

Burrendong Wind Farm Amendment Report

APPENDIX G

Revised Route Study





ROUTE STUDY: ARK ENERGY

PROJECT: BURRENDONG WIND FARM
EX NEWCASTLE PORT

WIND TURBINE TYPE: 82 METRE BLADE

29/11/2024 REV 02

Rev	Date	Change	Responsible	Checked
00	13/11/19	Route Assessed	W Andrews	✓
00	1/09/24	Report compiled	E Novak	✓
00	11/09/24	Report completed	W Andrews	✓
01	14/11/24	Minor edits	W Andrews	✓
02	29/11/24	Schedule and parking bays added	W Andrews	✓

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1.0 Introduction

Burrendong Wind Farm Pty Ltd is proposing to construct the Burrendong Windfarm in Central Western New South Wales.

Burrendong Windfarm is a utility scale wind energy generation project proposed for a location east of Lake Burrendong and South of Yarrabin within the Central West-Orana Renewable Energy Zone and the design currently involves a layout of 70 wind turbines.

The project is within the Dubbo Regional Council and Mid-Western Regional Council areas.

The study has been prepared in order to understand the likely transport route constraints associated with the delivery of over-size over-mass (OSOM) wind turbine generator components for the Project and assist in planning of the windfarm layout.

The document describes observations and previous experience on sections of the route and outlines the transport of wind turbine equipment from Newcastle Port to Burrendong Windfarm by Rex J Andrews Engineered Transportation.

This study is based on an 82-metre blade and a tower diameter up to 5.9 metres.

2.0 Evaluation

Assessment of the proposed routes was conducted by Rex J Andrews Engineered Transportation based on onsite route surveys as well as previous experience on sections of the identified routes and transporting turbine equipment similar to the proposed turbine that is used on various other projects. The assessment was conducted utilising the knowledge, experience and intellectual property of Rex J Andrews Engineered Transportation on purpose-built equipment and is not intended for use by other parties.

The assessment considered the key constraints encountered on the routes and an estimation of the amount of work required to make the route viable based on previous experience. Table 1 shows the evaluation of each route and provides an overall ranking to give guidance on the most suitable route for the development from a transport perspective. The assessment was based on operational factors and equipment capability and does not consider external factors such as regulatory, landholder, environmental, cultural or any other external factors beyond the knowledge or control of Rex J Andrews Engineered Transportation.

		Harbour	Road Modification	Road Furnishings	Vegetation	Site Entrance	Bridge Calculations	Overhead utilities	Overall Work Required
1	No Cost								
2	Some Work								
3	Moderate Amount of Work								
4	Large Amount of Work								
Route 1	Blades & Loads under 4.9m High	2	4	4	4	4	2	2	4
Route 2	Towers & Loads up to 6.2m high	1	3	3	3	4	3	4	3.5
Route 3	Motors & Loads up to 5.3m high	1	2	2	2	4	3	2	2.5

Table 1 - Route Evaluation

3.0 Project Data

Date of latest Route Study. 29/08/2024

Survey undertaken by. Rex J Andrews Engineered Transportation P/L

Project name. Burrendong Windfarm

Location. Newcastle (NSW) to Lake Burrendong (NSW)

Turbine types undertaken in the study: 6-7 MW Turbine with an 82 Metre blade

Tower types undertaken in the study: Up to a 166 Metre tower with a maximum flange size of 5.9 Metres

4.0 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 1 – Newcastle Port, Mayfield No.4 Berth

5.0 Site Location

The proposed Burrendong Wind Farm is located East of Lake Burrendong and South of Yarrabin in Central Western New South Wales. The design currently involves a layout of 70 wind turbines.

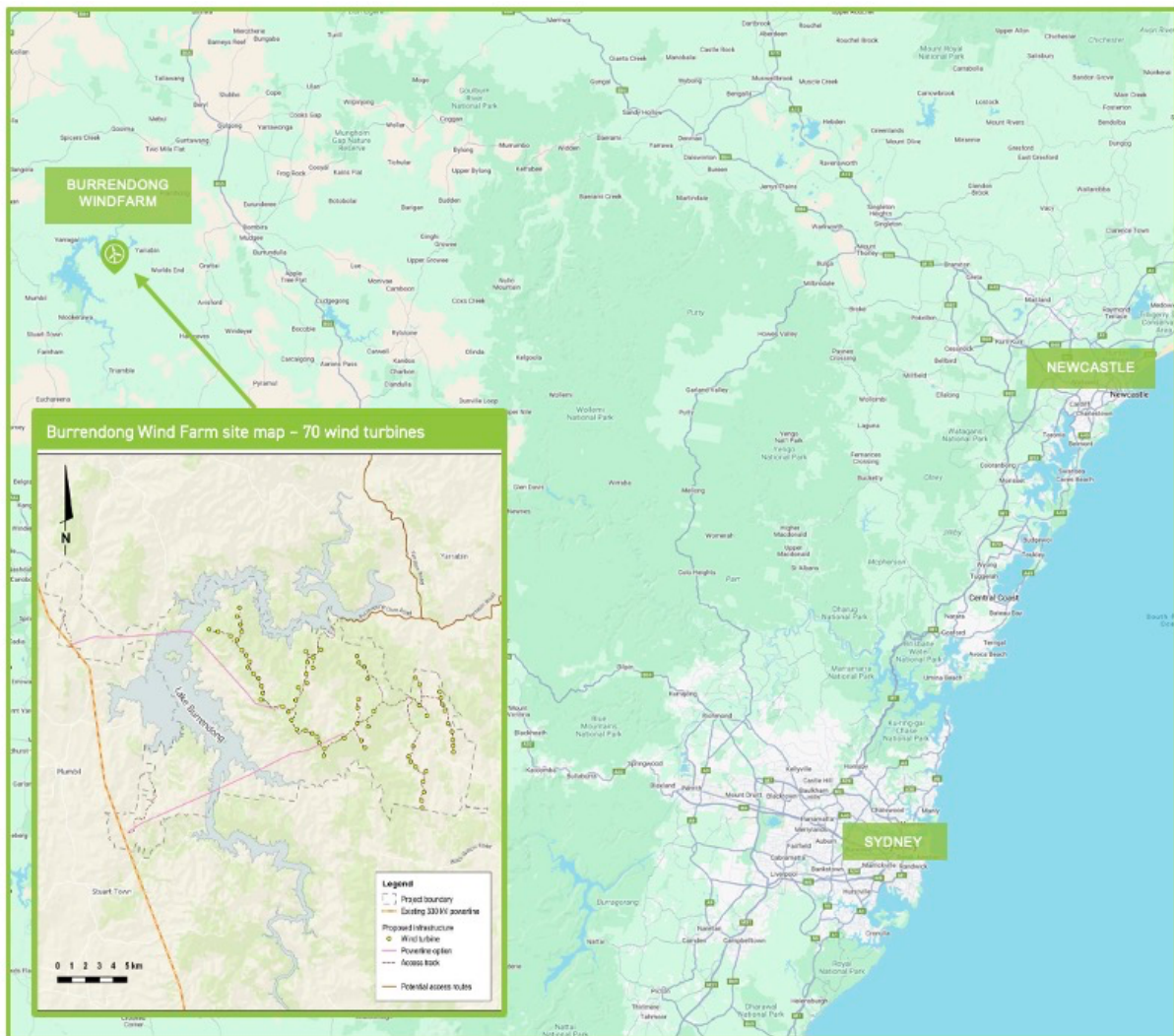


Figure 2 - Site Location

6.0 Transport Summary

The study is based on the turbine components and imported towers entering Australia via Newcastle Port. The study details the likely routes for these components, and the constraints that they may encounter on the proposed routes.

The following routes have been shown up to the turnoff inside the Cudegong River Holiday Park.

ROUTE 1: PORT OF NEWCASTLE TO LAKE BURRENDONG

COMPONENTS: Blades (Max loaded height 5.6m)

DISTANCE: 469.0 kilometres

GPS LINK: <https://goo.gl/maps/pfZR1dtyUcF8erS38>

Note: Route is via Saxa Road which is currently closed for upgrading and not available in google maps. Link to be upgraded when roadworks completed.)

ROUTE: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Saxa Rd, Mitchell Highway, Goolma Road, Twelve Mile Road, Yarrabin Road, Burrendong Dam Road, Endacott Road.

ROUTE 2: PORT OF NEWCASTLE TO LAKE BURRENDONG

COMPONENTS: Towers (Max loaded height 6.1m)

DISTANCE: 421.0 kilometres

GPS LINK: <https://maps.app.goo.gl/NYEqe22d3941bfht5>

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, Castlereagh Highway, Goolma Road, Twelve Mile Road, Yarrabin Road, Burrendong Dam Road, Endacott Road.

ROUTE 3: PORT OF NEWCASTLE TO LAKE BURRENDONG

COMPONENTS: Remaining Components (Max loaded height 5.6m)

DISTANCE: 389.0 kilometres

GPS LINK: <https://goo.gl/maps/k9cqYYSrChd77sR96>

ROUTE: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Castlereagh Highway, Goolma Road, Twelve Mile Road, Yarrabin Road, Burrendong Dam Road, Endacott Road.

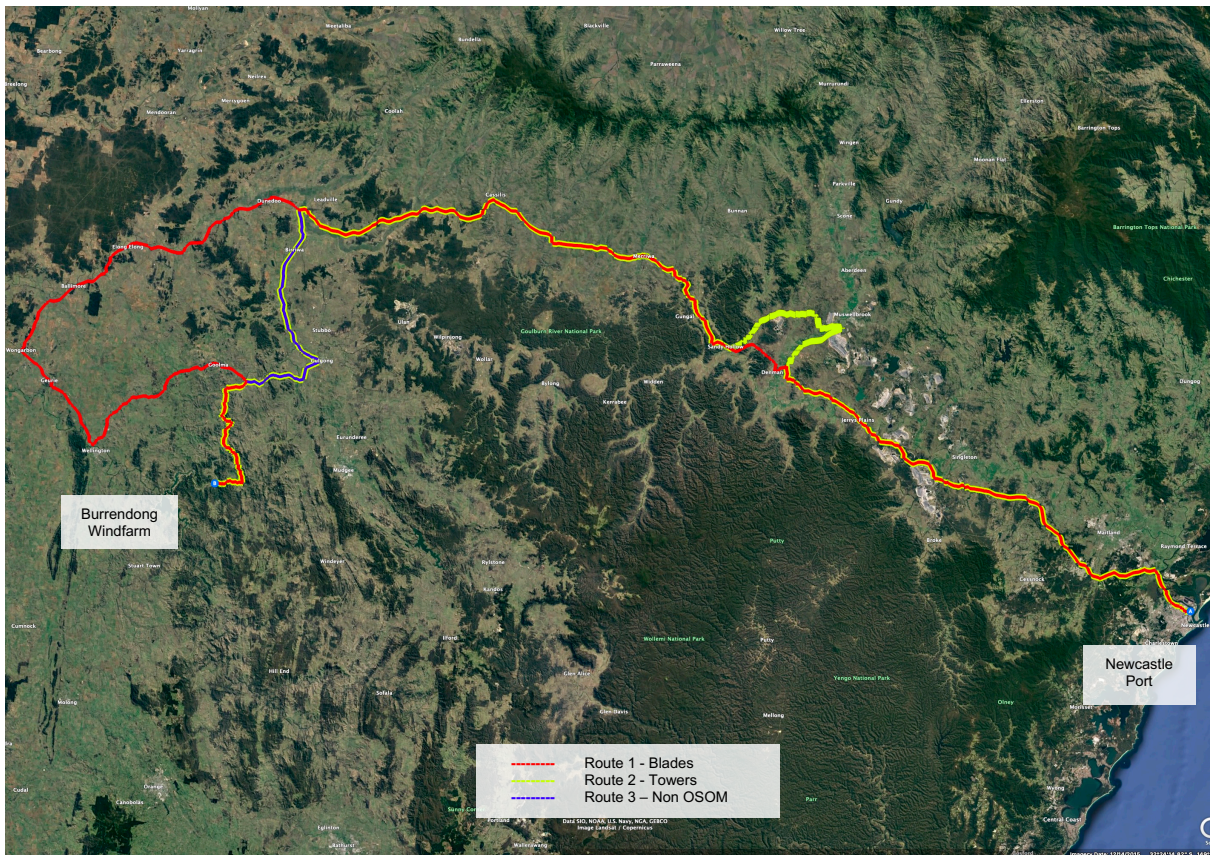


Figure 3 - Transport Routes

7.0 Route 1: Newcastle Port to Lake Burrendong

COMPONENTS: Blades (Max loaded height 5.3m)

DISTANCE: 497.0 kilometres

GPS LINK: <https://goo.gl/maps/pfZR1dtyUcF8erS38>

Note: Route is via Saxa Road which is currently closed for upgrading and not available in google maps. Link to be updated when roadworks completed.

ROUTE: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Saxa Rd, Mitchell Highway, Goolma Road, Twelve Mile Road, Yarrabin Road, Burrendong Dam Road, Endacott Road.

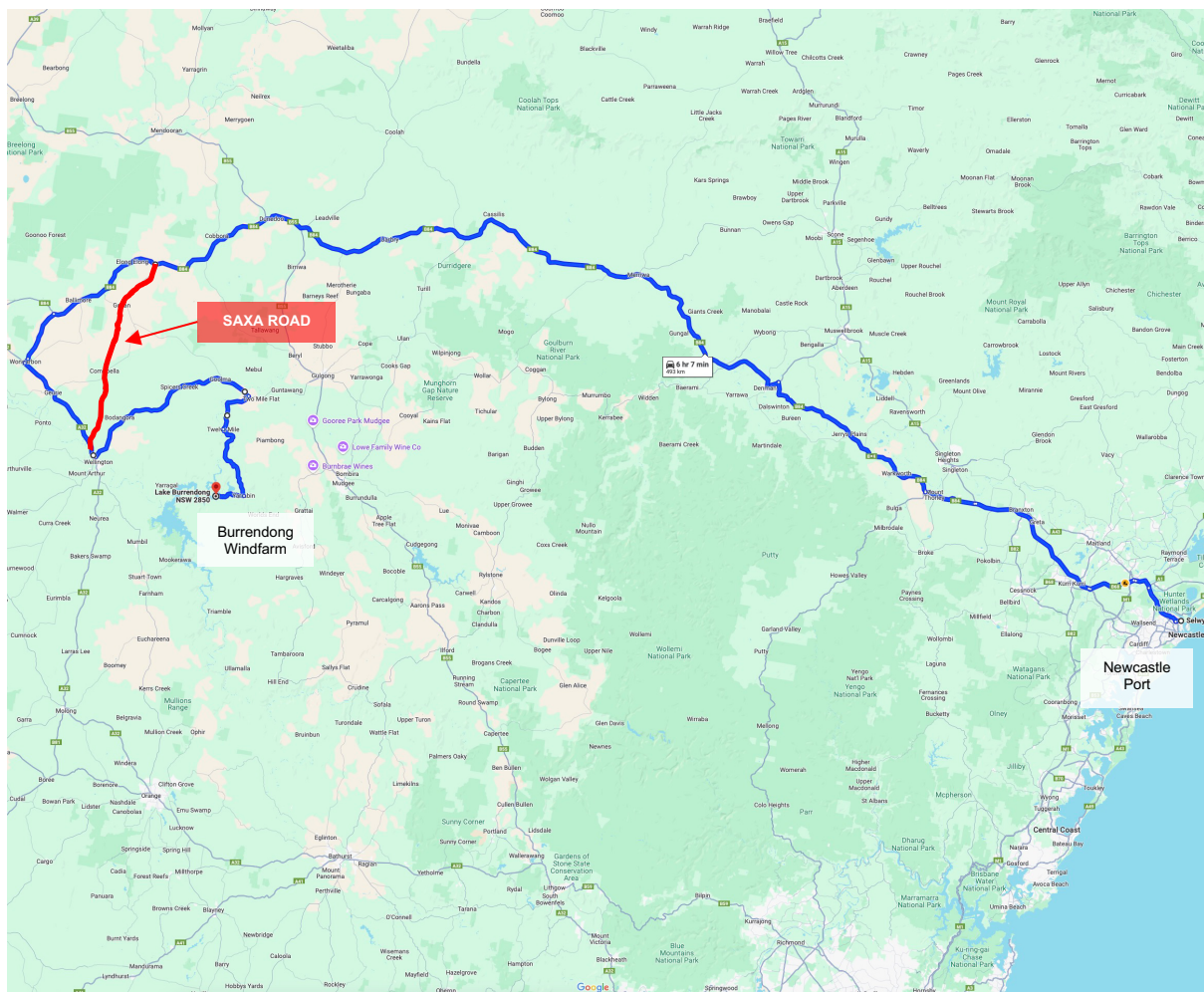


Figure 4 - Route 1

ROUTE INDEX	
ROAD MODIFICATION	
CAUTION	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street GPS link: https://goo.gl/maps/aFLwPYXuNdm	70.0 metres clearance	Moderate right hand turn	Fence and gate to be modified. Culvert to be extended and hardstand installed on outside of corner on entry and exit.
0.4	Mayfield	Selwyn Street rail crossing GPS link: https://goo.gl/maps/AmohE54hKSz	Length: 90 metres Width: 9.0 Metres Height: 5.2 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 GPS link: https://goo.gl/maps/gXeh4yBtCa4D2	70.0 metres clearance	Right hand turn	Signs to be relocated and hardstand installed on inside of corner.
1.4	Mayfield	George Street onto Industrial Drive https://goo.gl/maps/s4yvrsuoAsD2	70.0 metres clearance	Right hand turn	Island to be made trafficable/replaced with painted lines.
4.9	Mayfield	Industrial Drive under traffic signals GPS link: https://goo.gl/maps/YmqhiS2iR582	Height: 5.4 metres	Travel directly ahead	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 metres will need to travel in the right hand lane.
5.5	Mayfield West	Industrial Drive onto Maitland Road GPS link: https://goo.gl/maps/Kn49dhWq2g32	70.0 metres clearance	Right hand turn	Island to be made trafficable/replaced with painted lines. Signs relocated or made removable with flush bases.
6.4	Sandgate	Maitland Road over rail bridge GPS link: https://goo.gl/maps/W2JWWjhfqv5UMviB7	Length: 90 metres Width: 9.0 Metres Height: 5.2 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 GPS link: 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.
15.1	Tarro	New England Highway over rail bridge GPS link: https://goo.gl/maps/ITnWLwQC2hzSPhAp6	Length: 90 metres Width: 7.0 Metres Height: 5.2 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 GPS link: https://goo.gl/maps/SRDr5JigkBp	100.0 metres clearance	Left hand merge	Both Blades: No problems with this section of road.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
18.4	Beresfield	John Renshaw Drive GPS link: https://goo.gl/maps/N19vJih1Fgr		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 GPS link: https://goo.gl/maps/1STJ1P1Q19E2	65.0 metres clearance	Cross to the incorrect side than down the off-ramp onto the incorrect side of the expressway. Approx 600 metres along the expressway there is a break in the road, which will allow the blades to cross back to the correct side of the expressway.	Vegetation to be trimmed for blade oversail clearance. Traffic control and or police will be required to perform this procedure.
29.3	Buchanan	Crossover on Hunter Expressway https://maps.app.goo.gl/nZG8MTZ6vdhJQ1Kz8	Length: 100 m Width: 10.0 M	Cross to correct side of expressway	Traffic control and or police will be required to perform this procedure.
58.9	Branxton	The Hunter Expressway onto The New England Highway GPS link: https://goo.gl/maps/7rauNuxzqjg	12.0 Metres wide	Travel directly ahead	No problems with this section of road.
67.3	Whittingham	The New England Highway onto the Golden Highway GPS link: https://goo.gl/maps/nAnfkYfeUn42	12.0 Metres wide	Left Hand turn	No problems with this section of road.
67.4	Whittingham	Golden Highway GPS link: https://goo.gl/maps/R86RFuPnmFU2	115.0 x 9.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
67.7	Whittingham	Roundabout on Golden Highway GPS link: https://maps.app.goo.gl/UGh3Uzpy5BRfWYA6	Length: 70 metres Width: 6.0 Metres	Travel directly ahead	Light pole & signs to be relocated out of swept path. Roundabout to be made trafficable.
68.0	Whittingham	Golden Highway over rail bridge GPS link: https://goo.gl/maps/5NwDQofandvVMKY9	Length: 90 metres Width: 9.0 Metres Height: 5.2 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 GPS link: https://goo.gl/maps/qTxSbkxPu87L5hx4A	Length: 90 metres Width: 9.0 Metres Height: 5.2 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 GPS link: https://goo.gl/maps/7h1QdFmK1EgE2	Length: 65 metres Width: 6.0 Metres Height: 5.2 metres	Left hand turn	Signs to be relocated or made removable with flush bases. Island to be made trafficable/replaced with painted lines.
77.5	Mount Thorley	Golden Highway GPS link: https://goo.gl/maps/zGvdupDuixx	100.0 x 10.0 metres	Parking Bay	Suitable parking for Fatigue breaks.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
80.6	Mount Thorley	Golden Highway over rail bridge GPS link: https://goo.gl/maps/ipGU4USXmWZ8GkJs6	Length: 90 metres Width: 9.0 Metres Height: 5.2 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	Golden Highway intersection with the Putty Road GPS link: https://goo.gl/maps/VyA42n1CaZx	Length: 65 metres Width: 6.0 Metres Height: 5.2 metres	Right hand turn	Signs to be relocated out of swept path or blade to be able to oversail.
98.0	Warkworth	Golden Highway GPS link: 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 GPS link: https://goo.gl/maps/Wj3CBsJ6ZG1	Length: 60 metres Width: 6.0 Metres Height: 5.2 metres	Right hand turn	Vegetation to be trimmed for blade oversail clearance. Signs relocated out of swept path and hardstand installed on outside of corner.
107.2	Jerrys Plains	Golden Highway through Jerrys Plains village GPS link: https://maps.app.goo.gl/8xHm7UjHdD1m9Z	Length: 60 metres Width: 6.0 Metres Height: 5.2 metres	Left hand turn	Vegetation to be trimmed for blade oversail clearance. Signs relocated out of swept path and hardstand installed on outside of corner.
126.0	Ogilvy	Golden Highway GPS link: https://goo.gl/maps/58TR8js7CC2	6% gradient	Travel directly ahead	This section of road has a steep mountain range that will require additional pull trucks to assist loads that exceed 80T gross weight. Additionally the NSW Government is currently upgrading this section of road. It is recommended that you monitor the progress of the upgrades, and that any changes are thoroughly looked at.
131.9	Denman	Golden Highway onto Denman Road GPS link: https://goo.gl/maps/s14PNvycB32	Length: 55 metres Width: 6.0 Metres Height: 5.2 metres	Left hand turn	Vegetation to be trimmed for blade oversail clearance. Signs to be relocated and hardstand installed on outside of corner.
132.8	Denman	Golden Highway over Denman Bridge GPS link: https://goo.gl/maps/UToXyFe3QKu	Length: 90 metres Width: 6.9 Metres Height: 5.8 metres	Travel directly ahead in the centre of the lane	A width of 6.5 metres and a height of 5.6 metres should not be exceeded of this structure. If loads are over these dimensions than they may detour the bridge via Bengalla and Wybong Roads.
137.9	Denman	Golden Highway rail crossing GPS link: https://goo.gl/maps/r7x7Qc685d82	Length: 90 metres Width: 7.0 Metres Height: 5.2 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.
150.1	Sandy Hollow	Golden highway GPS link: https://goo.gl/maps/2THBuV165xx	50.0 x 4.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
161.2	Gungal	Golden highway GPS link: https://goo.gl/maps/WDol2LfeCoP2	70.0 x 6.0 metres	Parking Bay	Suitable parking for Fatigue breaks.

ROUTE STUDY

BURRENDONG WINDFARM

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
184.8	Merriwa	Golden highway GPS link: https://goo.gl/maps/NqrWzTsRmmt	100.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
187.1	Merriwa	Bend on Golden highway GPS link: https://maps.app.goo.gl/95JdeDvBRmdiDtbz9	Length: 90 metres Width:9.0 Metres	Left hand turn	No problems with this section of road.
234.0	Cassilis	Golden highway GPS link: https://goo.gl/maps/vs6YMT6TxCA2	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
291.0	Dunedoo	Golden Highway rail crossing GPS link: https://goo.gl/maps/wsyNKfcoAji3SosY9	Length: 90 metres Width: 7.0 Metres Height: 5.2 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. Blade to oversail signals or signals to be modified/relocated.
291.1	Dunedoo	Golden Highway at Wargundy Street GPS link: https://goo.gl/maps/NvACU1kv3Yard1K7	Length: 60 metres Width: 6.0 Metres Height: 5.2 metres	Right hand bend	A no parking area will need to be placed on the exit of the corner. Blade to oversail signals or signals to be modified/relocated.
325.4	Elong Elong	Golden Highway onto Saxa Road GPS link: https://goo.gl/maps/XSoTDVASTZwNsGo4Z	Length: 60 metres Width: 6.0 Metres Height: 5.2 metres	Left hand turn	Signs to be relocated. Culvert pipe to be extended and hardstand installed on inside of corner.
375.7	Wellington	Saxa Road rail crossing GPS link: https://goo.gl/maps/oPmi2bbBpPTHJYf6	Length: 90 metres Width: 8.0 Metres Height: 5.2 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. Blade to oversail signals or signals to be modified/relocated.
375.8	Wellington	Saxa Road onto Mitchell Highway GPS link: https://goo.gl/maps/Y3WFnEdjocE5dWPHBA	Length: 60 metres Width: 6.0 Metres Height: 5.2 metres	Left hand turn	Signs to be relocated out of swept path. Blade to oversail rail signals or signals to be modified.
378.3	Wellington	Mitchell Highway onto Goolma Road GPS link: https://goo.gl/maps/mWjNN3ozCvzpp7ag0	Length: 78 metres Width: 6.0 Metres Height: 5.2 metres	Left hand turn	Signs to be relocated out of swept path. Hardstand to be installed on inside of corner.
427.5	Two Mile Flat	Goolma Road onto Twelve Mile Road GPS link: https://maps.app.goo.gl/cvYN7vYSDada32x0	Length: 35 metres Width: 6.0 Metres	Right hand turn	Landholder permission required for blade oversail. Vegetation to be removed and hardstand installed on inside and outside of corners.
427.5-440.4	Two Mile Flat	Twelve Mile Road GPS link: https://maps.app.goo.gl/mY3z3uM3Y27rGN8y0	Twelve Mile Road in its current condition is not suitable for the transport of wind turbine components. Twelve Mile Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.		
440.4	Twelve Mile	Twelve Mile Road onto Yarrabin Road GPS link: https://maps.app.goo.gl/yvTDN6TR3F-dPnLA	Length: 60 metres Width: 3.5 Metres	Left hand turn	No problems with this bend

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
440.4-461.9	Yarrabin	Yarrabin Road GPS link: https://maps.app.goo.gl/32b7WNCJXCLZ55wrC8	Yarrabin Road in its current condition is not suitable for the transport of wind turbine components. Yarrabin Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.		
461.9	Yarrabin	Yarrabin Road onto Burrendong Road GPS link: https://maps.app.goo.gl/53dPv8YxXURGk6cZ	Length: 30 metres Width: 5.0 Metres	Right hand turn	Landholder permissions required. Vegetation to be removed, fence modified and hardstand installed on inside and outside of corner.
461.9 – 468.9	Yarrabin	Burrendong Dam Road GPS link: https://goo.gl/maps/qj1bmZ3w9L1mR090	Burrendong Dam Road in its current condition is not suitable for the transport of wind turbine components. Burrendong Dam Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.		
468.9	Cudegong River Holiday Park	Burrendong Dam Road onto Endacott Road GPS link: https://maps.app.goo.gl/ZETJTe4N-W0Tt00	Length: 60 metres Width: 3.0 Metres	Travel directly ahead	Landholder permission required. Security gate and fence to be modified to accommodate all proposed loads. Vegetation to be trimmed/removed for blade clearance.
468.9-469.7	Cudegong River Holiday Park	Endacott Road through Cudegong River Holiday Park GPS link: https://goo.gl/maps/bdDQJPK-cfGwCX1as0	Endacott Road in its current condition is not suitable for the transport of wind turbine components. Endacott Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required. The existing boom gates will need to be widened to at least 6.0 metres.		
469.7	Lake Burrendong	Endacott Road into Primary site entrance GPS Location: https://goo.gl/maps/5iWRCAskE3R0JWh8	Length: 30 metres Width: 5.0 Metres	Right hand turn	Vegetation to be trimmed/removed, embankment trimmed and hardstand installed on inside of corner.
Site entry and all site roads to be constructed to appropriate standards in order to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become un trafficable during periods of wet weather.					

