APPENDIX J TRAFFIC AND TRANSPORT ASSESSMENT

Keri Keri Wind Farm

Traffic & Transport Impact Assessment

Prepared for:

Acciona Energy Australia Global Pty Ltd

16 April 2024

The Transport Planning Partnership

Keri Keri Wind Farm

Traffic & Transport Impact Assessment

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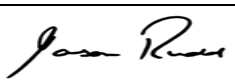
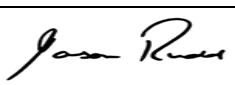
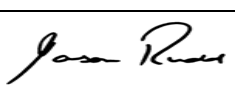
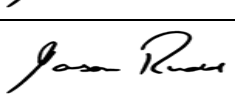
V03	17/04/2023	Sokan Chhoun	Jason Rudd	Jason Rudd	
V04	20/03/2024	Sokan Chhoun	Jason Rudd	Jason Rudd	
V05	27/03/2024	Sokan Chhoun	Jason Rudd	Jason Rudd	
V06	16/04/2024	Sokan Chhoun	Jason Rudd	Jason Rudd	

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1 Introduction

This Traffic and Transport Impact Assessment has been prepared for the Keri Keri Wind Farm (the Project) for Acciona Energy Australia Global Pty Ltd (the Applicant).

The Applicant is seeking State Significant Development (SSD) consent for the Project under Part 4, Division 4.7 of the Environmental Planning & Assessment Act 1979 (EP&A Act).

This Traffic and Transport Impact Assessment supplements the Environmental Impact Statement (EIS) prepared by Environmental Resources Management Pty Ltd (ERM) for the Project and is required to be prepared as part of the SSD consent process.

Acciona Energy Australia Global Pty Ltd proposes to construct and operate the Keri Keri Wind Farm which will be located about 30 kilometres (km) southeast of Balranald.

The Keri Keri Wind Farm will include up to 155 wind turbine generators (WTG) with a Battery Energy Storage System (BESS), together with associated and ancillary infrastructure.

2 Existing Conditions

2.1 Site Description

The Project is situated about 30 km southeast of Balranald, and 75 km southwest of Hay in the Murray River Local Government Area (LGA).

The Project site is approximately 800 km from Sydney and 400 km from Melbourne. The location of the Project site in a broad context is shown in Figure 2.1.

The Project is located within the South West Renewable Energy Zone (REZ) and is directly south of the Sturt Highway on land that is predominately used for sheep grazing and cropping.

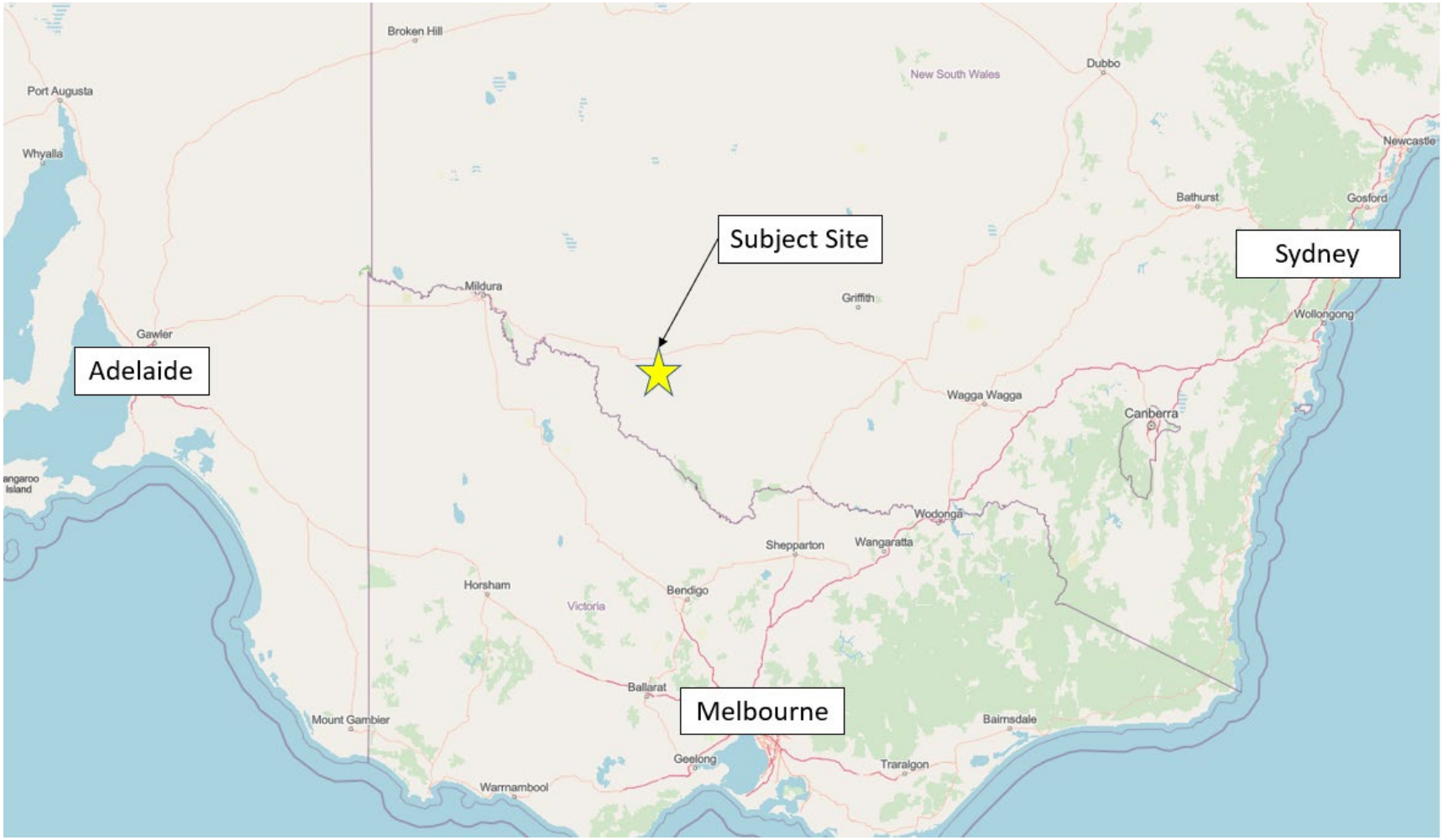
The Project extends over an area of approximately 18,012 hectares (ha) across 66 freehold land parcels (Project site).

The under-construction Project EnergyConnect intersects the Project site. Project EnergyConnect is a new 900 km TL (interconnector) that will connect power grids across three (3) Australian states between Wagga Wagga in NSW and Robertstown in SA, with a connection to Red Cliffs in VIC.

The Applicant intends to bid for Access Rights to this interconnector. The 330 kV overhead TL will connect the Project to Project EnergyConnect.

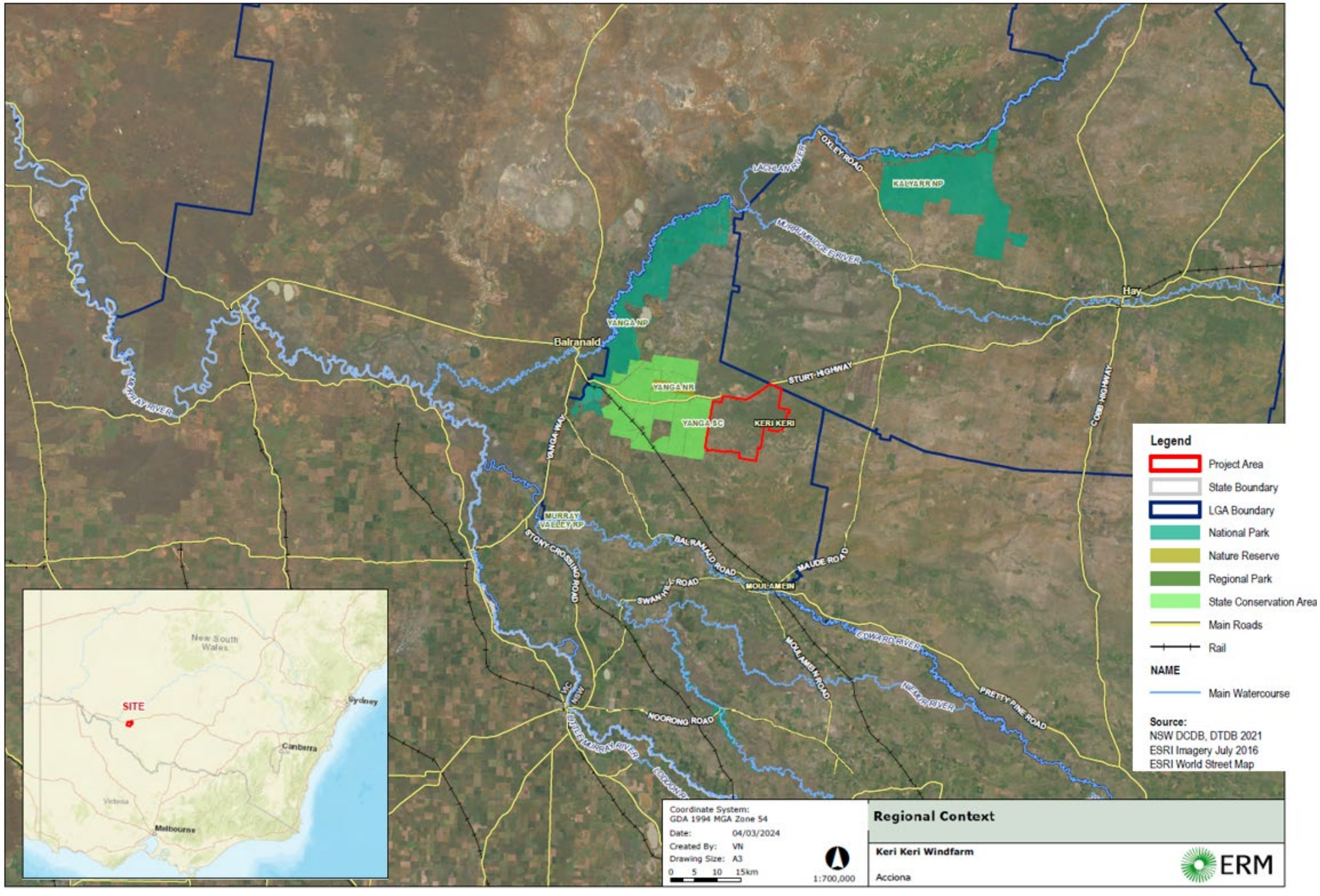
The Project site is bound by Sturt Highway to the north and Keri Keri Road to the west. The subject site location within the context of the local road network is shown in Figure 2.2

Figure 2.1: Site Context



Basemap Source: ArcGIS Maps

Figure 2.2: Site Location – Regional Context



2.2 Road Network

The following section describes the local road network which consists of two key roads, namely the Sturt Highway and Keri Keri Road (see Figure 2.3).

The site of the proposed Keri Keri Wind Farm has road frontages to both the Sturt Highway and to Keri Keri Road.

The **Sturt Highway (A20)** is a state road which runs east-west direction between Northern Expressway (Reid, South Australia) and Hume Highway (north of Tarcutta).

Within the vicinity of the site, the Sturt Highway is a two-lane road providing a single travel lane in each direction. Each travel lane is approximately 3.5 m wide with sealed road shoulders and gravel verge provided on both sides of the road.

The alignment of the Sturt Highway is flat with extensive straight sections of road providing excellent sight distances to approaching vehicles and for those vehicles accessing the highway.

Figure 2.4 shows the Sturt Highway at a point along the site's frontage.

Keri Keri Road is a local road with a north-south alignment between Sturt Highway and Berrambong Railway Road. Keri Keri Road is an unsealed road running along the site's western boundary.

No speed limit signage is installed on Keri Keri Road.

Keri Keri Road is flat with a straight alignment offering extensive sight distances to approaching vehicles (see Figure 2.5). The width of Keri Keri Road is approximately 5 m with unsealed shoulders.

The intersection of Sturt Highway and Keri Keri Road / Loorica Road is a four-way priority-controlled intersection (give way). The layout of the intersection is shown in Figure 2.6 - Figure 2.9.

Figure 2.3: Surrounding Road Network and Site Access Locations

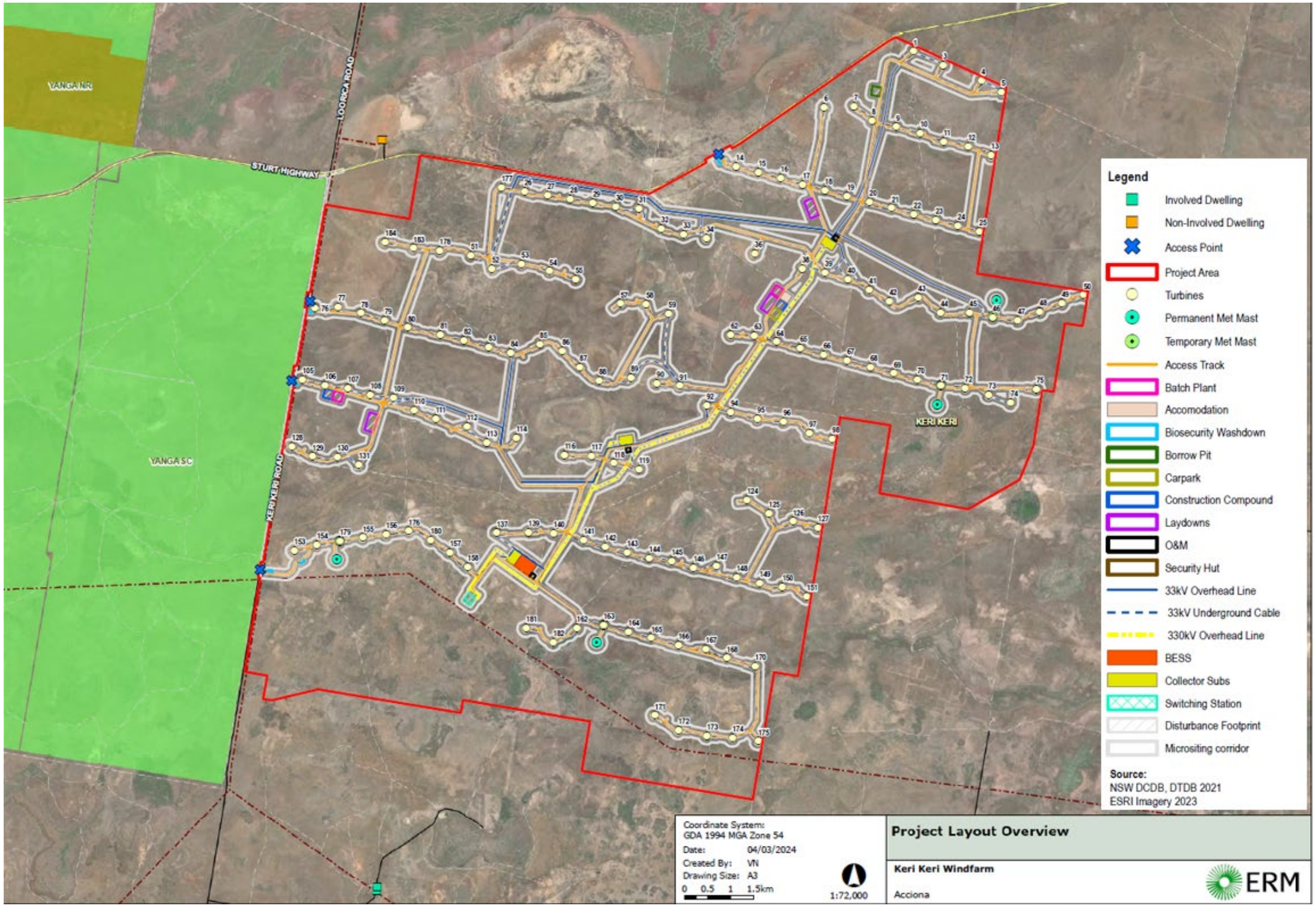


Figure 2.4: Sturt Highway – East of Keri Keri Road (at Site's Frontage)

Figure 2.5: Keri Keri Road – West of Project Site (at Site's Frontage)

Figure 2.6: Sturt Highway at Keri Keri Road Intersection (looking east)

Figure 2.7: Sturt Highway at Keri Keri Road / Loorica Road Intersection (looking west)

Figure 2.8: Sturt Highway at Keri Keri Road Intersection (looking south from Loorica Road to Keri Keri Road)

Figure 2.9: Sturt Highway and Keri Keri Road / Loorica Road Layout

Basemap Source: www.nearmap.com (accessed 2023)

2.3 Public Transport

There are no nearby public transport services within the vicinity of the subject site.

Balranald Coach Stop in Market Street is nearest bus stop and is located approximately 45 km away from the site. Pre-paid bus routes 725 and 726 run between Mildura and Cootamundra using Sturt Highway. There are two services per day, typically one in the early morning and one in the evening.

Griffith Station is located 200 km away from the site and is served by the NSW TrainLink Regional train and coach service. The rail network in the area is shown in Figure 2.10.

The coach link between Balranald and Hay travels along the Sturt Highway past the site's frontage.

Figure 2.10: Rail and Coach Network

Source: Transport NSW – Southern NSW

2.4 Crash History

Historic crash data has been sourced from Transport for NSW (TfNSW) Centre for Road Safety online for the five-year period from 2017 to 2021 in the vicinity of the subject site.

The crash locations and degree of crashes are presented in Figure 2.11.

The historic crash data shows that there have been six crashes recorded within the five-year period along and within proximity to) the Project site's frontage to the Sturt Highway.

None of the six recorded crashes were located within 1 km of the proposed Project vehicle site accesses on the Sturt Highway nor the Sturt Highway / Keri Keri Road intersection.

Of the six recorded crashes, four were non-injury (tow away) crashes, while the other two crashes resulted in a minor injury.

All crashes along the Project site frontage were single vehicle crashes and were recorded as 'vehicle leaving road' on a straight section or bend in the roadway.

No crashes were recorded on Keri Keri Road for the period 2017-2021.

2.5 Existing Traffic Volumes

Traffic surveys were undertaken along the Sturt Highway and Keri Keri Road (and specifically at the Sturt Highway / Keri Keri Road / Loorica Road intersection) for the period Sunday 18 September 2022 to Wednesday 21 September 2022.

Based on the obtained survey data the peak traffic flow periods were observed to occur on

From the traffic survey data, the AM and PM peak hours have been identified to occur on Monday 19 September 2022 at the following times:

- AM Peak Hour: 9.30am to 10.30am.
- PM Peak Hour: 3.30pm to 4.30pm.

On Sturt Highway, there was surveyed to be 109 two-way movements (AM) and 96 two-way movements (PM) in the peak periods.

On Keri Keri Road, there was one movement recorded in the PM peak hour. On Loorica Road, there are no vehicle movements recorded in the peak periods.

The average daily traffic volume (weekday) is in the order of 535 vehicles in the eastbound direction and 970 vehicles in the westbound direction. Heavy vehicles comprise around 47% of the daily traffic volume. A summary of the intersection peak hourly traffic flows is presented in Table 2.1 while traffic turning movements are shown diagrammatically in Figure 2.12 and Figure 2.13.

Figure 2.11: Historic Crash Data (2017-2021)

Data Source: TfNSW, Centre for Road Safety Crash Statistics, data extracted on 17/04/23

Table 2.1: Traffic Volumes

Road and Direction	AM Peak (9:30 – 10:30)			PM Peak (15:30 – 16:30)		
	Light Vehicles	Heavy Vehicles	Combined	Light Vehicles	Heavy Vehicles	Combined
Sturt Highway:						
Eastbound	37	15	**52**	30	15	**45**
Westbound	36	21	**57**	36	14	**50**
Two-way Flow	**73**	**36**	**109**	**66**	**29**	**95**
Keri Keri Road:						
Northbound	0	0	**0**	1	0	**1**
Southbound	0	0	**0**	0	0	**0**
Two-way Flow	**0**	**0**	**0**	**0**	**0**	**1**

Figure 2.12: Turning Movements in AM Peak Hour

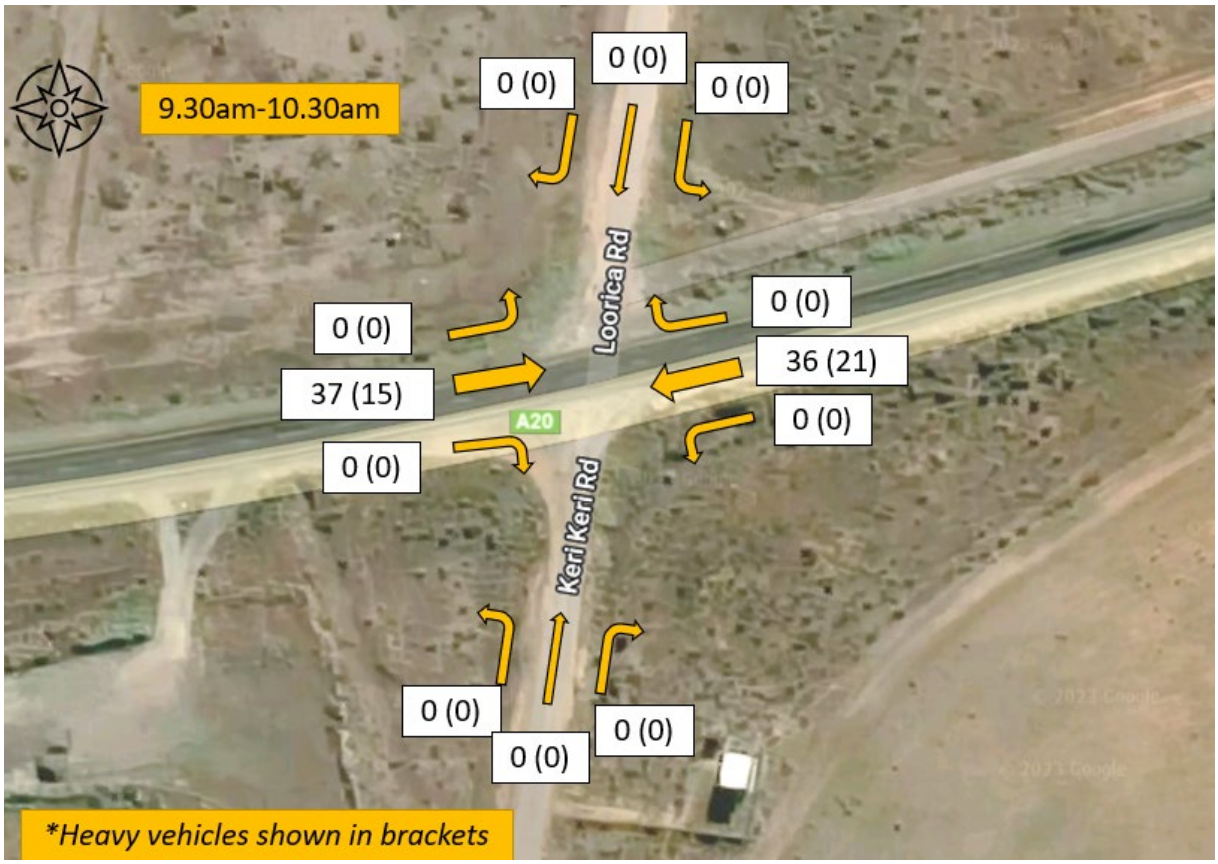
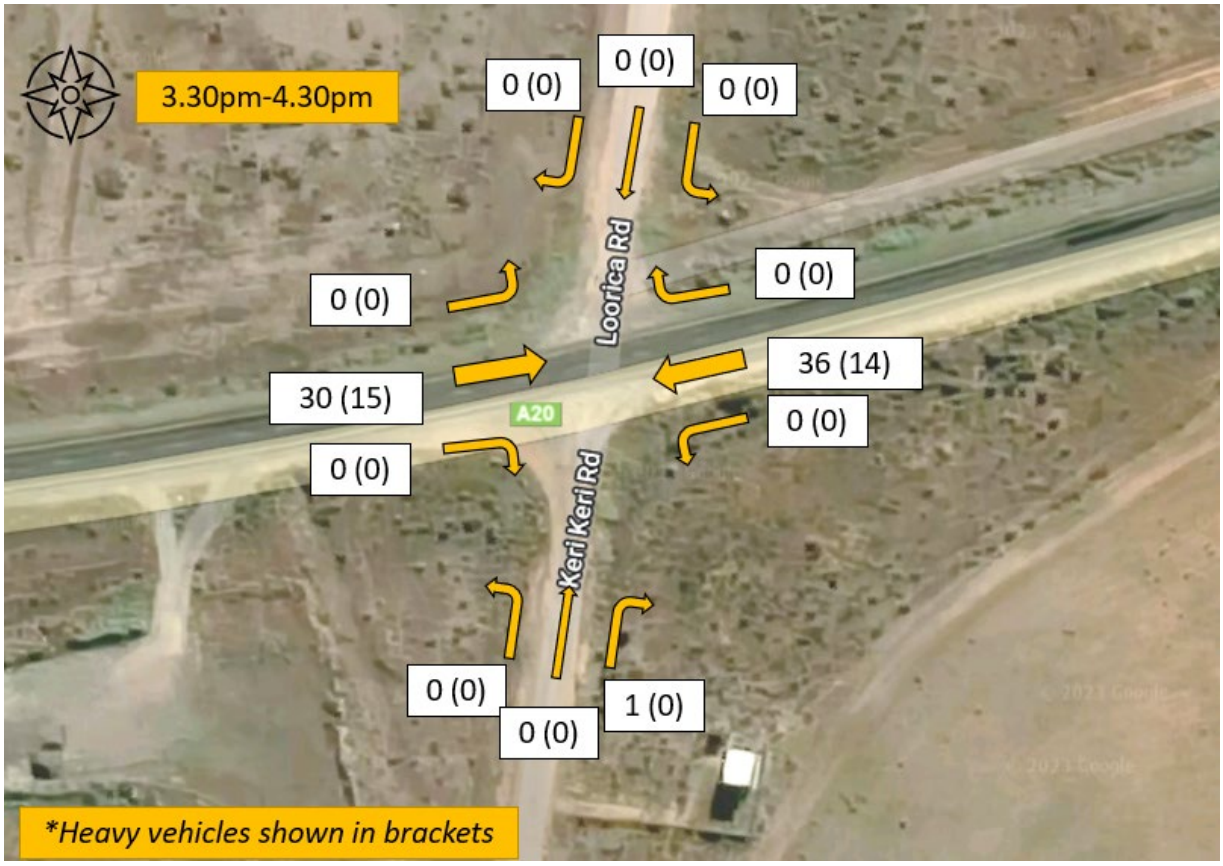


Figure 2.13: Turning Movements in PM Peak Hour



3 Proposal Description

3.1 Overview of the Keri Keri Wind Farm Project

The Keri Keri Wind Farm Project is a proposed wind farm that will consist of up to 155 WTGs with associated and ancillary infrastructure.

Each of the WTGs will consist of the following:

- Three blades mounted on a rotor hub (up to 200 metres high) on a nacelle above a tubular steel tower;
- Gearbox and generator housed in the nacelle
- Adjacent hardstand for use as crane pads, assembly and laydown areas.

The WTGs would be supported by ancillary infrastructure including:

- One electrical and two collector substations
- An on- site battery energy storage system (BESS)
- Overhead and underground electrical cabling
- Electrical Transmission line
- Three operations and maintenance facilities
- Internal vehicle access tracks

During construction of the Project, the following temporary facilities will also be provided on site:

- Construction compounds comprising site buildings and facilities for construction contractors / equipment, site offices, car parking and amenities
- Mobile concrete batching plant
- On-site workers accommodation
- External water supply – for the purpose of assessing the 'worst case' scenario with regard to water truck movement, it is assumed in this assessment report that all water to be trucked to site for construction and general use. It is acknowledged that the potential to utilise on-site groundwater boreholes is an option for the Project. The use of on-site boreholes will decrease the volume of potential heavy vehicle movements to and from the site.

It is noted that a scoping study and request for SEARs have been made under a separate SSD application (SSD-4012957) for a solar farm on the Project site.

For the purpose of this traffic and transport assessment, the Keri Keri Solar Farm project is not included in the assessment. Should the project proceed to the next stage of planning and

the timing of construction become known, the assessment of both the Wind Farm and Solar Farm projects on the Project site would be assessed as part of the Solar Farm application.

3.2 Project Site Access

For both construction and operation of the Project, it is proposed that the site will be accessed via four site accesses, namely:

- 1 x Sturt Highway – direct access off Sturt Highway to the site
- 3 x Keri Keri Road – accessed via the Sturt Highway / Keri Keri Road / Loorica Road intersection.

Internal site access tracks would be constructed to connect the various on-site facilities to the site accesses.

The proposed locations of the Project site access locations are shown in Figure 2.3. The assessment of these site access locations is further discussed in Section 5 of this report.

3.3 Oversized Over Mass (OSOM) Vehicle Haulage Routes

Route assessments for the transportation of oversized over mass (OSOM) vehicles to the site has been undertaken by engineered transportation and logistic experts, Rex J Andrews P/L.

These route assessment reports by Rex J Andrews P/L are provided in Appendix A.

The delivery of materials to the site by OSOM vehicles would include;

- WTG components such as blades, tower section, hubs etc
- Large substation, BESS and batching plant equipment
- Water tanks and other operation and maintenance facility equipment.

The route assessments considered the constraints associated with the movement of OSOM vehicles to the sites from the following locations:

- Port of Newcastle
- Victoria border near Robinvale (Port of Adelaide)

The Rex J Andrews P/L reports provide commentary on the suitability of the potential OSOM routes and required upgrades and management measures to facilitate OSOM movements on these routes.

The final routes for OSOM vehicles would be subject to consultation and approval by relevant road authorities, council's and private land owners.

Notwithstanding the above, with regard to accessing the Project site, OSOM vehicles will approach the site from the east along the Sturt Highway when arriving from the Port of Newcastle, and from the west when approaching from the Port of Adelaide.

3.4 Construction Duration and Workforce

Construction of the Project is expected to commence in late 2027 and take approximately 24 months to complete. Peak construction activity is expected to occur over a 12-month period.

It is estimated that up to 650 workers (FTE) would be engaged on the Project site during peak construction activity.

Workers will be housed within on-site accommodated working a typical 10 day on – 4 day off roster.

For the purpose of assessing the worst-case scenario for traffic implications, it has been assumed that all workers are accommodated off site and transported to and from site each day.

Transport of workers to / from site will include travel by:

- Shuttle bus service
- Car-pooling
- Individual (independent) travel

4 Project Traffic Generation Assumptions

The following section of this report sets out details of the assumptions used to estimate the potential traffic generation characteristics for the construction and operational stages of the proposed Keri Keri Wind Farm Project.

4.1 Types of Project Related Traffic Generation

For the purpose of the traffic assessment presented in this report, traffic generation potential for the Project has been considered as three separate types, namely:

- General Construction Traffic (Non OSOM vehicles)
- Construction Traffic – OSOM vehicles
- Operational Traffic

The estimated traffic generation potential for each type of the Project traffic is set out below.

4.2 Peak Construction Traffic Generation Assumptions

4.2.1 Definition of Peak Construction Period

As noted in Section 3, it is estimated that construction activities will be undertaken over a 24-month period.

The volume of construction vehicle generation will vary significantly over the period of construction as the Project moves through the various stages of construction.

For example, traffic generation of the Project site will be relatively low during site establishment and site commissioning stages of construction.

Furthermore, there are different types of traffic that will only occur during particular stages of construction. For example, the delivery of temporary equipment such as site sheds, batching plants etc would only occur during site establishment and pack up stages of construction but not during peak construction.

Similarly, the delivery of OSOM WTG components and associated materials are likely to be limited to peak construction periods.

For the purpose of assessing the worst-case scenario for traffic generation, the 'peak construction' period activity has been estimated and assessed.

Peak Construction is estimated to occur over a 12-month period roughly in the middle of the overall 24 month construction duration.

4.2.2 Over Sized Over Mass (OSOM) Vehicles

OSOM vehicles would be used for the transportation of the various component of the wind turbine generator (WTG) including blades, tower and turbine components between the port and the Project site. OSOM vehicles will also be used to transport components associated with BESS including transformers and batteries.

The route assessment and transport logistics associated with OSOM vehicles deliveries of WTG components to the site has been prepared by Rex J Andrews Pty Ltd.

The transportation logistics included the options of a 200 metre tower for each of the 155 proposed WTGs.

The vehicle dimensions, road upgrades and traffic management measures associated with OSOM vehicle movements are set out in the Rex J Andrews reports.

4.2.3 Bulk Earthworks

The Project site is extremely flat. No significant import / export of fill is envisaged to or from the site as part of the proposed construction works.

4.2.4 Plant, Equipment and Materials

Plant, equipment and materials are those items not included in the OSOM assessment and are carried with more commonly used transport units such as B-Doubles, semi-trailers or heavy rigid vehicles.

Construction materials including gravel, aggregate and sand will be required for the construction of hardstands to support the Project infrastructure, including internal access roads, wind turbine generators hardstands and laydown areas, for installation of electrical cabling and for concrete production.

It is proposed to use temporary on-site concrete batching plants for the production of concrete used in the construction of the wind turbine footings. The use of temporary on-site batching plants will reduce the number of external concrete truck vehicle movements to and from the Project site.

Importation of quarried materials including gravel, aggregate and sand will be required for the construction of hardstands and turbine foundations to support Project infrastructure including internal access roads, laydown areas and installation of electrical cabling.

Gravel, aggregate and sand have been assumed to be sourced externally from existing operating quarries. There are a number of existing quarries located locally however, further investigations about quality and quantity of materials is required before the location of materials to be transported to the Project site can be confirmed.

Notwithstanding the above, all materials would be transported to the site via the regional road network, namely via the Sturt Highway either east or west of the Project site.

It is anticipated that material from excavations will be recycled where suitable which will reduce the estimated traffic volumes upon confirmed geotechnical testing and construction procurement.

4.2.5 Water

For the purpose of the traffic assessment, it has been assumed that all water for construction works, dust suppression and general use would be sourced off site and transported to the Project site via water trucks.

It is noted that investigations are being undertaken to alternatively source water from existing or newly installed bores within the Project site. If bore water is determined to be an appropriate source of water, then water trucks traffic generation would be significantly reduced.

It is noted that water saving measures for dust suppression would be investigated as part of the construction methodology.

4.2.6 Construction Workers

At peak construction, it is estimated that approximately 650 workers (FTE) will be on-site.

Workers will be accommodated on-site with on-site housing and facilities provided throughout the peak construction period.

Workers will typically work a 10 day on – 4 day off roster.

Workers would be transported to / from site at the start and end of the 10 day on shift using a combination of shuttle buses, car-pooling and single person per vehicle.

The assessment presented here has assumed the following mix of worker transport:

- Shuttle bus (20 workers per shuttle): 50% of workers
- Private Vehicle (including car pooling): 50% of workers

Shuttle buses and car pooling will operate from transport hubs suitable to the workforce locations. This will include local and broader regional hubs.

It is anticipated that shift change over days will occur twice per week. On shift change over days it is estimated that up to 30% of workers will depart the Project site and be replace by another 30% of the workers. Thus, twice a week on shift change over days during peak construction, some 195 workers will arrive, and 195 workers depart the Project site.

4.2.7 Construction Hours of Operation

Proposed typical hours of construction are understood to be:

- Monday to Friday 7 am to 6 pm
- Saturday 8 am to 1 pm
- No work on Sundays or public holidays.

It is noted that OSOM deliveries to the Project site may occur outside of these construction hours such that the movement of OSOM through townships at peak periods and the associated disruptions to traffic can be minimised.

To estimate average daily construction vehicle generation, it has been assumed that:

- 24 work days per month

4.2.8 Operational Phase

Once operational, the Project will operate 24 hours per day seven days a week. The WTG's will be monitored remotely, however, regular maintenance will be required.

During the operational phase of the Project, it is estimated that the Project would employ up to 12 on -site workers who would access the site by car / utility vehicles.

The occasional heavy vehicle would be required for the delivery of parts for a repair to the WTGs.

4.3 Estimated Traffic Generation of Peak Construction Period

For the purpose of this assessment, a vehicle trip is defined in accordance with the *RTA Guide to Traffic Generating Developments (2002)* as a movement to or from the Project site. For example, a water truck arriving at the Project site and then leaving is two trips (one arriving and one leaving).

For the peak construction period the estimated peak daily traffic generation is summarised in Table 4.1.

While it is unlikely that peak activity for each of the construction activities and material deliveries are unlikely to occur simultaneously, Table 4.1 shows the potential peak activity of components occurring simultaneously. This is considered to be the worst-case scenario assessment and would not occur throughout the peak construction period.

Further details regarding peak construction period traffic generation are provided in Appendix B.

Table 4.1: Peak Construction Period Daily Project Traffic Generation

Stage	Peak Daily Trips (In & Out)
General Construction	598
WTG - OSOM	38
Construction Workers	140
Total	**776**

Both general construction and WTG construction vehicles will generally arrive and depart the site throughout the daily construction period and generally be evenly spread out.

Construction workers will however arrive at site at the start of Day 1 of their 10 day shift and then depart at the end of the Day 10. The arrival and departure time of construction workers will be dependent upon flight times and shuttle bus operations. Notwithstanding, this it is assumed that construction workers vehicle movements will occur over a 2 hour period in the morning and afternoon.

The estimated hourly traffic flows for the peak day are summarised in Table 4.2.

Table 4.2: Peak Construction Period – Hourly Project Traffic Generation (Shift Change Over Day – twice per week)

Stage	Peak Hour Trips (In & Out)
Morning Peak Hour	93
Midday Peak Hour	57
Evening Peak Hour	93

4.4 Traffic Distribution of Peak Construction Period

The potential distribution of Project generated traffic will be determined by a number of yet to be confirmed variables including:

- Port location for WTG components (OSOM vehicles)
  - Port of Newcastle vehicles will approach the site from the east along Sturt Highway; or
  - Port of Adelaide vehicles will approach the site from the west along Sturt Highway
- Locations of quarries and other materials, whether local or more regionally sourced
- Location(s) of worker transport hubs (ie. Shuttle bus stops).

For the purpose of the traffic assessment presented herein, it is assumed that non-OSOM vehicles Project generated traffic would be distributed evenly from both the east and the west along the Sturt Highway.

For OSOM vehicles, it is understood that only one of the two potential ports would be utilised for the transport of WTG components. However, which port will be utilised is yet to be determined.

5 Traffic Impact Assessment

5.1 Road Network Capacity

A mid-block capacity assessment has been used in this study to assess the impact of the Project on road capacity and performance. This approach is considered to be appropriate given the rural location of the Project where intersections are less frequent, and as such, are less of a determinant of rural road capacity (RMS, 2002).

Further details on the performance indicators and lane capacity assumptions used in the assessment are provided below.

Section 5.2 of *Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis* specifies the capacity for a two-lane highway to be 1,700 passenger car units per hour (pcu/h) for each direction of travel.

Accordingly, a capacity of 1,700 pcu/h for each direction of travel has been adopted for two-lane highways such as the Sturt Highway (A20).

