Lane https://goo.gl/maps/XdtLrmt7ubNNw96u6	Length: 70.0 metres Width: 6.0 metres	Right hand turn	Some signs will need to be relocated or made removable.
9.8	Calala	Reedy Creek Floodway https://goo.gl/maps/GqSZbfNpgQeEu7TaA	Width: 6.0 metres	Travel directly ahead	Structure to be checked for capacity.
10.0	Nemingha	Peel River Bridge https://goo.gl/maps/QcBdp4Harycb9pjv6	Width: 6.0 metres	Travel directly ahead	Structure to be checked for capacity.
10.6	Nemingha	Piallamore Anabranh Bridge https://goo.gl/maps/X5AwekD1dkB645zE6	Width: 6.0 metres	Travel directly ahead	Structure to be checked for capacity.
11.2	Nemingha	Obriens Lane and Nundle Road https://goo.gl/maps/P8GB73xxASZmf7uN9	Length: 70.0 metres Width: 6.0 metres	Right hand turn, then reverse.	Some hardstand will need to be added to the outside of the corner, and a pole will need to be relocated. Some signs will need to be made removable. Exit Corner in reverse

KM index	Location	Section of road	Current Measurement	Procedure	Notes
11.6	Nemingha	Cockburn River Bridge https://goo.gl/maps/hkME4cUyaT2uHj9u6	Width: 7.0 metres	Travel directly ahead	Structure to be checked for capacity.
11.7	Nemingha	Nundle Road onto New England Highway https://goo.gl/maps/hF56sogtNE0JLidA7	Length: 70.0 metres Width: 6.0 metres	Reverse through left hand corner, then drive directly ahead	Several signs to be made removable. Approach corner in reverse Traffic control to hold traffic for approx. 3 to 5 minutes while this procedure is performed.

0.0 Km's: New England Highway onto Whitehouse Lane at Kingswood

Image 1:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/A1siJyarGCgjR5zQ8>

PROCEDURE: Load to travel past the intersection and onto the incorrect side of the New England Highway.

Once past the intersection, the load will reverse into Spain's Lane. Once load is in a straight line with Whitehouse Lane, the load will then travel directly ahead.

COMMENTS: Some hardstand will need to be added to the left-hand side of the New England Highway to the north of the intersection. Some signs will need to be relocated and or made removable.

A spotter will need to keep the driver informed throughout the procedure.

Traffic control and Police and escorts to control local traffic either side of the intersection.

Traffic will be stopped for between 3-5 minutes for this procedure to take place.

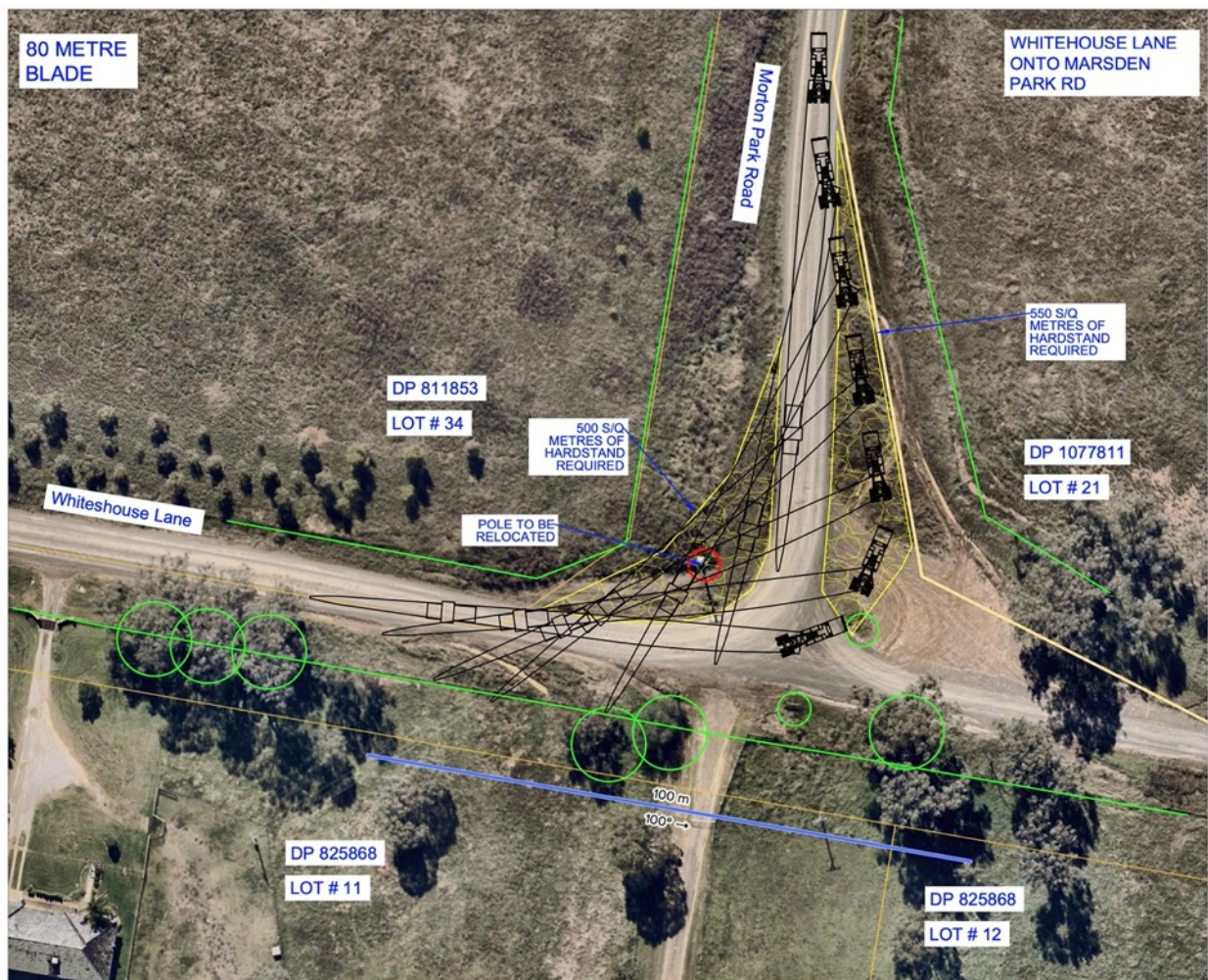
ROAD MODIFICATIONS: A large amount of work is required.

5.5 Km's: Whitehouse Lane onto Marsden Park Road at Calala

Image 1:



Image 2:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/RoXqBR8G8WmYh89C9>

PROCEDURE: Left hand turn from the incorrect side to the incorrect side of the road.

COMMENTS: Hardstand will need to be added to the inside and outside of the corner. A power pole will also need to be relocated.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A large amount of work is required.

8.7 Km's: Marsden Park Road onto OBriens Lane at Calala



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/XdtLrmt7ubNNw96u6>

PROCEDURE: Right hand turn.

COMMENTS: Some signs will need to be made removable or relocated.

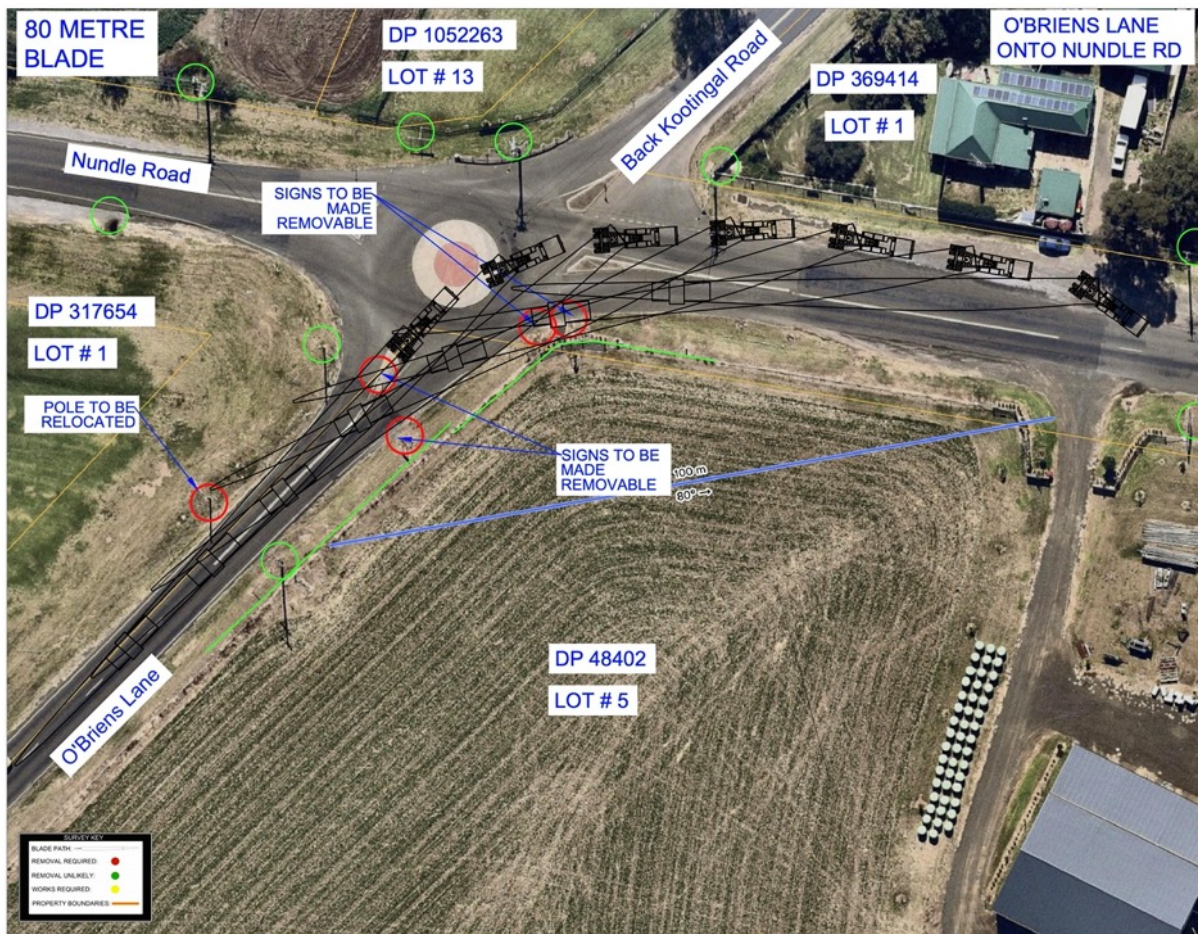
A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A minor amount of work is required.

11.2 Km's: OBriens Lane onto Nundle Road at Nemingah
Image 1:



Image 2:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/PSGB73osASZmf7uN9>

PROCEDURE: Right hand turn, before reversing north on Nundle Road.

COMMENTS: Some hardstand will need to be added to the outside of the corner, and a pole will need to be relocated. Some signs will need to be made removable.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

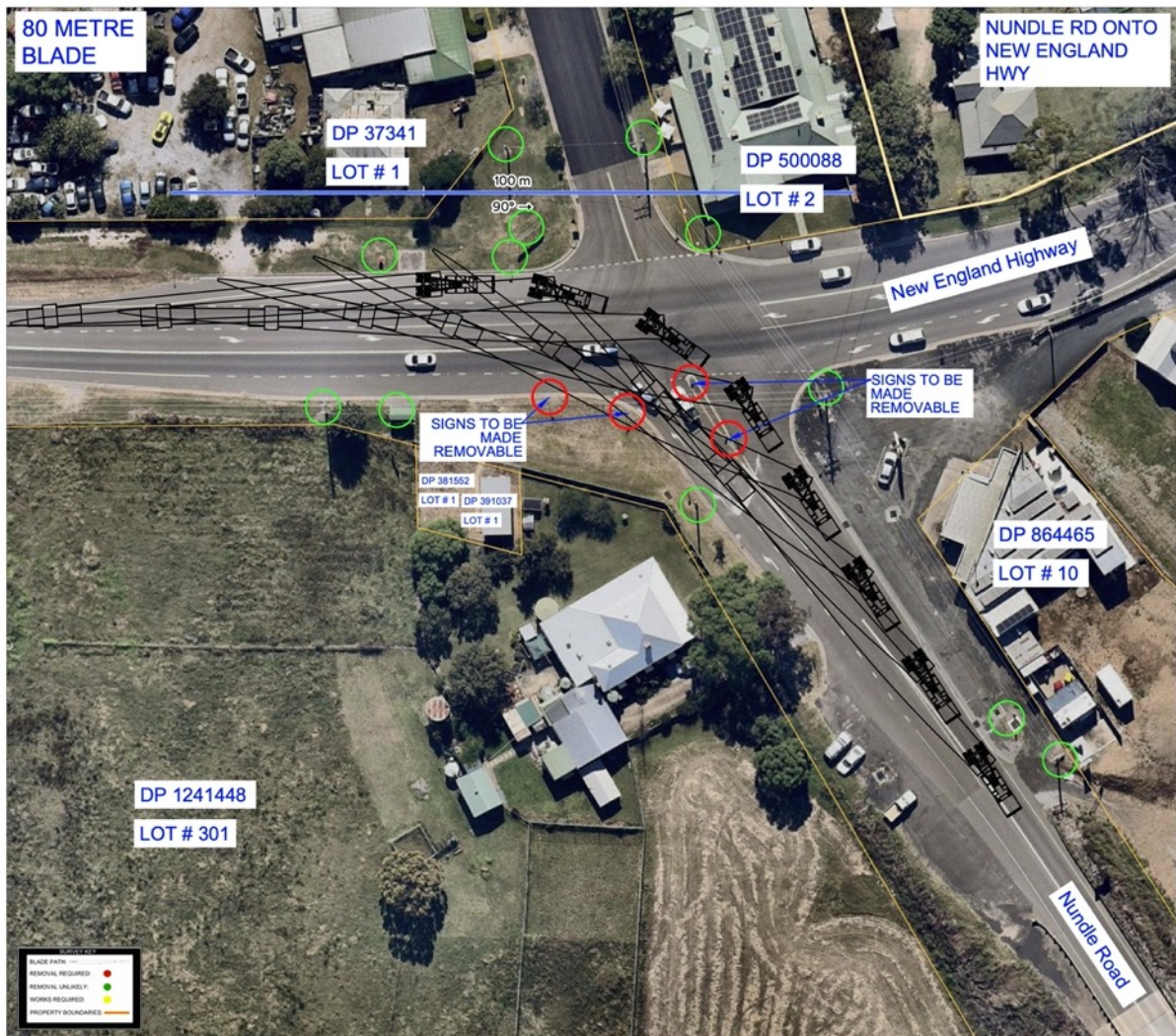
ROAD MODIFICATIONS: A large amount of work is required.

**11.7 Km's: Nundle Road onto New England highway at
Nemingah**

Image 1:



Image 2:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/nF56socgHEiULidA7>

PROCEDURE: Reverse around right hand corner, before traveling north along the New England Highway.

COMMENTS: Some signs will need to be made removable.

A spotter will need to keep the driver informed throughout the procedure.

Traffic control and Police and escorts to control local traffic either side of the intersection.

Traffic will be stopped for between 3-5 minutes for this procedure to take place.

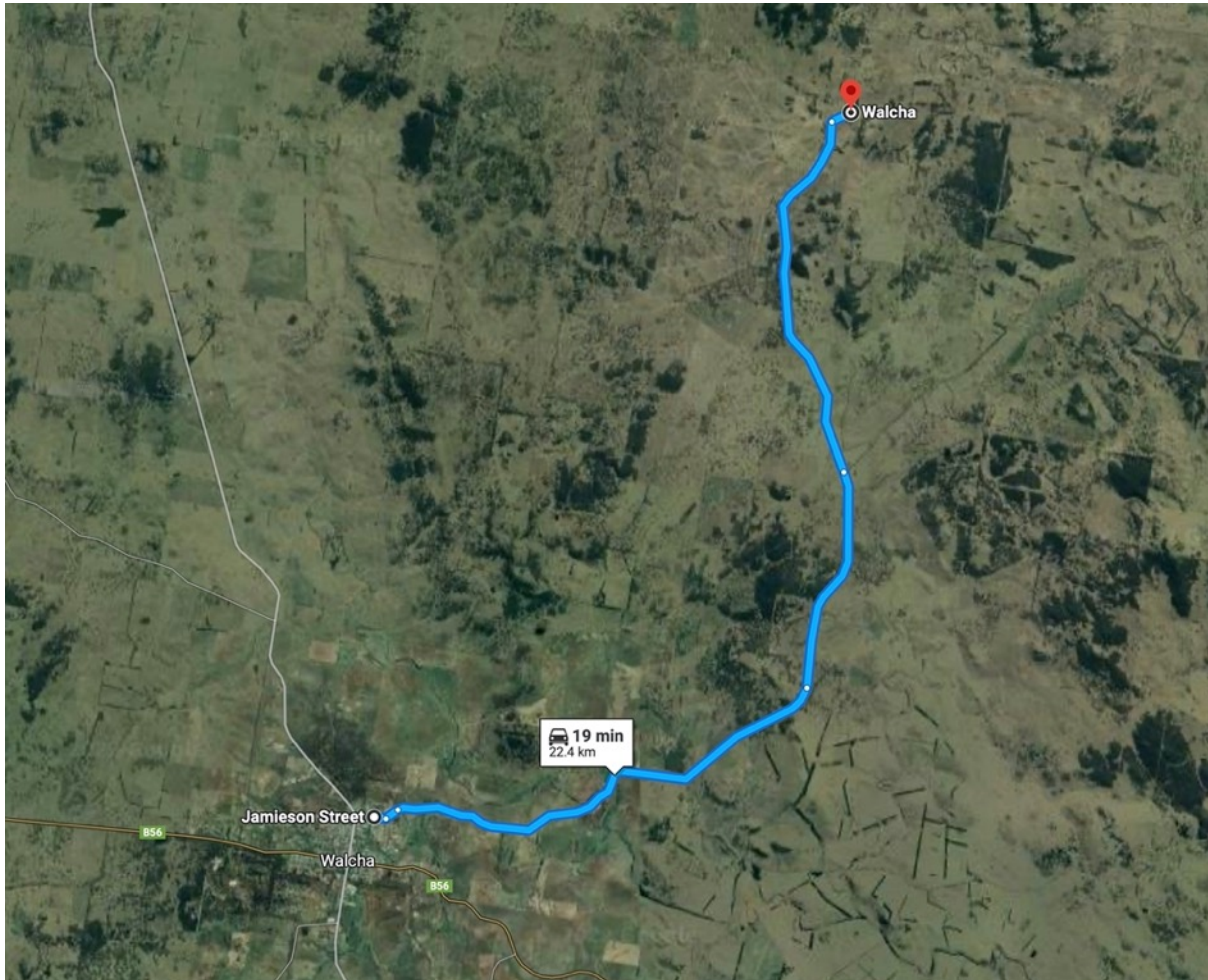
ROAD MODIFICATIONS: A minor amount of work is required.

12.0 Route Survey A: Walcha to Northern Site Entries

Distance: 22.4 Kilometres

GPS Link: <https://goo.gl/maps/HRwfgX9L4RmGVgOK6>

Via: Jamieson Street, Emu Creek Road, Winterbourne Road, Blue Mountain Road and Hazeldean Road.



KEY	
MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
2.0	Walcha	Right hand Curve on Emu Creek Road https://goo.gl/maps/vz0hM3JTaH67HFKP9	Length: 70.0 metres Width: 7.0 metres	Right hand curve	Remove dead trees on tailswing.
5.1	Walcha	Ohio Creek Bridge https://goo.gl/maps/TeU7jhAY2DgXF32d9	Width >6.0 metres	Travel directly ahead	Structure to be checked for capacity.
6.8	Walcha	Intersection of Emu Creek Road and Moona Plains Road https://goo.gl/maps/GVDg9AoNmq7da1J98	Length: 85.0 metres Width: 7.0 metres	Left hand Curve	No problems with this section of road.
14.3	Walcha	Blue Mountain Road https://goo.gl/maps/CT7femf6NkuBHH626	Clearance Width <5.0m in places	Travel directly ahead	Current road width less than 5.0m in places – will need to be widened to 5m to 5.5m with .05m verge on each side.
19.9	Walcha	Possible Western Site Entry https://goo.gl/maps/oZVCLr8URmdqPV7F0	Clearance Length 30.0 metres	Left hand turn	Site entrance to be made suitable for the swept path of the largest loads.
22.0	Walcha	Blue Mountain Road onto Hazeldean Road https://goo.gl/maps/4vFwoCbrwWgrUWX6	Clearance Length 75.0 metres	Right hand curve	Road is narrow in sections and may need to be widened.
22.4	Walcha	Possible Northern Site Entry https://goo.gl/maps/28KwoBgIQ9H1StUSd6	Clearance Length 30.0 metres	Left hand turn	Site entrance to be made suitable for the swept path of the largest loads.

2.0 Km's: Right hand curve on Emu Creek Road Walcha

Image 1:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/yzHpM3JTaHp7HFKP9>

PROCEDURE: Right hand curve.

COMMENTS: Hardstand required on inside of corner to avoid trees with tail swing.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A small amount of work is required.

6.8 Km's: Intersection Emu Creek Road and Moona Plains Road Walcha

Image 1:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/GVDg9AoNm7da1J98>

PROCEDURE: Left hand curve.

COMMENTS: A spotter will need to keep the driver informed throughout the procedure.
Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: No works required.

14.3 Km's: Blue Mountain Road Walcha

Image 1:



Image 2:



Image 3:



Image 4:



PROCEDURE: Travel directly ahead.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/CT7fcmHvNkuBHi626>

COMMENTS: 8 kilometres of roads with less than 5.0m in width. Will need to be widened to 5.0m to 5.5m with a 0.5m verge on each side.

Current over mass trailers are up to 4.2m at the wheels, but there is a possibility future projects will be 5.0m at the wheels to achieve a lower overall height if required for the route.

ROAD MODIFICATIONS: A significant amount of work is required.

19.9 Km's: Possible Western Site Entry from Blue Mountain Road

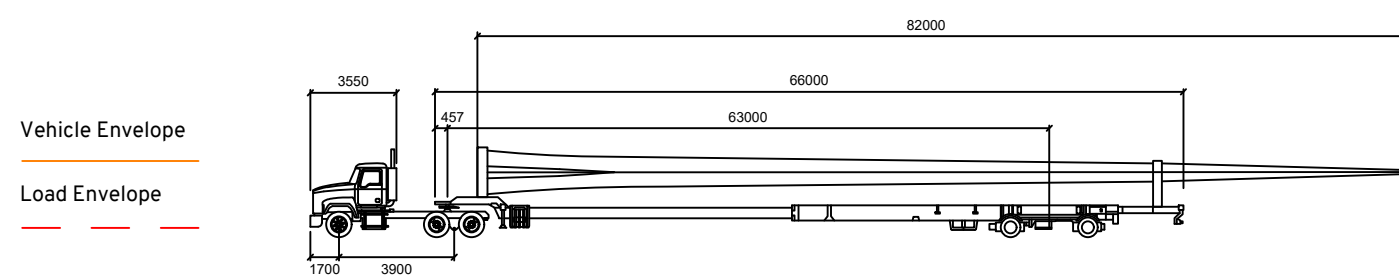
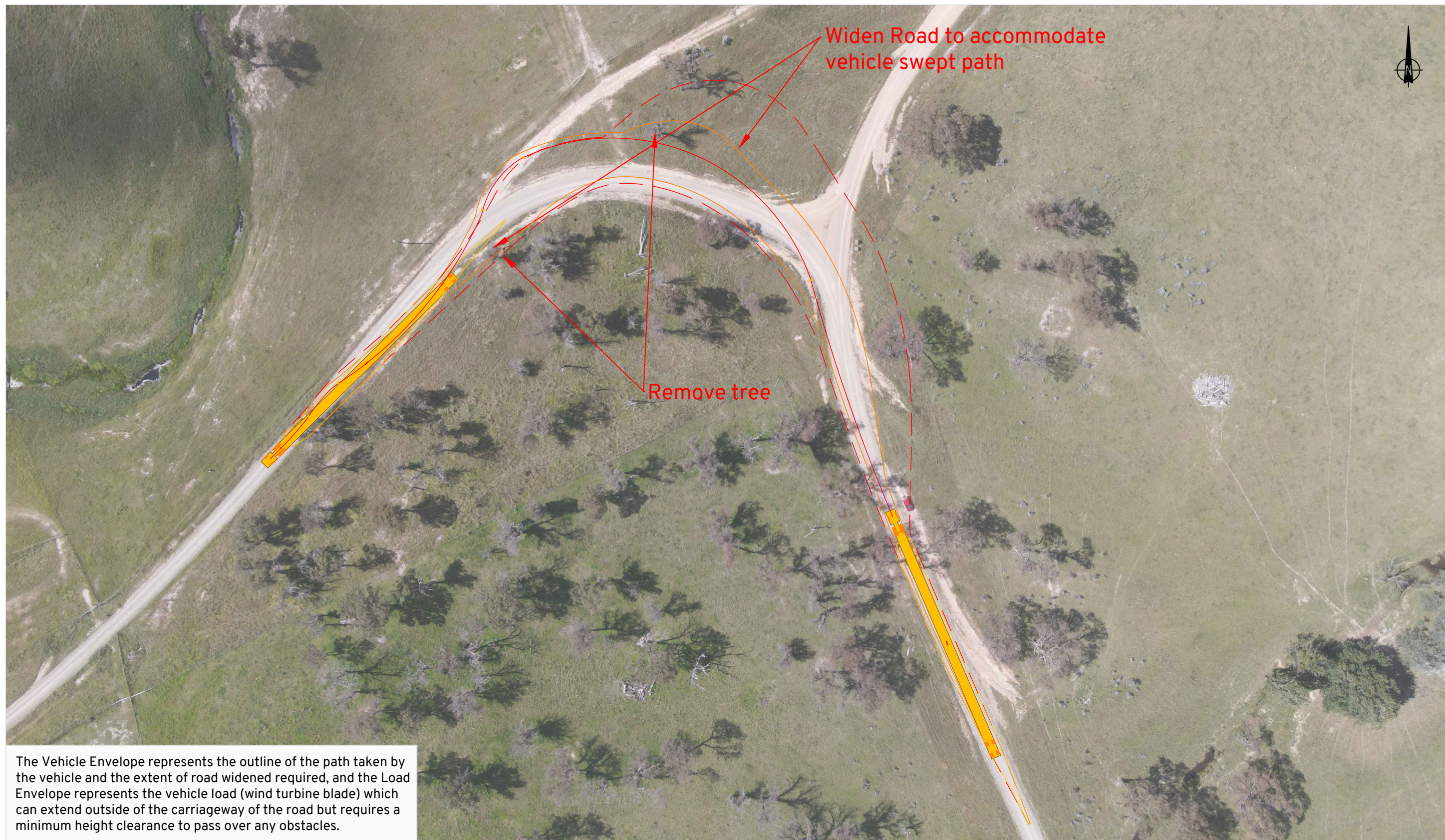


PROCEDURE: Left hand turn.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/oZVQLr8URmdqPV7F8>

COMMENTS: Site entrance to be made suitable for the swept path of the largest load.

ROAD MODIFICATIONS: A significant amount of work is required.



Winterbourne Blade Transport Vehicle

Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Blue Mountain Road / Hazeldean Road Intersection Swept Path Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01B

22.4 Km's: Intersection of Blue Mountain Road and Hazeldean Road

Image 1:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/4vFwoCbrrwWgrUWX6>

PROCEDURE: Right hand curve.

COMMENTS: Road is narrow in sections and will need to be widened.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: Large amounts of works are required.

22.4 Km's: Possible Northern Site Entry from Hazeldean Road

Image 1:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/2bKwnBgJQ9H5tUSd6>

PROCEDURE: Left hand turn.

COMMENTS: Site entrance to be made suitable for the swept path of the largest load.

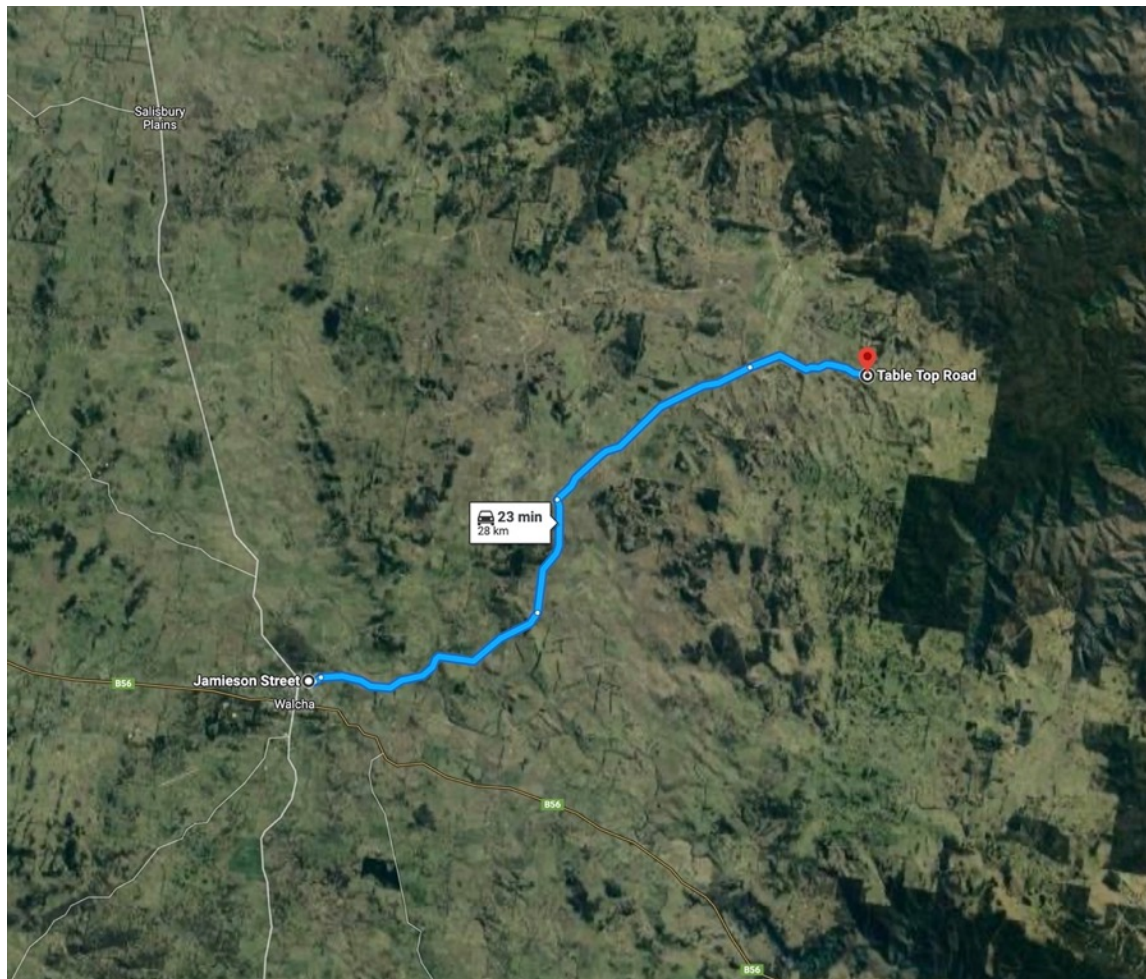
ROAD MODIFICATIONS: A significant amount of work is required.

13.0 Route Survey B: Walcha to Eastern Site Entries

Distance: 28.0 Kilometres

GPS Link: <https://goo.gl/maps/32kSFuPTcRX2Y8BR8>

Via: Jamieson Street, Emu Creek Road, Winterbourne Road and Table Top Road.



KEY	
MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
2.0	Walcha	Right hand Curve on Emu Creek Road https://goo.gl/maps/vdHnM3TaHn7HFKP9	Length: 70.0 metres Width: 7.0 metres	Right hand curve	Remove dead trees on tailswing.
5.1	Walcha	Ohio Creek Bridge https://goo.gl/maps/TeU7jhAY2DgXF32d9	Width >6.0 metres	Travel directly ahead	Structure to be checked for capacity.
6.8	Walcha	Intersection of Emu Creek Road and Moona Plains Road https://goo.gl/maps/GVDg9AoNm97da1J98	Length: 85.0 metres Width: 7.0 metres	Left hand Curve	No problems with this section of road.
14.3	Walcha	Winterbourne Road at Blue Mountain Road https://goo.gl/maps/QbZYeu1Fw8Z6Ei98	Clearance Length 82.0 metres	Right hand curve	Hardstand is required to the exit of the corner.
15.0	Walcha	Emu Creek Bridge https://goo.gl/maps/Aqvpa3rGYRDqWnp29	Clearance: Width 6.1 metres	Travel directly ahead	Structure to be checked for capacity.
16.1	Walcha	Winterbourne Road onto Bark Hut Road https://goo.gl/maps/mxZGY745566CJ567	Clearance Length 55 metres	Right hand turn	Significant hardstand required on inside of corner and culvert to be extended.
25.6	Walcha	Table Top Road and Florida Road https://goo.gl/maps/iQq38fUMSQmLxjke6	Clearance Length 55 metres	Left hand curve	Remove Cattle Grid
26.6	Walcha	Winterbourne Creek Bridge https://goo.gl/maps/Pzm35wi2w6mwTwh17	Clearance: Width 6.1 metres	Straight ahead	May need to be widened if transport required 5.0m wide wheels to achieve a lower overall height.
27.5	Walcha	S Bend along Table Top Road https://goo.gl/maps/mx5rYazJHQwKPaS37	Clearance Length 82.0 metres	S bend	Proceed with caution
28.0	Walcha	Possible Northern Site Entry https://goo.gl/maps/b9iSaVnDHkQ5wies9	Clearance Length 20.0 metres	Right hand turn	Site entrance to be made suitable for the swept path of the largest loads.

Route up until 14.3 kilometres is the same as Route A.

14.3 Km's: Right hand curve on Winterbourne Road Walcha

Image 1:



PROCEDURE: Right hand curve.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/QbZYeu1Fwx8Z6Ei98>

COMMENTS: Hardstand required on the exit to the corner.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

15.0 Km's: Emu Creek Bridge Walcha

Image 1:



Image 2:



PROCEDURE: Travel directly ahead.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/Aqvpa3rGYRDqWnp29>

COMMENTS: Bridge to be assessed for over mass transport.

16.1 Km's: To Site Entries exiting from Bark Hut Road

Image 1:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/mrzZGY745566CJS67>

PROCEDURE: Right hand turn.

COMMENTS: Hardstand required on inside of corner to avoid trees with tail swing and culvert to be extended.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A significant amount of work is required.

25.6 Km's: Left hand curve on Table Top Road at Florida Road Walcha



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/iQq38fUMSQmLxjke6>

PROCEDURE: Left hand curve.

COMMENTS: Remove cattle grid to allow use of full road.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A minor amount of work is required.

26.6 Km's: Winterbourne Creek Bridge

Image 1:



Image 2:



Image 3:



PROCEDURE: Travel directly ahead.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/Pzm35wi2w6mwTwh17>

COMMENTS: Bridge is 4.4m wide, so will be a tight squeeze for 4.2m wide trailers but will not be possible with 5.0m wide trailers.

Current over mass trailers are up to 4.2m at the wheels, but there is a possibility future projects will be 5.0m at the wheels to achieve a lower overall height if required for the route.

Will need to be assessed for over mass transport.

ROAD MODIFICATIONS: May need to be widened if 5.0m wide trailers are required to achieve a lower overall height along the route.

27.5 Km's: S Bend on Table Top Road Walcha



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/mx5rYazJHQwKPaS37>

PROCEDURE: S bend curve.

COMMENTS: Proceed with caution.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: No work is required.

28.0 Km's: Possible Southern Site Entry from Table Top Road

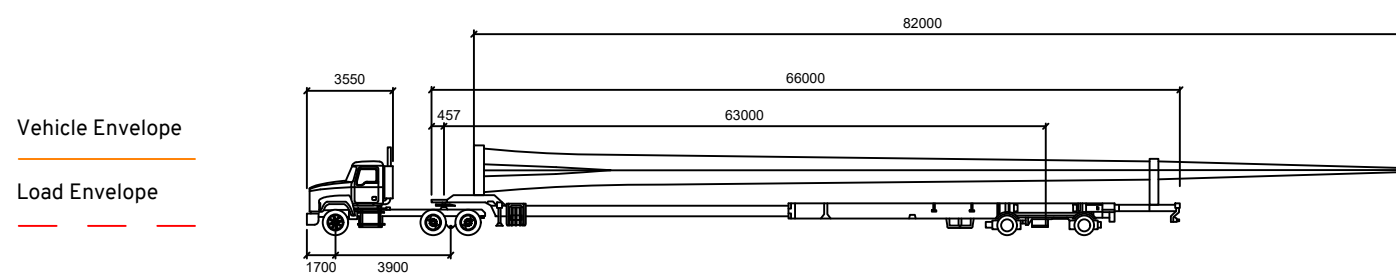


PROCEDURE: Right hand turn.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/b9jSqVrDHoQ5wiew9>

COMMENTS: Site entrance to be made suitable for the swept path of the largest load.