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

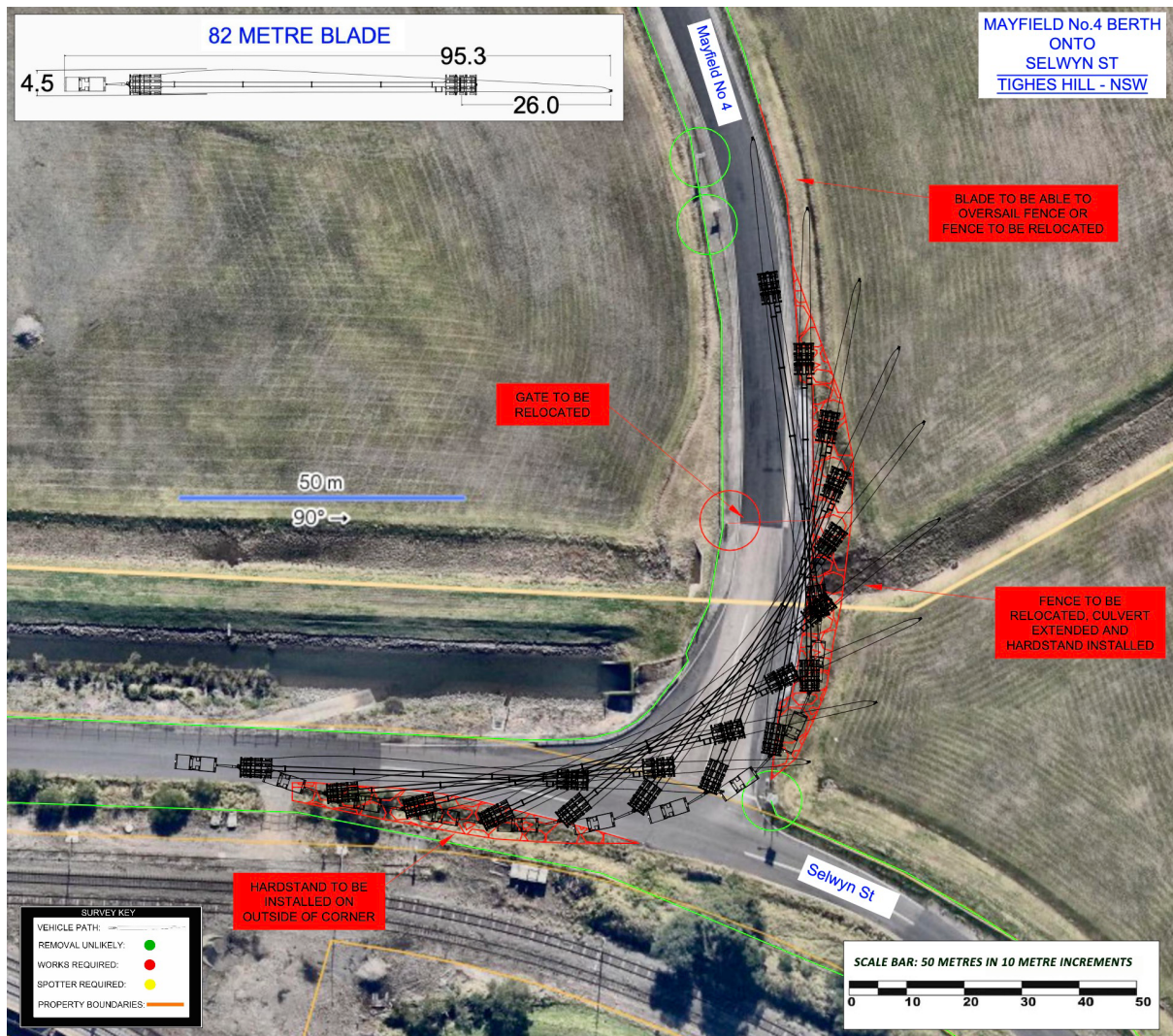


Figure 5 - Mayfield No.4 berth onto Selwyn Street

GPS LINK: <https://goo.gl/maps/afLwPYKuNdm>

PROCEDURE: Right hand turn.

ROAD MODIFICATIONS: Fence and gate to be modified. Culvert to be extended and hardstand installed on outside of corner on entry and exit.

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



Figure 6 - Selwyn Street onto Industrial Drive via George Street

GPS LINK: <https://goo.gl/maps/brPRAckLr572>

PROCEDURE: Right hand turn

ROAD MODIFICATIONS: Signs to be relocated and hardstand installed on inside of corner. Island to be made trafficable/replaced with painted lines.

5.5 Km's: Industrial Drive onto Pacific Hwy

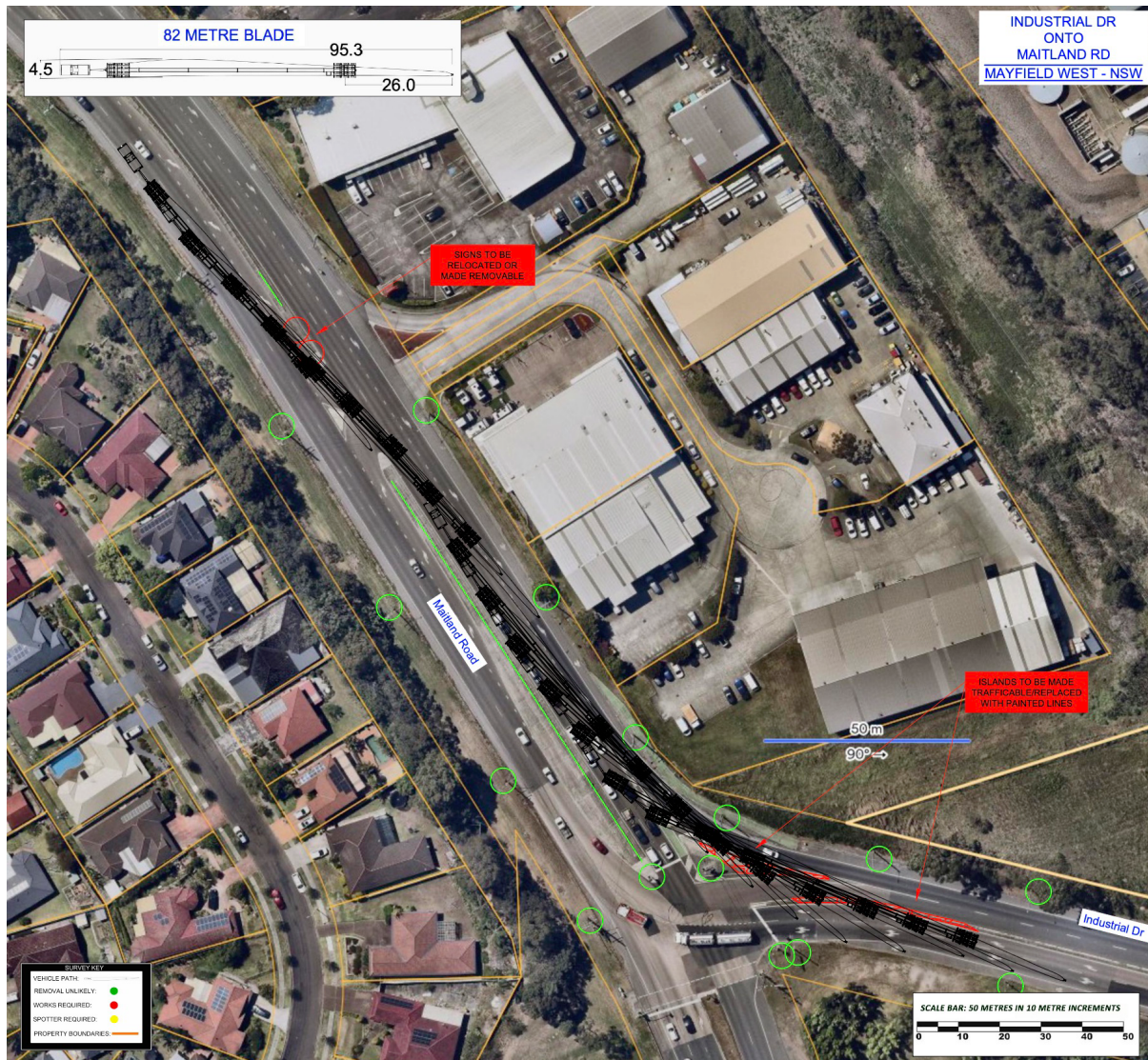


Figure 7 - Industrial Drive onto Pacific Hwy

GPS LINK: <https://goo.gl/maps/Kn49dhWG2qG2>

PROCEDURE: Right hand turn. 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.

ROAD MODIFICATIONS: Island to be made trafficable/replaced with painted lines. Signs relocated or made removable with flush bases.

14.8 Km's: Bend on New England Highway



Figure 8 - Bend on New England Highway

GPS LINK: <https://goo.gl/maps/hkKgsZMfdVJncRdu6>

PROCEDURE: Left hand bend

ROAD MODIFICATIONS: No problems with this section of road.

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



Figure 9 - John Renshaw Drive onto the Hunter Expressway

GPS LINK: <https://goo.gl/maps/1STJ1PfQt9E2>

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

ROAD MODIFICATIONS: Vegetation to be trimmed for blade oversail clearance.

29.3 Km's: Crossover on Hunter Expressway



Figure 10 - Crossover on Hunter Expressway

GPS LINK: <https://maps.app.goo.gl/nZQ8MTZfvdhJQ1Kz8>

PROCEDURE: Cross to correct side of expressway

ROAD MODIFICATIONS: Nil. Traffic control and or police will be required to perform this procedure.

67.3 Km's: New England Highway onto the Golden Highway



Figure 11 - New England Highway onto the Golden Highway

GPS LINK: <https://goo.gl/maps/nAnfkYfeUn42>

PROCEDURE: Left Hand turn

ROAD MODIFICATIONS: No problems with this section of road.

67.7 Km's: Roundabout on Golden Highway



Figure 12 - Roundabout on Golden Highway

GPS LINK: <https://maps.app.goo.gl/UGbXUqvy5B8fWYAi6>

PROCEDURE: Travel directly ahead

ROAD MODIFICATIONS: Light pole & signs to be relocated out of swept path.
Roundabout to be made trafficable.

77.4 Km's: Golden Highway intersection with the Putty Road

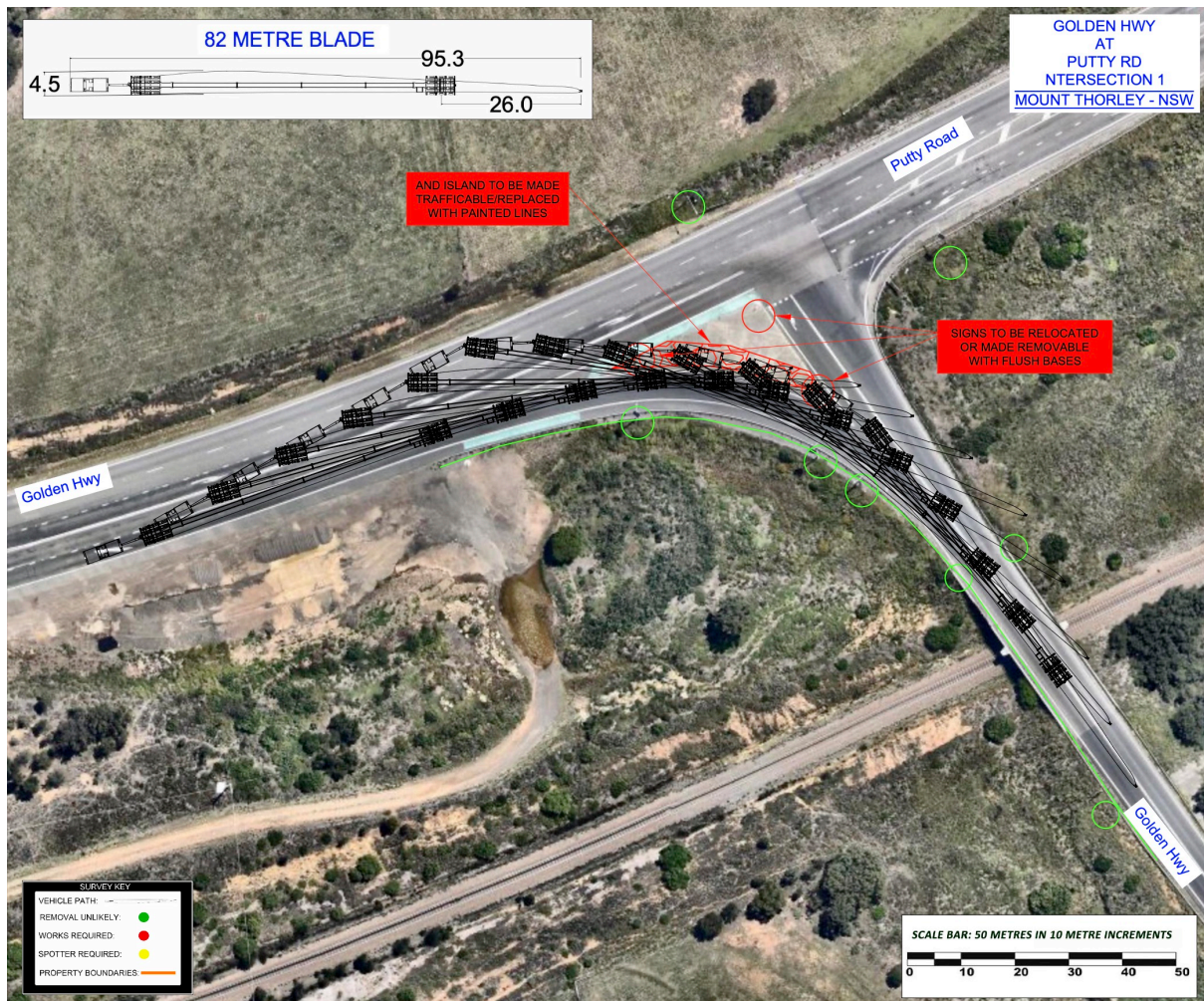


Figure 13 - Golden Highway intersection with the Putty Road

GPS LINK: <https://goo.gl/maps/7hQdEmK1EgE2>

PROCEDURE: Left hand turn

ROAD MODIFICATIONS: Signs to be relocated or made removable with flush bases. Island to be made trafficable/replaced with painted lines.

80.8 Km's: Golden Highway intersection with the Putty Road

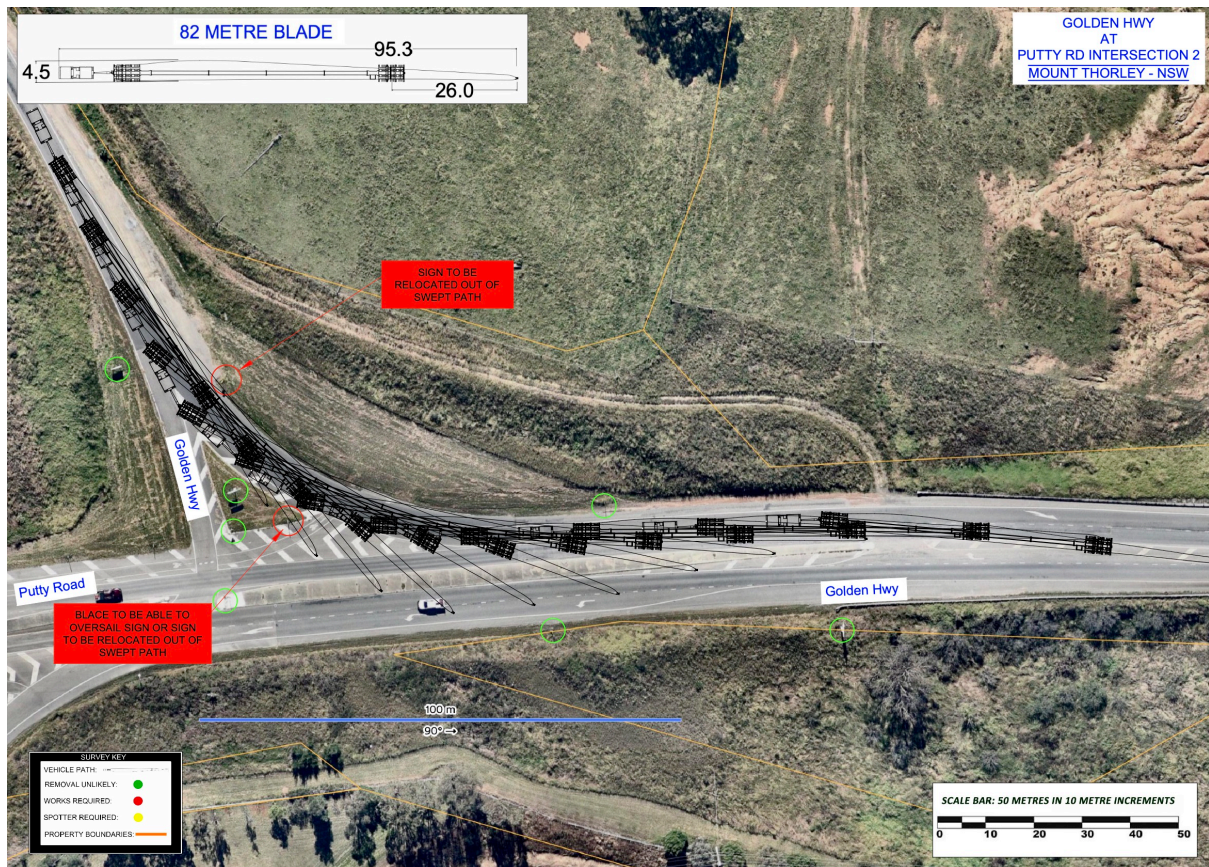


Figure 14 - Golden Highway intersection with the Putty Road

GPS LINK: <https://goo.gl/maps/VyA42n1CqZx>

PROCEDURE: Right hand turn

ROAD MODIFICATIONS: Signs to be relocated out of swept path or blade to be able to oversail.

107.0 Km's: Golden Highway Through Jerrys Plains Village



Figure 15 - Golden Highway Through Jerrys Plains Village

GPS LINK: <https://goo.gl/maps/WqSCRsJ9ZGt>

PROCEDURE: Left hand turn

ROAD MODIFICATIONS: Vegetation to be trimmed for blade oversail clearance.
Signs relocated out of swept path and hardstand installed on outside of corner.

107.2 Km's: Golden Highway through Jerrys Plains village



Figure 16 - Golden Highway through Jerrys Plains village

GPS LINK: <https://maps.app.goo.gl/8zHtm7iJjjHdD1m97>

PROCEDURE: Left hand turn

ROAD MODIFICATIONS: Vegetation to be trimmed for blade oversail clearance.
Signs relocated out of swept path and hardstand installed on outside of corner.

131.9 Km's: Golden Highway onto Denman Road

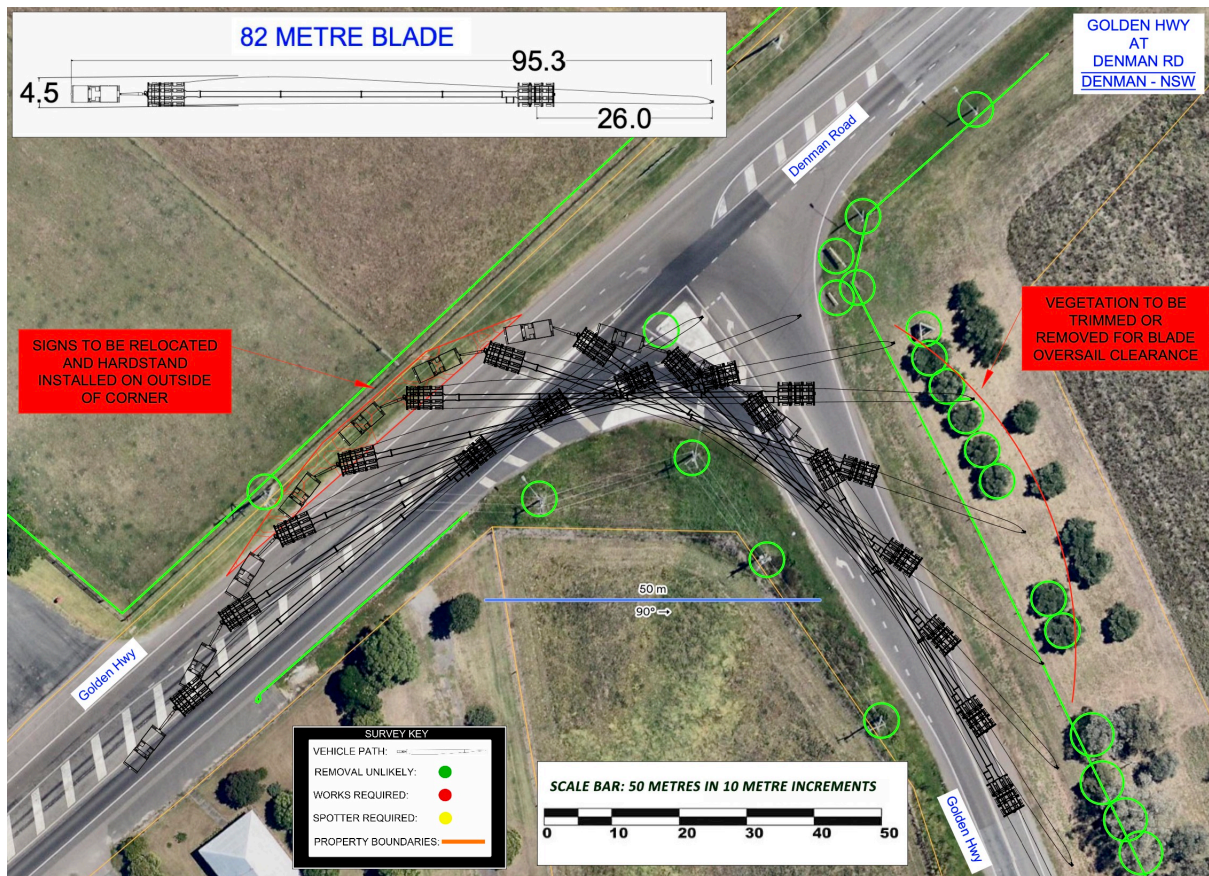


Figure 17 - Golden Highway onto Denman Road

GPS LINK: <https://goo.gl/maps/sf4PNnycxB32>

PROCEDURE: Left hand turn

ROAD MODIFICATIONS: Vegetation to be trimmed for blade oversail clearance. Signs to be relocated and hardstand installed on outside of corner.

132.8 Km's: Denman Bridge

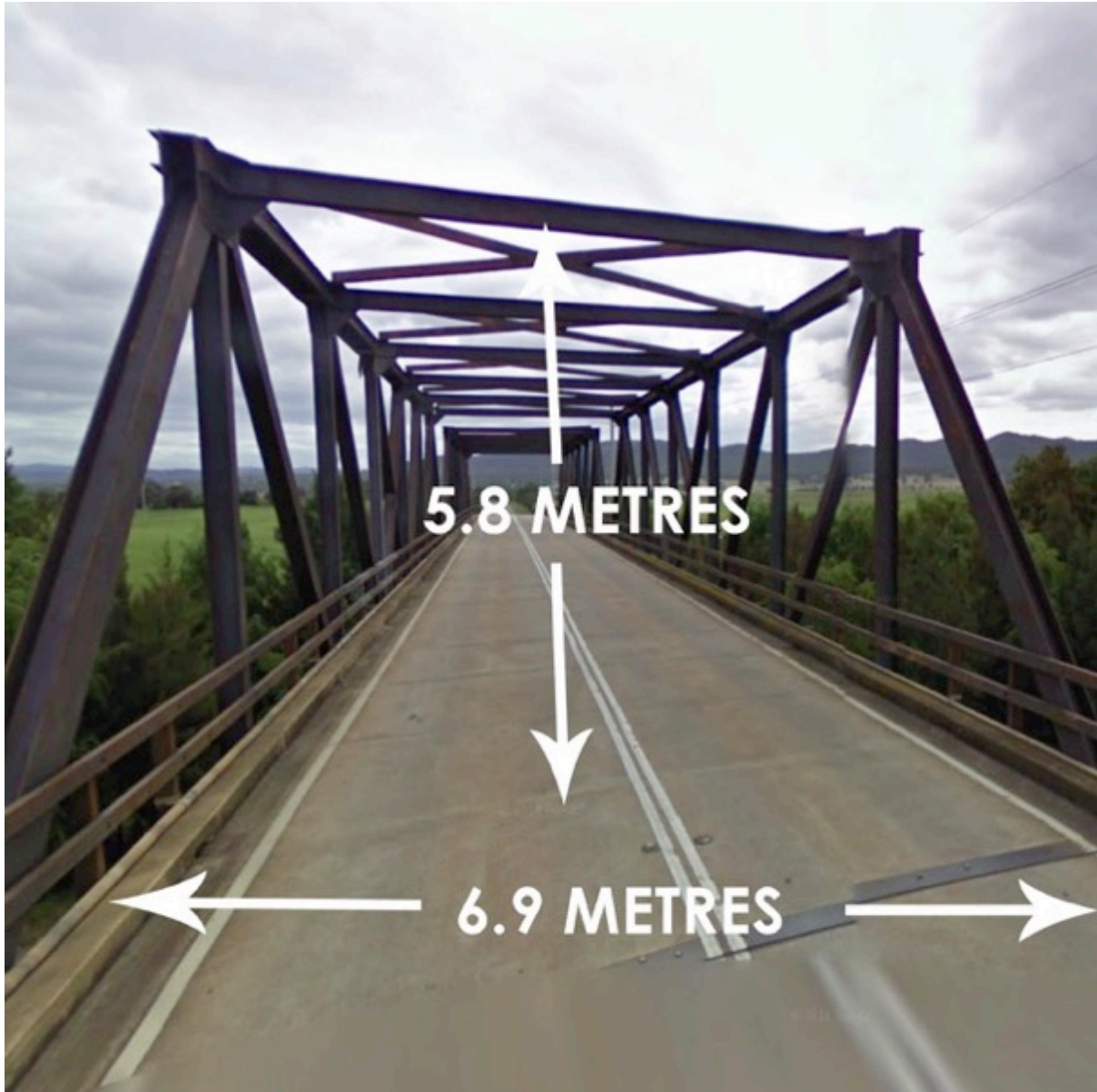


Figure 18 - Denman Bridge

GPS LINK: <https://goo.gl/maps/UToXyFe3QKu>

PROCEDURE: Travel over the bridge.

COMMENTS: A width of 6.5 metres and a height of 5.6 metres should not be exceeded over this structure. If loads are over these dimensions than they will need to detour the bridge via Bengalla and Wybong Roads.

137.9 Km's: Denman Rail Crossing



Figure 19 - Denman Rail Crossing

GPS LINK: <https://goo.gl/maps/r7x7Qc685d82>

PROCEDURE: Travel over crossing.

COMMENTS: Large width clearance and good ground clearance over this crossing. ARTC approval will need to be obtained to travel over this crossing. Likely to cross with caution, no escort required.

187.1 Km's: Bend on Golden Highway

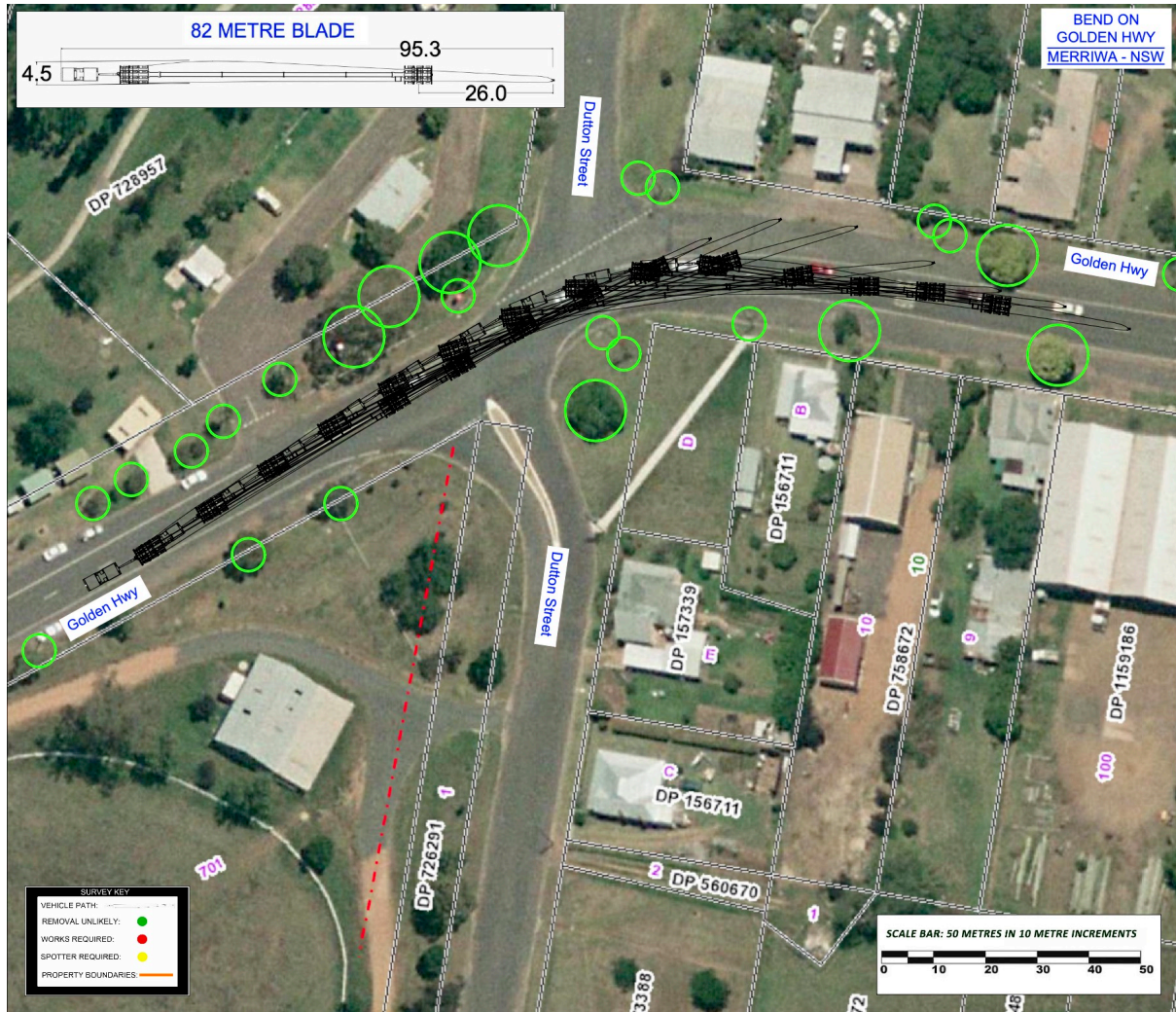


Figure 20 - Bend on Golden Highway

GPS LINK: <https://maps.app.goo.gl/95JdeDvBRmdiDtbz9>

PROCEDURE: Left hand turn

ROAD MODIFICATIONS: No problems with this section of road

291.0 Km's: Golden Highway Rail Crossing at Dunedoo



Figure 21 - Golden Highway Rail Crossing at Dunedoo

PROCEDURE: Travel over crossing.