Local unsealed roads have reduced capacity resulting from lower vehicle operating speeds (due to factors such as reduced vehicle control) and increased headways between vehicles (due to factors such as dust). As such, a capacity of 1,000 pcu/h for each direction of travel has been conservatively assumed for the unsealed Keri Keri Road.

The criteria for evaluating road performance used in this study is Level of Service (LoS).

Table 5.1 outlines the LoS categories and definitions provided in Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis (Austroads, 2017).

LoS is a qualitative measure that describes the operational conditions within a traffic stream and the perception of these by motorists and / or passengers. LoS ranges from A (best) to F (worst).

In rural areas, LoS C can be considered a minimum desirable standard; a deterioration of the LoS under this level would imply that remedial measures to maintain the existing LoS should be sought.

In the assessment of the Keri Keri Wind Farm Project, LoS has been determined using the volume-to-capacity (V/C) ratios outlined in the *Guide to Traffic Management Part 3: Traffic Studies and Analysis (Austroads, 2020*) and the *Highway Capacity Manual 2010 (Transportation Research Board, 2010).*

Table 5.1: Level of Service Definitions and Criteria for Mid-block Sections

Level of Service	Description	Volume-to-capacity (V/C) Threshold*
A	LOS A is 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.	0.32
B	LOS B is in the zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is little less than that of the Level of Service A.	0.50
C	LOS C is 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.	0.71
D	LOS D is close to the limit of stable flow but is 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.	0.91
E	LOS E occurs when 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 a traffic-jam	1.00
F	LOS F describes unstable flow. Such conditions exist within queues forming behind bottlenecks. The projected flow rate can exceed the estimated capacity of a given location. Flow break-down occurs and queuing and delays result.	>1.00

Source: Guide to Traffic Management Part 3: Traffic Studies and Analysis (Austroads, 2020)
** Based on a free-flow speed of 100km/h*

The results of the V/C assessment for the peak period construction activities of the Project are shown in Table 5.2.

Table 5.2 presents the surveyed (existing) traffic volumes and corresponding Volume Capacity (V/C) ratio and the forecast traffic volumes and V/C during the construction period.

For the forecast (with construction traffic) traffic volumes it is assumed that all construction traffic associated with the Project arrives and departs in the same direction and all traffic utilises the Sturt Highway site access. This represents an absolute worst-case scenario with regard to volume / capacity ratios.

The assessment shows that the Sturt Highway would operate at Level of Service A (LoS A) during the peak of construction of the proposed Keri Keri Wind Farm.

The analysis indicates that the capacity of the Sturt Highway would not be adversely impacted by the proposed Keri Keri Wind Farm.

Table 5.2: Peak Construction Period Generation and V/C Ratio

Road	Period	Direction	Existing Volumes		With Peak Construction Volumes		
			Volume (vph)	V/C	Project Generated Traffic (vph)	Total Volume (vph)	V/C
Sturt Highway	Morning Peak	Eastbound (towards Hay)	37	0.021	93	130	0.076
		Westbound (towards Balranald)	36	0.021	93	129	0.076
	Evening peak	Eastbound (towards Hay)	30	0.018	93	123	0.072
		Westbound (towards Balranald)	36	0.021	93	129	0.076

It is noted that traffic flows along Keri Keri Road are extremely low with 0 - 1 vehicles per hour surveyed in peak periods. The use of Keri Keri Road for construction access of up to 96 vehicles per hour in a peak period would represent a v/c ratio of 0.1 (LoS A).

5.2 Construction Vehicle Transport Routes

Construction deliveries from locally sourced quarries, water supplies etc are expected to come from the nearby towns from the east (Hay) and the west (Balranald and Mildura) along Sturt Highway.

Similarly, materials sourced from regional locations further afield will also arrive and depart the site using the Sturt Highway to the east or west of the Project site.

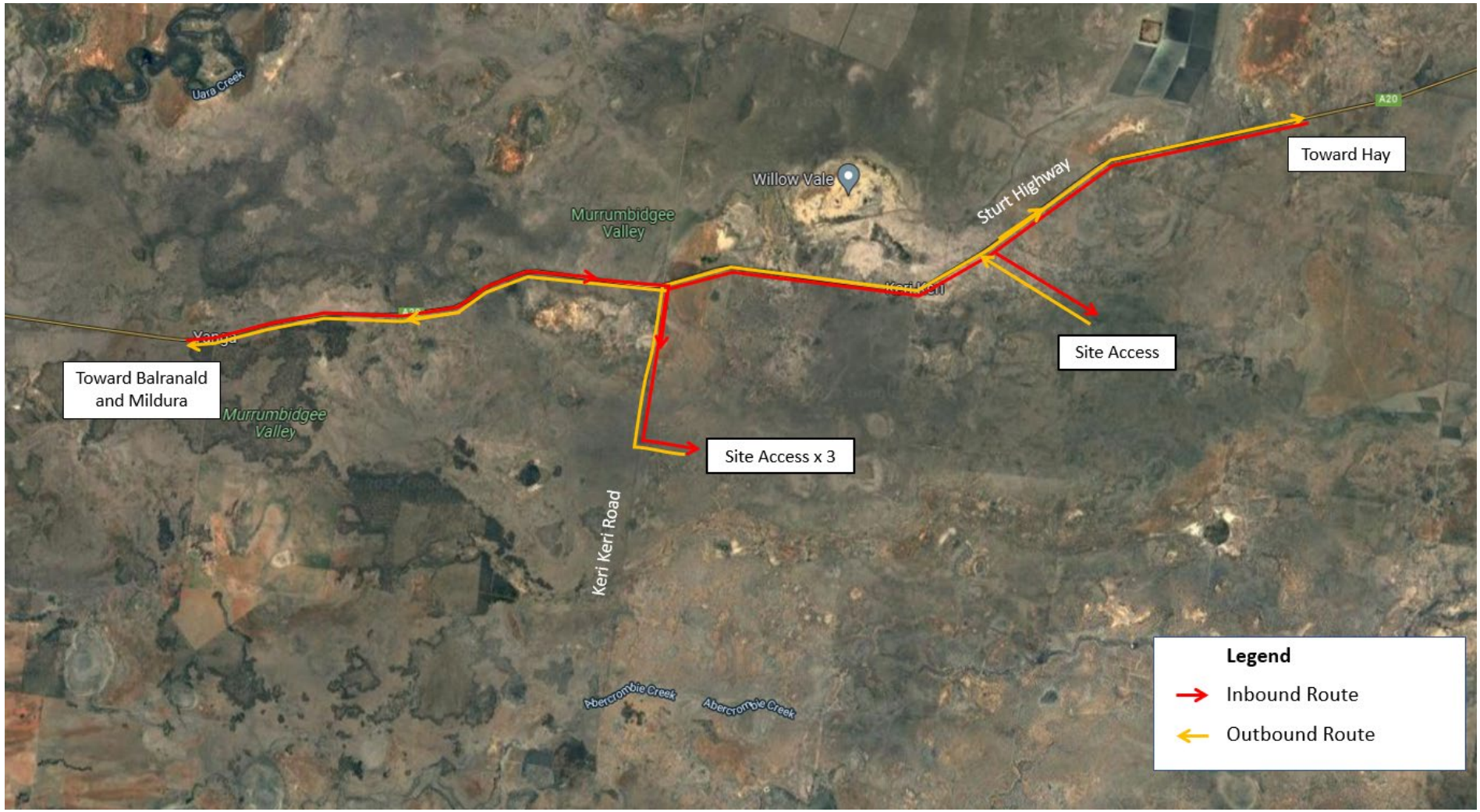
The Project site has four potential site access locations, one along the Sturt Highway and three along the Keri Keri Road frontages.

Due to the size of some WTG components of the development, OSOM vehicles will be required for transportation to the site. OSOM vehicles would require permits that specify the designated route for travel, the number of escorts required and the permissible travel times for the vehicles.

The proposed potential construction vehicle routes within the vicinity of the site access points are shown in Figure 5.1.

It is also assumed that construction workers accessing the Project site would utilise the Sturt Highway from either Balranald or Hay.

Figure 5.1: Transport Routes



Basemap Source: Google Maps, last accessed on 22/11/2022

5.3 OSOM Vehicle Transportation

As noted in the project description, OSOM vehicles will be utilised to deliver WTG components and associated electrical equipment between the port and the site.

The movement of OSOM vehicles for WTG components is a specialised logistics exercise and deliveries are undertaken with extensive traffic control and potentially enabling works (ie. temporary removal of street furniture, etc).

Rex J Andrews P/L has been engaged by the proponent to undertake an investigation into feasibility and implications associated with the transport of WTG components to the site with port origins at:

- Port of Newcastle;
- Port of Adelaide (note: the report considers the OSOM movements from the Victorian border to the site).

The findings of the investigation, including the implications to the road network and associated enabling works are presented in the Rex J Andrews P/L reports provided in Appendix A.

The Rex J Andrews P/L assessment reports determined that the transport of WTG components with OSOM to the Project site from a Victorian port would require 'moderate – extreme' amount of enabling works.

The transport of WTG components to the site from the Port of Newcastle would by comparison require 'some – moderate' amount of works.

Based on the Rex J Andrews P/L feasibility assessments it is considered that the Port of Newcastle is the preferred port for the transportation of WTG OSOM vehicles to the site.

Notwithstanding the above, the Rex J Andrews P/L assessment has concluded that both the Port of Newcastle and Port of Adelaide are feasible port locations with regard to the transportation of WTG components using OSOM vehicles.

A detailed traffic management plan would be prepared for the transportation of individual WTG components prior to the commencement of construction activities.

5.4 Project Site Access Arrangements

5.4.1 Site Access Intersection Capacity

To assess the capacity of a potential site access intersection along the Sturt Highway and its ability to accommodate the estimated traffic generation potential of peak period construction activity of the Project, a SIDRA intersection analysis was undertaken.

For the purpose of assessing the operating capacity of the Sturt Highway site access intersection during peak construction of the Project, it has been assumed that all Project related construction traffic would utilise the Sturt Highway site access for access to the Project site. This represents a worst-case scenario with regard to site access capacity.

For intersection operation, TfNSW uses the performance measure level of service (LoS), to determine how efficient an intersection/network is operating under given prevailing traffic conditions. Level of service is directly related to the delays experienced by traffic travelling through the intersection.

SIDRA's level of service ranges from LoS A to LoS F, with LoS A indicating that the intersection is operating with spare capacity and LoS F indicating the intersection is operating over capacity. LoS D is the long-term desirable level of service.

The criteria that SIDRA intersection adopts in assessing the level of service is shown in Table 5.3.

The modelling results are shown in Table 5.4.

For the peak construction periods the delay and level of service for the worst performing movement is presented as the intersection result in accordance with standard practice stipulated in the RTA Guide to Traffic Generating Developments for priority and roundabout intersections.

The modelling shows that a site access intersection would perform acceptably with the construction traffic from the Keri Keri.

Table 5.3: Levels of Service Criteria - Intersection Capacity

Level of Service (LoS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity; at signals incidents would cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	Greater than 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode or major treatment

Source: RMS Guide to Traffic Generating Developments, 2002

Table 5.4: Sidra Model Results

Intersection	Period	Existing		Existing + Construction Traffic	
		Ave. Delay (sec)	LoS	Ave. Delay (sec)	LoS
Sturt Highway / Project Access Intersection	Morning Peak	-	-	8	A
	Midday Peak	-	-	11	A
	Evening Peak			11	A

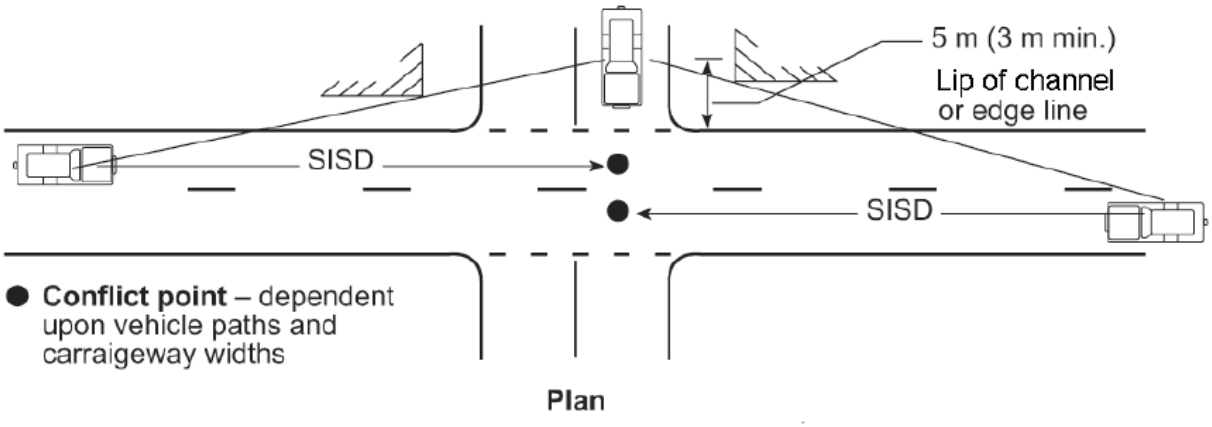
5.4.2 Sight Distance Assessment

A review of driver sight distance has been undertaken in accordance with Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersection (2021).

In assessing the available sight distances at the proposed Project site accesses the Safe Intersection Sight Distance (SISD) criteria as defined by Austroads has been applied.

SISD is the minimum sight distance which should be provided on the major road at any intersection. The method of calculating SISD is shown graphically in Figure 5.2.

Figure 5.2: Safe Intersection Sight Distance (SISD)



Source: Austroads (2021) Guide to Road Design Part 4A: Unsignalised and Signalised Intersection

As shown in the extract from Austroads guide (see Figure 5.4), the SISD requirement increases with increasing design speed of the major road.

Figure 5.3: Required Driver Sight Distances at Site Accesses

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 sec[3]		R_T = 2.0 sec		R_T = 2.5 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

For the Sturt Highway access and the Sturt Highway / Keri Keri Road intersection the appropriate design speed is 120 km/h which is +10 km/h on the posted speed limit.

For the site access on Keri Keri Road, the road conditions are such that the design speed is considered to be 80 km/h.

Based on Figure 5.3, the SISD requirements for vehicles travelling along the Sturt Highway approaching the proposed site access and the Keri Keri Road intersection is 324 m.

The available sight distances for vehicles entering the Sturt Highway at the Project site access at Sturt Highway and from Keri Keri Road exceeds 500m at both locations and in both directions.

As such the available sight distances at the access points to the Sturt Highway comply with the minimum Austroad SISD requirements.

It is noted that at the Sturt Highway access and the Keri Keri Road intersection, the turning area is of flat terrain and straight alignment with limited vegetation to obstruct view lines.

Similarly for the three proposed site accesses along Keri Keri Road, the available SISD distances exceeds the minimum Austroad SISD requirements of 181m.

Thus, the proposed site access driveways will be located and constructed such that there is adequate entering sight distance to traffic along the frontage road.

5.4.3 Site Access Intersection Design – Turn Warrants

An assessment of the turn treatments required for a potential site access point at the Sturt Highway has been undertaken in accordance with *Austroads Guide to Road Design (AGRD) Part 4* (2017 and 2021) and *Austroads Guide to Traffic Management (AGTM) Part 6 (2020)*.

The turn treatment warrants are based on the major road traffic volumes on Sturt Highway, 'Q_M', and the volume of turning movements generated by the development, 'Q_R' and 'Q_L'.

For the purpose of the turn warrants assessment, it is assumed that all construction related traffic will enter and exit using one site access intersection along the Sturt Highway.

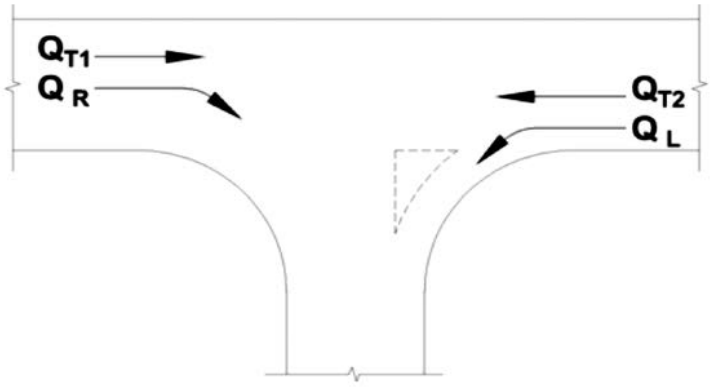
Thus, the findings of the turn warrant assessment would apply to the Keri Keri Road intersection at the Sturt Highway as well as the site access intersections along the Sturt Highway providing access to the internal Project site roads.

The value for Q_R and Q_L have been taken from peak period construction traffic generation as estimated above in this report.

The turn treatment warrant assessment for Sturt Highway also considers the design speed of the road, which is typically taken as the posted speed limit plus 10 km/h; namely, the design speed for Sturt Highway is 120 km/h.

Figure 5.5 shows an extract from AGTM Part 6 of the turn treatment warrants on major roads at unsignalised intersections with a design speed more than 100 km/h, which is applicable to Sturt Highway.

Figure 5.4: Calculation of the Major Road Traffic Volume Parameter, Q_M



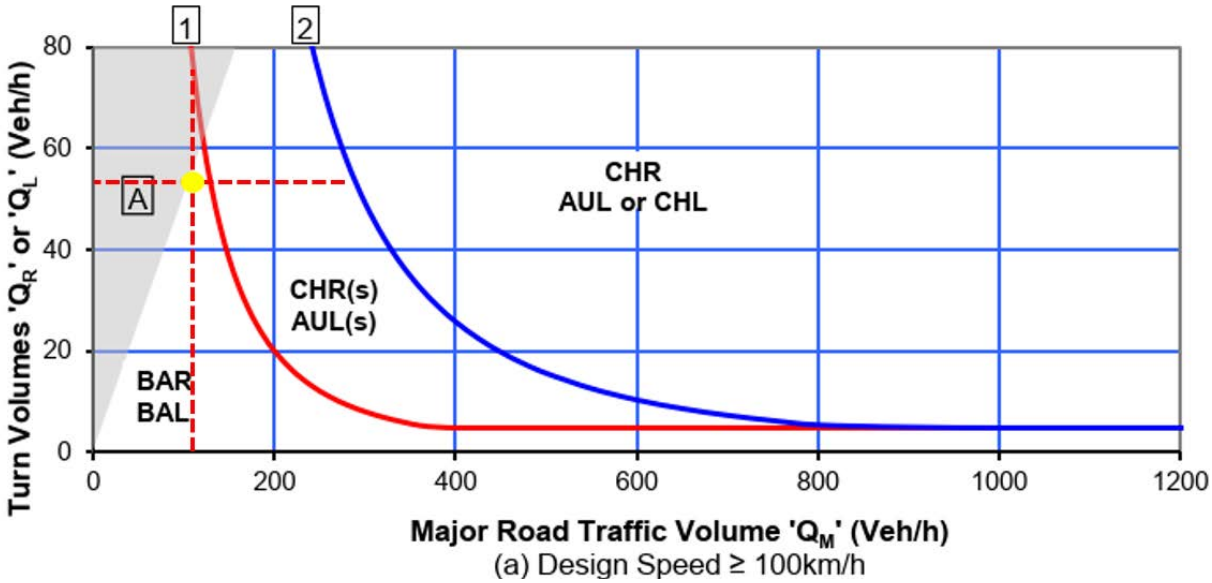
Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	$= Q_{T1} + Q_{T2} + Q_L$
		Yes	$= Q_{T1} + Q_{T2}$
	Left	Yes or no	$= Q_{T2}$

Source: Austroads Guide to Traffic Management Part 6, 2020

Table 5.5: Calculation of Q_M

Road Type	Peak Period	Turn Type	Splitter Island	Q_M (vph)	
Site Access Location A (Sturt Hwy):					
Two-Lane Two-Way	AM	Right (Q_R) = 55	No	$Q_M = Q_{T1} + Q_{T2} + Q_L$	122 vph
		Left (Q_L) = 56	No	$Q_M = Q_{T2}$	36 vph
	PM	Right (Q_R) = 56	No	$Q_M = Q_{T1} + Q_{T2} + Q_L$	70 vph
		Left (Q_L) = 55	No	$Q_M = Q_{T2}$	36 vph

Figure 5.5: Warrants for Turn Treatments on Major Roads at Unsignalised Intersections



Source: Austroads Guide to Traffic Management Part 6, 2020

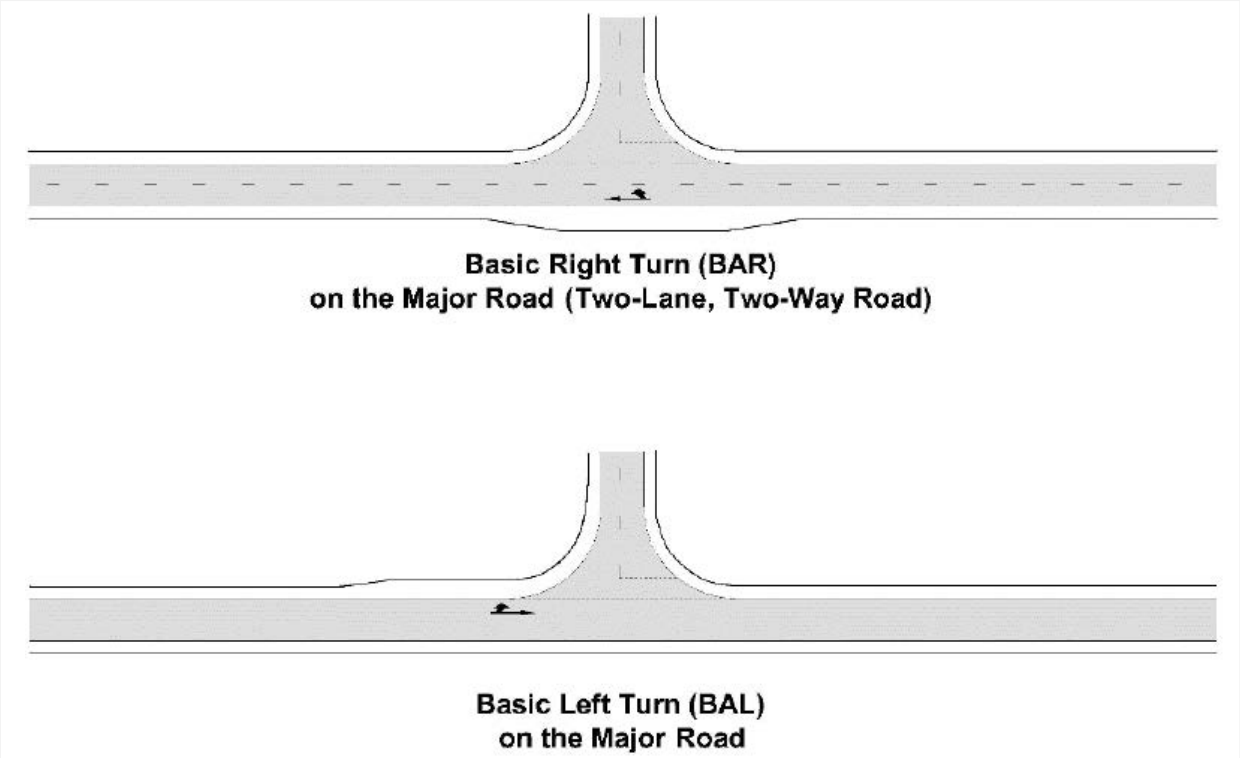
Based on values for Q_M, Q_L and Q_R in Table 5.5 and warrants for turn treatments in Figure 5.6, the turn treatments required at a Project site access at the Sturt Highway would be as follows:

- a basic left-turn (BAL); and
- basic right-turn (BAR).

The warrants are such that these upgrades would be required at the Sturt Highway site access and at the Sturt Highway / Keri Keri Road intersection.

An indicative layout for BAL and BAR treatments as per AGRD Part 4 is provided in Figure 5.6.

Figure 5.6: Basic Left Turn (BAL) and Basic Right Turn (BAR)



Source: Austroads Guide to Traffic Management Part 6, 2020

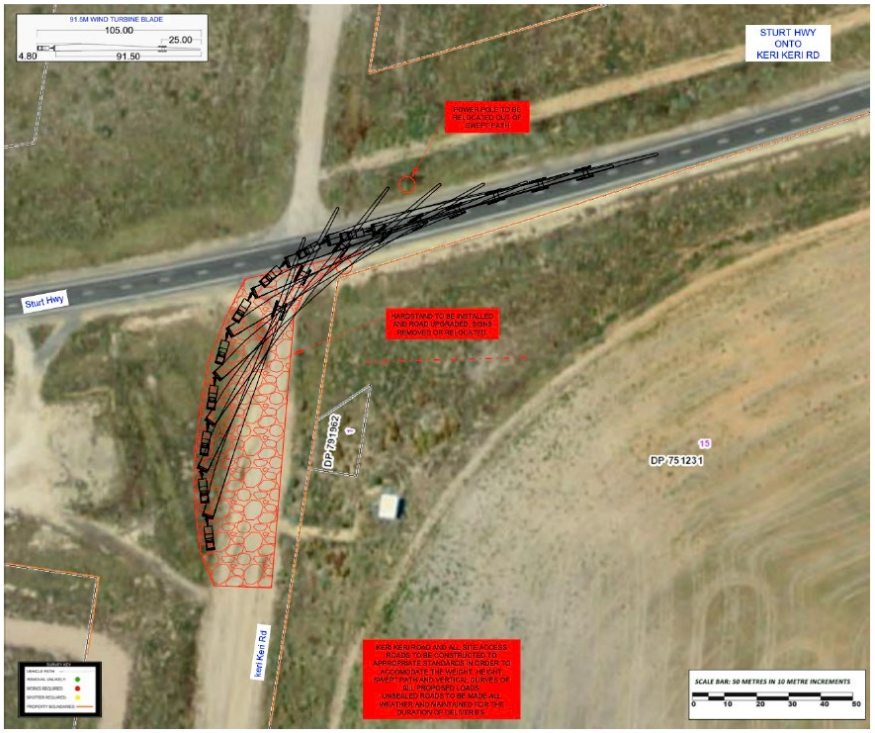
Beyond the site access, site generated vehicles would be utilising the regional road network and as such capacity improvements would not be required as part of the Project.

However, temporary road works would be required to accommodate OSOM vehicles transporting long loads (ie. WTG blades) to the site.

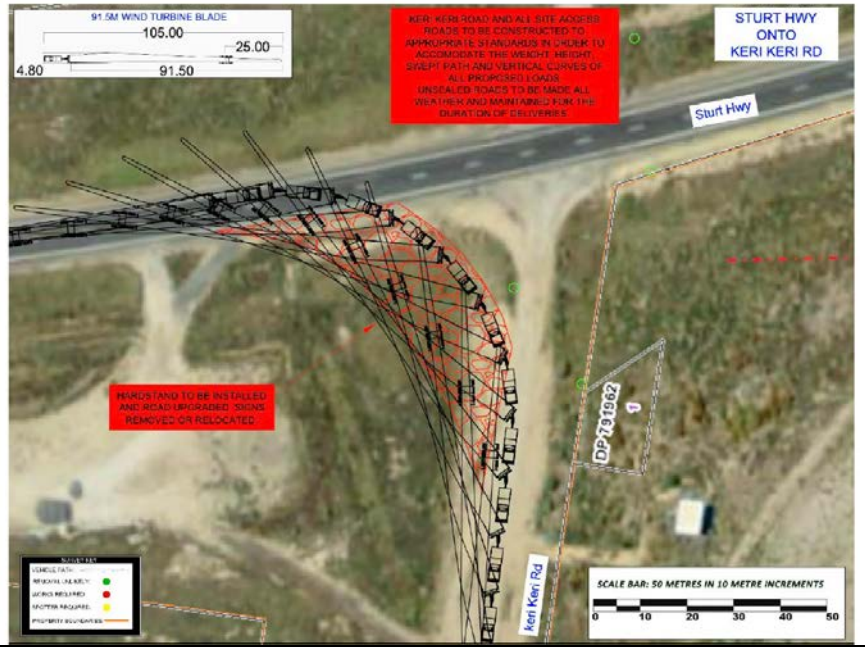
The Rex J Andrews P/L OSOM route assessment has considered the turn path of a OSOM vehicle carrying a WTG blade (largest vehicle) at the Sturt Highway and Keri Keri Road intersection. An extract from the report is provided in Figure 5.7.

Figure 5.7: WTG Blade OSOM Vehicle Turn Path Requirements (Sturt Highway / Keri Keri Road)

976 Km's: Sturt Highway onto Keri Keri Road



119.6 Km's: Sturt Highway onto Keri Keri Road



The requirements for the turn path of the WTG OSOM vehicles should also be accommodated into the site access design whether at Keri Keri Road or at the other potential site access location along the Sturt Highway.

5.5 Car Parking Arrangements

The demand for car parking associated with the construction and operation of the proposed Keri Keri Wind Farm development shall be accommodated on site.

As set out in the proposed description of works, construction includes provisions for hard stand / gravel car parking areas and vehicle circulation roads.

5.6 Cumulative Traffic Assessment

The proposed Keri Keri Wind Farm Project is located within the South-West Renewable Energy Zone, which comprises a number of renewable energy developments, all of which aim to increase the supply of renewable energy to the national grid and reduce emissions.

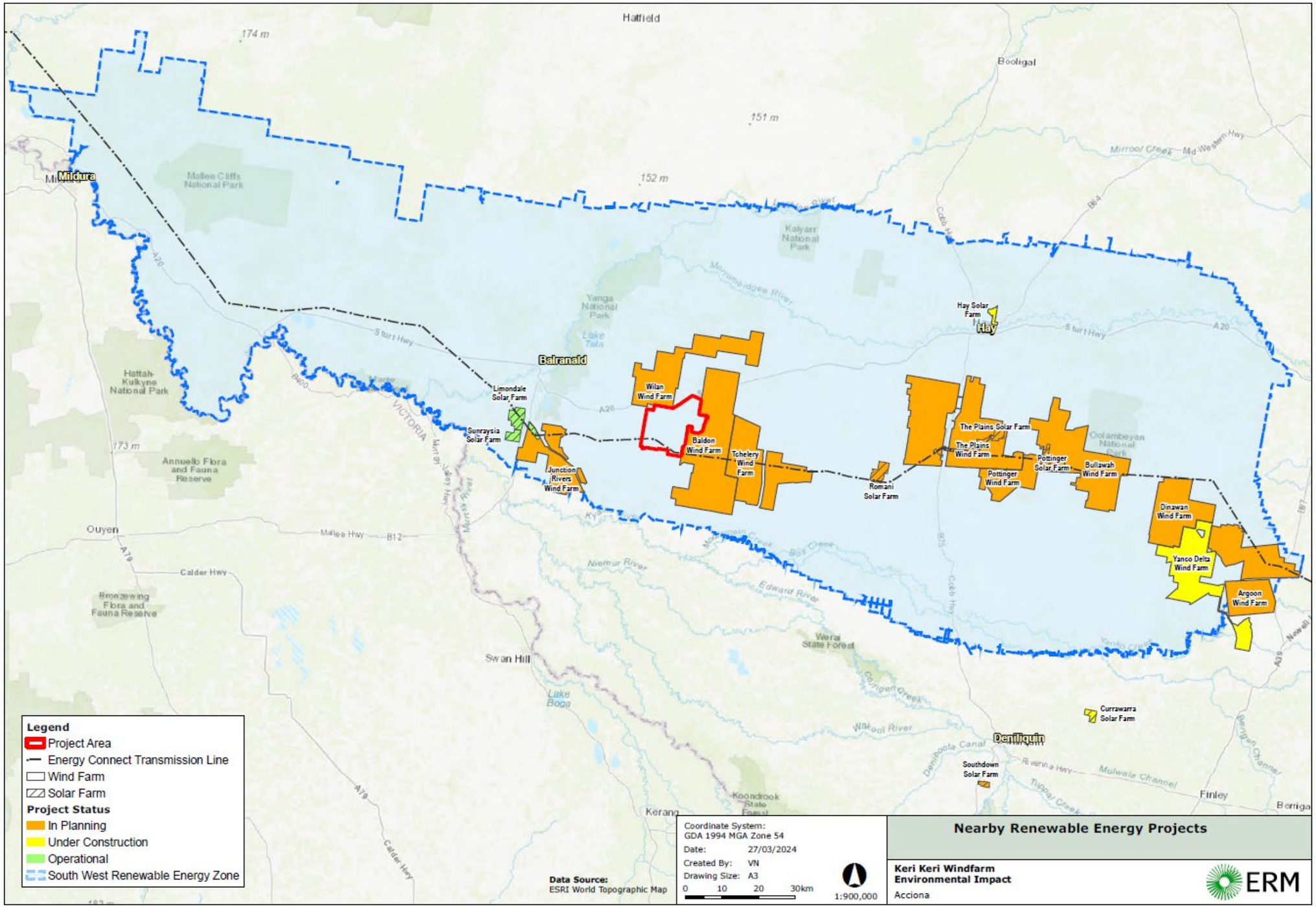
Figure 5.8 shows the nearby renewable energy developments around the Project site that are generally large in scale and of relevance in terms of potentially contributing to cumulative traffic related impacts in the area surrounding the Project site.

A detailed list of the wind and solar projects within the South – West Renewable Energy Zone are set out in Appendix C.

It is noted that some of these projects have already been approved and are under construction or operational whereas other projects are still in the various planning / proposal phases. The anticipated construction period for the various renewable energy projects in the South - West Renewable Energy Zone is typically between 12-24 months with construction completion slated to occur between 2024 and 2029.

Appendix C indicates the project status of these projects, estimated construction start date and construction finish date of each project and whether an overlap is anticipated.

Figure 5.8: Nearby Renewable Energy Developments



Projects within the vicinity of the Keri Keri Wind Farm site that have the potential to result in cumulative impacts with the proposed Keri Keri Wind Farm are:

- Junction Rivers Wind Farm - construction timing unknown
- Wilan Wind Farm - construction 2025 to 2027 (estimate)
- Baldon Wind Farm - construction 2024 – 2026 (estimate)
- Tchelery Wind Farm - construction 2026-2028
- Project EnergyConnect - construction completed by 2025.

As such both the Wilan Wind Farm and Baldon Wind Farm projects and the Project EnergyConnect are likely to be operational prior to the commencement of construction activities at the Keri Keri Wind Farm Project site, there are no significant cumulative traffic implications associated with these projects.

While the timing of the Junction Rivers Wind Farm construction is unknown and the construction of the Tchelery Wind Farm is likely to overlap with Keri Keri Wind Farm, the traffic analysis presented in Section 5.1 and 5.4 has indicated that there is significant spare capacity in the surrounding road network to accommodate construction traffic associated with the Keri Keri Wind Farm and other developments.

It is noted that, like the Keri Keri Wind Farm Project, construction of the Wilan Wind Farm is likely to use the Sturt Highway / Keri Keri Road / Loorica Road intersection for construction vehicle access to and from the Wilan Wind Farm site. The need for this intersection to be potentially upgraded for Wilan Wind Farm construction vehicles has been identified.

Other projects are located to the south or east of the Sturt Highway and are unlikely to generate traffic within the vicinity of the Project site.

Additionally, the various projects are slated to be constructed prior to the commencement of construction activities for the Keri Keri Wind Farm Project and hence peak construction traffic activities are unlikely to overlap.

Notwithstanding this, frequent consultation is proposed between the Construction Contractor for this project (once appointed) and other concurrent construction projects which would have a common route with the proposed development. This would help to minimise any traffic impacts associated with these projects and schedule any OSOM vehicle deliveries amongst the projects.

6 Mitigation Measures

The following sets out suggested mitigation measures to management and / or mitigate the potential traffic and transport related impacts associated with the proposed Keri Keri Wind Farm development.

6.1 OSOM Vehicles Enabling Works

Oversized and over mass (OSOM) vehicles would be governed by a detailed traffic management plan that should be developed before approval for transport is granted.

The traffic management plan will include:

- Procedures for escorts of OSOM vehicles.
- Traffic control plans for temporary road closures to allow vehicles to cross to carriageway.
- Safe work methods and strategies for working on roadways.
- Dates and times for transporting loads.
- Location and use of rest stops and layovers along the journey.
- Communication strategy to affected communities.
- Notification and consultation of key stakeholders including:
  - Police and emergency services
  - Local Councils along the route
  - Public and School bus operators that may be affected
  - Advertising in local newspaper and media releases.
- Contact details of foreman or project manager throughout operations to be shared with emergency services and road authorities.
- Timing of operations and measures to avoid commuter peaks and school peaks through populated areas where practicable.
- Consideration of cumulative impacts of other projects along the route.
- Identification of layby areas for driver breaks and co-ordination of OSOM on site arrivals.

6.2 Reducing Project Related Traffic Generation

As detailed in the previous sections of the report, the proposed construction methodology will implement a number of mitigation measures to reduce the potential volume of daily and peak hour traffic generated by construction activities associated with the Project.

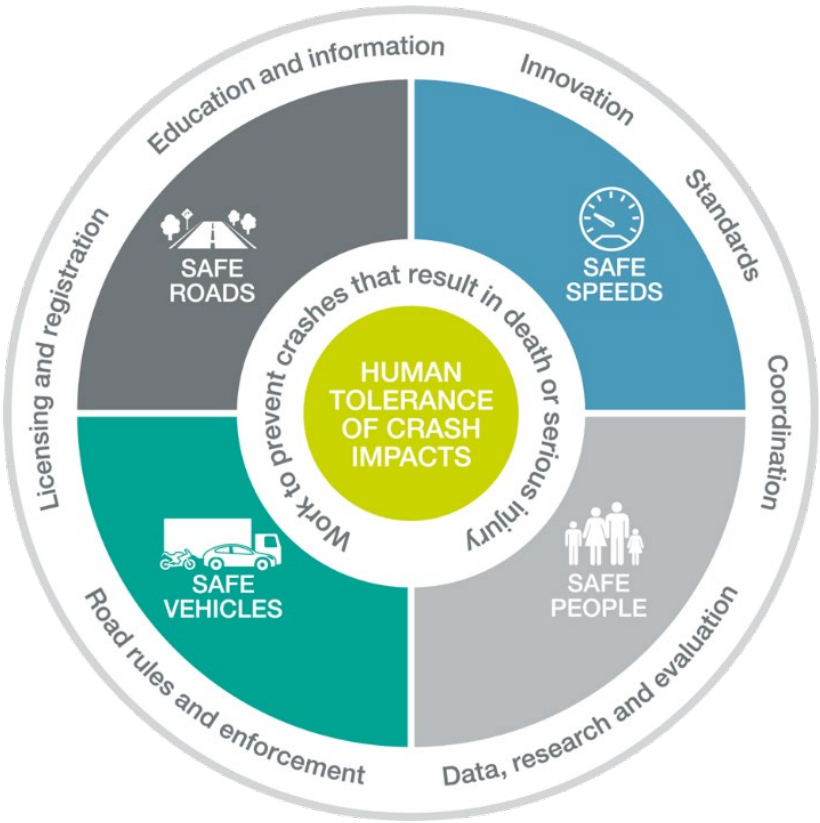
These measures include:

- Provision of on-site worker accommodation and implementation of a typical 10 day on – 4 day off shift
- Implementation of the shuttle bus service for workers travelling to and from the site.