ROAD MODIFICATIONS: A significant amount of work is required.



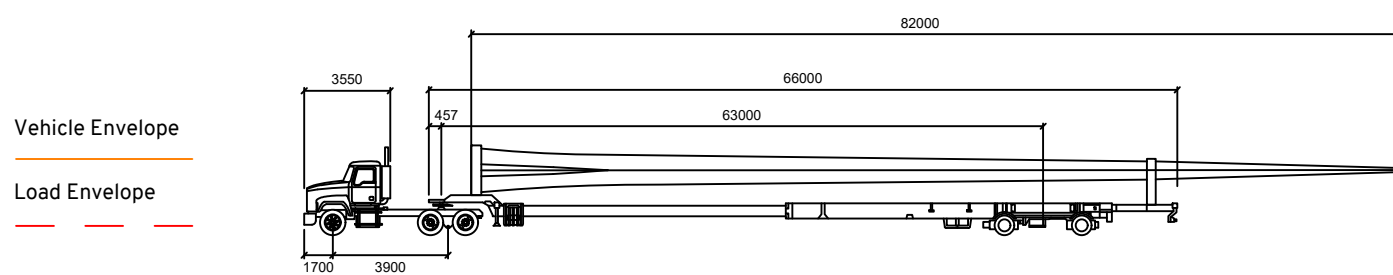
Winterbourne Blade Transport Vehicle

	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Hazeldean Road - Chainage 35.8km Swept Path Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01B



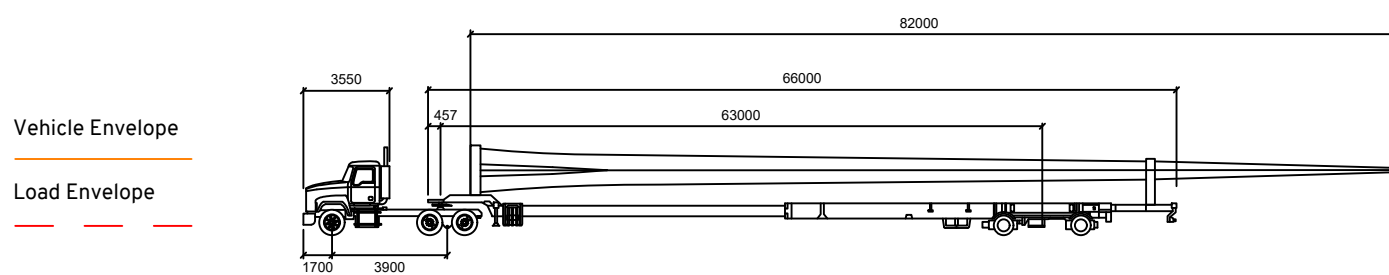
Winterbourne Blade Transport Vehicle

Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Hazeldean Road / Winterbourne Road Intersection Swept Path Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01B



Winterbourne Blade Transport Vehicle

	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Hazeldean Road / Uruga Road Intersection Swept Path Assessment

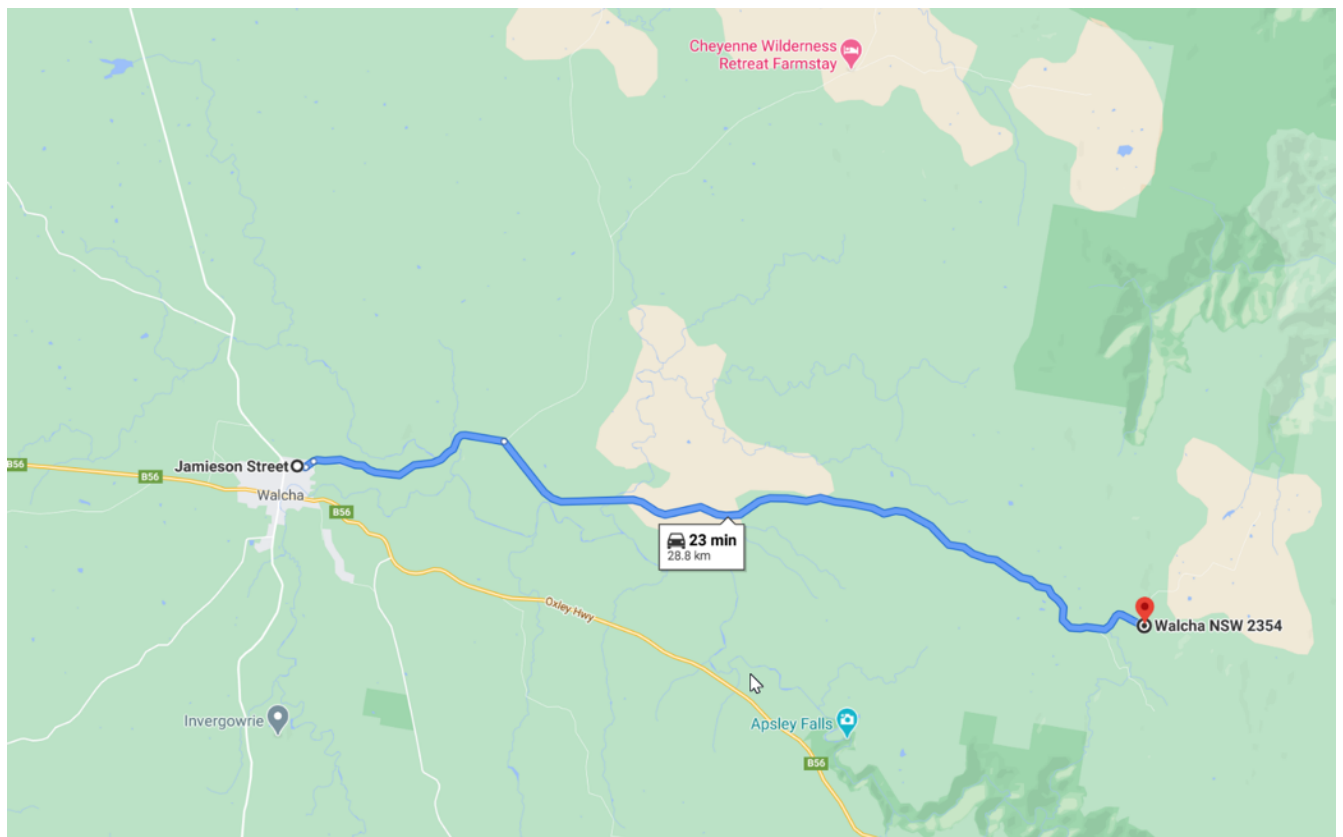
DRAWN: MW
DATE: 04/05/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01B

14.0 Route Survey C: Walcha to Southern Site Entries

Distance: 28.8) Kilometres

GPS Link: <https://goo.gl/maps/VrbSJR4GaH6ZzyUd9>

Via: Jamieson Street, Emu Creek Road and Moona Plains Road.



KEY	
MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
2.0	Walcha	Right hand Curve on Emu Creek Road https://goo.gl/maps/vJhM3JTtH6P9	Length: 70.0 metres Width: 7.0 metres	Right hand curve	Remove dead trees on tailswing.
5.1	Walcha	Ohio Creek Bridge https://goo.gl/maps/TeU7jhAY2DgXF32d9	Width >6.0 metres	Travel directly ahead	Structure to be checked for capacity.
6.8	Walcha	Intersection Emu Creek Road and Moona Plains Road https://goo.gl/maps/GvDg9AaNm97da1J98	Clearance Length 55.0 metres	Right hand turn	Add hardstand to inside of corner to avoid trees with tail swing.
21.6	Walcha	Left hand curve on Moona Plains Road https://goo.gl/maps/RMb1JTEpUMATi53q8	Clearance Length 80.0 metres	Left hand curve	No work is required.
22.0	Walcha	Right hand curve on Moona Plains Road https://goo.gl/maps/Raq2iMPqr1zDn5s29	Clearance Length 80.0 metres	Right hand curve	No work is required.
22.3	Walcha	Left hand curve on Moona Plains Road https://goo.gl/maps/ykMq4Tyaijy8BJe7	Clearance Length 60.0 metres	Left hand curve	Trim and remove trees for tail swing
23.0	Walcha	Intersection of Moona Plains road and Rowleys Creek Road https://goo.gl/maps/gmJnVpk836ghXG9	Clearance Length 35.0 metres	Left hand turn	Hardstand required on inside and outside of the corner
23.1	Walcha	Right hand curve on Monna Plains Road https://goo.gl/maps/MZy365cw6xw64ojx9	Clearance Length 90.0 metres	Right hand curve	No work is required.
24.3	Walcha	Right hand curve on Monna Plains Road https://goo.gl/maps/6aKkZvbvaqpwgVQ2A	Clearance Length 90.0 metres	Right hand curve	No work is required.
24.9	Walcha	Right hand curve on Monna Plains Road https://goo.gl/maps/LKNQk8E6PPRnrDSf9	Clearance Length 70.0 metres	Right hand curve	Hardstand required on the outside of the corner to avoid the trees on the inside of the corner.
25.6	Walcha	Right hand curve on Monna Plains Road https://goo.gl/maps/GMk915Kk7cghd9j5A	Clearance Length 70.0 metres	Right hand curve	Tree to be removed on tailswing.
26.0	Walcha	Moona Plains Road onto Lockyer Lane https://goo.gl/maps/WDLwT9mo73aVZw9	Clearance Length 35.0 metres	Right hand turn	A significant amount of vegetation to be removed and hardstand required to use Lockyer road as an access point.
26.0	Walcha	Left hand curve on Moona Plains Road at Lockyer Lane https://goo.gl/maps/WDLwT9mo73aVZw9	Clearance Length 65.0 metres	Left hand curve	Several trees to be removed

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
26.3	Walcha	Left hand curve on Moona Plains Road https://goo.gl/maps/zctXV4EeSYTKkGER7	Clearance Length 50.0 metres	Left hand curve	Significant vegetation to be removed
27.4	Walcha	Left hand curve on Moona Plains Road over Stockyard Creek https://goo.gl/maps/d4pp111syv28Bw38	Clearance Length 50.0 metres	Left hand curve	Hardstand to be added to the right hand side of the road prior to the bridge.
28.0	Walcha	Right hand curve on Monna Plains Road https://goo.gl/maps/EKn7CymxB1akuBuc7	Clearance Length 70.0 metres	Right hand curve	Significant vegetation to be removed
28.8	Walcha	Moona Plains Road onto unnamed road https://goo.gl/maps/4o6asE5H-y8Sm2d48	Clearance Length 30.0 metres	Right hand turn	Site entrance to be made suitable for the swept path of the largest loads.

Route up until 6.38 kilometres is the same as Route A & B.

6.8 Km's: Intersection Emu Creek Road and Moona Plains Road Walcha

Image 1:



PROCEDURE: Right hand turn.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/GVDg9AoNm7da1J98>

COMMENTS: Hardstand required on inside of corner to avoid trees with tail swing.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

21.6 Km's: Left hand curve on Moona Plains Road Walcha



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/RMb1JTEpUMATi53q8>

PROCEDURE: Left hand curve.

COMMENTS: A spotter will need to keep the driver informed throughout the procedure.
Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: No works required.

22.0 Km's: Right hand curve on Moona Plains Road Walcha



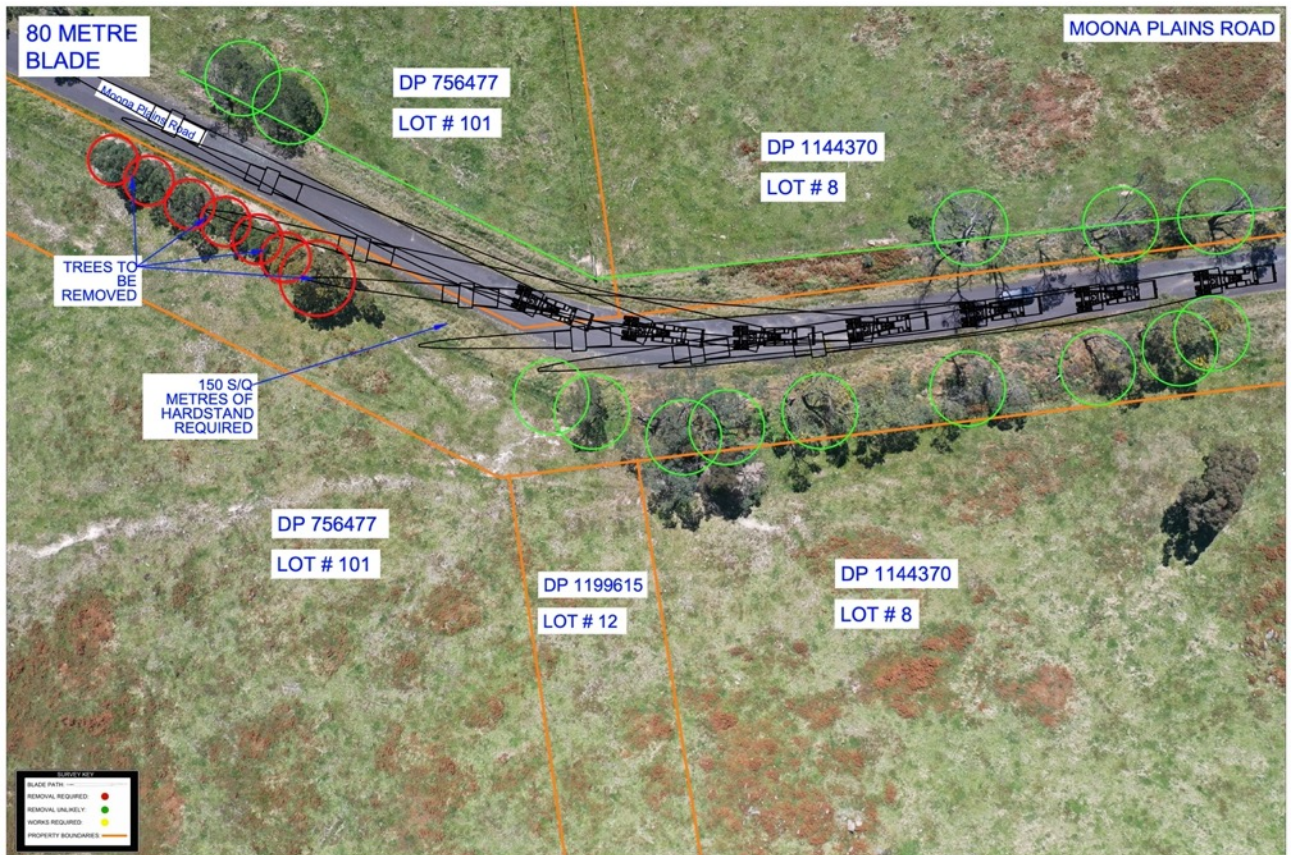
GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/Raq2iMPqr1zDn5s29>

PROCEDURE: Right hand curve.

COMMENTS: A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: No works required.

22.3 Km's: Left hand curve on Moona Plains Road Walcha



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/ykMq4Tyaijy8BJei7>

PROCEDURE: Left hand curve.

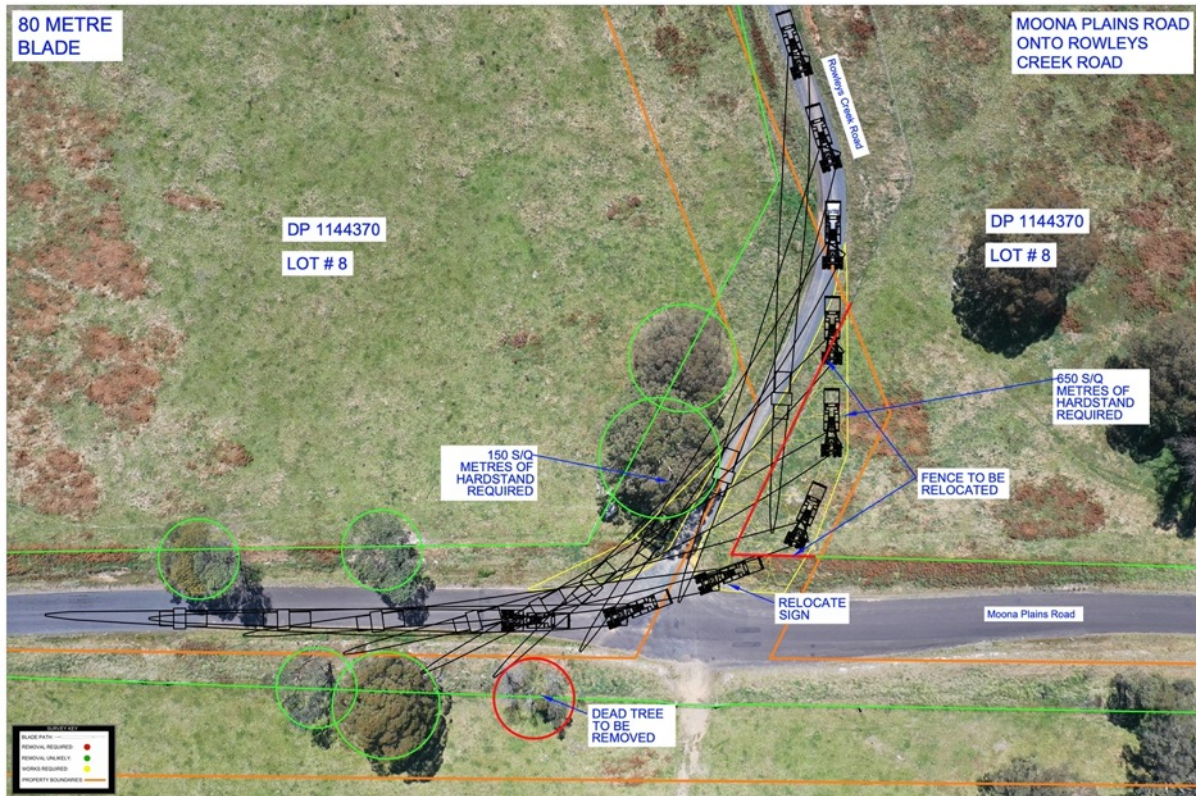
COMMENTS: Tree removal and trimming required to provide clearance for tail swing.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

23.0 Km's: To Site Entries exiting from Rowleys Creek Road

Image 1:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/gnmJmVpk836nghXG9>

PROCEDURE: Left hand turn.

COMMENTS: Hardstand required on inside at entry to corner and outside at exit to corner to avoid trees with both the belly of the blade and tail swing.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A significant amount of work is required.

23.1 Km's: Right hand curve on Moona Plains Road Walcha

Image 1:



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/MZy365cw6xw64ojx9>

PROCEDURE: Right hand curve.

COMMENTS: Swept path is below the tree's canopy.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: No work is required.

24.3 Km's: Right hand curve on Moona Plains Road Walcha



GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/6aNkZvbvaqpwgvQ2A>

PROCEDURE: Right hand curve.

COMMENTS: Proceed with caution.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: No work is required.

24.9 Km's: Right hand curve on Moona Plains Road Walcha



PROCEDURE: Right hand curve.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/LKNQk8E6PPRnrDSf9>

COMMENTS: Hardstand required on outside of corner to avoid trees on the inside of the corner.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

25.6 Km's: Right hand curve on Moona Plains Road Walcha



PROCEDURE: Right hand curve.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/GMk91SKm7czhdrJ5A>

COMMENTS: A tree needs to be removed on the tailswing.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

26.0 Km's: Moona Plains Road onto Lockyer Lane Walcha

Image 1:



Image 2:



PROCEDURE: Right hand turn.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/WDLwT9ino7j3uNZw9>

COMMENTS: A significant amount of vegetation will be required to be cleared for this intersection. Ideally a survey will help identify specific tree locations and be used to create an optimised design during development. Alternatively, the developer may choose a route parallel to this vegetation corridor.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A significant amount of work is required.

26.0 Km's: Left hand curve on Moona Plains Road Walcha



PROCEDURE: Left hand curve.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/WDLwT9ino7j3uNZw9>

COMMENTS: Several trees to be removed.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A moderate amount of work is required.

26.3 Km's: Left hand curve on Moona Plains Road Walcha



PROCEDURE: Left hand curve.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/zctXV4Es5YTKkGFR7>

COMMENTS: Several trees to be removed on both inside and outside of the corner.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A large amount of work is required.

27.4 Km's: Left hand curve on Moona Plains Road Walcha



PROCEDURE: Left hand curve.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/i4ipp111syy26BW36>

COMMENTS: Hardstand required prior to the bridge and on the right hand side of the road. A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A large amount of work is required.

28.0 Km's: Right hand curve on Moona Plains Road Walcha



PROCEDURE: Right hand curve.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/EKn7CymxB3akuBus7>

COMMENTS: Several trees to be removed on the outside of the corner.

A spotter will need to keep the driver informed throughout the procedure. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: A large amount of work is required.

28.8 Km's: Possible Southern Site Entry from Moona Plains Road

Image 1:



Image 2:



Image 3:



PROCEDURE: Right hand turn.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/4o6osE5Hy8Sm2dj48>

COMMENTS: Site entrance to be made suitable for the swept path of the largest load.

This alignment is likely to have the least impact on vegetation.

ROAD MODIFICATIONS: A significant amount of work is required.

15.0 Conclusion:

MAIN ROUTES: (Newcastle Port to Walcha)

After studying all options and undertaking a route survey, it was observed that the components would need to be transported on several different routes through to Winterbourne as listed in the report. Routes 1 and 2 are selected due to the component size. Additionally, Route 3 is a real option to avoid the issues that a blade of this size would have through Tamworth.

WALCHA TO SITE ENTRANCE ROUTES:

After studying all options and undertaking a route survey, it was observed that the components would need to be transported on 3 different routes through to each Winterbourne site access points as listed in the report. These routes are listed as A,B and C in this report.

NEWCASTLE:

The intersection of George Street and Industrial Drive at Mayfield looks to be the most difficult corner. Hardstand would be required on the south side of the intersection.

The corner from Industrial Drive onto Maitland Road will require the blades to cross to the incorrect side of the intersection 200 metres prior to the corner and return to the correct side 100 metres after the intersection.

HUNTER EXPRESSWAY:

The blades will not make it around the roundabout from John Renshaw Drive onto the Hunter Expressway.

Traffic control/Police will be required to block the eastbound lanes of the Hunter expressway while the blades travel down the incorrect side before crossing over at the centre crossover point approx. 400 metres to the west of the offramp. This procedure would take less than 5 minutes to complete.

MUSWELLBROOK:

Several different routes are required to travel through Muswellbrook, listed below is a summary of these routes.

- BLADES AND COMPOENNTS UNDER 5.2 METRES IN OVERALL HEIGHT
VIA: New England Highway, Thomas Mitchell Drive, Denman Road, Bengalla Road, Wybong Road, Kayuga Road, Ivermein Street, Dartbrook Mine access Road, New England Highway.

This route will require a large amount of upgrades; these include large amounts of hard standing, relocating of poles and approvals from Muswellbrook Shire Council, Private landowners and Dartbrook Mine.

- TOWERS COMPOENNTS OVER 5.2 METRES IN OVERALL HEIGHT:

VIA: New England Highway, Golden Highway, Denman Road, Bengalla Road, Wybong Road, Kayuga Road, Ivermein Street, Dartbrook Mine access Road, New England Highway.

This route is suitable in its current form for loads up to 40 metres long and 5.6 metres in height. Approval required from Muswellbrook Shire Council and Dartbrook Mine.

TAMWORTH:

Several corners will require major upgrades. It is likely that a vacant block of land will need to be purchased and large amounts of hard standing required along with a streetlight to be relocated. Additionally, some palm trees will need to be removed. All other components are okay to use this route in its current form.

An alternate route has been provided and looks to be a better solution for the blades, but currently has a 25T limit, and requires 2 traffic control procedures on the New England Highway at each side of Tamworth.

WALCHA:

Several different routes are likely to be required to travel through Walcha, listed below is a summary of these routes.

- VIA: New England Highway, Oxley Highway, Saleyards Road, Darjeeling Road, Thunderbolts Way and Jamieson Street.

This route will require a large number of upgrades; these include large amounts of hard standing, vegetation removal and trimming, modification of signs including and not limited to the removal of armco on Surveyors Creek bridge and approvals from Walcha Shire Council.

WALCHA TO SITE ENTRANCES VIA ROUTES A,B AND C:

- The roads will need to be widened in multiple places due to the width of the tower trailers. Some bridge structures will need to be modified, and large amounts of hardstand will be required on multiple corners.
- There will also need to be large amounts of vegetation removed due to the length and height of the loads.
- Several sections of road will require access to private landowners boundaries, due to the swept path of the blades.

SUMMARY OF ROUTES:

After reviewing all both main routes and site access routes, we are under the opinion that the loads could be delivered through to Winterbourne with a large number of upgrades.

The 80 metre blades would require a detour around Muswellbrook and approvals would still need to be sought to confirm that this is possible.

Also, the blades may be better suited on route 3 to bypass Tamworth.

GENERAL ROAD ACCESS:**BRIDGE CROSSINGS:**

This route from Newcastle to Bendemeer has been used in the past for items up to 120T. Further investigations would be required if item mass exceeds this. Additionally, once the loads turn off the New England Highway all structures that require the loads to travel over them, will need to be assessed for axle loads.

OVERHEAD STRUCTURES:

On Route 1 the lowest structure is the Liddell overpass. This bridge is 5.2 metres in the centre carriageway and 5.3 metres in the far-right lane. Loads that exceed 5.2 metres in overall height will need to bypass this bridge via Route 1.

On Route 2 a maximum height of 5.9 metres would be the lowest structure that cannot be avoided. This structure is on the New England Highway at Tarro.

Large GVM loads may need to bypass Tarro, which would result in a maximum height of 5.6m.

Loads for these routes are not to exceed 5.9 metres in height and may be limited to 5.6m for heavy components.

OVERHEAD WIRES:

This route would need to be assessed to handle a loaded height of up to 6.0 metres. It is likely that there are wires that will need to be permanently lifted.

RAIL ASSETS:

There are a number of rail overbridges and crossings on route that will require approval from authorities before loads can access the routes.

FLOODWAYS:

There are a number of floodway's on the access roads that will need to be raised and widened. These floodway's vary considerably, and some would need moderate to large amount of works, where others would only need minor upgrades. Each floodway should be assessed on its own merit.

CRESTS:

There are number of crests on Moona Plains Road that will need to be surveyed. Hydraulic lift trailers could overcome these obstacles without the need for additional road works.

PAVEMENT:

The Pavement up to Walcha is of suitable highway grade, following Walcha there are places where the pavement appears to thin in places.

Blue Mountain Road is likely to require widening to suit wide over mass trailers.

ROADWORKS:

Road works are likely to be continuous on any route within NSW, as this is common practice. Some roads will just have general maintenance, and resealing, while other sections will have complete realignment. It is recommended that the project discuss any major works well in advance with the authorities.

PORT:

The port has an excellent Break bulk berth that runs at approximately 60% berth occupancy.

The berth has axle and crane loadings well above what is required for this project.

The storage area is asphalt hardstand with a current area of 100,000 s/q metres available, all level. It is adjacent to the port, and within 300 metres of the berth, all within the Port grounds. No local roads need to be used during the discharge.

Access to the local roads from the port is while require some upgrades, including adding hardstand and relocating fences.

APPROVALS:

At a minimum, the following are required for approval to access these routes.

- NHVR
- RMS
- Newcastle Council
- Muswellbrook Council
- Tamworth Regional Council
- Walcha Shire Council
- Uralla Shire Council
- NSW Police
- Ausgrid
- Essential Energy
- Telstra
- CRN JHG (Rail)
- ARTC (Rail)

16.0 References:

Rex J Andrews Pty. Ltd.

Rex J Andrews Route survey # 336

Vestas

Google Earth/Maps

Nearmaps

NHVR

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.

Any, and all parties using information contained this submission do so at own risk.

RJA accept no responsibility for the use of all information contained within this report.

Actual approved routes may differ from those surveyed.

Proposed routes may change subject to approvals from authorities.

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

Thunderbolts Way / Jamieson Road Intersection Upgrade

WALCHA COUNCIL

DERBY STREET NORTH UPGRADE

APSLEY STREET TO JAMIESON STREET

INDEX

SHEET No.	DESCRIPTION
1	COVER SHEET
2	GENERAL ARRANGEMENT PLAN
3	TYPICAL CROSS SECTIONS
4	DERBY STREET PLAN AND LONGITUDINAL SECTION, SHEET 1 OF 3
5	DERBY STREET PLAN AND LONGITUDINAL SECTION, SHEET 2 OF 3
6	DERBY STREET PLAN AND LONGITUDINAL SECTION, SHEET 3 OF 3 AND JAMIESON STREET PLAN AND LONGITUDINAL SECTION
7	DERBY STREET KERB RETURNS 1 AND 2, PLAN AND LONGITUDINAL SECTIONS
8	DERBY STREET KERB RETURNS 3-5, PLAN AND LONGITUDINAL SECTIONS
9	DERBY STREET KERB RETURNS 6 AND 7, PLAN AND LONGITUDINAL SECTIONS
10	DERBY STREET CROSS SECTIONS, SHEET 1 OF 6
11	DERBY STREET CROSS SECTIONS, SHEET 2 OF 6
12	DERBY STREET CROSS SECTIONS, SHEET 3 OF 6
13	DERBY STREET CROSS SECTIONS, SHEET 4 OF 6
14	DERBY STREET CROSS SECTIONS, SHEET 5 OF 6
15	DERBY STREET CROSS SECTIONS, SHEET 6 OF 6
16	DERBY STREET LINEMARKING AND SIGNPOSTING PLAN
17	DERBY STREET PAVEMENT PLAN

LOCALITY MAP



GENERAL NOTES:

IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND LEVEL ALL SERVICES ADJACENT TO OR OTHERWISE AFFECTING THE WORKS PRIOR TO THE COMMENCEMENT OF WORKS, WHETHER OR NOT THEY ARE INDICATED ON THE DRAWINGS. WHERE SERVICES CONFLICT WITH PROJECT WORKS THEY ARE TO BE RELOCATED ON APPROVAL FROM THE 'PRINCIPAL'S AUTHORISED PERSONNEL' (P.A.P.). THE CONTRACTOR, ON APPROVAL FROM THE P.A.P., SHALL MAKE ALL NECESSARY ARRANGEMENTS WITH THE RELEVANT AUTHORITY TO RELOCATE OR ADJUST AS FOUND NECESSARY.

EXISTING SIGNS TO BE REUSED PROVIDED THEY ARE IN A GOOD AND SERVICEABLE CONDITION TO THE SATISFACTION OF THE P.A.P.. OTHERWISE, REPLACE WITH A NEW, EQUIVALENT SIGN.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUPPLY AND IMPLEMENT CONTEMPORARY SITE-SPECIFIC EROSION AND SEDIMENT CONTROL MEASURES AS PART OF THEIR ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROJECT. THE CONTROL MEASURES SHALL BE IN ACCORDANCE WITH COUNCIL SPECIFICATIONS AND 'THE BLUE BOOK'. THE CONTRACTOR SHALL, PRIOR TO COMMENCEMENT OF WORKS, PREPARE AND SUBMIT TO COUNCIL AN EROSION AND SEDIMENT CONTROL PLAN.

ALL DISTURBED AREAS ARE TO BE REGENERATED AND RESTORED TO PRE-EXISTING CONDITION.

THE CONTRACTOR SHALL NOT ENTER UPON OR DO ANY WORK WITHIN ADJACENT LANDS WITHOUT PRIOR WRITTEN PERMISSION OF THE LAND OWNER AND COUNCIL.

THE CONTRACTOR SHALL AT ALL TIMES MAINTAIN IN A SAFE CONDITION AN ALL WEATHER ACCESS TO THE ROADWAYS AND PROPERTIES ADJACENT TO THE SITE TO THE SATISFACTION OF COUNCIL.

THE CONTRACTOR SHALL UNDERTAKE TRAFFIC CONTROL MEASURES IN ACCORDANCE WITH THE WORK HEALTH AND SAFETY ACT 2011.

ALL EXISTING CULVERTS ARE TO BE CLEANED AND VEGETATION TO BE REMOVED FROM INLET AND OUTLET TO RE-ESTABLISH A CLEAR WATERWAY.

ALL EXISTING CULVERTS ARE TO BE INSPECTED DURING CONSTRUCTION TO ENSURE THEY ARE STRUCTURALLY SOUND. DAMAGED SECTIONS OF CULVERTS MAY BE REPLACED UPON APPROVAL FROM THE P.A.P..

LEGS IN NO WAY CERTIFY THE STRUCTURAL INTEGRITY NOR STRUCTURAL CAPACITY OF EXISTING STRUCTURES WITHIN THE WORKS. IF THE CONTRACTOR DEEMS AN EXISTING STRUCTURE TO BE STRUCTURALLY UNSOUND, CONTACT THE PRINCIPAL'S REP. (P.A.P.)

SURVEY NOTES:

DETAIL SURVEY - DERBY ST - APSLEY STREET TO JAMIESON STREET, WALCHA - 21.01.19

THIS SURVEY PLAN/DATA HAS BEEN PREPARED FOR WALCHA COUNCIL FROM FIELD SURVEY FOR THE PURPOSE OF SHOWING THE PHYSICAL FEATURES, TOPOGRAPHY AND LEVELS FOR ROAD DESIGN. THE INFORMATION SHOWN HEREIN IS ONLY RELIABLE FOR THIS PURPOSE AND SHOULD NOT BE USED FOR OTHER PURPOSE OR AT A LATER DATE WITHOUT VERIFICATION.

SURVEY IS ON GROUND DISTANCES, MGA ZONE 56 ORIENTATION AND AHD.

ORIGIN OF COORDINATES PM 12947, E: 365809.591 N: 6571885.776 CLASS A ORDER 1 (SOURCE: SCIMS 19th NOV 2018). TO OBTAIN MGA GRID DISTANCES SCALE BY 0.999650 FROM ORIGIN.

ORIGIN OF LEVELS SSM 77587, RL 1046.884m AHD, CLASS LB ORDER L2.

A STATE SURVEY MARK (E.G. PM, SS ETC) OR BOUNDARY REFERENCE MARK MUST NOT BE DESTROYED OR DAMAGED UNLESS AUTHORISATION HAS BEEN GIVEN BY THE SURVEYOR GENERAL AND THE MARKS ARE ASSESSED BY A REGISTERED SURVEYOR OR PERSON AUTHORISED BY THE SURVEYOR GENERAL'S DEPARTMENT. ALL OTHER SURVEY MARKS ARE NOT TO BE DISTURBED OR DESTROYED UNTIL ASSESSED BY THE SITE SURVEYOR.

ANY STATE SURVEY MARK (E.G. PM, SS ETC.) THAT ARE DESTROYED ARE TO BE REPLACED WITH ANOTHER STATE SURVEY MARK AS PER THE SURVEYOR GENERALS'S DIRECTIONS NO. 11: PRESERVATION OF SURVEY INFRASTRUCTURE.

BOUNDARIES HAVE NOT BEEN SURVEYED. FENCELINES SHOWN ARE INDICATIVE OF POSITION ONLY AND DO NOT REFLECT CADASTRAL BOUNDARIES.

SERVICE LOCATIONS SHOWN ARE FROM SURFACE INVESTIGATIONS ONLY. WHERE SERVICE INFORMATION IS CRITICAL TO THE DESIGN PROPOSED, THE INFORMATION SHOULD BE VERIFIED PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL PARTIES SHOULD CARRY OUT THEIR OWN DIAL BEFORE YOU DIG SEARCH PRIOR TO COMMENCING ANY WORK ON SITE.

ALL SYMBOLS SHOWN ARE DIAGRAMMATIC ONLY AND NOT TO SCALE. TREE DIMENSIONS STIPULATED ARE DIAMETERS.

THIS NOTE FORMS PART OF THIS PLAN/DATA. REPRODUCTION OF THIS PLAN/DATA OR ANY PART OF IT WITHOUT THIS NOTE BEING INCLUDED IN FULL WILL RENDER THE INFORMATION SHOWN ON SUCH REPRODUCTION INVALID AND NOT SUITABLE FOR USE.