GPS LINK: <https://goo.gl/maps/wsyNKfcoAij3SosY9>

COMMENTS: Blades to oversail signals or signals to be modified/relocated.

NOTE: ARTC approval will need to be obtained to travel over this crossing. Likely to cross with caution, no escort required.

291.1 Km's: Golden Highway at Wargundy Street

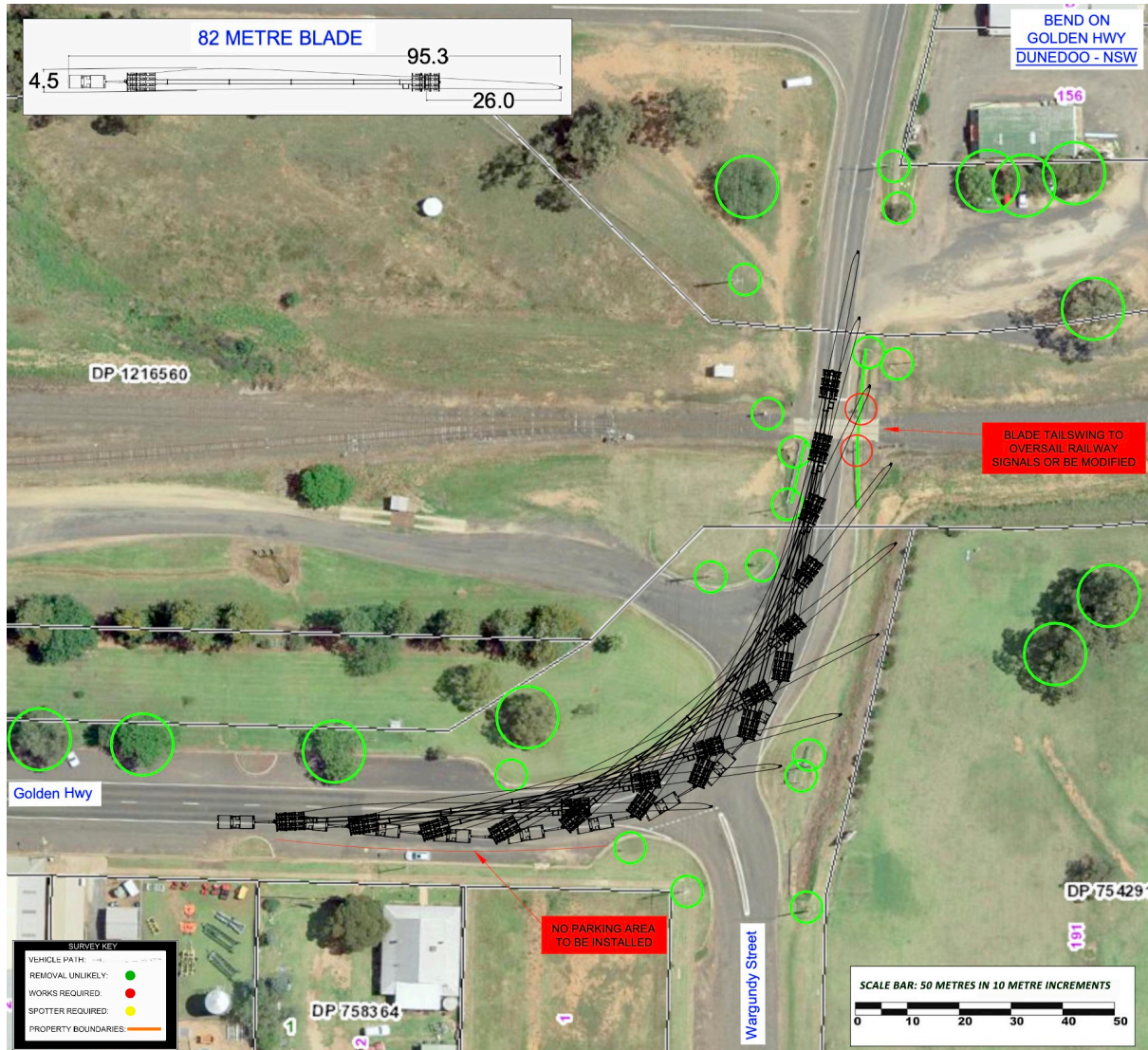


Figure 22 - Golden Highway at Wargundy Street

GPS LINK: <https://goo.gl/maps/WzACUHey3jYadj1K7>

PROCEDURE: Right hand bend.

ROAD MODIFICATIONS: A no parking area will need to be placed on the exit of the corner. Blade to oversail signals or signals to be modified/relocated.

325.4 Km's: Golden Highway onto Saxa Road

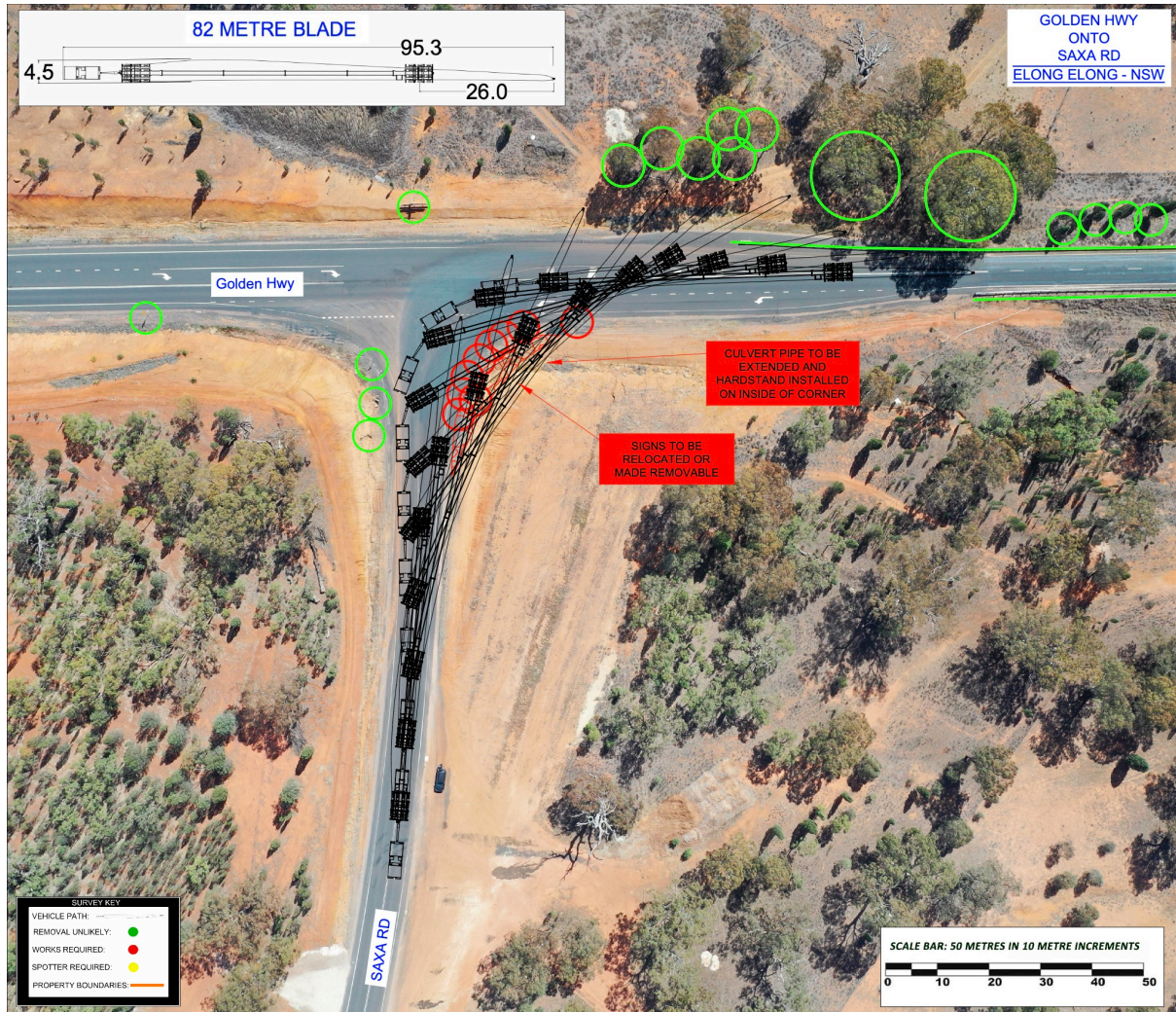


Figure 23 - Golden Highway onto Saxa Road

GPS LINK: <https://goo.gl/maps/XSoTDVA8TZwNsGo47>

PROCEDURE: Left hand turn

ROAD MODIFICATIONS: Signs to be relocated. Culvert pipe to be extended and hardstand installed on inside of corner.

375.7 Km's: Saxa Road Rail crossing at Wellington



Figure 24 - Saxa Road Rail crossing at Wellington

GPS LINK: <https://goo.gl/maps/oPmj2bbBpPTHJYtF6>

PROCEDURE: Travel over crossing

COMMENTS: Blades to oversail signals or signals to be modified/relocated.

Large width clearance and good ground clearance over this crossing.

ARTC approval will need to be obtained to travel over this crossing. Likely to cross with caution, no escort required.

375.8 Km's: Saxa Road onto Mitchell Highway

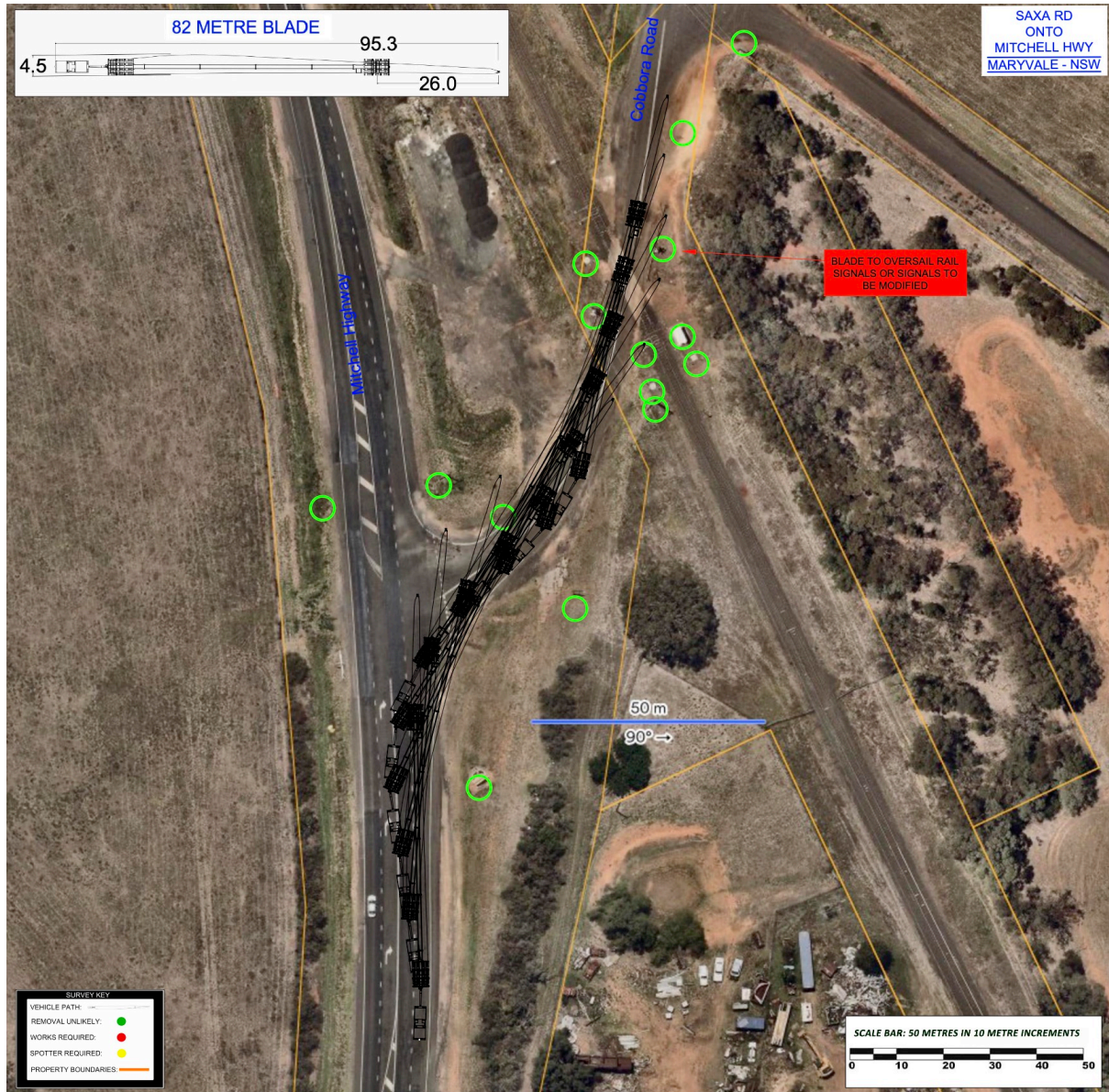


Figure 25 - Saxa Road onto Mitchell Highway

GPS LINK: <https://goo.gl/maps/Y9WRnEdpCEsWPHBA>

PROCEDURE: Left hand turn

ROAD MODIFICATIONS: Signs to be relocated out of swept path. Blade to oversail rail signals or signals to be modified.

378.3 Km's: Mitchell Highway onto Goolma Road

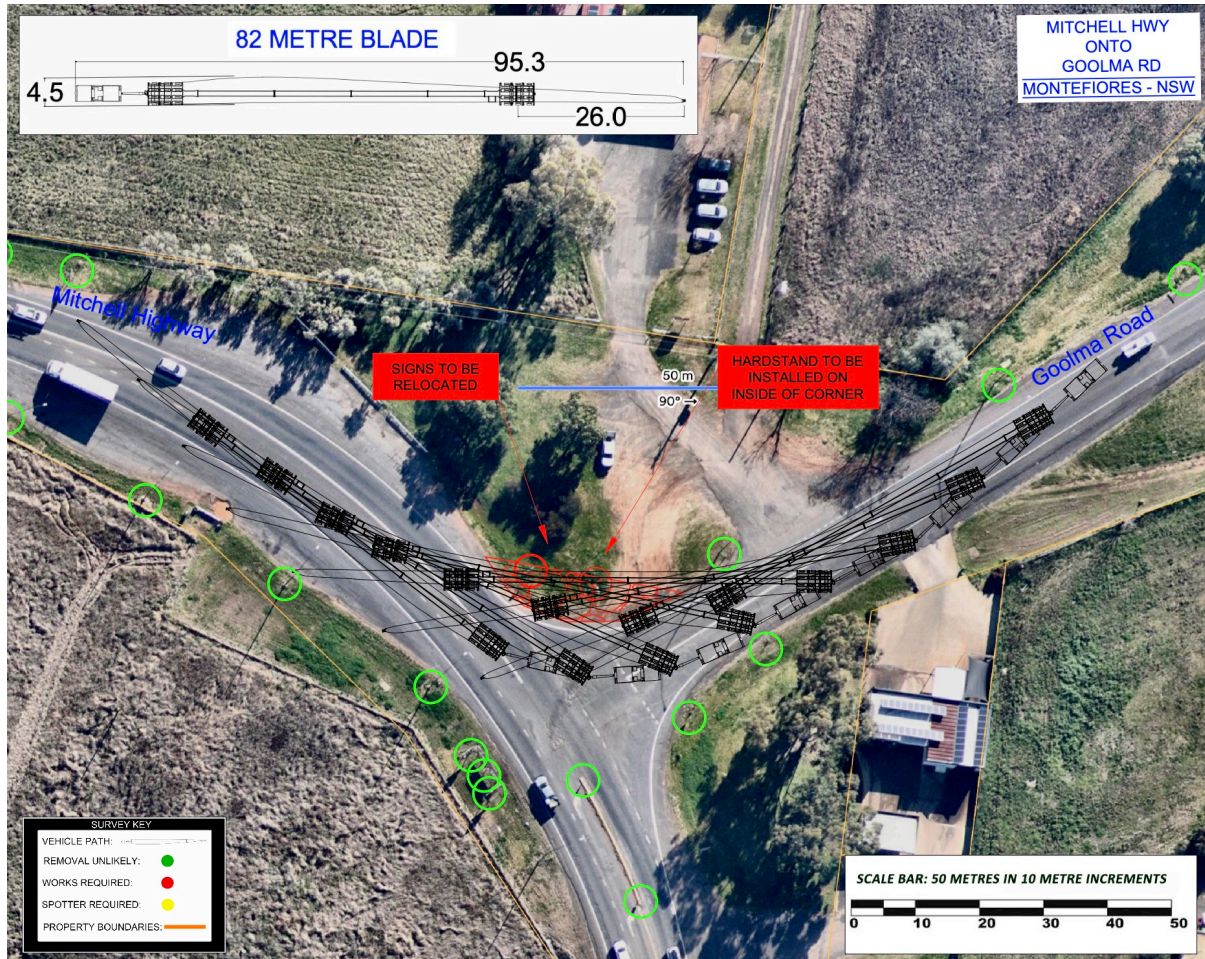


Figure 26 - Mitchell Highway onto Goolma Road

GPS LINK: <https://goo.gl/maps/nWHNN3pzCvpzp7ag8>

PROCEDURE: Left hand turn

ROAD MODIFICATIONS: Signs to be relocated out of swept path. Hardstand to be installed on inside of corner.

427.5 Km's: Goolma Road onto Twelve Mile Road

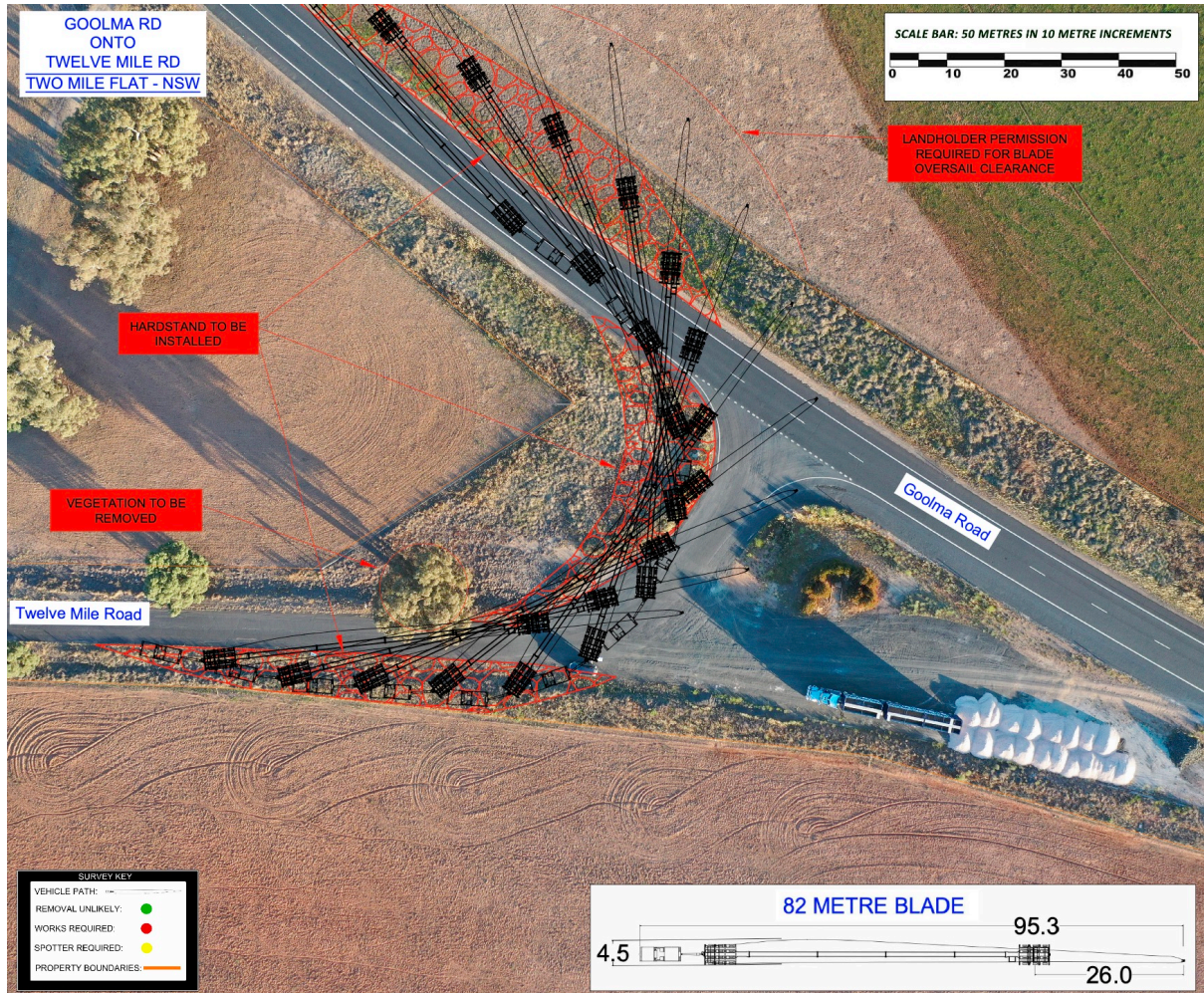


Figure 27 - Goolma Road onto Twelve Mile Road

GPS LINK: <https://goo.gl/maps/B4CiZMXhMZFbFBL99>

PROCEDURE: Right hand turn

ROAD MODIFICATIONS: Landholder permission required for blade oversail. Vegetation to be removed and hardstand installed on inside and outside of corners.

427.5 - 440.4 Km's: Twelve Mile Road

Twelve Mile Road in its current condition is not suitable for the transport of wind turbine components. Below is a sample of the typical constraints on this section of the route.

ROAD MODIFICATIONS: Twelve Mile Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.

GPS LINK: <https://maps.app.goo.gl/nvY3vSgMW27vGNBy8>



Figure 28 - GPS Link: <https://maps.app.goo.gl/qE6HvChyXV54TR2v9>

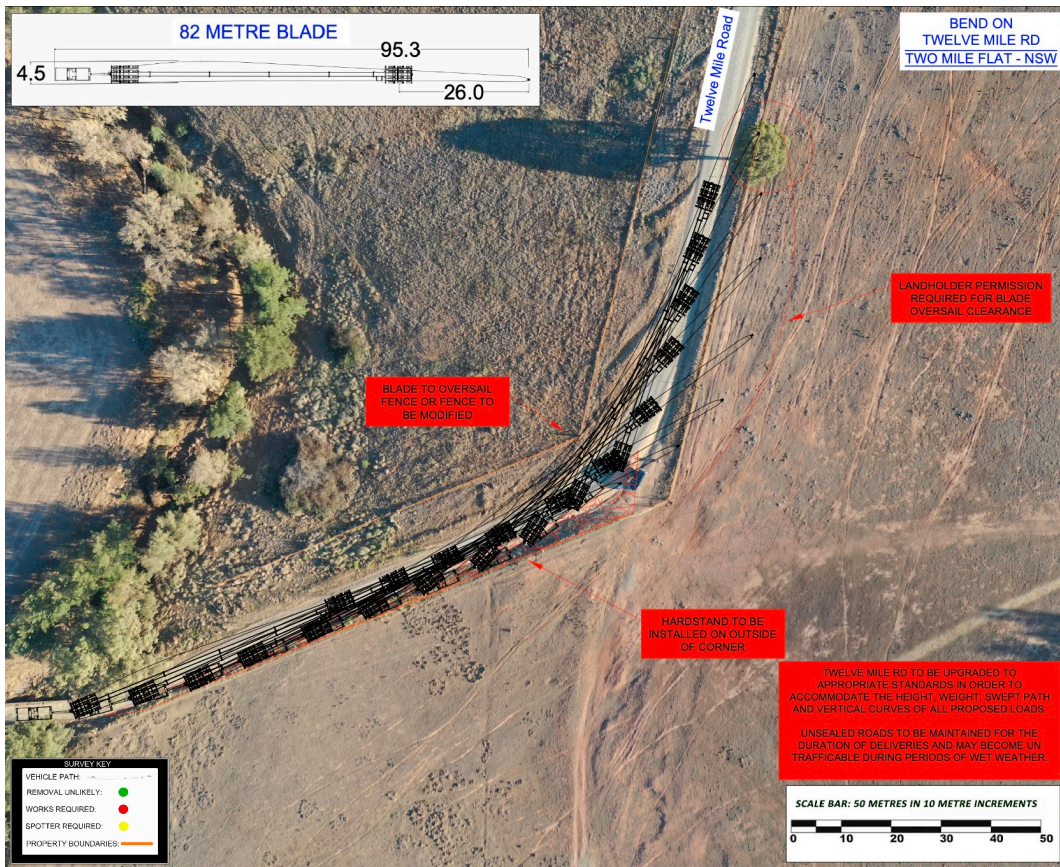


Figure 29 - GPS Link: <https://maps.app.goo.gl/n6YU6Z6xr6yU1YcD6>

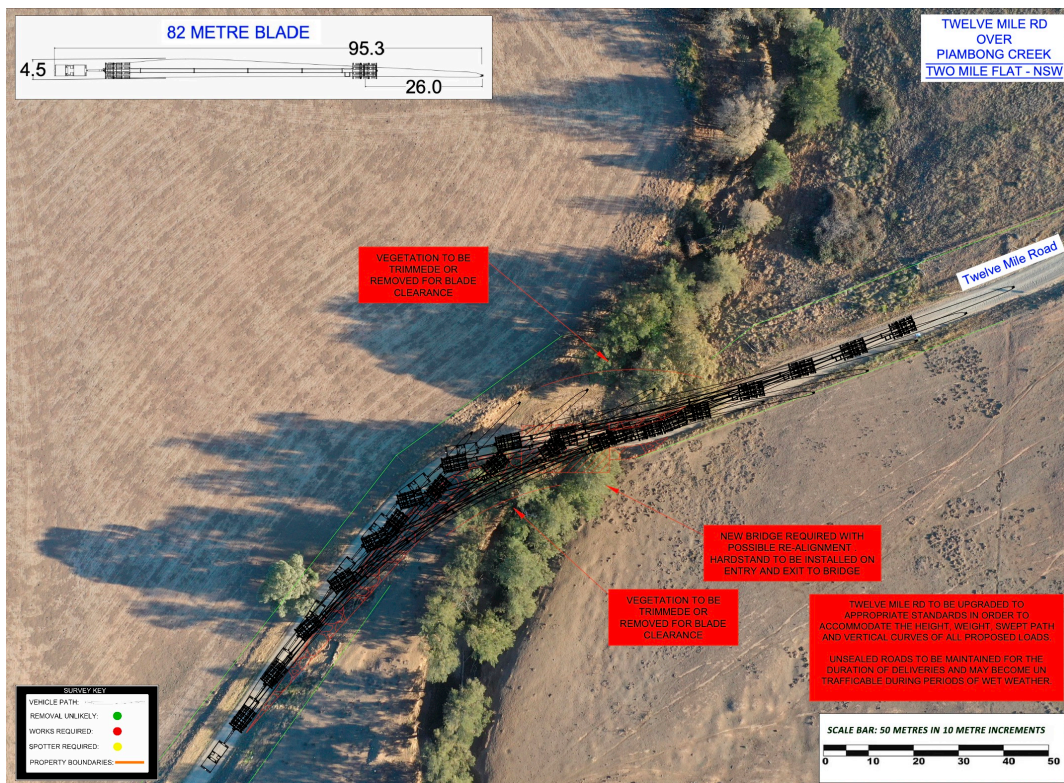


Figure 30 - GPS Link: <https://maps.app.goo.gl/n6YU6Z6xr6yU1YcD6>

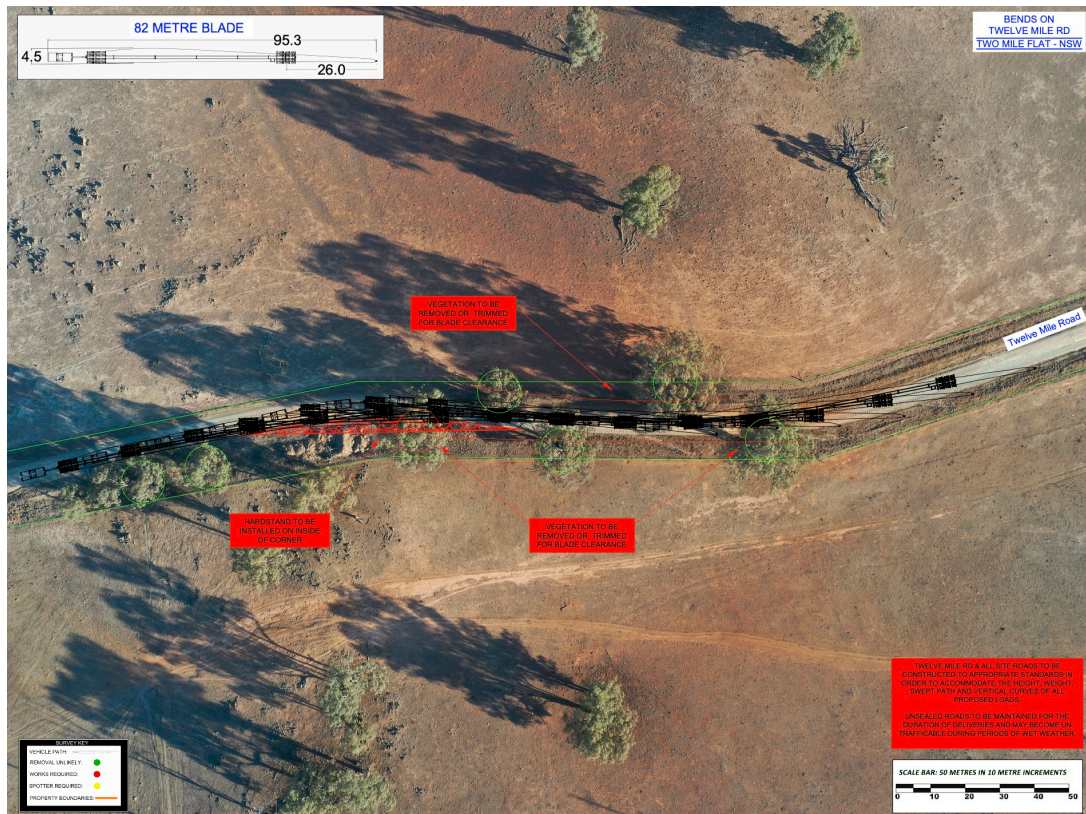


Figure 31 - GPS Link: <https://maps.app.goo.gl/MB3g3fLvHtbuD2w8>



Figure 32 - GPS Link: <https://maps.app.goo.gl/Jv2a1vXn8LwrAqun7>

440.4 – 461.9 Km's: Yarrabin Road

Yarrabin Road in its current condition is not suitable for the transport of wind turbine components. Below is a sample of the typical constraints on this section of the route.