6.3 Road Safety

Under the safe systems approach road safety is generally improved by focussing on Safe Roads, Safe Speeds, Safe People and Safe Vehicles. The safe systems approach is summarised in Figure 6.1.

Figure 6.1: Safe Systems Approach



Source: National Road Safety Strategy 2021-30 (December 2021)

6.3.1 Safe People

"Safe people" can be achieved by education of workers and policies of the work site. To this end worker site induction should include driver education of the local road conditions and an adoption of a "drivers code of conduct".

This could include:

- Training on drivers respect private property and farm gates.
- Driving to the conditions on unsealed roads.
- Avoid speeding and other dangerous behaviour. Identification and communication of known road crash cluster locations. Also, identification and warning of when roads may be affected by black ice, road damage (pot-holes) and incidents.
- A drug and alcohol policy to reduce incidents of drunk and drug driving.
- Additional caution when driving at dawn and dusk of kangaroos and other wildlife.
- Driving around livestock.
- Measures to reduce the risk of workers driving while tired.

In addition, the use of shuttle bus services would reduce the number of workers driving from the site while tired.

6.3.2 Safe Vehicles

Contractors are to ensure that all vehicles used are road worthy and in good working condition with lights, brakes, tire pressure etc.

6.3.3 Safe Speeds

As part of managing the Project, workers would be required to drive to the conditions and respect speed limits.

6.3.4 Sensitive Land Uses

It is recognised that the Project may have an impact on sensitive land uses such as schools and residential precincts within townships along material delivery routes.

To minimise the impacts on schools it is recommended that temporary road closures for OSOM movements should be avoided during school peaks. To this end vehicle layovers should be identified so allow vehicles to wait until appropriate times for travel.

6.4 Dilapidation Survey

Dilapidation surveys covering the pavement, drainage, and bridge structures will be undertaken in consultation with TfNSW and local Councils for the proposed transport routes before and after construction. Regular inspections and consultation with local Councils and proponents would be developed. It is expected that any damage resulting from construction traffic, except normal wear and tear, would be repaired.

6.5 Road Authority Approvals for OSOM Vehicles

OSOM vehicles would require permits from the National Heavy Vehicle Regulator (NHVR). This replaces the approvals that were previously granted from TfNSW and councils. Applications are to be submitted to the NHVR.

7 Conclusions

The Keri Keri Wind Farm Project will involve the construction and operation of up to 155 WTGs and associated and ancillary infrastructure on the Project site located approximately 30km south east of Balranald in the Murray River Local Government Area.

The Project is located within the South West Renewable energy Zone (REZ) and is directly accessible to the Sturt Highway.

With regards to traffic and transport the construction of the Project will include:

- Construction duration of approximately 2 years with peak construction activity of approximately 12 months in the middle of the works
- Construction to commence in 2027
- Up to 650 personnel on site during peak construction activities
- On-site accommodation to be provided for construction workers
- Up to 776 two way construction vehicle trips per day in peak construction
  - 598 general construction vehicles
  - 38 OSOM vehicles delivery WTG components
  - 140 worker vehicles (including shuttle buses, car pooling and private vehicles)
- General construction heavy vehicle trips will generally involve a range of vehicle sizes up to and including a 19m semi trailer.
- OSOM vehicles will be utilised to deliver WTG and BESS components to the site from either the Port of Newcastle or the Port of Adelaide. The ability of routes to accommodate OSOM vehicles has been assessed by R J Andrews (see Appendix A) including identification of works to facilitate OSOM vehicle movements.

The geometric assessment of the transport route alternatives has demonstrated that both routes can satisfactorily accommodate the swept path movements of the proposed construction vehicle types albeit with the need to adjust road infrastructure and intersection layouts / furniture.

The assessment of the road network operation demonstrated that the road network on the proposed transport routes has sufficient capacity to accommodate the peak construction traffic generation of the Project.

Furthermore, the peak construction period timing of the nearby proposed projects is unlikely to occur simultaneously with the Keri Keri Wind Farm Project.

To accommodate the proposed Keri Keri Wind Farm Project, the following measures are recommended:

- Site access intersection improvement works at the proposed Sturt Highway Site Access.
- Intersection improvements works at the Sturt Highway / Keri Keri Road intersection to accommodate the turning path requirements of OSOM vehicles.
- Implementation of appropriate traffic control measures and plans for OSOM vehicle movements.
- Implementation of the Drivers Code of Conduct detailing expectations for driver behaviour for travel to and from the Project site.
- Preparation and implementation of a detailed Construction Traffic Management Plan (CTMP) detailing how works to the site access and ongoing construction works will be undertaken. The CTMP shall be prepared by the proponent with the works contractor in consultation with TfNSW / Council.

In conclusion, it is considered that with the mitigation measures set out in this report, that the construction and operation of the Keri Keri Wind Farm Project can be undertaken without significant adverse impacts to the operation, capacity or safety of the surrounding road network.

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Appendix A

OSOM Route Assessment – Rex J Andrews P/L

REX J ANDREWS
ENGINEERED TRANSPORTATION

ROUTE STUDY: ACCIONA

PROJECT: KERI KERI WINDFARM

EX PORT OF NEWCASTLE

07/03/2024 REV 01

Rev	Date	Change	Responsible	Checked
00	04/08/22	Route Assessed	C Ewin	✓
00	27/09/22	Report Compiled	S Kasteel	✓
00	14/10/22	Report Completed	W Andrews	✓
01	07/03/24	Report Updated 91.5m Blade	E Novak	✓
01	07/03/24	Report Completed	W Andrews	✓

Index

1.0 Introduction

This Route Study has been prepared for the Keri Keri Wind Farm (the Project) for Acciona Energy Australia Global Pty Ltd (the Applicant).

The study is to understand the transport route constraints for the components listed in this report and assist in planning of the windfarm layout.

This document describes observations and previous experience on route and explains the transport of wind turbine equipment from Newcastle to Keri Keri Windfarm.

The route survey was conducted on 04/08/2022

2.0 Evaluation

1	No Work
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: 04/08/2022
Survey undertaken by: (Rex J Andrews P/L)
Project name: Keri Keri Windfarm
Location: Port of Newcastle (NSW) to Keri Keri Wind Farm (NSW)
The project consists of the following key components:

- Up to 155 Wind Turbine Generators (WTG) with a hub height of 200 metres (m) and maximum height tip height of 291.5 m (vertical tip)

4.0 Transport Combinations Examples

465 x Blades (91.5l x 4.8w x 3.9h x 35.0T)
Transport configuration. Prime mover with 3x8-3x8 Blade trailer.
Overall dimensions: 105.0l x 4.8w x 4.9h x 108.5T.

125 x Hubs (4.8l x 4.8w x 4.0h x 60.0T)
Transport configuration. Prime mover with 2x8 dolly 3x8 low loader.
Overall Dimensions: 28.0l x 4.8w x 5.0h x 96.5T.

176 x Nacelle (12.0l x 4.5w x 4.2h x 75.0T)
Transport configuration. Prime mover with 2x8 dolly 5x8 low loader.
Overall Dimensions: 30.0l x 4.5w x 5.0h x 117.5T.

176 x Drive Train (7.0l x 3.5w x 3.5h x 95.0T)
Transport configuration. Prime mover with 2x8 8x8 dolly platform trailer.
Overall Dimensions: 32.0l x 4.2w x 4.5h x 157.5T.

176 x T1 tower sections (13.4 x 5.5 x 5.0 x 99T)
Transport configuration. Prime mover with 10x8 Low Platform trailer.
Overall Dimensions: 30.0l x 5.0w x 5.9h x 161.5T.

176 x T2 tower sections (19.3 x 5.0 x 5.0 x 98T)
Transport configuration. Prime mover with 10x8 Low Platform trailer.
Overall Dimensions: 30.0l x 5.0w x 5.9h x 160.5T.

176 x T3 tower sections (23.4 x 5.0 x 5.0 x 97T)
Transport configuration. Prime mover with 10x8 Low Platform trailer.
Overall Dimensions: 37.0l x 5.0w x 5.9h x 159.5T.

176 x T4 tower sections (29.5 x 5.0 x 5.0 x 98T)
Transport configuration. Prime mover with 5x8 5x8 Extending Platform trailer.
Overall Dimensions: 45.0l x 5.0w x 5.9h x 169.5T.

176 x T5 tower sections (29.9 x 5.0 x 4.1 x 86T)
Transport configuration. Prime mover with 5x8 5x8 Extending Platform trailer.
Overall Dimensions: 45.0l x 5.0w x 5.9h x 157.5T.

176 x T6 tower sections (29.3 x 4.1 x 3.3 x 50.5T)
Transport configuration. Prime mover with 4x4-2x8 Dolly and Jinker.
Overall Dimensions: 45.0l x 5.0w x 5.9h x 86.5T.

Modular tower option:

1056 x Standard loads (12l x 2.4w x 2.4h x 10.0T)
Transport configuration. Prime mover with 3x4 semi-trailer.
Overall Dimensions: 19.0l x 2.5w x 4.3h x 38.5T.

1936 x Generic special loads (18l x 3.5w x 3.5h x 20.0T)
Transport configuration. Prime mover with 3x4 semi-trailer.
Overall Dimensions: 26.0l x 3.5w x 5.0h x 42.5T.

126 x Transition segments (17.3l x 4.3w x 4.3h x 66.0T)
Transport configuration. Prime mover with 8x8 Platform trailer.
Overall Dimensions: 30.0l x 4.3w x 5.3h x 124.5T.

126 x Monotubular segment 3 (21.5l x 4.3w x 4.3h x 72.0T)
Transport configuration. Prime mover with 10x8 Platform trailer.
Overall Dimensions: 35.0l x 4.3w x 5.3h x 134.5T.

126 x Monotubular segment 2 (28.8l x 4.3w x 4.3h x 67.0T)
Transport configuration. Prime mover with 4x8-4x8 Extending platform trailer.
Overall Dimensions: 42.0l x 4.3w x 5.3h x 131.5T.

126 x Monotubular segment 1 (28.9l x 4.3w x 3.3h x 44.0T)
Transport configuration. Prime mover with 4x4-2x8 Dolly jinker.
Overall Dimensions: 40.0l x 4.3w x 5.3h x 86.5T.

5.0 Transport Drawings

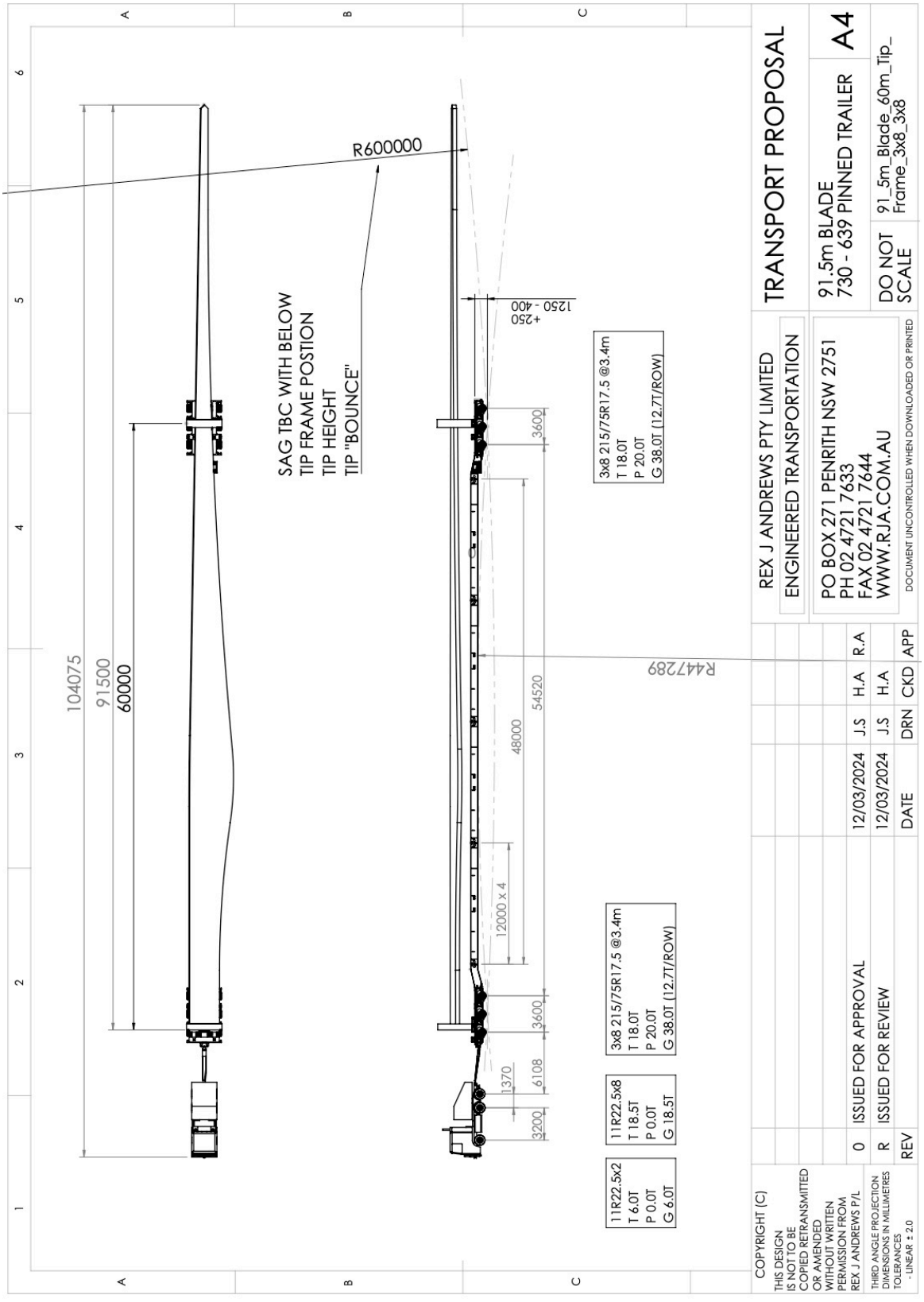

Figure 1 - Blade diagram

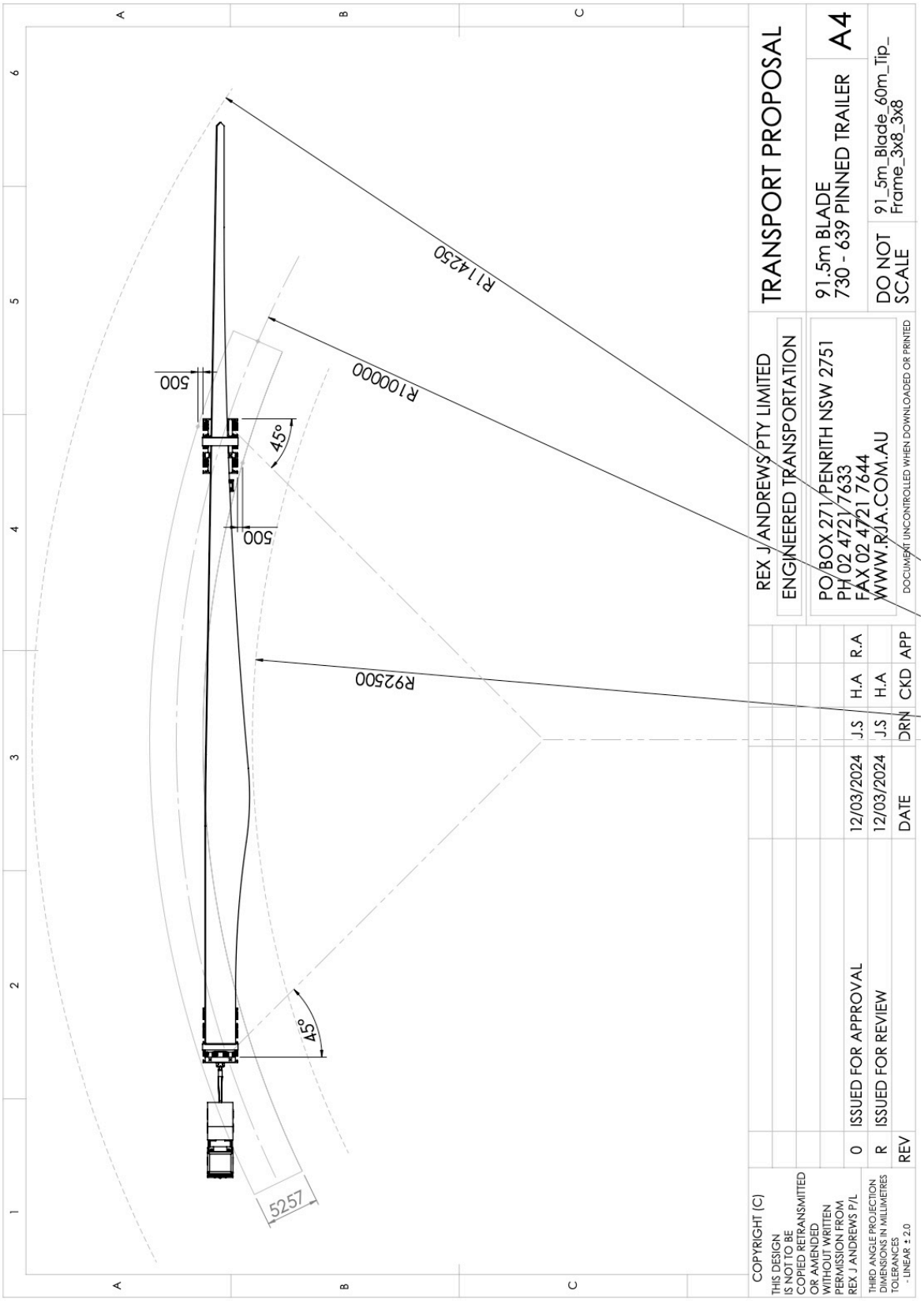

Figure 2 - Blade diagram: Swept path

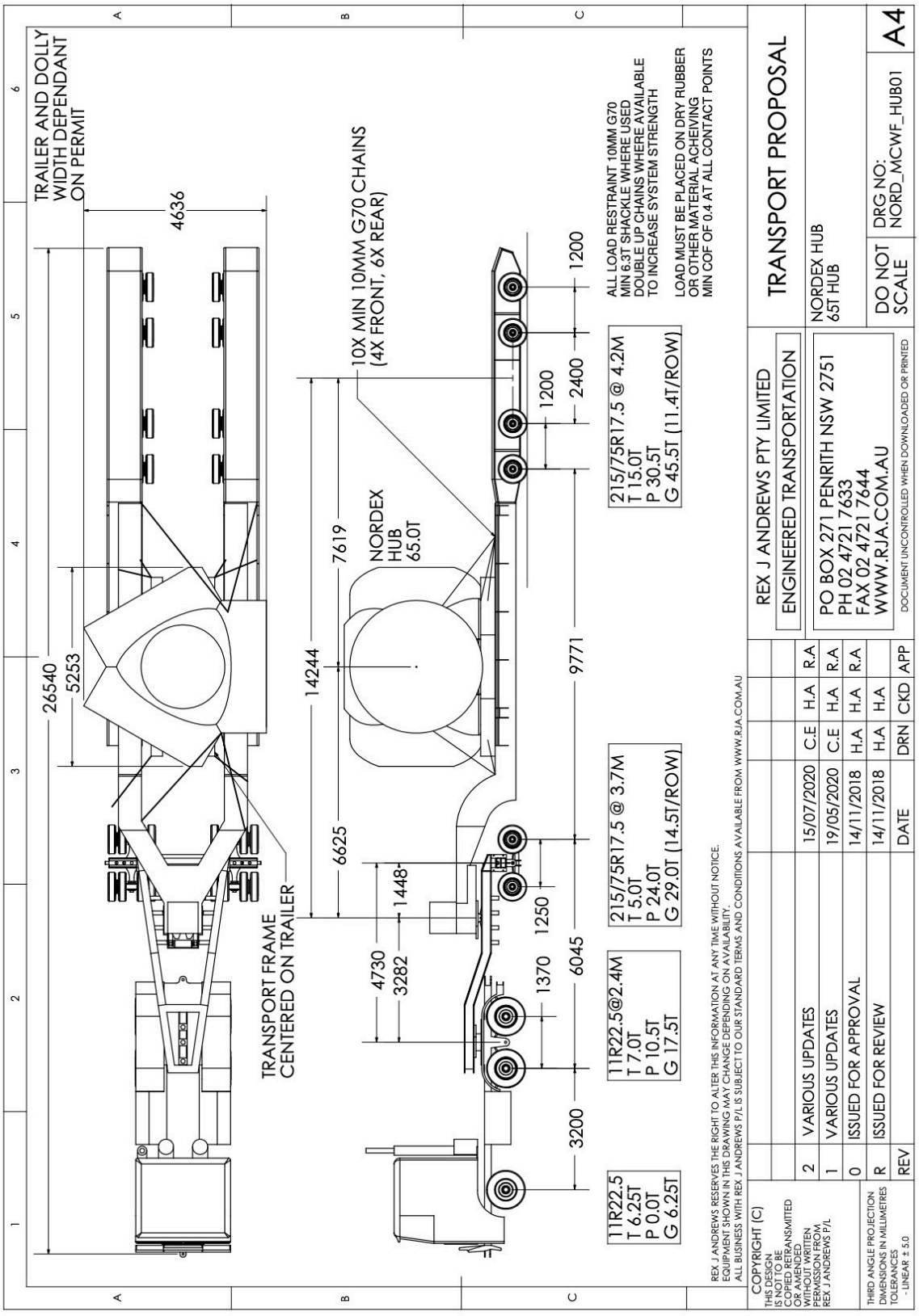

Figure 3 - Hub combination example

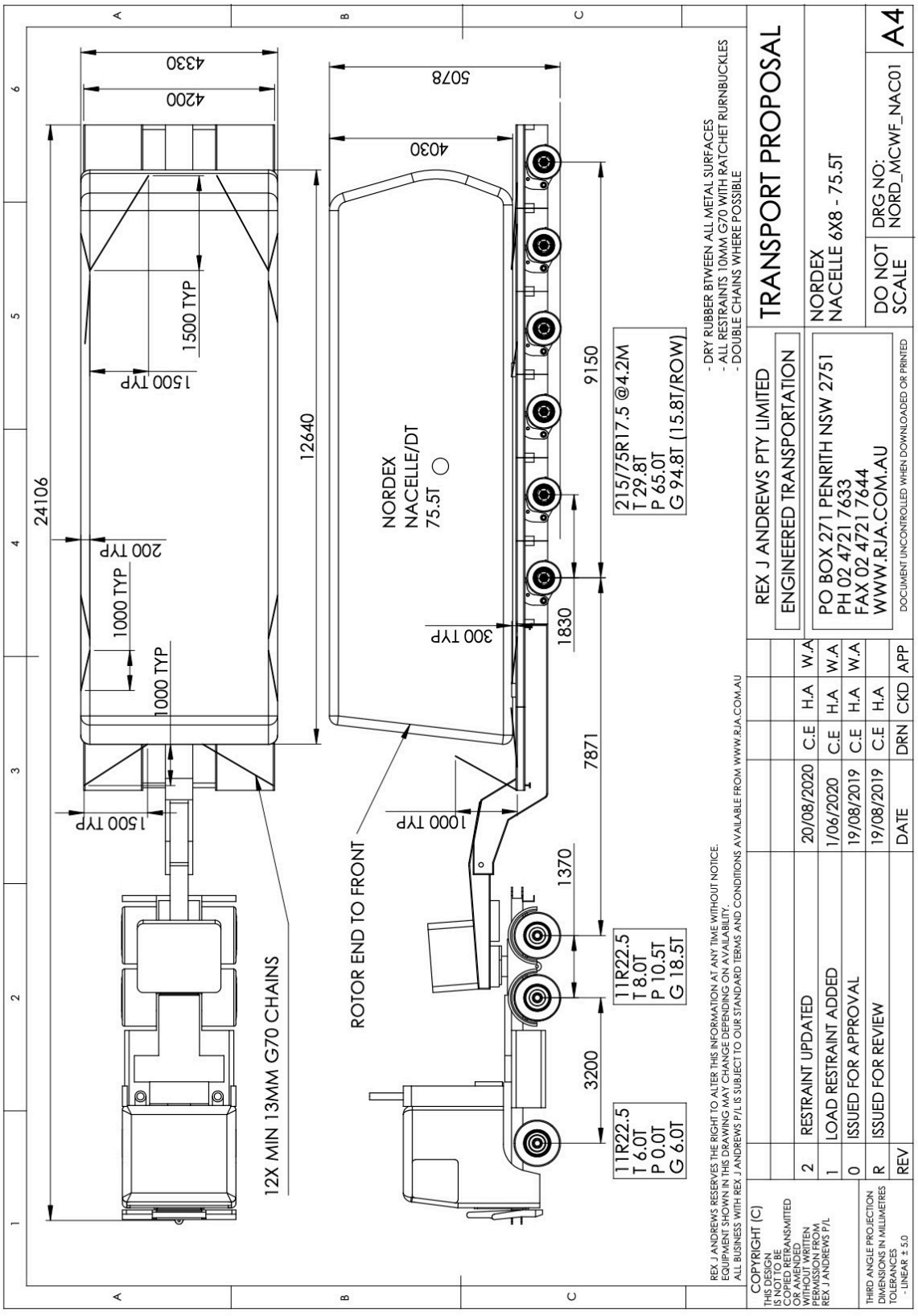

Figure 4 - Nacelle combination example

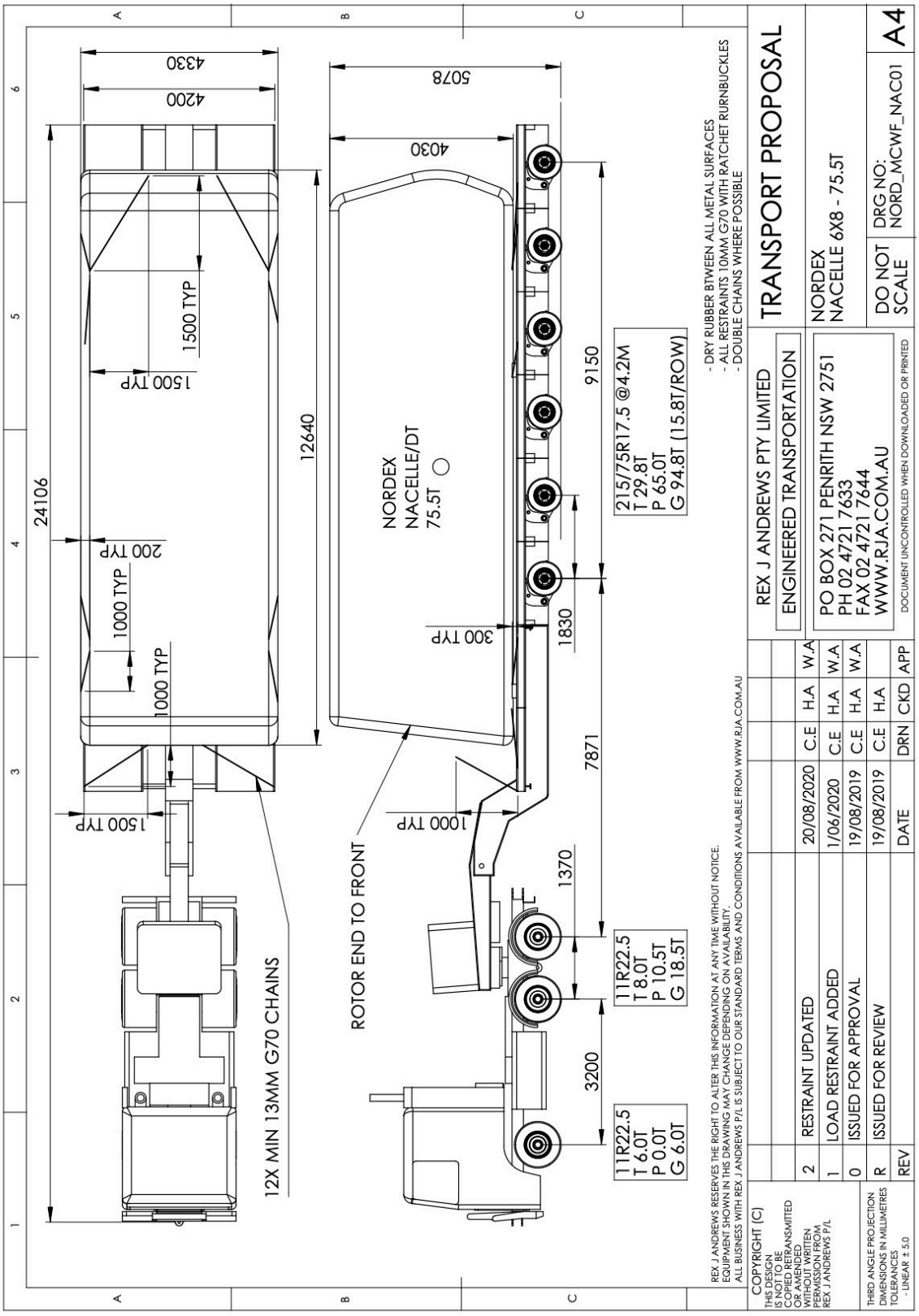

Figure 5 - Nacelle combination example

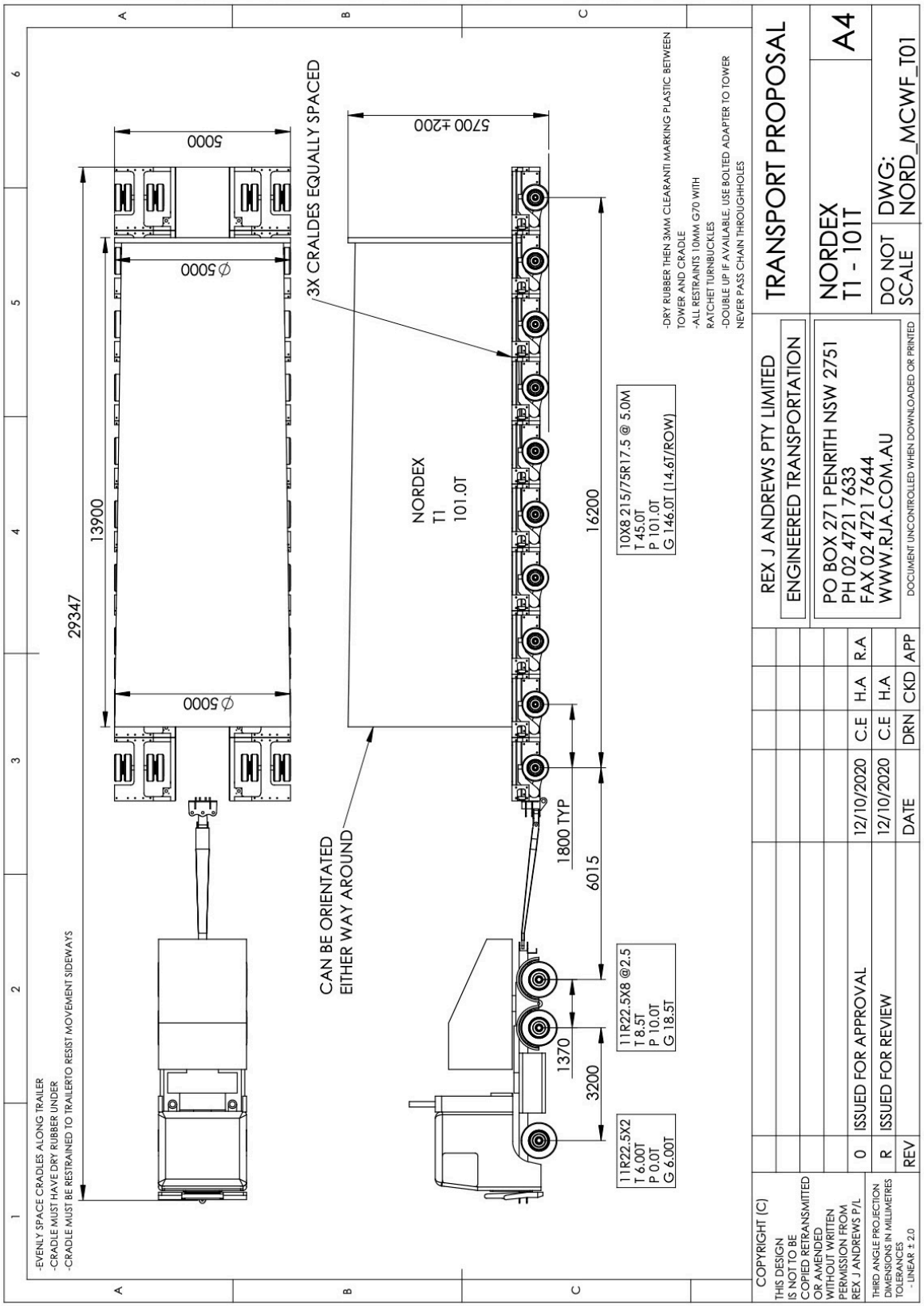

Figure 6 - Tower Trailer 10x8 Low platform example

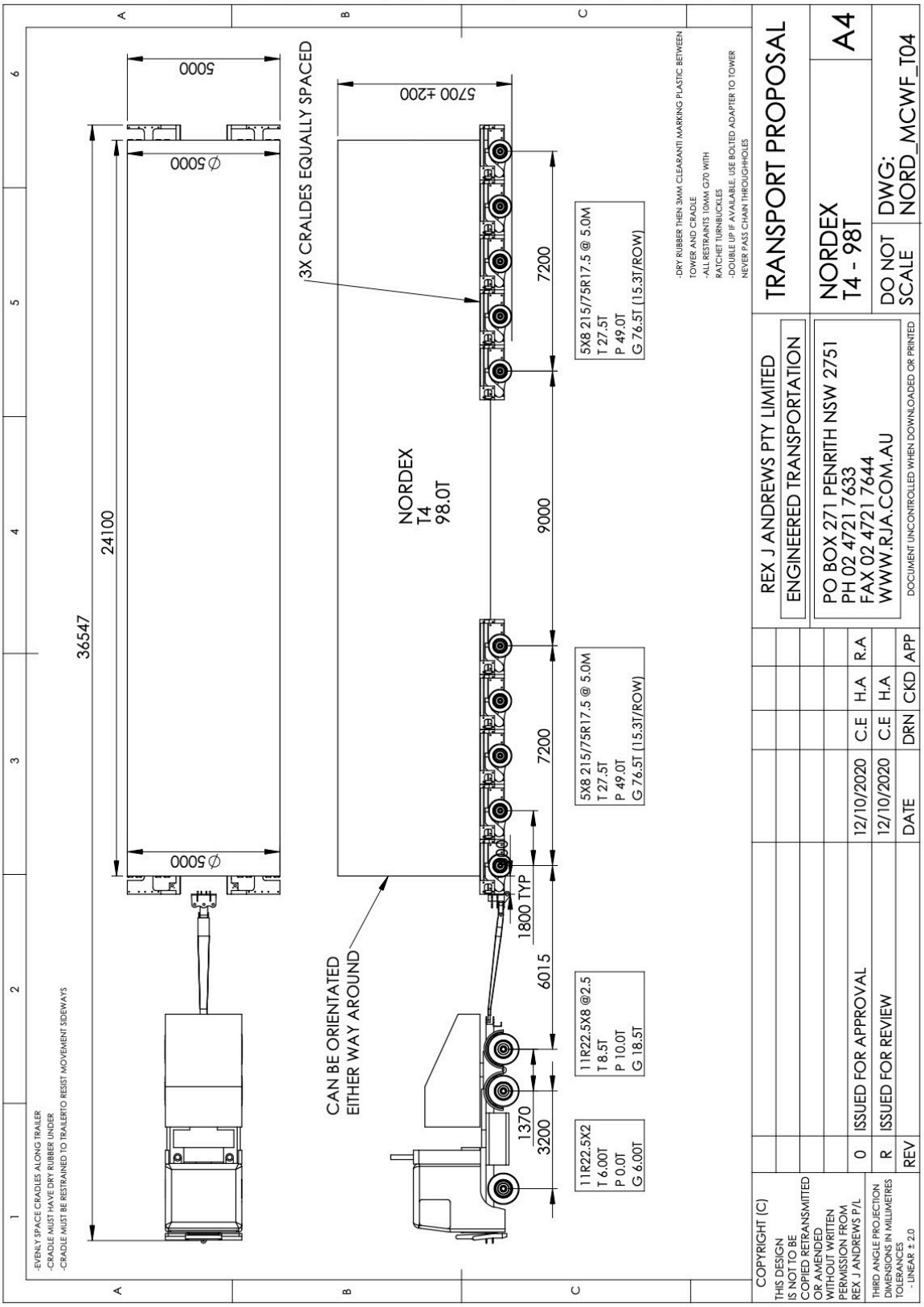

Figure 7 - Tower trailer 5x8-5x8 Low extending platform example

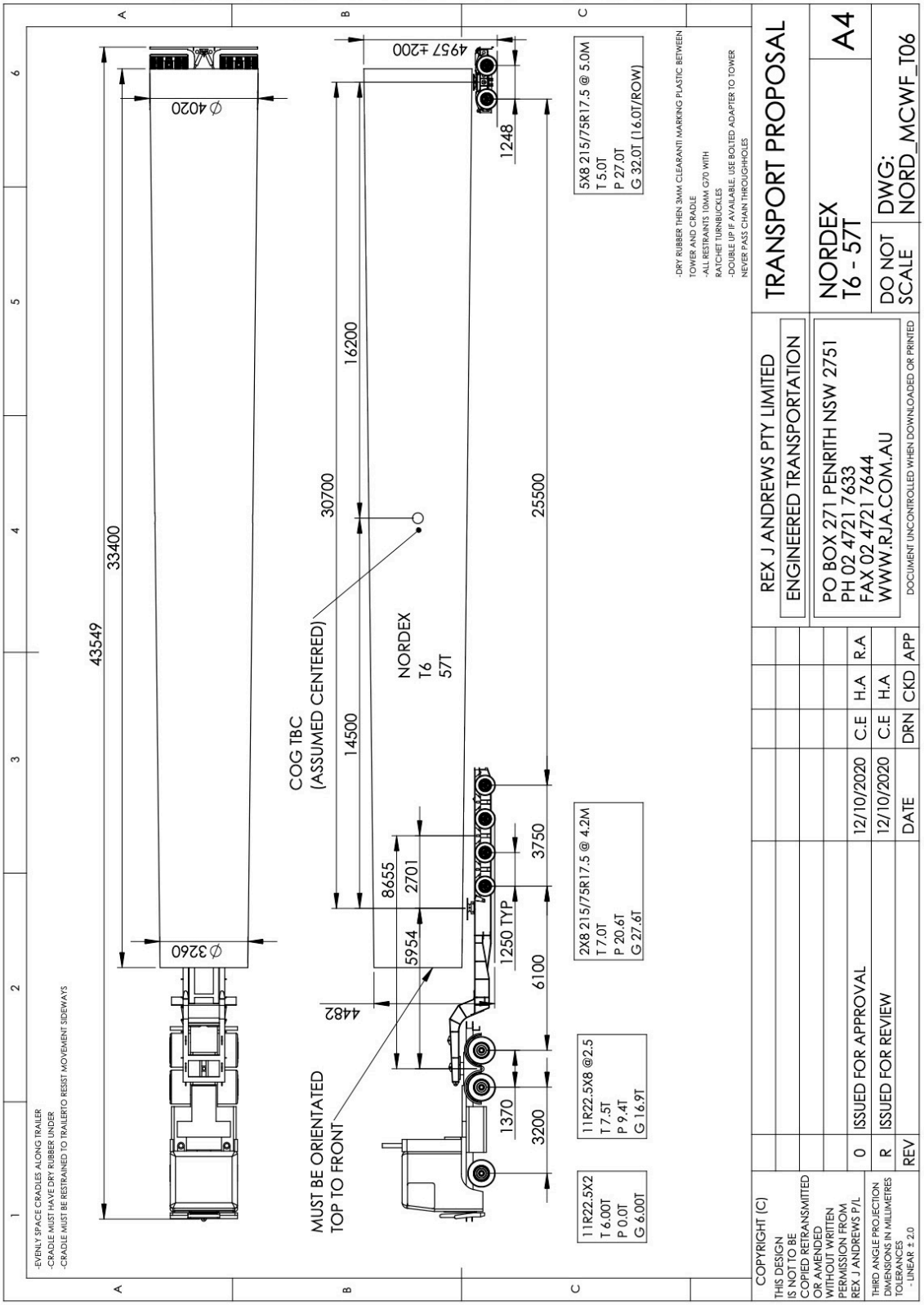

Figure 8 - Tower trailer Dolly and Jinker example

6.0 Keri Keri Wind Farm Site Location

The proposed Keri Keri Wind Farm is located approximately 30 kilometres (km) southeast of Balranald, and 75 km southwest of Hay in the Murray River Local Government Area (LGA).