C	ISSUED FOR TENDER	J.C	17/10/19
B	ISSUED TO CLIENT FOR APPROVAL	L.W	09/10/19
A	ISSUED TO CLIENT FOR REVIEW	Z.C	24/07/19
ISSUE	REVISION	AUTH	DATE

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Ph: 02-67225110

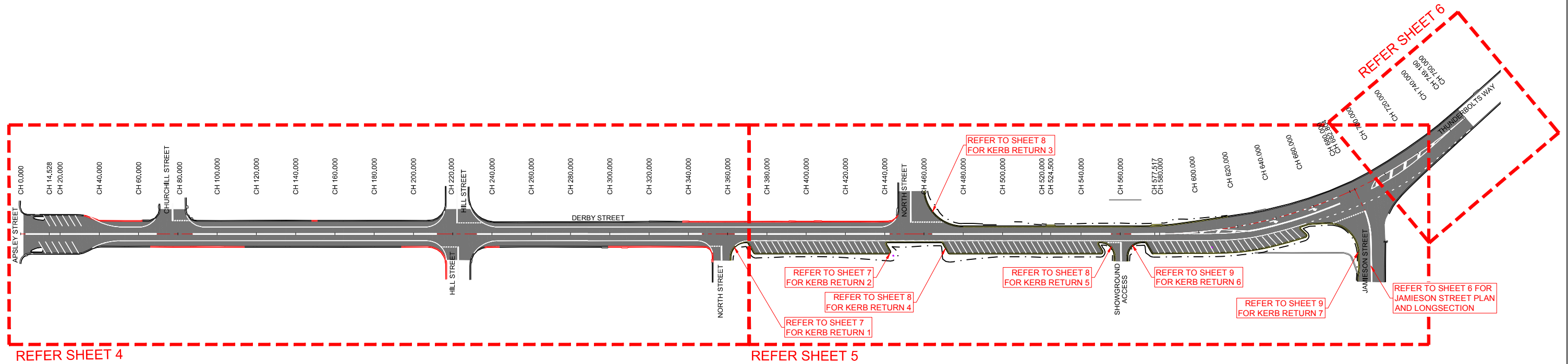
Email: andrew@legs.com.au



CLIENT	WALCHA COUNCIL
PROJECT	DERBY STREET NORTH UPGRADE
	COVER SHEET

SCALES	A1 ORIGINAL
DRAWN	Z.C
DATE	24/07/19
DESIGNED	L.W
DATE	24/07/19
APPROVED	J.C
DATE	24/07/19
FILE NAME:	PM668_D.dwg
DATUM:	-

JOB No.:	PM668	ISSUE	C	SHEET No.	1
DOCUMENT No.:	D01			OF	17
STATUS:	TENDER				
REG. No.:	-				



C	ISSUED FOR TENDER	J.C	17/10/19
B	ISSUED TO CLIENT FOR APPROVAL	L.W	09/10/19
A	ISSUED TO CLIENT FOR REVIEW	Z.C	24/07/19
ISSUE	REVISION	AUTH	DATE

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CLIENT	WALCHA COUNCIL
PROJECT	DERBY STREET NORTH UPGRADE
	GENERAL ARRANGEMENT

SCALES

A1 ORIGINAL

020406080100m

SCALE 1:1000

@A1

FILE NAME: PM668_D.dwg

DRAWN	DATE
Z.C	24/07/19
DESIGNED	DATE
L.W	24/07/19
APPROVED	DATE
J.C	24/07/19
DATUM:	-

JOB No.:	ISSUE	SHEET No.
PM668	C	2
DOCUMENT No.:		OF 17
D02		
STATUS:	TENDER	
REG. No.:	-	

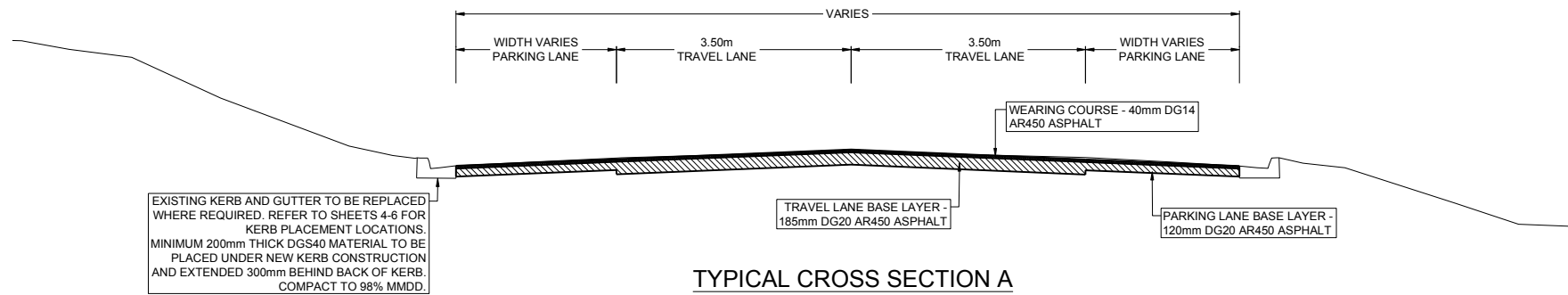
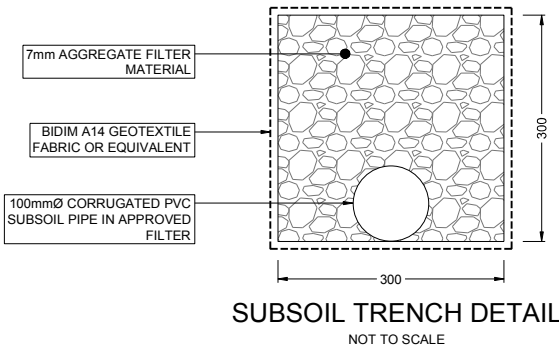
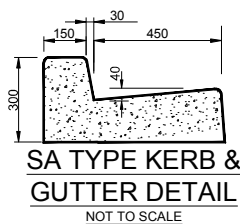
PAVEMENT NOTE
PAVEMENT DETAILS ARE TO BE READ IN CONJUNCTION WITH
REGIONAL GEOTECH SOLUTIONS REPORT NUMBER
RGS31755.1-AF DATED 04/05/2019

SURVEY CONTROL SCHEDULE

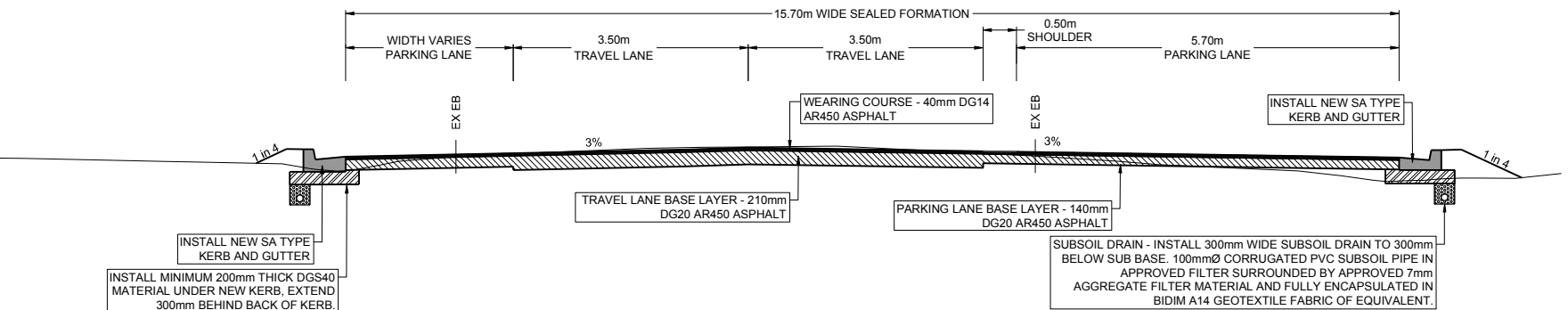
Station Name	Easting	Northing	RL	Description
PM 12947	365809.591	6571885.776	1056.824	Permanent Mark
PM 12948	365547.409	6571896.748	1067.624	Permanent Mark
PM 54300	365846.858	6572115.202	1059.871	Permanent Mark
SS 11212	365773.17	6571636.162	1065.17	State Survey Mark
SS 160133	365797.364	6572111.83	1059.774	State Survey Mark
SS 70904	365731.448	6572242.905	1066.509	State Survey Mark
SS 77587	365739.698	6571422.543	1046.884	State Survey Mark
SS 77594	365712.527	6571429.999	1048.075	State Survey Mark
STN1	365634.44	6572341.322	1069.496	Dumpy
STN2	365806.288	6572007.851	1057.505	Dumpy
STN3	365762.145	6571749.28	1064.019	Nail in Footpath
STN4	365730.175	6571523.959	1057.938	Dumpy

SUBSOIL TABLE

START CHAINAGE	END CHAINAGE	SIDE OF FORMATION
340	440	LEFT
460	610	LEFT
360	660	RIGHT



TYPICAL CROSS SECTION A
(CH0 - CH300)
SCALE 1:50



TYPICAL CROSS SECTION B
(CH300 - CH750)
SCALE 1:50

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CLIENT	WALCHA COUNCIL
PROJECT	DERBY STREET NORTH UPGRADE
	TYPICAL CROSS SECTIONS

SCALES	A1 ORIGINAL
0 1 2 3 4 5m	SCALE 1:50 @A1
FILE NAME:	PM668_D.dwg

DRAWN	DATE	JOB No.:	ISSUE	SHEET No.
Z.C	24/07/19	PM668	C	3
DESIGNED	DATE	DOCUMENT No.:		OF 17
L.W	24/07/19	D03		
APPROVED	DATE	STATUS:	TENDER	
J.C	24/07/19	REG. No.:	-	
DATUM:	-			

ISSUE	REVISION	AUTH	DATE
C	ISSUED FOR TENDER	J.C	17/10/19
B	ISSUED TO CLIENT FOR APPROVAL	L.W	09/10/19
A	ISSUED TO CLIENT FOR REVIEW	Z.C	24/07/19

ALL SERVICES SHOWN ARE INDICATIVE ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND LEVEL ALL SERVICES ADJACENT TO OR OTHERWISE AFFECTING THE WORKS PRIOR TO THE COMMENCEMENT OF WORKS

WARNING
EXISTING SEWER, WATERMAIN AND NBN WITHIN FORMATION. LOCATE PRIOR TO CONSTRUCTION.

WARNING
EXISTING SEWER, WATERMAIN AND NBN WITHIN FORMATION. LOCATE PRIOR TO CONSTRUCTION.

WARNING
EXISTING WATERMAIN WITHIN FORMATION. LOCATE PRIOR TO CONSTRUCTION.

WARNING
EXISTING WATERMAIN WITHIN FORMATION. LOCATE PRIOR TO CONSTRUCTION.

WARNING
EXISTING WATERMAIN AND NBN WITHIN FORMATION. LOCATE PRIOR TO CONSTRUCTION.

WARNING
EXISTING NBN WITHIN FORMATION. LOCATE PRIOR TO CONSTRUCTION.

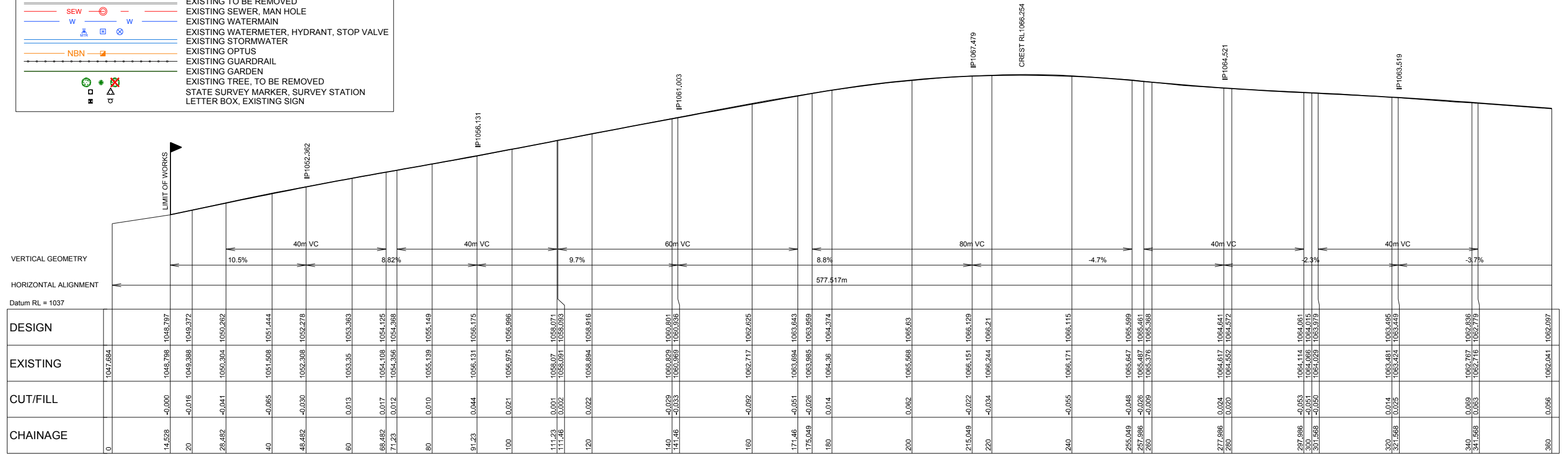
WARNING
EXISTING SEWER AND WATERMAIN WITHIN FORMATION. LOCATE PRIOR TO CONSTRUCTION.

DERBY STREET - PLAN VIEW

SCALE 1:500

LEGEND

- DESIGN CENTERLINE
- DESIGN BATTER INTERFACE
- DESIGN SEALED FORMATION
- DESIGN DRIVEWAY
- DESIGN CONCRETE KERB
- EXISTING KERB TO BE RECONSTRUCTED
- STORMWATER TO BE CONSTRUCTED BY OTHERS
- NEW SIGN
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING FENCELINE
- EXISTING EDGE OF BITUMEN
- EXISTING EDGE OF GRAVEL
- EXISTING OVERHEAD POWER, POWER POLE
- EXISTING U/G ELECTRICITY
- EXISTING KERB
- EXISTING TO BE REMOVED
- EXISTING SEWER, MAN HOLE
- EXISTING WATERMAIN
- EXISTING WATERMETER, HYDRANT, STOP VALVE
- EXISTING STORMWATER
- EXISTING OPTUS
- EXISTING GUARDRAIL
- EXISTING GARDEN
- EXISTING TREE, TO BE REMOVED
- STATE SURVEY MARKER, SURVEY STATION
- LETTER BOX, EXISTING SIGN



DERBY STREET - LONGITUDINAL SECTION

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CLIENT
WALCHA COUNCIL

PROJECT
DERBY STREET NORTH UPGRADE

DERBY STREET PLAN AND LONGITUDINAL SECTION
SHEET 1 OF 3

SCALES

A1 ORIGINAL

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SCALE 1:250

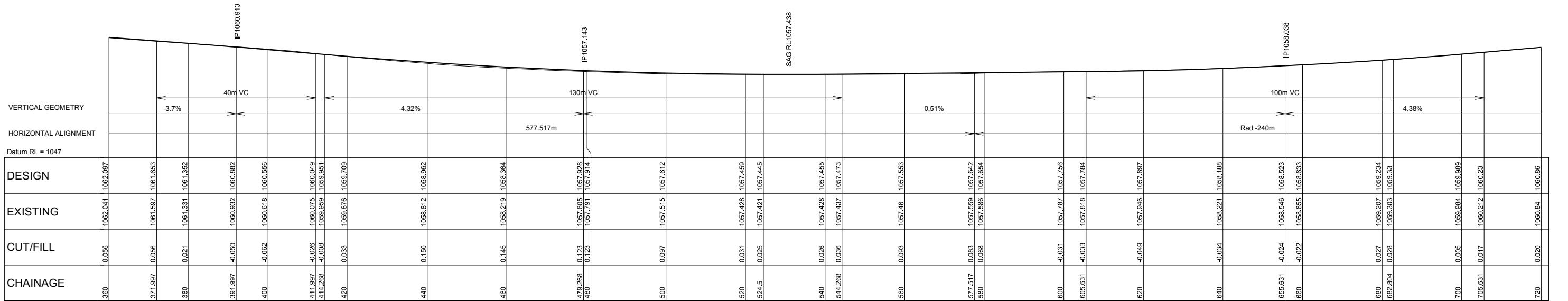
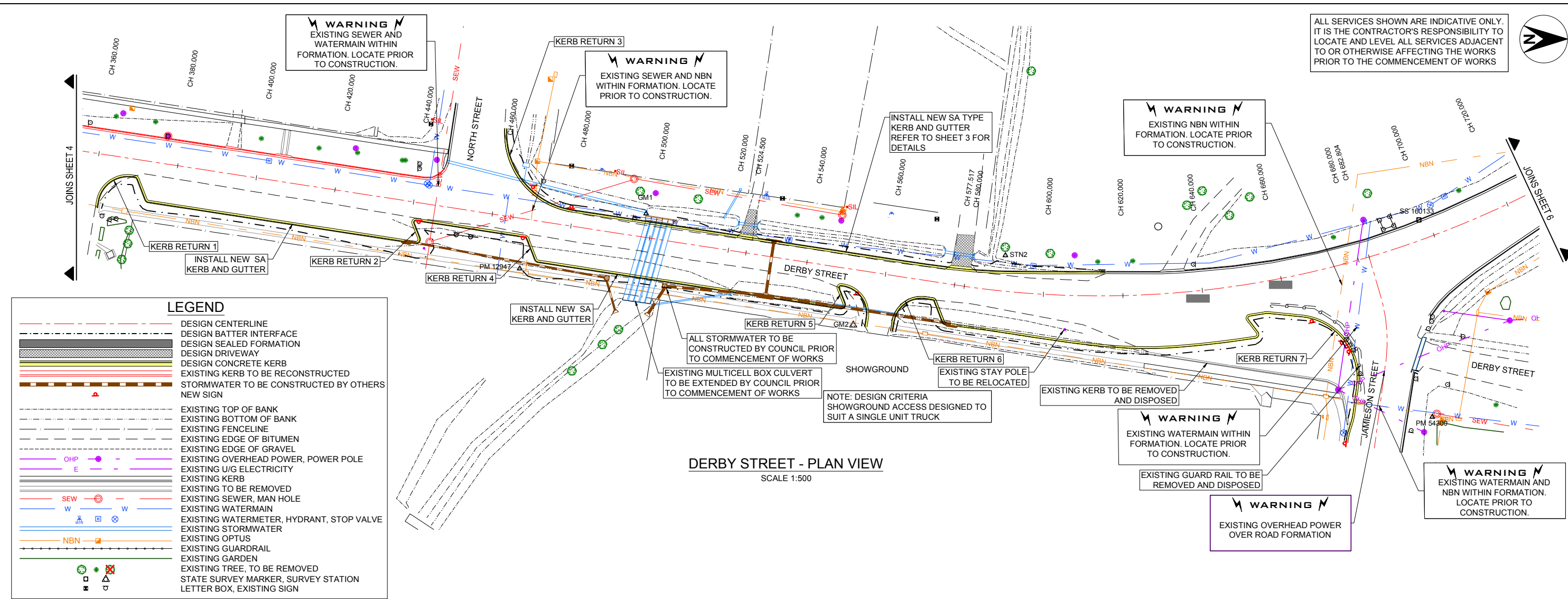
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FILE NAME: PM668_D.dwg

DRAWN Z.C	DATE 24/07/19	JOB No.: PM668	ISSUE C	SHEET No. 4
DESIGNED L.W	DATE 24/07/19	DOCUMENT No.: D04	OF 17	
APPROVED J.C	DATE 24/07/19	STATUS: TENDER		
DATUM: -		REG. No.: -		

C	ISSUED FOR TENDER	J.C	17/10/19
B	ISSUED TO CLIENT FOR APPROVAL	L.W	09/10/19
A	ISSUED TO CLIENT FOR REVIEW	Z.C	24/07/19
ISSUE	REVISION	AUTH	DATE



DERBY STREET - LONGITUDINAL SECTION

C

ISSUED FOR TENDER

J.C

17/10/19

B

ISSUED TO CLIENT FOR APPROVAL

L.W

09/10/19

A

ISSUED TO CLIENT FOR REVIEW

Z.C

24/07/19

ISSUE

REVISION

AUTH

DATE

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WALCHA COUNCIL

CLIENT

WALCHA COUNCIL

PROJECT

DERBY STREET NORTH UPGRADE

DERBY STREET PLAN AND LONGITUDINAL SECTION

SHEET 2 OF 3

SCALES

A1 ORIGINAL

0 5 10 15 20 25m

SCALE 1:250

0 10 20 30 40 50m

SCALE 1:500

FILE NAME:

PM668_D.dwg

DRAWN

Z.C

DATE

24/07/19

DESIGNED

L.W

DATE

24/07/19

APPROVED

J.C

DATE

24/07/19

DATUM:

-

JOB No.:

PM668

ISSUE

C

SHEET No.

5

DOCUMENT No.:

D05

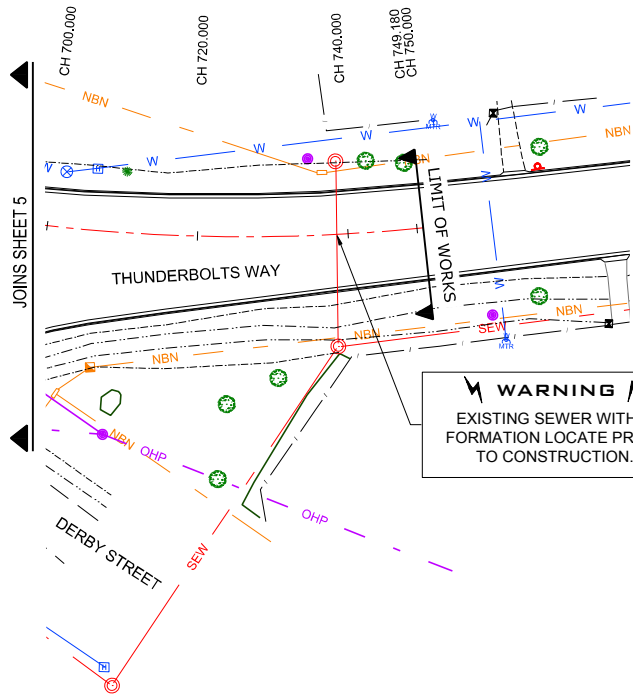
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TENDER

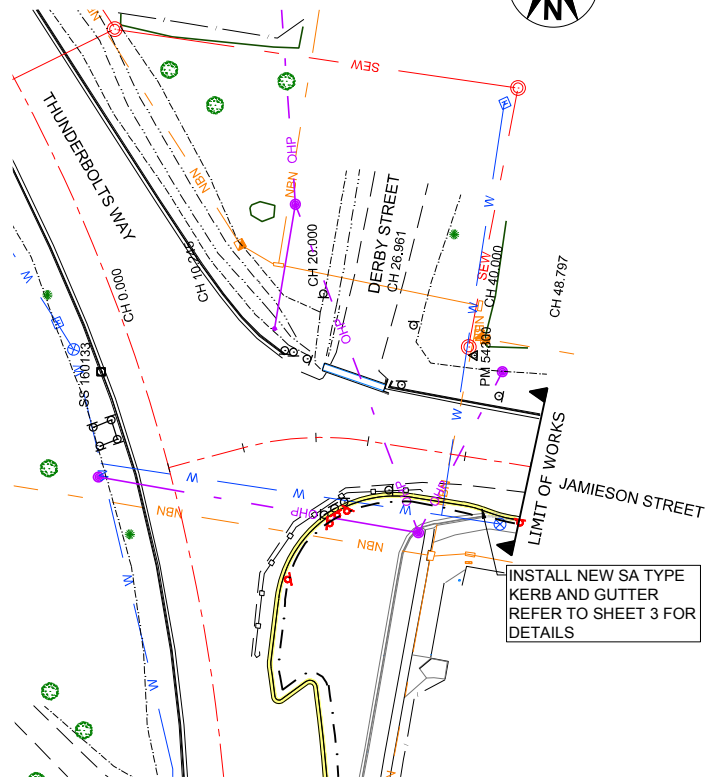
REG. No.:

-

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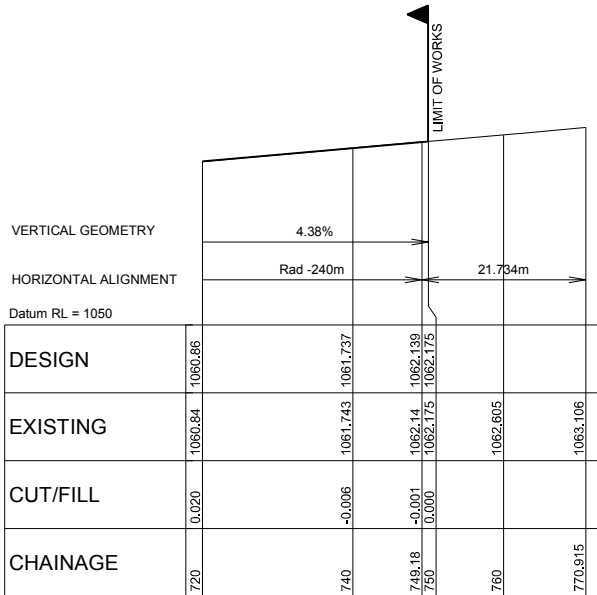
DERBY STREET - PLAN VIEW
SCALE 1:500



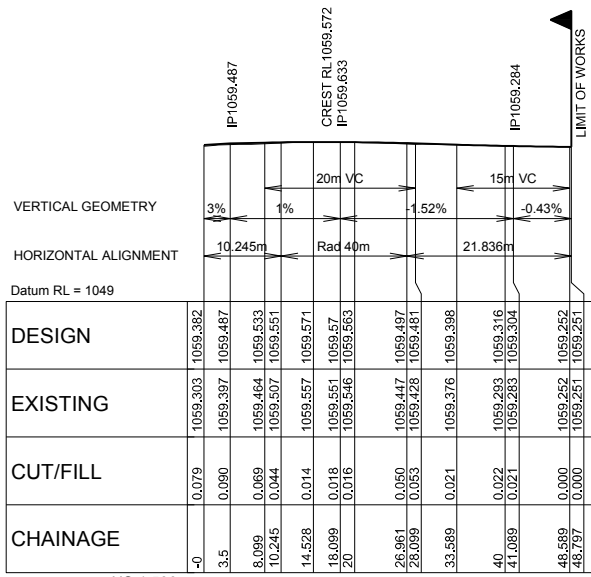
JAMIESON STREET - PLAN VIEW
SCALE 1:500

LEGEND

	DESIGN CENTERLINE
	DESIGN BATTER INTERFACE
	DESIGN SEALED FORMATION
	DESIGN DRIVEWAY
	DESIGN CONCRETE KERB
	EXISTING KERB TO BE RECONSTRUCTED
	STORMWATER TO BE CONSTRUCTED BY OTHERS
	NEW SIGN
	EXISTING TOP OF BANK
	EXISTING BOTTOM OF BANK
	EXISTING FENCELINE
	EXISTING EDGE OF BITUMEN
	EXISTING EDGE OF GRAVEL
	EXISTING OVERHEAD POWER, POWER POLE
	EXISTING U/G ELECTRICITY
	EXISTING KERB
	EXISTING TO BE REMOVED
	EXISTING SEWER, MAN HOLE
	EXISTING WATERMAIN
	EXISTING WATERMETER, HYDRANT, STOP VALVE
	EXISTING STORMWATER
	EXISTING OPTUS
	EXISTING GUARDRAIL
	EXISTING GARDEN
	EXISTING TREE, TO BE REMOVED
	STATE SURVEY MARKER, SURVEY STATION
	LETTER BOX, EXISTING SIGN



DERBY STREET - LONGITUDINAL SECTION
HS 1:500
VS 1:250



JAMIESON STREET - LONGITUDINAL SECTION
HS 1:500
VS 1:250

C	ISSUED FOR TENDER	J.C	17/10/19
B	ISSUED TO CLIENT FOR APPROVAL	L.W	09/10/19
A	ISSUED TO CLIENT FOR REVIEW	Z.C	24/07/19
ISSUE	REVISION	AUTH	DATE

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Email: andrew@legs.com.au



CLIENT	WALCHA COUNCIL
PROJECT	DERBY STREET NORTH UPGRADE
	DERBY STREET PLAN AND LONGITUDINAL SECTION SHEET 3 OF 3 JAMIESON STREET PLAN AND LONGITUDINAL SECTION

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SCALE 1:250 @A1

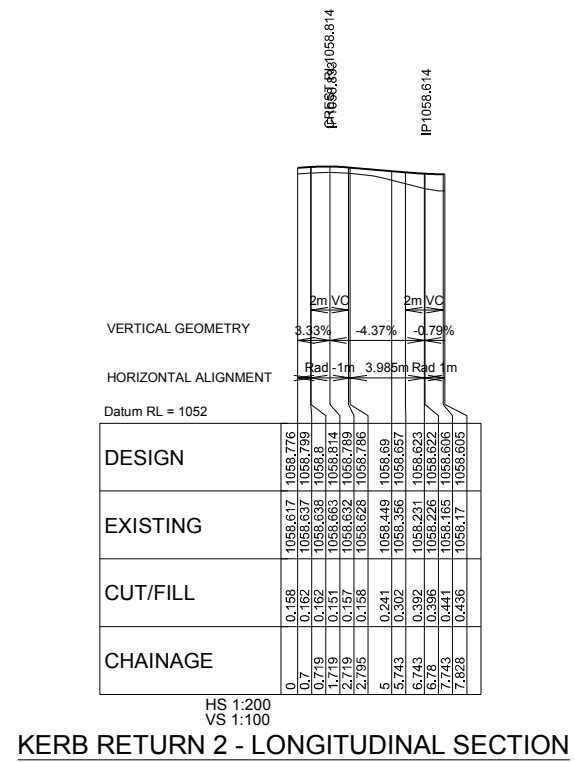
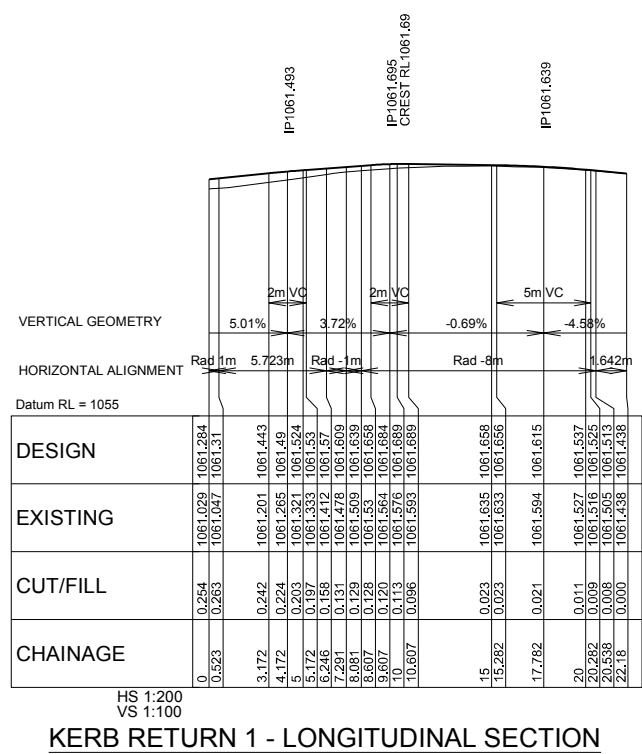
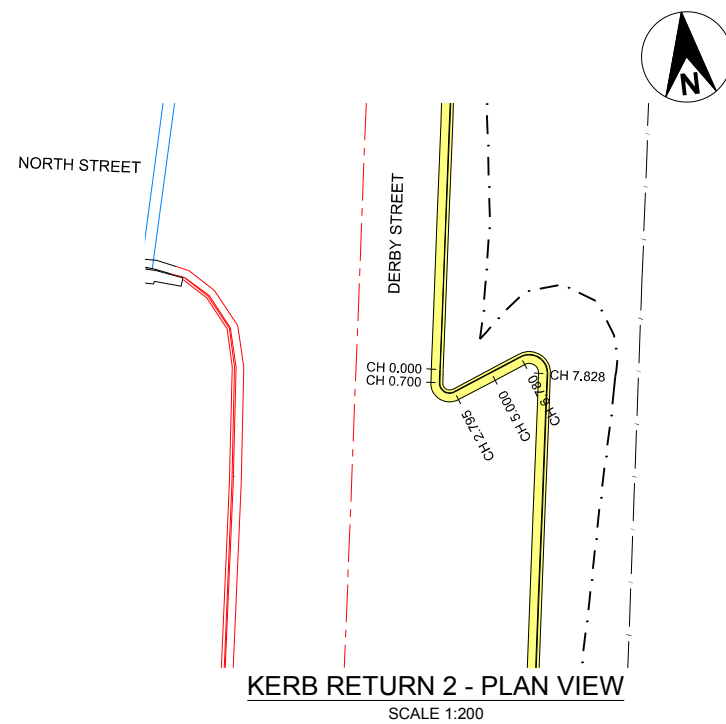
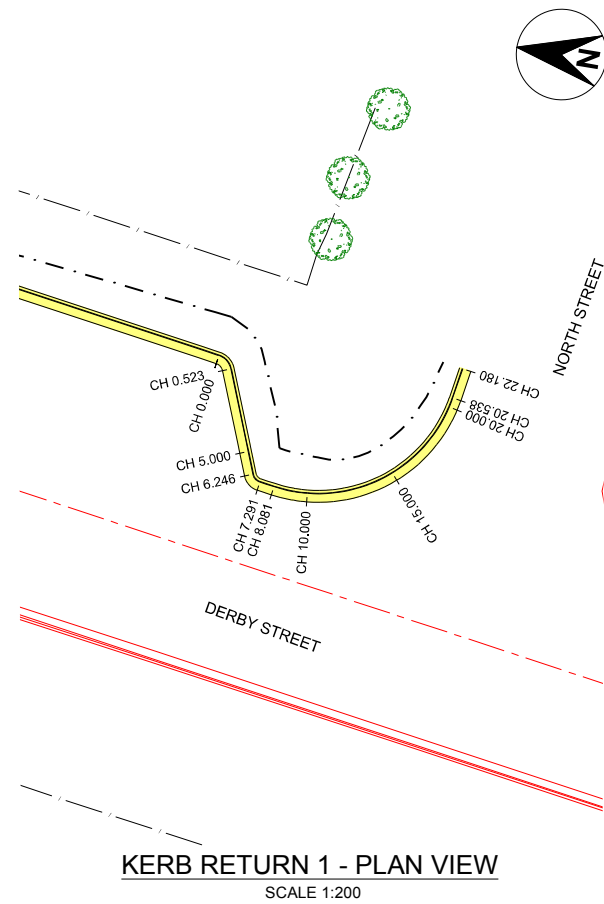
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Z.C	24/07/19	PM668	C	6
DESIGNED	DATE	DOCUMENT No.:		OF 17
L.W	24/07/19	D06		
APPROVED	DATE	STATUS:	TENDER	
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DATUM:	-			

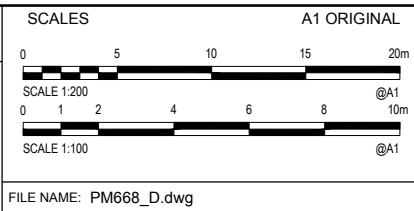
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TO OR OTHERWISE AFFECTING THE WORKS
PRIOR TO THE COMMENCEMENT OF WORKS



C	ISSUED FOR TENDER	J.C	17/10/19
B	ISSUED TO CLIENT FOR APPROVAL	L.W	09/11/19
A	ISSUED TO CLIENT FOR REVIEW	Z.C	24/07/19
ISSUE	REVISION	AUTH	DATE