ROAD MODIFICATIONS: Yarrabin Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.

GPS LINK: <https://maps.app.goo.gl/J2h7WCJXCLZSiwrC8>

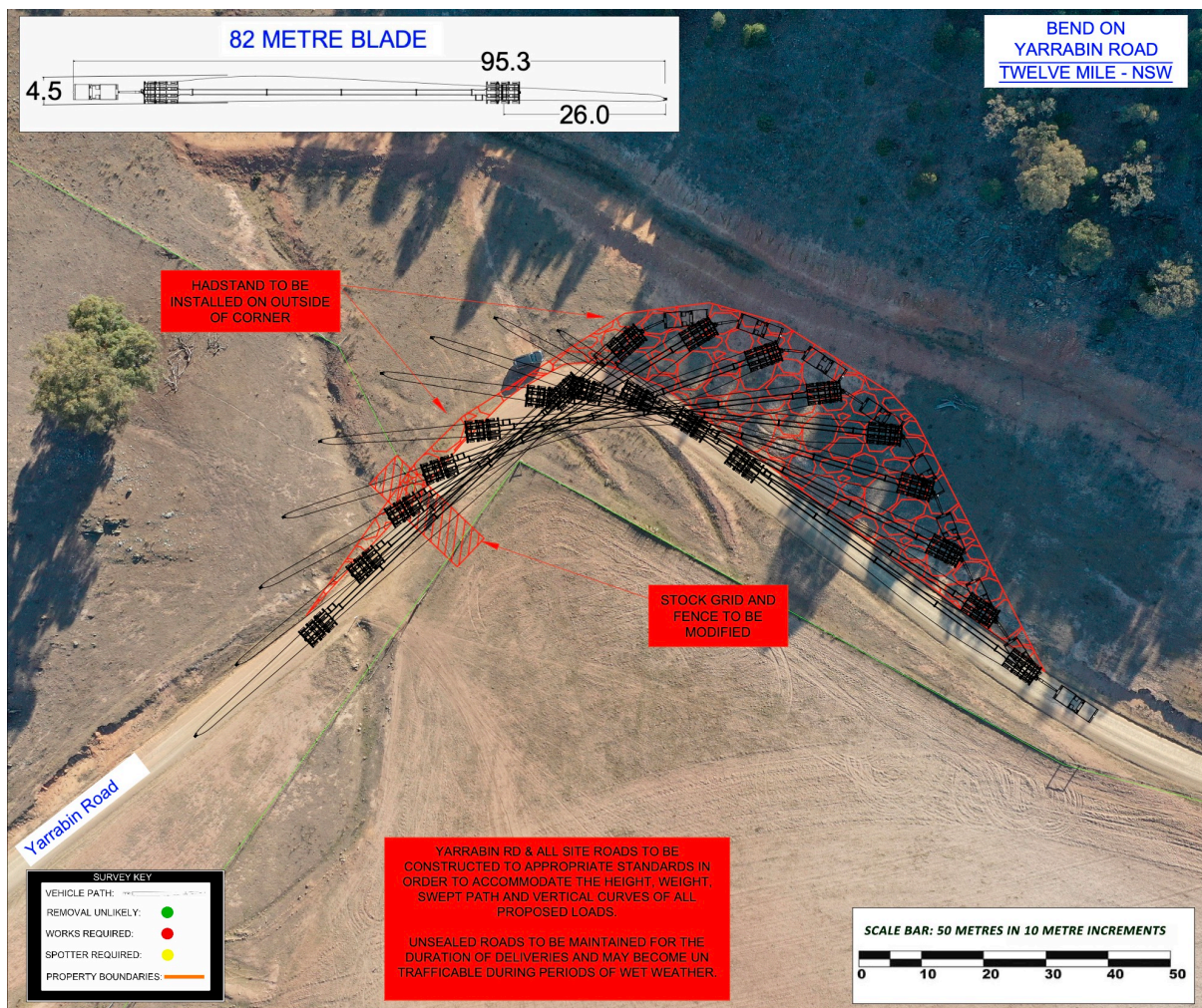


Figure 33 - GPS Link: <https://maps.app.goo.gl/4VA8j46TmHd5FMKJ6>

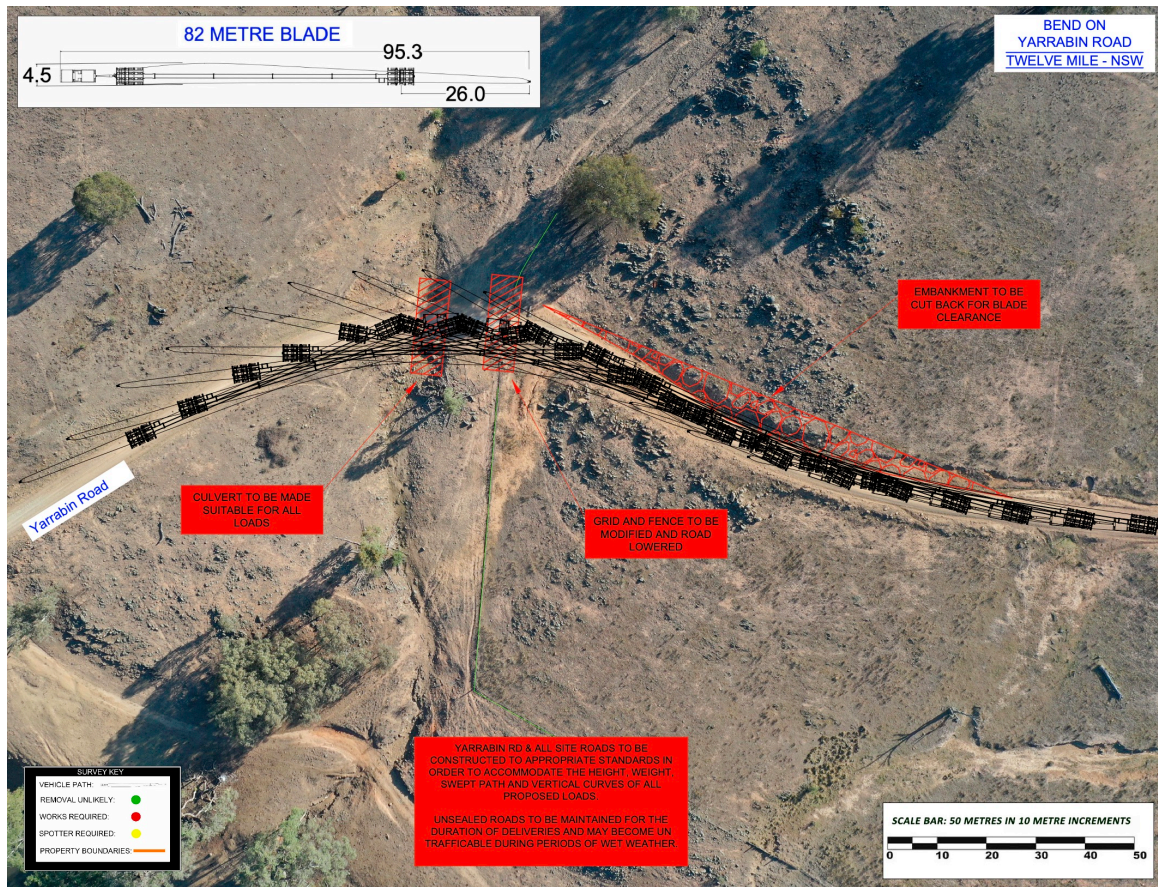


Figure 34 - GPS Link: <https://maps.app.goo.gl/gTZLqH4e75qoM6nb6>



Figure 35 - GPS Link: <https://maps.app.goo.gl/fw4M9fCuadD6D6pE6>

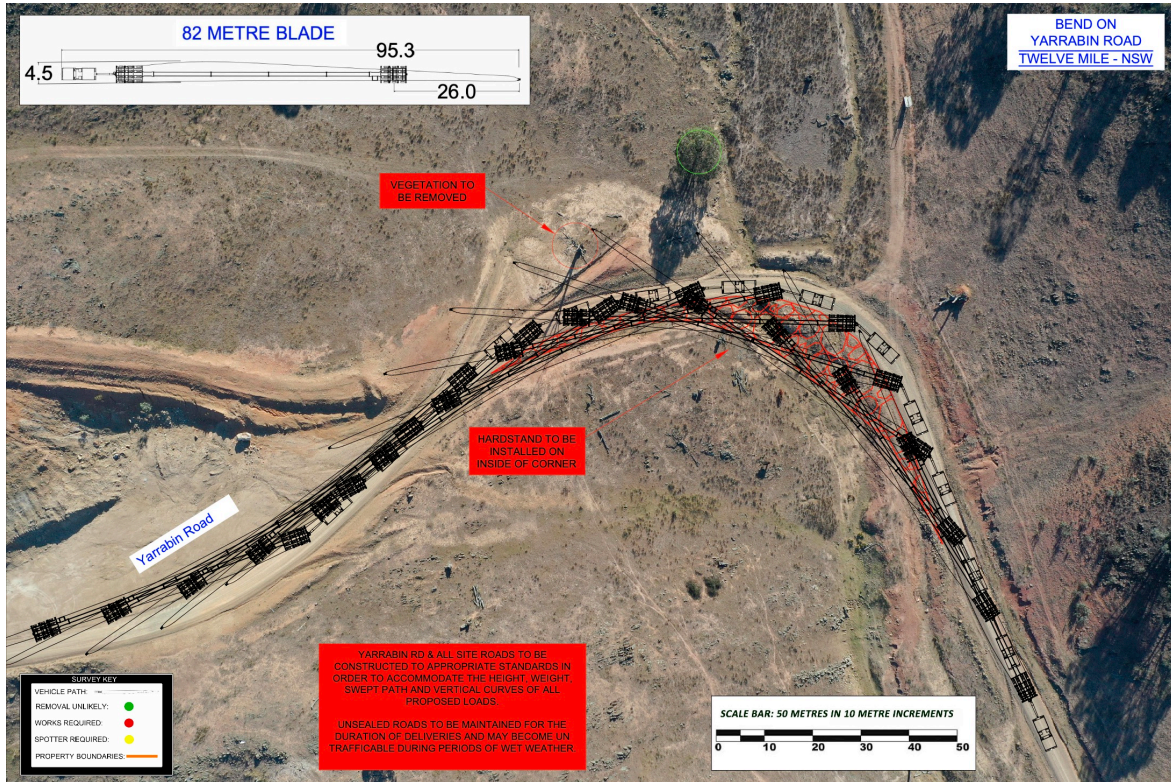


Figure 36 - GPS Link: <https://maps.app.goo.gl/kJgJKzXkXXUQzFaf9>



Figure 37 - GPS Link: <https://maps.app.goo.gl/6igGXL2jtdA84CtX7>



Figure 38 - GPS Link: <https://maps.app.goo.gl/3oEw32uZy79ivWdY7>

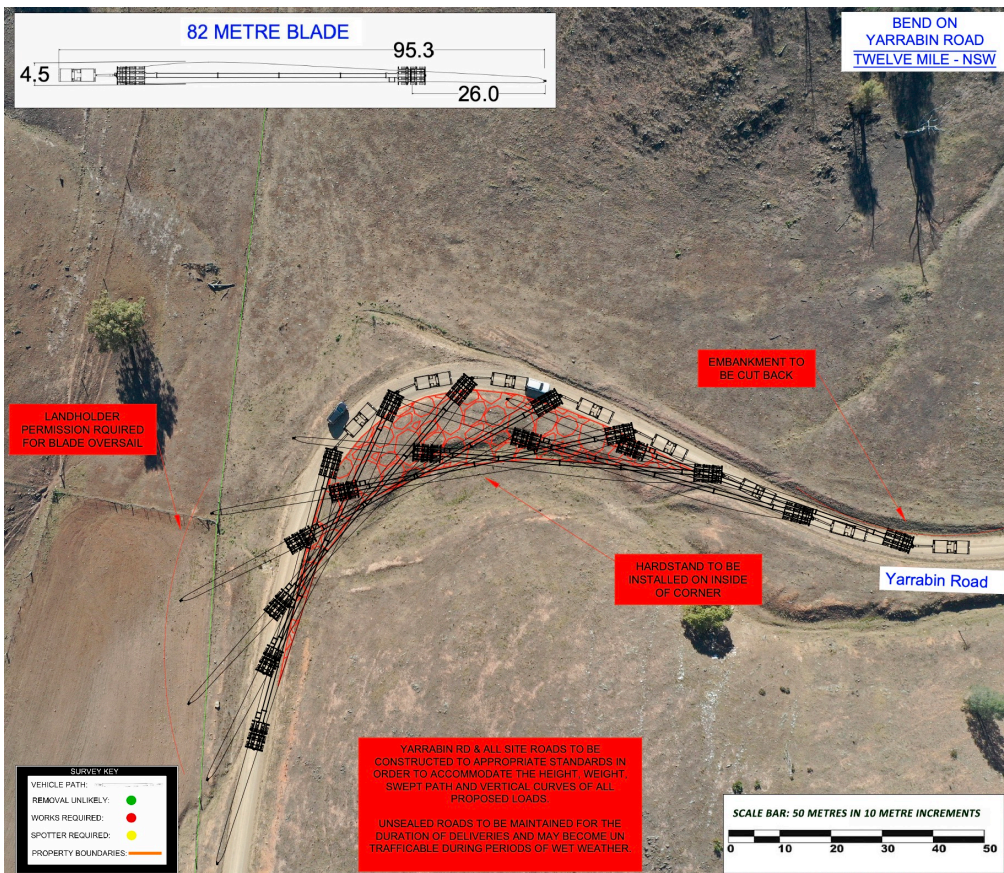


Figure 39 - GPS Link: <https://maps.app.goo.gl/6a2QkTKkLpdWRLa9A>

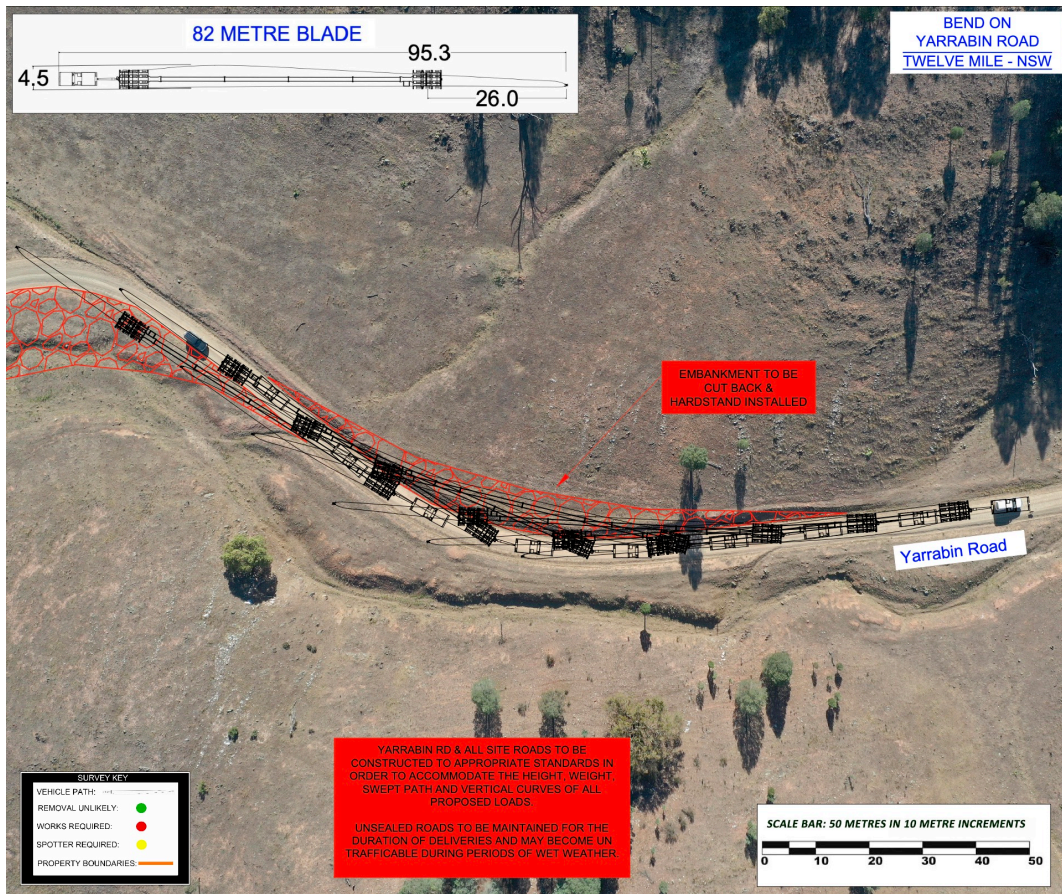


Figure 40 - GPS Link: <https://maps.app.goo.gl/HmQYDzTMqejG2Pzk7>



Figure 41 - GPS Link: <https://maps.app.goo.gl/Yp9yFQ8SyYCaq6QA>

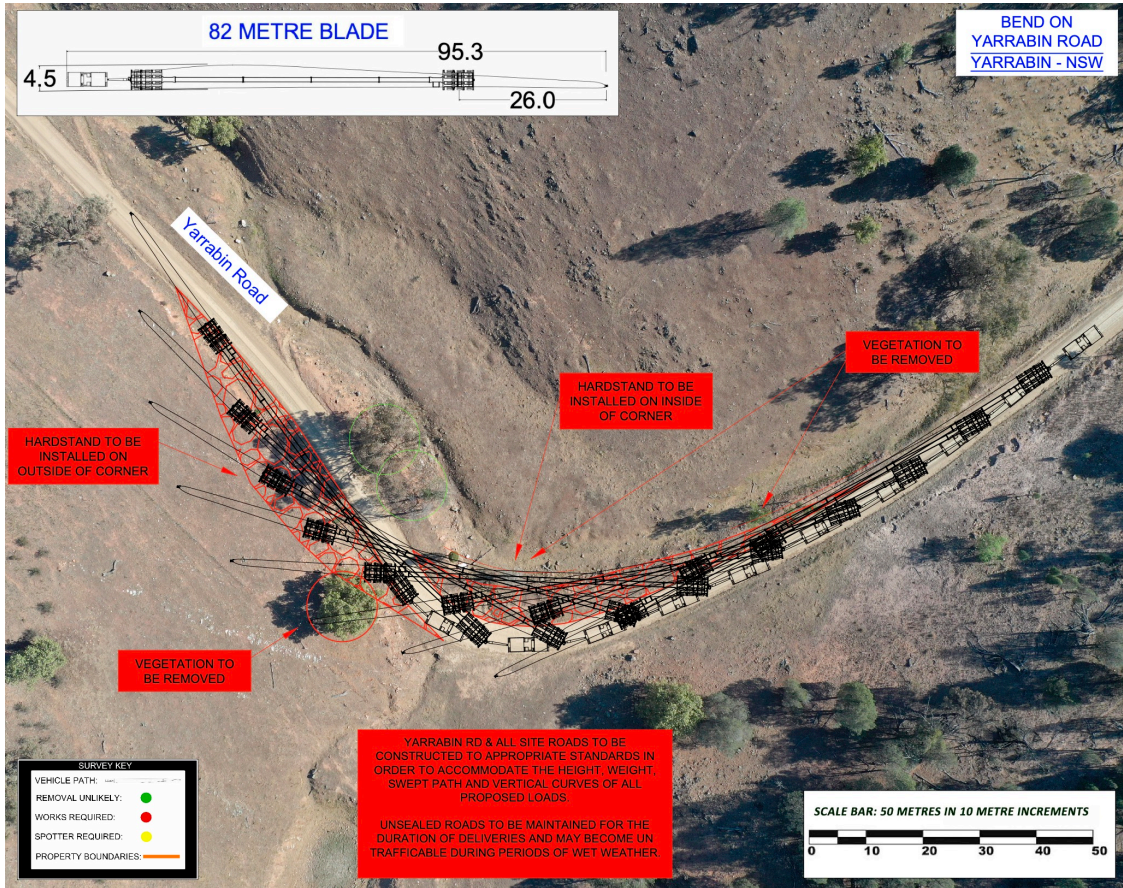


Figure 42 - GPS Link: <https://maps.app.goo.gl/2124b1hXpxgSBBs26>



Figure 43 - GPS Link: <https://maps.app.goo.gl/PqLdr8qXFxtA7Zxs6>

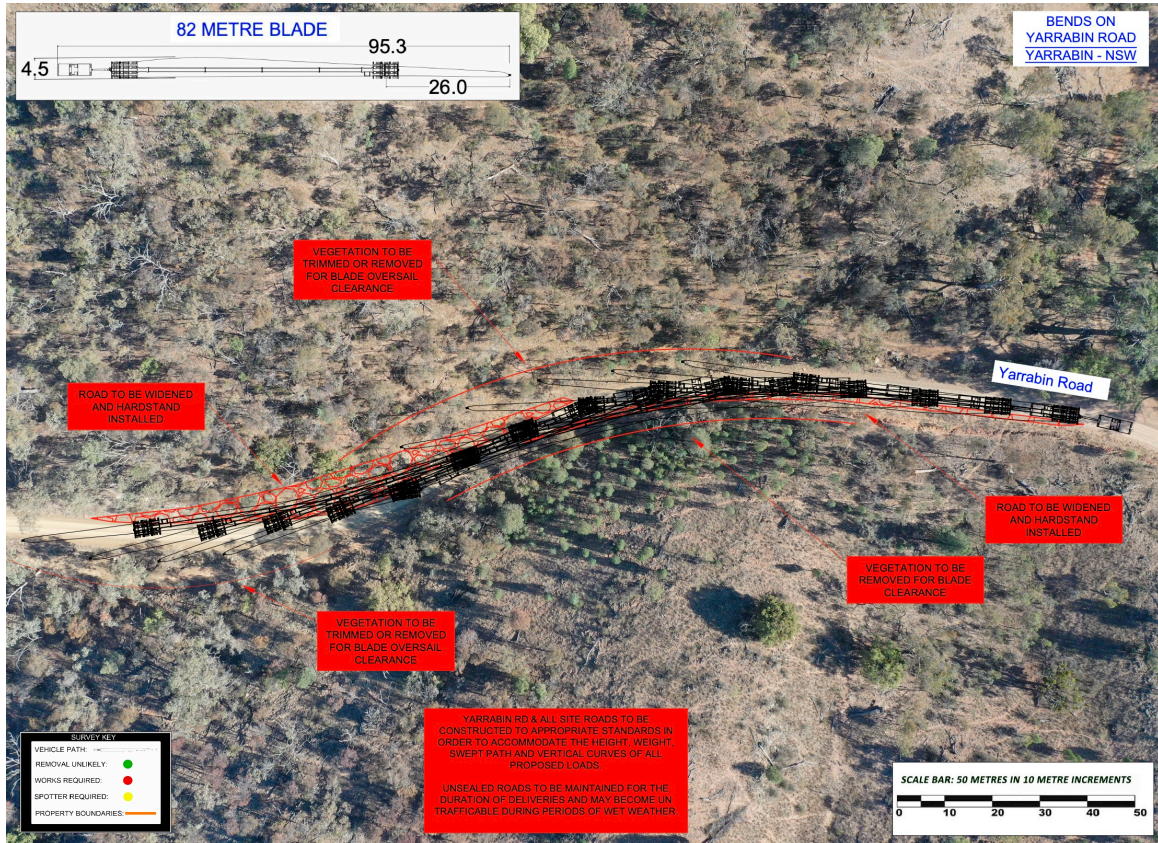


Figure 44 - GPS Link: <https://maps.app.goo.gl/SB2pZnkcqNUC7mDMA>

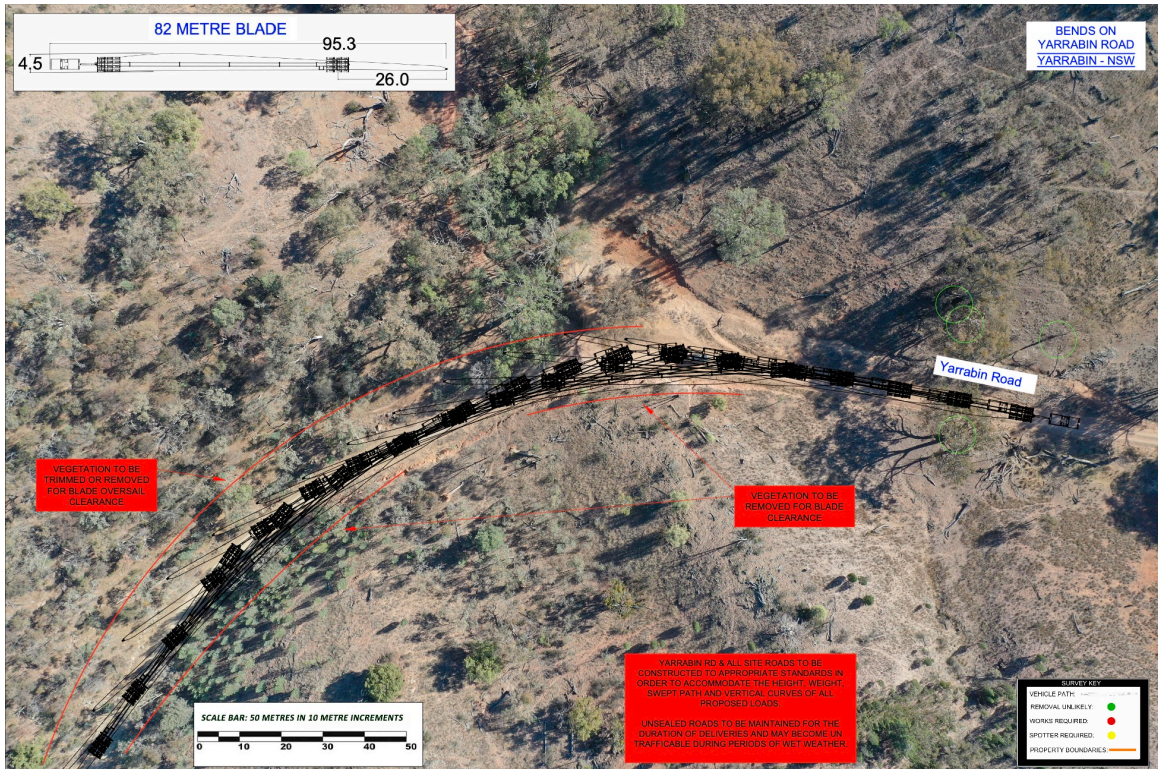


Figure 45 - GPS Link: <https://maps.app.goo.gl/xHbCDj8aQeXAHJ5M8>

461.9 Km's: Yarrabin Road onto Burrendong Dam Road

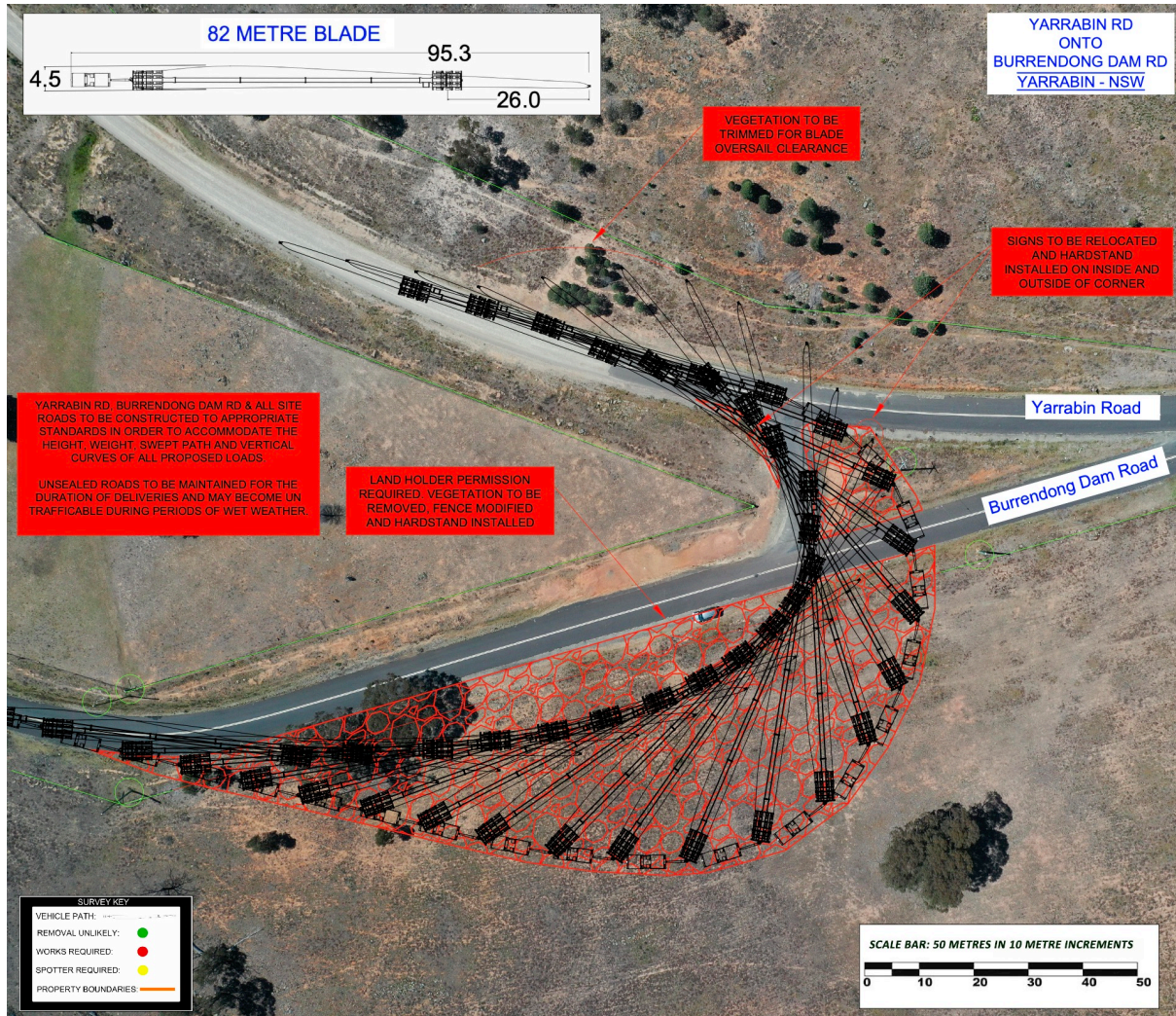


Figure 48 - Yarrabin Road onto Burrendong Dam Road

GPS LINK FOR THIS LOCATION: <https://maps.app.goo.gl/S34Pk9YYxXNEGkqc7>

PROCEDURE: Right hand turn.

ROAD MODIFICATIONS: Landholder permissions required. Vegetation to be removed, fence modified and hardstand installed on inside and outside of corner.

461.9 – 468.9 Km's: Burrendong Dam Road

Burrendong Dam Road in its current condition is not suitable for the transport of wind turbine components. Below is a sample of the typical constraints on this section of the route.

ROAD MODIFICATIONS: Burrendong Dam Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.

GPS LINK: <https://goo.gl/maps/gcibmZ6w9LMrdRC98>



Figure 49 - Burrendong Dam Road



Figure 50 - Meroo River Bridge



Figure 51 - Meroo River Bridge



Figure 52 - Typical tree lined section of Burrendong Dam Road

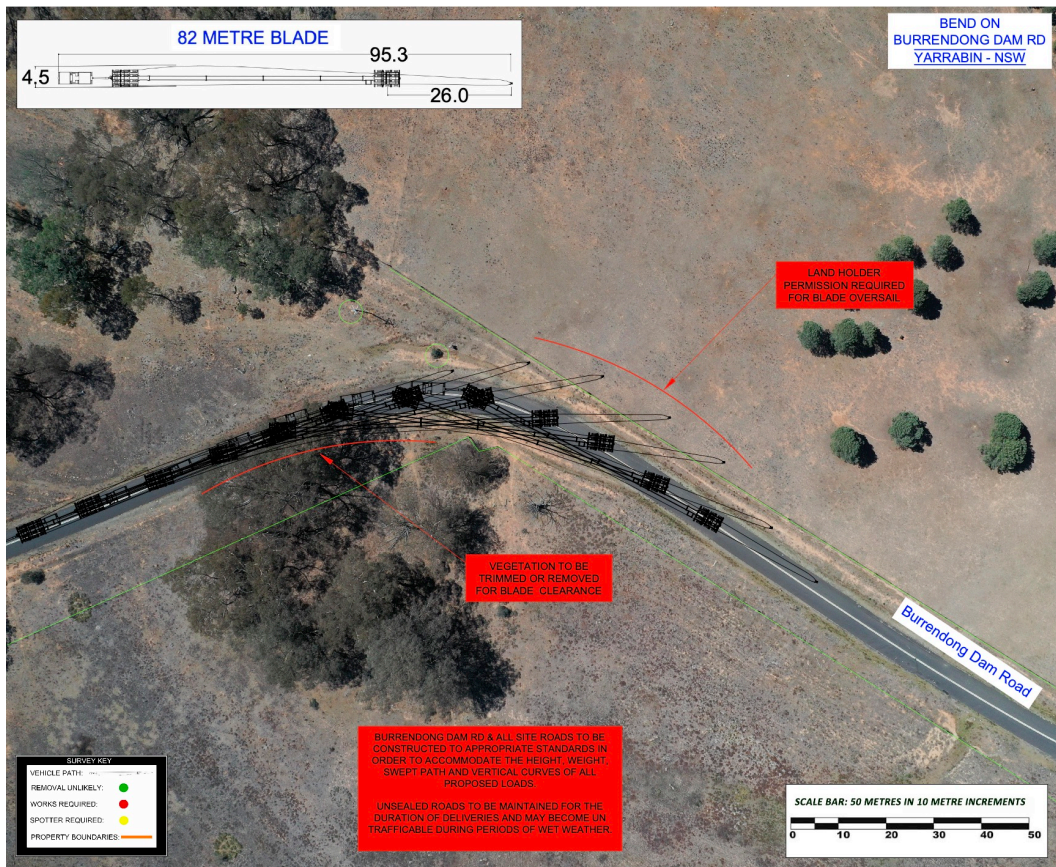


Figure 53 - GPS Link: <https://maps.app.goo.gl/KxxnvdZkzCsN1ZT7>



Figure 54 - GPS Link: <https://maps.app.goo.gl/XkfmCkdRe9XJPs3w7>