The project is located within the Southwest Renewable Energy Zone (REZ) and is directly south of the Sturt Highway.

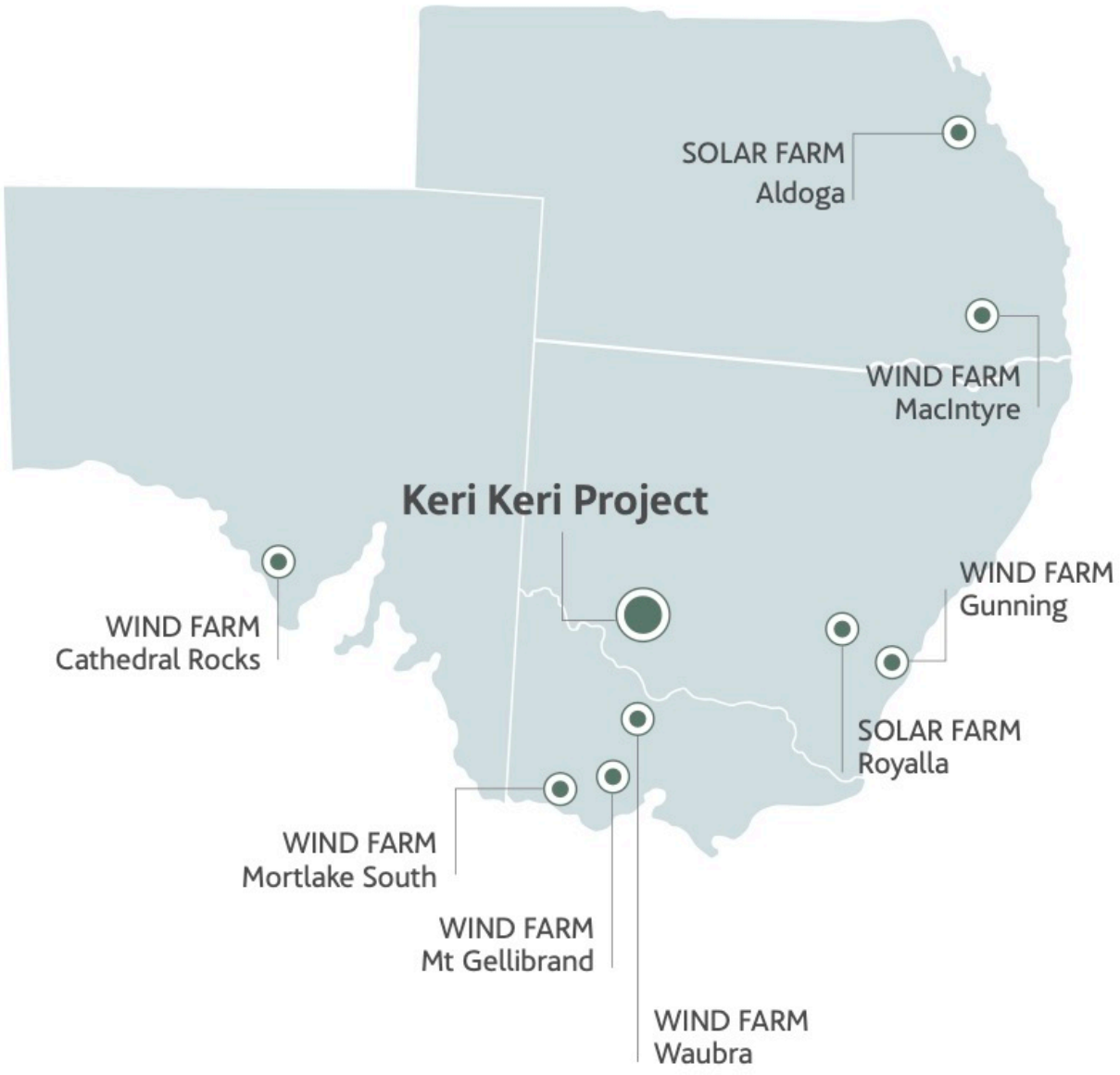

Figure 9 - Keri Keri Wind Farm Site Location

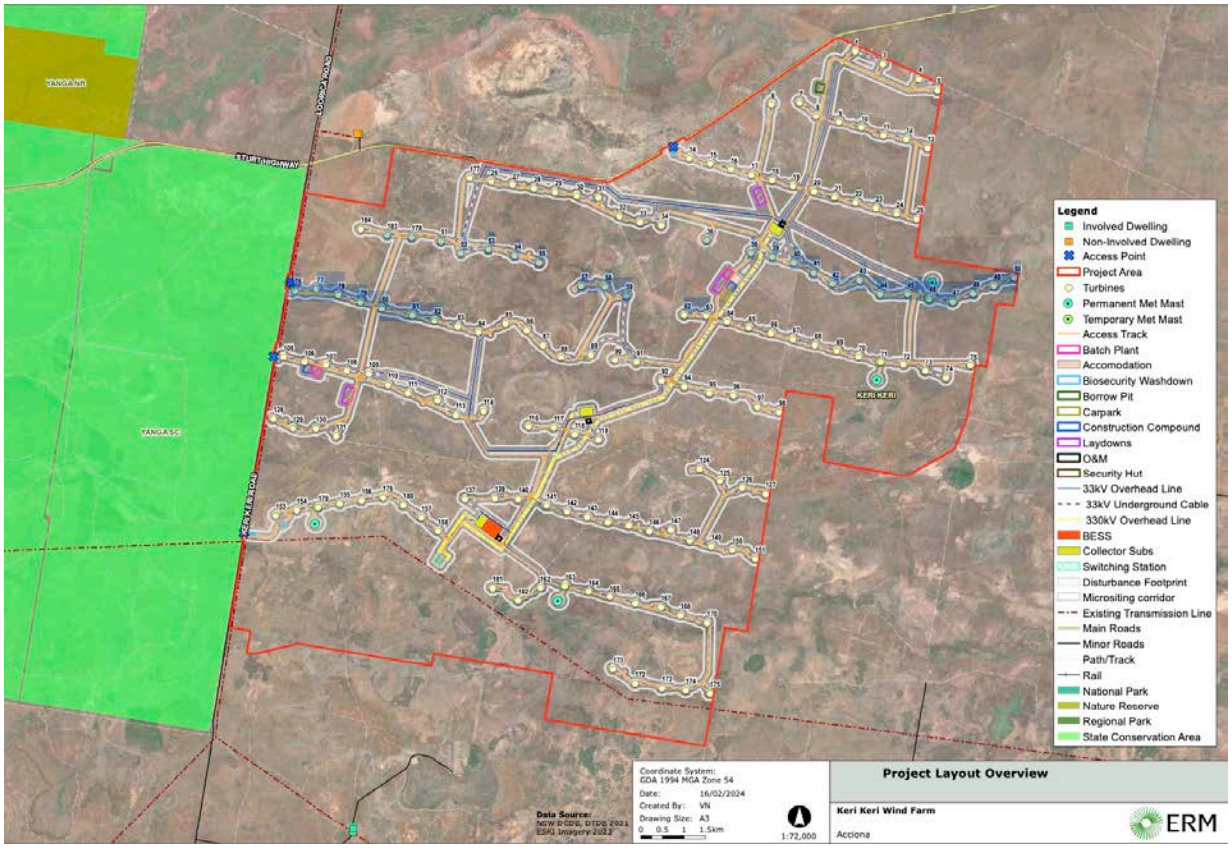

Figure 10 - Keri Keri Wind Farm Site Layout

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 ideal berth for these shipments is the Mayfield No.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.

Figure 11 - Mayfield No.4 berth overview

Figure 12 - Mayfield No.4 Port storage area

8.0 Transport Summary

The study is based on the turbine components entering Australia via the Port of Newcastle. The study will show the likely route for these components, and the constraints that they may encounter on the route.
Route 1 would be used as the option for the blades and components under 5.25m loaded height.
Route 2 is the option for all loads over 5.25m with a **maximum loaded height of 5.9m**

ROUTE 1: Blades and components **under 5.25m** loaded height

DISTANCE: 984 kilometres

GPS LINK: https://maps.app.goo.gl/vBHUqDDoFLSuFELCA

ROUTE: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, M1, NorthConnex tunnel, (Pennant Hills Road for all items other than blades), M2, M7, M5, Hume Highway, Sturt Hwy, Keri Keri Road.

ROUTE 2: High load route. **Maximum loaded height 5.9m**

DISTANCE: 1106 kilometres

GPS LINK: https://maps.app.goo.gl/wEudEHokGnwBWK7M7

ROUTE: 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, Golden Highway, Boothenba Road, Troy Bridge Road, Bunglegumbie Road, Mitchell Highway, Manildra Street, Derribing Avenue, Algalah Street, Tomingley Road, Newell Highway, Thomas Street, Moulden Street, Henry Parkes Way, Westlime Road, Hartigan Avenue, Newell Highway, Compton Road, Showground Road, Newell Highway, Sturt Highway, Keri Keri Road.

9.0 Route 1: Blades and components under 5.25m loaded height

DISTANCE: 984 kilometres
COMPONENTS: Blades and components under 5.25m loaded height
GPS LINK: https://goo.gl/maps/rrHV7cAEwTqzcX5EA
ROUTE: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, M1, NorthConnex tunnel, (Pennant Hills Road for all items other than blades), M2, M7, M5, Hume Highway, Sturt Hwy, Keri Keri Road.

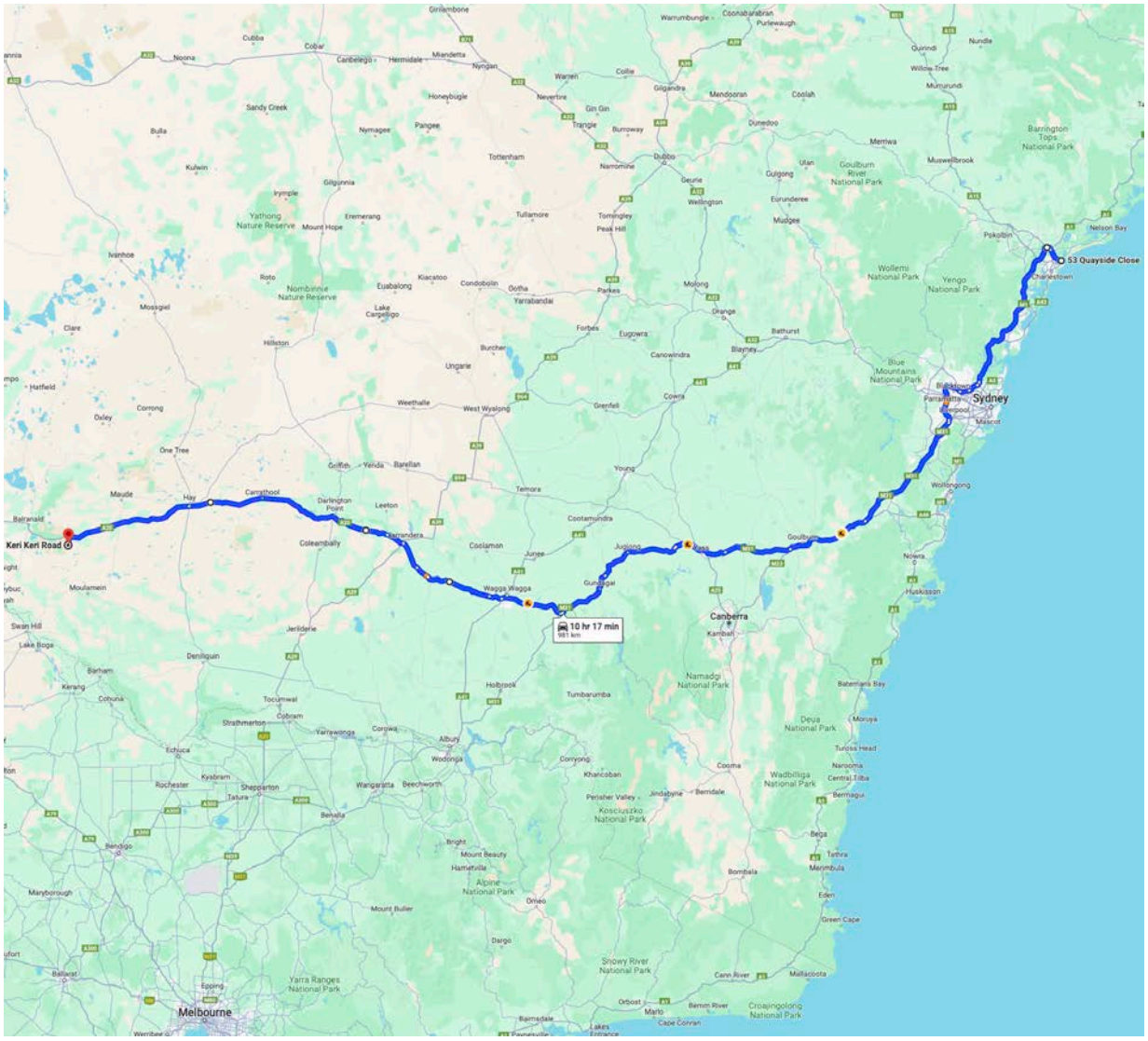

Figure 13 - Route 1

KEY	
MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Current clearance	Procedure	Comments
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street https://goo.gl/maps/afLwPYKuNdm	Length: 70.0m Width: 8.0m	Moderate right hand turn	Hardstand will need to be added to the left entry and exit of the corner. The existing culvert will need to be extended. Some signs will need to be relocated and or made removable and some fence and gate will need to be relocated.
0.4	Mayfield	Selwyn Street rail crossing https://goo.gl/maps/864FhMSaF9P2	Width: 9.0m	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 Industrial Drive via George Street https://goo.gl/maps/brPRAckLr572	Length: 70.0m Width: 8.0m	Right hand turn	The first right hand turn through George Street will need a sign made removable and a disused pole on the overhang removed. On the inside of the corner hardstand will need to be added, a sign made removable, and a light pole and traffic signal relocated. On the outside tailswing the disused pole next to the railway line will need to be removed.
4.9	Mayfield	Industrial Drive under traffic signals https://goo.gl/maps/5DpD3b7KnT72	Clearance: Height: 5.4m	Travel directly ahead	The blades will need to cross to the incorrect side of the intersection 200 metres prior, before crossing back over to the correct side 120 metres to the north of the intersection. A light pole on the inside of the corner will need to be made removable, and two signs will need to be made removable or relocated.
5.5	Mayfield West	Industrial Drive onto Maitland Road https://goo.gl/maps/Kn49dhWG2qG2	Length: 70.0m Width: 8.0m	Right hand turn	A light pole on the inside of the corner will need to be relocated outside swept path, and two signs will need to be made removable or relocated. Traffic islands to be replaced with painted lines to be trafficable.
14.8	Tarro	New England Highway/Maitland Rd https://goo.gl/maps/hkKqsZMfdVJncRdu6	Length: 100.0m Width: 12.0m	Left hand bend	Spotter to guide load through this section of road.
17.4	Tarro	New England Highway onto John Renshaw Drive https://goo.gl/maps/SRDr5JigkBp	Length: 100.0m Width: 12.0m	Left hand merge	No problems with this section of road.

KM index	Location	Section of road	Current clearance	Procedure	Comments
18.4	Beresfield	John Renshaw Drive onto the M1 https://goo.gl/maps/A34jhxCjM5wfRDdo6	Length: 80.0m Width: 8.0m	Left hand bend	2x light poles to be removed or relocated on the outside of corner for tail swing. Signs to be relocated/removed. Kerb and gutter to be modified to be trafficable for trailer.
113.0	Mt White	M1 Motorway under Mt White overpass https://goo.gl/maps/K3fPPe4fNx63xB3j7	Height clearances: Left Lane: 5.2m Centre Lane: 5.3m Right Lane: 5.4ms	Travel directly ahead	Loads that exceed 5.3 metres high are not to travel under this structure. Loads over 5.2 metres high are to travel under the bridge in the far-right lane, and at a speed of no more than 5 km's per hour. Spotter to guide load through this section of road.
122.0	Hawkesbury River	M1 Motorway https://goo.gl/maps/yDzjirEKLAbREE8B6	100.0 long x 6.0 wide	Merge to left	Large parking area
146.4	Wahroonga	M1 onto North Connex GPS link: https://goo.gl/maps/7TMrKXHJzJDzimqZ7	Height: 5.0m 120 metres	Right Hand Merge	Merge into right hand lane ready to enter North Connex Tunnel. BLADES ONLY.
146.4 to 155.9	Wahroonga to West Pennant Hills	M1 onto Pennant Hills Road GPS link: https://maps.app.goo.gl/ZEBwkDNnC7DtmPoA8	Height: 5.0m 120 metres	Left hand turn onto PHR, travel along PHR before turning right onto the M2.	Merge into right hand lane ready to enter North Connex Tunnel. REMAINING LOADS UNDER 5.25 METRES IN HEIGHT.
155.9	West Pennant Hills	North Connex onto M2 GPS Link: https://goo.gl/maps/C6aAHGR54c4KbkeJ7	Height: 5.25m 120 metres	Right Hand Merge	Merge onto the M2 Motorway
167.0	Kings Park	M7 Motorway https://goo.gl/maps/T8WcbR9T84Zs7WpF7	100.0 long x 6.0 wide	Merge to left	Large parking area
201.0	Prestons	M7 Motorway onto M5 Motorway https://goo.gl/maps/FA2mF7PxZkxrRDTR9	Width: 10.0 metres	Travel directly ahead	No problems with this section of road.
229.0	Menangle	Hume Highway https://goo.gl/maps/KPMdLS1XuRWHrcyb6	200.0 long x 8.0 wide	Merge to left	Large parking area for towers and motors, no blades to enter this parking bay.
238.0	Wilton	Hume Highway under Farm access overpass https://goo.gl/maps/2ZsVqYJ9j9qPTGqa9	Height clearances: Left Lane: 5.5m Centre Lane: 5.4m Right Lane: 5.3m	Travel directly ahead	Loads that exceed 5.3 metres high are not to travel under this structure. Loads over 5.2 metres high are to travel under the bridge in the left lane, and at a speed of no more than 5 km's per hour. Spotter to guide load through this section of road.
303.0	Sutton Forest	Hume Highway https://goo.gl/maps/uT1ubtSuawS2	150.0 long x 10.0 wide	Merge to left	Large parking area
352.0	Goulburn	Hume Highway https://goo.gl/maps/7HywRcjZiJy	180.0 long x 15.0 wide	Merge to left	Large parking area
353.0	Goulburn	Windellama/Bungonia Road Overpass GPS Link: Windellama Rd OP	5.44 Metres clearance	Travel directly ahead	No problems with this section of road
380.0	Breadalbane	Hume Highway https://goo.gl/maps/UWjx3XndLejWG1UD9	140.0 long x 14.0 wide	Merge to left	Large parking area
453.0	Bowning	Hume Highway https://goo.gl/maps/vRMmSbJCke5d65PJ9	200 long x 8.0 wide	Merge to left	Large Parking area
456.0	Bowning	Hume Highway https://goo.gl/maps/XENMvuFeHCevVo8J6	80 long x 25 wide	Merge to left	Large parking area

KM index	Location	Section of road	Current clearance	Procedure	Comments
510.0	Jugiong	Hume Highway https://goo.gl/maps/QzzfyAAnixQn3nwx8	140.0 long x 14.0 wide	Merge to left	Large parking area
573.70	Tarcutta	Hume Hwy onto Sturt Hwy GPS Link: https://goo.gl/maps/ruqNDSw5vanJDd4x5	200m long	Left Hand Merge	Merge left to left lane to exit Hume Hwy, follow road right onto overpass onto Sturt Hwy. No problems with this section of road.
614.6	Wagga Wagga	Sturt Hwy GPS Link: https://goo.gl/maps/7VDWUvW8KnUhCEdd7	80m long	Second Exit on Round-about	Sign to be removed in the middle of the roundabout. Roundabout made trafficable.
617.3	Wagga Wagga	Sturt Hwy GPS Link: https://goo.gl/maps/VeavHs6e4AiLaqqDA	80m long	Second Exit on Round-about	Sign to be removed in the middle of the roundabout. Handstand to be installed on roundabout and roundabout made trafficable.
618.4	Wagga Wagga	Sturt Hwy GPS Link: https://goo.gl/maps/dBrte59BvHvvcGSr5	80m long	Second Exit on Round-about	The truck will need to cut across the centre of the roundabout. The existing pavement is ok to drive on without any extra work. 2x signs to be removed in the middle of the roundabout.
618.75	Wagga Wagga	Sturt Hwy under rail overpass GPS Link: https://goo.gl/maps/JPkJBAyzJuMAiHUz8	Height clearances: 5.40m	Travel under rail overpass	Detailed vertical curve assessment required to determine whether blade loads can travel under the rail bridge and maintain clearance, as well as maintaining tip clearance to the ground on entry and the bridge on exit while travelling through the dip.
621.5	Wagga Wagga	Sturt Hwy GPS Link: https://goo.gl/maps/fx388vcUAibykivPA	80m long	Second Exit on Round-about	Signs to be removed in the middle of the roundabout. Roundabout made trafficable.
711.0	Gillenbah	Sturt Hwy GPS Link: https://goo.gl/maps/C7qJ8ouDVdpcH5Rz7	80m long	Left Hand Turn	Several signs to be relocated or made removable. Power pole to be relocated out of swept path. Vegetation to be removed or trimmed for blade oversail. Traffic island to be removed and replaced with paint to make trafficable.
711.5	Gillenbah	Sturt Hwy GPS Link: https://goo.gl/maps/w4bRo2oaCsWADQcA7	100.0 metres long 5.0 metres wide	Merge to	Emergency parking
882.0	Hay South	Sturt Hwy Roundabout at Cobb Hwy GPS Link: https://maps.app.goo.gl/Sln5kWiKvUXBYK5e9	50 metres	Load to cross to incorrect side of road and use bypass through roundabout.	Existing shoulder on entry to be made trafficable. Hardstand bypass installed through roundabout parallel with existing easement. Vegetation to be removed or trimmed. Several signs relocated or made removable.
967	Keri Keri	Stuart Highway into site entrances GPS Link: https://goo.gl/maps/C2aaH9WJcqcRE9MD8		Site Entrance	A site entrance is proposed for this location. The land is very flat with limited vegetation. All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

KM index	Location	Section of road	Current clearance	Procedure	Comments
976	Keri Keri	Sturt Highway onto Keri Keri Road GPS Link: https://goo.gl/maps/uH5pmWwzWvz3TJ4K6		Left hand turn	Hardstand to be installed and signs and all obstacle relocated or removed. Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic. Keri keri Rd and All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.
979-984	Keri Keri	Keri Keri Road into site entrances GPS Link: https://maps.app.goo.gl/nGXFh9Snwd52CoR69		3 x Site Entrance	3 x site entrances are proposed for this location. The land is very flat with limited vegetation. All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

0.0 Km's: Mayfield No.4 onto Selwyn Street at Mayfield

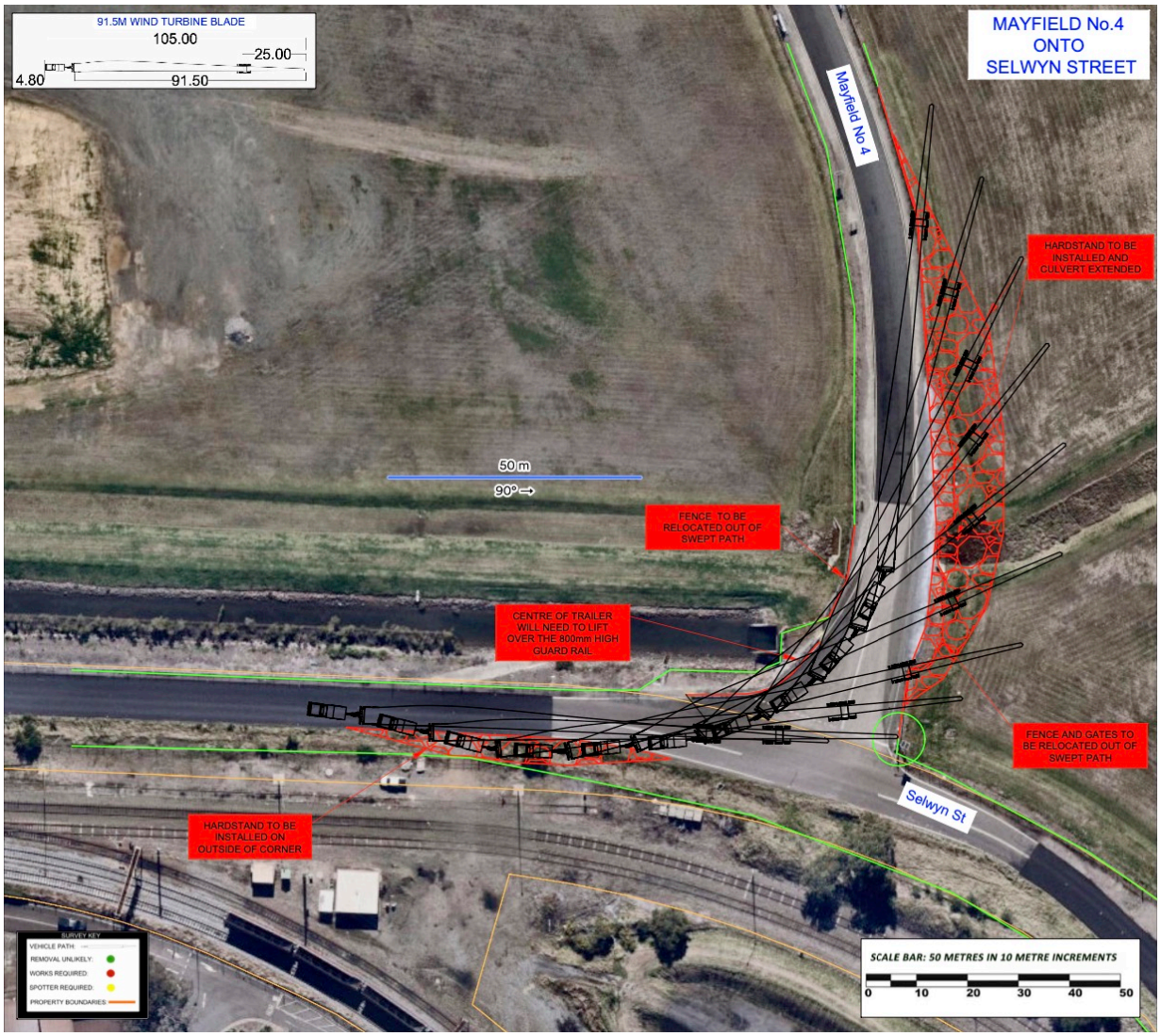

Figure 14 - Mayfield No.4 onto Selwyn Street

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/afLwPYKuNdm

PROCEDURE: Right hand turn.

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: Hardstand will need to be added to the left entry and exit of the corner. The existing culvert will need to be extended. Some signs will need to be relocated and or made removable and some fence and gate will need to be relocated.

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

Figure 15 - Rail crossing over Selwyn Street

GPS LINK FOR THIS LOCATION: 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

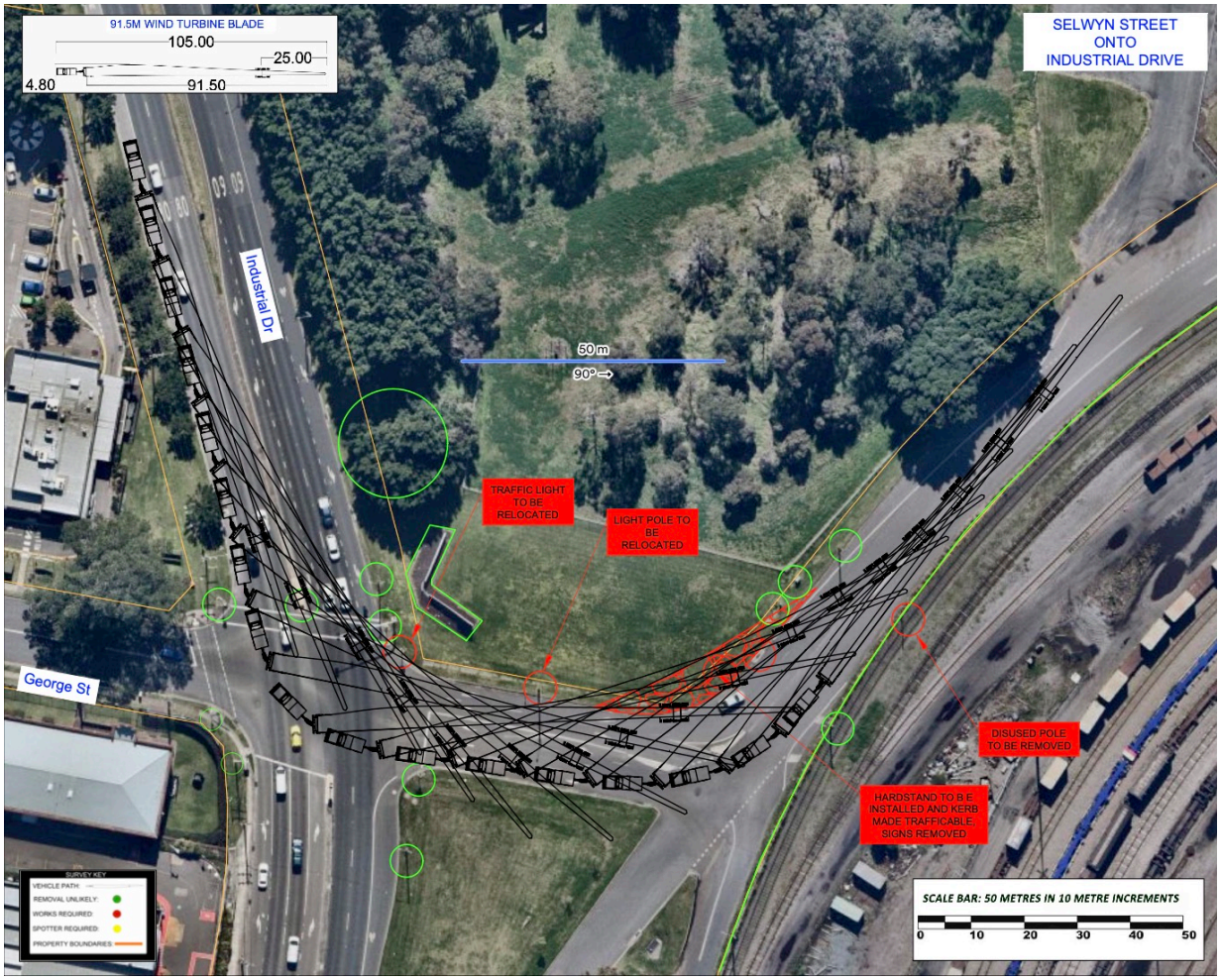

Figure 16 - Selwyn Street onto Industrial Drive

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/brPRAckLr572

PROCEDURE: Right hand turn from Selwyn Street through George Street and onto Industrial Drive. Entering Industrial Drive, the prime mover will cross from the correct side to the correct side with the trailer cutting the corner and travelling over the centre median strip.

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: The first right hand turn through George Street will need a sign made removable and a disused pole on the overhang removed. On the inside of the corner hardstand will need to be added, a sign made removable, and a light pole and traffic signals relocated. On the outside tail swing the disused pole next to the railway line will need to be removed.

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

Figure 17 - Standard overhanging Traffic signals Mayfield to Hunter Expressway

GPS LINK FOR THIS LOCATION: 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

Figure 18 - Industrial Drive onto Maitland Road

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/Kn49dhWG2qG2

PROCEDURE: Right hand turn from Industrial Drive onto Maitland Road. The blades will need to cross to the incorrect side of the intersection 200 metres prior, before crossing back over to the correct side 120 metres to the north of the intersection.

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: A light pole on the inside of the corner will need to be relocated outside swept path, and two signs will need to be made removable or relocated. Traffic islands to be replaced with painted lines to be trafficable.

14.8 Km's: New England Highway/Maitland Rd at Tarro

Figure 19 - New England Highway/Maitland Rd at Tarro

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/hkKgsZMfdVJncRdu6
PROCEDURE: Left hand bend.
COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.
ROAD MODIFICATIONS: No works required. The blades will stay on the correct side of the road for the entirety.
Spotter to keep the driver informed throughout the procedure.

18.4 Km's: Intersection of John Renshaw Drive and M1 at Beresfield

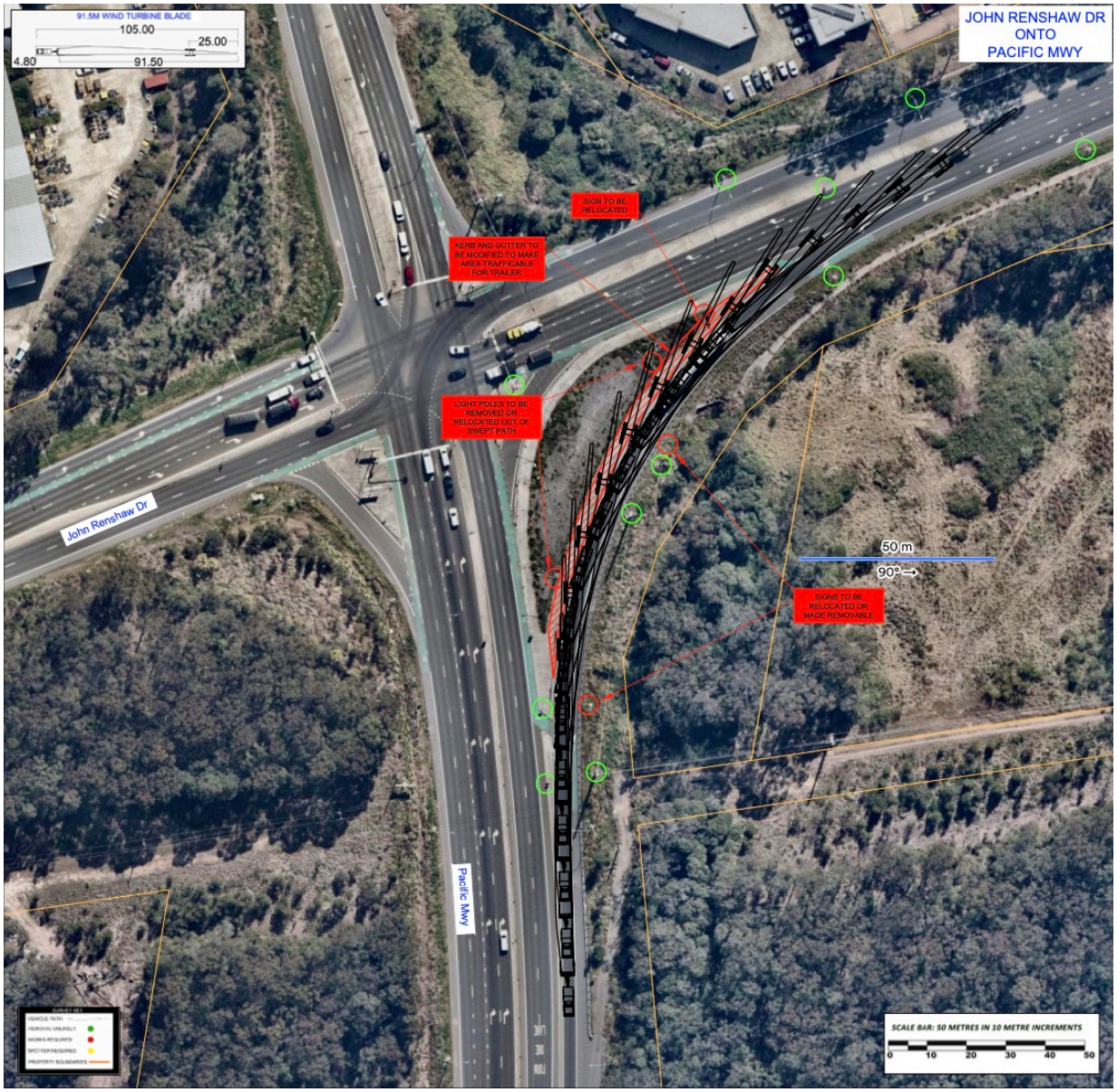

Figure 20 - Intersection of John Renshaw Drive and M1

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/A34ihxCjM5wfRDdq6

PROCEDURE: Left hand turn via slip lane.

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: 2x light poles to be removed or relocated on the outside of corner for tail swing. Signs to be relocated/removed. Kerb and gutter to be modified to be trafficable for trailer.

146.1 – 155.9 Km's: M1 Motorway onto M2 Motorway through the Northconnex tunnel.