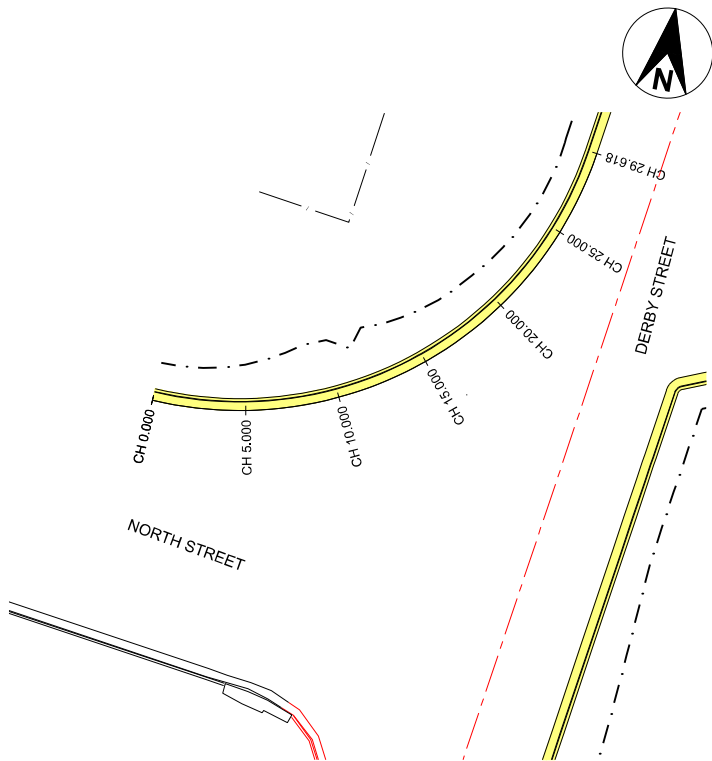


CLIENT	WALCHA COUNCIL
PROJECT	DERBY STREET NORTH UPGRADE
	DERBY STREET KERB RETURN 1 AND 2 PLAN AND LONGITUDINAL SECTION

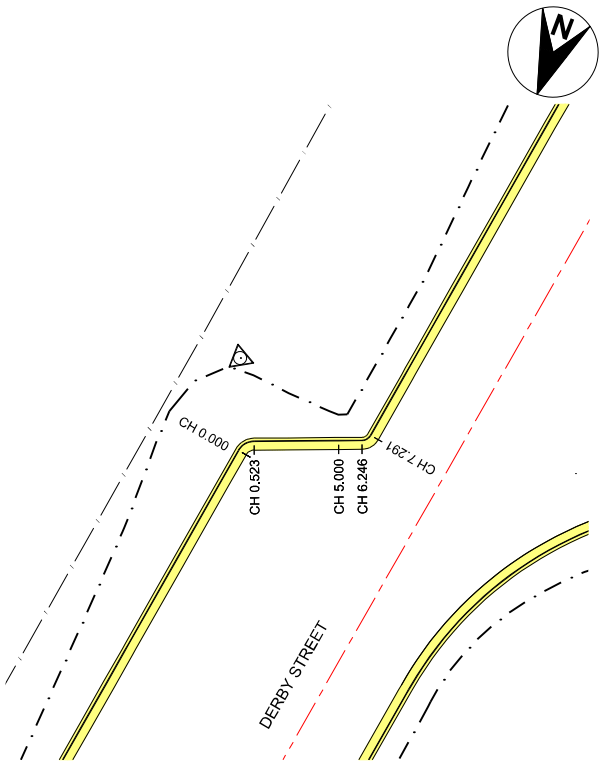


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Z.C	24/07/19	PM668	C	7
DESIGNED	DATE	DOCUMENT No.:		
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APPROVED	DATE	STATUS:		
J.C	24/07/19	TENDER		
DATUM: -		REG. No.:		

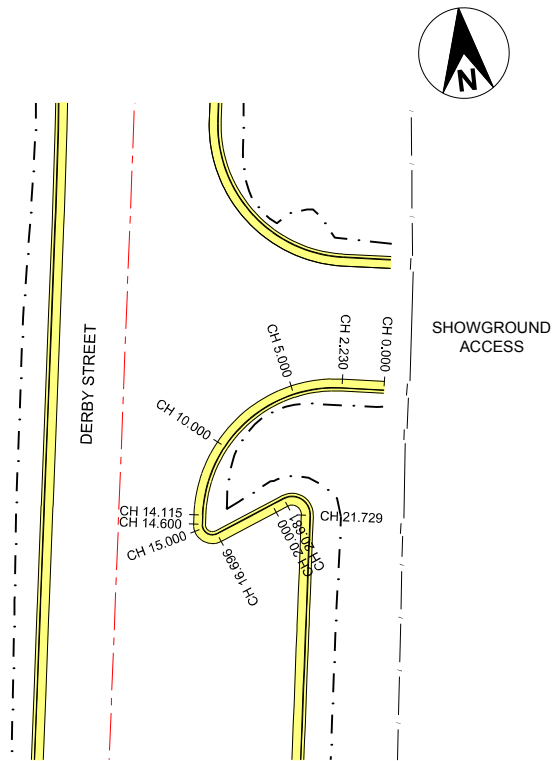
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TO OR OTHERWISE AFFECTING THE WORKS
PRIOR TO THE COMMENCEMENT OF WORKS



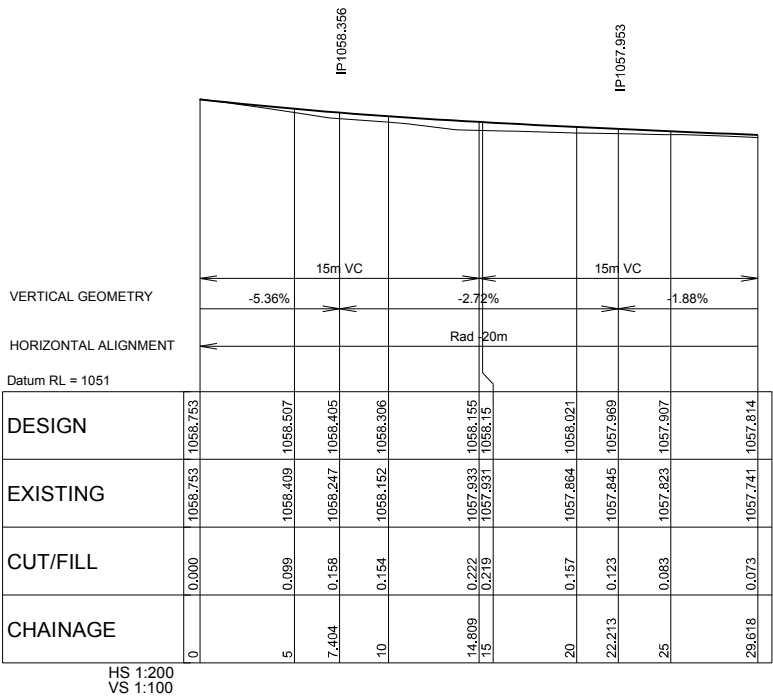
KERB RETURN 3 - PLAN VIEW
SCALE 1:200



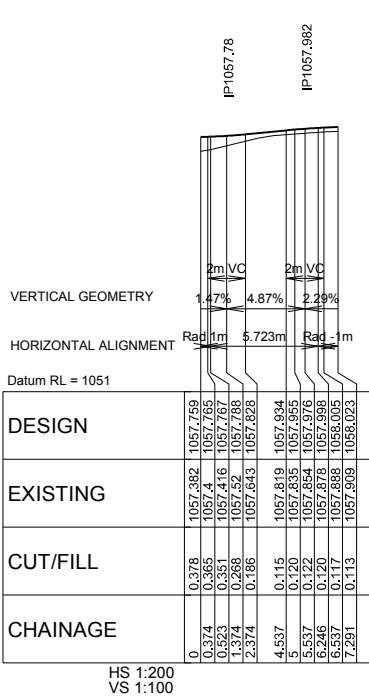
KERB RETURN 4 - PLAN VIEW
SCALE 1:200



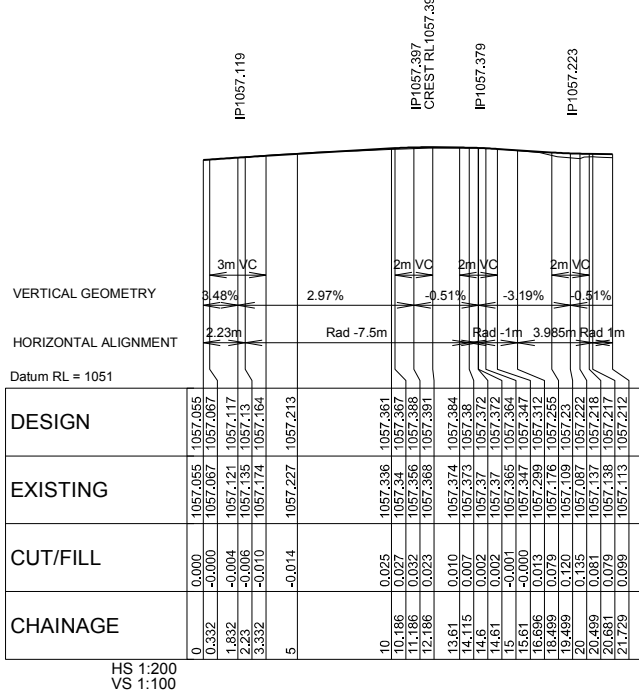
KERB RETURN 5 - PLAN VIEW
SCALE 1:200



KERB RETURN 3 - LONGITUDINAL SECTION



KERB RETURN 4 - LONGITUDINAL SECTION



KERB RETURN 5 - LONGITUDINAL SECTION

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CLIENT
WALCHA COUNCIL

PROJECT
DERBY STREET NORTH UPGRADE
DERBY STREET KERB RETURN 3-5
PLAN AND LONGITUDINAL SECTION

SCALES
A1 ORIGINAL
0 1 2 4 6 8 10m
SCALE 1:100 @A1
0 5 10 15 20m
SCALE 1:200 @A1

FILE NAME: PM668_D.dwg

DRAWN
Z.C
DATE
24/07/19

DESIGNED
L.W
DATE
24/07/19

APPROVED
J.C
DATE
24/07/19

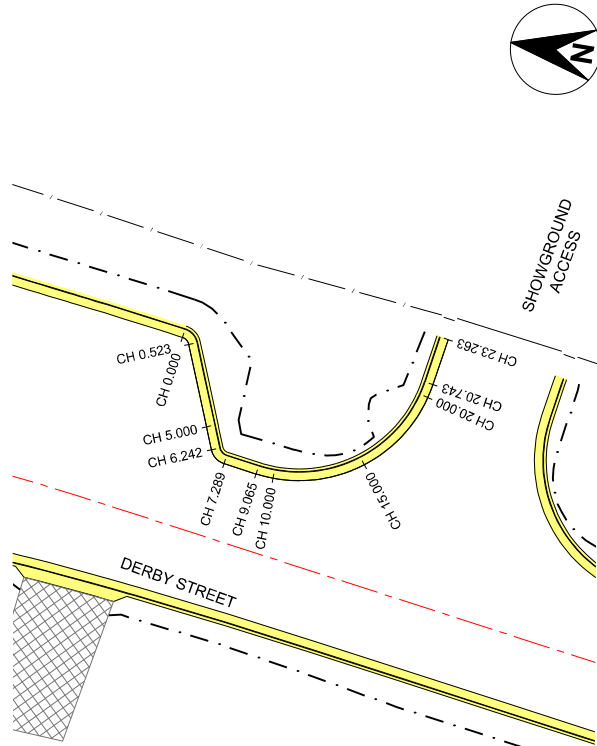
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JOB No.: PM668
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REG. No.: -

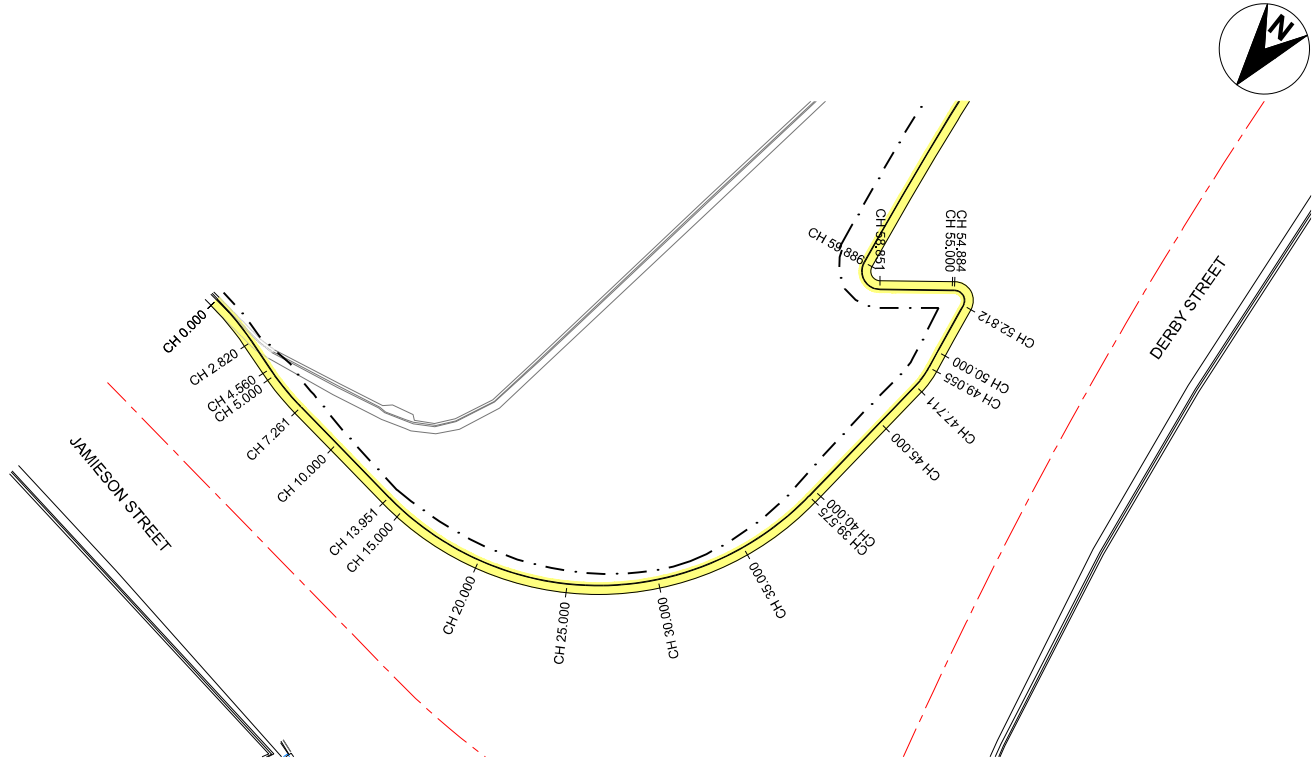
ISSUE
C
SHEET No.
8
OF 17

ISSUE	REVISION	AUTH	DATE
C	ISSUED FOR TENDER	J.C	17/10/19
B	ISSUED TO CLIENT FOR APPROVAL	L.W	09/10/19
A	ISSUED TO CLIENT FOR REVIEW	Z.C	24/07/19

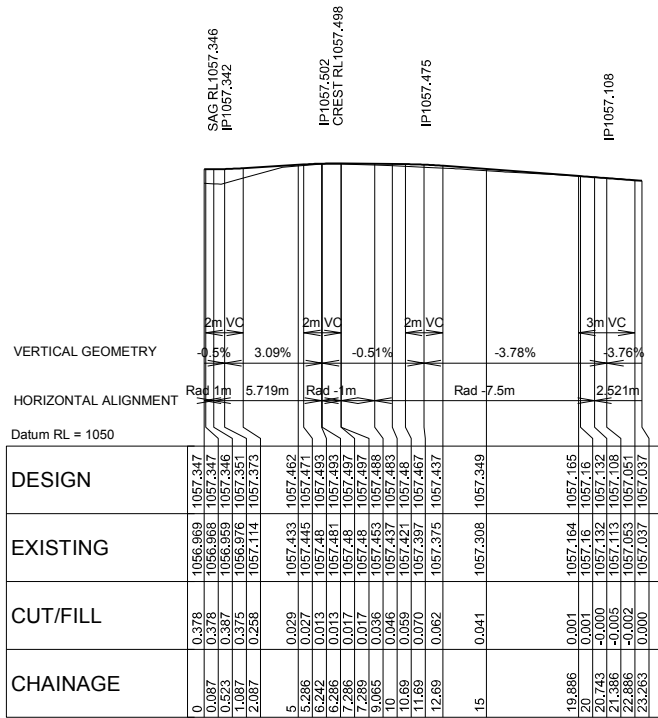
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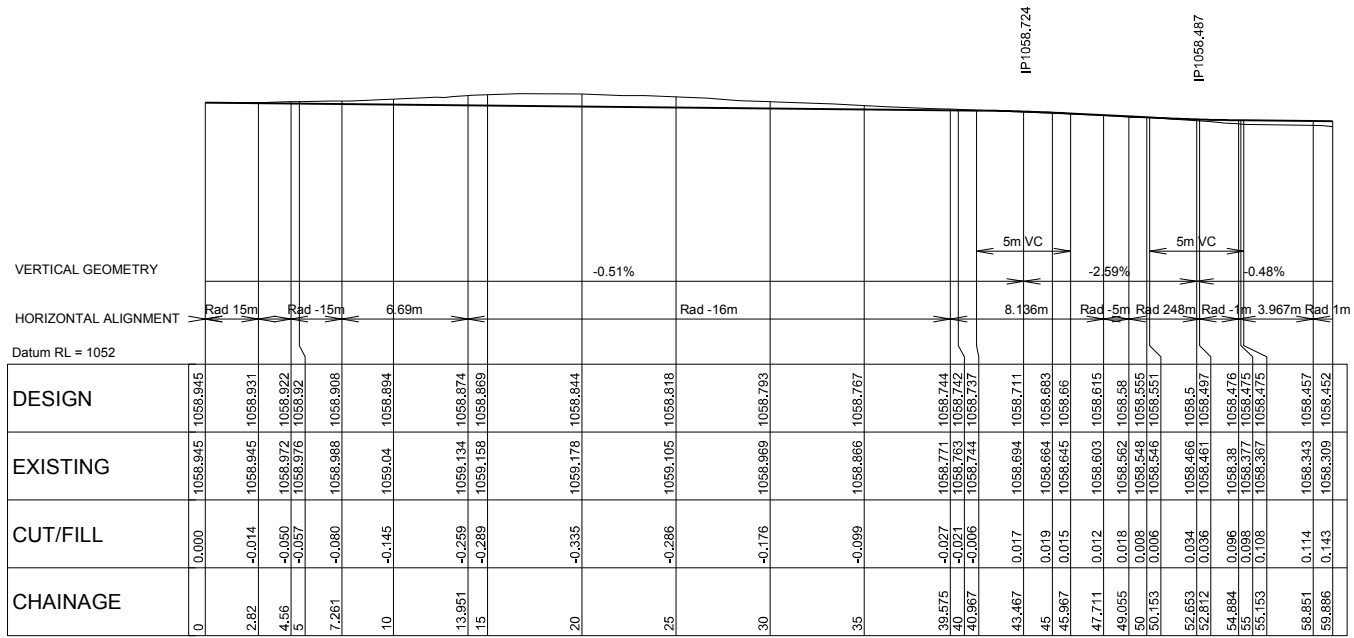
KERB RETURN 6 - PLAN VIEW
SCALE 1:200



KERB RETURN 7 - PLAN VIEW
SCALE 1:200



KERB RETURN 6 - LONGITUDINAL SECTION
HS 1:200
VS 1:100



KERB RETURN 7 - LONGITUDINAL SECTION
HS 1:200
VS 1:100

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CLIENT
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PROJECT
DERBY STREET NORTH UPGRADE

DERBY STREET KERB RETURN 6 AND 7
PLAN AND LONGITUDINAL SECTION

SCALES

A1 ORIGINAL

0 1 2 4 6 8 10m

SCALE 1:100

0 5 10 15 20m

SCALE 1:200

FILE NAME: PM668_D.dwg

DRAWN
Z.C

DATE
24/07/19

DESIGNED
L.W

DATE
24/07/19

APPROVED
J.C

DATE
24/07/19

DATUM: -

JOB No.:
PM668

ISSUE
C

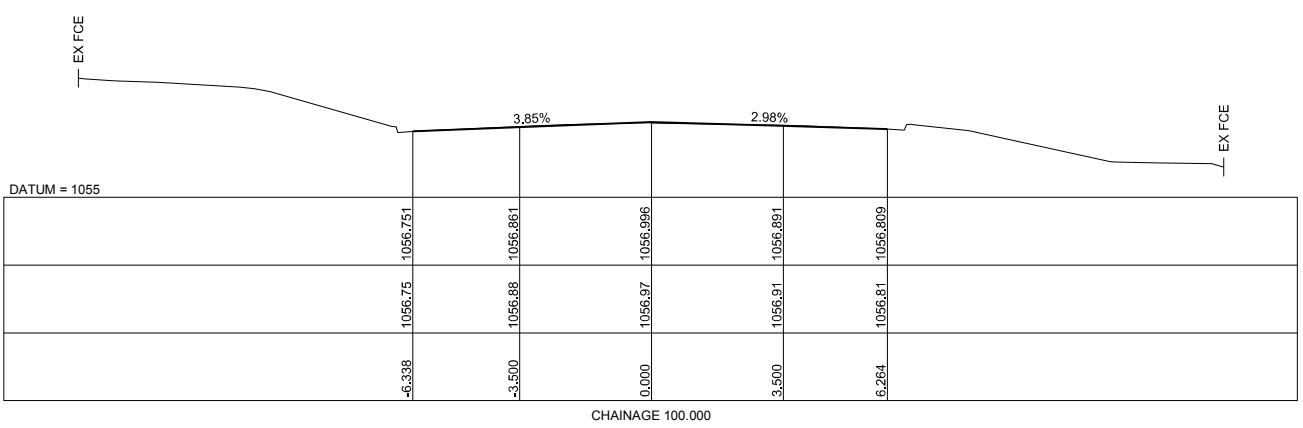
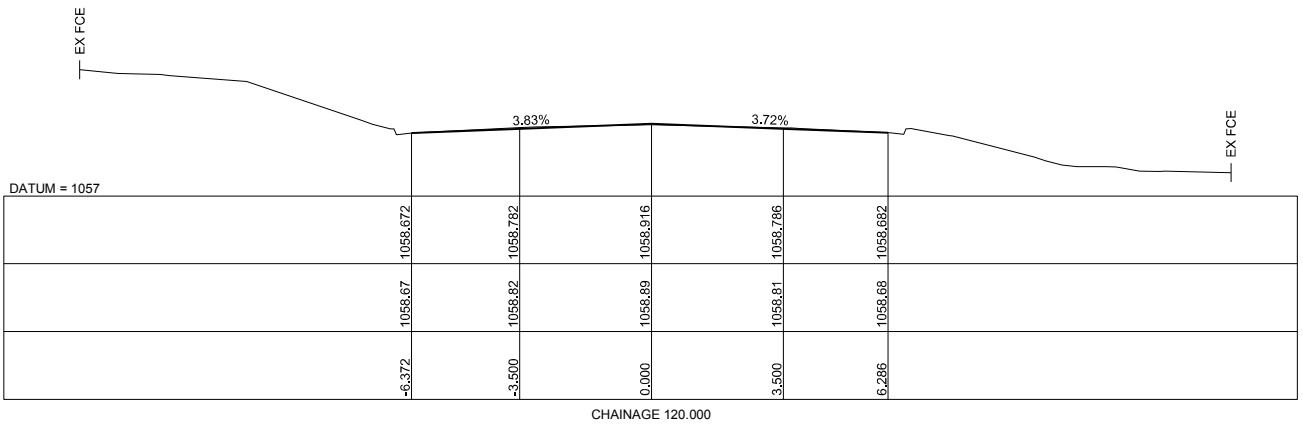
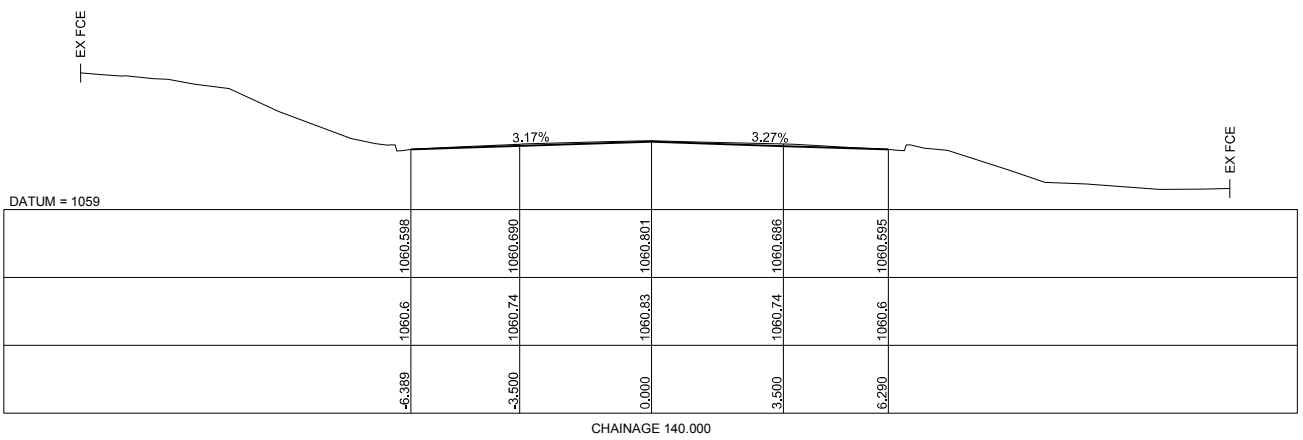
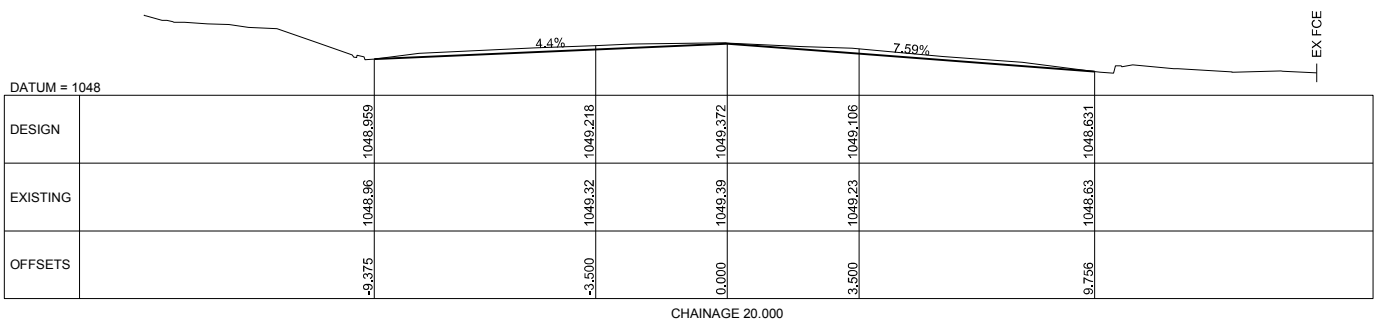
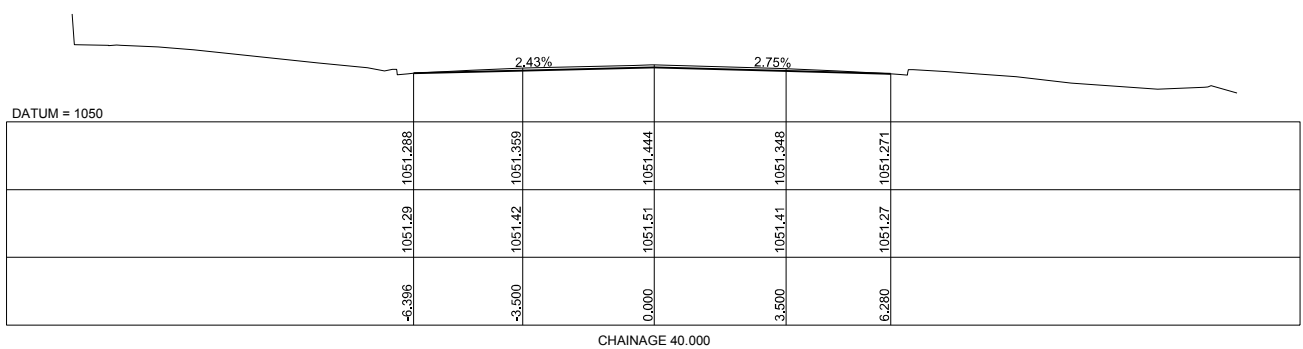
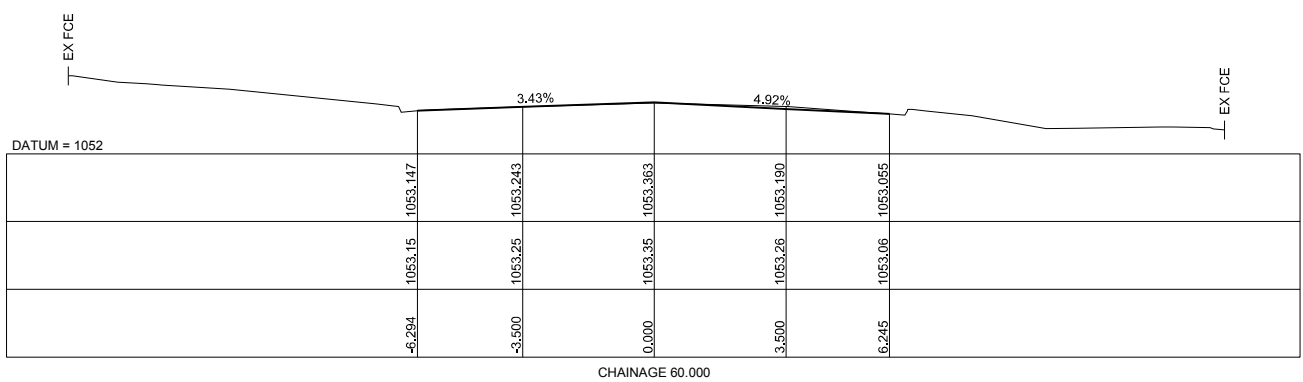
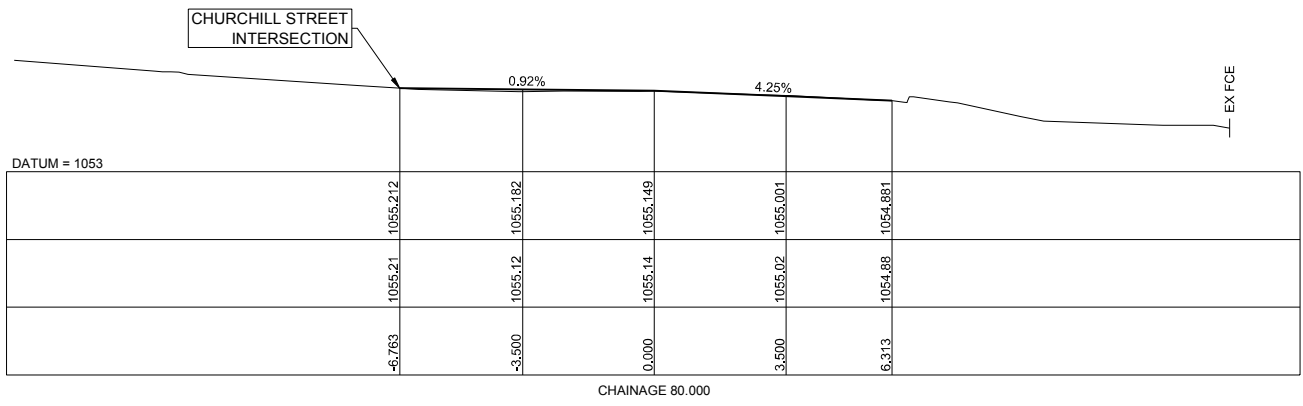
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OF 17

STATUS:
TENDER

REG. No.:
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B	ISSUED TO CLIENT FOR APPROVAL	L.W	09/10/19
A	ISSUED TO CLIENT FOR REVIEW	Z.C	24/07/19



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CLIENT	WALCHA COUNCIL
PROJECT	DERBY STREET NORTH UPGRADE DERBY STREET CROSS SECTIONS SHEET 1 OF 6

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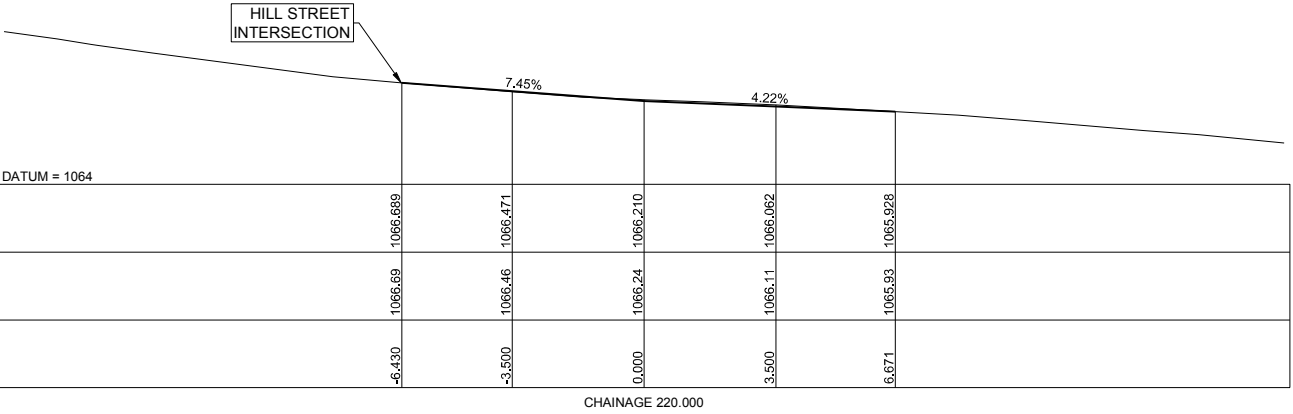
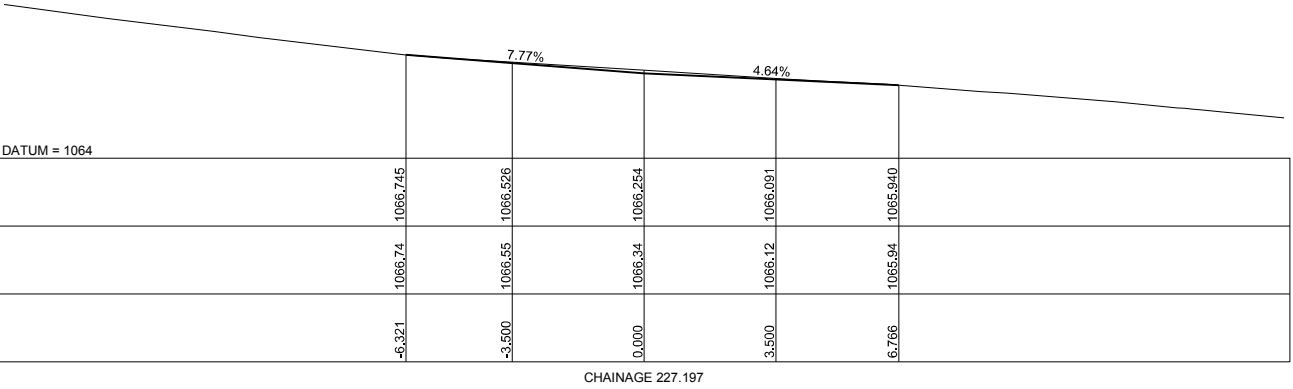
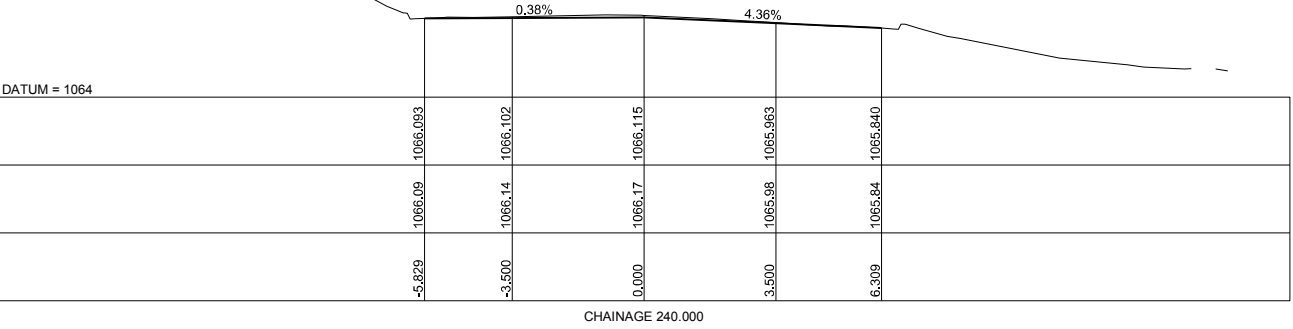
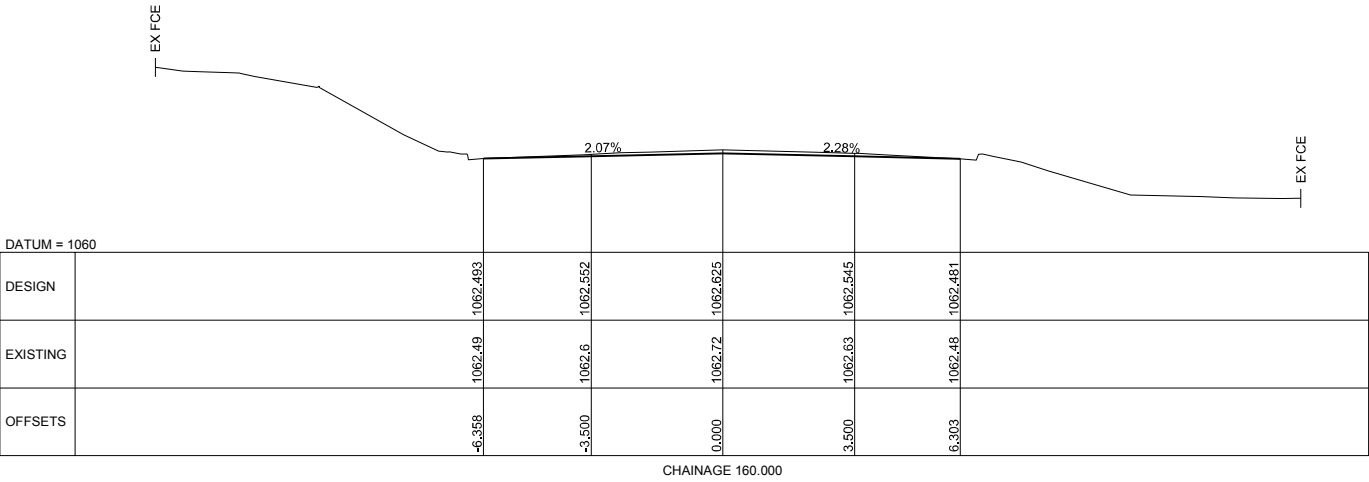
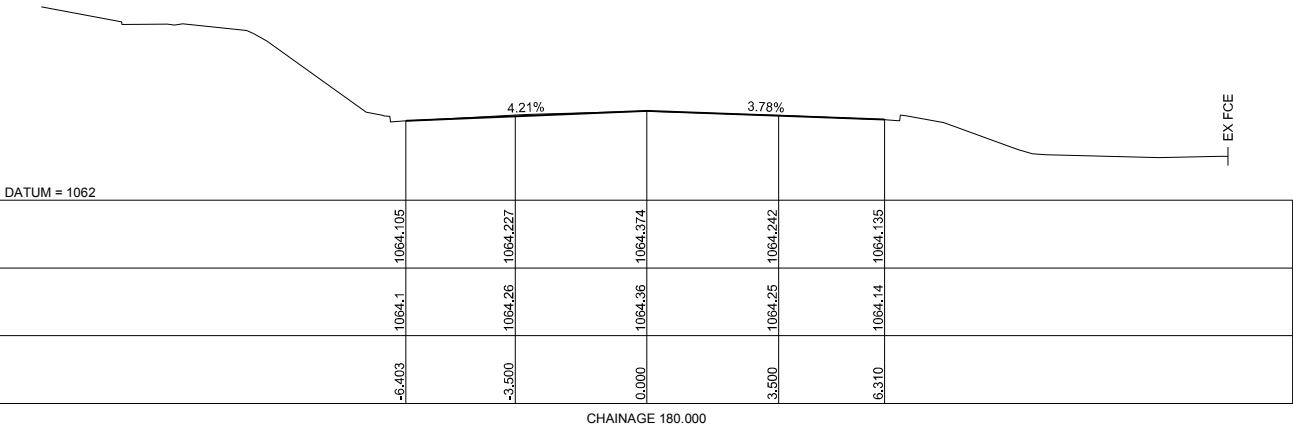
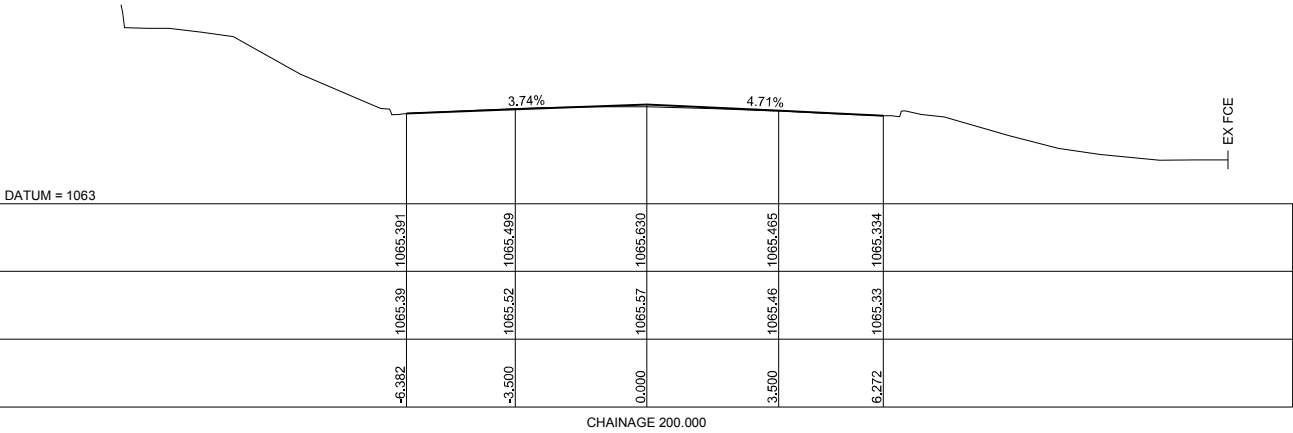
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APPROVED	DATE	STATUS:	TENDER	
J.C	24/07/19	REG. No.:		
DATUM: -				