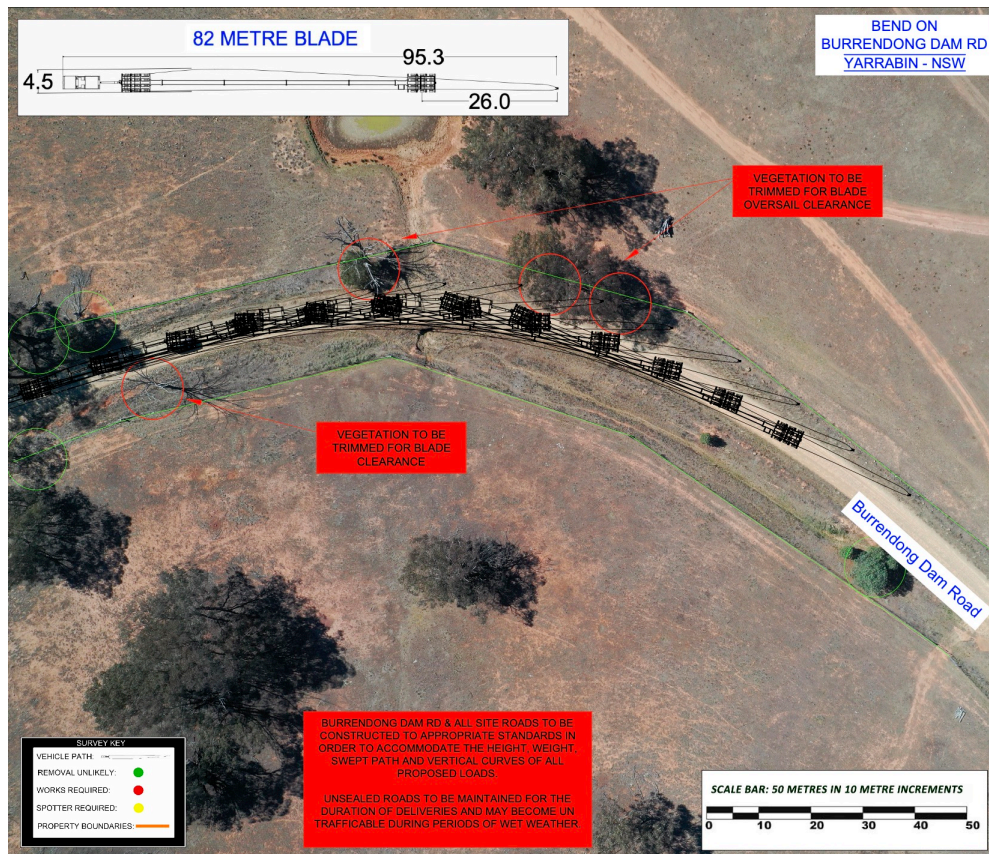


Figure 55 - GPS Link: <https://maps.app.goo.gl/ZkfeQVJpQcqi6dRM9>

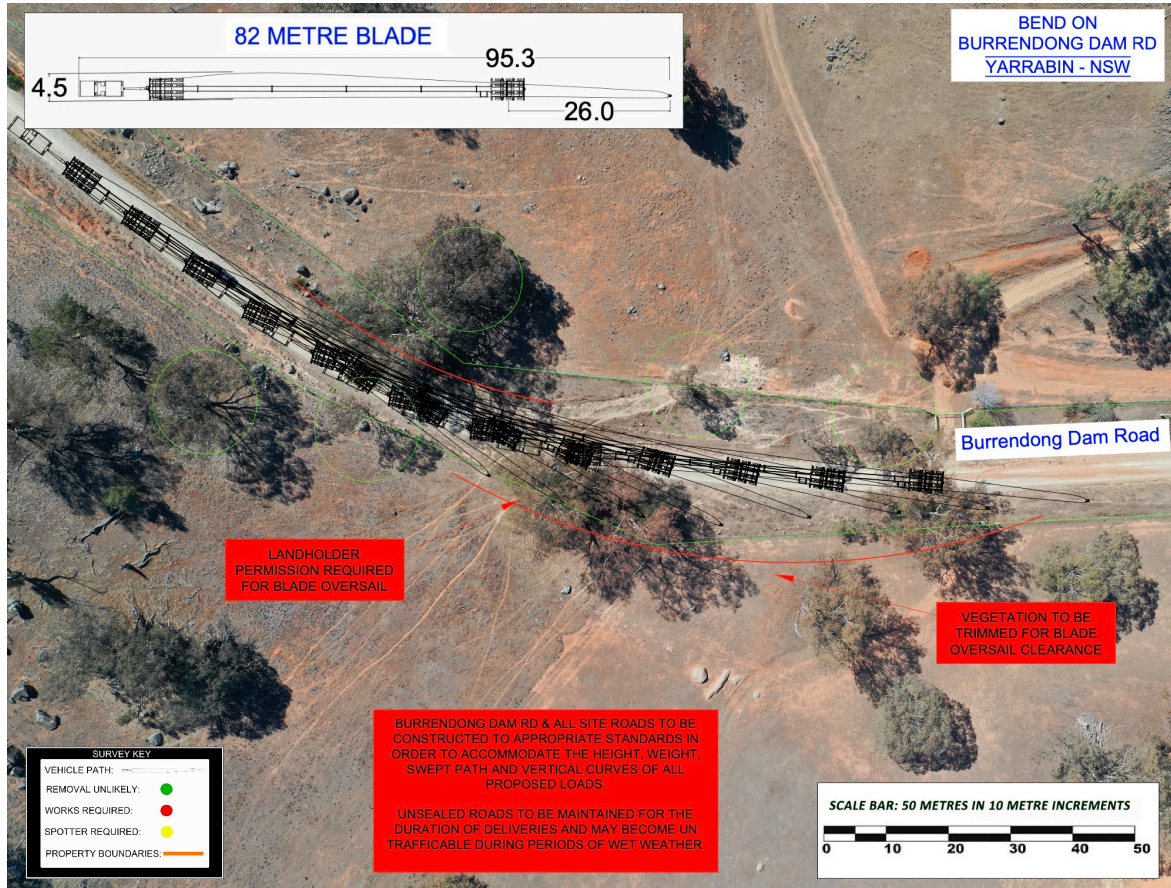


Figure 56 - GPS Link: <https://maps.app.goo.gl/SESj3jWAD4xSY9aX8>



Figure 57 - GPS Link: <https://maps.app.goo.gl/cjT1fqGFUDR4eRBv6>



Figure 58 - GPS Link: <https://maps.app.goo.gl/yq2zb2PofHLVlwYUA>



Figure 59 - GPS Link: <https://maps.app.goo.gl/QSwjQdzSXvrnhZc7>

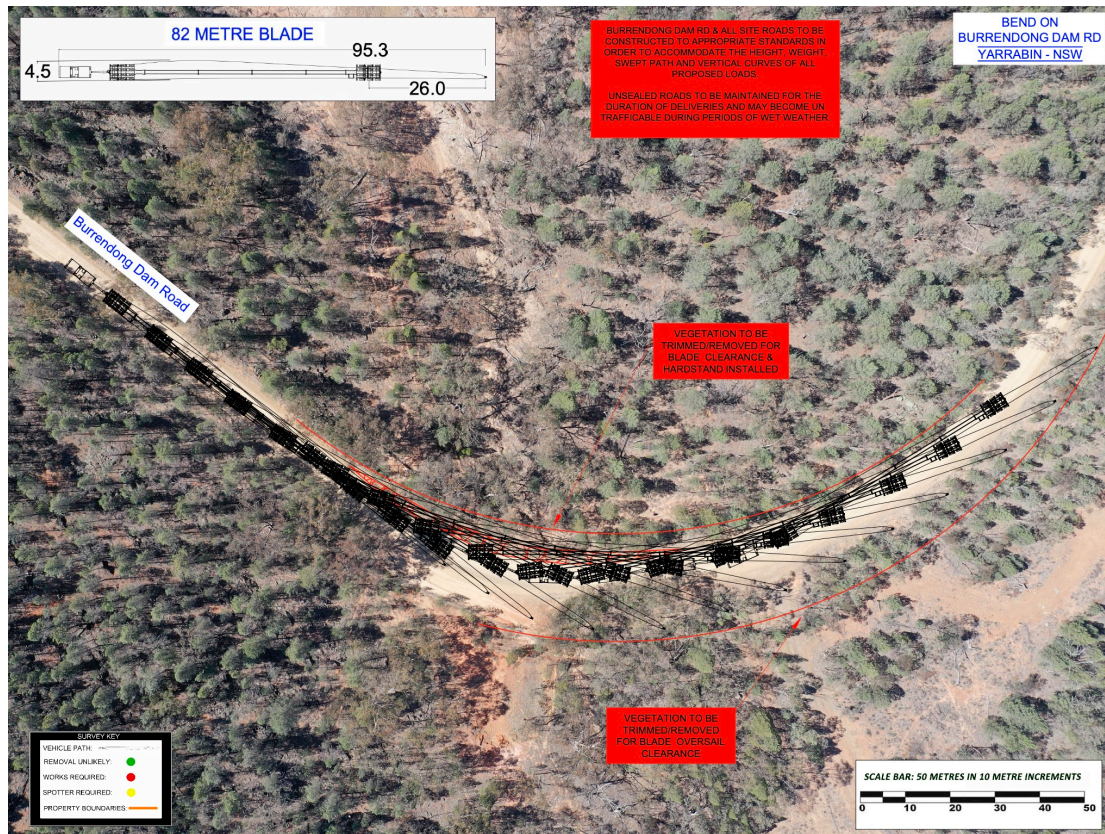




Figure 62 - GPS Link: <https://maps.app.goo.gl/jV9ubNjyCytiTpmW9>



Figure 63 - GPS Link: <https://maps.app.goo.gl/CY5AWz8SpVzkHvcx7>

469.8 Km's: Burrendong Dam Road onto Endacott Road

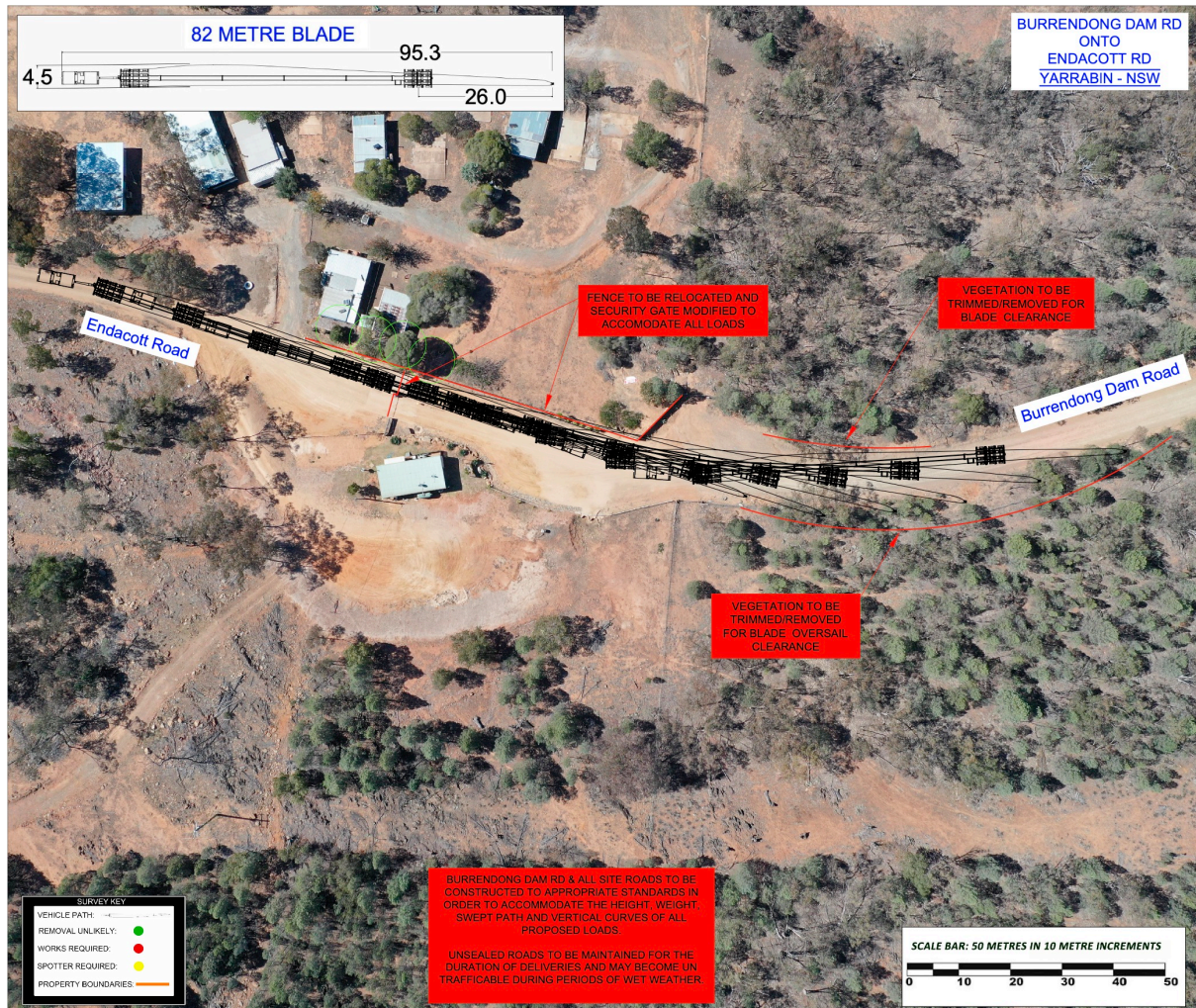


Figure 64 - Burrendong Dam Road onto Endacott Road

GPS LINK: <https://maps.app.goo.gl/ZETJ7a4jNJWJrTtp6>

PROCEDURE: Travel directly ahead

ROAD MODIFICATIONS: Landholder permission required. Security gate and fence to be modified to accommodate all proposed loads. Vegetation to be trimmed/removed for blade clearance.

468.9 - 469.7 Km's: Endacott Road

Endacott Road in its current condition is not suitable for the transport of wind turbine components. Below is a sample of the typical constraints on this section of the route.

ROAD MODIFICATIONS: Endacott Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.

GPS LINK: <https://goo.gl/maps/bsDQ3Pkz8GwCX1qs9>



Figure 65 - Endacott Road through the holiday park



Figure 66 - Boom gate

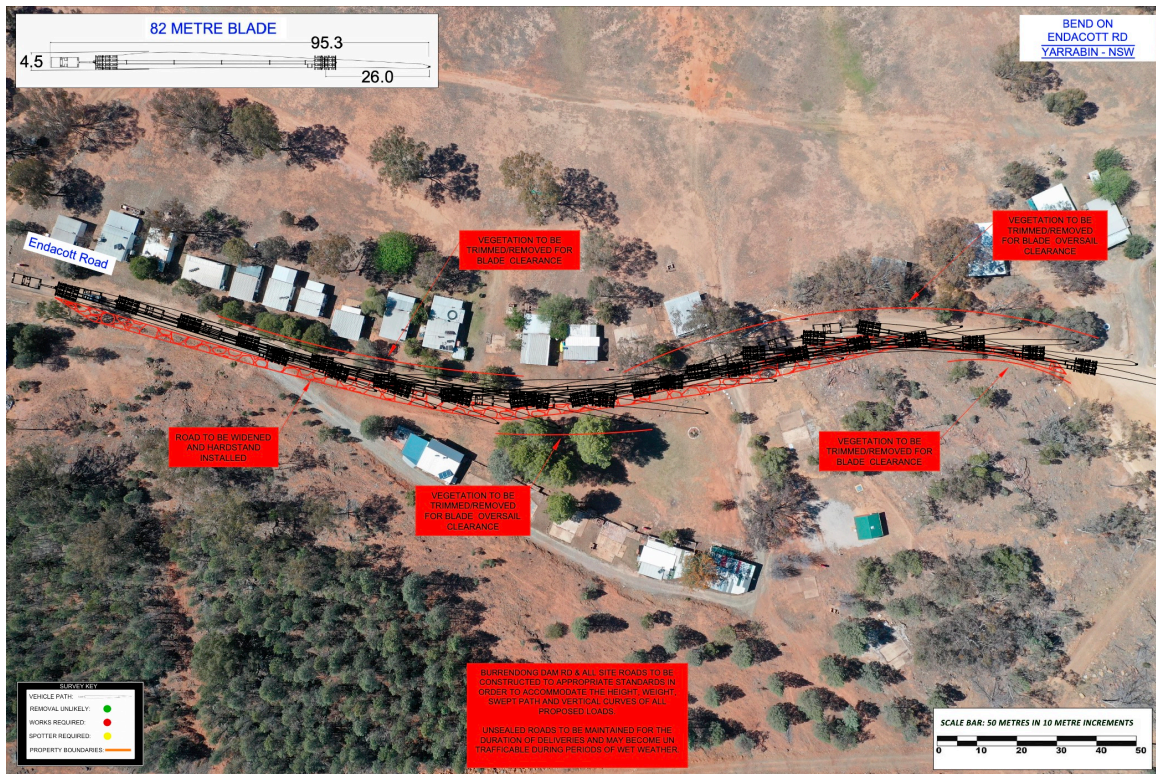


Figure 67 - GPS Link: <https://maps.app.goo.gl/6gLnw7WLeirB5Mb8>

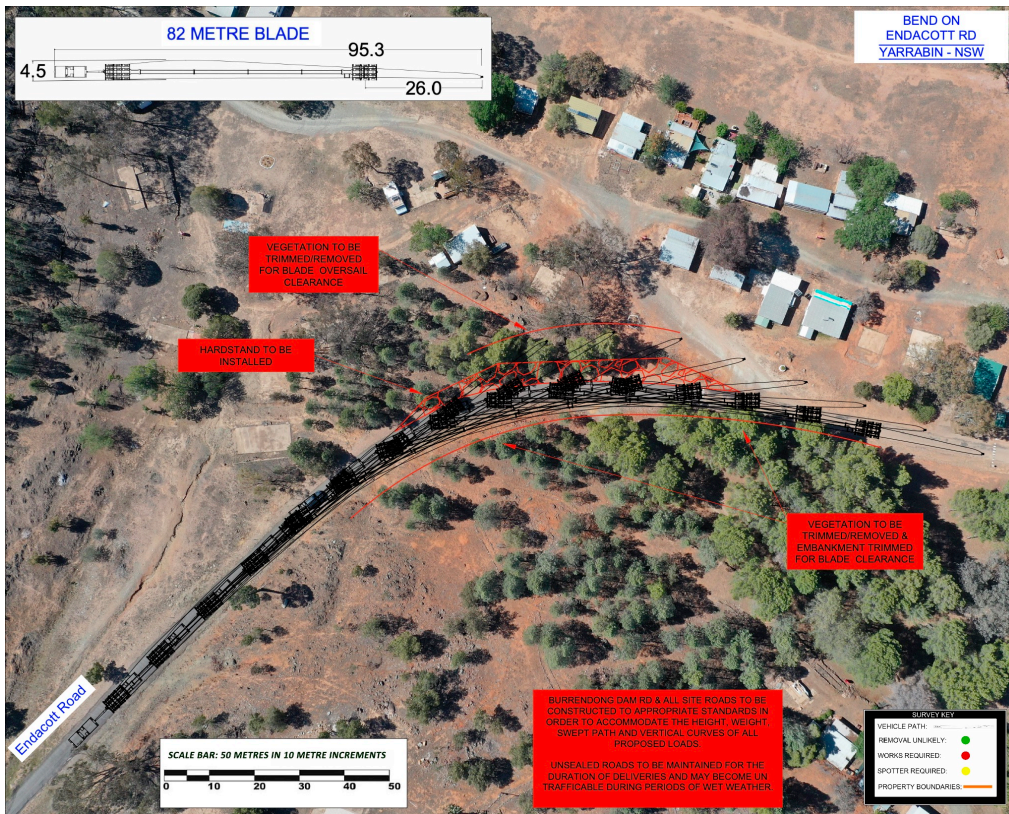


Figure 68 - GPS Link: <https://maps.app.goo.gl/9xntfPKD8HsrD3B76>

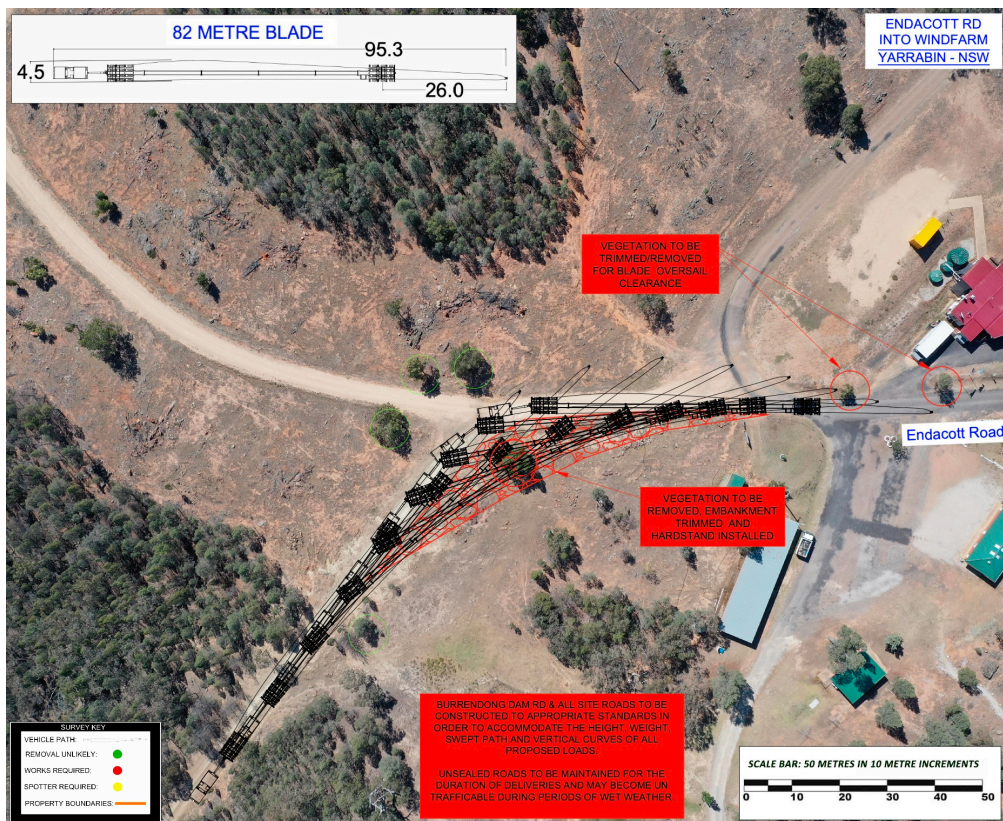


Figure 69 - GPS Link: <https://maps.app.goo.gl/o1oxibNNCK5iReNC8>

8.0 Conclusion Route 1

After studying all options and undertaking a route survey, the route in its current condition will require a moderate amount of upgrading 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 will require a moderate amount of work in order to accommodate the proposed blade size.
- The corners that have been identified in the report as requiring work should be investigated early in the planning stages to avoid delays or rejections.
- Twelve Mile Road, Yarrabin Road, Burrendong Dam Road and Endacott Road all have a large number of corners requiring work in order to accommodate the required swept path.