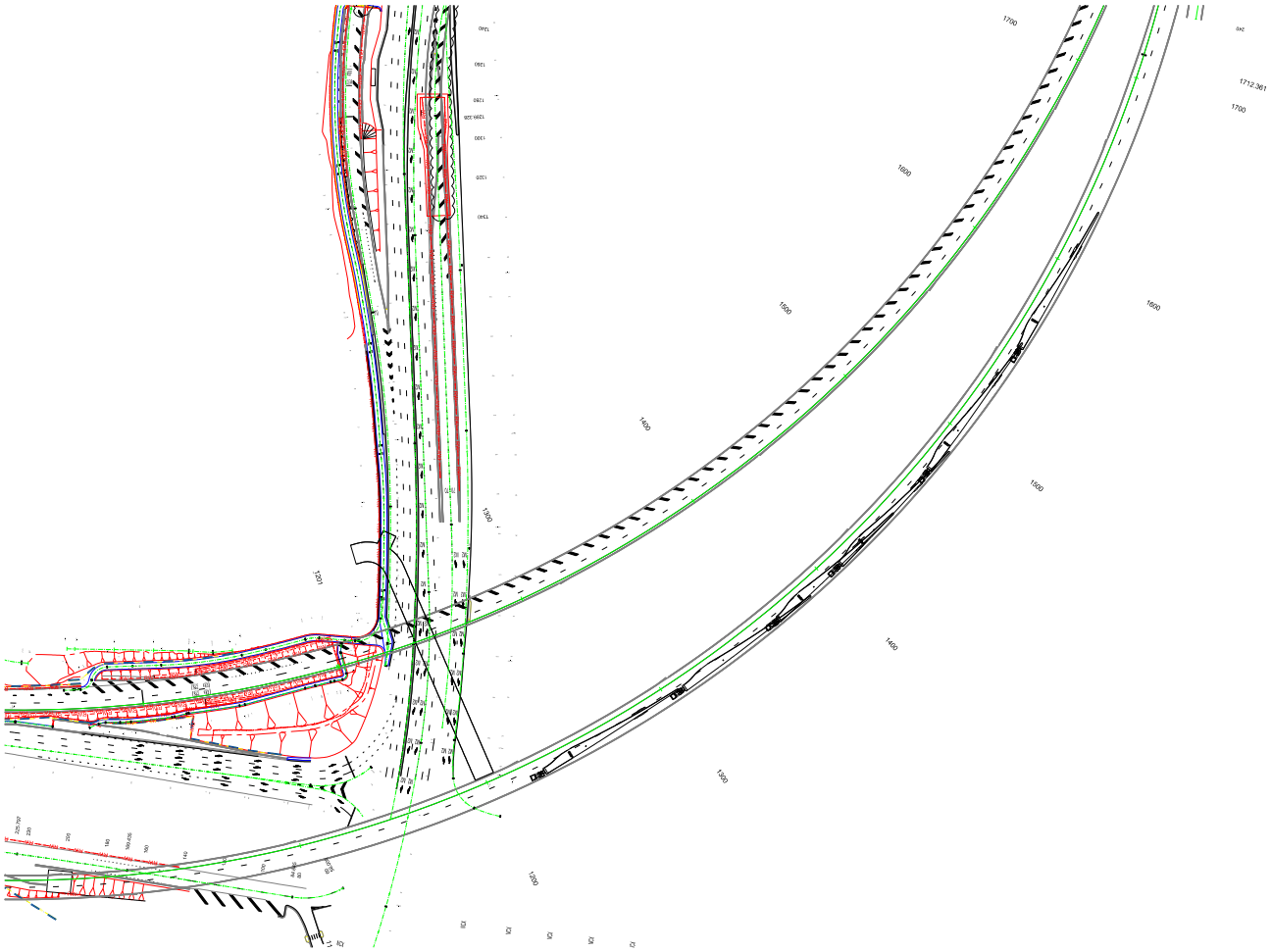

Figure 21 - Intersection of John Renshaw Drive and M1

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/BZaXJ5V6CmT2Pt8v8

PROCEDURE: Travel through the Northconnex tunnel.

COMMENTS: The tunnel has very large radius corners that will be no issues for the blades. The tightest section is shown above.
Approval will be required from TfNSW and the Northconne to travel through the tunnel.

Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic. Maximum height of 5.0 metres.

ROAD MODIFICATIONS: No works are required.

614.6 Km's: 1st Roundabout on the Sturt Highway at Wagga Wagga

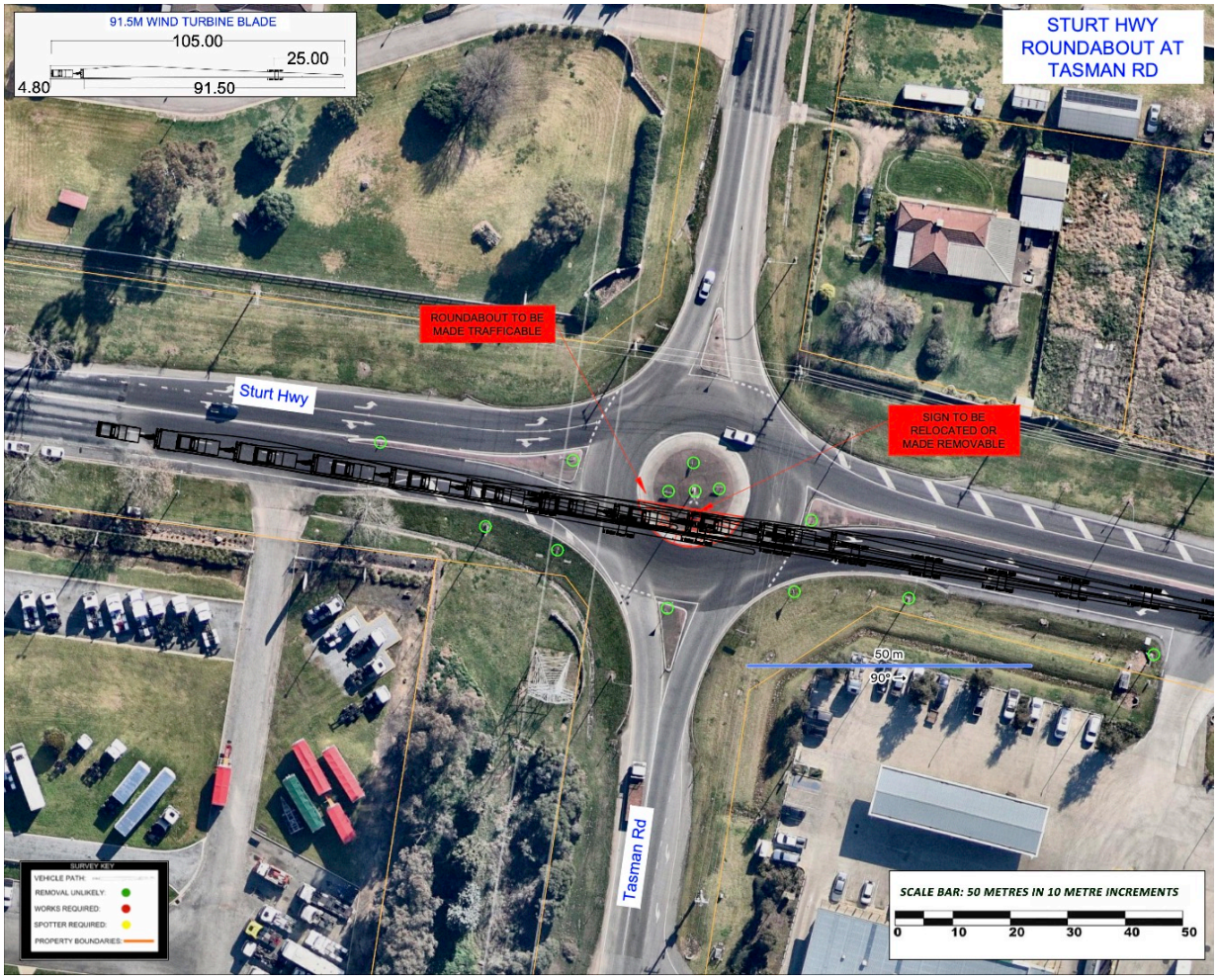

Figure 22 - 1st Roundabout on the Sturt Highway at Wagga Wagga

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/7VDWUyW8KnUhCEdd7

PROCEDURE: Continue straight ahead. The truck will need to cut across the centre of the roundabout.

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: Sign to be removed in the middle of the roundabout. Roundabout made trafficable.

617.3 Km's: 2nd Roundabout on the Sturt Highway at Wagga Wagga

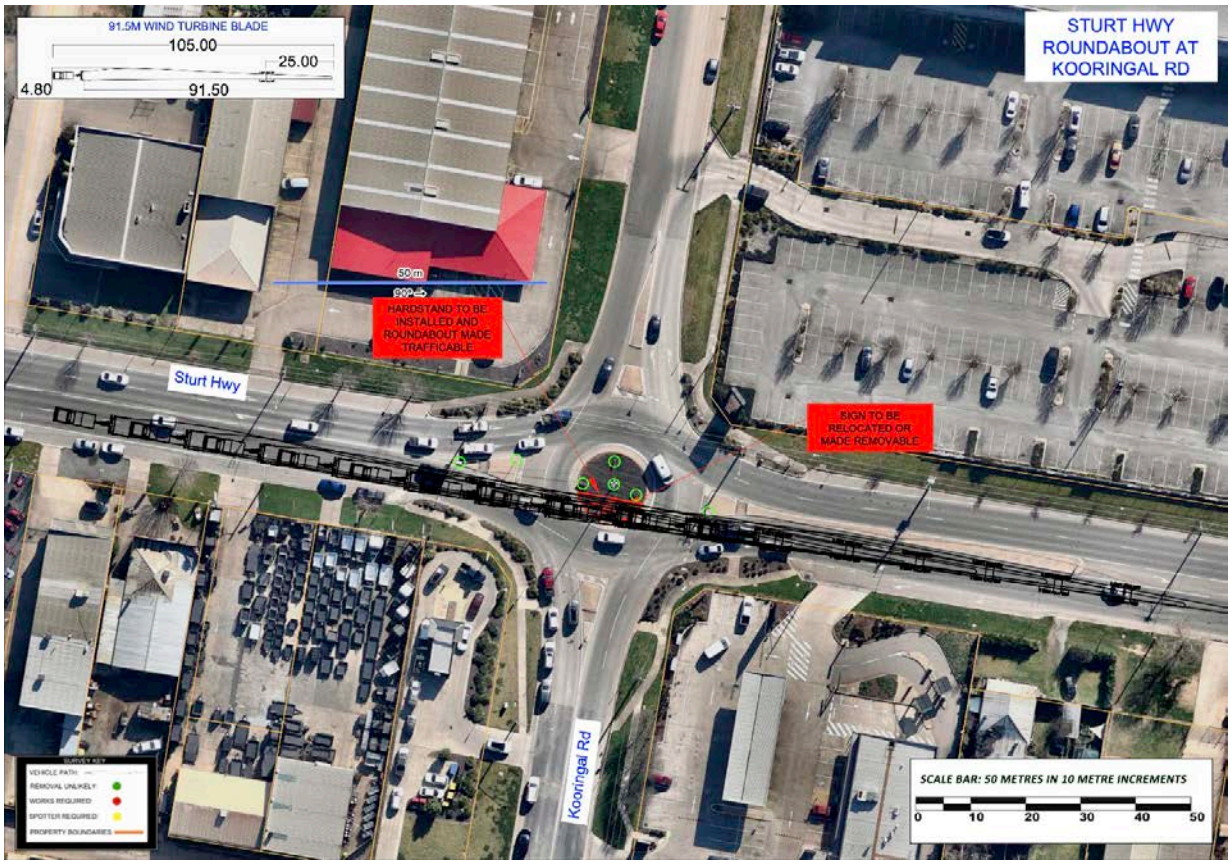

Figure 23 - 2nd Roundabout on the Sturt Highway at Wagga Wagga

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/VeavHs6e4AjLaggDA

PROCEDURE: Continue straight ahead. The truck will need to cut across the centre of the roundabout.

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: Sign to be removed in the middle of the roundabout. Handstand to be installed on roundabout and roundabout made trafficable.

618.4 Km's: 3rd Roundabout on the Sturt Highway at Wagga Wagga

Figure 24 - 3rd Roundabout on the Sturt Highway at Wagga Wagga

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/dBrte59BvHyvcGSr5

PROCEDURE: Continue straight ahead. The truck will need to cut across the centre of the roundabout.

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: Sign to be removed in the middle of the roundabout. Roundabout made trafficable.

618.75 Km's: Sturt Hwy under Edward St Rail Bridge

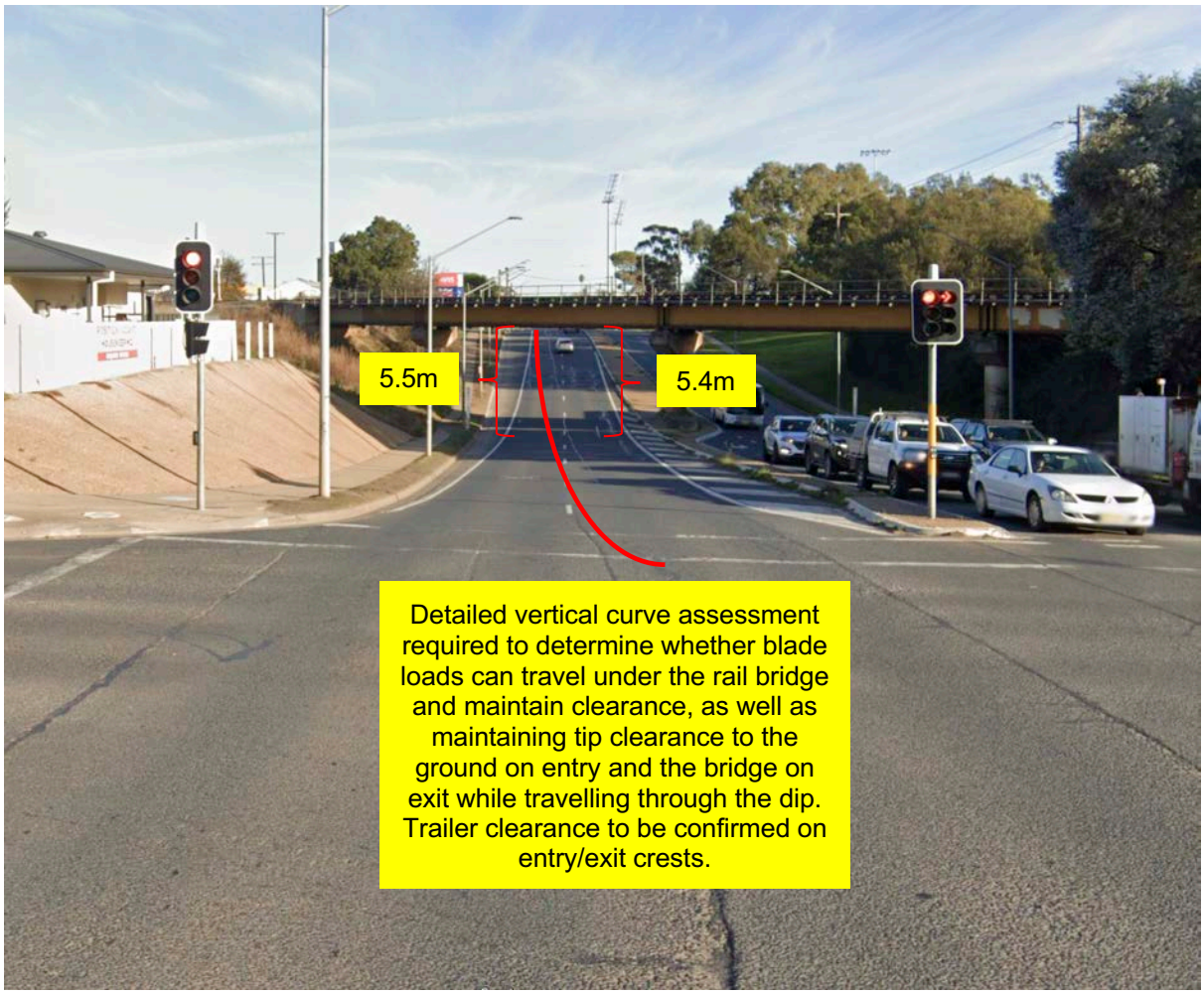

Figure 25 - Sturt Hwy under Edward St Rail Bridge

621.5 Km's: 4th Roundabout on the Sturt Highway at Wagga Wagga

Figure 26 - 4th Roundabout on the Sturt Highway at Wagga Wagga

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/fx388veUAjbykiyPA

PROCEDURE: Continue straight ahead. The truck will need to cut across the centre of the roundabout.

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: Signs to be removed in the middle of the roundabout. Roundabout made trafficable.

716.2 Km's: Left hand bend to stay on the Sturt Highway at Gillenbah

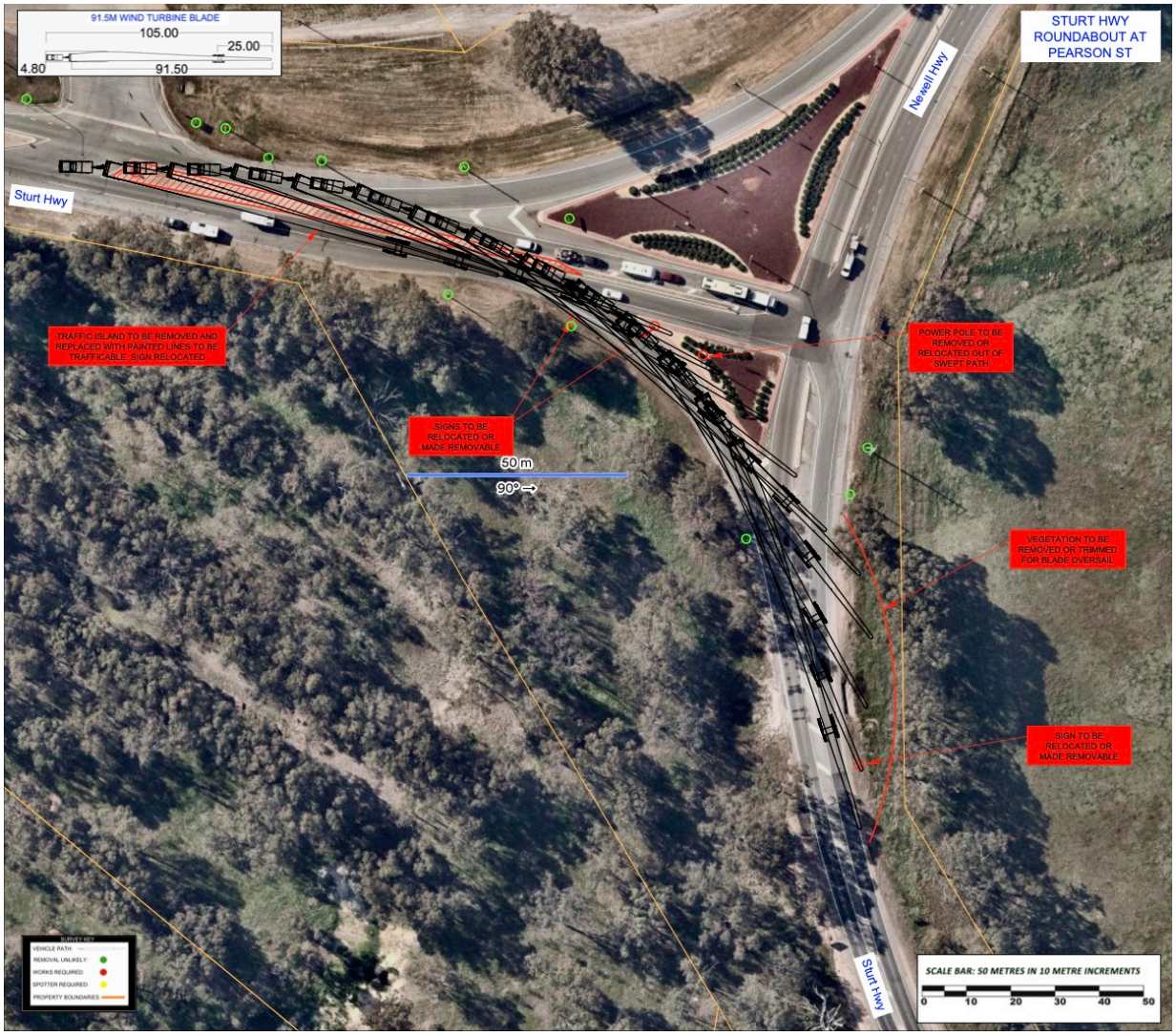

Figure 27 - Left hand bend to stay on the Sturt Highway at Gillenbah

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/C7gJ8ouDVdpcH5Rz7

PROCEDURE: Left hand Turn. The truck will need to cross onto the wrong side of the road for about 100m by cutting across the medium strip.

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: Several signs to be relocated or made removable. Power pole to be relocated out of swept path. Vegetation to be removed or trimmed for blade oversail. Traffic island to be removed and replaced with paint to make trafficable.

880.9 Km's: Roundabout on the Sturt Highway at Hay South

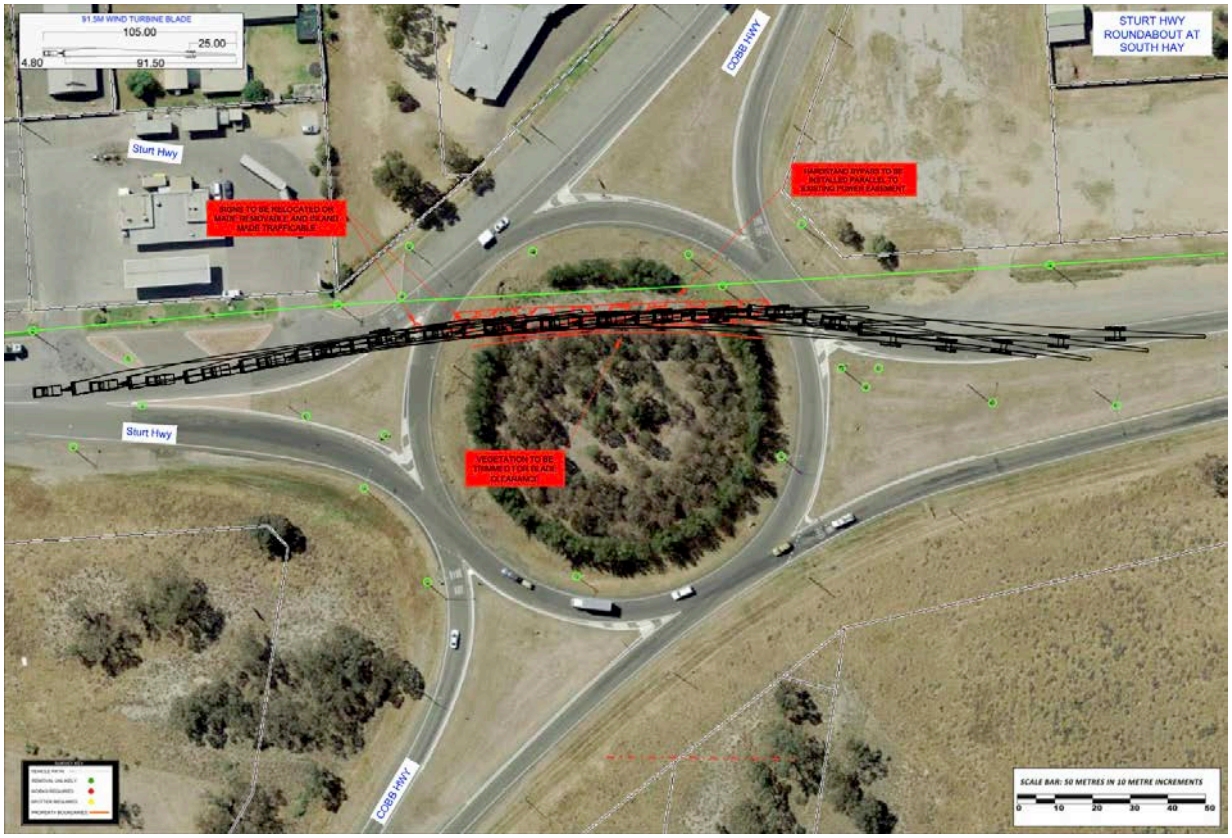

Figure 28 - Roundabout on the Sturt Highway at Hay South

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/NBFhAv8wqei8gws66

PROCEDURE: Load to cross to incorrect side of road and use bypass through roundabout adjacent to existing power easement.

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: Existing shoulder on entry and traffic island on exit to be made trafficable. Hardstand bypass to be installed through roundabout parallel with existing easement. Vegetation to be removed or trimmed. Several signs relocated or made removable.

967 Km's: Sturt Highway into Site Entrance

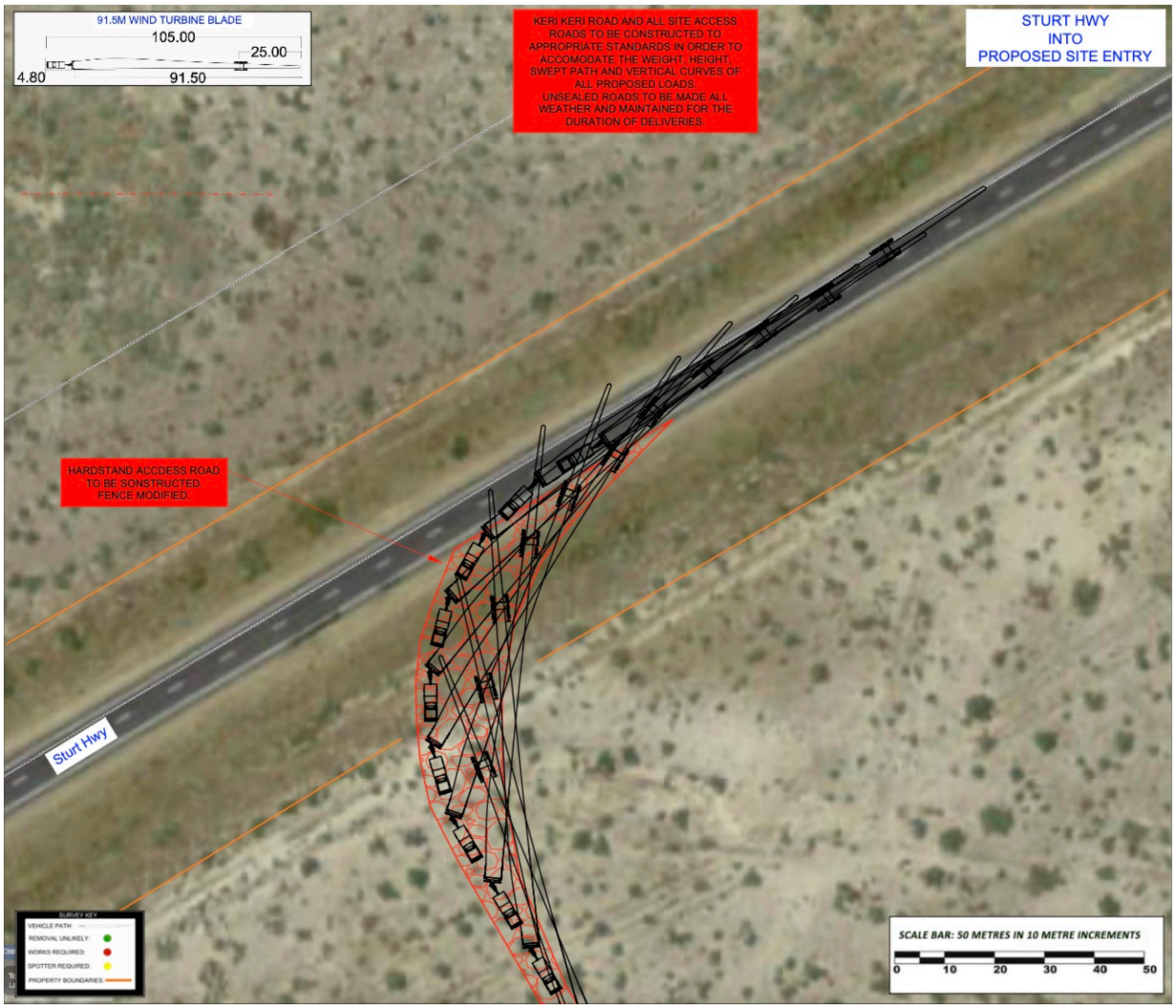

Figure 29 - Sturt Highway into site entrance

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/uUhj8HobAbyn9rcy8

PROCEDURE: Left hand turn

COMMENTS: The site entrances are proposed along this location. The land is very flat with limited vegetation. Client to provide adequate swept path for the blade to enter site.

ROAD MODIFICATIONS: All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

976 Km's: Sturt Highway onto Keri Keri Road

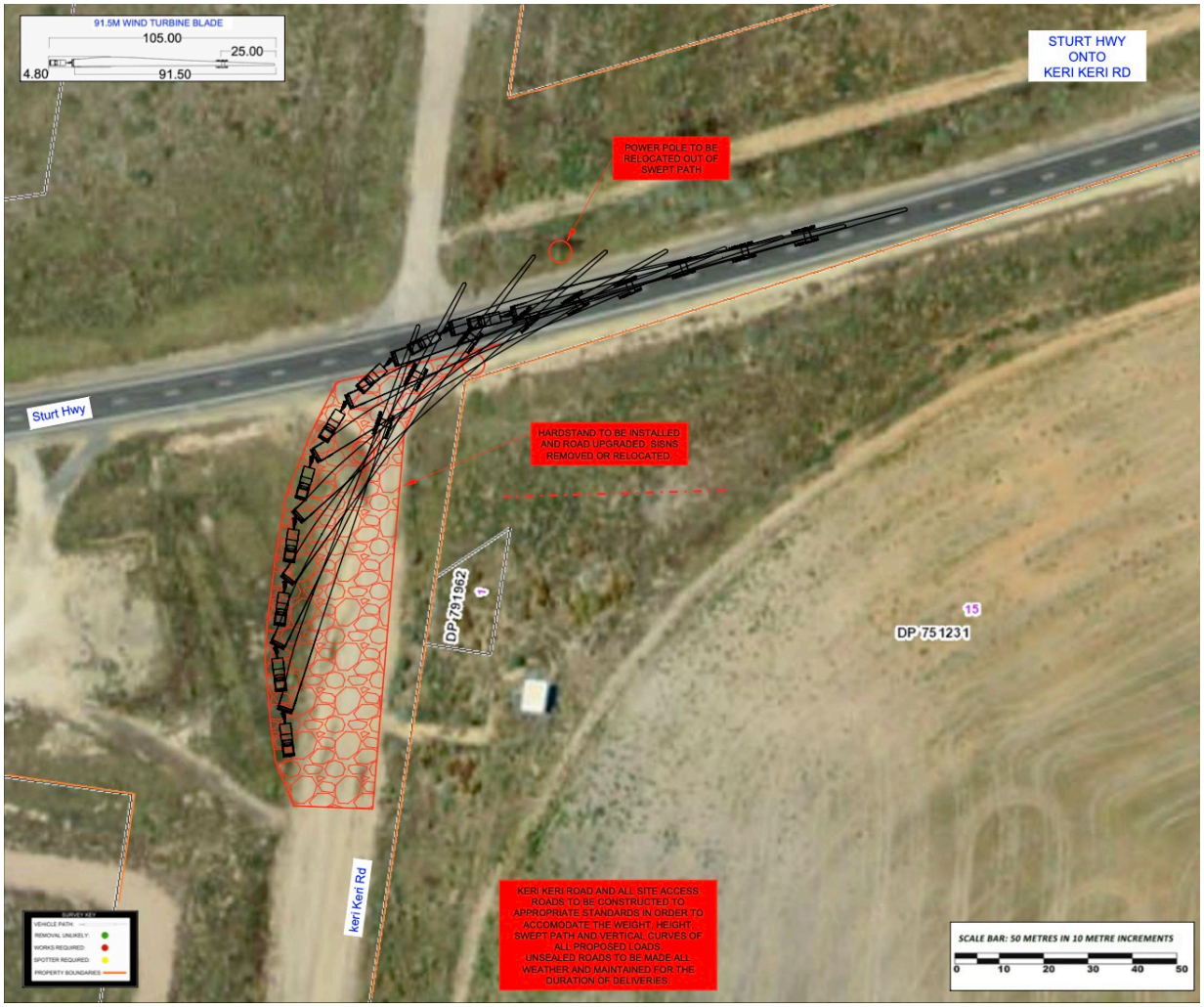

Figure 30 - Sturt Highway onto Keri Keri Road

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/uUhj8HobAbyn9rcy8

PROCEDURE: Left hand turn

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: Hardstand to be installed and signs and all obstacle relocated or removed. Power pole to be relocated out of swept path.
Keri Keri Rd and all site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

979-984 Km's: Keri Keri Rd into 3 x Proposed Site Entries

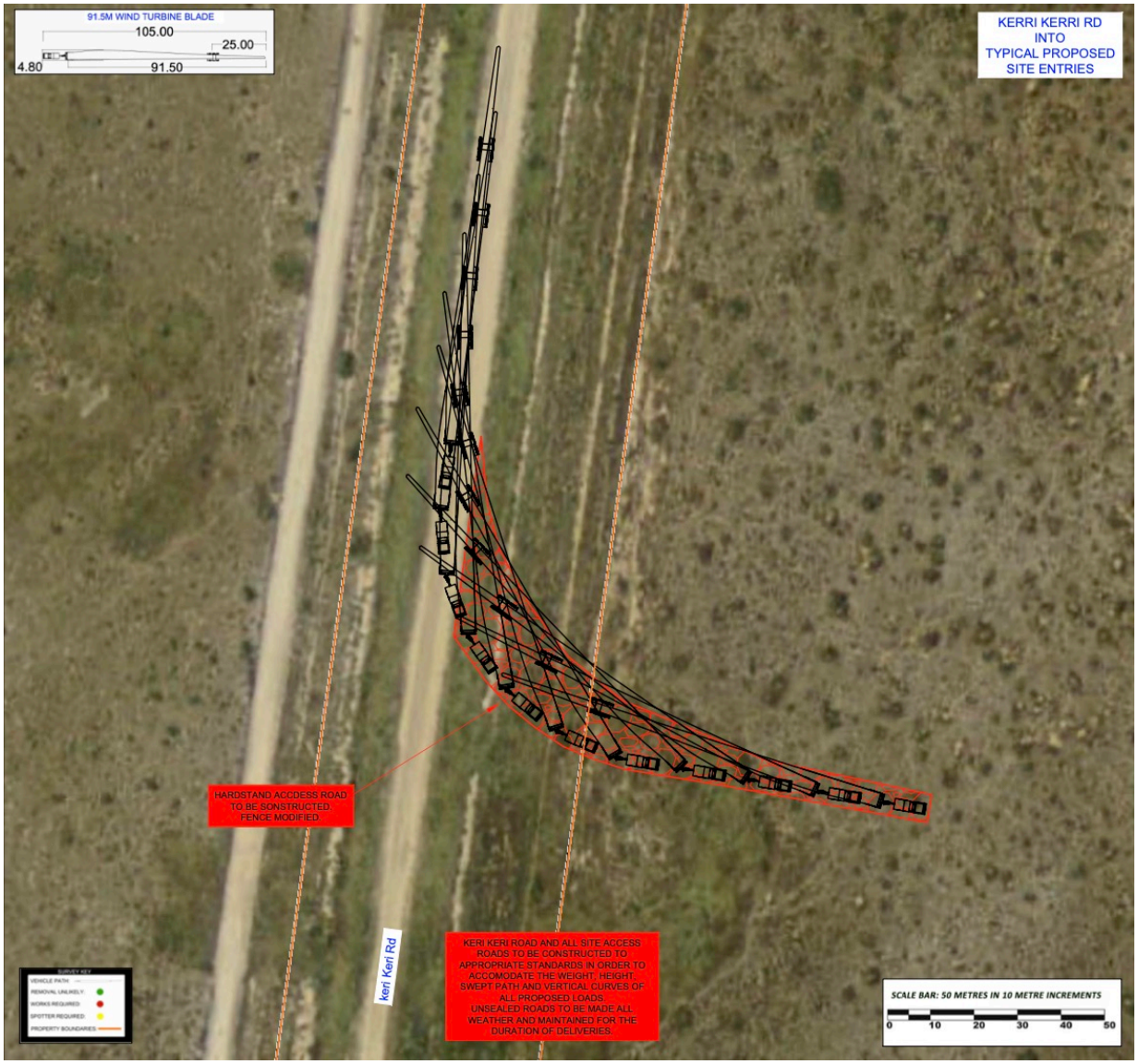

Figure 31 - Keri Keri Rd into 3 x Proposed Site Entries

GPS LINK FOR THIS LOCATION:

PROCEDURE: Left hand turn

COMMENTS: Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic.

ROAD MODIFICATIONS: All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

10.0 Conclusion Route 1

After studying all options and undertaking a route survey, this route in its current condition will require a moderate to major amount of upgrades before it could be deemed suitable for transporting the proposed components.

The following are the key points that need to be taken into consideration if the project moves forward with this route.

SWEPT PATH:

- There are numerous sections along the route that need moderate to major work to allow a blade of this size through.
- All the work detailed above looks achievable.
- Numerous site entrances are proposed that will need to be designed to suit the largest components.

OVERHEAD STRUCTURES: (5.0m maximum loaded height)

- The maximum loaded height through the Northconnex tunnel should not exceed 5.0m. NOTE: No oversize loads are currently allowed to use the Northconnex tunnel. Negotiations are required with Northconnex to use the tunnel for the blades. All loads are to use Pennant Hills Road unless approval to use Northconnex is otherwise granted.
- If blades are approved to travel through the Northconnex tunnel, NO other components on this route can use the tunnel, they must use Pennant Hills Road to bypass the tunnel.
- The rail overpass at Wagga Wagga needs further investigation to determine the impact the change in vertical curve under this overpass may have on the blades.
- Loads higher than 5.25m cannot use this route and will need to travel along route 2 (high load route)

OVERHEAD UTILITIES:

- This route will need to be checked by an authorised scoping company. It is likely that a route of at least 5.25m is required for this project.

BRIDGES:

- Majority of the bridges have been used previously for similar loads so it is expected they will be ok. A bridge assessment will still be required.

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.

VEGETATION:

- A moderate amount of vegetation may require trimming.

PAVEMENT:

- All roads have adequate highway pavement until Keri Keri Road.
- Keri Keri Road may need regular maintenance during deliveries.

ROADWORKS:

- The project will need to start discussions with government authorities at least 18 months prior to turbine transport to understand if the project would conflict with any upcoming roadworks. Once a Transport Management Plan “TMP” has been approved for the transport of the turbines, then the exact movement dates need to be communicated with all relevant authorities to make all road stakeholders are aware of the scheduled movements for each day.
- The project will need to regularly check on any new upgrades not listed in the report. If upgrades have taken place on a section of route after this report has been completed, then a swept path study would need to be undertaken on that section of road to confirm that it can still be used.

ROADWORKS:

- All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads.
- Unsealed roads to be made all weather and maintained for the duration of deliveries.