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CLIENT	WALCHA COUNCIL
PROJECT	DERBY STREET NORTH UPGRADE DERBY STREET CROSS SECTIONS SHEET 2 OF 6

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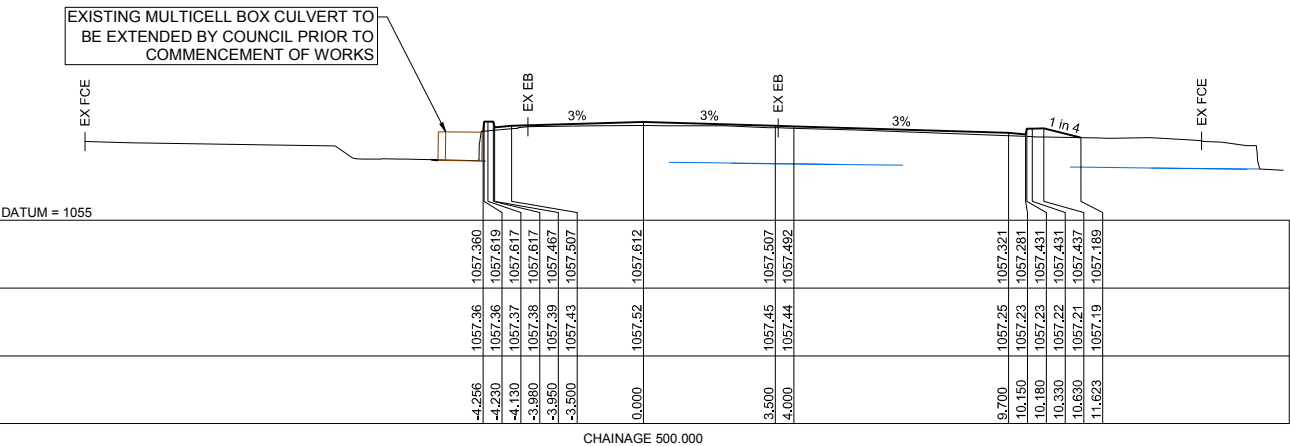
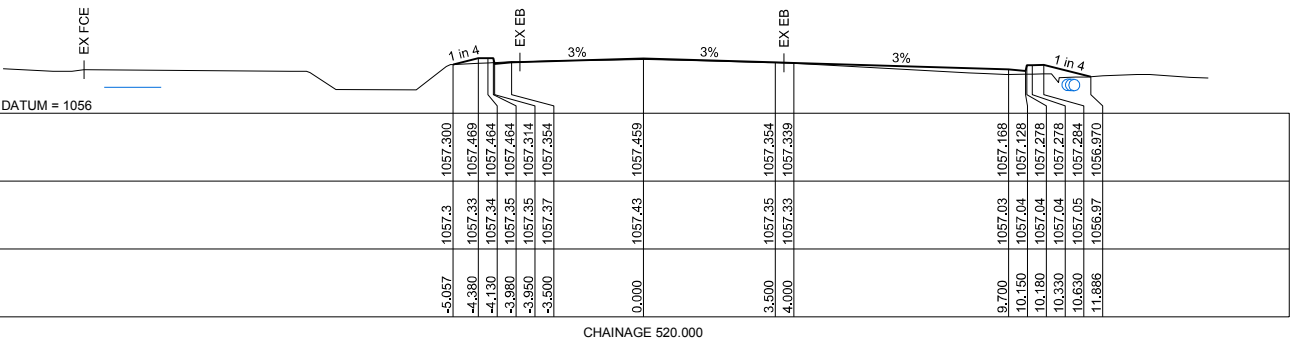
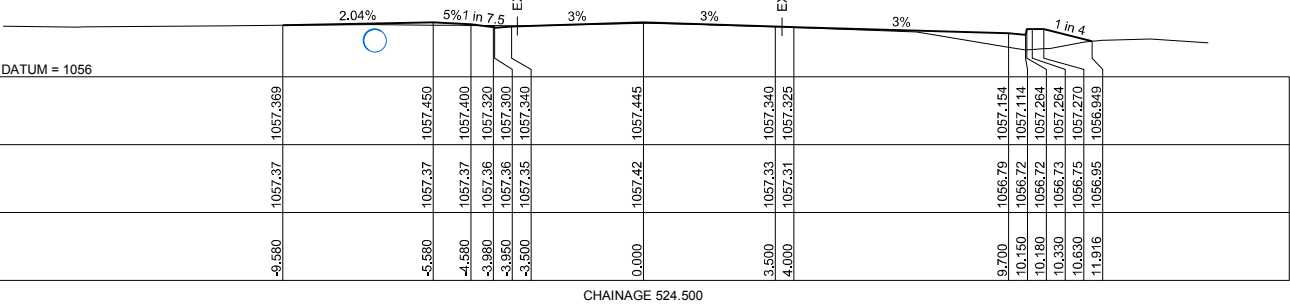
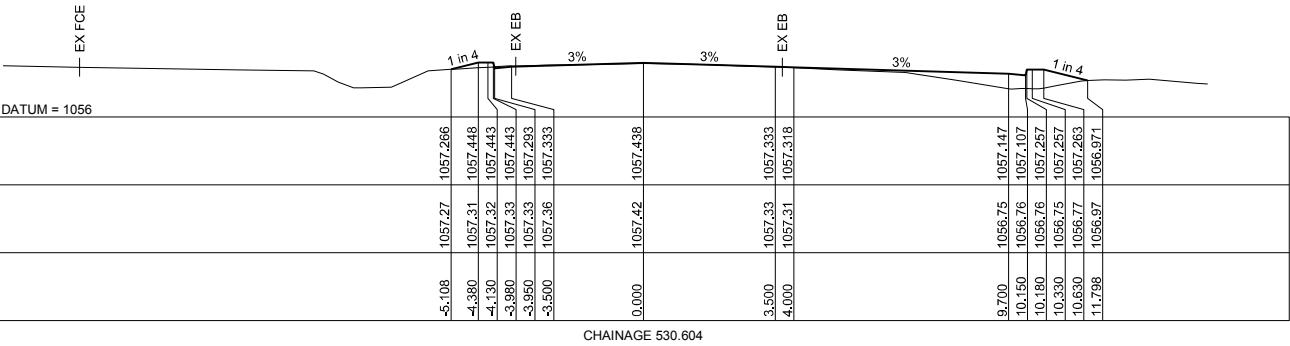
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J.C	24/07/19	REG. No.:		
DATUM: -				



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A	ISSUED TO CLIENT FOR REVIEW	Z.C	24/07/19
ISSUE	REVISION	AUTH	DATE



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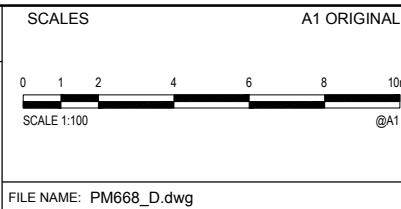
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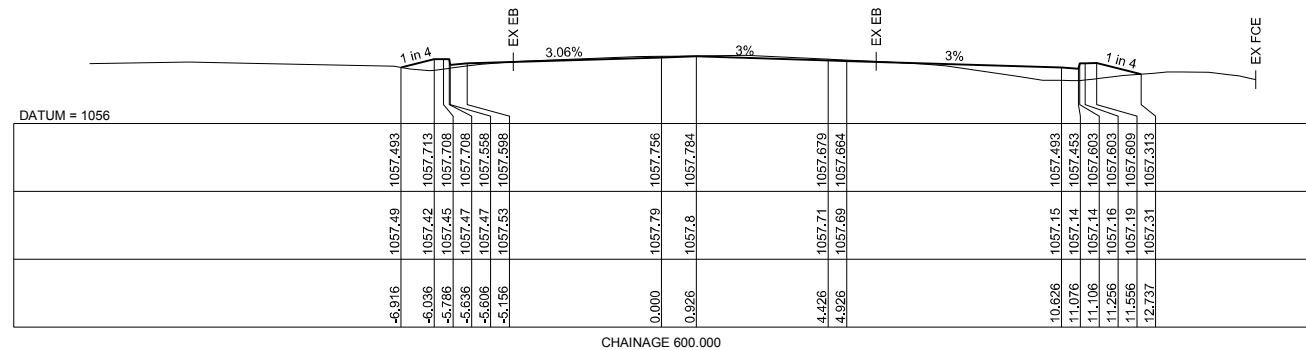
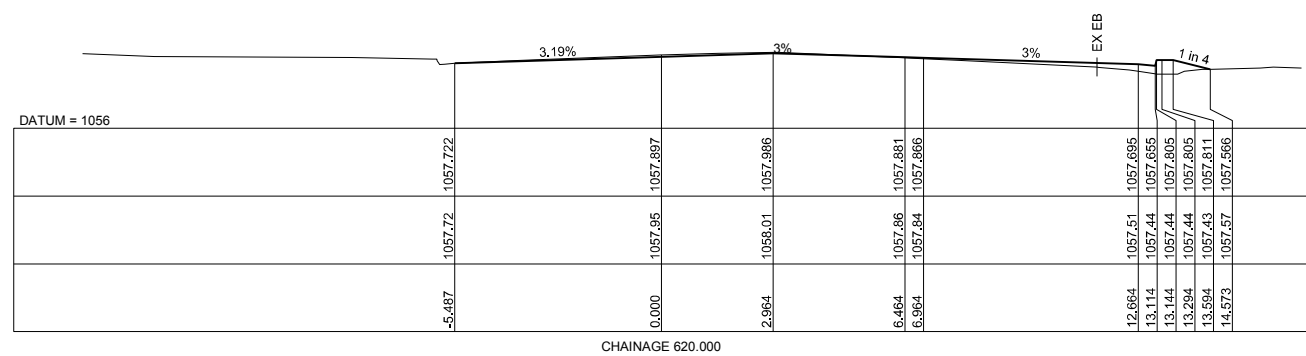
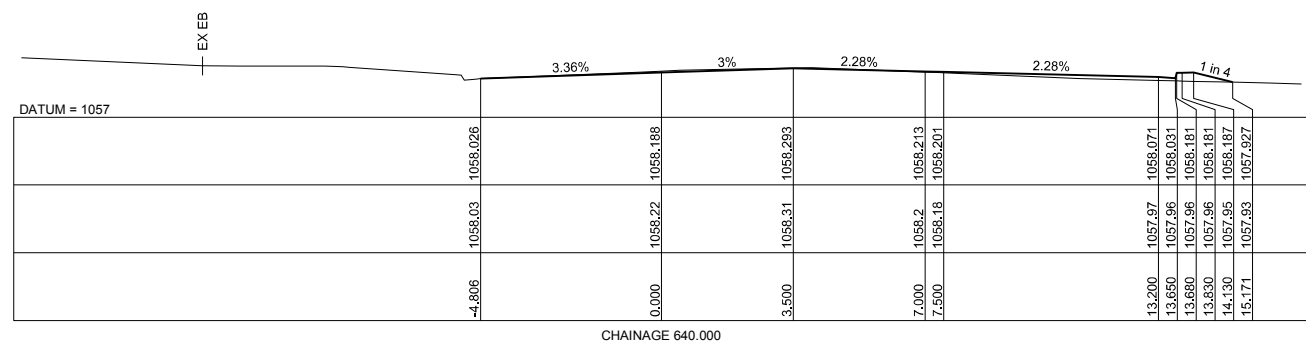
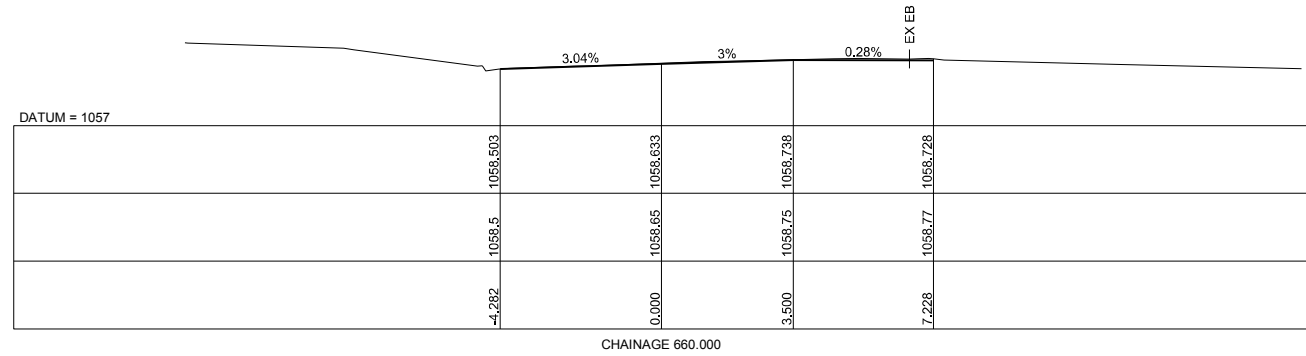
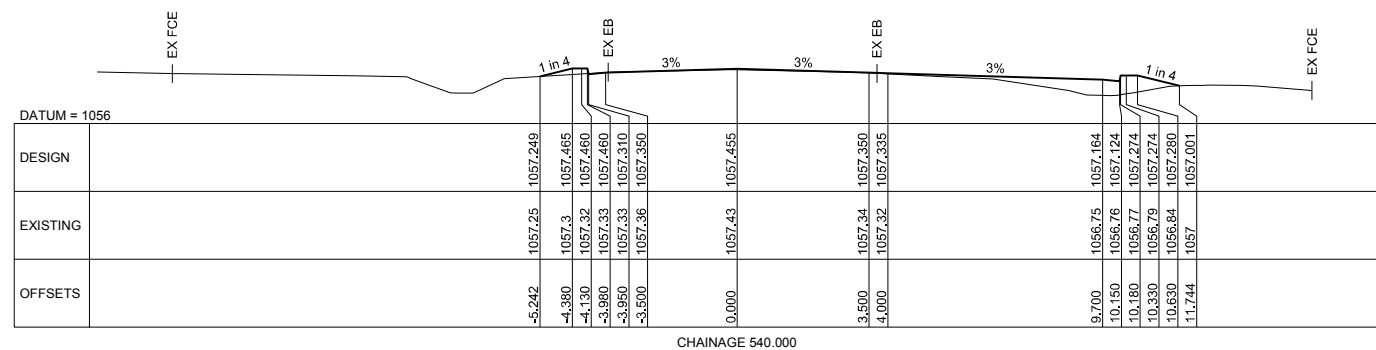
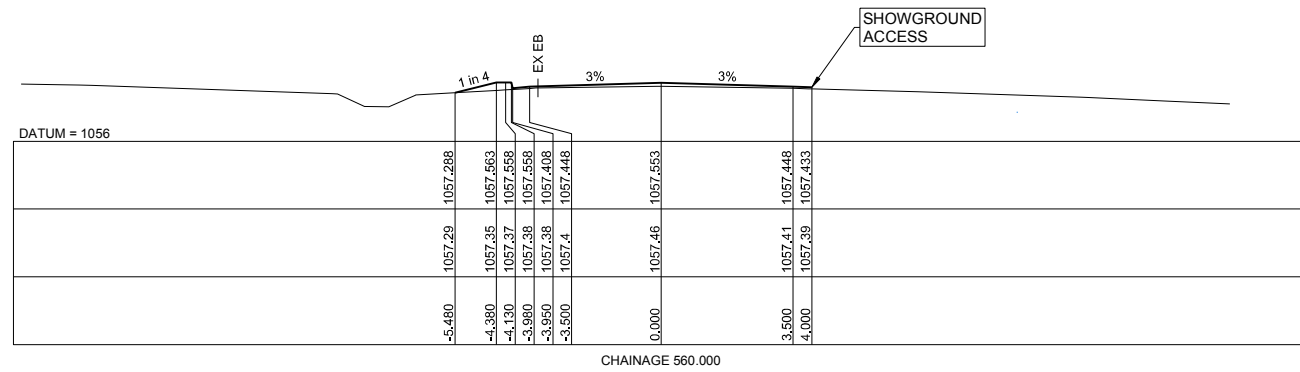
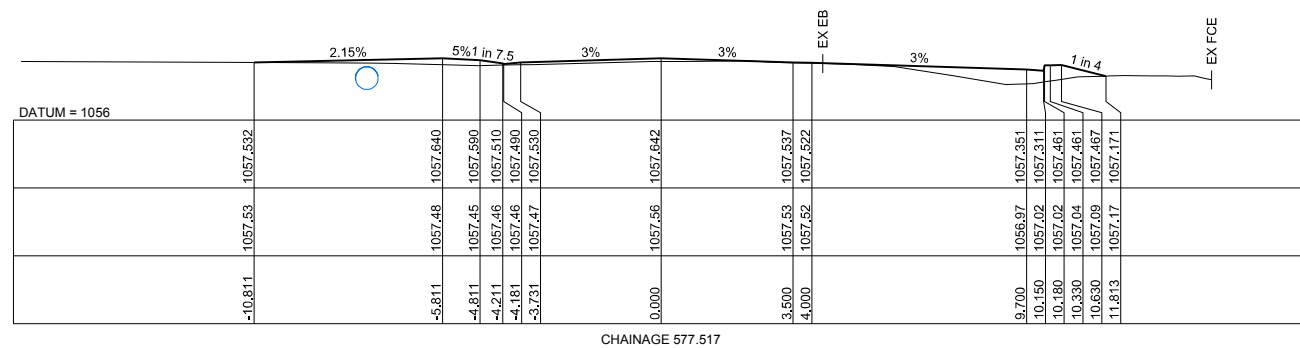
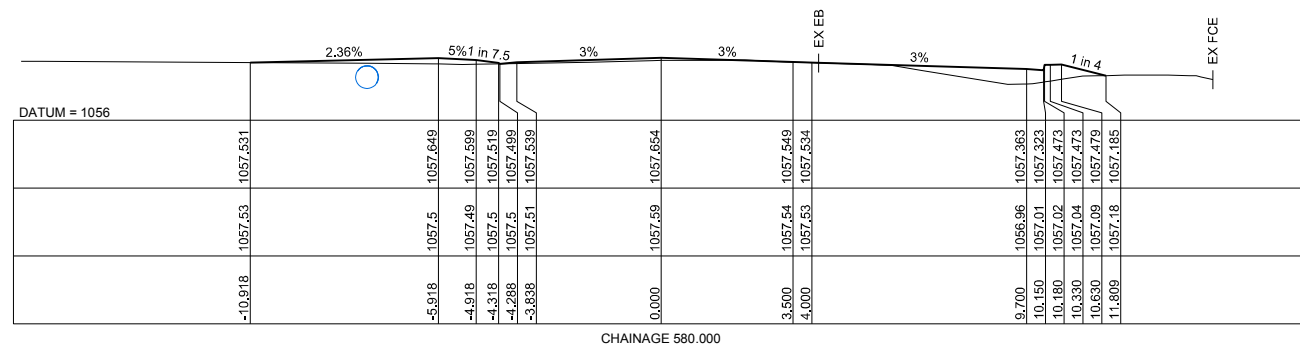
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CLIENT	WALCHA COUNCIL
PROJECT	DERBY STREET NORTH UPGRADE
	DERBY STREET CROSS SECTIONS
	SHEET 4 OF 6



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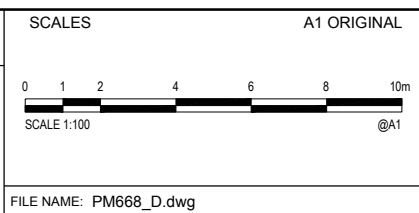


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ISSUE	REVISION	AUTH	DATE

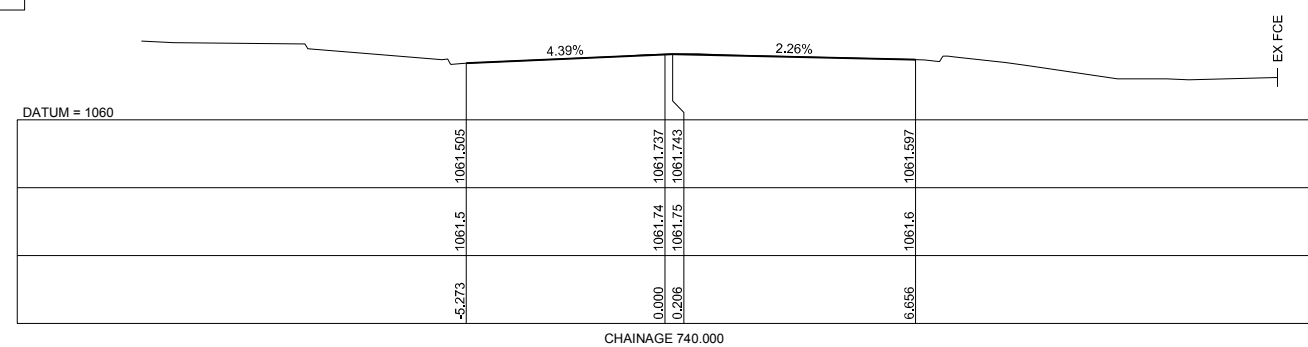
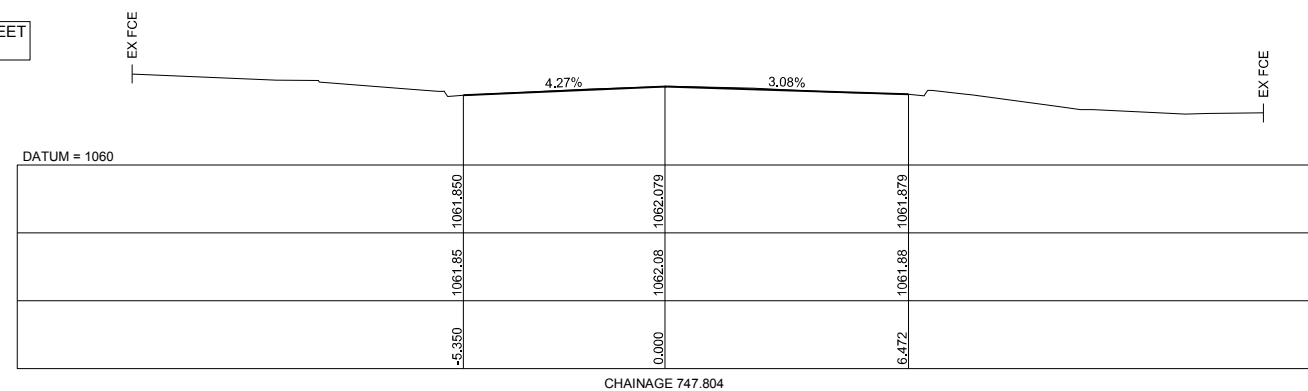
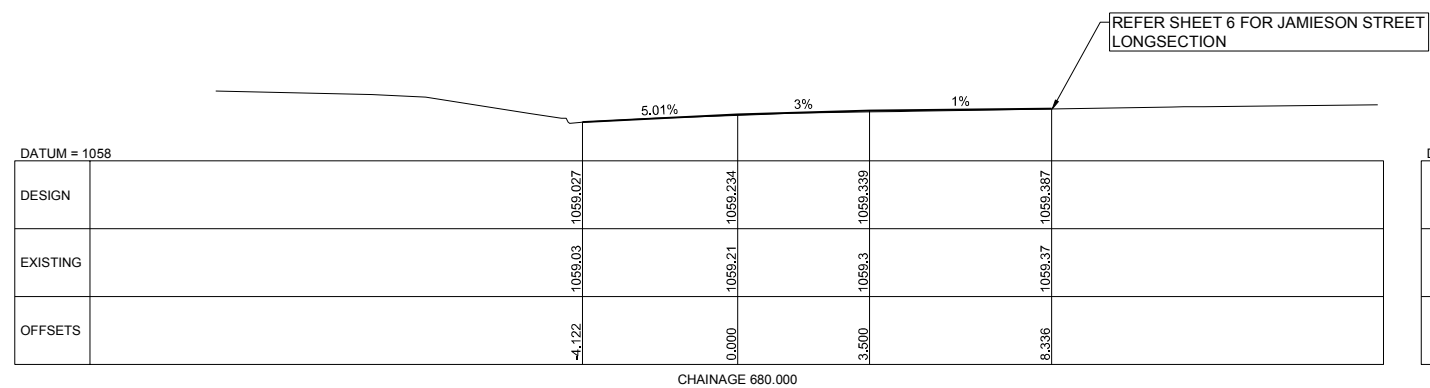
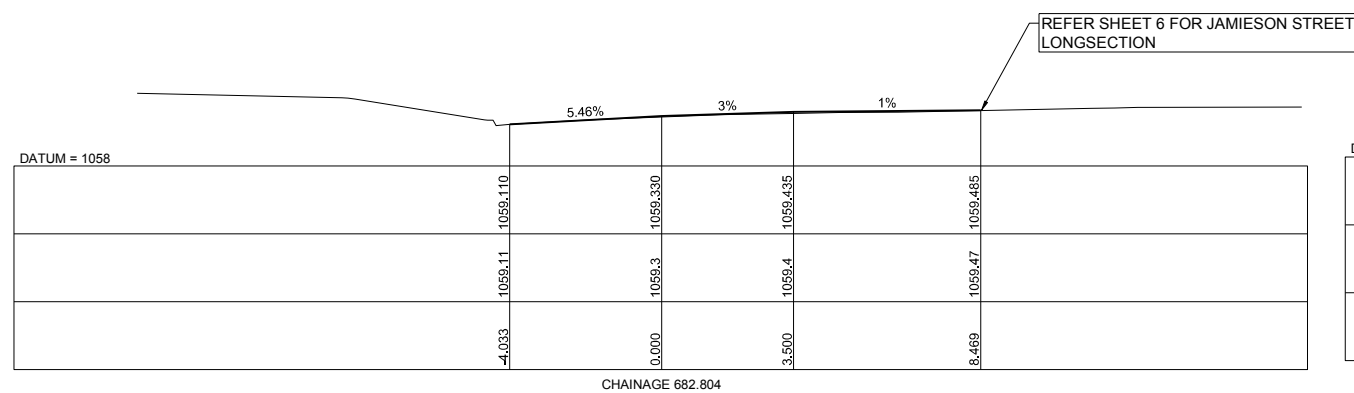
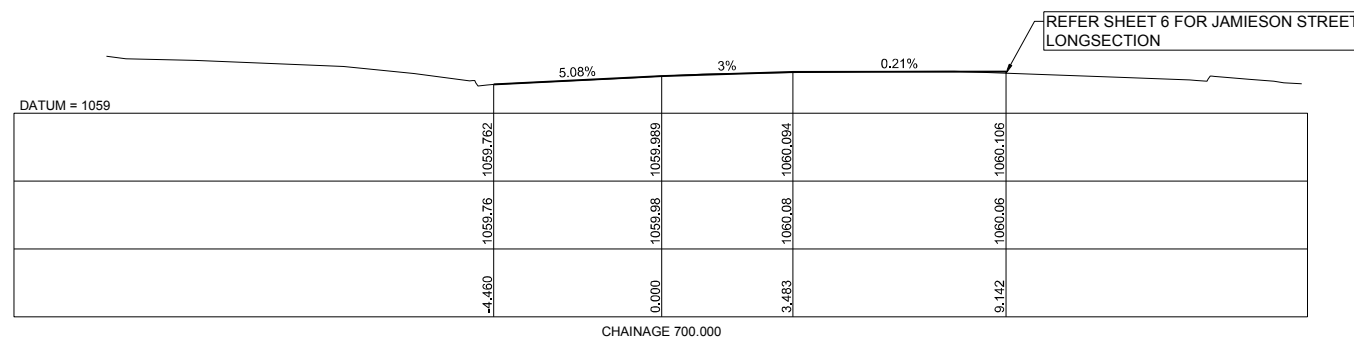
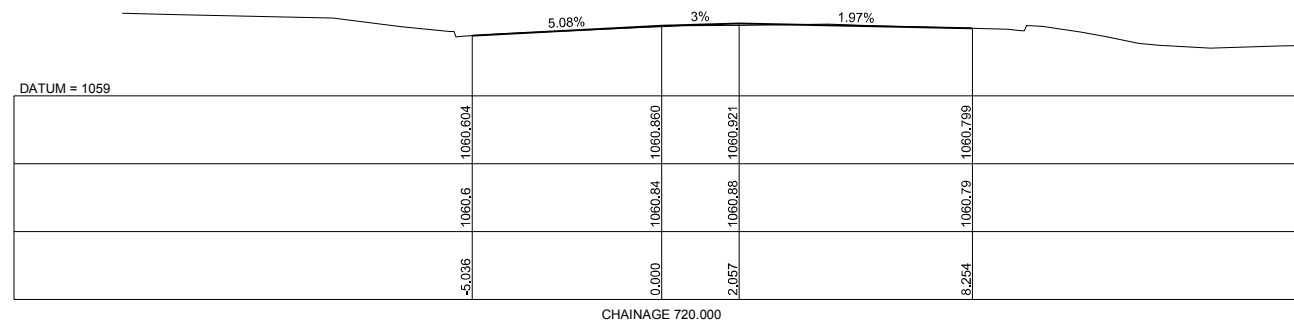
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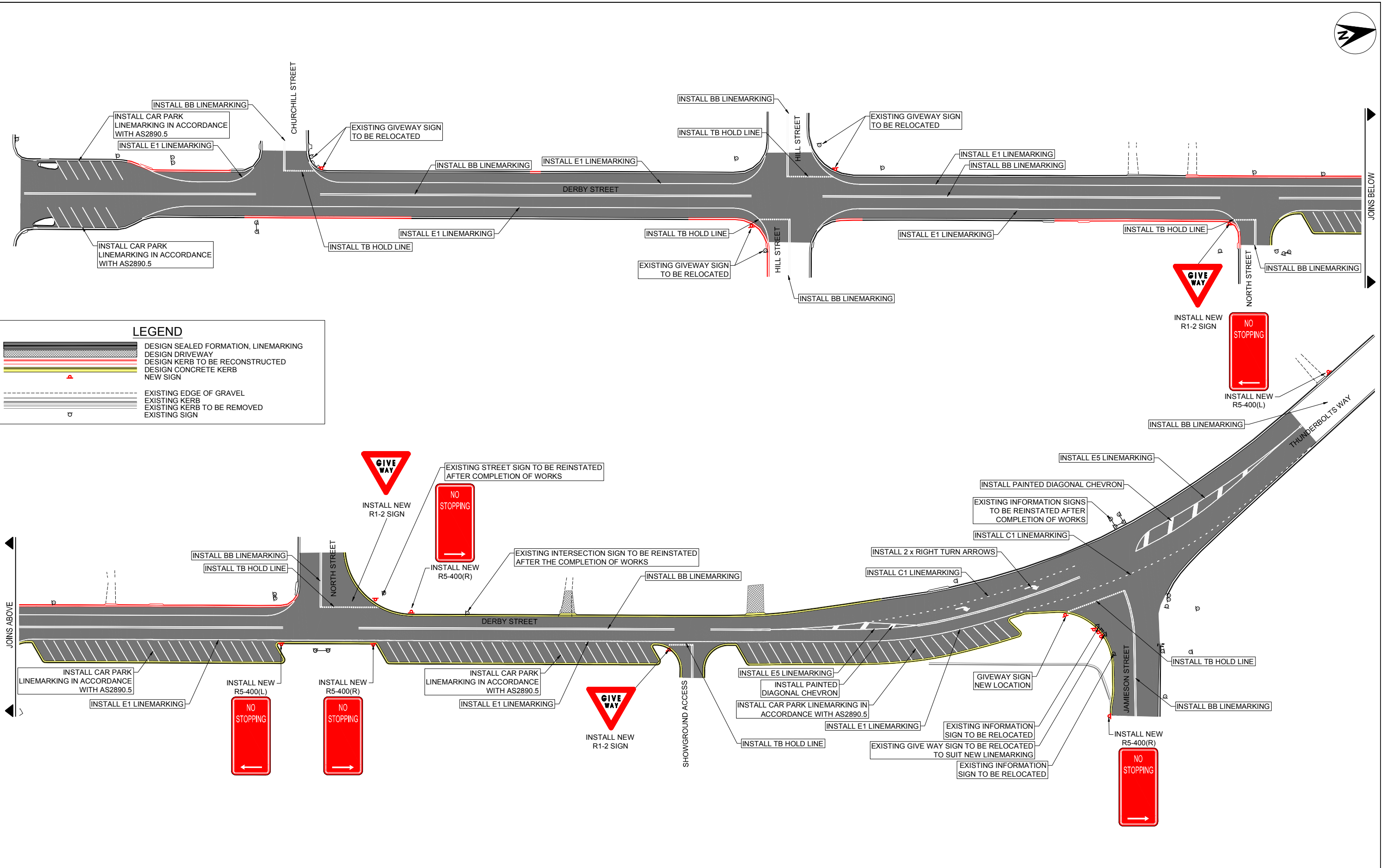