OVERHEAD STRUCTURES: (5.6 Maximum loaded height)

- The lowest structure on this route are overhanging traffic signals, the lowest of these is 5.4 metres high, but these signals can be avoided by passing them to the side. The lowest fixed structure is a gantry at Hexham. Loads over 5.2 metres are to pass to the side of the traffic signals. The lowest structure that cannot be detoured is the Denman bridge. Denman Bridge is 5.7 metres in height. A loaded height of 5.6 metres should not be exceeded. Loads that exceed 5.6 metres will need to detour this structure.

OVERHEAD UTILITIES:

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

BRIDGES:

- Bridge assessments will still be required for the entire route.

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:

- The route requires a large amount of vegetation clearing at various locations as listed in the report, primarily from Twelve Mile Road onwards.

PAVEMENT:

- Pavement on the route is of highway standard up to Twelve Mile Road
- Twelve Mile Road, Yarrabin Road, Burrndong Dam Road and Endacott Road are currently gravel roads.
- Twelve Mile Road, Yarrabin Road, Burrndong Dam Road and Endacott Road are to be constructed to suitable standards and maintained for the duration of deliveries if not sealed.
- All site access roads to be constructed to appropriate standards in order to accommodate the weight, height and swept path of all proposed loads. Roads to be maintained for the duration of deliveries if not sealed.

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 ACCESS ROADS:

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

9.0 Route 2: Newcastle Port to Lake Burrendong

COMPONENTS: Towers (Max loaded height 6.1m)

DISTANCE: 421.0 kilometres

GPS LINK: <https://maps.app.goo.gl/NYEqe22d3941bfht5>

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, Castlereagh Highway, Goolma Road, Twelve Mile Road, Yarrabin Road, Burrendong Dam Road, Endacott Road.

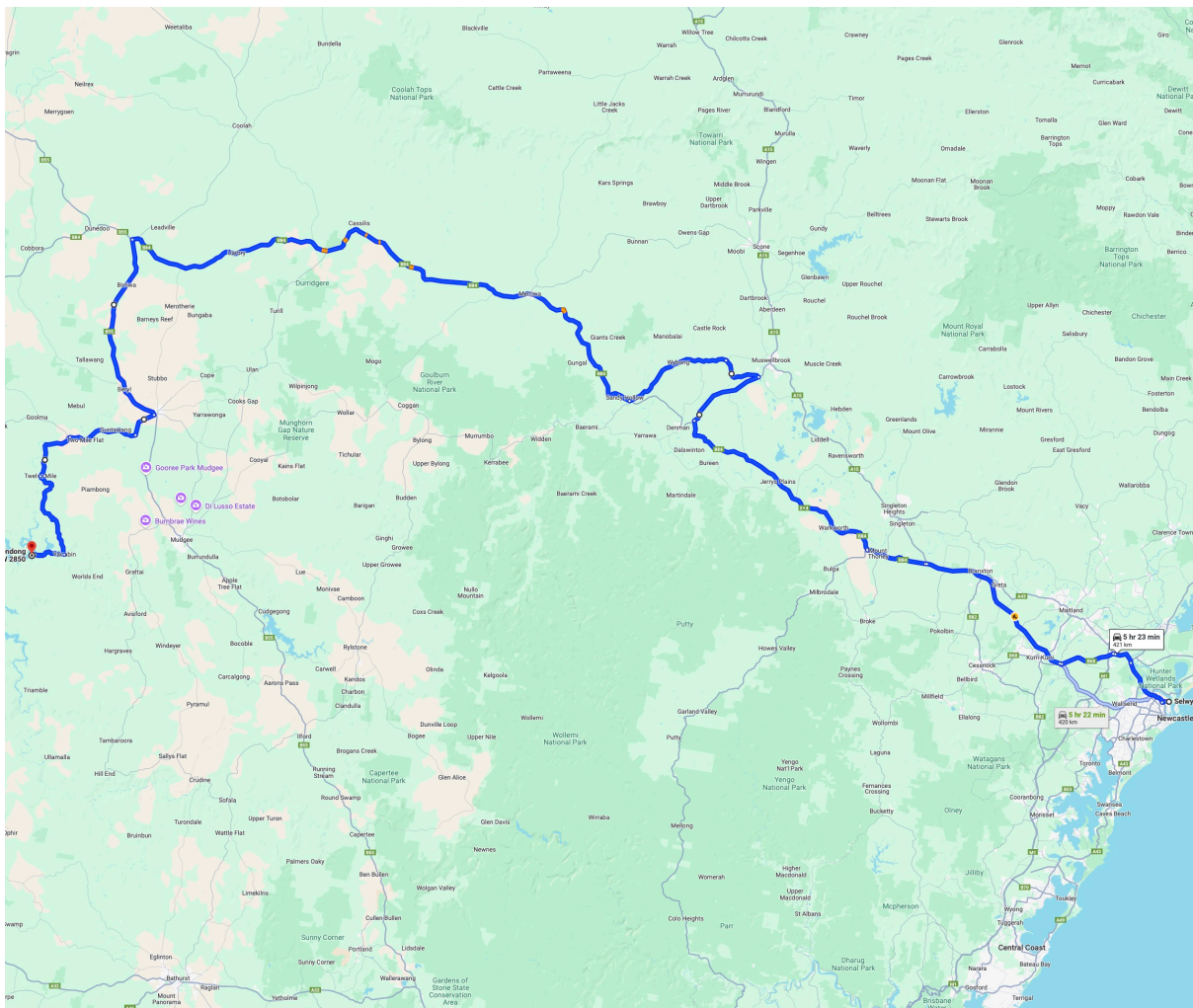


Figure 70 - Route 2

KEY	
MODIFICATIONS REQUIRED	
PINCH POINT	
EMERGENCY PARKING	

KM index	Location	Section of road	Current clearance	Procedure	Notes
0.0	Mayfield	Mayfield No.4 berth onto Selwyn Street GPS link: https://goo.gl/maps/aflwPYKuNdm	Length: 70.0 Mtrs Width: 8.0 Mtrs	Right hand turn	No problems with the towers on this section of road.
0.4	Mayfield	Selwyn Street over rail crossing GPS link: 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 GPS link: https://goo.gl/maps/gXcHvBiCp4DQ2	Length: 40.0 Mtrs Width: 8.0 Mtrs	Right hand turn	Islands to be made trafficable/replaced with painted lines.
1.4	Mayfield	George Street onto Industrial Drive GPS link: 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 GPS link: 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.
5.5	Mayfield West	Industrial Drive onto Maitland Road GPS link: 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 GPS link: 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 GPS link: https://goo.gl/maps/YTMoFe7Aick	Height: 6.2 metres	Travel directly ahead on the far left side of road	This is the lowest structure on route. There is no bypass around the gantry. A maximum loaded height of 6.2 metres should not be exceeded. Loads to lower to 6.1m and travel under gantry on the far left side of the road.
15.0	Tarro	Bend on New England Hwy GPS link: https://maps.app.goo.gl/63RTZvnpTRLjksJf9	Width: 7.5 Metres	Left hand bend	No problems with the towers on this section of road.
15.1	Tarro	New England Highway over rail bridge GPS link: https://goo.gl/maps/tTnWlwQC2hzSPhAp6	Width: 9.0 Metres	Travel directly ahead	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.

KM index	Location	Section of road	Current clearance	Procedure	Notes
15.2	Tarro	New England Highway under Tarro interchange	Height: 6.2 metres	Travel directly ahead on the far left side of road	This is the lowest structure on route. There is no bypass around the bridge. A maximum loaded height of 6.2 metres should not be exceeded. Loads to lower to 6.1m and travel under gantry on the far left side of the road.
17.4	Tarro	New England Highway onto John Renshaw Drive GPS link: https://goo.gl/maps/SRDr5JgkBp	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 GPS link: 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 GPS link: https://goo.gl/maps/1STJ1PfQt9E2	Length: 65.0 Mtrs Width: 7.0 Mtrs	Right hand turn around roundabout	No problems with the towers on this section of road.
58.9	Branxton	The Hunter Expressway onto The New England Highway GPS link: https://goo.gl/maps/7rauNuxzqjg	Length: 100.0 Mtrs Width: 12.0 Mtrs	Travel directly ahead	No problems with this section of road.
67.3	Whittingham	New England Highway onto the Golden Highway GPS link: https://goo.gl/maps/nAnfkYfeUn42	Length: 70.0 Mtrs Width: 8.0 Mtrs	Left Hand turn than travel directly ahead through the roundabout.	No problems with this section of road.
67.4	Whittingham	Golden Highway GPS link: https://goo.gl/maps/R86RFuPnmFU2	115.0 x 9.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
67.5	Whittingham	Roundabout on Golden Highway GPS link: https://maps.app.goo.gl/92r3wt9cTYRQRShm8	Length: 50.0 Mtrs Width: 7.5 Mtrs	Travel directly ahead	The roundabout has been designed to accommodate windfarm projects in the Orana REZ.
68.0	Whittingham	Golden Highway over rail bridge GPS link: 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 GPS link: https://goo.gl/maps/qTxSbkkPu87L5hx4A	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	Mount Thorley	Golden Highway intersection with the Putty Road GPS link: 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 GPS link: 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 GPS link: https://goo.gl/maps/ipGU4USXmWZ8GkJs6	Length: 90 metres Width: 9.0 Metres Height: 5.2 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.

KM index	Location	Section of road	Current clearance	Procedure	Notes
80.8	Mount Thorley	Putty Road under Mt Thorley Road GPS link: 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 GPS link: https://goo.gl/maps/Q589qv5y7YWaFHpX9	Length: 45 metres Width: 6.0 Metres	Right hand turn	Signs to be relocated or made removable with flush base. Island to be made trafficable.
98.0	Warkworth	Golden Highway GPS link: 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 GPS link: 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 GPS link: 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.
131.9	Denman	Golden Highway onto Denman Road GPS link: 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 GPS link: https://goo.gl/maps/3sk4m6Y5fHNrlkqn69	Length: 60 metres Width: 8.0 Metres	Left hand turn	Hardstand to be installed on inside of corner.
149.0	Bengalla	Bengalla Road onto Wybong Road GPS link: 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 GPS link: 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.
169.0	Wybong	Mine Road over Wybong Rd GPS link: https://maps.app.goo.gl/asumAbcya4cHz4EbA	Height: 6.3meters	Travel directly ahead	No problems with this section of road.
183.0	Sandy Hollow	Wybong Road onto Golden Highway GPS link: https://goo.gl/maps/5ll3VnWpnPhce84u7	Length: 60 metres Width: 8.0 Metres	Right hand turn	Sign to be relocated or made removable with flush base & hardstand installed on inside of corner.
190.1	Sandy Hollow	Golden highway GPS link: 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 GPS link: https://goo.gl/maps/b719zH2ankJcvWpT6	Height: Left: 6.3 metres	Travel directly ahead on the correct side	No problems with this section of road.
201.0	Gungal	Golden highway GPS link: https://goo.gl/maps/WDoL2LfeCoP2	70.0 x 6.0 metres	Parking Bay	Suitable parking for Fatigue breaks.

KM index	Location	Section of road	Current clearance	Procedure	Notes
221.0	Merriwa	Golden Highway under safety Cam GPS link: 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 GPS link: https://goo.gl/maps/NqrWzTsRmmt	100.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
274.0	Cassilis	Golden highway GPS link: https://goo.gl/maps/vs6YMT6TxCA2	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
305.0	Leadville	Golden highway GPS link: https://goo.gl/maps/ujxMGukhopeFWRhb8	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
315.0	Leadville	Golden highway onto the Castlereagh Highway GPS link: https://goo.gl/maps/aJMXknfMmuH2	Width: 9.0m	Merge directly ahead	Spotter to guide load through this pinchpoint. Police and pilots to supply traffic control as per the procedure for this section of road.
325.0	Birriwa	Castlereagh Highway rail crossing GPS link: https://goo.gl/maps/BTrCz8VaeLN2	65.0 metres clearance	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
357.0	Gulgong	Castlereagh Highway onto Goolma Road GPS link: https://goo.gl/maps/US53QUHC6R92	50.0 metre clearance	Right hand turn	The pole on the inside of the turn needs to be temporary removed. Spotter to guide load through this pinchpoint. Police and pilots to supply traffic control as per the procedure for this section of road.
363.0	Gulgong	Goolma Road intersection of Guntawang Road GPS link: https://goo.gl/maps/r511qpBpRzN2	65.0 metres clearance	Right hand turn	Spotter to guide load through this pinchpoint. Police and pilots to supply traffic control as per the procedure for this section of road.
378.0	Two Mile Flat	Goolma Road onto Twelve Mile Road GPS link: https://maps.app.goo.gl/5S7N7vVSCndq32tw8f	Length: 35 metres Width: 6.0 Metres	Left hand turn	No problems with this corner
391.0	Twelve Mile	Twelve Mile Road onto Yarrabin Road GPS link: https://maps.app.goo.gl/yrtTEiNRtB3ErfPMLA	Length: 60 metres Width: 3.5 Metres	Left hand turn	Road to be widened to accommodate proposed loads
391.0-413.0	Yarrabin	Yarrabin Road GPS link: https://maps.app.goo.gl/U2h7WCJXCLZS8wrc8f	Yarrabin Road in its current condition is not suitable for the transport of wind turbine components. Yarrabin Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.		
413.0	Yarrabin	Yarrabin Road onto Burrendong Dam Road GPS link: https://maps.app.goo.gl/ErnDfNvEBoACeF9d1g	Length: 30 metres Width: 5.0 Metres	Right hand turn	Landholder permissions required. Vegetation to be removed, fence modified and hardstand installed on inside and outside of corner.

KM index	Location	Section of road	Current clearance	Procedure	Notes
413.0-420.0	Yarrabin	Burrendong Dam Road GPS link: https://goo.gl/maps/ocbmZfw0LMydRC98	Burrendong Dam Road in its current condition is not suitable for the transport of wind turbine components. Burrendong Dam Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.		
420.0	Yarrabin	Burrendong Dam Road onto Endacott Road GPS link: https://maps.app.goo.gl/ZET-7a4jNjWkTye6	Length: 60 metres Width: 3.0 Metres	Travel directly ahead	Landholder permission required. Security gate and fence to be modified to accommodate all proposed loads. Vegetation to be trimmed/removed for clearance.
420-421	Cudegong River Holiday Park	Endacott Road through Cudegong river Holiday Park GPS link: https://goo.gl/maps/bsDQ3Pkz8G6CX1n8f	Endacott Road in its current condition is not suitable for the transport of wind turbine components. Endacott Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required. The existing boom gates will need to be widened to at least 6.0 metres.		
421.0	Lake Burrendong	Endacott Road into Primary site entrance GPS Location: https://goo.gl/maps/5W8CArkPvfkjEWh8	Length: 30 metres Width: 5.0 Metres	Right hand turn	Vegetation to be trimmed/removed, embankment trimmed and hardstand installed on inside of corner.
Site entry and all site roads to be constructed to appropriate standards in order to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become un trafficable during periods of wet weather.					

10.0 Conclusion Route 2

After studying all the options and undertaking a route survey, the route in its current condition will require a large 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 will require upgrading in order to accommodate the proposed tower size.
- The corners that have been identified in the report as requiring significant work should be investigated early in the planning stages to avoid delays or rejections.

OVERHEAD STRUCTURES: (6.1m Maximum loaded height)

- The lowest Bridge structure on the route is the Tarro overpass on the New England Highway at Tarro which has a clearance of 6.2 metres. The loads must not exceed 6.1 metres in overall height and must be able to lower to 6.0 metres and pass under this structure in the far left breakdown lane.

OVERHEAD UTILITIES:

- We would recommend a travel height of up to 6.3 metres when trailers are at travelling height.
- This route will need to be checked by an authorised scoping company for a loaded height of 6.3 metres.
- Given the length of the route and large tower size there will likely be a significant amount of overhead utility lifting/relocation required.

BRIDGES:

- Bridge assessments will be required for the entire route.
- There are numerous bridges that may have restrictions placed upon them, therefore, discussions with asset owners and bridge assessments if required should be conducted as soon as possible to confirm the suitability of the route.

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:

- The route requires a large amount of vegetation clearing at various locations as listed in the report, primarily from Twelve Mile Road onwards.
- The route will need to have a height survey undertaken for vegetation that is below the maximum loaded height of 6.3 metres. During the scope there were a large number of locations that would require vegetation trimming but not removal for overhead vegetation.

PAVEMENT:

- Pavement on the route is of highway standard up to Twelve Mile Road
- Twelve Mile Road, Yarrabin Road, Burrndong Dam Road and Endacott Road are currently gravel roads.
- Twelve Mile Road, Yarrabin Road, Burrndong Dam Road and Endacott Road are to be constructed to suitable standards and maintained for the duration of deliveries if not sealed.
- All site access roads to be constructed to appropriate standards in order to accommodate the weight, height and swept path of all proposed loads. Roads to be maintained for the duration of deliveries if not sealed.

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 ACCESS ROADS:

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

11.0 Route 3: Newcastle Port to Lake Burrendong

COMPONENTS: Remaining Components (Max loaded height 5.6m)

DISTANCE: 389.0 kilometres

GPS LINK: <https://goo.gl/maps/k9cqYYsRChd77sR96>

ROUTE: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Castlereagh Highway, Goolma Road, Twelve Mile Road, Yarrabin Road, Burrendong Dam Road, Endacott Road.

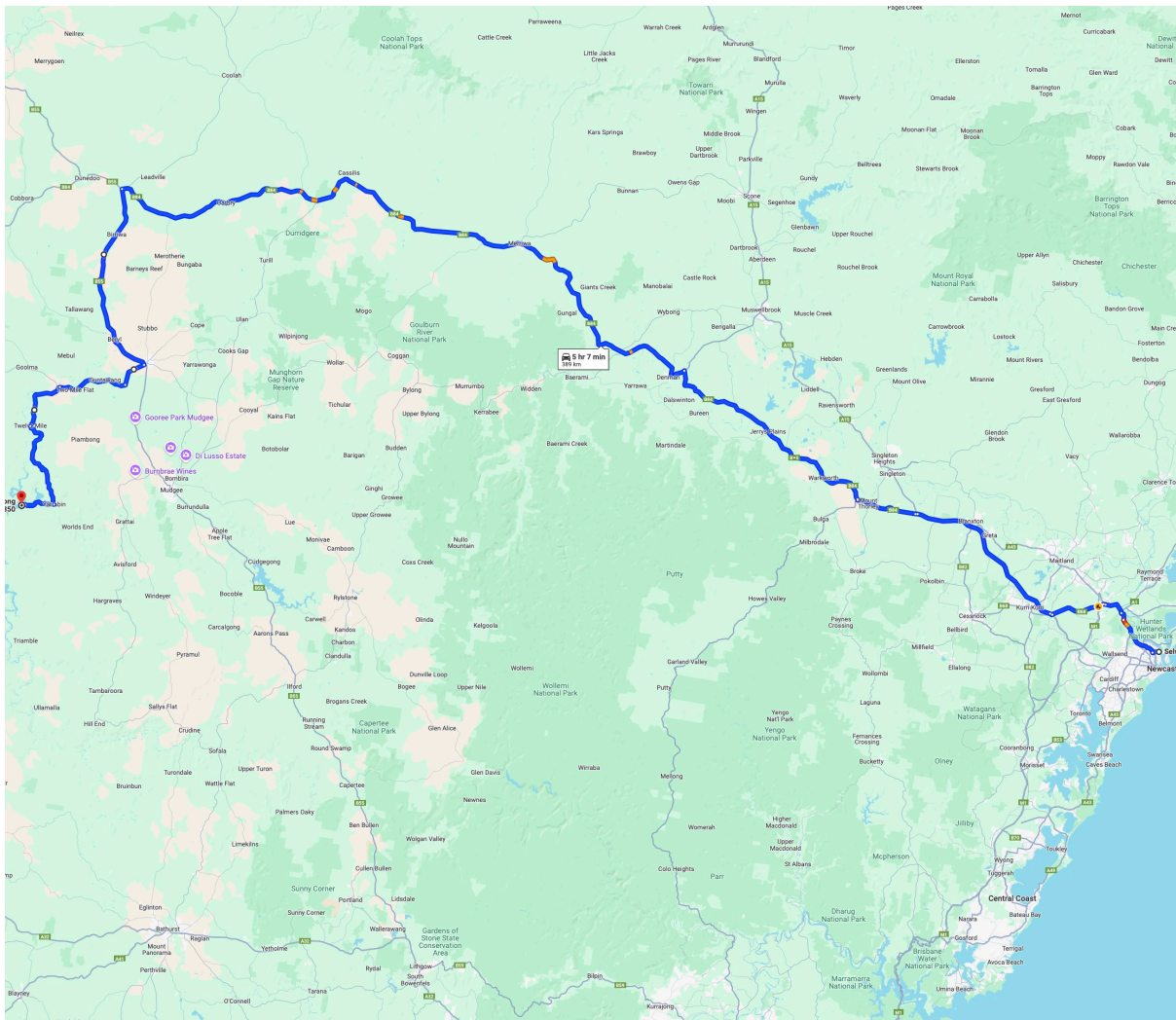


Figure 71 - Route 3

KEY	
MODIFICATIONS REQUIRED	
PINCH POINT	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street GPS link: https://goo.gl/maps/aflwPYKuNdm	70.0 metres clearance	Moderate right hand turn	No problems with this section of road.
0.4	Mayfield	Selwyn Street rail crossing GPS link: https://goo.gl/maps/AmohE54hKSz	Length: 90 metres Width: 9.0 Metres Height: 5.2 metres	Travel directly ahead	No problems with this section of road.
1.3	Mayfield	Selwyn Street onto George Street GPS link: https://goo.gl/maps/qXeHvBtCp4D2	70.0 metres clearance	Right hand turn	No problems with this section of road.
1.4	Mayfield	George Street onto Industrial Drive GPS link: https://goo.gl/maps/s4ayrsuoAsD2	70.0 metres clearance	Right hand turn	No problems with this section of road.
4.9	Mayfield	Industrial Drive under traffic signals GPS link: https://goo.gl/maps/YmqhiS2iR582	Height: 5.4 metres	Travel directly ahead	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 metres will need to travel in the right hand lane.
5.5	Mayfield West	Industrial Drive onto Maitland Road GPS link: https://goo.gl/maps/Kn49dhWG2gG2	70.0 metres clearance	Right hand turn	No problems with this section of road.
6.4	Sandgate	Maitland Road over rail bridge GPS link: https://goo.gl/maps/W2JWWjhfqv5UMviB7	Length: 90 metres Width: 9.0 Metres Height: 5.2 metres	Travel directly ahead	No problems with this section of road.
13.9	Hexham	New England Highway under gantry GPS link: 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.
15.1	Tarro	New England Highway over rail bridge GPS link: https://goo.gl/maps/tTnWLwQC2hzSPhAp6	Length: 90 metres Width: 7.0 Metres Height: 5.2 metres	Travel directly ahead in the right-hand lane	No problems with this section of road.
17.4	Tarro	New England Highway onto John Renshaw Drive GPS link: https://goo.gl/maps/SRDr5JigkBp	100.0 metres clearance	Left hand merge	No problems with this section of road.
18.4	Beresfield	John Renshaw Drive GPS link: https://goo.gl/maps/N19vJih1Fgr		Travel directly ahead	No problems with this section of road.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
28.7	Buchanan	John Renshaw Drive onto the Hunter Expressway GPS link: https://goo.gl/maps/1STJ1PfQt9E2	65.0 metres clearance	Exit roundabout onto onramp	No problems with this section of road.
58.9	Branxton	The Hunter Expressway onto The New England Highway GPS link: https://goo.gl/maps/7rauNuxzqjg	12.0 Metres wide	Travel directly ahead	No problems with this section of road.
67.3	Whittingham	The New England Highway onto the Golden Highway GPS link: https://goo.gl/maps/nAnfkYfeUn42	12.0 Metres wide	Left Hand turn	No problems with this section of road.
67.4	Whittingham	Golden Highway GPS link: https://goo.gl/maps/R86RFuPnmFU2	115.0 x 9.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
67.7	Whittingham	Roundabout on Golden Highway GPS link: https://maps.app.goo.gl/UGbXUgvy5B8fWYAi6	Length: 70 metres Width: 6.0 Metres	Travel directly ahead	No problems with this section of road.
68.0	Whittingham	Golden Highway over rail bridge GPS link: https://goo.gl/maps/5NwDQofandvMKfY9	Length: 90 metres Width: 9.0 Metres Height: 5.2 metres	Travel directly ahead in the centre of the road.	No problems with this section of road.
77.3	Mount Thorley	Golden Highway over rail bridge GPS link: https://goo.gl/maps/qTxSbkxPu87L5hx4A	Length: 90 metres Width: 9.0 Metres Height: 5.2 metres	Travel directly ahead in the centre of the road.	No problems with this section of road.
77.4	Whittingham	Golden Highway intersection with the Putty Road GPS link: https://goo.gl/maps/7hQdEmK1EgE2	Length: 65 metres Width: 6.0 Metres Height: 5.2 metres	Left hand turn	No problems with this section of road.
77.5	Mount Thorley	Golden Highway GPS link: 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 GPS link: https://goo.gl/maps/ipGU4USXmWZ8GkJs6	Length: 90 metres Width: 9.0 Metres Height: 5.2 metres	Travel directly ahead in the centre of the road.	No problems with this section of road.
80.8	Mount Thorley	Golden Highway intersection with the Putty Road GPS link: https://goo.gl/maps/VyA42n1CgZx	Length: 65 metres Width: 6.0 Metres Height: 5.2 metres	Right hand turn	No problems with this section of road.
98.0	Warkworth	Golden Highway GPS link: https://goo.gl/maps/Y6V6EXaCwxq	100.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.