11.0 Route 2: High load route. Maximum loaded height 5.9m

DISTANCE: 1106 kilometres

COMPONENTS: Components over 5.25m up to 5.9m Maximum loaded height

GPS LINK: https://goo.gl/maps/pAPp2X19Q1DoQDdW9

Route: 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, Golden Highway, Boothenba Road, Troy Bridge Road, Bunglegumbie Road, Mitchell Highway, Manildra Street, Derribing Avenue, Algalah Street, Tomingley Road, Newell Highway, Thomas Street, Moulden Street, Henry Parkes Way, Westlime Road, Hartigan Avenue, Newell Highway, Compton Road, Showground Road, Newell Highway, Sturt Highway, Keri Keri Road.

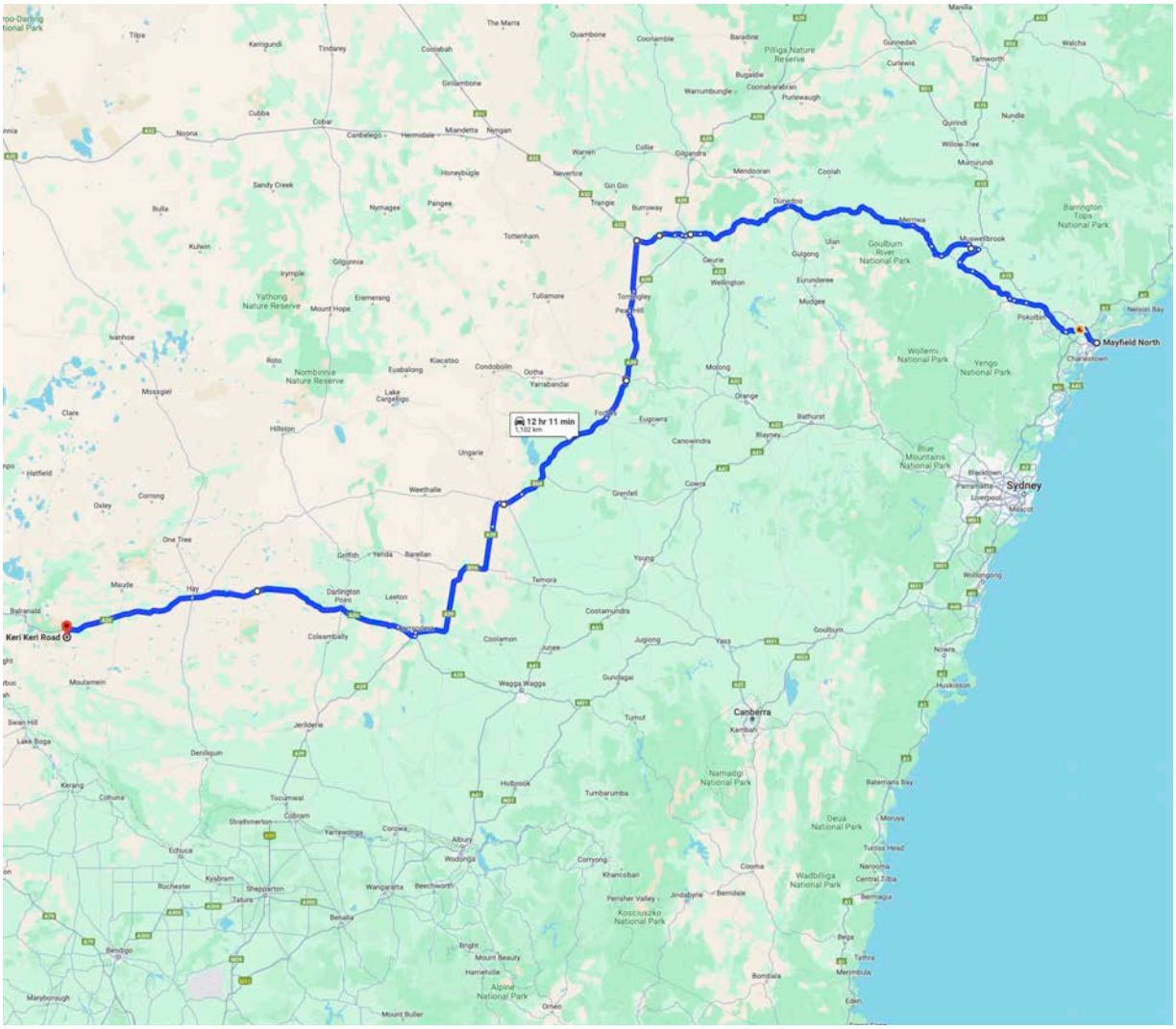

Figure 32 - 11.0 Route 2

KEY	
CRITICAL	
CAUTION	
EMERGENCY PARKING	

KM index	Location	Section of road	Current clearance	Procedure	Notes
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street https://goo.gl/maps/afLwPYKuNdm	Length: 70.0 Mtrs Width: 8.0 Mtrs	Moderate right hand turn	No problems with the towers on this section of road.
0.4	Mayfield	Selwyn Street over rail crossing https://goo.gl/maps/AmohE54hKSz	Length: 90 metres 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	Length: 40.0 Mtrs Width: 8.0 Mtrs	Right hand turn	No problems with the towers on this section of road.
1.4	Mayfield	George Street onto Industrial Drive https://goo.gl/maps/s4ayrsuoAsD2	Length: 40.0 Mtrs Width: 8.0 Mtrs	Right hand turn	No problems with the towers on this section of road.
4.9	Mayfield	Industrial Drive under traffic signals https://goo.gl/maps/YmqhiS2iR582	Height: 5.4 metres	Travel directly ahead in the far right lane.	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. Clearance in the right end lane is 6.0 metres. Base towers (6.1m) will need to be lowered for travel through this intersection
5.5	Mayfield West	Industrial Drive onto Maitland Road https://goo.gl/maps/Kn49dhWG2qG2	Length: 40.0 Mtrs Width: 7.0 Mtrs	Right hand turn	No problems with the towers on this section of road.
6.4	Sandgate	Maitland Road over rail bridge https://goo.gl/maps/W2JWWjhfqv5UMviB7	Length: 90 metres Width: 9.0 Metres	Travel directly ahead in the right-hand lane	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.
13.9	Hexham	New England Highway under gantry https://goo.gl/maps/YTMoFe7Aick	Height: 5.9 metres	Travel directly ahead	This is the lowest structure on route. There is no bypass around the gantry. A maximum loaded height of 5.9 metres should not be exceeded. Base towers (6.1m) will need to be lowered before travelling under this structure.
15.1	Tarro	New England Highway over rail bridge https://goo.gl/maps/tTnWLwQC2hzSPhAp6	Length: 90 metres Width: 7.0 Metres	Travel directly ahead in the right-hand lane	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.
17.4	Tarro	New England Highway onto John Renshaw Drive https://goo.gl/maps/SRDr5JigkBp	Length: 100.0 Mtrs Width: 12.0 Mtrs	Left hand merge	No problems with the towers on this section of road.
18.4	Beresfield	John Renshaw Drive https://goo.gl/maps/N19vJih1Fgr	Length: 100.0 Mtrs Width: 10.0 Mtrs	Travel directly ahead	The roundabout has been removed. A set of dual lanes now takes traffic directly across the intersection.
28.7	Buchanan	John Renshaw Drive onto the Hunter Expressway https://goo.gl/maps/1STJ1PfQt9E2	Length: 65.0 Mtrs Width: 7.0 Mtrs	Right hand turn	No problems with the towers on this section of road.
58.9	Branxton	The Hunter Expressway onto The New England Highway https://goo.gl/maps/7rauNuxzqjq	Length: 100.0 Mtrs Width: 12.0 Mtrs	Travel directly ahead	No problems with this section of road.

KM index	Location	Section of road	Current clearance	Procedure	Notes
67.3	Whittingham	The New England Highway onto the Golden Highway https://goo.gl/maps/nAnfkYfeUn42	Length: 70.0 Mtrs Width: 8.0 Mtrs	Left Hand turn	The NSW Government is currently upgrading this intersection. At this stage the data that is available for the upgrades shows that the section of road that we would need to access does not change considerably. However, it is recommended that you monitor the progress of the upgrades, and that any changes are thoroughly looked at.
67.4	Whittingham	Golden Highway https://goo.gl/maps/R86RFuPnmFU2	115.0 x 9.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
68.0	Whittingham	Golden Highway over rail bridge https://goo.gl/maps/5NwDQofandvvMKfY9	Length: 90 metres Width: 9.0 Metres	Travel directly ahead in the centre of the road.	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.
77.3	Mount Thorley	Golden Highway over rail bridge https://goo.gl/maps/qTxSbkxPu87L5hx4A	Length: 90 metres Width: 9.0 Metres	Travel directly ahead in the centre of the road.	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.
77.4	Whittingham	Golden Highway intersection with the Putty Road https://goo.gl/maps/7hQdEmK1EgE2	Length: 65 metres Width: 6.0 Metres	Left hand turn	No problems with this section of road.
77.5	Mount Thorley	Golden Highway https://goo.gl/maps/zGvdupDuixx	100.0 x 10.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
80.6	Mount Thorley	Golden Highway over rail bridge https://goo.gl/maps/ipGU4USXmWZ8GkJs6	Length: 90 metres Width: 9.0 Metres	Travel directly ahead in the centre of the road.	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.
80.8	Mount Thorley	Putty Road under Mt Thorley Road https://goo.gl/maps/SMzSLP1kvQYDMqa86	Heights: Left: 6.6 metres Centre: 6.3 Metres Right: 6.3 metres	Travel under the bridge in the left lane	Mt Thorley underpass is 6.3 metres in the centre of the road. Towers to pass under this structure on the correct side.
80.8	Mount Thorley	Golden Highway intersection with the Putty Road https://goo.gl/maps/QS9quvSyHYWaFHoX9	Length: 45 metres Width: 6.0 Metres	Right hand turn	No problems with this section of road.
98.0	Warkworth	Golden Highway https://goo.gl/maps/Y6V6EXaCwxq	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	Length: 60 metres Width: 6.0 Metres	Left hand than right hand turn	No problems with this section of road.
126.0	Ogilvy	Golden Highway https://goo.gl/maps/58Tj9ojs7CC2	6% 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. 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.
131.9	Denman	Golden Highway onto Denman Road https://goo.gl/maps/sf4PNnycxB32	Length: 55 metres Width: 6.0 Metres	Right hand turn	No problems with this section of road.
137.9	Muswellbrook	Denman Road onto Bengalla Road https://goo.gl/maps/3sK4m6YSHNHqkqn68	Length: 60 metres Width: 8.0 Metres	Left hand turn	No problems with this section of road.
149.0	Bengalla	Bengalla Road onto Wybong Road https://goo.gl/maps/zfDyG4GQq6G37imB9	Length: 90 metres Width: 8.0 Metres	Left hand bend	No problems with this section of road.
158.0 to 183.0	Bengalla	Wybong Road https://goo.gl/maps/ekGZA5wFFK55Mvmc7	Length: 60 metres Width: 8.0 Metres	Travel directly ahead	This road is maintained by Muswellbrook Council. Approval will be required to travel on this section of Road.

KM index	Location	Section of road	Current clearance	Procedure	Notes
183.0	Sandy Hollow	Wybong Road onto Golden Highway https://goo.gl/maps/5ft3VnWpnPhpeN4u7	Length: 60 metres Width: 8.0 Metres	Right hand turn	No problems with this section of road.
190.1	Sandy Hollow	Golden highway https://goo.gl/maps/2THBuV165xx	50.0 x 4.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
193.0	Sandy Hollow	Golden Highway under safety Cam https://goo.gl/maps/b7t9zH2ankJcvWpT6	Height: Left: 6.3 metres	Travel directly ahead on the correct side	No problems with this section of road.
201.0	Gungal	Golden highway https://goo.gl/maps/WDoL2LfeCoP2	70.0 x 6.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
221.0	Merriwa	Golden Highway under safety Cam https://goo.gl/maps/D92rzQ8vnUcYsqj56	Height: Right: 6.4 metres	Travel directly ahead on the correct side	No problems with this section of road.
224.0	Merriwa	Golden highway https://goo.gl/maps/NqrWzTsRmnt	100.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
274.0	Cassilis	Golden highway https://goo.gl/maps/vs6YMT6TxCA2	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
305.0	Leadville	Golden highway https://goo.gl/maps/ujxMGukhopeFWRhb8	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
331.0	Dunedoo	Golden Highway over rail crossing https://goo.gl/maps/wsyNKfcoAij3SosY9	Length: 90 metres Width: 7.0 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.
331.1	Dunedoo	Golden Highway intersection with Wargundy Street https://goo.gl/maps/WzACUHey3jYadj1K7	Length: 60 metres Width: 6.0 Metres	Right hand bend	No problems with this section of road.
384.0	Ballimore	Golden Highway https://goo.gl/maps/RuKKrfHarw1Mjy5E9	150.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
392.0	Ballimore	Golden Highway over rail crossing https://goo.gl/maps/yb15Kz6R2r3E69fj6	Length: 90 metres Width: 7.0 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.
400.0	Dubbo	Golden Highway onto Boothenba Road https://goo.gl/maps/TJLi5W4ir11ejgtb6	Length: 50 metres Width: 6.5 Metres	Right hand turn	No problems with this section of road.
411.0	Dubbo	Boothenba Road over rail crossing https://goo.gl/maps/72aqeimPLqPWYY7M9	Length: 90 metres Width: 6.5 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.
411.1	Dubbo	Boothenba Road onto Troy Bridge Road https://goo.gl/maps/2u5uRf2BvKxseoFm9	Length: 90 metres Width: 6.5 Metres	Travel directly ahead	No problems with this section of road.
414.0	Dubbo	Troy Bridge Road onto Bunglegumbie road https://goo.gl/maps/6Uke9jwPypNYVPux5	Length: 90 metres Width: 6.5 Metres	Travel directly ahead	No problems with this section of road.
420.0	Dubbo	Bunglegumbie road onto the Mitchell Highway https://goo.gl/maps/jCWqmaQsd3fChp837	Length: 50 metres Width: 6.5 Metres	Right hand turn	No problems with this section of road.
450.0	Narromine	Mitchell Highway onto Manildra Street https://goo.gl/maps/hFG648tcSMUHxJ8h6	Length: 40 metres Width: 6.5 Metres	Left hand turn	No problems with this section of road.
450.1	Narromine	Manildra Street over rail crossing https://goo.gl/maps/4s2HYJJfJQ5pGbKq7	Length: 60 metres Width: 7.0 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.
450.2	Narromine	Manildra Street onto Derribong Avenue https://goo.gl/maps/776aPaxgsFTWi6qL6	Length: 40 metres Width: 6.5 Metres	Left hand turn	No problems with this section of road.
450.5	Narromine	Derribong Avenue onto Algalah Street https://goo.gl/maps/9s8cb8G4T2c75t1V8	Length: 40 metres Width: 6.5 Metres	Left hand turn	No problems with this section of road.
452.0	Narromine	Algalah Street onto Tomingley Road https://goo.gl/maps/EWfZYo3Xos6T3J8A8	Length: 60 metres Width: 7.0 Metres	Travel directly ahead	No problems with this section of road.
487.5	Tomingley	Tomingley Road onto the Newell Highway https://goo.gl/maps/NJtXmHCFHxaiMaq39	Length: 60 metres Width: 7.0 Metres	Travel directly ahead	No problems with this section of road.
488.0	Tomingley	Newell Highway https://goo.gl/maps/ADMke5At2A1Uy1z4A	200.0 x 15.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
489.0	Tomingley	Newell Highway under safety Cam https://goo.gl/maps/9Vqu9xXxRwhHt4Uk6	Height: Right: 6.8 metres	Travel directly ahead on the correct side	No problems with this section of road.
490.0	South Tomingley	Newell Highway https://goo.gl/maps/1q8f6HJ2zsZSxup66	150.0 x 7.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
502.0	Peak Hill	Newell Highway https://goo.gl/maps/orKTBB8wobK6exsc6	90.0 x 7.0 metres	Parking Bay	Suitable parking for Fatigue breaks.

KM index	Location	Section of road	Current clearance	Procedure	Notes
503.0	Peak Hill	Newell Highway under safety Cam https://goo.gl/maps/sAbh8zwZzZVMriD2A	Height: Right: 6.3 metres	Travel directly ahead on the correct side	No problems with this section of road.
526.0	Alectown	Newell Highway https://goo.gl/maps/GMGbEJHAEkeWuRyz5	90.0 x 7.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
552.0	Parkes	Newell Highway onto Thomas Street https://goo.gl/maps/fSnFVWPr78RePSTz9	Length: 55 metres Width: 6.5 Metres	Right hand turn	No problems with this section of road.
554.0	Parkes	Thomas Street onto Moulden Street https://goo.gl/maps/HpYrcwcx8BHrUmfc8	Length: 55 metres Width: 6.5 Metres	Left hand turn	No problems with this section of road.
554.8	Parkes	Moulden Street onto Henry Parkes Way https://goo.gl/maps/atnNtdtyi21wK4PF9	Length: 55 metres Width: 6.5 Metres	Left hand turn	No problems with this section of road.
555.0	Parkes	Henry Parkes Way onto Westlime Road https://goo.gl/maps/Uk2nuLS7xvfnv5dt6	Length: 55 metres Width: 6.5 Metres	Right hand turn	No problems with this section of road.
556.0	Parkes	Westlime Road onto Hartigan Ave https://goo.gl/maps/XtKgPrWcZHY3im65A	Length: 55 metres Width: 6.5 Metres	Travel directly ahead	No problems with this section of road.
557.0	Parkes	Hartigan Avenue under traffic signal https://goo.gl/maps/sQxVxzZivbDX7E3j6	Height: Left: 5.5 metres	Travel around the traffic signal on the incorrect side of the road.	Traffic signal is too low. Pass on right hand side.
558.0	Parkes	Hartigan Ave onto the Newell Highway https://goo.gl/maps/y3rabftt4HGreX9e6	Length: 55 metres Width: 6.5 Metres	Travel directly ahead	No problems with this section of road.
558.1	Parkes	Newell Highway over rail crossing https://goo.gl/maps/7tSoLfFManXyKV3T9	Length: 60 metres Width: 7.0 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.
562.0	Parkes	Newell Highway over rail crossing https://goo.gl/maps/Kxa3shUCMiuKe2sX7	Length: 60 metres Width: 7.0 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.
569.0	Tichborne	Newell Highway over rail crossing https://goo.gl/maps/gxYUZLLe3jsCEJqD7	Length: 60 metres Width: 7.0 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.
576.0	Daroobalgie rest area	Newell Highway https://goo.gl/maps/swec16PWh1N8ZbUR7	200.0 x 7.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
590.0	Forbes	Newell Highway intersection with Dowling Street https://goo.gl/maps/DqkvxH4qtWnXvLJ26	Length: 45 metres Width: 6.0 Metres	Left hand turn	No problems with this section of road.
590.2	Forbes	Newell Highway https://goo.gl/maps/Hsmjs9pqvZ5UYFAH7	100.0 x 6.5 metres	Parking Bay	Suitable parking for Fatigue breaks.
595.5	Forbes	Newell Highway under safety Cam https://goo.gl/maps/hUdv6YJunC9yfoxF7	Height: Right: 6.4 metres	Travel directly ahead on the correct side	No problems with this section of road.
658.0	Marsden	Newell Highway under safety Cam https://goo.gl/maps/fRpjbRoXfup29Swx6	Height: Right: 6.9 metres	Travel directly ahead on the correct side	No problems with this section of road.
659.0	Marsden rest area	Newell Highway https://goo.gl/maps/AfAfr2wuNTjQMdKT8	200.0 x 7.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
689.0	Wyalong	Newell Highway under safety Cam https://goo.gl/maps/sudP4qYXPWbDB6sL6	Height: Centre: 6.2 metres	Travel directly ahead on the correct side	No problems with this section of road.
698.0	West Wyalong	Newell Highway onto Compton Road https://goo.gl/maps/PeM4uWq5hLiyZiPd8	Length: 55 metres Width: 6.5 Metres	Left hand turn	Spotter to assist at this pinchpoint. Escorts to control traffic as per plan below for this section of road.
700.5	West Wyalong	Compton Road onto Showground Road https://goo.gl/maps/hts5qARMMWZcvW7R7	Length: 50 metres Width: 6.5 Metres	left hand turn	No problems with this section of road.
701.0	West Wyalong	Compton Road over rail crossing https://goo.gl/maps/KQwsqDkEDASMpB9r8	Length: 50 metres Width: 6.0 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.
702.5	West Wyalong	Showground Road https://goo.gl/maps/C8GevkguVtpkHikFA	150.0 x 7.0 metres	Parking Bay	Suitable parking for Fatigue breaks.

KM index	Location	Section of road	Current clearance	Procedure	Notes
703.0	West Wyalong	Showground Road onto the Newell Highway https://goo.gl/maps/yAyBdrZcocEeTBnz6	Length: 50 metres Width: 6.5 Metres	Left hand turn	Spotter to assist at this pinchpoint. Escorts to control traffic as per plan below for this section of road.
721.0	Allena	Newell Highway over rail crossing https://goo.gl/maps/GMHsd5ynEFwzjmnXA	Length: 50 metres Width: 7.0 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.
749.0	Mirrool	Newell Highway over rail crossing https://goo.gl/maps/kFkwMBL9nfKgL954A	Length: 50 metres Width: 6.5 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.
784.0	Ardlethan rest area	Newell Highway https://goo.gl/maps/Na3rzBt25sMnsBya6	200.0 x 7.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
810.0	Grong Grong rest area	Newell Highway https://goo.gl/maps/vBTyD3zJVMcbn6wy9	200.0 x 7.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
823.0	Narrandera	Newell Highway over rail bridge https://goo.gl/maps/YBWuYYyVoZfSUTJ37	Length: 50 metres Width: 7.0 Metres	Travel directly ahead	Loads to travel over the bridge in the center of the road. Approval required crossing this line, likely cross with caution.
824.0	Narrandera	Newell Highway at Whitton Street https://goo.gl/maps/EXcuuBeMsXdhVDtm8	Length: 50 metres Width: 7.5 Metres	Left hand turn	Spotter to assist at this pinchpoint. Escorts to control traffic as per plan below for this section of road.
824 to 827	Narrandera	Newell Highway (Cadell St) https://goo.gl/maps/Z3ptasM9sGGtaB5A8	Length: 50 metres Width: 7.5 Metres	Travel directly ahead	Trees to be trimmed
827	Narrandera	Newell Highway onto Sturt Highway https://goo.gl/maps/uFiCyhp9uF147Wie8	Length: 80 metres Width: 7.5 Metres	Right hand turn. use wrong side of road.	Use slip lane on incorrect side of road.
999	Hay South	Sturt Hwy Roundabout at Cobb Hwy GPS Link: https://maps.app.goo.gl/Sfn5kWiKvUXBYK5e9	50 metres	Travel directly ahead	Use correct side of road
1083	Keri Keri	Stuart Highway into site entrances GPS Link: https://goo.gl/maps/C2aaH9WJcqcRE9MD8		Site Entrance	A site entrance is proposed for this location. The land is very flat with limited vegetation. All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.
1096.3	Keri Keri	Sturt Highway onto Keri Keri Road GPS Link: https://goo.gl/maps/uH5pmWwzWvz3TJ4K6		Left hand turn	Use hardstand installed for blades as required. Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warn all traffic. All site access roads to be constructed to appropriate standards in order to accomodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

KM index	Location	Section of road	Current clearance	Procedure	Notes
1105	Keri Keri	Keri Keri Road into site entrances GPS Link: https://maps.app.goo.gl/nGXFh9Snwd52CoR69		3 x Site Entrance	3 x site entrances are proposed for this location. The land is very flat with limited vegetation. All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

12.0 Conclusion Route 2

After studying all options and undertaking a route survey, this route is suitable in its current condition for transporting the proposed components.

The following are the key points that need to be taken into consideration, if the project moves forward with this route.

LENGTH:

- The longest combination that can travel along this route without upgrades is **55m overall length**
- Numerous site entrances are proposed that will need to be designed to suit the largest components.

OVERHEAD STRUCTURES: (Maximum loaded height 5.9m)

- The lowest unavoidable structures are the gantries along the New England Highway. The lowest of these has a clearance of 6.0m. A maximum loaded height of 6.0m should not be exceeded on this route.
- Base towers will need to be lowered at a number of points along the route.
- The lowest bridge structure is the Tarro interchange at 6.1 metres in height.
- There are several traffic signals that will need to be lifted on route.

OVERHEAD UTILITIES:

- This route will need to be checked by an authorised scoping company. It is likely that a route of at least 5.9m is required for this project.

BRIDGES:

- Majority of the bridges have been used previously for similar loads so it is expected they will be ok. A bridge assessment will still be required.

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.

PAVEMENT:

- All roads have adequate highway pavement up until Keri Keri Road.

ROADWORKS:

- All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads.
- Unsealed roads to be made all weather and maintained for the duration of deliveries.

13.0 References

Rex J Andrews P/L Route survey # 362 REV01
Google Earth/Maps
Nearmaps
ERM
Acciona
NHVR (OSOM)
Australian Load Restraint Guide

Disclaimer: This route study is provided on the basis of information only purposes and is to be used strictly as 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.

REX J ANDREWS
ENGINEERED TRANSPORTATION

ROUTE STUDY: ACCIONA

PROJECT: KERI KERI WINDFARM

EX NSW/VIC BORDER

07/03/2024 REV 01

Rev	Date	Change	Responsible	Checked
00	04/08/22	Route Assessed	C Ewin	✓
00	27/09/22	Report Compiled	S Kasteel	✓
00	14/10/22	Report Completed	W Andrews	✓
01	07/03/24	Report Updated 91.5m Blade	E Novak	✓
01	07/03/24	Report Completed	W Andrews	✓

Index

1.0 Introduction

This Route Study has been prepared for the Keri Keri Wind Farm (the Project) for Acciona Energy Australia Global Pty Ltd (the Applicant).

The study is to understand the transport route constraints for the components listed in this report and assist in planning of the windfarm layout.

This document describes observations and previous experience on route and explains the transport of wind turbine equipment from the NSW/VIC border through to the Keri Keri Windfarm.

The route survey was conducted on 04/08/2022

2.0 Evaluation

1	No Work
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: 04/08/2022
Survey undertaken by: (Rex J Andrews P/L)
Project name: Keri Keri Windfarm
Location: (NSW/VIC border) to Keri Keri Wind Farm (NSW)
The project consists of the following key components:

- Up to 155 Wind Turbine Generators (WTG) with a hub height of 200 metres (m) and maximum height tip height of 291.5 m (vertical tip)

4.0 Transport Combinations Examples

465 x Blades (91.5l x 4.8w x 3.9h x 35.0T)
Transport configuration. Prime mover with 3x8-3x8 Blade trailer.
Overall dimensions: 105.0l x 4.8w x 4.9h x 108.5T.

125 x Hubs (4.8l x 4.8w x 4.0h x 60.0T)
Transport configuration. Prime mover with 2x8 dolly 3x8 low loader.
Overall Dimensions: 28.0l x 4.8w x 5.0h x 96.5T.

176 x Nacelle (12.0l x 4.5w x 4.2h x 75.0T)
Transport configuration. Prime mover with 2x8 dolly 5x8 low loader.
Overall Dimensions: 30.0l x 4.5w x 5.0h x 117.5T.

176 x Drive Train (7.0l x 3.5w x 3.5h x 95.0T)
Transport configuration. Prime mover with 2x8 8x8 dolly platform trailer.
Overall Dimensions: 32.0l x 4.2w x 4.5h x 157.5T.

176 x T1 tower sections (13.4 x 5.5 x 5.0 x 99T)
Transport configuration. Prime mover with 10x8 Low Platform trailer.
Overall Dimensions: 30.0l x 5.0w x 5.9h x 161.5T.

176 x T2 tower sections (19.3 x 5.0 x 5.0 x 98T)
Transport configuration. Prime mover with 10x8 Low Platform trailer.
Overall Dimensions: 30.0l x 5.0w x 5.9h x 160.5T.

176 x T3 tower sections (23.4 x 5.0 x 5.0 x 97T)
Transport configuration. Prime mover with 10x8 Low Platform trailer.
Overall Dimensions: 37.0l x 5.0w x 5.9h x 159.5T.

176 x T4 tower sections (29.5 x 5.0 x 5.0 x 98T)
Transport configuration. Prime mover with 5x8 5x8 Extending Platform trailer.
Overall Dimensions: 45.0l x 5.0w x 5.9h x 169.5T.

176 x T5 tower sections (29.9 x 5.0 x 4.1 x 86T)
Transport configuration. Prime mover with 5x8 5x8 Extending Platform trailer.
Overall Dimensions: 45.0l x 5.0w x 5.9h x 157.5T.

176 x T6 tower sections (29.3 x 4.1 x 3.3 x 50.5T)
Transport configuration. Prime mover with 4x4-2x8 Dolly and Jinker.
Overall Dimensions: 45.0l x 5.0w x 5.9h x 86.5T.

Modular tower option:

1056 x Standard loads (12l x 2.4w x 2.4h x 10.0T)
Transport configuration. Prime mover with 3x4 semi-trailer.
Overall Dimensions: 19.0l x 2.5w x 4.3h x 38.5T.

1936 x Generic special loads (18l x 3.5w x 3.5h x 20.0T)
Transport configuration. Prime mover with 3x4 semi-trailer.
Overall Dimensions: 26.0l x 3.5w x 5.0h x 42.5T.

126 x Transition segments (17.3l x 4.3w x 4.3h x 66.0T)
Transport configuration. Prime mover with 8x8 Platform trailer.
Overall Dimensions: 30.0l x 4.3w x 5.3h x 124.5T.

126 x Monotubular segment 3 (21.5l x 4.3w x 4.3h x 72.0T)
Transport configuration. Prime mover with 10x8 Platform trailer.
Overall Dimensions: 35.0l x 4.3w x 5.3h x 134.5T.

126 x Monotubular segment 2 (28.8l x 4.3w x 4.3h x 67.0T)
Transport configuration. Prime mover with 4x8-4x8 Extending platform trailer.
Overall Dimensions: 42.0l x 4.3w x 5.3h x 131.5T.

126 x Monotubular segment 1 (28.9l x 4.3w x 3.3h x 44.0T)
Transport configuration. Prime mover with 4x4-2x8 Dolly jinker.
Overall Dimensions: 40.0l x 4.3w x 5.3h x 86.5T.