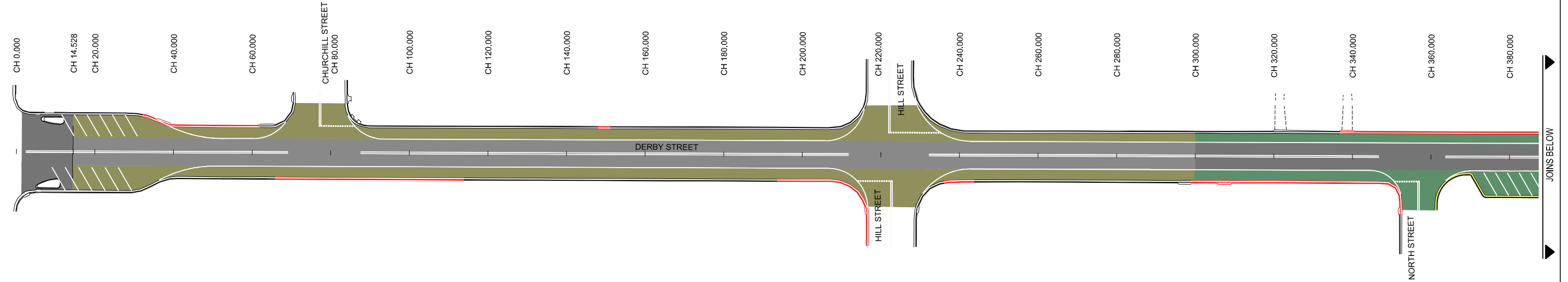
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PROJECT	DERBY STREET NORTH UPGRADE
	DERBY STREET CROSS SECTIONS SHEET 5 OF 6



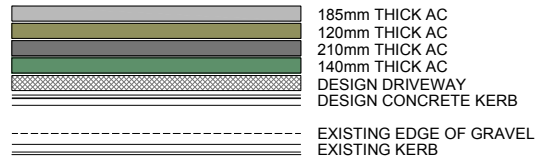
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DATUM: -		REG. No.:		

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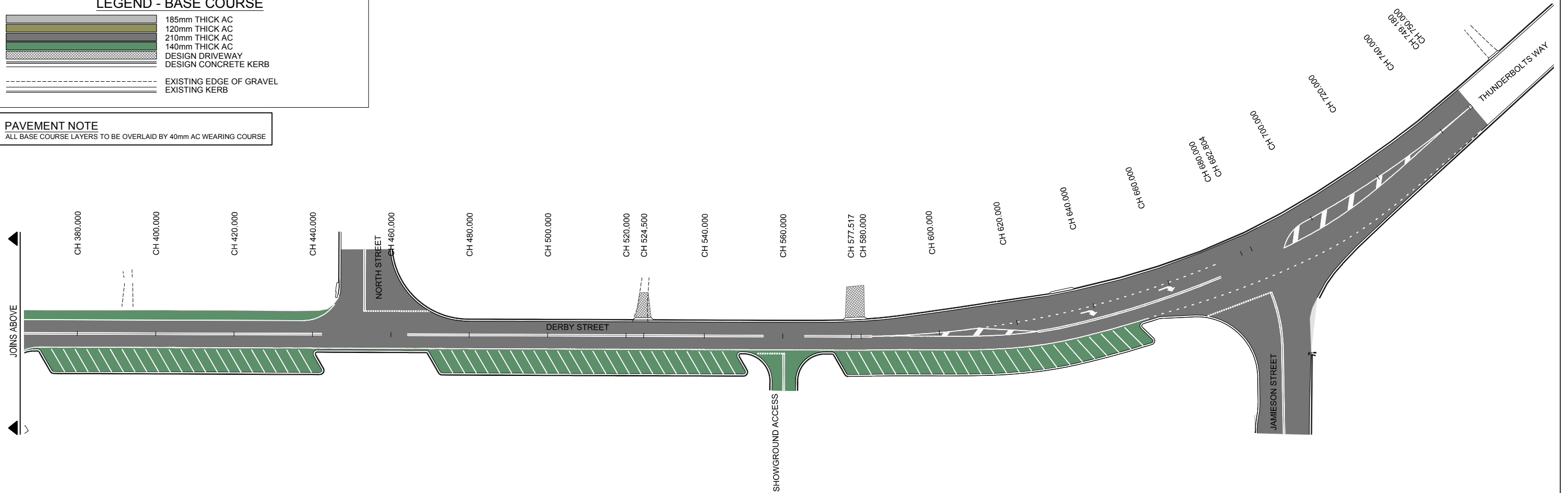


LEGEND - BASE COURSE



PAVEMENT NOTE

ALL BASE COURSE LAYERS TO BE OVERLAID BY 40mm AC WEARING COURSE



ISSUE	REVISION	AUTH	DATE
C	ISSUED FOR TENDER	J.C	17/10/19
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CLIENT	WALCHA COUNCIL
PROJECT	DERBY STREET NORTH UPGRADE
	DERBY STREET PAVEMENT PLAN

SCALES

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SCALE 1:500

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FILE NAME: PM668_D.dwg

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DESIGNED	DATE	DOCUMENT No.:		OF 17
L.W	15/10/19	D17		
APPROVED	DATE	STATUS:	TENDER	
J.C	15/10/19	REG. No.:	-	
DATUM:	-			

Appendix C

Bus Route Information

MOONA BUS RUN DIRECTIONS 2020

Of a morning:

START AT

1889 The Retreat

Right onto Moona Plains Road

Left at Emu Creek Road

Left at Angle Street

Left to Walcha Central School

On to North Street

Left at Middle Street

Right at Hill Street

Across Derby Street (Thunderbolts way)

Left at Meridian Street

Left at Apsley Street to St Patricks School

Left at Derby Street

Right onto Jamieson Street

Onto Emu Creek Road

Right at Moona Plains Road

1889 The Retreat

Of an Afternoon:

START AT

1889 The Retreat

Right onto Moona Plains Road

Left at Emu Creek Road

Onto Jamieson Street

Left onto Derby Street (Thunderbolts Way)

Right at Roundabout onto Fitzroy Street

Through next roundabout

Right at Towers Street

Right at Apsley Street to St Patricks School

Left at Derby Street

Right at Hill Street

Left at Middle Street

Right at North Street to Walcha Central School

Right at Angle Street

Right onto Emu Creek Road

Right onto Moona Plains Road

Left to 1889 Moona Plains Road

MOONA BUS TIMETABLE 2020

AM	Bus Stop/ Property Name	KM on Moona Road
8:00	The Retreat	1889
	Chinooks Road Turnoff	
8:05	East Lynne	1802
	Romavilla	1426
8:15	Elswick	677
8:25	Bangalla	0.1
8:30	Walcha Central School	
8:35	St Patricks School	
PM		
3:05	St Patricks School	
3:15	Walcha Central School	
3:25	Bangalla	
3:30	Elswick	
	Romavilla	
3:35	East Lynne	
	Chinooks Road Turnoff	
3:40	The Retreat	

**Indicates pending additions in the future years

Appendix D

Construction Traffic Volumes

Winterbourne Wind Farm

Calculated Total Traffic Volumes - 119 Turbines

Item - Light and Medium Vehicles	Movements Per Day	Work Days Per Period	Austrroads Vehicle Class	Vehicle Capacity (tonne)	Total Light Vehicle Movements
Light Vehicles - Months 0 to 3	50	66	Class 1	N/A	3,300
Light Vehicles - Months 3 to 9	200	132	Class 1	N/A	26,400
Light Vehicles - Months 9 to 17	270	176	Class 1	N/A	47,520
Light Vehicles - Months 17 to 25	200	176	Class 1	N/A	35,200
Light Vehicles - Months 25 to 31	40	132	Class 1	N/A	5,280
Shuttle Bus - Months 3 to 25	4	484	Class 1	N/A	1,936
Total					119,636

Item - Heavy Vehicles	Quantity	Unit	Austrroads Vehicle Class	Vehicle Capacity (tonne)	Total Movements
Fuel Delivery	400	No. movements	Class 7	10	400
Water Cartage (assumed 50% imported, 50% sourced on site)	75,000,000	kL	Class 7	15	5,000
Civil Subcontractor Mobilisation and Demobilisation	350	No. movements	Class 9	32	350
Electrical Subcontractor Mobilisation and Demobilisation	200	No. movements	Class 9	32	200
Concrete - Aggregate	140,000	tonne	Class 9	32	4,375
Concrete - Sand	110,000	tonne	Class 9	32	3,438
Concrete - Cement	40,000	tonne	Class 9	32	1,250
Pavement Material (assumed 30% imported, 70% sourced on site)	150,000	tonne	Class 9	32	4,688
Cable Trench Sand	110,000	tonne	Class 9	32	3,438
WTG Reinforcement	13,311	tonne	Class 9	32	416
PVC Conduits	50	No. movements	Class 9	32	50
Electrical Cable Drums	250	No. movements	Class 9	32	250
Electrical Overhead Line Works	600	No. movements	Class 9	32	600
Substation Equipment	300	No. movements	Class 9	32	300
Container Deliveries	595	No. movements	Class 9	32	595
Container Returns	595	No. movements	Class 9	32	595
Crane Mobilisation and Demobilisation	200	No. movements	Class 9	32	200
Precast Concrete	100	No. movements	Class 9	32	100
General and Misc Deliveries	500	No. movements	Class 9	32	500
Total					26,743

Item - Over Size Over Mass	Quantity	Unit	Austrorads Vehicle Class	Vehicle Capacity (tonne)	Total Movements
Machinery and Misc Civils	20	No. movements	Over Size Over Mass	N/A	20
Transformer and Misc Electrical	15	No. movements	Over Size Over Mass	N/A	15
Control Buildings	4	No. movements	Over Size Over Mass	N/A	4
Turbine Tower Sections	833	No. movements	Over Size Over Mass	160	833
Turbine Blades	357	No. movements	Over Size Over Mass	73	357
Turbine Hub	119	No. movements	Over Size Over Mass	95	119
Turbine Nacelle	119	No. movements	Over Size Over Mass	153	119
Turbine Drivetrain	119	No. movements	Over Size Over Mass	160	119
Crane Mobilisation and Demobilisation	6	No. movements	Over Size Over Mass	N/A	6
Total					1,592

Appendix E

Muswellbrook Hills of Gold Objection

I refer to the Environmental Impact Statement, prepared for Wind Energy Partners, and *Appendix G, Traffic and Transport Assessment* prepared by The Transport Planning Partnership, for the Hills of Gold Windfarm Project SSD - 9679. Council appreciates the opportunity for comment.

Council's submission is as follows:

3.0 Many of the roads and intersections identified in the *Traffic and Transport Assessment* for transport of oversized loads through Muswellbrook Shire have a known crash and fatality history. For example:

- Golden Highway;
- Thomas Mitchell Drive/Denman Road intersection;
- Thomas Mitchell Drive/New England Highway intersection;
- Bengalla Link Road;
- Bengalla Link Rd/Wybong Rd intersection;
- Wybong Road; and
- Kayuga Road.

4.0 Many of the roads are the designated access to mines and horse studs, carry high volumes of traffic at peak times and disruption to traffic can cause significant issues for these businesses. The businesses include:

- Maxwell Underground Mine;
- Mt Arthur Mine;
- Bengalla Mine;
- Mt Pleasant Mine;
- Mangoola Mine;
- Dartbrook Underground Mine;
- Coolmore Stud
- Darley Woodlands Stud
- Edenglassie Stud
- Balmoral Stud

5.0 Mt Pleasant Mine has commenced construction of a rail loop over Wybong Road, which will create changes to traffic conditions. Works have commenced and could continue to end of 2022.

6.0 The existing road alignment and constructed standard for sections of Wybong Road, Kayuga Road, Invermein Street and Dartbrook Access Road are generally of a 'country road' standard with narrower lane widths, unformed shoulders, poor pavement, aged sealed surface, and drainage structures that will not support the proposed repeated heavy loads/turning movements. For example, the Rosebrook Bridge on Wybong Road has been assessed as inadequate structurally for supporting loads greater than local traffic (< 12 tonne mass limit). Several drainage structures and bridges along these roads also require upgrading to increase loading capacity.

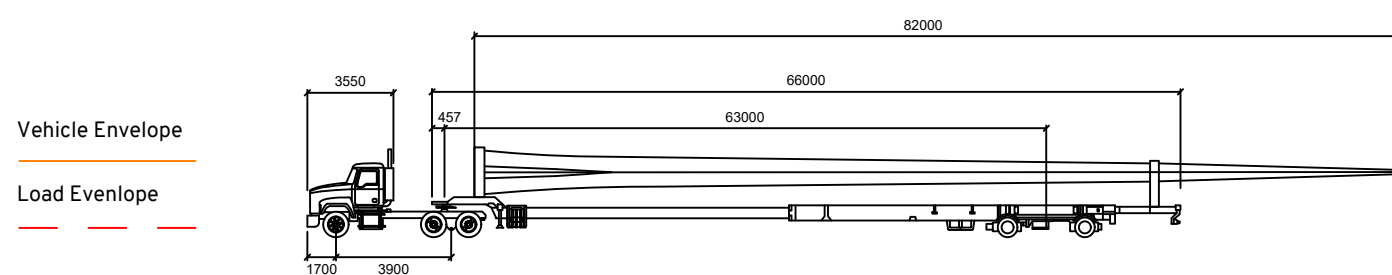
7.0 Muscle Creek Bridge in Bell Street is speed limit restricted to 10km/hr due to concerns with the bridge load capacity. The load capacity of the railway bridge in Bell Street is currently being reviewed due to the age of the structure and the damage that has occurred from other oversized loads.

8.0 There are additional road restrictions in place for Wybong Rd during school bus hours, and for Bell, Victoria and Market St movements are limited to daytime transportation, except for school zone times.

9.0 In summary, **Council objects to the use of the roads** in Muswellbrook Shire that have been identified in the Environmental Impact Statement, as the roads are not appropriate for the proposed traffic generated by the proposal.

Appendix F

Route 4 Swept Path Assessment



Winterbourne Blade Transport Vehicle

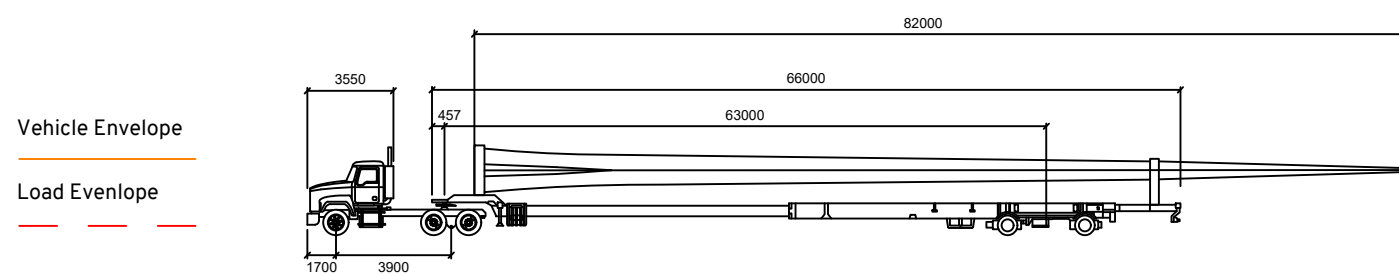
	mm
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Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Bark Hut Road Route Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:2000 @ A3
DWG NO: 100-S01G

The Vehicle Envelope represents the outline of the path taken by the vehicle and the extent of road widened required, and the Load Envelope represents the vehicle load (wind turbine blade) which can extend outside of the carriageway of the road but requires a minimum height clearance to pass over any obstacles.



Winterbourne Blade Transport Vehicle

	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

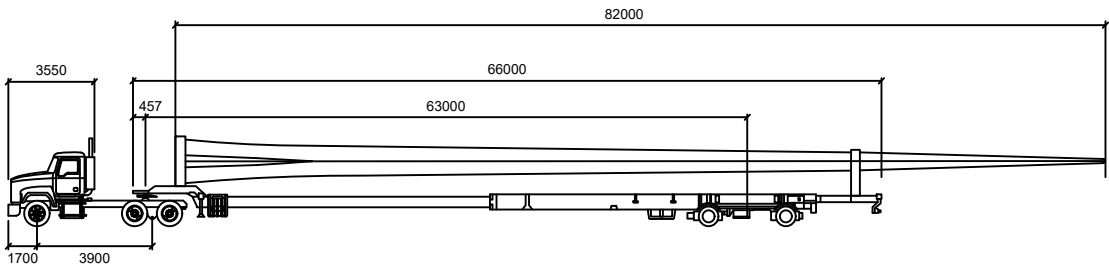
Winterbourne Wind Farm Bark Hut Road Route Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:2000 @ A3
DWG NO: 100-S01G

The Vehicle Envelope represents the outline of the path taken by the vehicle and the extent of road widened required, and the Load Envelope represents the vehicle load (wind turbine blade) which can extend outside of the carriageway of the road but requires a minimum height clearance to pass over any obstacles.



Vehicle Envelope
Load Envelope



Winterbourne Blade Transport Vehicle	
	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760
Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

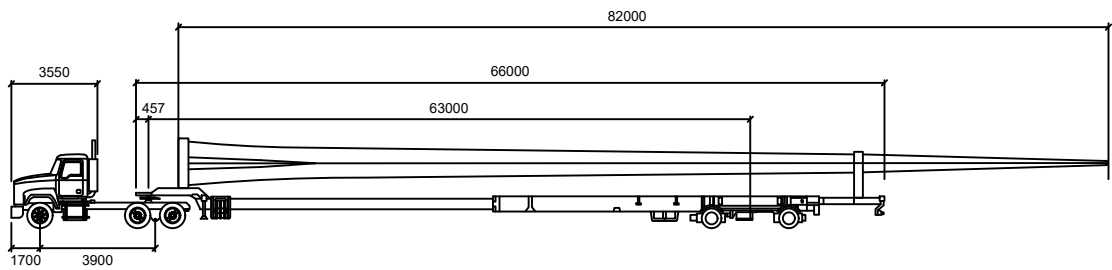
Winterbourne Wind Farm
Bark Hut Road
Route Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:2000 @ A3
DWG NO: 100-S01G

The Vehicle Envelope represents the outline of the path taken by the vehicle and the extent of road widened required, and the Load Envelope represents the vehicle load (wind turbine blade) which can extend outside of the carriageway of the road but requires a minimum height clearance to pass over any obstacles.



Vehicle Envelope
Load Envelope



Winterbourne Blade Transport Vehicle	
	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760
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Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

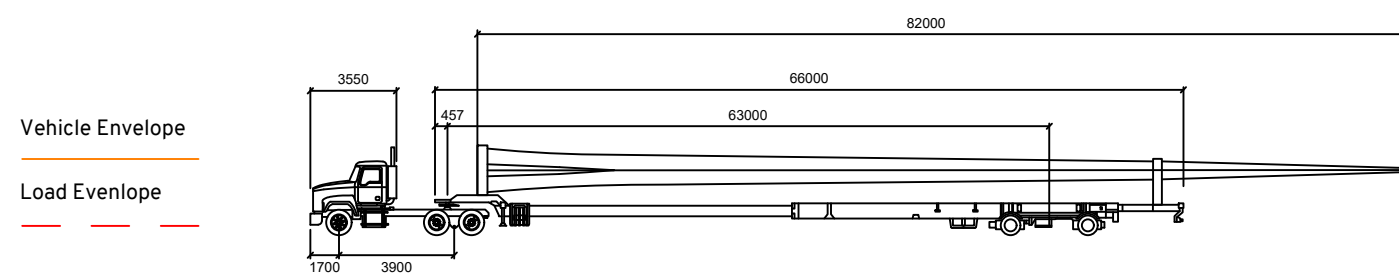
Winterbourne Wind Farm
Bark Hut Road
Route Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:2000 @ A3
DWG NO: 100-S01G

The Vehicle Envelope represents the outline of the path taken by the vehicle and the extent of road widened required, and the Load Envelope represents the vehicle load (wind turbine blade) which can extend outside of the carriageway of the road but requires a minimum height clearance to pass over any obstacles.

Trim trees or widen road to the north

Removal cattle stop



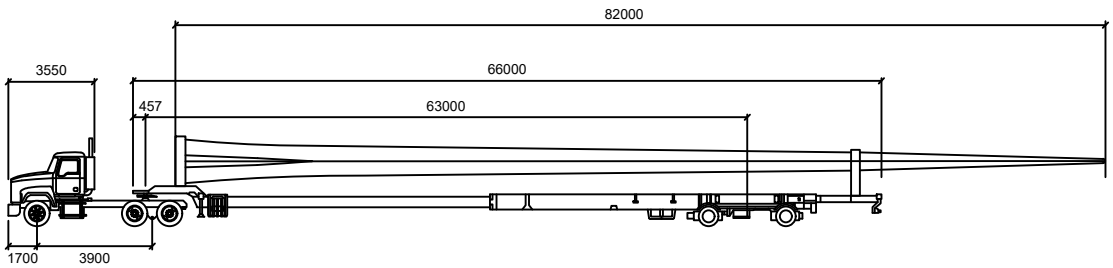
Winterbourne Wind Farm
Bark Hut Road
Route Assessment

Amber 5

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Vehicle Envelope
Load Envelope



Winterbourne Blade Transport Vehicle	
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760
Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm
Bark Hut Road
Route Assessment

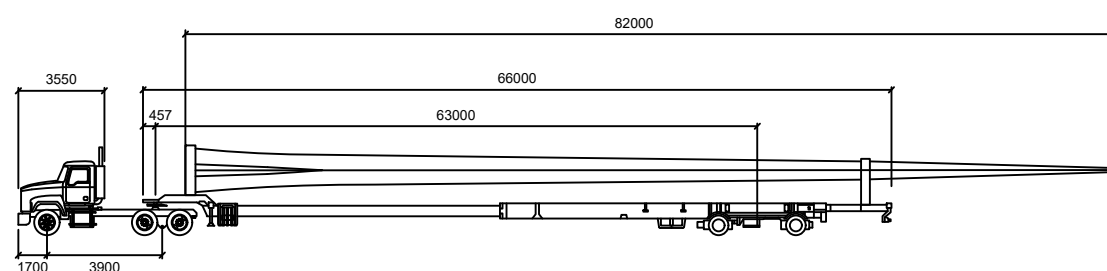
DRAWN: MW
DATE: 04/05/2021
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Vehicle Envelope

Load Envelope



Winterbourne Blade Transport Vehicle

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Trailer Width	2550
Load Width	5320
Total Length	96760

Lock to Lock Time	6.0
Steering Angle	30.0
Articulating Angle	70.0
Height	5450

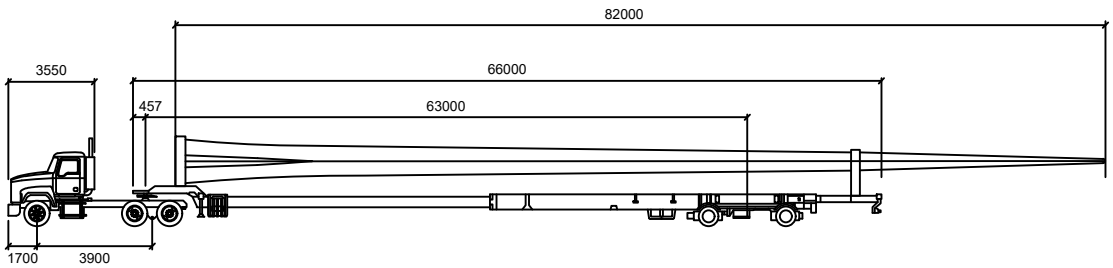
Winterbourne Wind Farm Bark Hut Road Route Assessment

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DATE: 04/05/2021
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Vehicle Envelope
Load Evenlope



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Articulating Angle	70.0
Height	5450

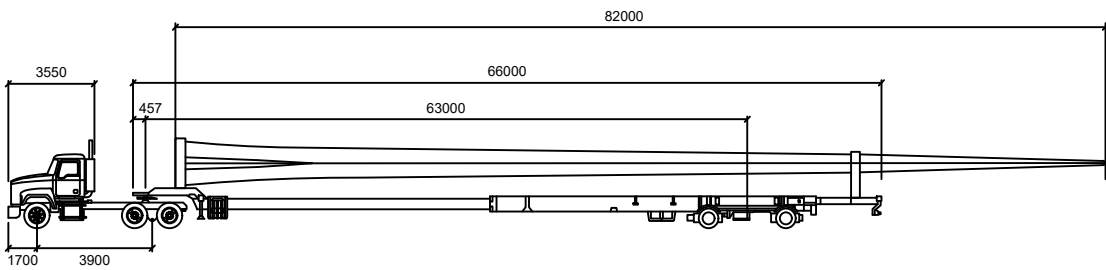
Winterbourne Wind Farm
Bark Hut Road
Route Assessment

DRAWN: MW
DATE: 04/05/2021
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Load Envelope



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Height	: 5450

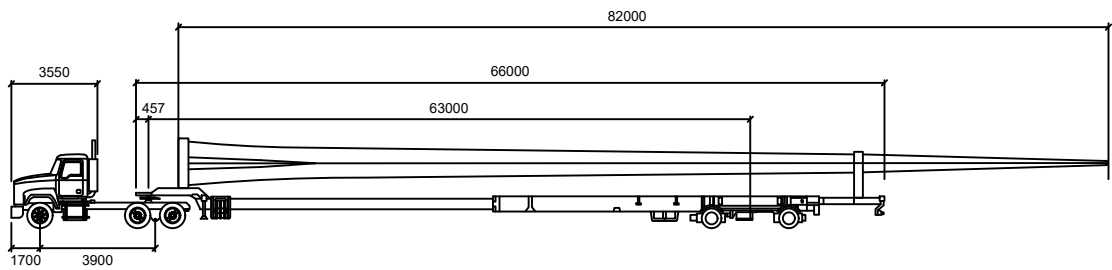
Winterbourne Wind Farm
Bark Hut Road
Route Assessment

DRAWN: MW
DATE: 04/05/2021
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DWG NO: 100-S01G

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Height	: 5450

Winterbourne Wind Farm
Bark Hut Road
Route Assessment

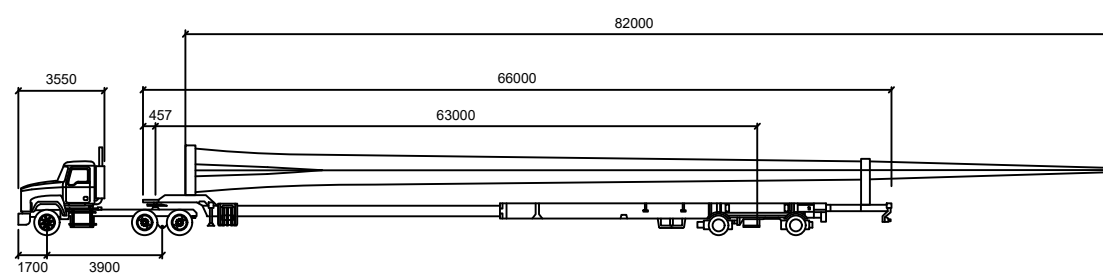
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SCALE: 1:2000 @ A3
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Vehicle Envelope

Load Envelope



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Winterbourne Wind Farm

Bark Hut Road

Route Assessment

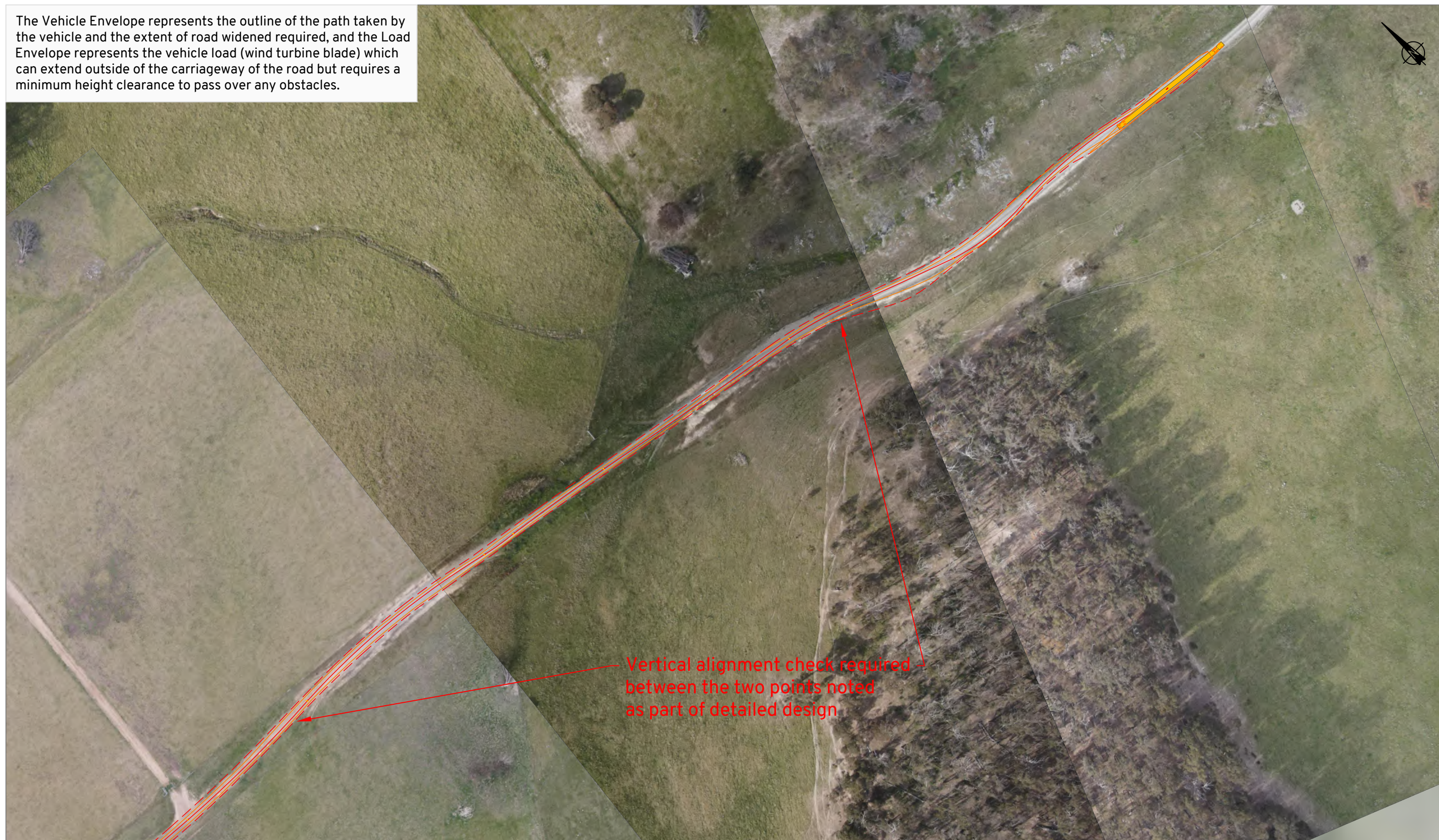
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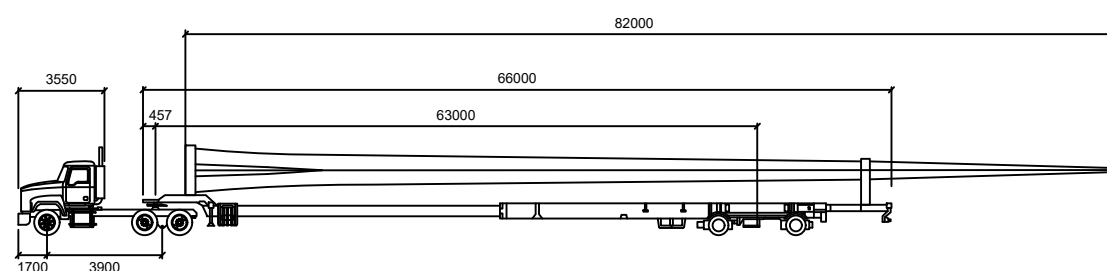
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Vehicle Envelope

Load Envelope



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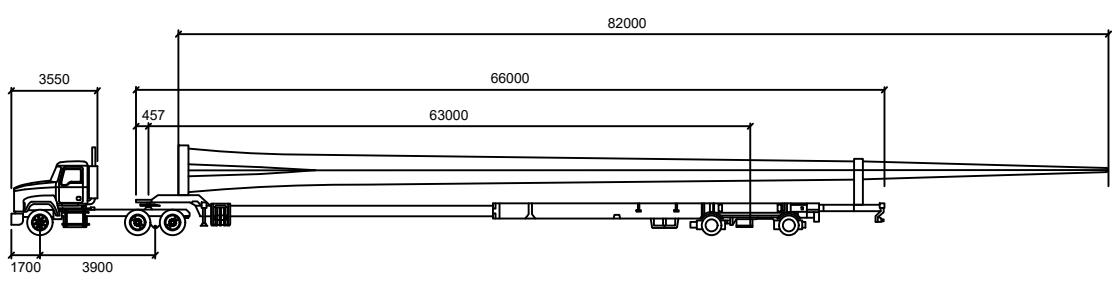
Winterbourne Wind Farm Bark Hut Road Route Assessment

DRAWN: MW
DATE: 04/05/2021
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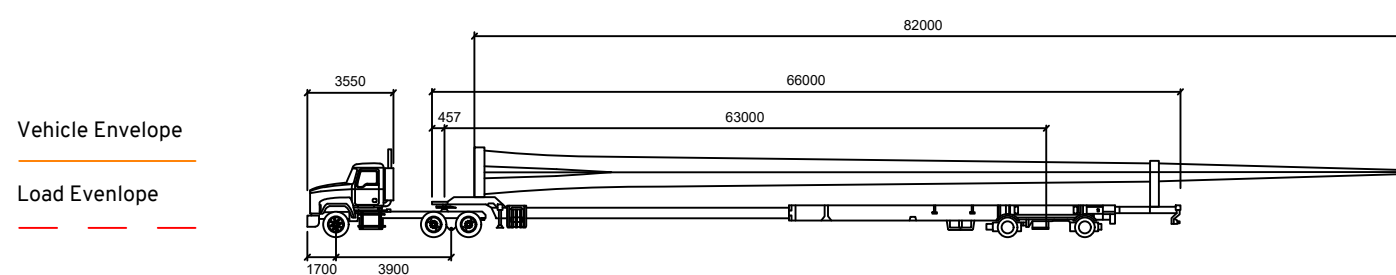
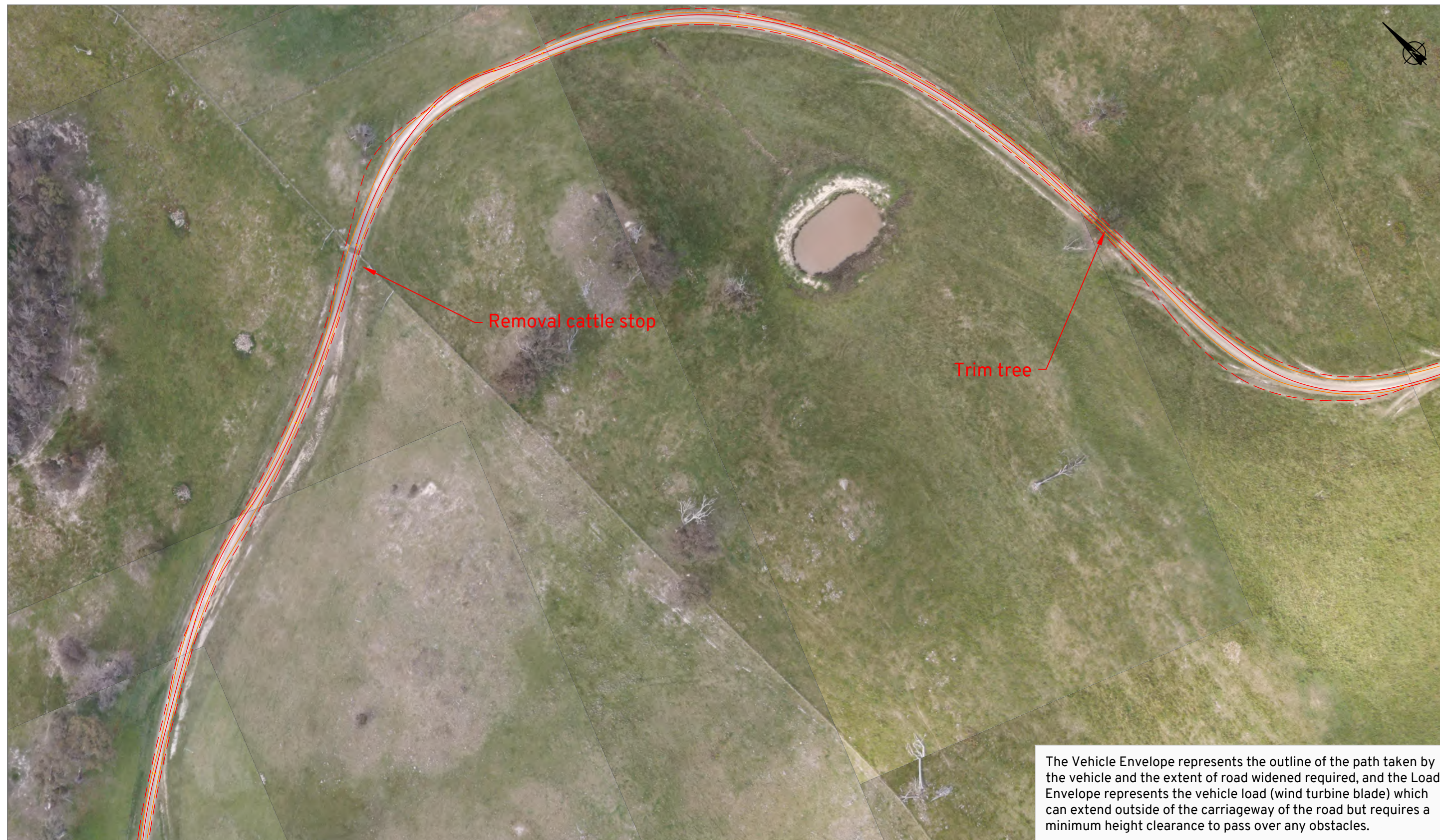
Vehicle Envelope
Load Evenlope