ROUTE STUDY

BURRENDONG WINDFARM

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
107.0	Jerrys Plains	Golden Highway through Jerrys Plains village GPS link: https://goo.gl/maps/WgSCRsJ9ZGt	Length: 60 metres Width: 6.0 Metres Height: 5.2 metres	Right hand turn	No problems with this section of road.
107.2	Jerrys Plains	Golden Highway through Jerrys Plains village GPS link: https://maps.app.goo.gl/8zHtm7iJijHdD1m97	Length: 60 metres Width: 6.0 Metres Height: 5.2 metres	Left hand turn	No problems with this section of road.
126.0	Ogilvy	Golden Highway GPS link: https://goo.gl/maps/58Tj9ois7CC2	6% gradient	Travel directly ahead	No problems with this section of road.
131.9	Denman	Golden Highway onto Denman Road GPS link: https://goo.gl/maps/sf4PNnycxB32	Length: 55 metres Width: 6.0 Metres Height: 5.2 metres	Left hand turn	No problems with this section of road.
132.8	Denman	Golden Highway over Denman Bridge GPS link: https://goo.gl/maps/UToXyFe3QKu	Length: 90 metres Width: 6.9 Metres Height: 5.8 metres	Travel directly ahead in the centre of the lane	A width of 6.5 metres and a height of 5.6 metres should not be exceeded of this structure. If loads are over these dimensions than they may detour the bridge via Bengalla and Wybong Roads.
137.9	Denman	Golden Highway rail crossing GPS link: https://goo.gl/maps/r7x7Qc685d82	Length: 90 metres Width: 7.0 Metres Height: 5.2 metres	Travel directly ahead	No problems with this section of road.
150.1	Sandy Hollow	Golden highway GPS link: https://goo.gl/maps/2THBuV165xx	50.0 x 4.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
161.2	Gungal	Golden highway GPS link: https://goo.gl/maps/WDoL2LfeCoP2	70.0 x 6.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
184.8	Merriwa	Golden highway GPS link: https://goo.gl/maps/NqrWzTsRmni	100.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
187.1	Merriwa	Bend on Golden highway GPS link: https://maps.app.goo.gl/95JdeDvBRmdiDtbz9	Length: 90 metres Width: 9.0 Metres	Left hand turn	No problems with this section of road.
234.0	Cassilis	Golden highway GPS link: https://goo.gl/maps/vs6YMT6TxCA2	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
273.0	Leadville	Golden highway GPS link: https://goo.gl/maps/ujxMGukhopeFWRhb8	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
283.0	Leadville	Golden highway onto the Castlereagh Highway GPS link: https://goo.gl/maps/aJMXknfMmuH2	Width: 9.0m	Merge directly ahead	No problems with this section of road.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
293.0	Birriwa	Castlereagh Highway rail crossing GPS link: https://goo.gl/maps/BTrCz8VaeLN2	65.0 metres clearance	Travel directly ahead	No problems with this section of road.
325.0	Gulgong	Castlereagh Highway onto Goolma Road GPS link: https://goo.gl/maps/US53QJHQ6R92	50.0 metre clearance	Right hand turn	No problems with this section of road.
331.0	Gulgong	Goolma Road intersection of Guntawang Road GPS link: https://goo.gl/maps/r511gpBpRzN2	65.0 metres clearance	Right hand turn	No problems with this section of road.
346.0	Two Mile Flat	Goolma Road onto Twelve Mile Road GPS link: https://maps.app.goo.gl/cVN7vVSQadq32bxi8	Length: 35 metres Width: 6.0 Metres	Left hand turn	No problems with this corner
359.0	Twelve Mile	Twelve Mile Road onto Yarrabin Road GPS link: https://maps.app.goo.gl/ydTDiNIRTR3FrPNLA	Length: 60 metres Width: 3.5 Metres	Left hand turn	No problems with this section of road.
359.0-381.0	Yarrabin	Yarrabin Road GPS link: https://maps.app.goo.gl/3b7VWUJXSLZ5hwC8	Yarrabin Road in its current condition is not suitable for the transport of wind turbine components. Yarrabin Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.		
381.0	Yarrabin	Yarrabin Road onto Burrendong Dam Road GPS link: https://maps.app.goo.gl/zAjYqYkC9z23NDCa8	Length: 30 metres Width: 5.0 Metres	Right hand turn	No problems with this section of road.
381.0-388.0	Yarrabin	Burrendong Dam Road GPS link: https://goo.gl/maps/qzibmZ6w9LMnd8C98	Burrendong Dam Road in its current condition is not suitable for the transport of wind turbine components. Burrendong Dam Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required.		
388.0	Yarrabin	Burrendong Dam Road onto Endacott Road GPS link: https://maps.app.goo.gl/ZETJ7a4iJWJrTtp6	Length: 60 metres Width: 3.0 Metres	Travel directly ahead	No problems with this section of road.
388.0-389.0	Cudgegong River Holiday Park	Endacott Road through Cudgegong river Holiday Park GPS link: https://goo.gl/maps/baDQJPKz8GwCX1as8	Endacott Road in its current condition is not suitable for the transport of wind turbine components. Endacott Road requires upgrading in order to accommodate the swept path, vertical curve, weight and height requirements for all proposed loads. A detailed survey and design is required. Landholder permissions and vegetation removal will be required. The existing boom gates will need to be widened to at least 6.0 metres.		
389.0	Lake Burrendong	Endacott Road into Primary site entrance GPS Location: https://goo.gl/maps/5iW8CA8kPsfKdPW8	Length: 30 metres Width: 5.0 Metres	Right hand turn	No problems with this section of road.

Site entry and all site roads to be constructed to appropriate standards in order to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become un trafficable during periods of wet weather.

12.0 Conclusion Route 3

After studying all options and undertaking a route survey, the route in its current condition is suitable for the loads listed to use this route, as long as they do not exceed 5.3 metres in loaded height.

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

SWEPT PATH:

- No issues for the loads listed to use this route.

OVERHEAD STRUCTURES: (5.6 Maximum loaded height)

- The loads cannot exceed 5.6 metres in overall height.

OVERHEAD UTILITIES:

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

BRIDGES:

- Bridge assessments will still be required for the entire route.

RAIL ASSETS:

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

VEGETATION:

- The route requires a large amount of vegetation clearing at various locations as listed in the report, primarily from Twelve Mile Road onwards.
- The route will need to have a height survey undertaken for vegetation that is below the maximum loaded height of 5.6 metres. During the scope there were a large number of locations that would require vegetation trimming but not removal for overhead vegetation.

PAVEMENT:

- Pavement on the route is of highway standard up to Twelve Mile Road
- Twelve Mile Road, Yarrabin Road, Burrndong Dam Road and Endacott Road are currently gravel roads.

- Twelve Mile Road, Yarrabin Road, Burrndong Dam Road and Endacott Road are to be constructed to suitable standards and maintained for the duration of deliveries if not sealed.
- All site access roads to be constructed to appropriate standards in order to accommodate the weight, height and swept path of all proposed loads. Roads to be maintained for the duration of deliveries if not sealed.

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 ACCESS ROADS:

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

13.0 Transport Approvals Required

Approvals will need to be sought from the following stakeholders.

- NHVR
- TfNSW
- NSW Police
- Local councils
- Motorways and private infrastructure operators
- Energy & telecommunication infrastructure owners/managers
- Rail Managers/Owners

14.0 Fatigue parking

FATIGUE PARKING LOCATION #1: Golden Highway at Warkworth.

Components: All components.

Road modifications required: Nil.

Road stakeholder: TfNSW.

Parking bay owner: TfNSW.

GPS link: <https://maps.app.goo.gl/tMxaK8AyPRseNmJ77>



Figure 72: Warkworth parking bay

FATIGUE PARKING LOCATION #2: Golden Highway at Hollydeen.

Components: All components.

Road modifications required: Nil.

Road stakeholder: TfNSW.

Parking bay owner: TfNSW.

GPS link: <https://maps.app.goo.gl/gje81kM6rFtqfEpt6>



Figure 73: Hollydeen parking bay

FATIGUE PARKING LOCATION #3: Golden Highway at Cassilis Park.

Components: All components.

Road modifications required: Yes, no entry sign to be relocated or made removable.

Road stakeholder: TfNSW.

Parking bay owner: TfNSW.

GPS link: <https://goo.gl/maps/vs6YMT6TxCA2>

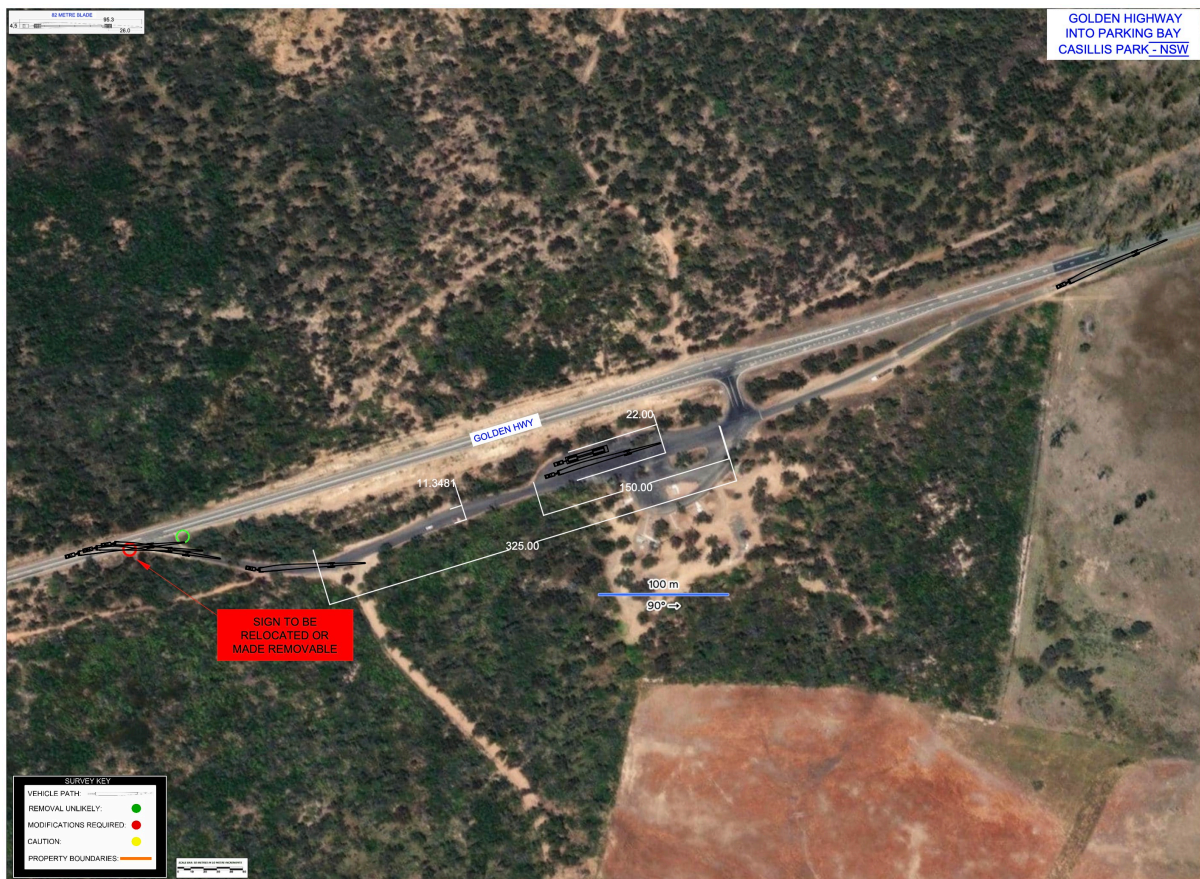


Figure 74: Casillis parking bay

FATIGUE PARKING LOCATION #4: Mitchell Highway at Wellington.

Components: All components.

Road modifications required: Nil.

Road stakeholder: TfNSW.

Parking bay owner: TfNSW.

GPS link: <https://maps.app.goo.gl/XYUYT7r33txDaxfTA>

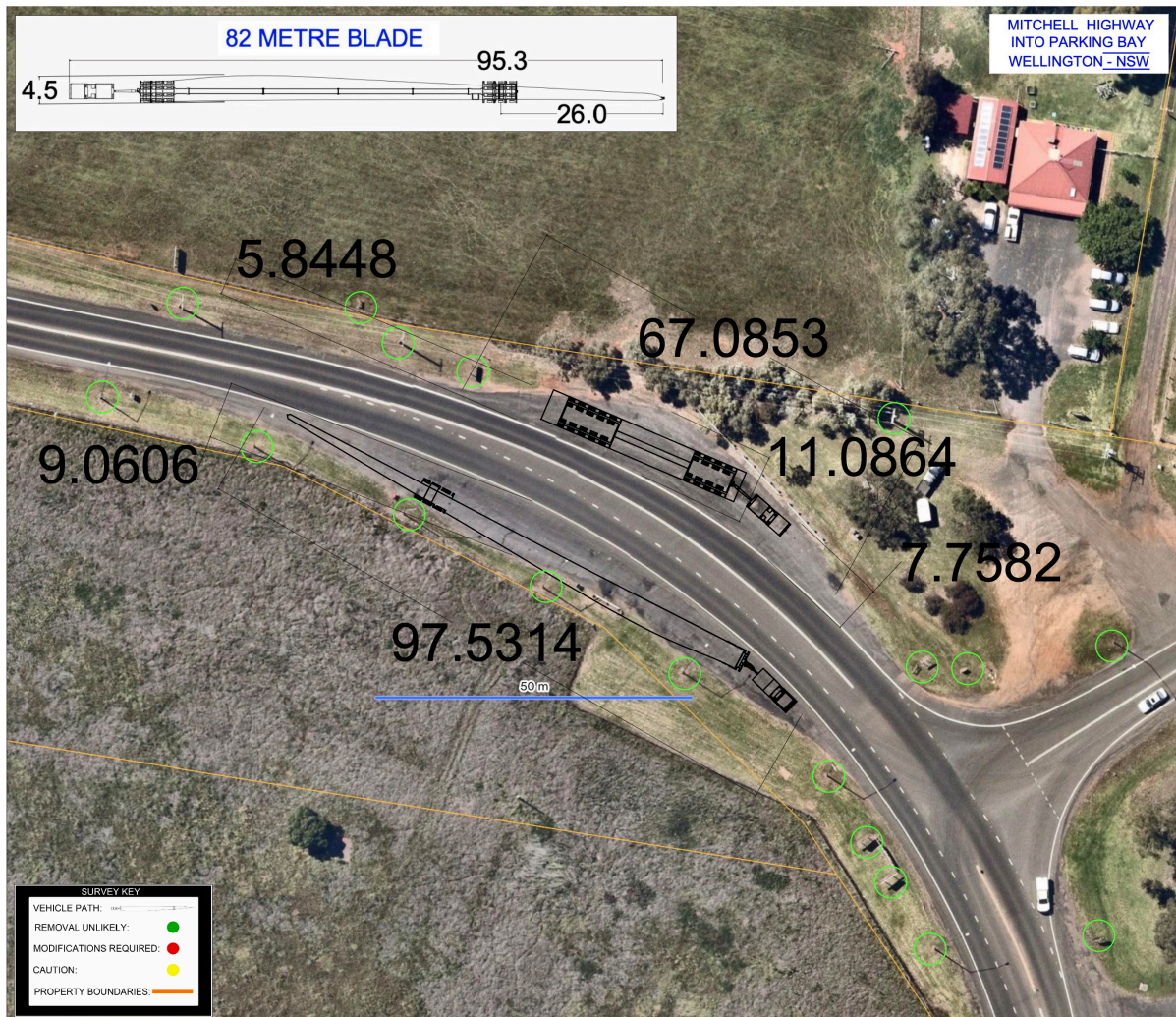


Figure 75: Wellington parking bay

15.0 References

Rex J Andrews P/L Drawings
Rex J Andrews P/L Route Study 478
Ark Energy
Google Earth/Maps
Nearmaps
NHVR (OSOM)
NHVAS Maintenance Management (NHVAS21193)
NHVAS Basic Fatigue Management (NHVAS21193)
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.

16.0 Appendix 1 – Possible Transport Combinations

6-7 MW TURBINE EXAMPLE:

Machine Head or Nacelle(13.4l x 4.8w x 4.2h x 98.0T)

Possible transport configuration. Prime mover with 10x8 platform trailer and backup truck.

Overall Dimension: 39.0l x 4.8w x 5.2h x 199.5T.

Route to be used: Route 3

Drivetrain 7.4l x 3.3w x 3.2h x 82.0T)

Possible transport configuration. Prime mover with 8x8 platform trailer.

Overall Dimension: 32.0l x 4.5w x 4.9h x 144.5T.

Route to be used: Route 3

Generators (5.49l x 5.49w x 4.16h x 127.8T)

Transport configuration. Prime mover with 10x8 Platform trailer.

Overall Dimensions: 30.0l x 5.5w x 5.3h x 183.5T.

Route to be used: Route 3

Hubs (4.6l x 4.1w x 3.8h x 50.0T)

Possible transport configuration. Prime mover with 2x8 4x8 Low Loader.

Overall Dimension: 28.0l x 4.2w x 5.0h x 97.5T.

Route to be used: Route 3

Blades (82.0l x 4.5w x 3.8h x 30T)

Possible transport. Prime mover with 3x8-3x8 Extending blade trailer.

Overall Dimension: 94.0l x 4.5w x 5.3h x 84.5T.

Route to be used: Route 1

166 METRE TOWER EXAMPLE:

Base Towers (9.3l x 5.85 x 5.85 x 85T)
Configuration. Prime mover with 4x8-4x8 Bookend.
Overall dimension: 40.0l x 6.0w x 6.1h x 151.5T
Route to be used: Route 2

Section 2 Towers (13.8l x 5.85 x 5.6 x 85T)
Configuration. Prime mover with 4x8-4x8 Bookend.
Overall dimension: 45.0l x 6.0w x 6.1h x 151.5T
Route to be used: Route 2

Section 3 Towers (15.4l x 5.6 x 5.6 x 87T)
Configuration. Prime mover with 4x8-4x8 Bookend.
Overall dimension: 47.0l x 6.0w x 6.1h x 153.5T
Route to be used: Route 2

Section 4 Towers (16.8l x 5.6 x 5.1 x 86T)
Configuration. Prime mover with 4x8-4x8 Bookend.
Overall dimension: 48.4l x 6.0w x 6.0h x 152.5T
Route to be used: Route 2

Section 5 Towers (21.0l x 5.1 x 5.1 x 92T)
Configuration. Prime mover with 10x8 Low platform.
Overall dimension: 35.0l x 5.5w x 6.1h x 166.5T
Route to be used: Route 2

Section 6 Towers (27.2l x 5.1 x 5.1 x 91T)
Configuration. Prime mover with 5x8-5x8 Low platform.
Overall dimension: 40.0l x 5.5w x 6.1h x 175.5T
Route to be used: Route 2

Section 7 Towers (29.9l x 5.1 x 4.25 x 77T)
Configuration. Prime mover with 3x8 dolly - 4x8 low Jinker.
Overall dimension: 37.0l x 5.5w x 6.1h x 123.5T
Route to be used: Route 2

Top Towers (30.0l x 4.25w x 4.1h x 65T)
Configuration. Prime mover with 4x4 dolly 3x8 low Jinker.
Overall dimension: 38.0l x 4.5w x 5.2h x 105.0T
Route to be used: Route 3

148 METRE TOWER EXAMPLE:

Door tower section (11.2l x 5.5 x 5.0 x 76T)
Possible transport configuration. Prime mover with 2x8-4x8 Bookend
Overall Dimension: 39.0l x 5.6w x 5.7h x 120.5T.
Route to be used: Route 2

Mid Tower E (15.1l x 5.0 x 5.0 x 76.5T)
Possible transport configuration. Prime mover with 8x8 low platform
Overall Dimension: 35.0l x 5.1w x 5.7h x 144.5T.
Route to be used: Route 2

Mid Tower D (17.4l x 5.0 x 4.6 x 75T)
Possible transport configuration. Prime mover with 8x8 low platform
Overall Dimension: 35.0l x 5.1w x 5.4h x 144.5T.
Route to be used: Route 2

Mid Tower C (18.2l x 4.6 x 4.3 x 71T)
Possible transport configuration. Prime mover with Extending 8x8 Platform
Overall Dimension: 37.0l x 4.7w x 5.6h x 144.5T.
Route to be used: Route 2

Mid Tower B (19.9 x 4.3 x 4.3 x 75T)
Possible transport configuration. Prime mover with Extending 8x8 Platform
Overall Dimension: 39.0l x 4.5w x 5.2h x 144.5T.
Route to be used: Route 3

Mid Tower A (28.9 X 4.3 X 4.3 X 73.5T)
Possible transport configuration. Prime mover with 3x4 Dolly 3x8 Jinker
Overall Dimension: 45.0l x 4.3w x 5.2h x 102.5T.
Route to be used: Route 3

Top Towers (36.8l x 4.3w x 3.7h x 64T)

Possible transport configuration. Prime mover with 3x4 Dolly 3x8 Jinker

Overall Dimension: 49.0l x 4.3w x 5.2h x 92.5T.

Route to be used: Route 2

130 METRE TOWER EXAMPLE:

T1 tower section (10.9l x 5.8 x 5.8 x 96.0T)

Configuration. Prime mover with 5x8-5x8 Bookend.

Overall dimension: 45.0l x 5.9w x 6.0h x 191.5T

Route to be used: Route 2

T2 tower section (13.3l x 5.49 x 5.49 x 99.0T)

Possible transport configuration. Prime mover with 10x8 Low platform trailer.

Overall dimensions: 30.0l x 5.5w x 6.2h x 163.5T.

Route to be used: Route 2

T3 tower section (13.9l x 5.49 x 5.49 x 88.0T)

Possible transport configuration. Prime mover with 10x8 Low platform trailer.

Overall dimensions: 30.0l x 5.5w x 6.2h x 154.5T.

Route to be used: Route 2

T4 tower section (18.1l x 5.45 x 5.45 x 89.8T)

Possible transport configuration. Prime mover with 10x8 Low platform trailer.

Overall dimensions: 30.0l x 5.5w x 6.2h x 164.5T.

Route to be used: Route 2

T5 tower section (18.1l x 5.45 x 5.45 x 57.0T)

Possible transport configuration. Prime mover with 10x8 Low platform trailer.

Overall dimensions: 30.0l x 5.5w x 6.2h x 134.5T.

Route to be used: Route 2

T6 tower section (28.7l x 4.5 x 5.45 x 69.7T)

Transport configuration. Prime mover with 3x8-3x8 dolly jinker.

Overall dimensions: 39.9l x 5.45w x 6.2h x 114.5T.

Route to be used: Route 2

T7 tower section (29.0l x 4.5 x 3.9 x 58.0T)

Possible transport configuration. Prime mover with 3x4-2x8 Dolly jinker.

Overall dimensions: 39.0l x 4.5w x 5.6h x 84.5T.

Route to be used: Route 2

ERECTION CRANES:

LG1750 carrier (19.2l x 3.0 x 4.0 x 96T)

Configuration. Prime mover with 10x8 Platform trailer + Backup truck

Overall dimensions: 36.0l x 4.2w x 5.2h x 174.5T + Backup truck

Route to be used: Route 3

LTM1500 carrier (21.0l x 3.0 x 4.0 x 96T)

Configuration. Prime mover with 10x8 Platform trailer + Backup truck

Overall dimensions: 36.0l x 5.0w x 5.2h x 174.5T + Backup truck

Route to be used: Route 3

TRANSFORMER:

Possible Transformer size (9.2l x 4.0 x 4.35 x 175T)

Configuration. Prime mover with 10x8-10x8 Beamset + 4 x Backup trucks

Overall dimensions: 120.0l x 6.5w x 5.2h x 324.5T + 4 x Backup trucks

Route to be used: Route 3

Possible Transformer size (9.2l x 4.0 x 4.35 x 130T)

Configuration. Prime mover with 12x8 Platform trailer + 1 x Backup trucks

Overall dimensions: 45.0l x 4.3w x 5.4h x 222.5T

Route to be used: Route 2

SWITCHROOM:

The largest switchroom size that is recommended for this site would be as follows.