5.0 Transport Drawings

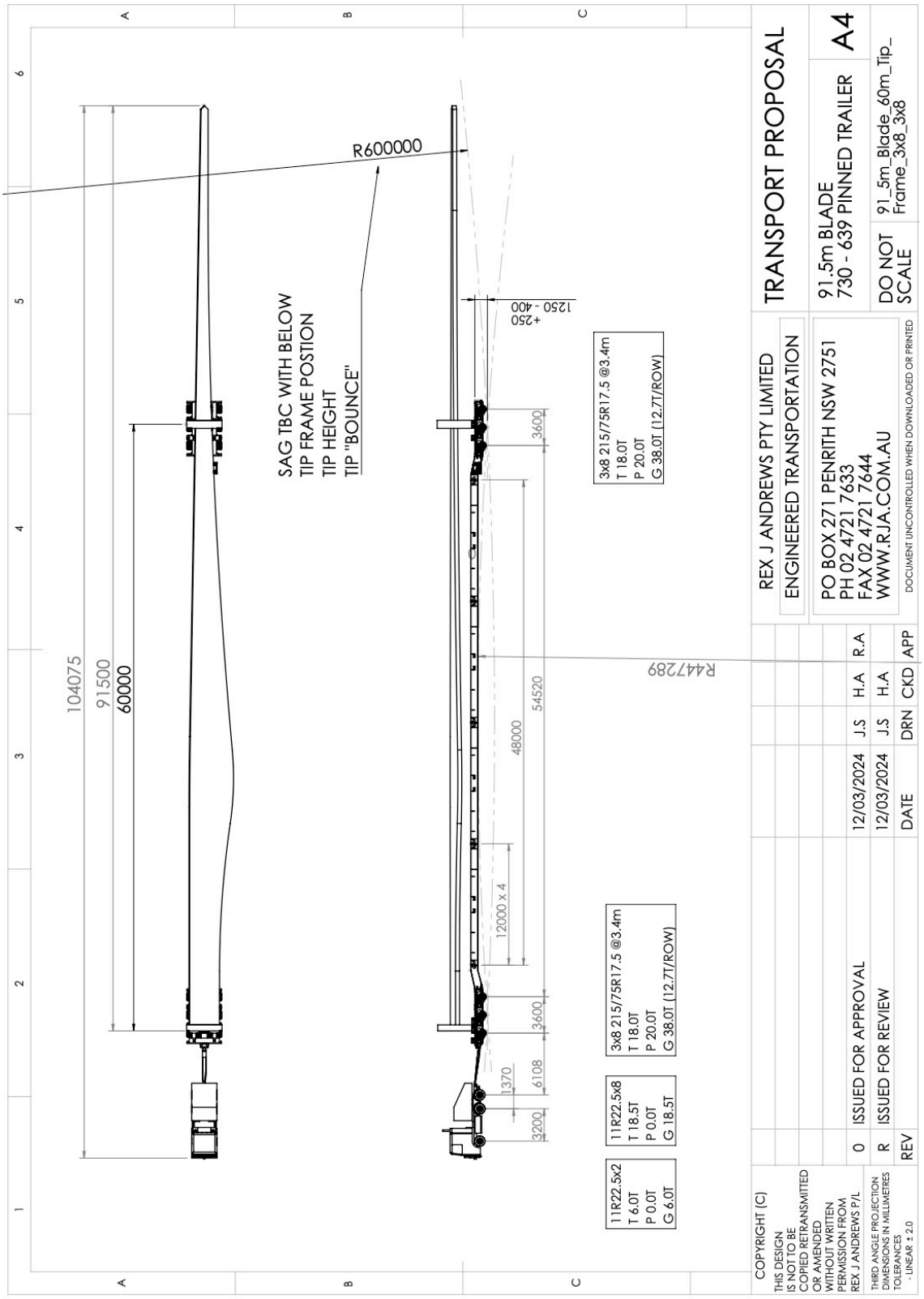

Figure 1 - Blade diagram

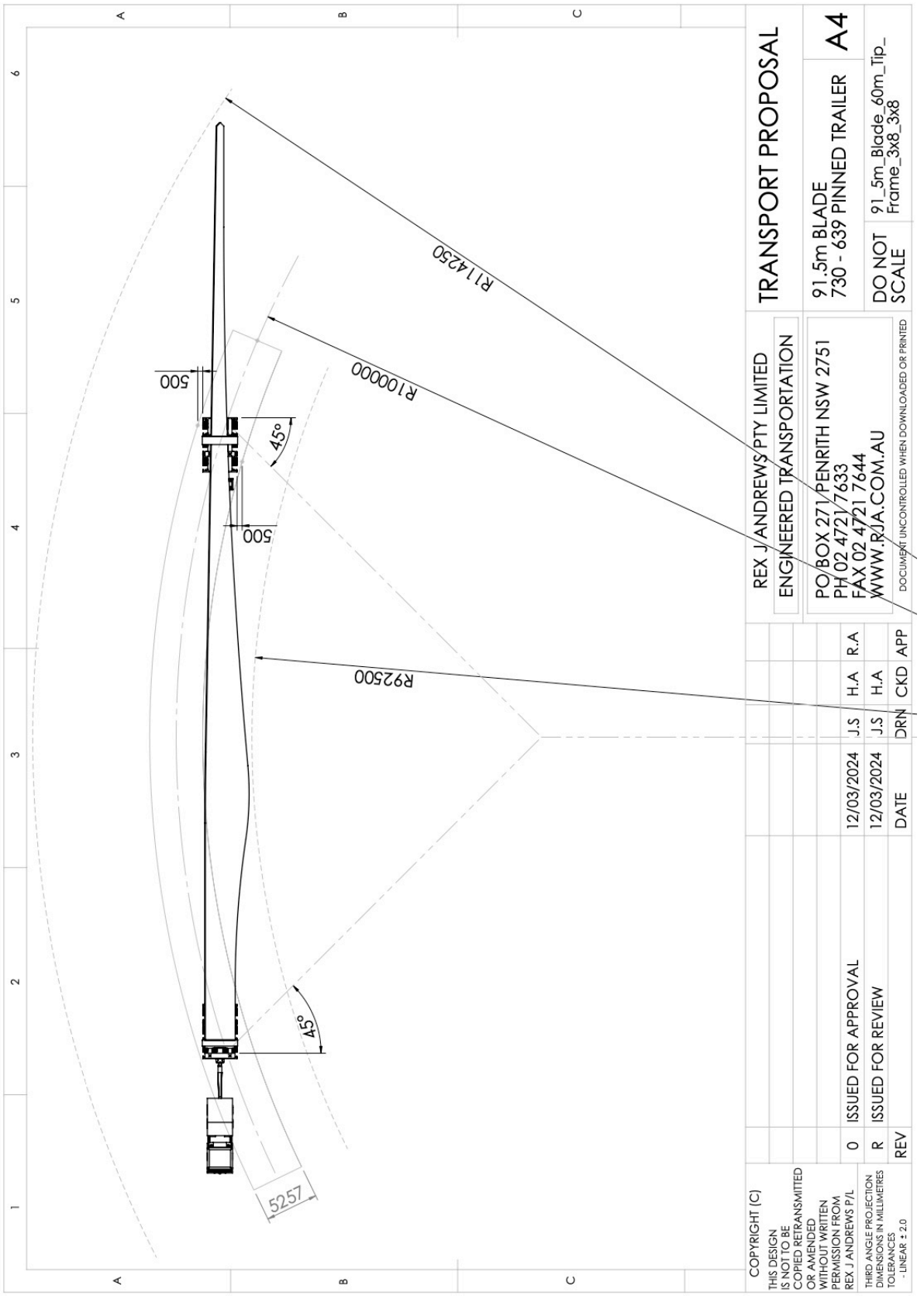

Figure 2 - Blade diagram: Swept path

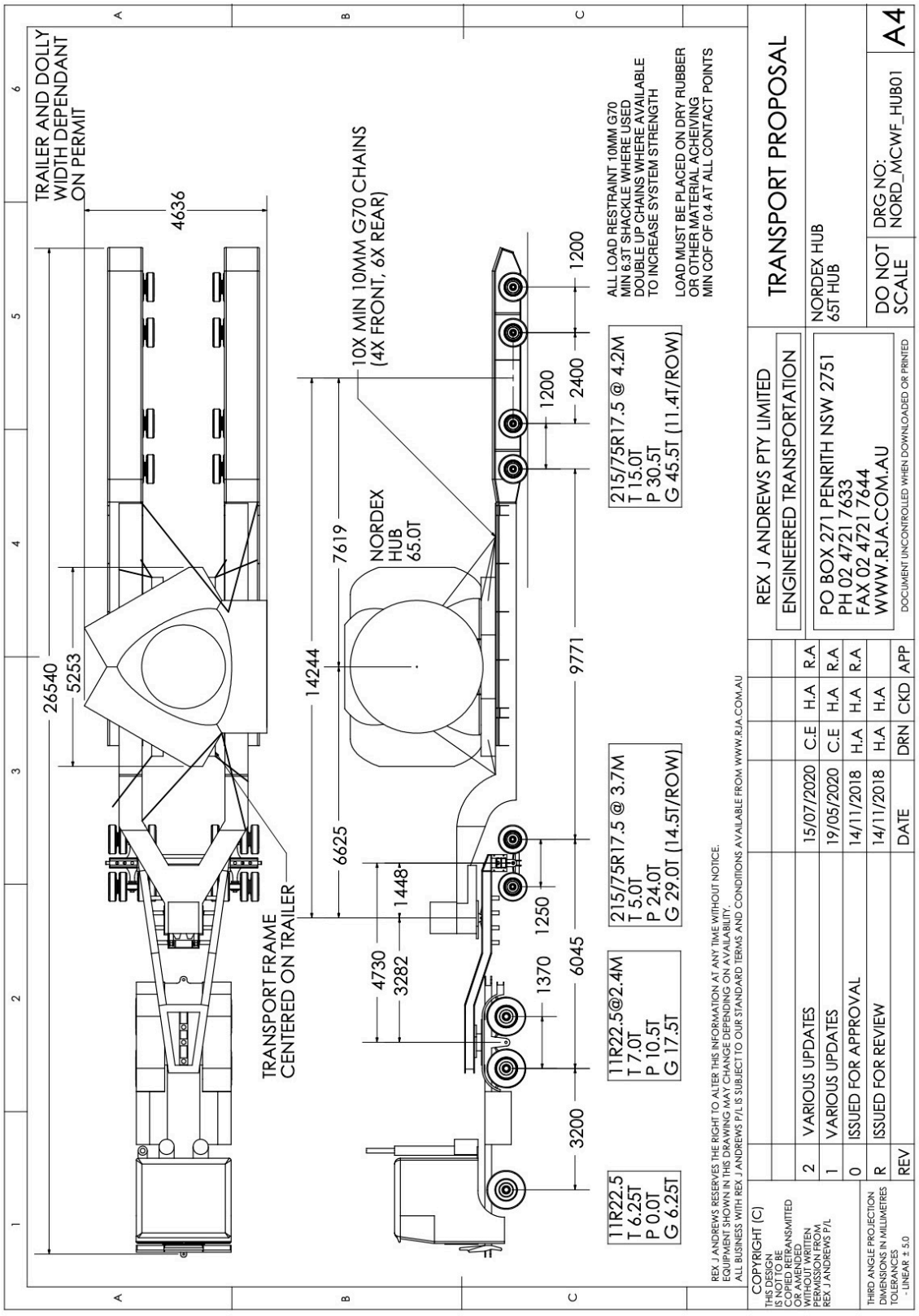

Figure 3 - Hub combination example

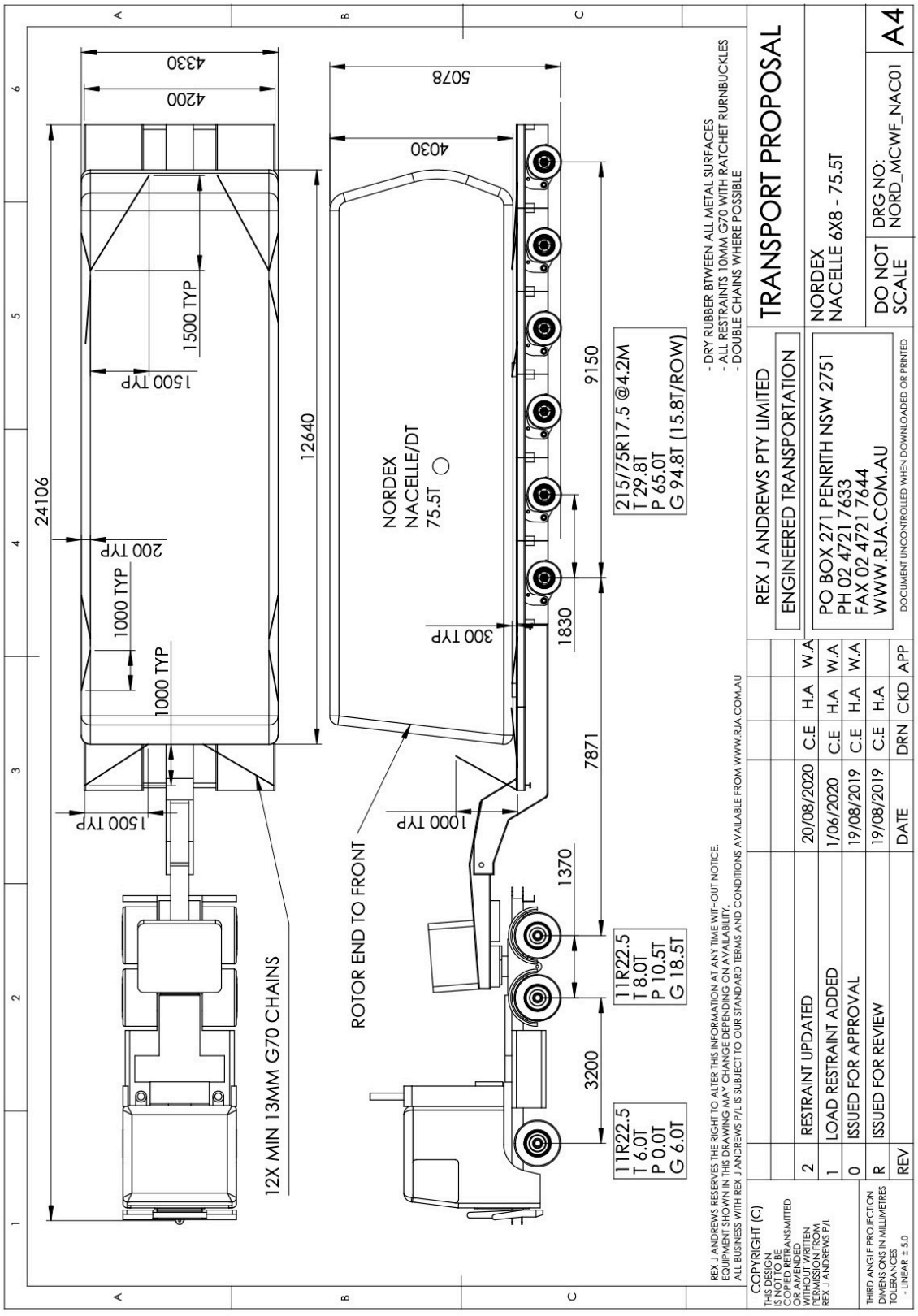

Figure 4 - Nacelle combination example

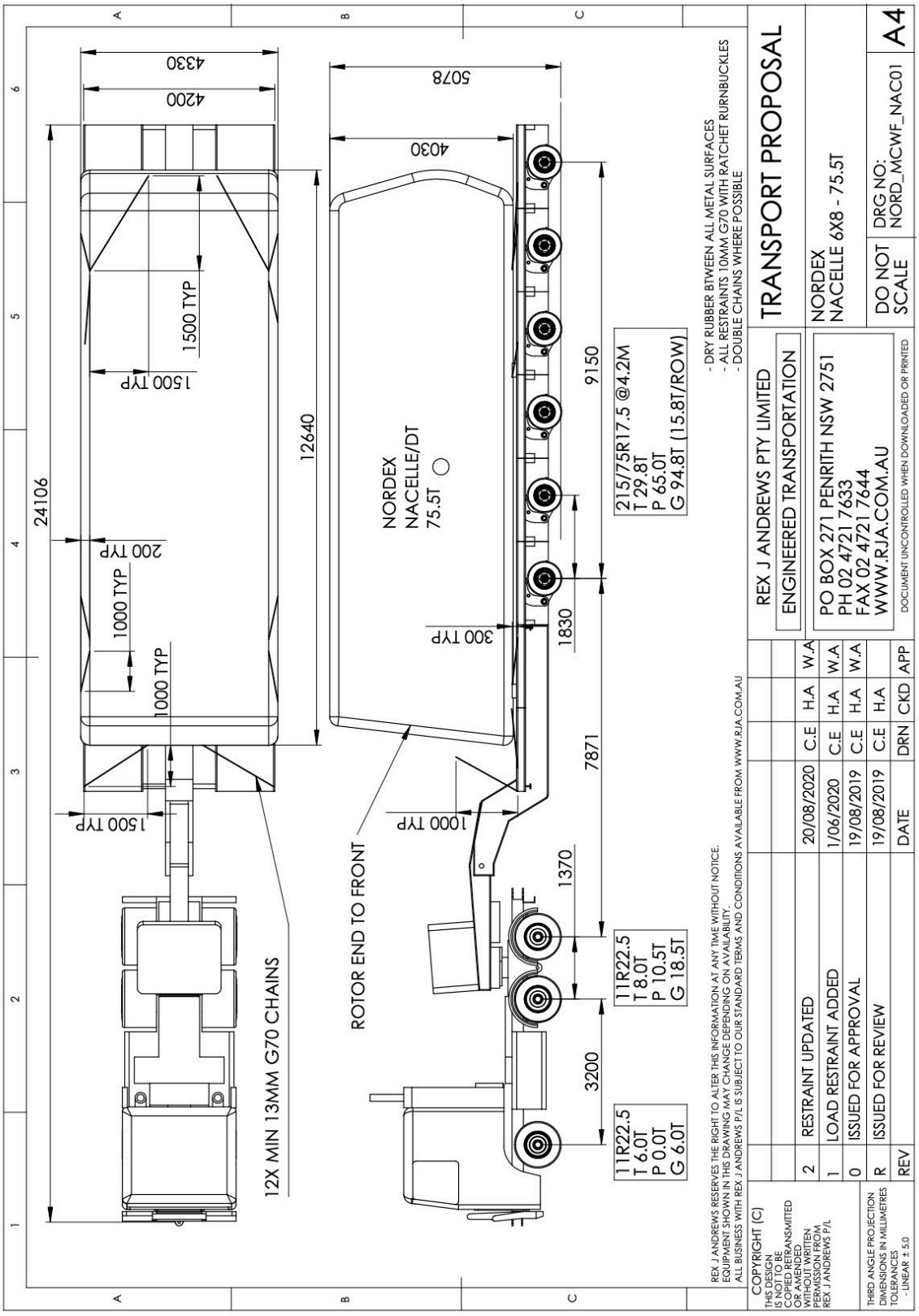

Figure 5 - Nacelle combination example

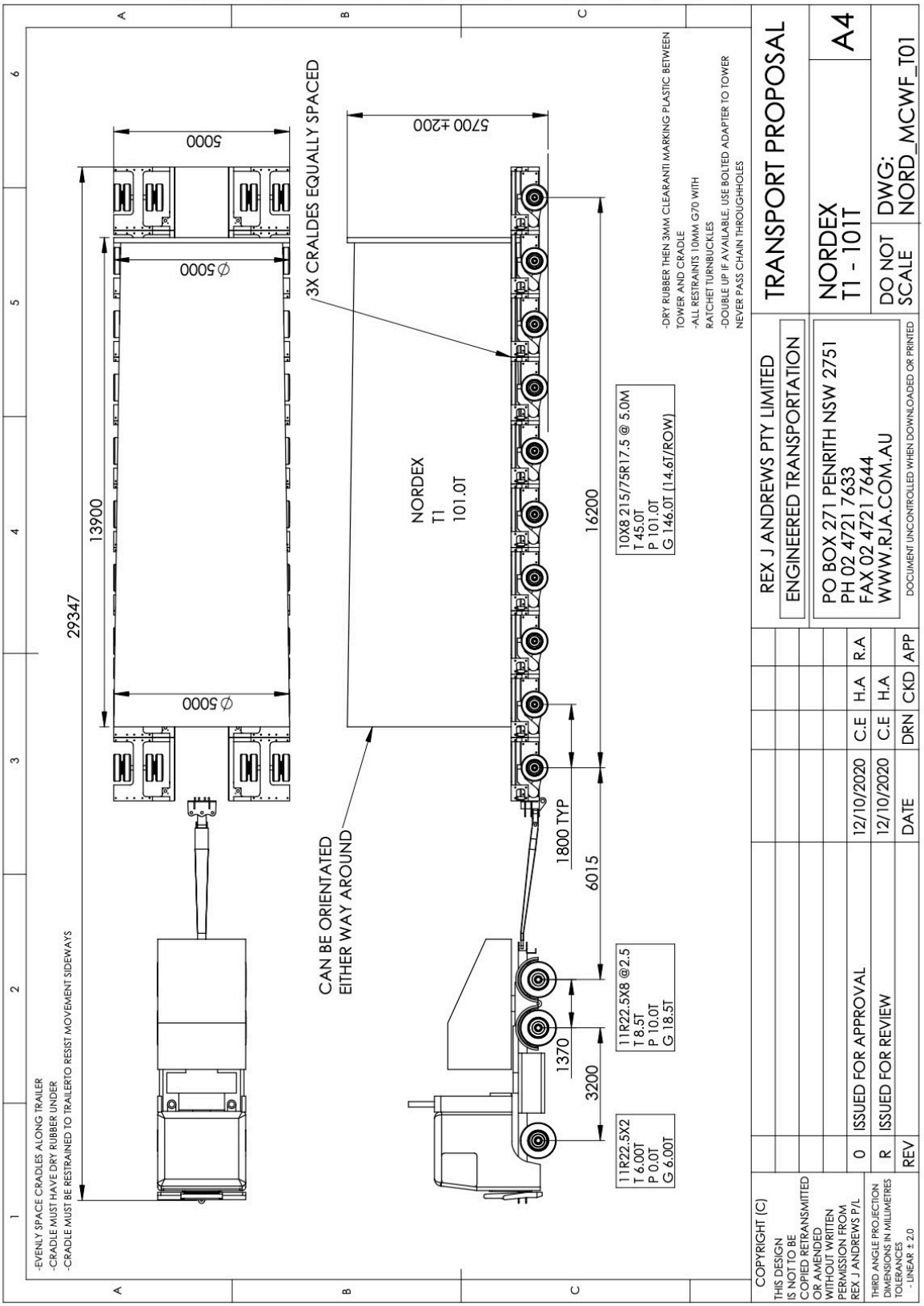

Figure 6 - Tower Trailer 10x8 Low platform example

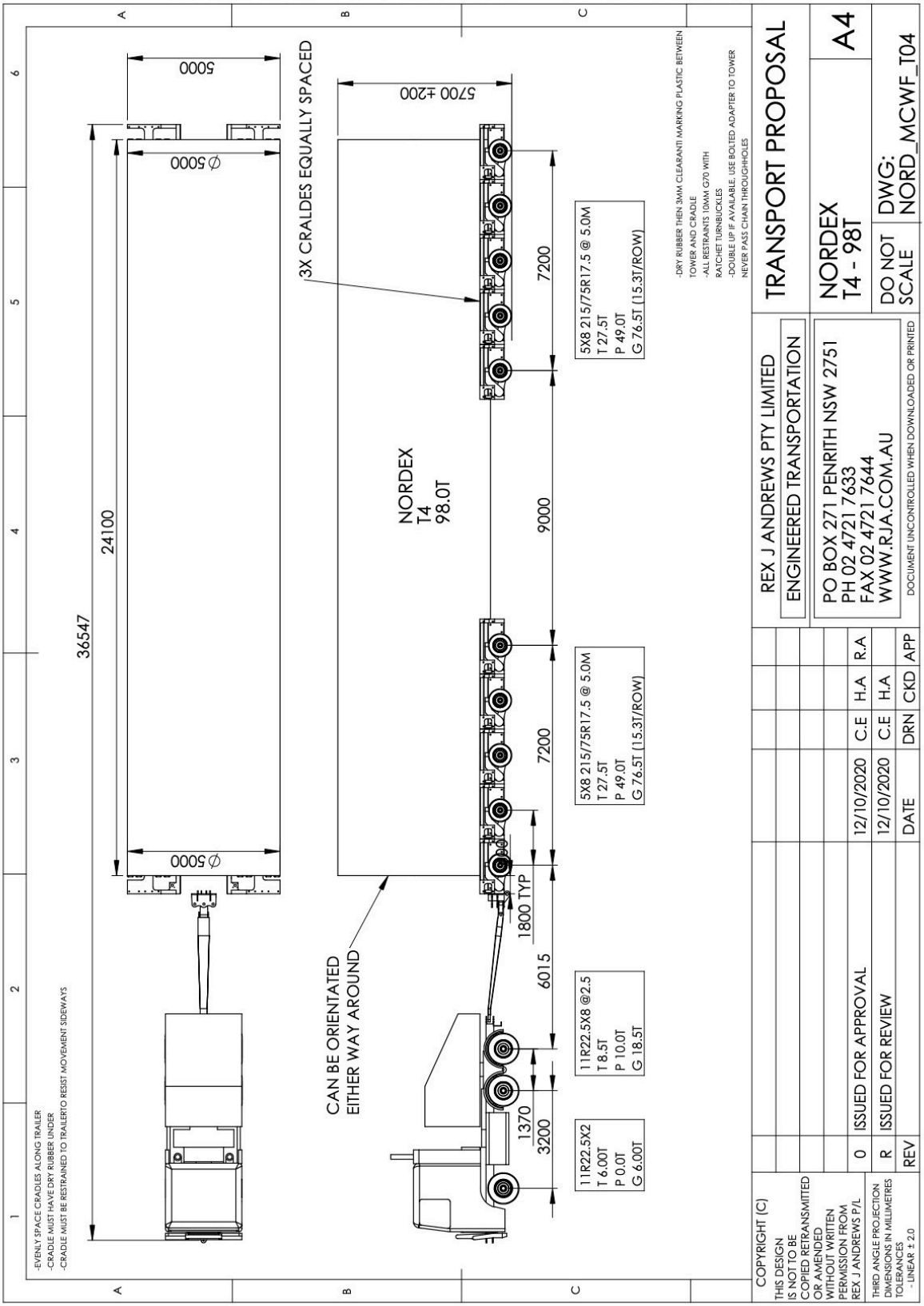

Figure 7 - Tower trailer 5x8-5x8 Low extending platform example

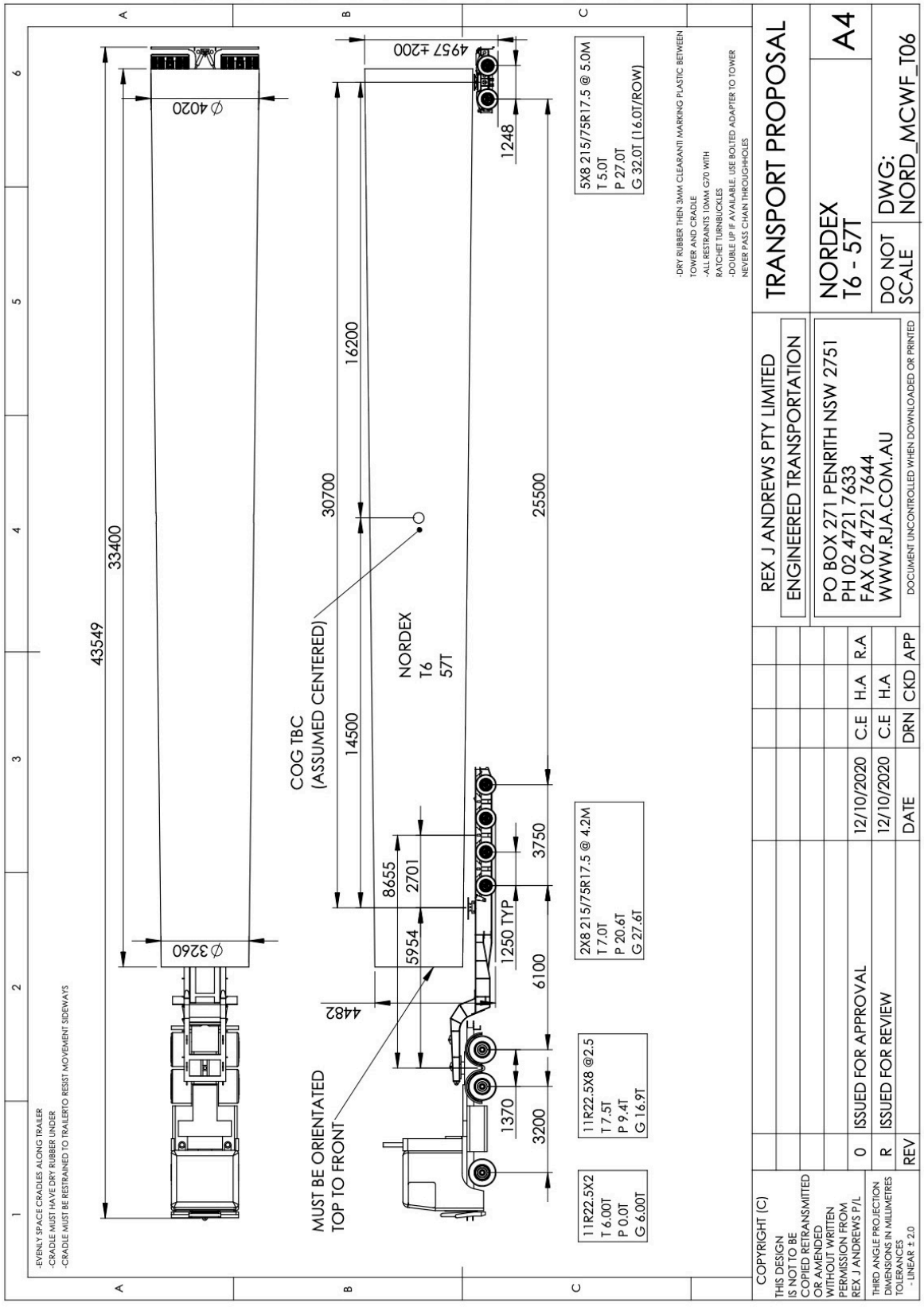

Figure 8 - Tower trailer Dolly and Jinker example

6.0 Keri Keri Wind Farm Site Location

The proposed Keri Keri Wind Farm is located approximately 30 kilometres (km) southeast of Balranald, and 75 km southwest of Hay in the Murray River Local Government Area (LGA).

The project is located within the Southwest Renewable Energy Zone (REZ) and is directly south of the Sturt Highway.

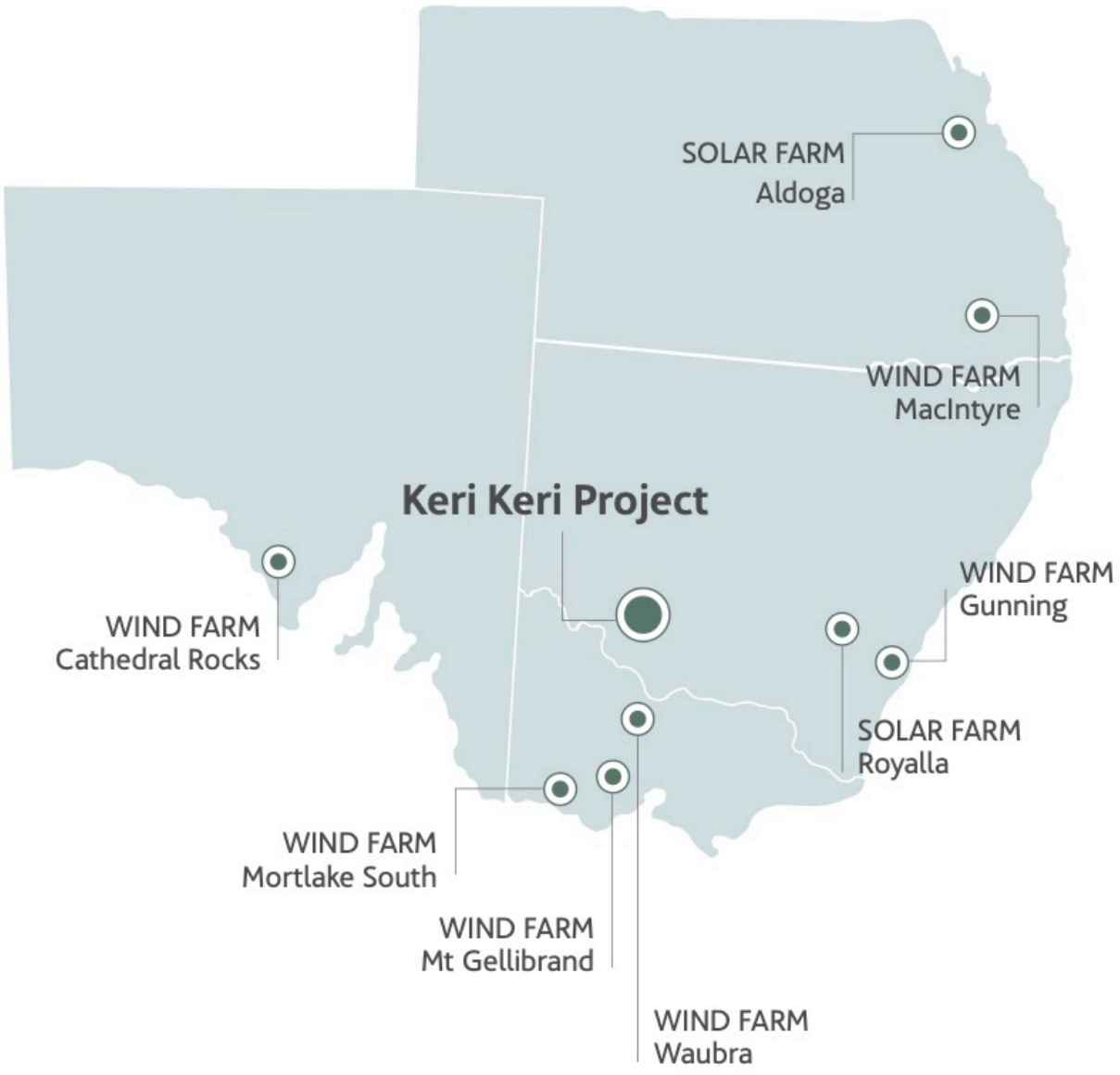

Figure 9 - Keri Keri Wind Farm Site Location

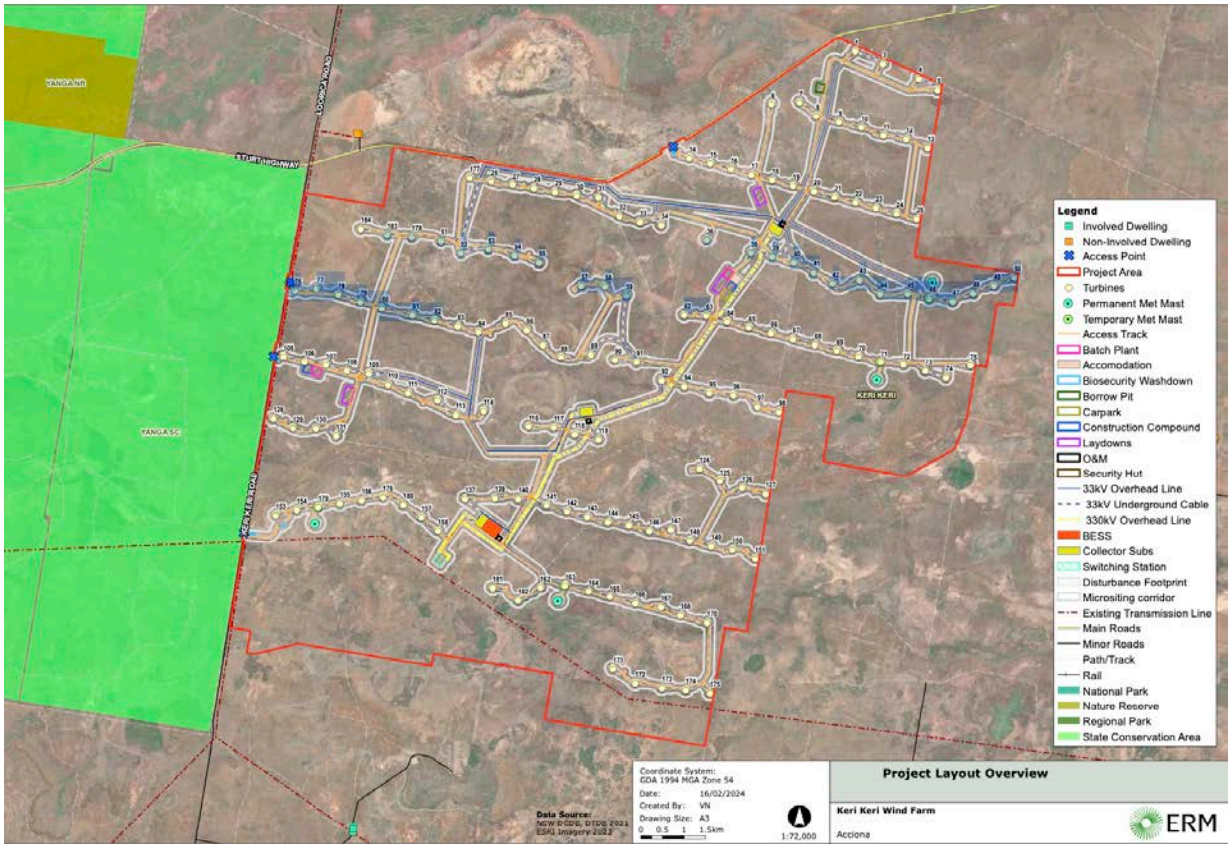

Figure 10 - Keri Keri Wind Farm Site Layout

7.0 Transport Summary

The study shows the proposed route for the wind turbine components, and the constraints they may encounter on the route to the Keri Keri Wind Farm from the Victorian border.

Route 1 would be used as the option for the blades.

Route 2 is the option for all other loads.

ROUTE 1: NSW/Victorian border (Robinvale) to Keri Keri Wind Farm
COMPONENTS: Blades.
DISTANCE: 125.0 kilometres
GPS LINK: https://goo.gl/maps/k465JQgDL8Tkp9Ez8
ROUTE: Robinvale-Sea Lake Rd, Murray Valley Hwy, Sturt Hwy, Keri Keri Road.

ROUTE 2: NSW/Victorian border (Mildura) to Keri Keri Wind Farm.
COMPONENTS: Loads under 40m overall length. **Max loaded height 5.9m**
DISTANCE: 199.0 kilometres
GPS LINK: https://goo.gl/maps/Q2aKRTh5KELca7Xv8
ROUTE: Seventh St, Sturt Hwy, Keri Keri Road.

8.0 Route 1: NSW/Victorian Border (Robinvale) to Keri Keri Windfarm

COMPONENTS: Blades.
DISTANCE: 125.0 kilometres
GPS LINK: https://goo.gl/maps/k465JQgDL8Tkp9Ez8
ROUTE: Robinvale-Sea Lake Rd, Murray Valley Hwy, Sturt Hwy, Keri Keri Road.

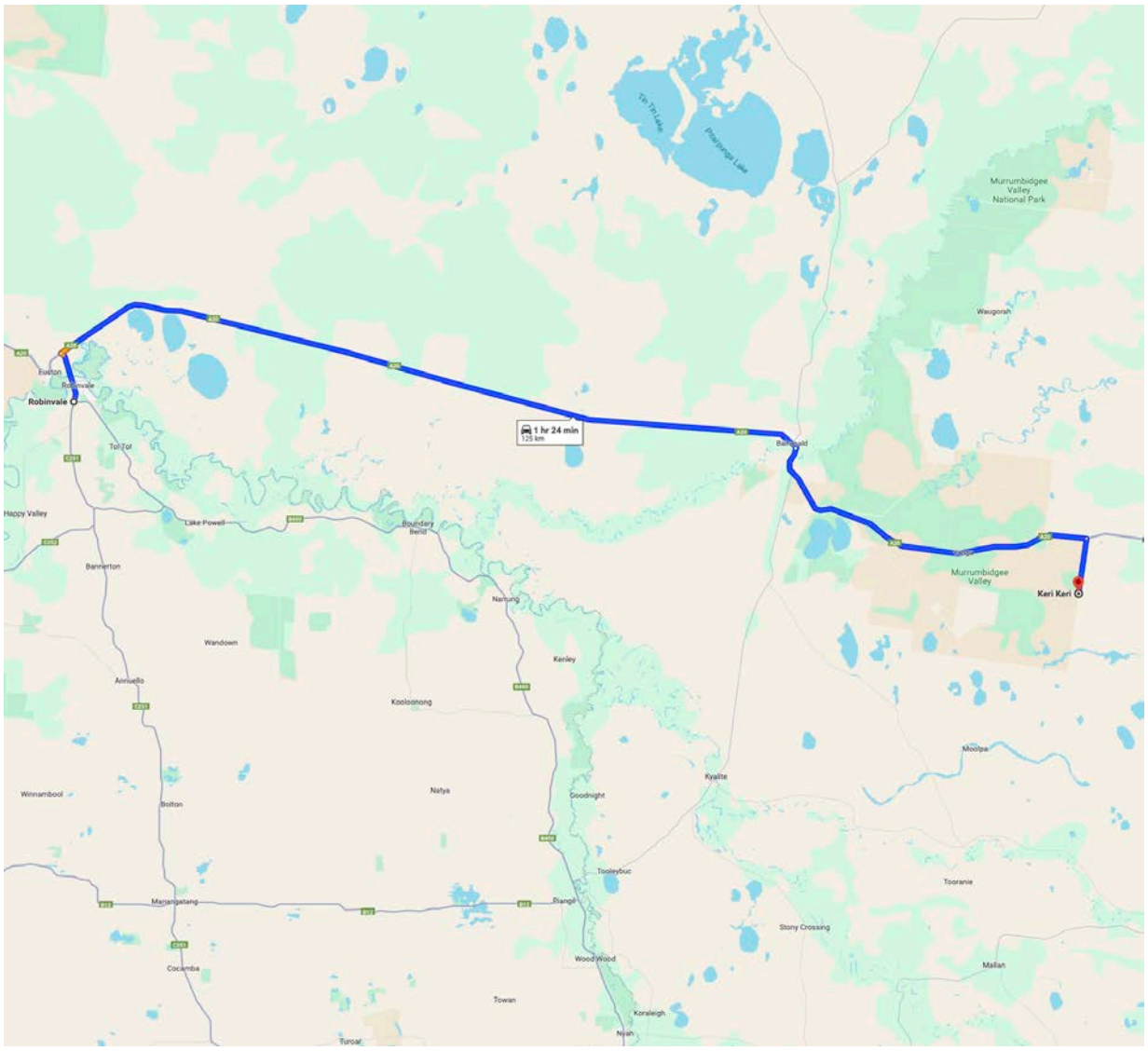

Figure 11 - Route 1

KEY	
MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
540.9	Robinvale	Robinvale-Sea Lake Rd turns into Murray Valley Hwy GPS Link: https://goo.gl/maps/55pknuwKNHsoA1ydA	120 metres	Continue Straight	No issues with this section
2.7	Robinvale	Murray Valley Highway over the Euston-Robinvale Bridge https://goo.gl/maps/uKnaiBJZG5yVVWJQ9	NA	Continue straight	A sign was noted saying the bridge has a load limit of 21.0t for a tri-axle group. A bridge assessment will be required to check suitability.
5.1	Euston	Murray Valley Hwy onto Sturt Hwy GPS Link: https://goo.gl/maps/rnhvninN6VkAWX3eA	50 metres	Right Hand Turn	This is a very tight corner that cuts back on itself. A very large amount of hardstand is required. The new alignment will need a lot of fil to bring it level with the highway. Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warm all traffic.
82.8	Balranald	Sturt Hwy (Market S t) onto Sturt Hwy GPS Link: https://goo.gl/maps/xve4ZgbuRkqqPvVr7	50 metres	Right Hand Turn	This section is very tight and will require the truck to continue into the park on the outside of the corner. A large area of hardstand will be required along with the removal of 5x trees, 2x light poles and 11x signs. Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warm all traffic.
119.6	Keri Keri	Sturt Highway onto Keri Keri Road GPS Link: https://goo.gl/maps/uH5pmWwzWvz3TJ4K6	`	Right hand turn	A large area of hardstand is required on the inside of the corner. Keri keri Rd and All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries. Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warm all traffic.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
125	Keri Keri	Keri Keri Road into site entrances https://maps.app.goo.gl/ytL5UYQ4rNfQq7SB8		3 x Site Entrance	3 x site entrances are proposed for this location. The land is very flat with limited vegetation. All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.
129.1	Keri Keri	Stuart Highway into site entrances GPS Link: https://goo.gl/maps/RkFMB8h4vJBVnHGw5		Site Entrance	A site entrance is proposed for this location. The land is very flat with limited vegetation. All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

5.1 Km's: Murray Valley Highway onto Sturt Highway at Euston

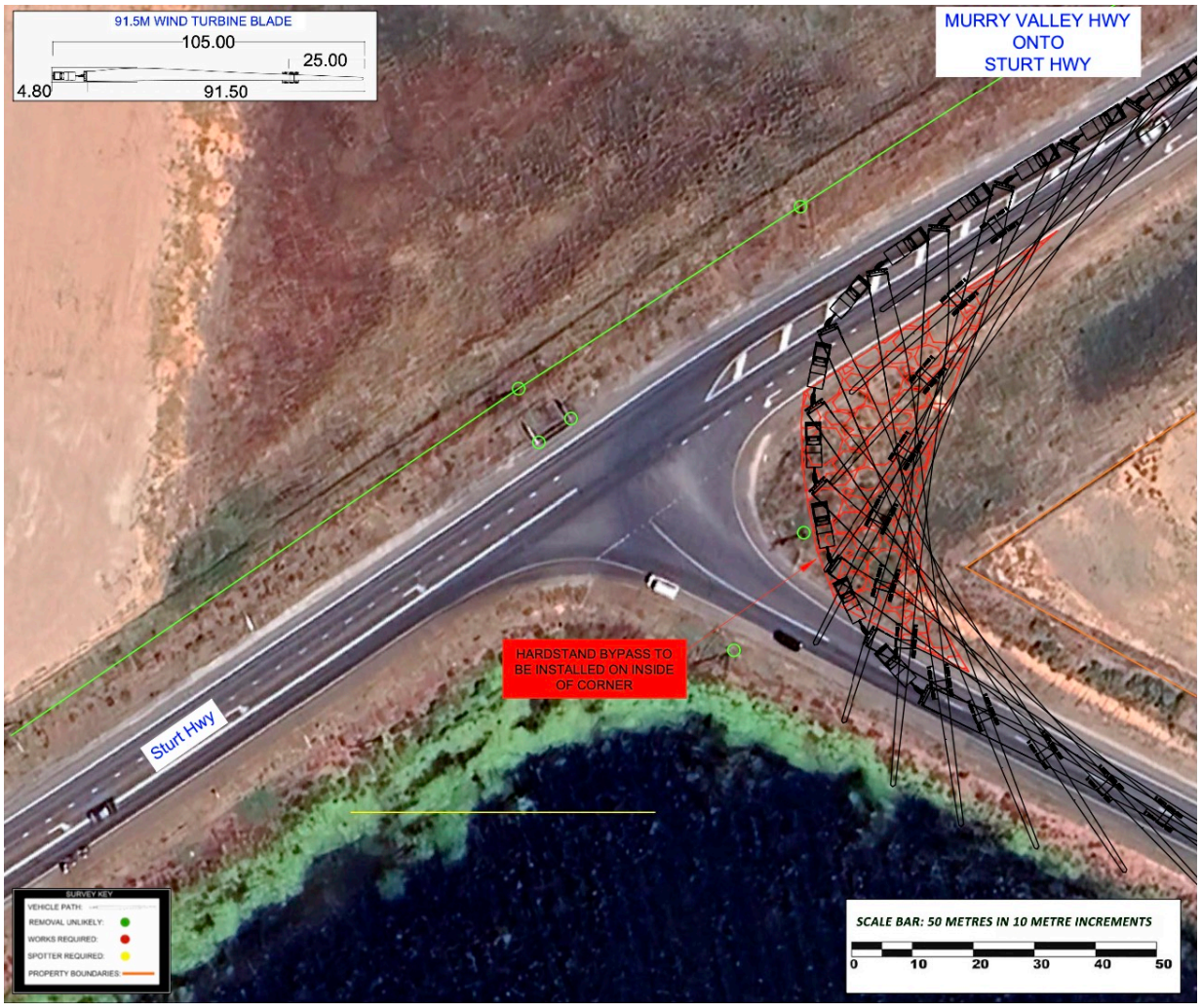

Figure 12 - Murray Valley Highway onto Sturt Highway

Figure 13 - Low angle shot

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/rnhvnjnN6VkAWX3eA

PROCEDURE: Right hand turn

COMMENTS: This is a very tight corner that cuts back on itself.

Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warm all traffic.

ROAD MODIFICATIONS: A very large amount of hardstand is required. The new alignment will need a lot of fil to bring it level with the highway. See image 2, there is a large drop off at the edges of the highway.

82.8 Km's: Right hand bend on Sturt Highway at Balranald

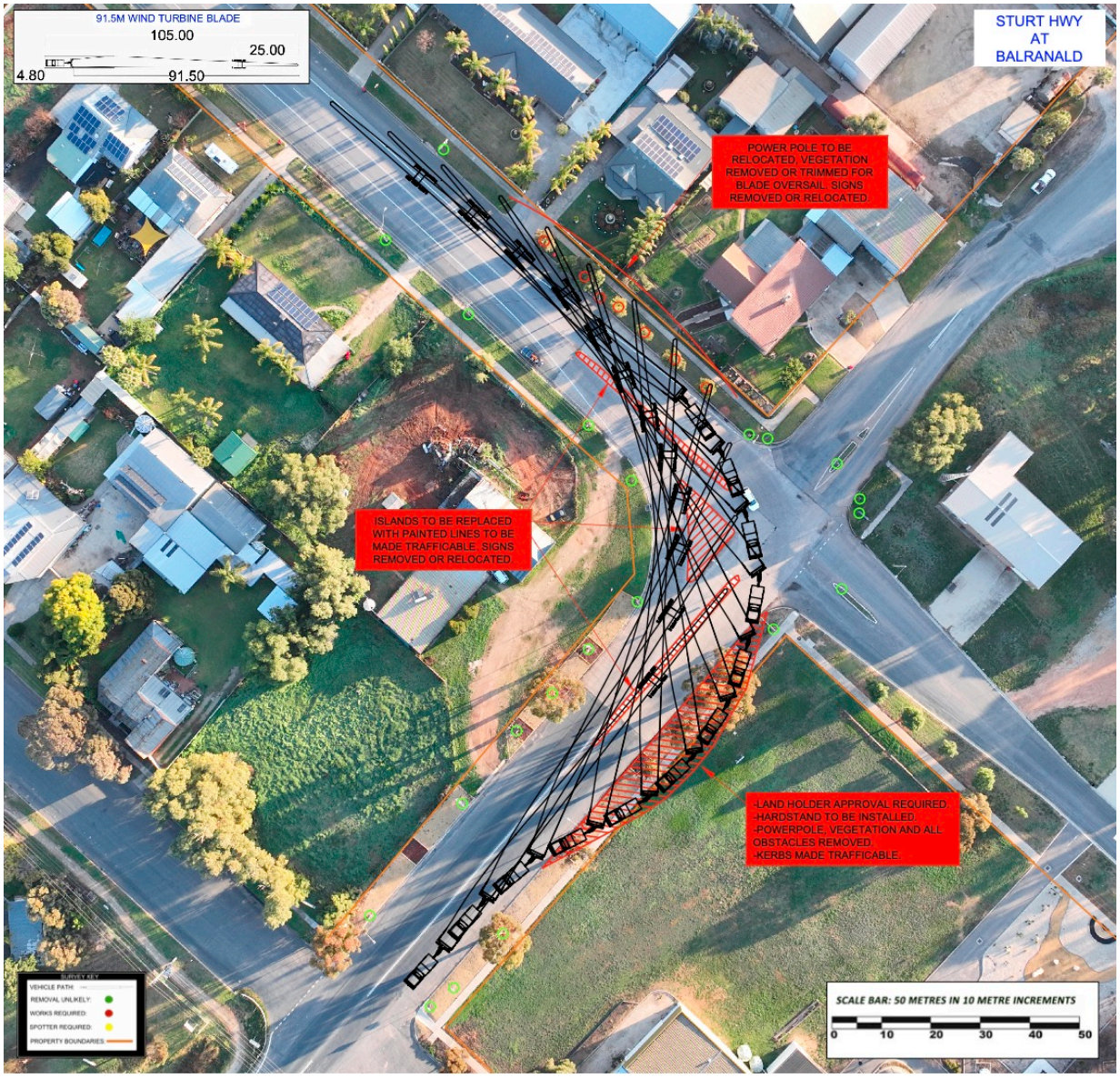

Figure 14 - Right hand bend on Sturt Highway

Figure 15 - Low angle shot

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/xve4ZgbuRkqqPvVr7

PROCEDURE: Right hand turn

COMMENTS: This section is very tight and will require the truck to continue into the park on the outside of the corner.

Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warm all traffic.

ROAD MODIFICATIONS: A large area of hardstand will be required on the exit of the corner, along with the removal of several trees, light poles, and signs. Kerb to be made trafficable. Landholder permission will be required.

A power pole and several trees and signs to be removed or trimmed on entry to corner. Traffic islands to be replaced with painted lines and made trafficable.

119.6 Km's: Sturt Highway onto Keri Keri Road

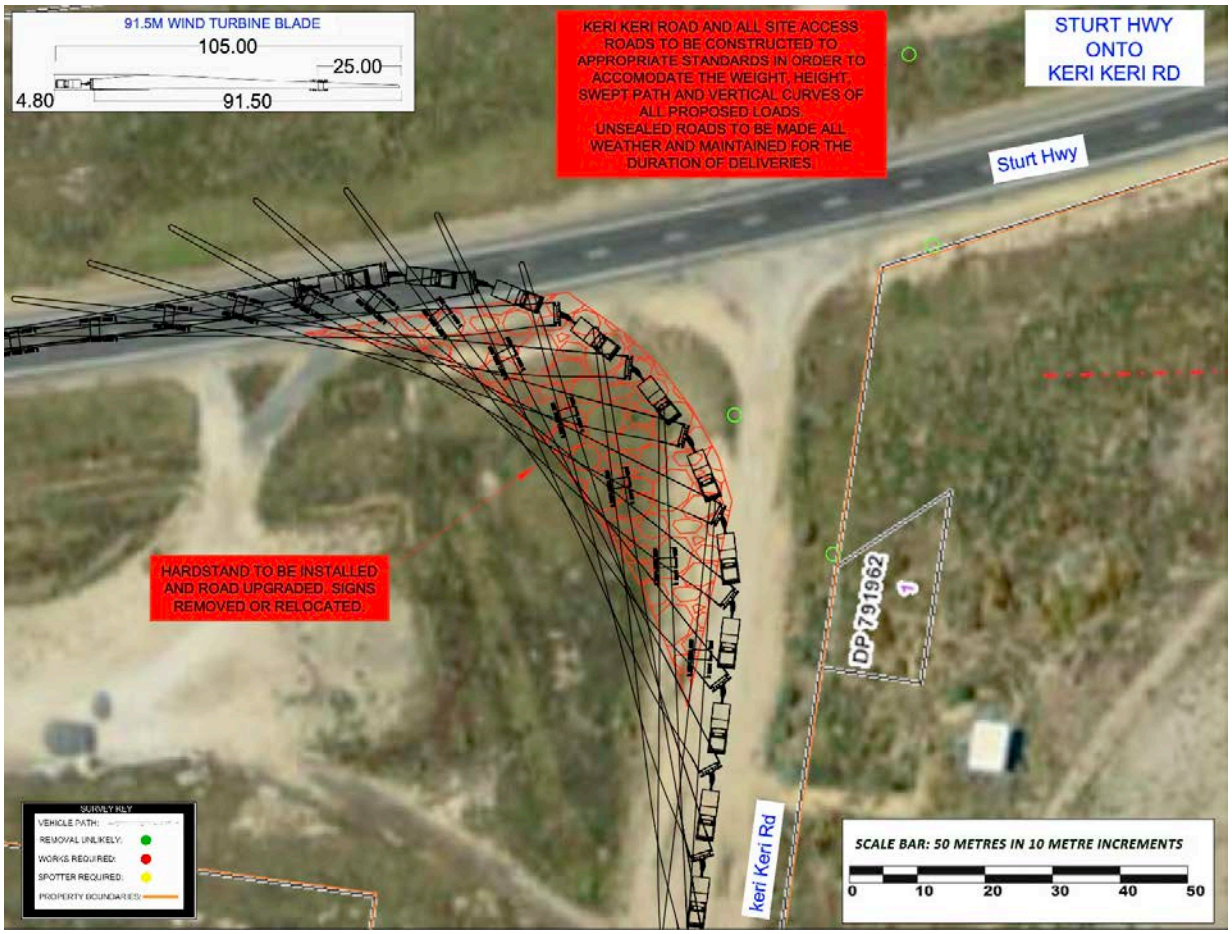

Figure 16 - Sturt Highway onto Keri Keri Road

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/uUhj8HobAbyn9rcy8

PROCEDURE: Right hand turn

COMMENTS: A large area of hardstand is required on the inside of the corner.

Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warm all traffic.

ROAD MODIFICATIONS: Keri keri Rd and All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

129.1 Km's: Sturt Highway into Site Entrance

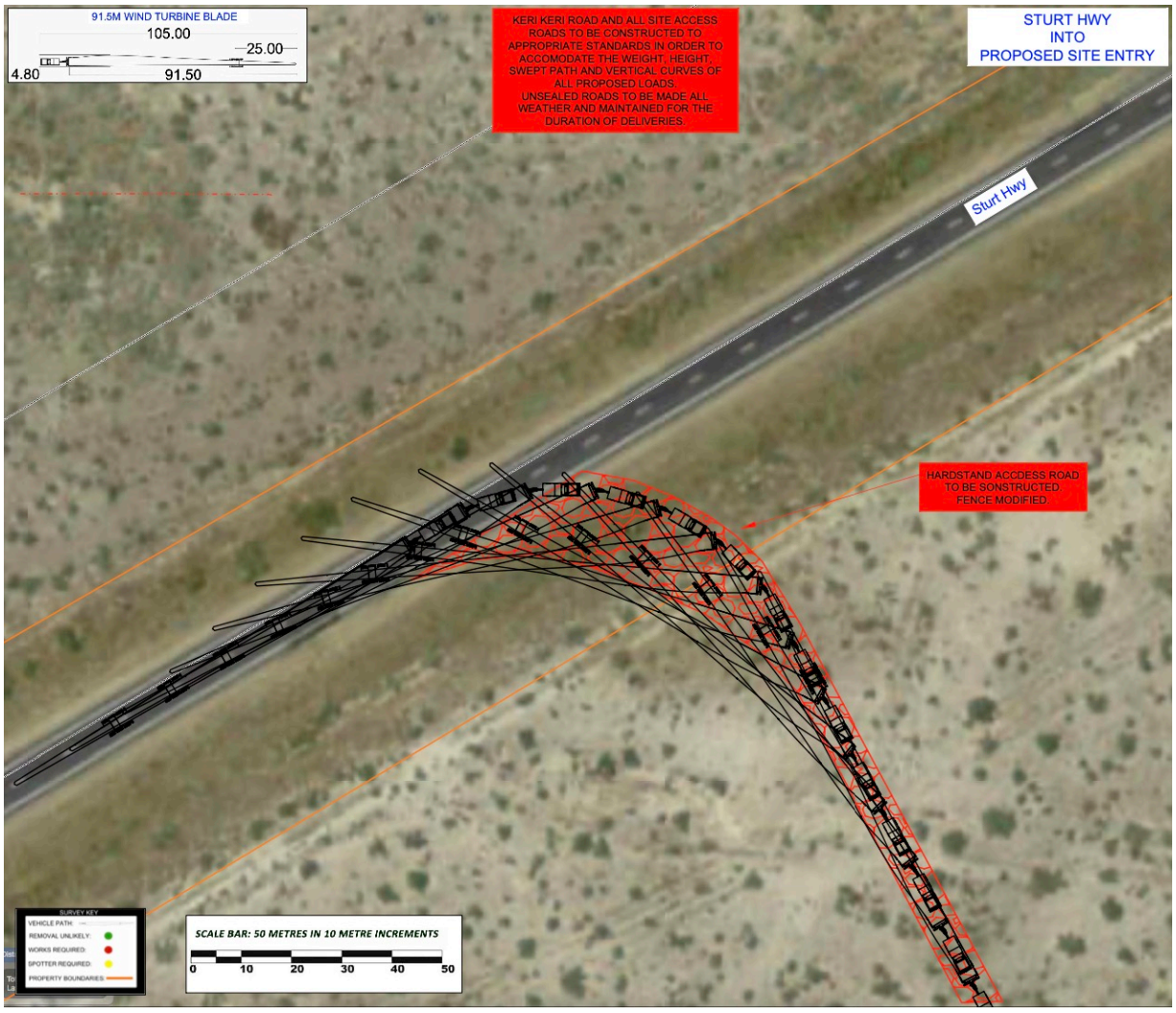

Figure 17 - Sturt Highway into site entrance

GPS LINK FOR THIS LOCATION: https://goo.gl/maps/uUhj8HobAbyn9rcy8

PROCEDURE: Right hand turn

COMMENTS: The site entrances are proposed along this location. The land is very flat with limited vegetation. Client to provide adequate swept path for the blade to enter site.

ROAD MODIFICATIONS: All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

129.1 Km's: Keri Keri Rd into Site Entrance (Typical)

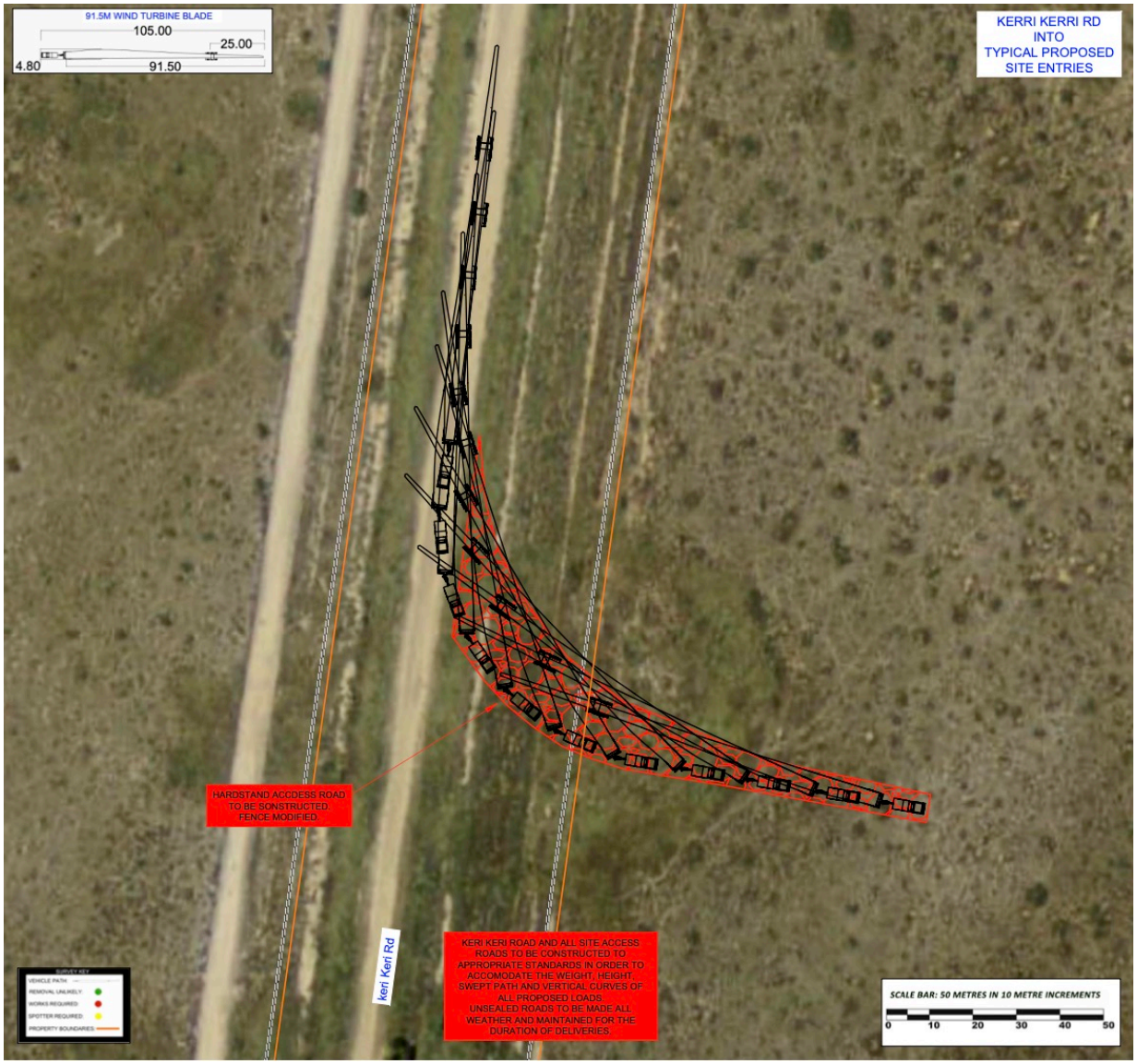

Figure 18 - Keri Keri Rd into Site Entrance (Typical)

GPS LINK FOR THIS LOCATION: https://maps.app.goo.gl/ytL5UYQ4rNfQqTSB8

PROCEDURE: Left hand turn

COMMENTS: 3 x site entrances are proposed along this location. The land is very flat with limited vegetation. Client to provide adequate swept path for the blade to enter site.

ROAD MODIFICATIONS: Keri keri Rd and All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads. Unsealed roads to be made all weather and maintained for the duration of deliveries.

9.0 Conclusion Route 1

After studying all options and undertaking a route survey, this route in its current condition will require a major amount of upgrades before it could be deemed suitable for transporting the proposed components.

The following are the key points that need to be taken into consideration, if the project moves forward with this route.

SWEPT PATH:

- There are numerous sections along the route that need major work to allow a blade of this size through.
- The corners that we consider will need significant work and should be investigated early in the planning stages to avoid delays or rejections are:
  - The right-hand turn from Murray Valley Highway onto the Sturt Highway at Euston
  - The right-hand bend on the Sturt Highway at Balranald

OVERHEAD UTILITIES:

- This route will need to be checked by an authorised scoping company. It is likely that a route of at least 5.6 metres is required for this project.

BRIDGES:

- Majority of the bridges have been used previously for similar loads so it is expected they will be ok. A bridge assessment will still be required.
- The only bridge of concern is the Euston-Robinvale Bridge over the Murray at Robinvale. This bridge has a sign noted saying the bridge has a load limit of 21.0t for a tri-axle group. A bridge assessment should be conducted as soon as possible to check suitability.

RAIL ASSETS:

- Rail overbridges and crossings on route will require approval from authorities before loads can access the routes.

VEGETATION:

- The route requires a moderate amount of vegetation clearing at various locations.

PAVEMENT:

- All roads have adequate highway pavement until Keri Keri Road.
- Keri Keri Road and all unsealed roads to be made all weather and maintained for the duration of deliveries.

ROADWORKS:

- The project will need to start discussions with government authorities at least 18 months prior to turbine transport to understand if the project would conflict with any upcoming roadworks. Once a Transport Management Plan “TMP” has been approved for the transport of the turbines, then the exact movement dates need to be communicated with all relevant authorities to make all road stakeholders are aware of the scheduled movements for each day.
- The project will need to regularly check on any new upgrades not listed in the report. If upgrades have taken place on a section of route after this report has been completed, then a swept path study would need to be undertaken on that section of road to confirm that it can still be used.

SITE ENTRIES:

- All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads.
- Unsealed roads to be made all weather and maintained for the duration of deliveries.

10.0 Route 2: NSW/Victorian border (Mildura) to Keri Keri Windfarm

COMPONENTS: Loads under 40m overall length.
DISTANCE: 199.0 kilometres
GPS LINK: https://goo.gl/maps/Q2aKRTh5KELca7Xv8
ROUTE: Seventh St, Sturt Hwy, Keri Keri Road.

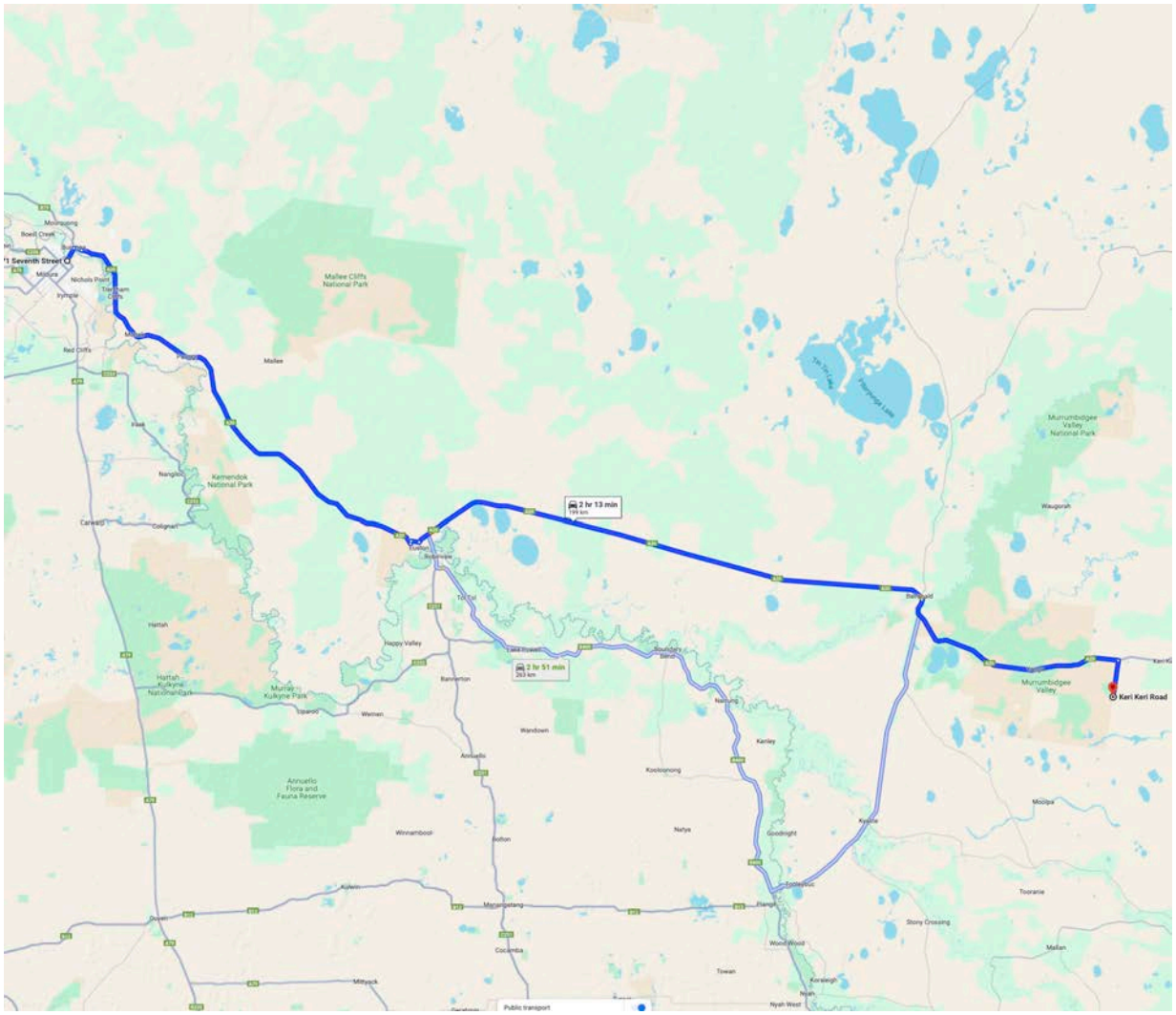

Figure 19 - Route 2

KEY	
MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Mildura	Seventh St E onto Sturt Hwy GPS Link: https://goo.gl/maps/DCWU9cDTpnWQFpudA	6 metres wide	Third Exit on Round-about	Right Hand Turn at round-about
2.2	Buronga	Sturt Hwy GPS Link: https://goo.gl/maps/eSH3JMoHGAk221YVA	6 metres wide	Second Exit on Round-about	Travel right at round-about
25.9	Paringi	Sturt Hwy GPS Link: https://goo.gl/maps/aF7DrHsfBEBnzMBZ8	90.0 metres long 10.0 metres wide	Left Hand Merge	Possible parking on correct side of the road.
78.1	Euston	Sturt Hwy GPS Link: https://goo.gl/maps/4WoDVv7TwnbDad6z5	6 metres wide	First Exit on Round-about	Travel left at round-about
158.4	Balranald	Sturt Hwy (market st) onto Sturt Hwy GPS Link: https://goo.gl/maps/xve4ZqbuRkqqPvVr7	6 metres wide	Right Hand Turn	No problems with this section of road.
194.1	Keri Keri	Sturt Highway onto Keri Keri Road GPS Link: https://goo.gl/maps/uH5pmWwzWvz3TJ4K6		Right hand turn	A large area of hardstand is required on the inside of the corner. Spotter to guide the load throughout the intersection. Police to control traffic, pilots to warm all traffic.
199	Keri Keri	Keri Keri Road into site entrances		Site Entrance	A site entrance is proposed for this location. The land is very flat with limited vegetation. Client to provide adequate swept path for the blade to enter site.

11.0 Conclusion Route 2

After studying all options and undertaking a route survey, this route is suitable in its current condition for transporting the proposed components.

The following are the key points that need to be taken into consideration, if the project moves forward with this route.

LENGTH

- The longest combination that can travel along this route without upgrades is **40m overall length**

OVERHEAD UTILITIES:

- This route will need to be checked by an authorised scoping company. It is likely that a route of at least 5.9 metres is required for this project.

BRIDGES:

- Majority of the bridges have been used previously for similar loads so it is expected they will be ok. A bridge assessment will still be required.

RAIL ASSETS:

- Rail overbridges and crossings on route will require approval from authorities before loads can access the routes.

PAVEMENT:

- All roads have adequate highway pavement up until Keri Keri Road.

SITE ENTRIES:

- All site access roads to be constructed to appropriate standards in order to accommodate the weight, height, swept path and vertical curves of all proposed loads.
- Unsealed roads to be made all weather and maintained for the duration of deliveries.

ROADWORKS:

- The project will need to start discussions with government authorities at least 18 months prior to turbine transport to understand if the project would conflict with any upcoming roadworks. Once a Transport Management Plan “TMP” has been approved for the transport of the turbines, then the exact movement dates need to be communicated with all relevant authorities to make all road stakeholders are aware of the scheduled movements for each day.
- The project will need to regularly check on any new upgrades not listed in the report. If upgrades have taken place on a section of route after this report has been completed, then a swept path study would need to be undertaken on that section of road to confirm that it can still be used.

12.0 References

Rex J Andrews P/L Route survey # 362 REV01
Google Earth/Maps
Nearmaps
ERM
Acciona
NHVR (OSOM)
Australian Load Restraint Guide

Disclaimer: This route study is provided on the basis of information only purposes and is to be used strictly as 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

Estimated Peak Construction Period Traffic Generation

21012 Keri Keri Wind Farm - Construction Traffic Generation Estimation

No. of WTG	155
Construction Duration	24
Based on Project Discription by ERM	16-Apr-24
No. of WTG	155
Tower Height	200m

Material	Vehicle Type	Estimated No. of Vehicles to site (Total)	Staging Months	Days (based on 24 Days / month	Ave Trips to Site / day	Peak Vehicles to Site / Day	Peak Movements / Day (in & out)	Assumptions / Comments
Temporary Facilities								
Concrete Batching Plant	OSOM - Prime mover with low loader	18						Up to 2 plants on site.
Agitators	self drive	8						Temporary vehicles to bump in at commenement of construction and bump out at end. Trips not part of typical construction day
Cranes	self transportation	8						
Earth moving Equipment / site sheds / car parks etc	various	60						
	Sub total							
Construction General								
Water - Batching	18m3 Water Truck	780	M2-M23	528	1	16	32	As advised by client and based on Macintyre Wind Farm pro-rated quantities
Water - Dust Control	18m3 Water Truck	2220	M1-M24	576	4	5	10	"
Water - General Use	18m3 Water Truck	5550	M1-M24	576	10	11	22	"
Cement - Foundations	42m3 Bulk Road tanker	470	M2-M20	456	1	2	5	"
Sand Foundations	15m3 Truck and Dog	4000	M2-M20	456	9	10	20	"
Aggregate - Foundations	15m3 Truck and Dog	4000	M2-M20	456	9	10	20	"
Aggregate - Roads	15m3 Truck and Dog	44490	M1-M18	432	103	104	209	"
Aggregate - Hardstand	15m3 Truck and Dog	59953	M1-M18	432	139	140	280	"
	Sub total	121463			275	299	598	
WTGs								
WTG - Blades	OSOM - blade trailer	477	M3-M22	480	1	3	6	Based on R J Andrews Report - Pro rata vehicles trips for 155 WTG (not 176 ETG) scenario
WTG - Tower (NABRA HH 200 Option)	OSOM - Prime mover with platform trailer	3158	M3-M22	480	7	10	20	"
WTG - Hubs	OSOM - Prime mover with low loader	159	M3-M22	480	0.3	2	4	"
WTG - Narcelle	OSOM - Prime mover with platform trailer	159	M3-M22	480	0.3	2	4	"
WTG - Drive Train	OSOM - Prime mover with platform trailer	159	M3-M22	480	0.3	2	4	"
	sub total	4112			9	19	38	
Electrical								
BESS	OSOM Prime Mover with trailer	6						Vehicles to be outside of peak WTG construction period
Substations	OSOM Prime Mover with trailer	20						Vehicles to be outside of peak WTG construction period
Cabling	OSOM Prime Mover with trailer	200	M3-M23	576	0.3			
	Sub total							
Construction Workforce								
650 workers at peak	Mini bus	20 per bus	50%		5	5	10	All workers are accommodated on site and 30% of total on site 650 workers arrive and 30% deaprt site on change over day (twice a week)
	Car pool	3 per car	25%		16	16	33	Inbound trips to occur at the start of the working day with outbound trips to be at the end of the day.
	Individual	1 per car	25%		49	49	98	
				Sub Total	70	70	140	

Appendix C

Cumulative Impact – Nearby Wind & Solar Projects

Project	Description	Distance (km) [1]	Construction Period / Timeline
Argoon Wind Farm (Prepare EIS)	• Estimated generating capacity of up to 901 MW. • Up to 106 WTGs with maximum height of 249 m to blade tip. • BESS (460 MW/2300 MWh) and ancillary infrastructure. • Peak construction workforce 340 FTE. • Operational workforce between 6 and 12 FTE. • Temporary workforce accommodation will be included if required.	158 km east	• Construction estimated to commence within one year of project approval. • Construction period about 24-36 months.
Baldon Wind Farm (Prepare EIS)	• Nominal generating capacity 1,000 MW. • Up to 162 WTGs with a maximum height of 300 m to blade tp. • BESS (200 MW/800MWh) and ancillary infrastructure. • Peak construction workforce 350 FTE. • Operational workforce 25 FTE. • Temporary workers accommodation will be established within Project Area.	13 km south-east	• Construction expected to commence 2024. • Construction period of 2-3 years. • Commissioning expected 2026-2027.
Bullawah Wind Farm (Prepare EIS)	• Nominal generating capacity of 1,000 MW. • 170 WTGs with maximum height of 300 m to blade tip. • BESS (storage of 500 MW/2000 MWh) and ancillary infrastructure. • Peak construction workforce 400 FTE. • Operational workforce 40 FTE. • Temporary workers accommodation may be located within the Project Area (as required).	115 km east	• Construction estimated to commence mid to late 2025. • Construction period about 24-months. • Commissioning expected 2027 (full scale operations).
Dinawan Wind Farm (Prepare EIS)	• Nominal generating capacity of 1,500 MW. • Up to 250 WTGs with maximum height of 280 m to blade tip. • BESS (300 MW/1200 MWh) and ancillary infrastructure. • Peak construction workforce 800 FTE. • Operational workforce up to 50 FTE . • Workforce accommodation is expected to rely on available rental, motel and other accommodation in surrounding townships and regional centres.	153 km south-east	• Construction expected to commence 2025. • Construction period up to 36 months. • Commissioning expected 2028.

[1] *Indicative direct-line distances from the approximate centre points of the Project sites*

Project	Description	Distance (km) [1]	Construction Period / Timeline
Junction Rivers Wind Farm (formerly Burrawong Wind Farm) (Prepare EIS)	• Nominal generating capacity 750 MW. • Up to 96 WTGs with a maximum height of 300 m to blade tip. • BESS (250 MW/500 MWh) and ancillary infrastructure. • Peak construction workforce 250 FTE. • Operational workforce 10-15 FTE. • Existing facilities in Balranald and other options in Kyalite and surrounding region will be utilised for construction staff accommodation.	33 km south-west	• No current information available regarding construction.
Pottinger Wind Farm (Prepare EIS)	• Nominal generating capacity of 750 MW. • Up to 108 WTGs with maximum height of 280 m to blade tip. • BESS (500 MW/2000 MWh) and ancillary infrastructure. • Peak construction workforce 450 FTE. • Operational workforce 40 FTE. • Temporary workers accommodation located within the Project Area or located offsite.	99 km east	• Construction estimated to commence 2025 or 2026. • Construction period expected to commence 2026. • Commissioning expected 2027.
Tchelery Wind Farm (Prepare EIS)	• Nominal generating capacity of 800 MW. • Up to 120 WTGs with maximum height of 285 m to blade tip. • Ancillary infrastructure and potential for BESS (not confirmed). • Peak construction workforce 500 FTE. • Operational workforce of up to 20 FTE. • Temporary workforce accommodation to be investigated.	25 km south-east	• Construction expected to commence 2026. • Construction period about 30-months. • Commissioning expected late 2028 early 2029.
The Plains Wind Farm	• Nominal generating capacity of up to 1,800 MW. • Up to 226 WTGs with maximum height of 280 m to blade tip plus ancillary infrastructure. • Peak construction workforce 850 FTE. • Operational workforce 56 FTE.	56 km north-east	• Construction expected to commence early 2026. • Construction period expected to take place for 2-3 years. • Commissioning expected 2028-2029.
Wilan Wind Farm (Prepare EIS)	• Nominal generating capacity of up to 800 MW. • Up to 138 WTGs with maximum height of 300 m to blade tip. • BESS (200 MW/800 MWh) and ancillary infrastructure. • Peak construction workforce 400 FTE. • Operational workforce 10-15 FTE. • Temporary workers accommodation will be established, with the location subject to Project design and community consultation.	13 km north	• Construction expected to commence early 2025. • Construction period expected to take place for 24 to 30 months. • Commissioning expected 2027-2028.

Project	Description	Distance (km) [1]	Construction Period / Timeline
Yanco Delta Wind Farm (Approved)	• Nominal generating capacity of 1,500 MW. • Up to 225 WTGs with maximum height of 270 m to blade tip. • BESS (500 MW/500 MWh) and ancillary infrastructure • Peak construction workforce 300 FTE. • Operational workforce of 20-30 FTE. • Workforce accommodation is expected to rely on available rental, motel and other accommodation in surrounding townships and regional centres.	151 km east	• Construction expected to commence late 2024. • Construction period about 36 months. • Commissioning expected late 2027.
Currawarra Solar Farm (Approved)	• Generating capacity 195 MW with 654,000 solar panels with associated infrastructure. • Workforce of approximately 200 FTE during construction and 4 FTE during operations.	140 km south-east	• Construction period expected to last for 18 months.
Hay Solar Farm (Approved)	• Generating capacity 110 MW with 430,000 solar panels. • 150 FTE during peak construction and between 2 and 5 FTE during operation. • Currently under construction.	93 km north-west	• Construction period expected to last 12-months.
Limondale Solar Farm (Operational)	• Generating capacity 250 MW with 868,00 solar panels. • BESS and ancillary infrastructure. • Peak construction workforce of 200 FTE and operational workforce of 4-7 FTE.	40 km west	• Currently operational.
Pottinger Solar Farm (Prepare EIS)	• Generating capacity 300 MW with 750,000 solar panels. • BESS (500 MW/2000 MWh) and ancillary infrastructure. • Peak construction workforce of 220 FTE and operational workforce of 4 FTE. • Temporary workforce accommodation to be investigated.	102 km east	• Construction expected to commence in 2026. • Construction period is estimated to take 24 months including commissioning.
Romani Solar Farm (SEARs)	• Generating capacity of 870.5 MW. • BESS (150 MW/300 MWh) and ancillary infrastructure. • Peak construction workforce of 150-200 FTE. • Temporary workforce accommodation to be investigated.	70 km west	• Construction expected to commence in 2025. • Construction period of 12-18 months, including commissioning.
Southdown Solar Farm (Prepare EIS)	• Generating capacity 130 MW with 335,000 solar panels and other associated infrastructure. • Workforce of up to 200 FTE during construction.	130 km south-east	• Construction was expected to commence in 2022 but has not yet begun. • Construction period about 15 months.

Project	Description	Distance (km) [1]	Construction Period / Timeline
Sunraysia Solar Farm (Operational)	• Generating capacity 200 MW. With 750,000 solar panels and ancillary infrastructure. • Peak construction workforce of 250 FTE and operational workforce of at least 2 FTE.	42 km west	• Currently operational.
The Plains Solar Farm (Prepare EIS)	• Nominal generating capacity of 400 MW with 900,000 solar panels. • BESS with a capacity of up to 400 MW/1.6 GWh. • Peak construction workforce of up to 278 FTE employees	72 km east	• Construction estimated to commence in 2026. • Construction period approximately 18 months. • Commissioning expected 2028.
Project EnergyConnect (NSW – Eastern Section) (Approved)	• 330kV transmission line • 375 km of new transmission lines and associated infrastructure • Up to 500 construction jobs and 5 operational jobs		• Construction and remediation work expected to be completed in 2025.

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