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Winterbourne Wind Farm
Bark Hut Road
Route Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:2000 @ A3
DWG NO: 100-S01G



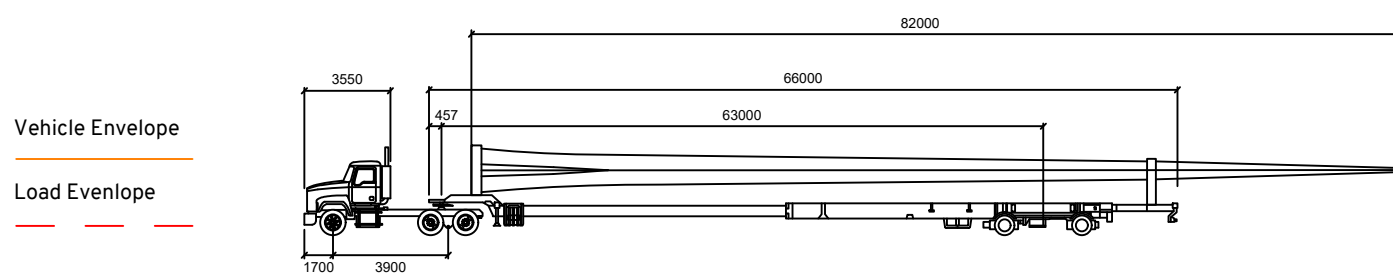
Winterbourne Blade Transport Vehicle

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Tractor Width	: 2550
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Load Width	: 5320
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Winterbourne Wind Farm Bark Hut Road Route Assessment

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SCALE: 1:2000 @ A3
DWG NO: 100-S01G



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Winterbourne Wind Farm Bark Hut Road Route Assessment

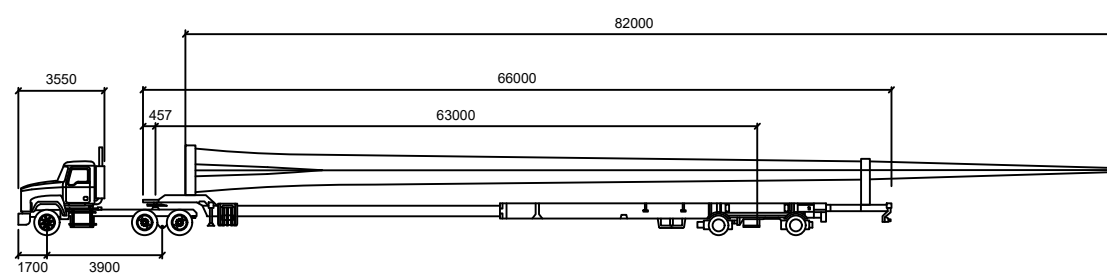
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Vehicle Envelope

Load Envelope



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Winterbourne Wind Farm

Bark Hut Road

Route Assessment

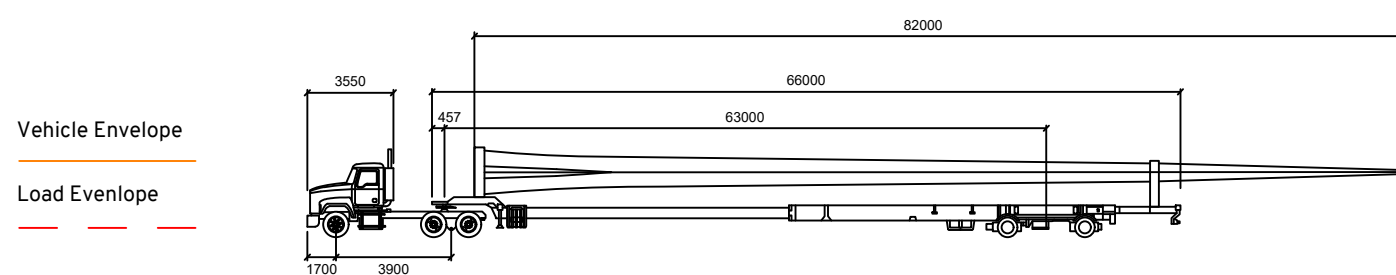
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DATE: 04/05/2021

SCALE: 1:2000 @ A3

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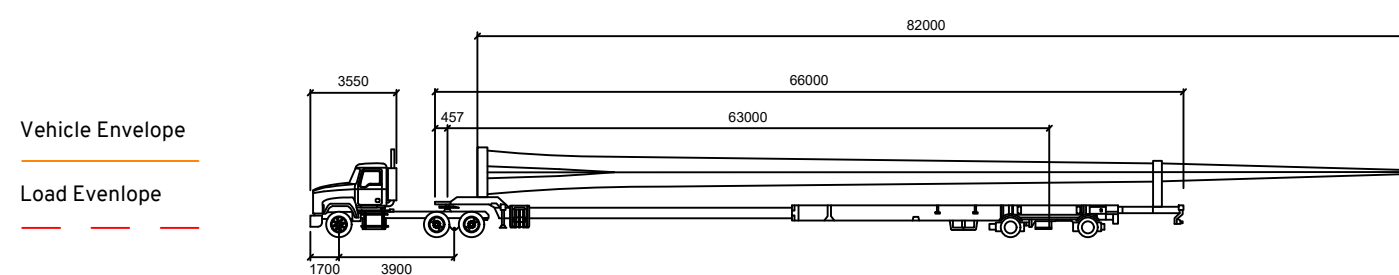
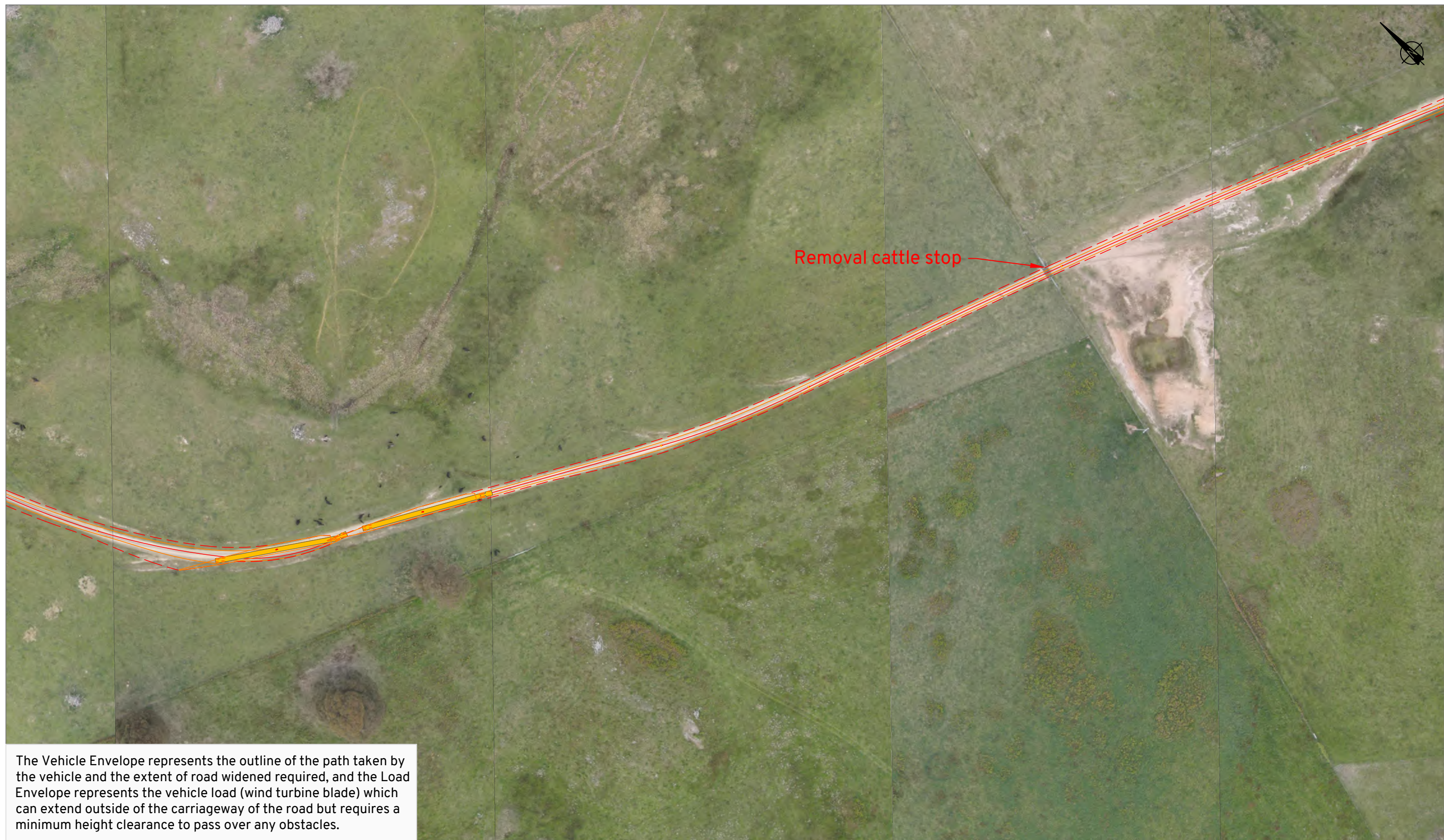


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Winterbourne Wind Farm Bark Hut Road Route Assessment

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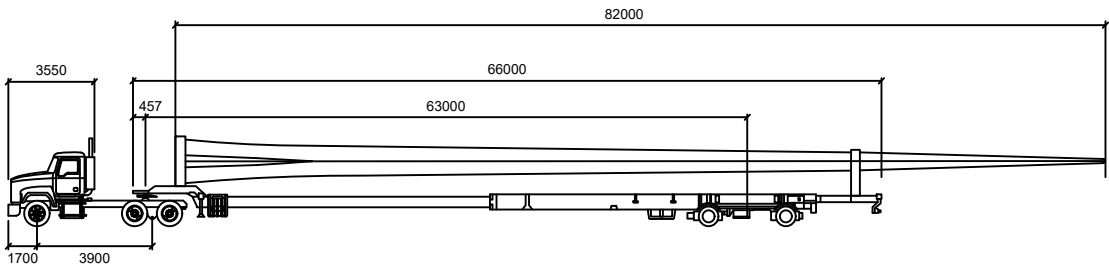
Winterbourne Wind Farm Bark Hut Road Route Assessment

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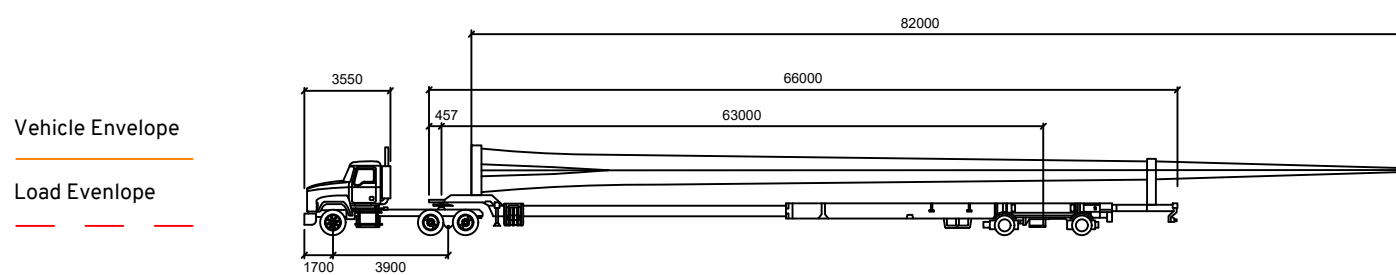
Vehicle Envelope
Load Envelope



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Winterbourne Wind Farm
Bark Hut Road
Route Assessment

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DATE: 04/05/2021
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Winterbourne Wind Farm Bark Hut Road Route Assessment

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DATE: 04/05/2021
SCALE: 1:2000 @ A3
DWG NO: 100-S01G

Appendix G

Guidelines for Assessing Intersection Performance

The *RTA Guide to Traffic Generating Developments* (October 2002, Issue 2.2), details the assessment of intersections. The assessment of the level of service of an intersection is based on the evaluation of the following Measures of Effectiveness:

- Average delay (seconds/veh) (all forms of control)
- Delay to critical movement (seconds/veh) (all forms of control)
- Degree of saturation (traffic signals and roundabouts)
- Cycle length (traffic signals)

SIDRA was used to calculate the relevant intersection parameters. The SIDRA software is an advanced lane-based micro-analytical tool for design and evaluation of individual intersections and networks of intersections including modelling of separate movement classes (light vehicles, heavy vehicles, buses, cyclists, large trucks, light rail / trams and so on). It provides estimates of capacity, level of service and a wide range of performance measures, including; delay, queue length and stops for vehicles and pedestrians, as well as fuel consumption, pollution emissions and operating costs.

It can be used to analyse signalised intersections (fixed-time / pretimed and actuated), signalised and unsignalised pedestrian crossings, roundabouts (unsignalised), roundabouts with metering signals, fully-signalised roundabouts, two-way stop sign and give-way / yield sign control, all-way stop sign control, single point interchanges (signalised), freeway diamond interchanges (signalised, roundabout, sign control), diverging diamond interchanges and other alternative intersections and interchanges. It can also be used for uninterrupted traffic flow conditions and merge analysis.

The best indicator of the level of service at an intersection is the average delay experienced by vehicles at that intersection. For traffic signals, the average delay over all movements should be taken. For roundabouts and priority control intersections (with Stop and Give Way signs or operating under the T-junction rule) the critical movement for level of service assessment should be that with the highest average delay.

With traffic signals, delays per approach tend to be equalised, subject to any over-riding requirements of signal co-ordination as well as to variations within individual movements. With roundabouts and priority - control intersections, the critical criterion for assessment is the movement with the highest delay per vehicle. With this type of control the volume balance might be such that some movements suffer high levels of delay while other movements have minimal delay. An overall average delay for the intersection of 25 seconds might not be satisfactory if the average delay on one movement is 60 seconds.

The average delay for level of service E should be no more than 70 seconds. The accepted maximum practical cycle length for traffic signals under saturated conditions is 120 - 140 seconds. Under these conditions 120 seconds is near maximum for two and three phase intersections and 140 seconds near maximum for more complex phase designs. Drivers and pedestrians expect cycle lengths of these magnitudes and their inherent delays in peak hours. A cycle length of 140 seconds for an intersection which is almost saturated has an average vehicle delay of about 70 seconds, although this can vary. If the average vehicle delay is more than 70 seconds, the intersection is assumed to be at Level of Service F.

Table 19 sets out average delays for different levels of service. There is no consistent correlation between definitions of levels of service for road links as defined elsewhere in this section, and the ranges set out in Table 19. In assigning a level of service, the average delay to the motoring public needs to be considered, keeping in mind the location of the intersection. For example, drivers in

inner urban areas of Sydney have a higher tolerance of delay than drivers in country areas. Table 19 provides a recommended baseline for assessment.

Table 19: Level of Service Criteria for Intersections

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 – 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 – 42	Satisfactory	Satisfactory, but accident study required
D	43 – 56	Operating near capacity	Near capacity and accident study required
E	57 – 70	At capacity Signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, require other control mode

The figures in Table 19 are intended as a guide only. Any particular assessment should take into account site-specific factors including maximum queue lengths (and their effect on lane blocking), the influence of nearby intersections and the sensitivity of the location to delays. In many situations, a comparison of the current and future average delay provides a better appreciation of the impact of a proposal, and not simply the change in the level of service.

Appendix H

Concept of Level of Service

An important consideration in determining the impact of a development proposal on the road system is to assess the effect on traffic efficiency, the objective of which is to maintain the existing level of service. Level of Service is defined within the *Austrroads Guide to Traffic Management Part 3: Traffic Studies and Analysis* as:

‘... a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level of service definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience, and safety.’

Levels of service are designated from A to F from best (free flow conditions) to worst (forced flow with stop start operation, long queues and delays) as follows:

Table 20: Level of Service Definition for Uninterrupted Traffic Flow

Level of Service	Description
A	A condition of free-flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.
B	In the zone of stable flow where drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is a little less than with level of service A.
C	Also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.
D	Close to the limit of stable flow and approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.
E	Traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause breakdown.
F	In the zone of forced flow, where the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow breakdown occurs, and queuing and delays result.

Austrroads provides the following discussion when referring to two-way rural roads:

‘Two-lane rural roads have one lane for use by traffic travelling in each direction. Overtaking of slower vehicles requires the use of the opposing traffic lane when sight distance and gaps in the opposing traffic stream permit. At low traffic volumes and under ideal conditions, drivers are able to travel at their desired speed without interference. As traffic volumes increase, and as roadway, terrain and traffic conditions become less than ideal, drivers are increasingly affected by the presence of other vehicles on the road, and bunches form in the traffic stream. Vehicles in these bunches are subjected to delay because of the inability to overtake slower moving vehicles.’

The guide also differentiates rural roads into the following three categories:

Table 21: Level of Service Definition for Uninterrupted Traffic Flow

Category	Description
Class I	These are two-lane highways on which motorists expect to travel at relatively high speeds. Two-lane highways that are major intercity routes, primary arterials connecting major traffic generators, daily commuter routes, or primary links in state or national highway networks generally are assigned to Class I. Class I facilities most often serve long-distance trips or provide connecting links between facilities that serve long-distance trips.
Class II	These are two-lane highways on which motorists do not necessarily expect to travel at high speeds. Two-lane highways that function as access routes to Class I facilities, serve as scenic or recreational routes that are not primary arterials, or pass through rugged terrain generally are assigned to Class II. Class II facilities most often serve relatively short trips, the beginning and ending portions of longer trips, or trips for which sightseeing plays a significant role.
Class III	These are two-lane highways serving moderately developed areas. They may be portions of a Class I or Class II highway that pass through small towns or developed recreational areas. On such segments, local traffic often mixes with through traffic, and the density of unsignalised roadside access points is noticeably higher than in a purely rural area. Class III highways may also be longer segments passing through more spread-out recreational areas, also with increased roadside densities. Such segments are often accompanied by reduced speed limits that reflect the higher activity level.

The three classes of road perform markedly different functions and are not totally dependent on the highway's role in the hierarchy. A highway between major urban centres through mountainous terrain might be classified as Class II instead of Class I if it is established that drivers appreciate that higher speeds are inappropriate.

The level of Service (LOS) criteria used for the different highway classes differ. The Austroads Guide notes that:

- The LOS for Class I highways on which efficient mobility is paramount is defined in terms of both percent time-spent-following and average travel speed.
- On Class II highways, mobility is less critical, and LOS is defined only in terms of percent time-spent-following.
- On Class III highways, high speeds are not expected. Because the length of Class III segments is generally limited, passing restrictions are also not a major concern. In these cases, drivers would like to make steady progress at or near the speed limit. Therefore, on these highways, per cent free-flow speed is used to define LOS.

Determining the LOS based on percent time-spent-following and average travel speeds is suitable when reviewing existing traffic conditions as they can be measured by on-site observations and measurements. However, the value of these criteria are difficult to estimate when trying to predict the impact generated by an increase in traffic on the road network. As an alternative, the LOS can be determined based on the service volume of the particular section of road and the expected traffic volume on that section of road.

A service volume, as defined by Austroads, is the maximum number of vehicles that can pass over a given section of roadway in one direction over one hour while operating conditions are maintained at a specified level of service. The *RTA Guide to Traffic Generating Developments*, dated October 2002, suggests that ideally rural roads should not exceed service volumes at Level of Service C. At this level, whilst most drivers are restricted in their freedom to manoeuvre,

operating speeds are still reasonable and acceptable delays experienced. However, on weekends roads operating at Level of Service D are still considered adequate.

Table 4.5 of the RTA Guide sets out two-way hourly road capacities for two-lane roads for different levels of service, with a design speed of 100 km/hr, based on different terrain types. The capacity assumes a 60/40 directional split of traffic. Where design speeds of 80 km/hr are used, the resulting capacities are between 85-95% of the figures quoted, depending on the level of service. Single lane capacities are affected by overtaking opportunities. The table is provided below.

Table 22: Peak Hour Flow on Two-Lane Rural Road for 100km/hr Design Speed (vph)

Terrain	Level of Service	Percentage of Heavy Vehicles			
		0%	5%	10%	15%
Level	B	630	590	560	530
	C	1030	970	920	870
	D	1630	1550	1480	1410
	E	2630	2500	2390	2290
Rolling	B	500	420	360	310
	C	920	760	650	570
	D	1370	1140	970	700
	E	2420	2000	1720	1510
Mountainous	B	340	230	180	150
	C	600	410	320	260
	D	1050	680	500	400
	E	2160	1400	1040	820

The data for Table 4.5 assumes the following criteria:

- Level terrain has 20% no overtaking opportunities.
- Rolling terrain has 40% no overtaking opportunities.
- Mountainous terrain has 60% no overtaking opportunities.
- 3.7 metre traffic lane width with side clearances of at least 2.0 metres.
- 60:40 directional split of traffic.

For the purposes of assessing the gravel road network it has conservatively been assumed that the capacity of the road has been reduced by 50% which has been applied when calculating the levels of service.

Appendix I

Intersection Swept Path Assessment

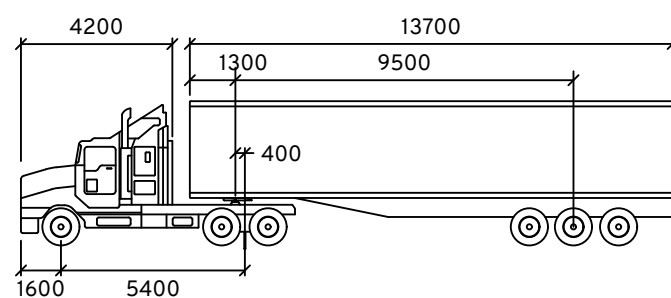




Vehicle Envelope

300mm Clearance

AV



Tractor Width : 2500 mm
Trailer Width : 2500
Tractor Track : 2500
Trailer Track : 2500
Lock to Lock : 6.0s
Steering Angle : 28.3
Articulating Angle : 70.0

Winterbourne Wind Farm

Thunderbolts Way / Jamieson Street Intersection

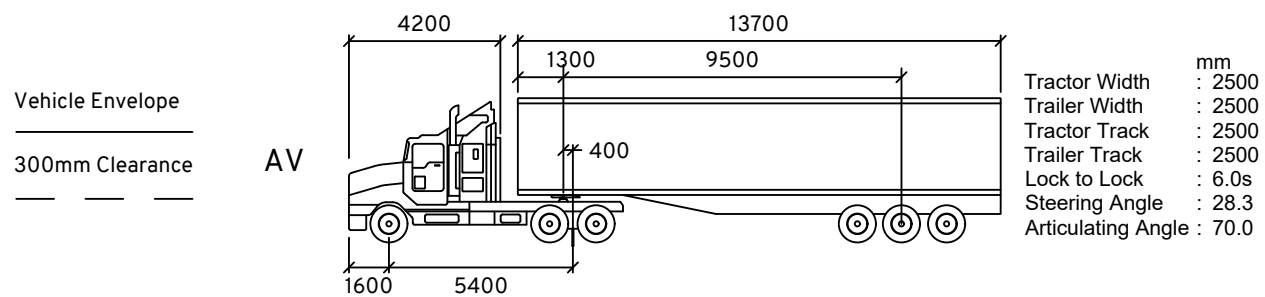
Swept Path Assessment

DRAWN: MW

DATE: 18/09/2021

SCALE: 1:500 @ A3

DWG NO: 100-S01C



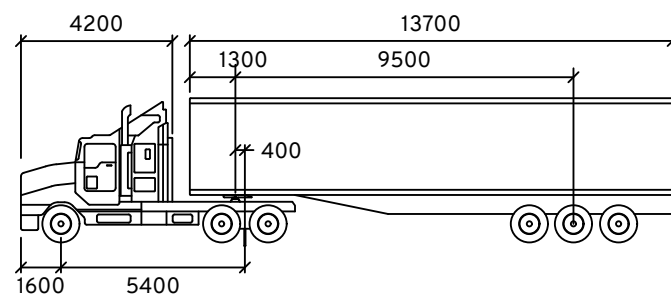
Winterbourne Wind Farm
Thunderbolts Way / Jamieson Street Intersection
Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:500 @ A3
DWG NO: 100-S01C



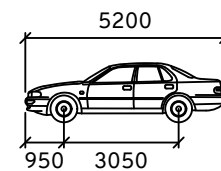
Vehicle Envelope
 ———
 300mm Clearance
 ———

AV



Tractor Width : 2500 mm
 Trailer Width : 2500
 Tractor Track : 2500
 Trailer Track : 2500
 Lock to Lock : 6.0s
 Steering Angle : 28.3
 Articulating Angle : 70.0

B99



Width : 1940 mm
 Track : 1840
 Lock to Lock : 6.0s
 Steering Angle : 33.9

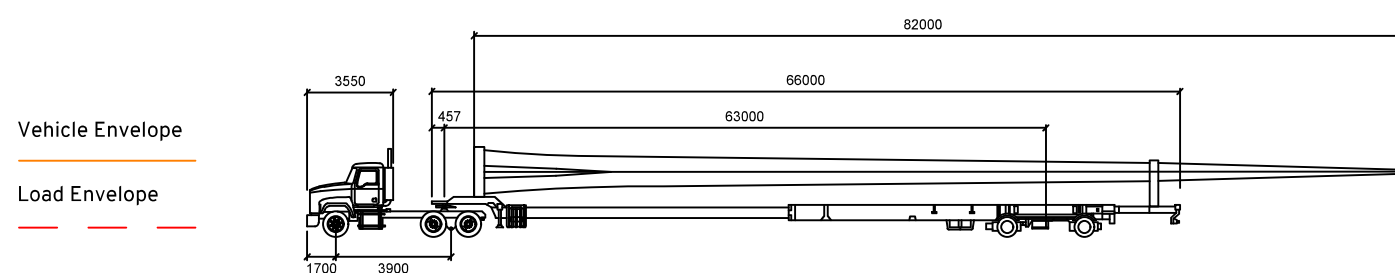
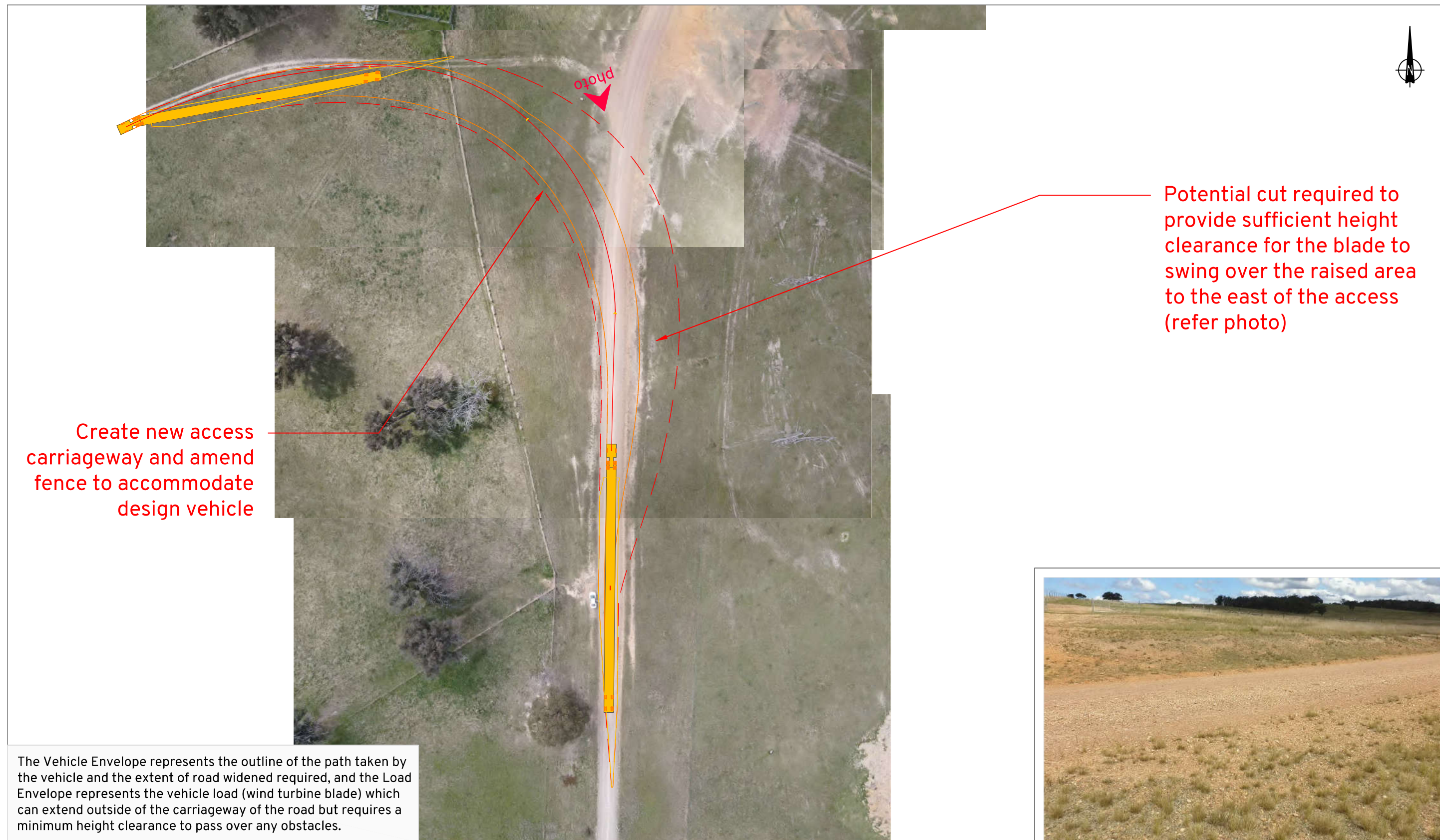
Winterbourne Wind Farm
 Thunderbolts Way / Jamieson Street Intersection
 Swept Path Assessment

DRAWN: MW
 DATE: 18/09/2021
 SCALE: 1:500 @ A3
 DWG NO: 100-S01C

Appendix J

Access Swept Path Assessment





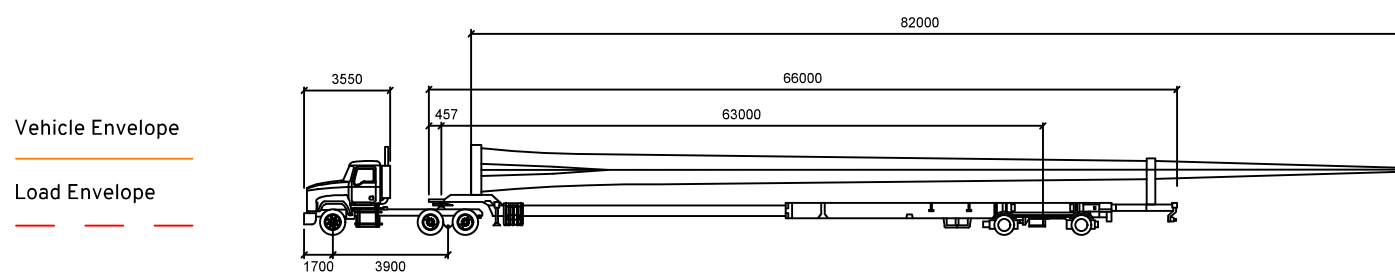
Winterbourne Blade Transport Vehicle

Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Access 1 - Blue Mountain Road Swept Path Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01C



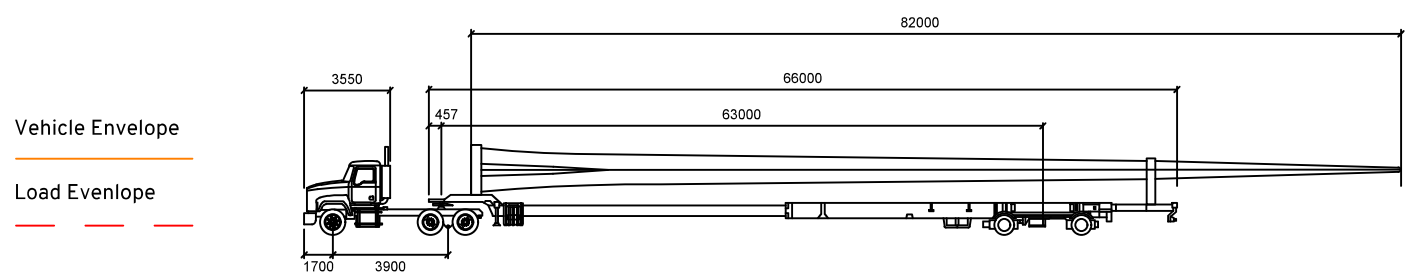
Winterbourne Blade Transport Vehicle

Tractor Width	mm
Trailer Width	2550
Load Width	2550
Total Length	5320
	96760

Lock to Lock Time	6.0
Steering Angle	30.0
Articulating Angle	70.0
Height	5450

Winterbourne Wind Farm Access 2 - Blue Mountain Road Swept Path Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01C

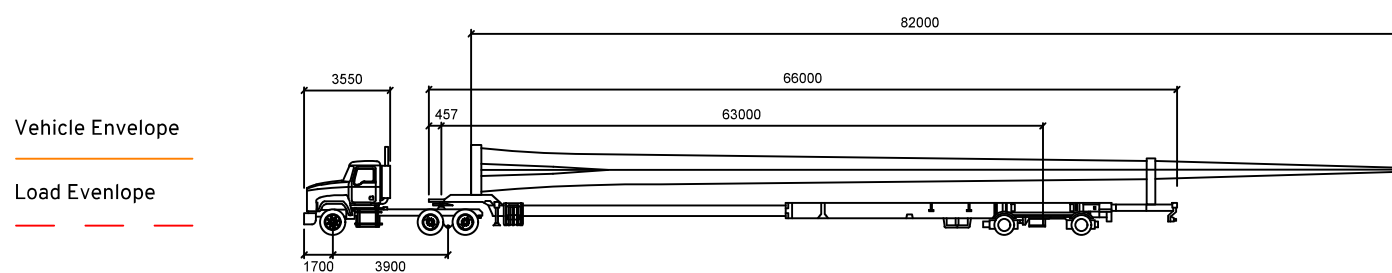


Winterbourne Blade Transport Vehicle

	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760
Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm
Access 3 - Winterbourne Road
Swept Path Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01B



Winterbourne Blade Transport Vehicle

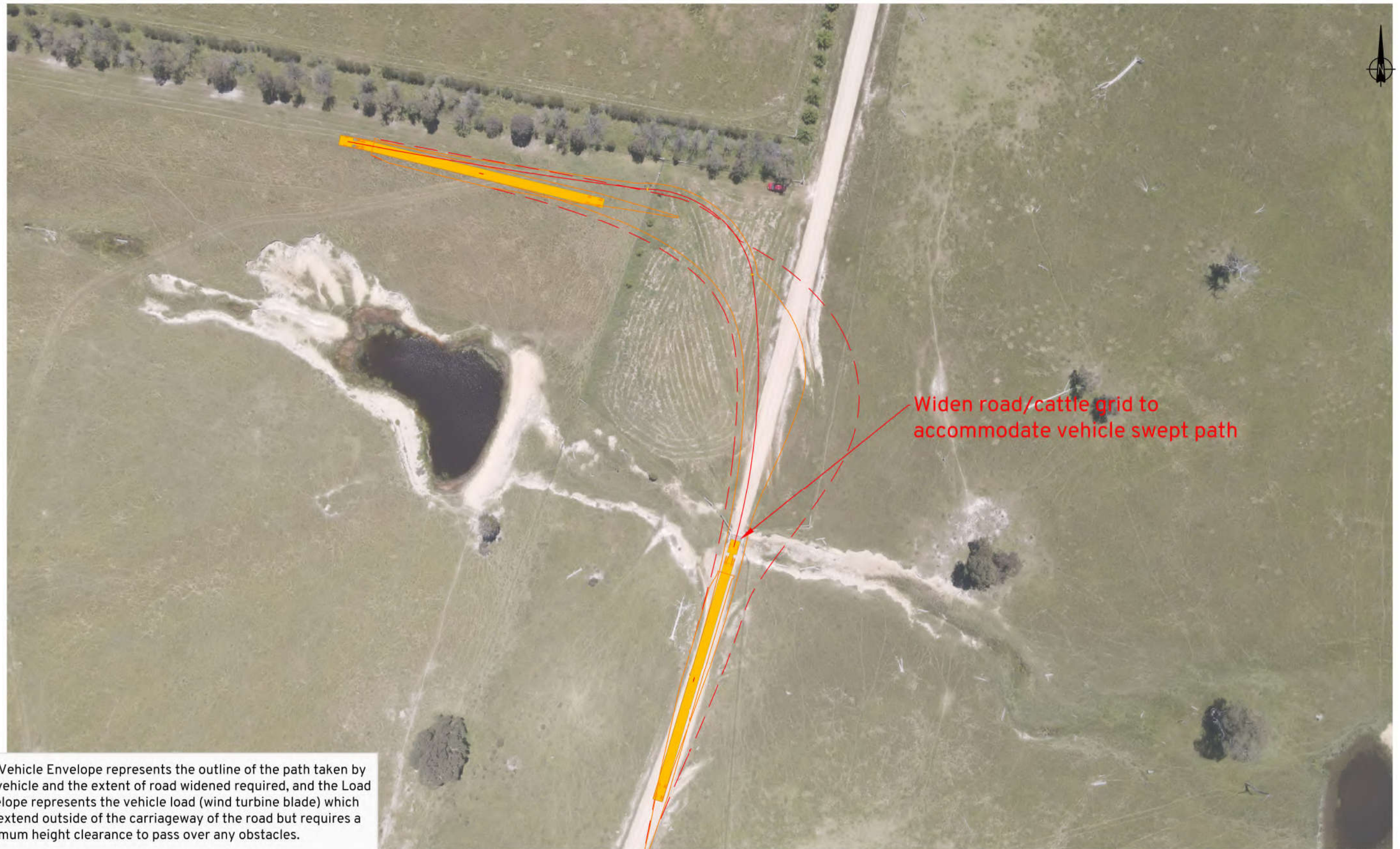
	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

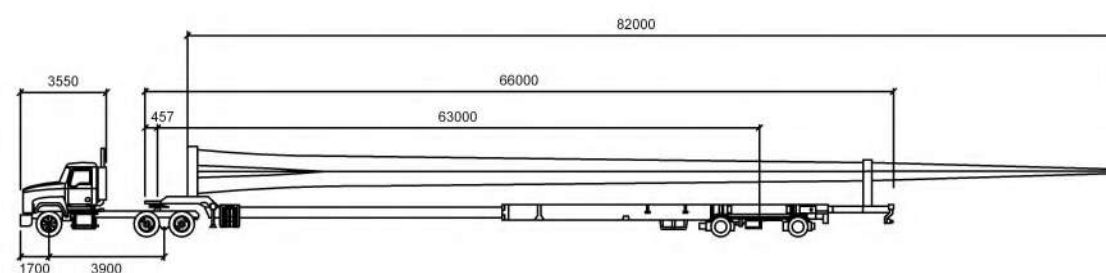
Winterbourne Wind Farm Access 4 - Winterbourne Road Swept Path Assessment

DRAWN: MW
DATE: 04/05/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01B





Vehicle Envelope
Load Envelope

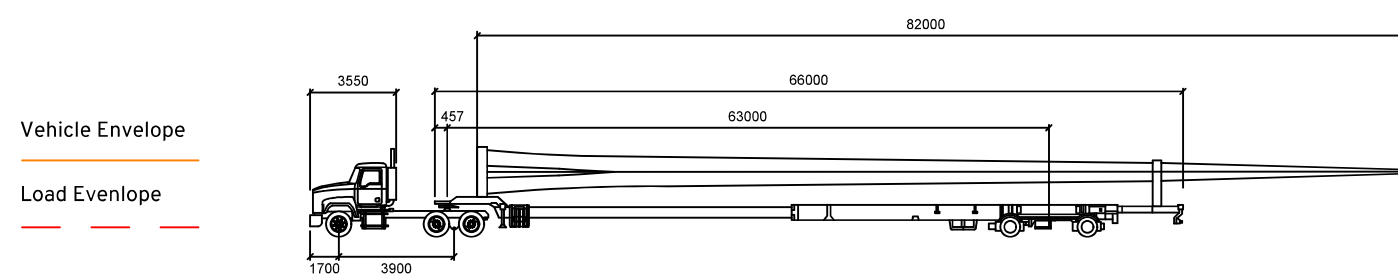
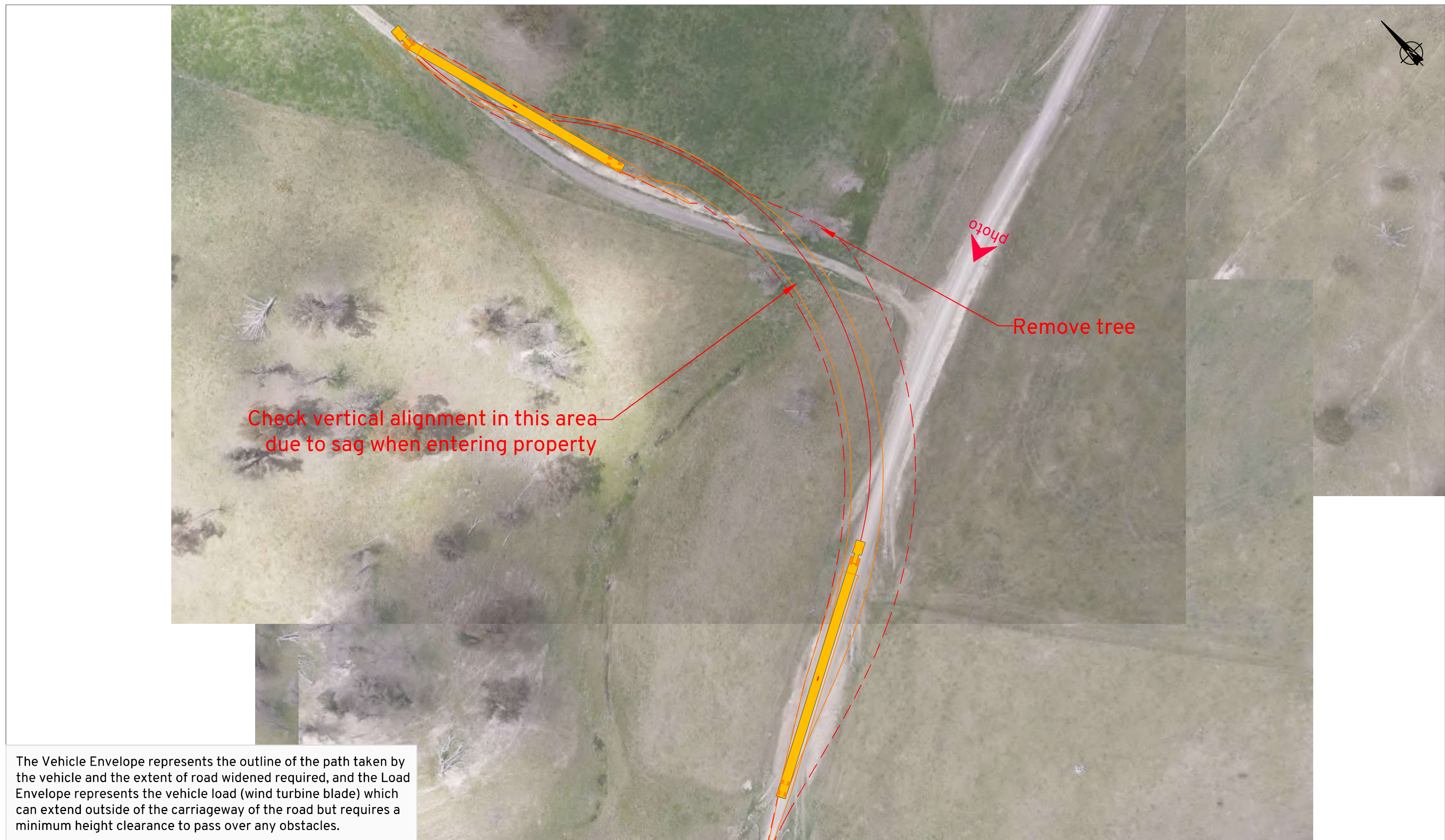


Winterbourne Blade Transport Vehicle

	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760
Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Access 5 - Uruga Road Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01C



Winterbourne Blade Transport Vehicle

Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm

Access 6 - Table Top Road

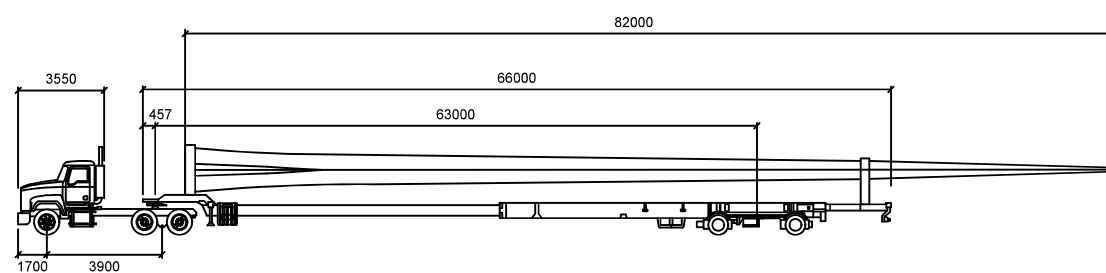
Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01D



Vehicle Envelope

Load Envelope



Winterbourne Blade Transport Vehicle

Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm

Access 7 - Table Top Road

Swept Path Assessment

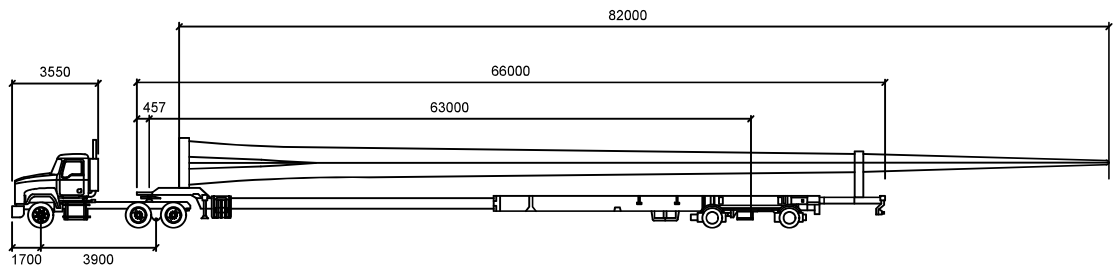
DRAWN: MW
DATE: 18/09/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01D



The Vehicle Envelope represents the outline of the path taken by the vehicle and the extent of road widened required, and the Load Envelope represents the vehicle load (wind turbine blade) which can extend outside of the carriageway of the road but requires a minimum height clearance to pass over any obstacles.



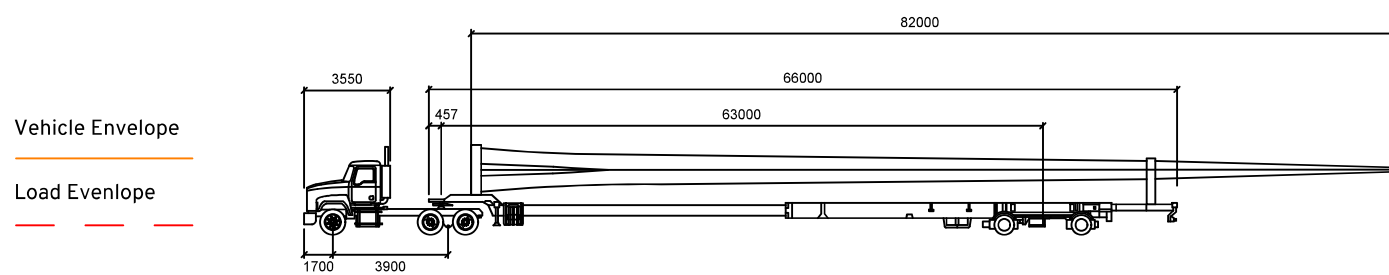
Vehicle Envelope
Load Envelope



Winterbourne Blade Transport Vehicle	
Tractor Width	2550 mm
Trailer Width	2550 mm
Load Width	5320 mm
Total Length	96760 mm
Lock to Lock Time	6.0
Steering Angle	30.0
Articulating Angle	70.0
Height	5450 mm

Winterbourne Wind Farm
Access 8 - Bark Hut Road
Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01H



Winterbourne Blade Transport Vehicle

Tractor Width	mm
Trailer Width	2550
Load Width	2550
Total Length	5320
	96760

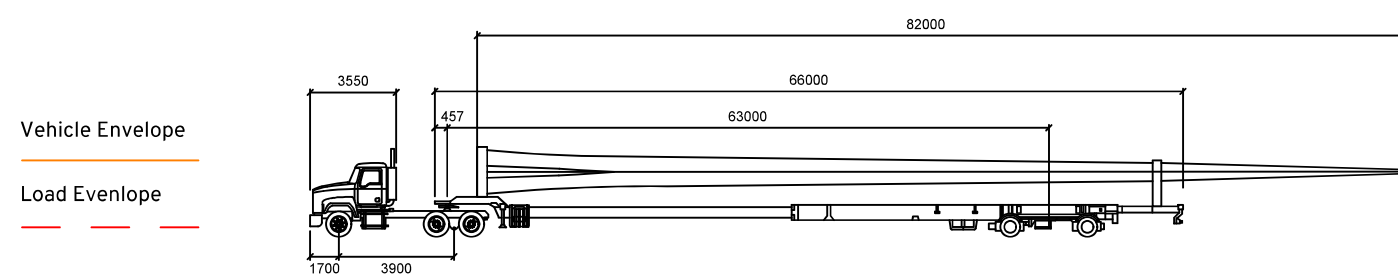
Lock to Lock Time	6.0
Steering Angle	30.0
Articulating Angle	70.0
Height	5450

Winterbourne Wind Farm

Access 9 - Bark Hut Road

Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01H



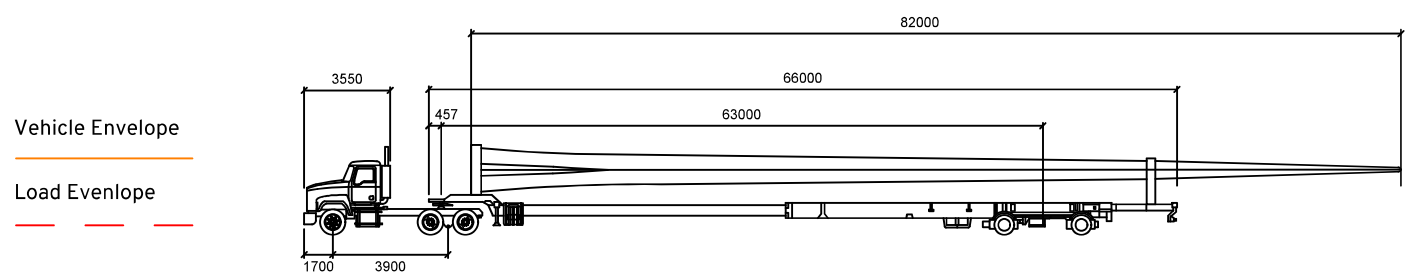
Winterbourne Blade Transport Vehicle

	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Access 10 - Bark Hut Road Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01H



Winterbourne Blade Transport Vehicle	
Tractor Width	mm
Trailer Width	2550
Load Width	5320
Total Length	96760
Lock to Lock Time	6.0
Steering Angle	30.0
Articulating Angle	70.0
Height	5450

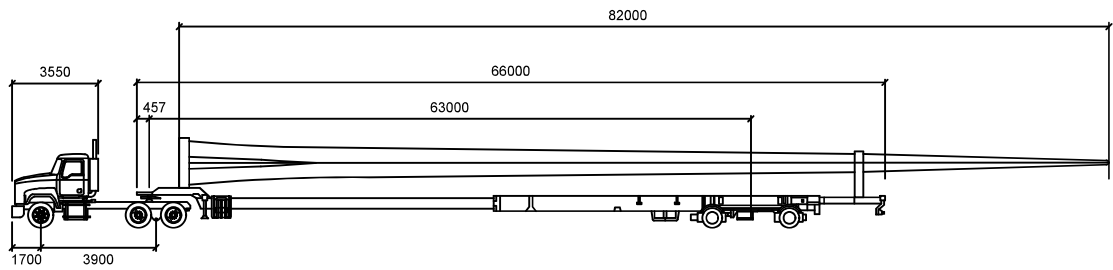
Winterbourne Wind Farm Access 11 - Bark Hut Road Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01H

The Vehicle Envelope represents the outline of the path taken by the vehicle and the extent of road widened required, and the Load Envelope represents the vehicle load (wind turbine blade) which can extend outside of the carriageway of the road but requires a minimum height clearance to pass over any obstacles.



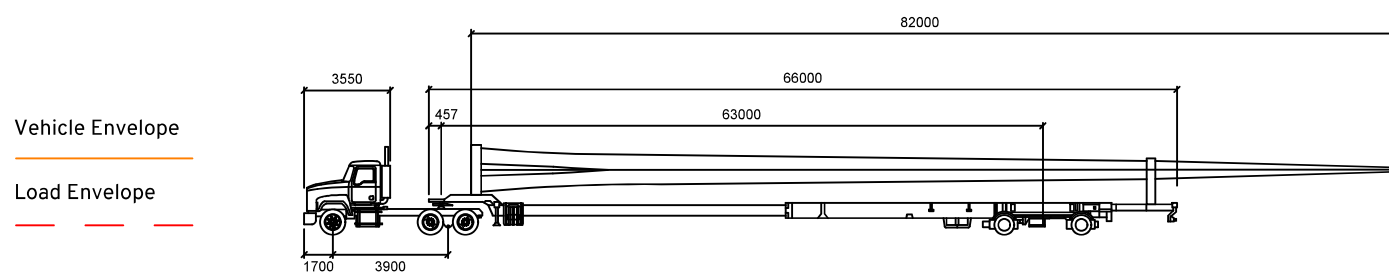
Vehicle Envelope
Load Envelope



Winterbourne Blade Transport Vehicle	
	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760
Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm
Access 12 - Bark Hut Road
Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:1000@ A3
DWG NO: 100-S01H



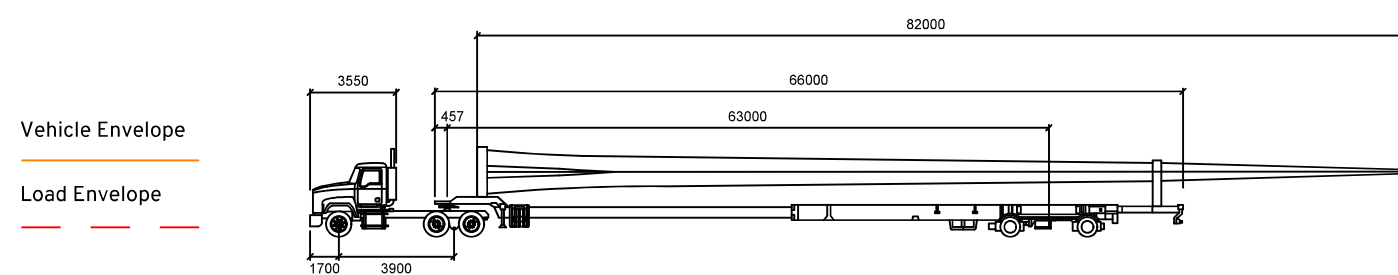
Winterbourne Blade Transport Vehicle

Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Access 17 - Moona Plains Road Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:1000@ A3
DWG NO: 100-S02C



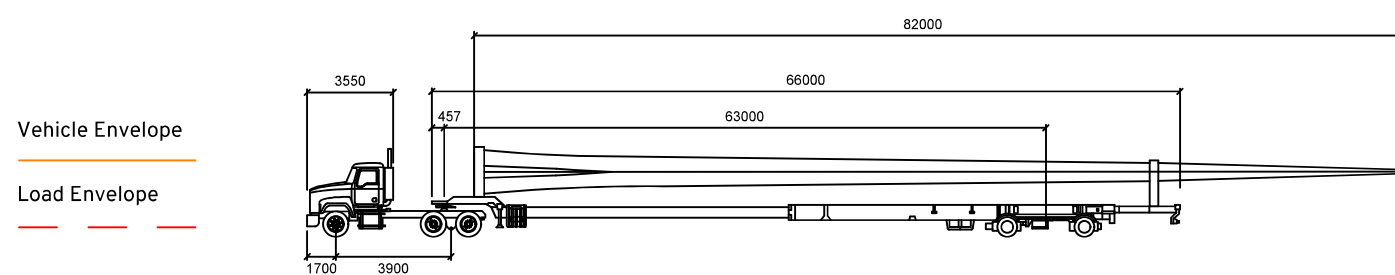
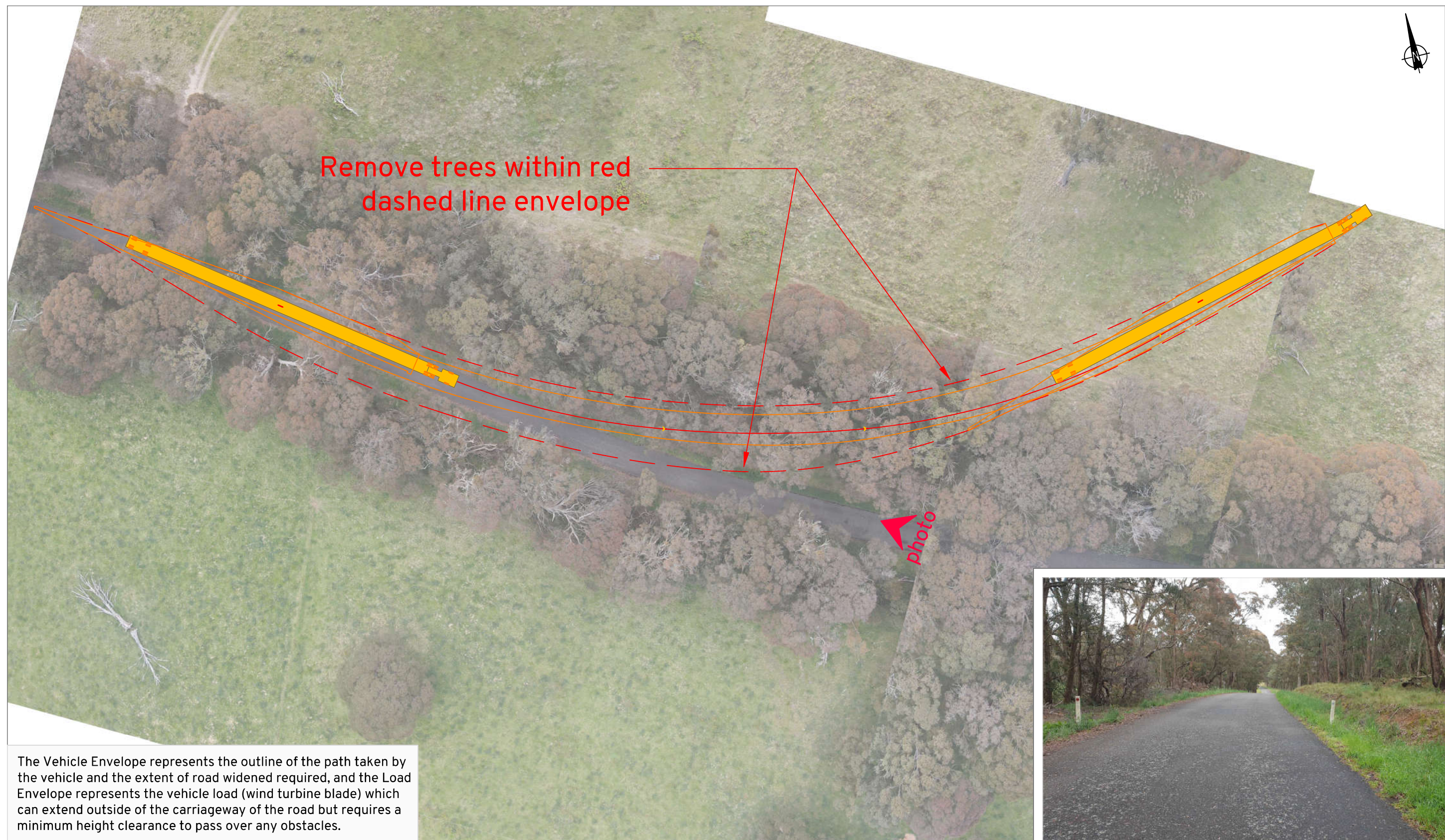
Winterbourne Blade Transport Vehicle

	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Access 18 - Moona Plains Road Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:1000@ A3
DWG NO: 100-S02C



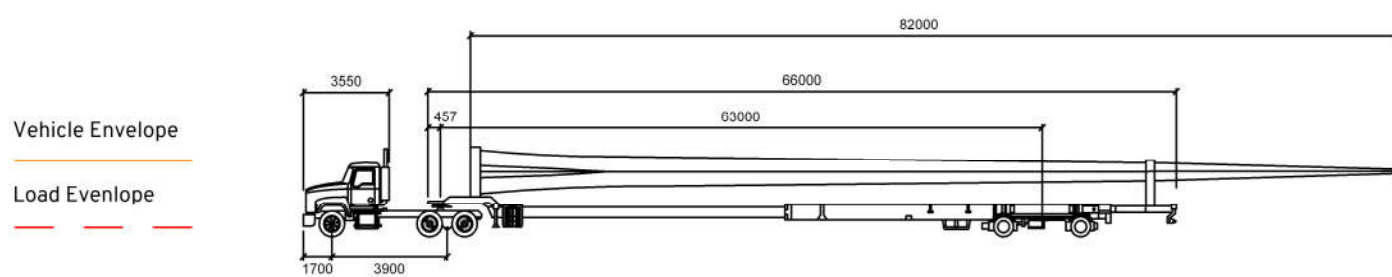
Winterbourne Blade Transport Vehicle

Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm Access 19 - Moona Plains Road Swept Path Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:750 @ A3
DWG NO: 100-S02C



Winterbourne Blade Transport Vehicle

	mm
Tractor Width	: 2550
Trailer Width	: 2550
Load Width	: 5320
Total Length	: 96760

Lock to Lock Time	: 6.0
Steering Angle	: 30.0
Articulating Angle	: 70.0
Height	: 5450

Winterbourne Wind Farm

Accesses 21 and 22 - Rowleys Creek Road
Route Assessment

DRAWN: MW
DATE: 18/09/2021
SCALE: 1:2500 @ A3
DWG NO: 100-S01C

Appendix K

Response to TfNSW Comments

Table 23: Response to TfNSW SEARs Comments

SEARs	Response
We note that section 7.2.1 of the Scoping Report lists two major options for transport of the wind farm components from the Port of Newcastle. It is imperative that the EIS address the impact on the State, Regional and local road infrastructure from the point of origin to the site, and we commend the developer for recognising this requirement. We look forward to seeing an expansion of these options in the EIS, noting which is the preferred option.	A Route Assessment has been provided within Section 5, which demonstrates that the transport of large plant can be undertaken in a safe manner, with minimal impact to the road network.
The EIS should adequately demonstrate that the chosen route can safely accommodate the type of vehicles proposed. This should include the nature and dimensions of the components and the pinch-points to be encountered en-route. In particular it should detail how the 90m long blades can be transported through towns and city environments such as Tamworth (especially Scotts Road). Details of swept paths and the eventual turning points from the Highway will also be critical.	A Route Assessment has been prepared by Rex J Andrews which details how the larger plant will be delivered from the Port of Newcastle to the site, and includes a swept path assessment at critical locals. The assessment is provided within Appendix A.
In order to provide the detail required to assess the proposal, TfNSW requests that a Traffic Impact Assessment (TIA) be prepared by suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and RTA Guide to Traffic Generating Developments. The TIA should include, but not necessarily be limited to, an assessment of the considerations outlined in Attachment A.	This document addresses the requirement to provide a Traffic Impact Assessment. An assessment against the considerations outlined within Attachment A of the TfNSW letter is provided below in Table 24.
It is likely that TfNSW will require a commitment from the applicant/developer to provide funding for the maintenance and repair of any affected classified roads for the duration of transportation of oversize/over-mass vehicles and loads. This should be recognised and addressed in the development application. All and any works associated with the project, including consultation and planning are to be at no cost to TfNSW.	Recommendations regarding maintenance and repair of the road network is provided within this document. Any requirements will be further documented within the TMP to be prepared by the appointed contractor.

A response is also provided in regard to the considerations outlined within Attachment A of the TfNSW letter.

Table 24: Response to TfNSW Attachment A Comments

SEARs	Response
A detailed map of the proposed transport route/s from point of origin to the site. The map (or associated documentation) should identify any proposed road closures necessary to accommodate the oversize vehicles; any removal or replacement of road infrastructure, or upgrading of road infrastructure.	A Route Assessment has been prepared which details how the larger plant will be delivered from the Port of Newcastle to the Project and includes maps of the proposed access route options. The assessment is provided within Appendix A. A Route Assessment has been provided within Section 5, which discusses the transport route from the Port of Newcastle to the Project. Further details regarding road closures or infrastructure upgrades will be provided as part of the TMP to be prepared by the appointed contractor

The total impact of existing and proposed development on the road network with consideration for a 10 year horizon. This should include;	
Identify Annual Average Daily Traffic (AADT) volumes with percentage heavy vehicles along the transport route/s and diagrammatically demonstrate AM and PM peak hour movements at key intersections.	The Project and future traffic volumes along the road network are provided within Figure 9 and Figure 10. The traffic volumes at the intersection of Thunderbolts Way and Jamieson Street are provided within Figure 11.
Background traffic data from published sources and/or recent survey data. The source of data and any assumptions are to be clearly explained and justified, including the growth rate applied to the future horizon.	Survey data for the road network has been obtained from the TfNSW Traffic Volume Viewer and Walcha Council. The traffic volumes are presented in Section 4.4.
The volume and distribution of proposed trips to be generated by the construction, operational and decommission phases of the development. This should identify the maximum daily and hourly demands generated by the development, particularly where they coincide with the network peak hour.	Overall, it is anticipated that during peak construction the Project could generate up to 288 heavy and 270 light vehicle movements per day. Section 6.1 and Section 6.2 summarise the traffic movement and distribution generated by the Project.
The type and frequency of design vehicles accessing the development site, and the dimensions of the wind farm components to be carried. In particular, details of the following should be provided: • Maximum blade length, • Maximum blade overhang length, • Minimum overhang heights above the road surface, • Wheelbase dimensions, • Minimum mid-wheelbase height clearance, • Maximum load widths, • Maximum load heights (clearance to overhead obstructions such as structures, utilities and vegetation), • Maximum trailer articulation angle(s), • Axle loads and axle group loads in terms of both tonnes and Equivalent Standard Axles (refer to Austroads Guide to Pavement Technology).	Details regarding the OSOM vehicles is provided within Section 5 and the Route Assessment prepared by Rex J Andrews, which is provided within Appendix A.
Details of the relevant road geometry and alignment along the identified transport route/s, including existing formations, crossings, intersection treatments and any identified hazards or constraints (such as bridges, narrow pinch points, culverts, etc). This should include;	Details regarding the OSOM vehicles is provided within Section 5 and the Route Assessment prepared by Rex J Andrews, which is provided within Appendix A.
Available sight distances at relevant intersections along the proposed transport routes and any constraint to achieving the required sight distance for the posted speed limit.	The available sight distance at the intersection of Thunderbolts Way and Jamieson Street exceeds the requirements of the Austroads Guide. Further, the sight distance at the access locations generally complies with the requirements of the Austroads Guide.

An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for intersections along the identified transport route/s, identifying the existence of the minimum basic turn treatments and addressing the need for any warranted higher order treatments.	The intersection of Thunderbolts Way and Jamieson Street is essentially provided with a BAL and a BAR turning treatment which meets the requirements of the Austroads Guide.
Swept path analysis demonstrating the largest design vehicle travelling to the site; entering and leaving the development; and moving in each direction through intersections along the proposed transport route/s.	A swept path assessment has been provided within the Route Assessment for all critical intersections. Further, a swept path assessment has been provided within Appendix K that demonstrates required road upgrades at the proposed access locations. The accesses are proposed to be designed to accommodate the largest design vehicle.
Details of any stopping bays at distances and dimensions required to accommodate the heavy vehicles proposed.	No stopping bays are proposed as part of the Project.
In addition to the above points, the TIA is to detail any staging of the development; and the time-schedule and sequence of the various vehicle types and volumes associated with any proposed development (temporary or permanent) including construction offices, workers' accommodation, concrete batch plant and operation and maintenance facility.	The construction schedule is provided within Figure 8.
For offsite sources of materials such as quarries or water sources, inclusion of any proposed material transport activities should form part of the TIA.	A breakdown of vehicle distribution is provided within Section 6.2. Exact sources of off-site material are not known at this stage and will be detailed as part of the TMP.
Capacity analysis using SIDRA or other relevant application, to identify an acceptable Level of Service (LOS) at intersections with the classified (State) road/s, and where relevant, analysis of any other intersections along the proposed transport route/s.	A SIDRA analysis has been undertaken for the intersection of Thunderbolts Way and Jamieson Street. The assessment demonstrates that the intersection is expected to continue to operate with a good level of service. Given the intersection accommodates the highest level of traffic of all the intersections used by construction vehicles within the vicinity of the site it is concluded that the intersections of the local roads northeast of Walcha are all expected to continue to operate with a good level of service.
A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.	A review of the most recent 5 year period of crash data is provided within Section 4.8 and a review of the road safety matters of the Project is provided within Section 11. Overall, the project is concluded to be able to occur in a safe manner.
Strategic (2D) design drawings of any/all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. Works must be appropriately designed for the existing posted speed limit.	The details of changes required to the state road network are detailed within the Route Assessment provided within Appendix A.

Site plan demonstrating site access, internal manoeuvring, servicing and parking areas consistent with the relevant parts of AS2890 and Council requirements.	A site plan is proposed to be included within the TMP, which will be designed in accordance with the relevant parts of AS2890 and Council requirements.
Details of measures to address impacts and/or provide connections for public transport services and active transport modes, such as, public and school bus services, walking and cycling.	School bus times have been detailed within this report and heavy vehicle deliveries are proposed to be timed so that they do not coincide with the school bus times. There are no active transport facilities within the vicinity of the site that are expected to be impacted by the Project.
Details of measures to ameliorate the impacts of road traffic noise, dust, and/or glare generated along the proposed transport route/s.	Please refer to Section 10 which details the mitigation measures for the Project which addresses these and other matters.
The impact on any rail corridor and/or rail infrastructure and crossings along the transport route.	No rail safety issues are expected as part of the Project.
Details of any Traffic Management Plan (TMP) proposed to address the construction, operation and decommission phases of the proposed development. The TMP may include temporary measures such a Traffic Control Plan (TCP) prepared and implemented by suitably qualified persons in accordance with the current Traffic Control at Work Sites Manual. It is recommended that any TMP adopt a Driver Code of Conduct, including but not necessarily limited to, the following; • A map of the primary haulage route/s highlighting critical locations. • An induction process for vehicle operators and regular toolbox meetings. • Procedures for travel through residential areas, school zones and/or bus route/s. • A complaint resolution and disciplinary procedure. • Community consultation measures proposed for peak periods.	Recommended measures to be implemented in the future TMP are provided within Section 10, which includes recommendations for a Driver Code of Conduct, and addresses these matters.
Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines.	No traffic safety concerns have been identified as part of this assessment.
Any roadwork on classified (State) road/s is to be designed and constructed in accordance with the current Austroads Guidelines, Australian Standards and TfNSW Supplements.	All road upgrades are proposed to be conducted in accordance with the current Austroads Guidelines, Australian Standards and TfNSW Supplements.