Switchroom dimensions: 30.0l x 6.0w x 4.4h x 90.0T

Overall dimensions: 45.0l x 6.0w x 5.4h x 180.5T

Route to be used: Route 2

17.0 Appendix 2 - Transport Drawings (Possible Combinations)

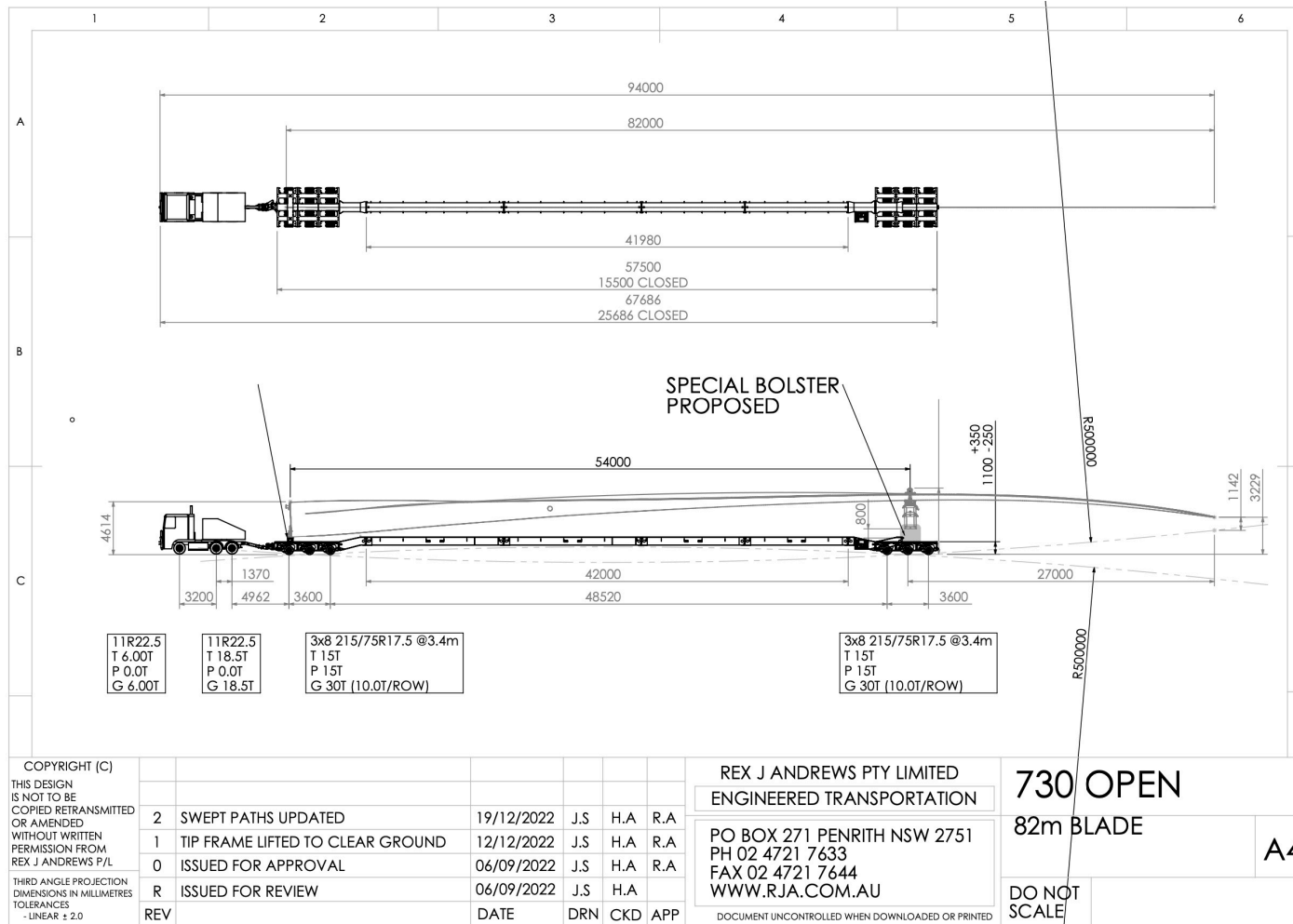


Figure 76: 82 Metre Blade drawing

**ROUTE STUDY
BURRENDONG WINDFARM**

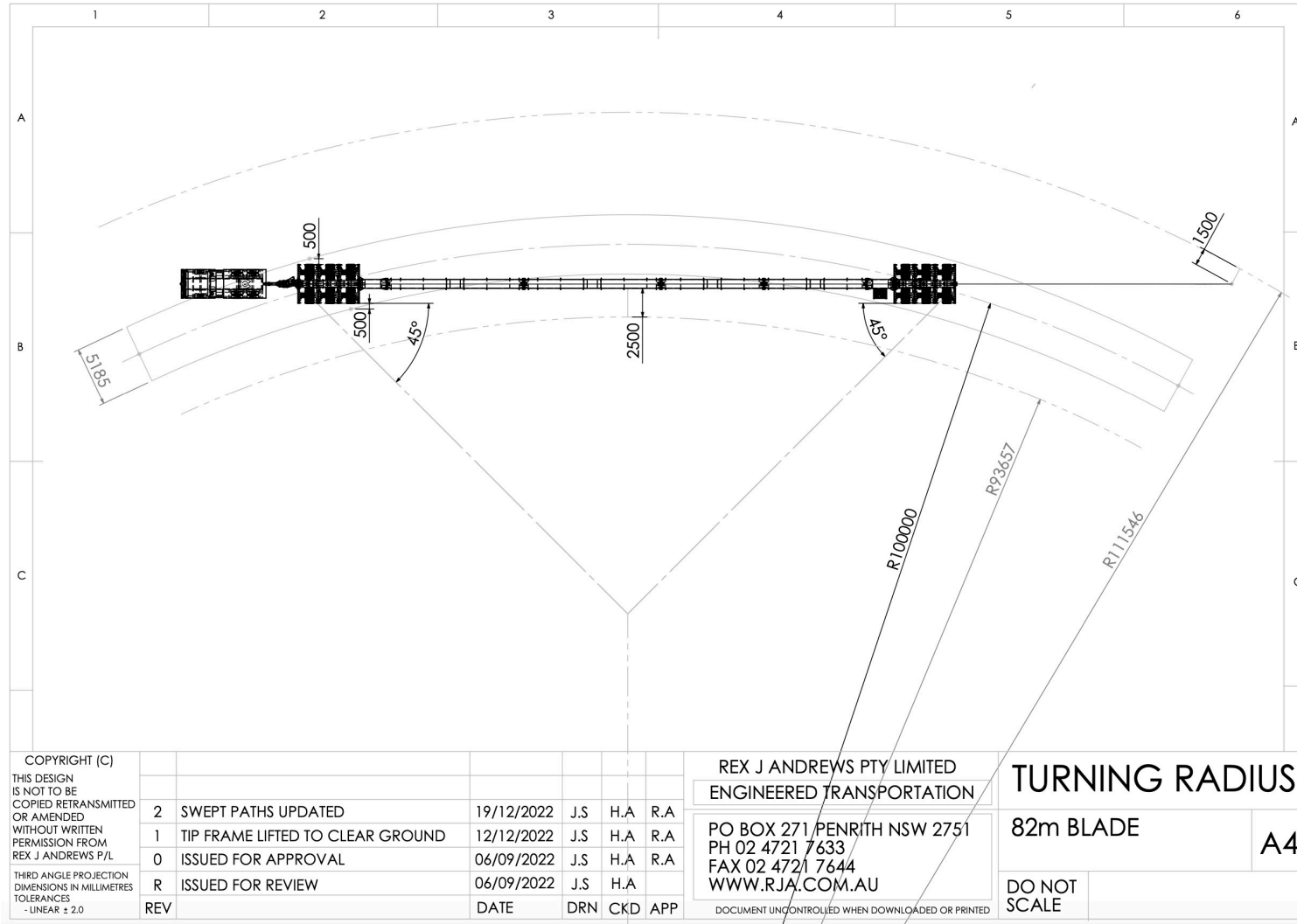


Figure 77 82 Metre Blade swept path drawing

**ROUTE STUDY
BURRENDONG WINDFARM**

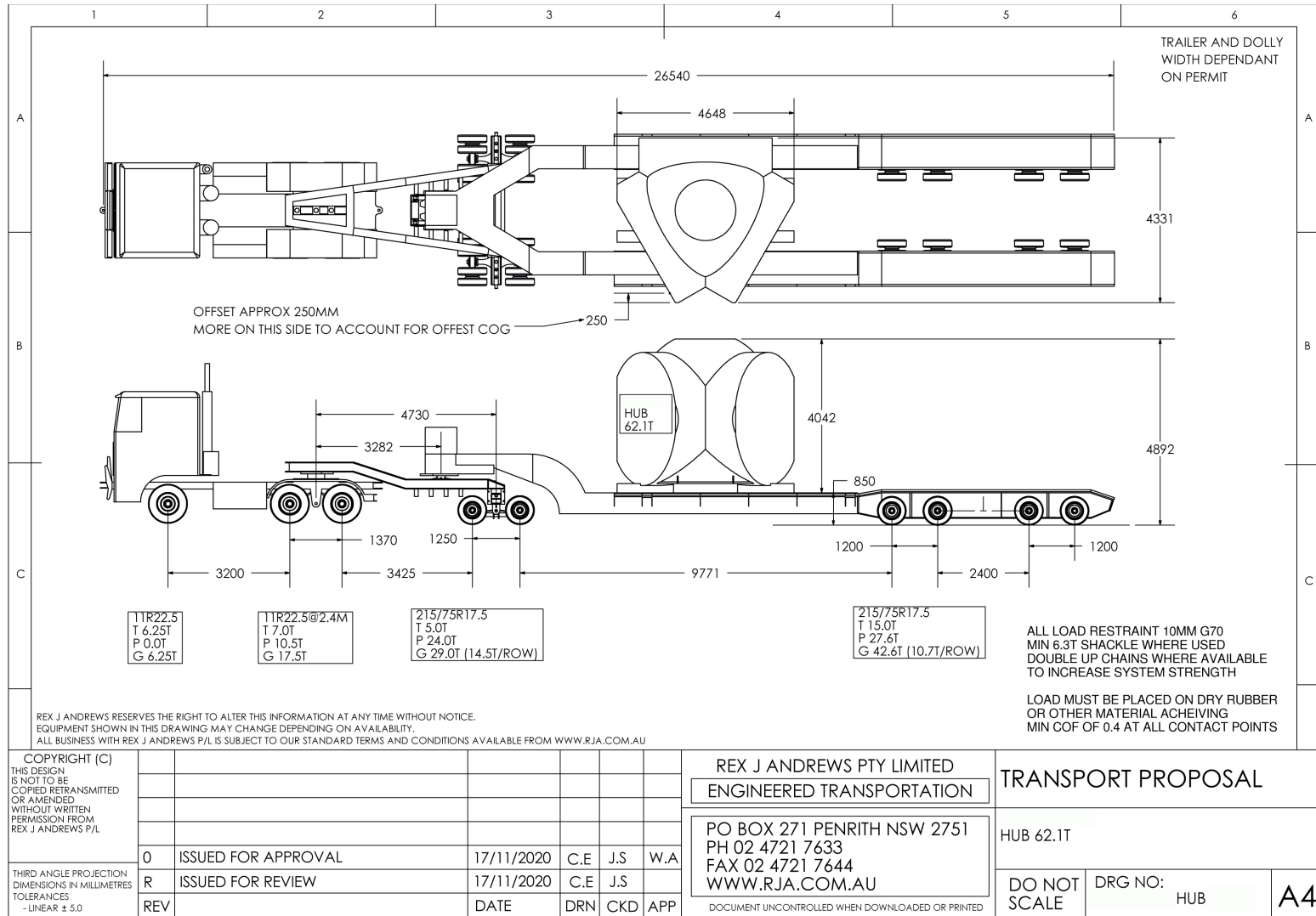


Figure 78 – Hub Combination Example

**ROUTE STUDY
BURRENDONG WINDFARM**

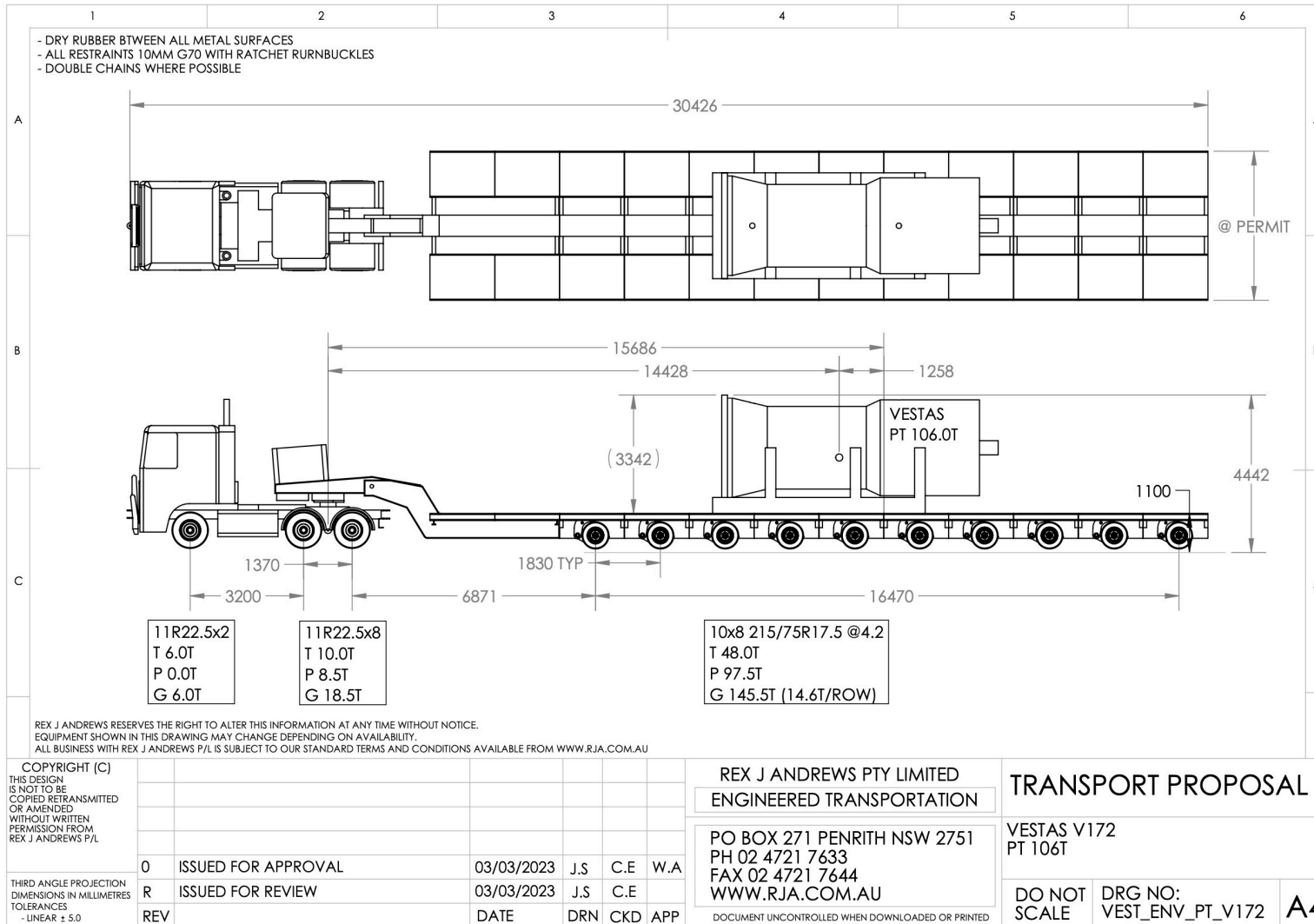


Figure 79 - Drivetrain Combination Example

**ROUTE STUDY
BURRENDONG WINDFARM**

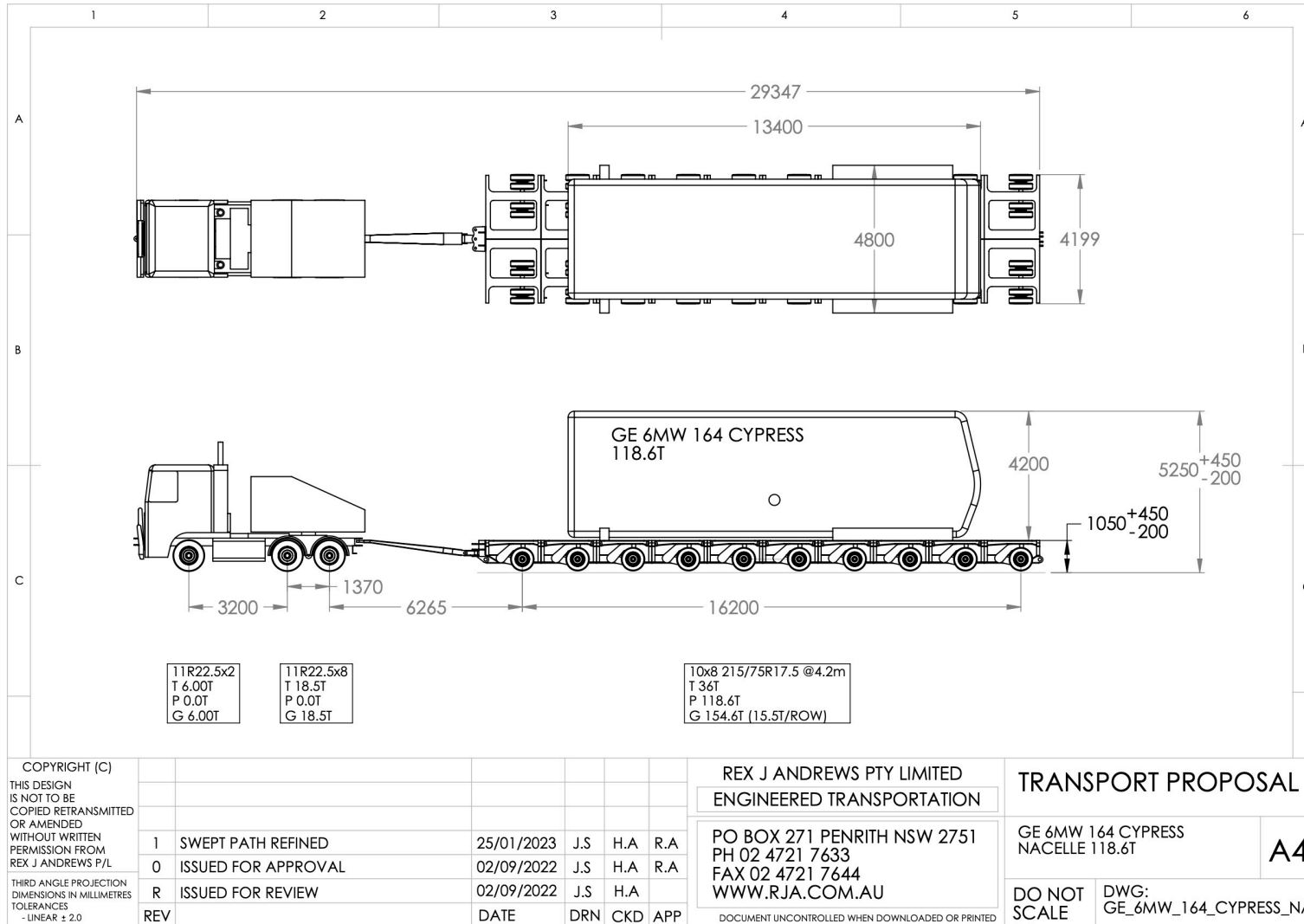


Figure 80: Machine head combination

**ROUTE STUDY
BURRENDONG WINDFARM**

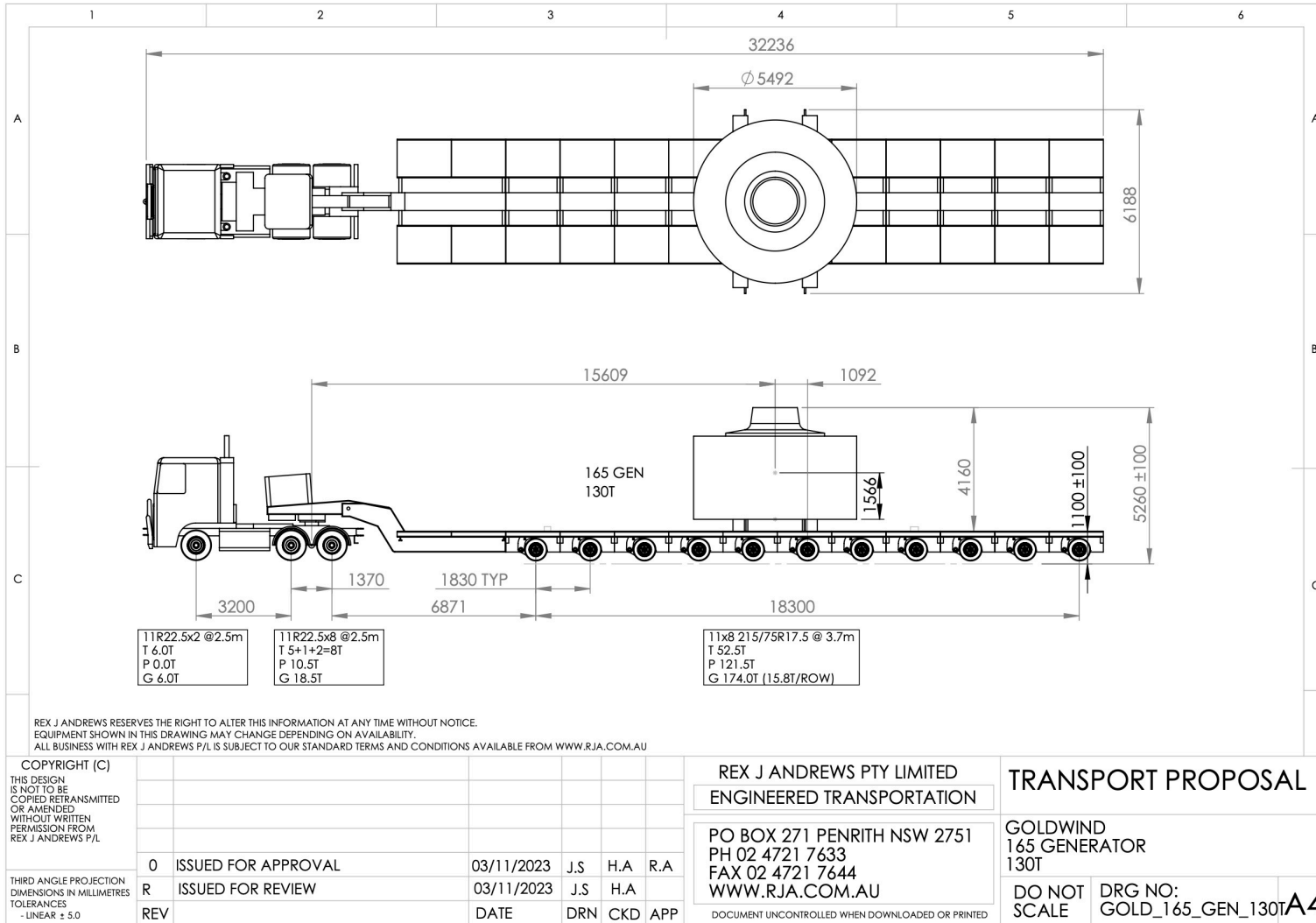


Figure 81 - Generator Combination Example

**ROUTE STUDY
BURRENDONG WINDFARM**

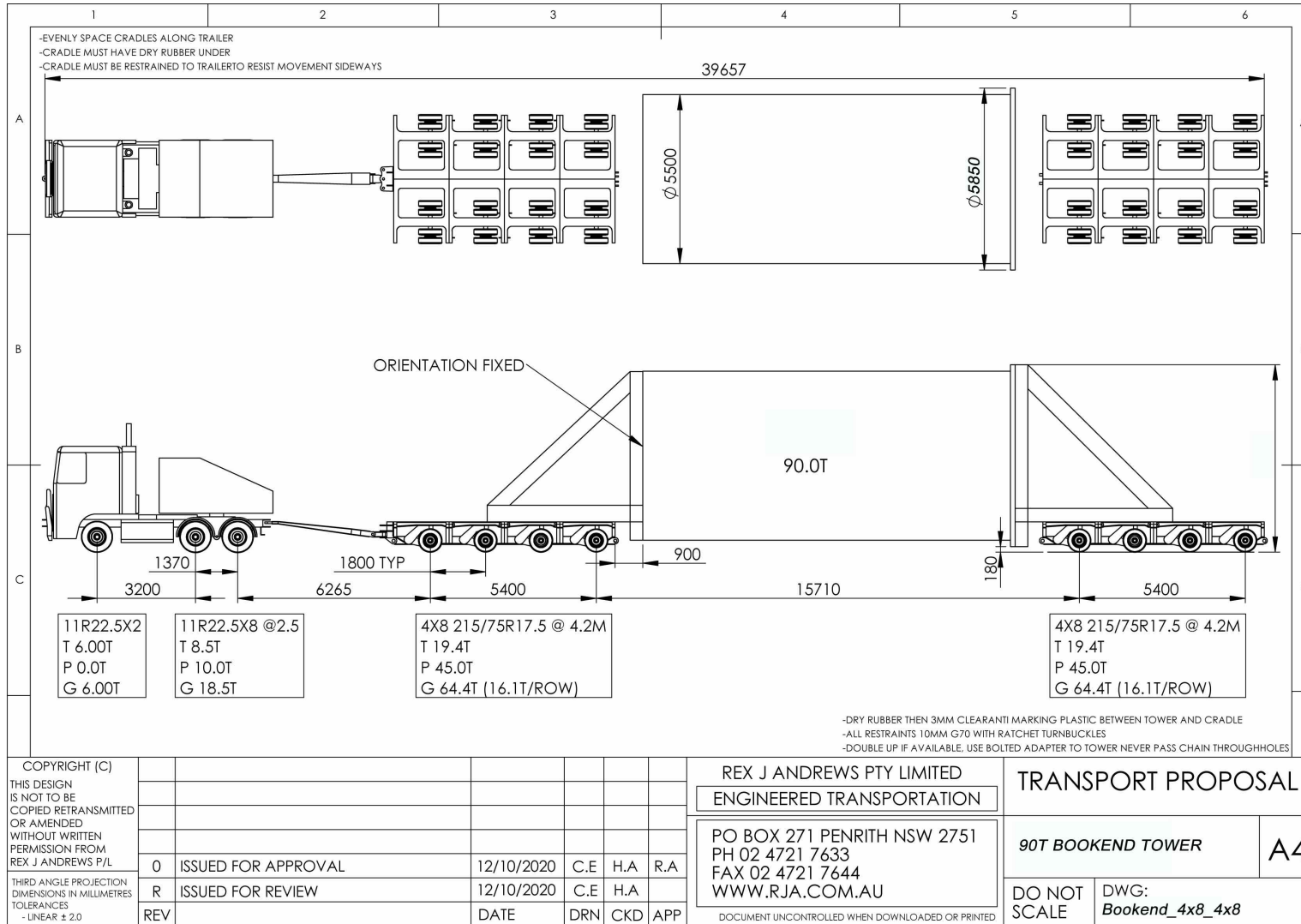


Figure 82 - Tower Trailer Bookend

ROUTE STUDY BURRENDONG WINDFARM

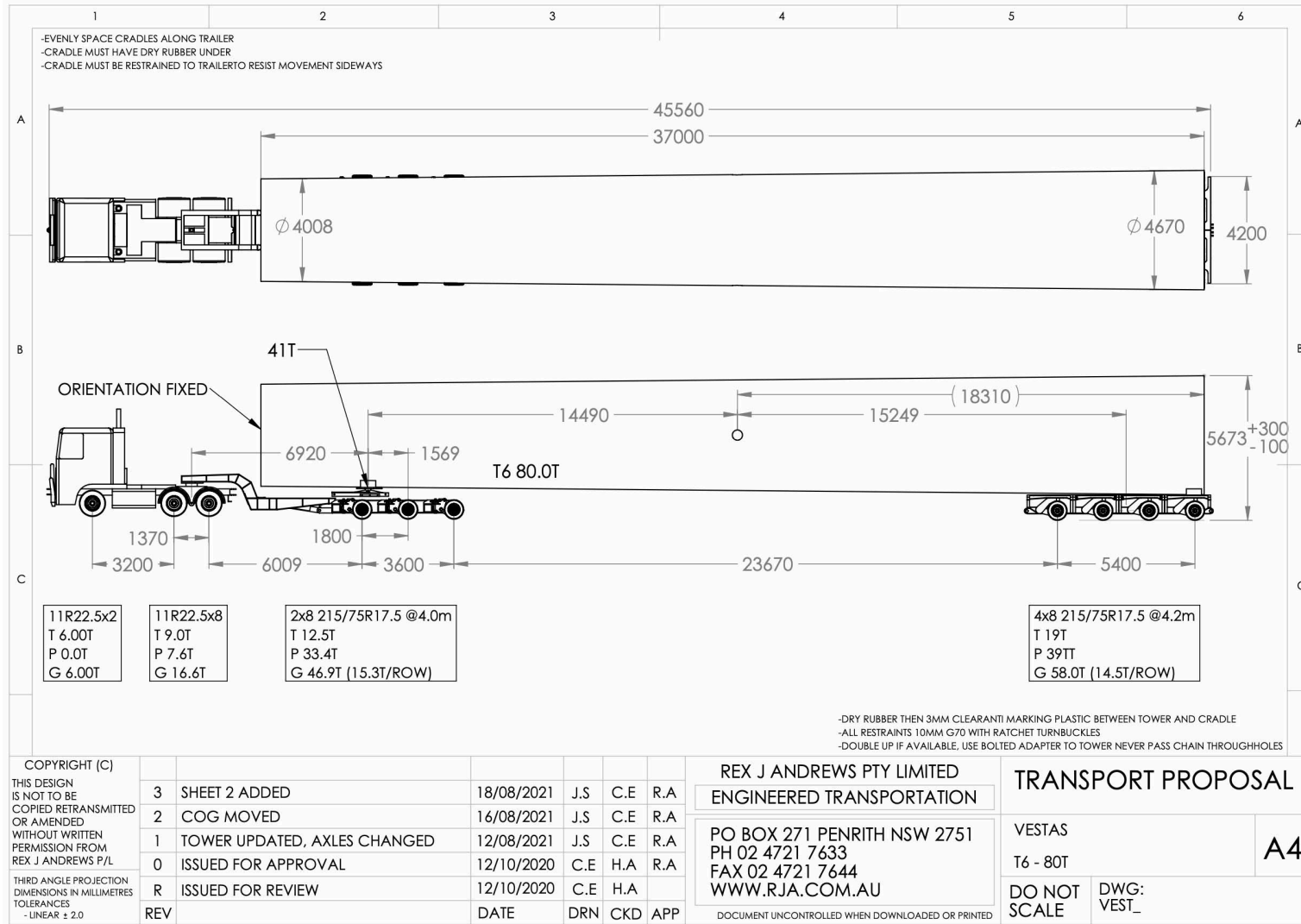


Figure 84 - Tower Trailer Dolly And Jinker

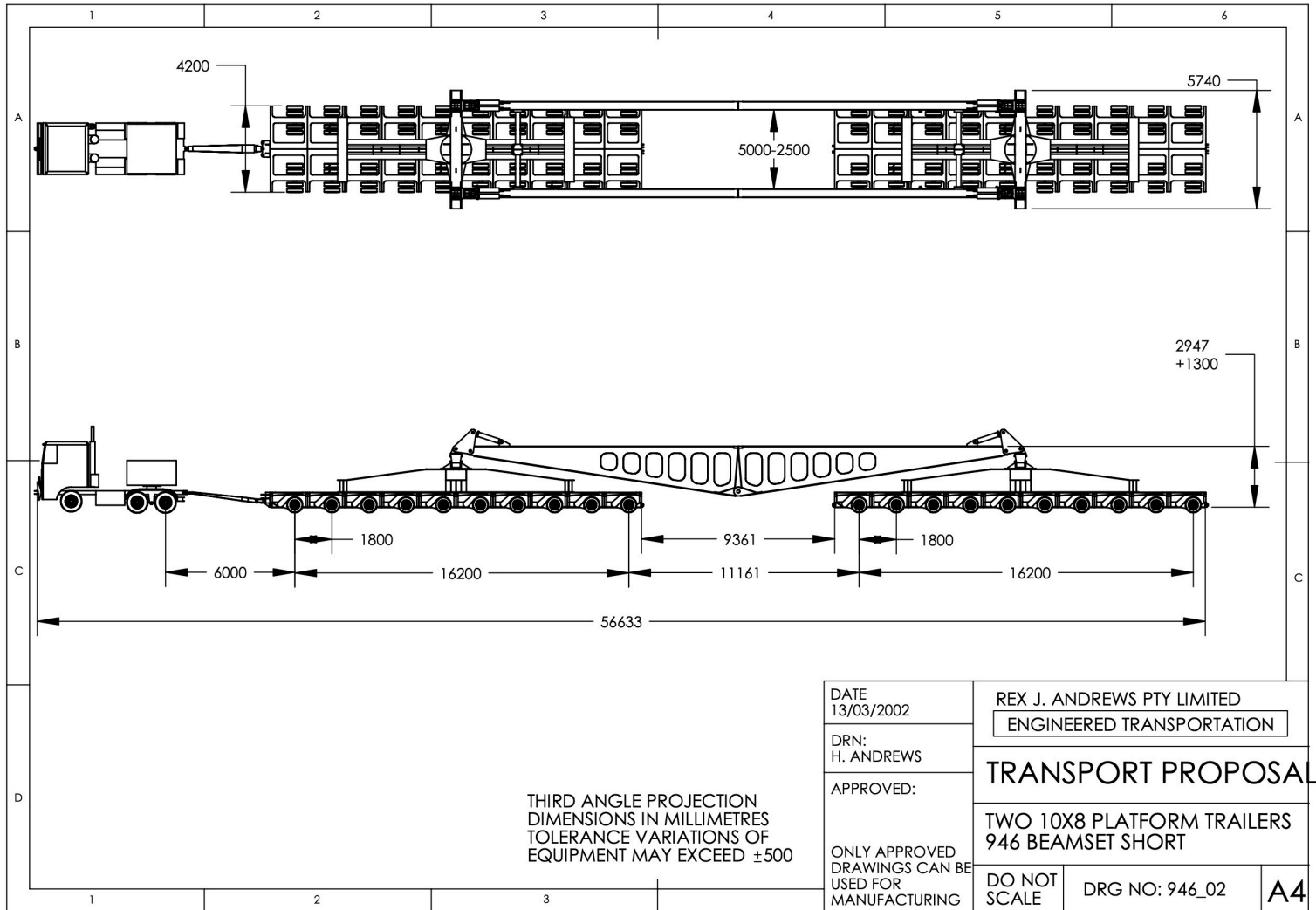


Figure 85 – 300MVA Transformer Trailer 10x8-10x8 Beamset

**ROUTE STUDY
BURRENDONG WINDFARM**

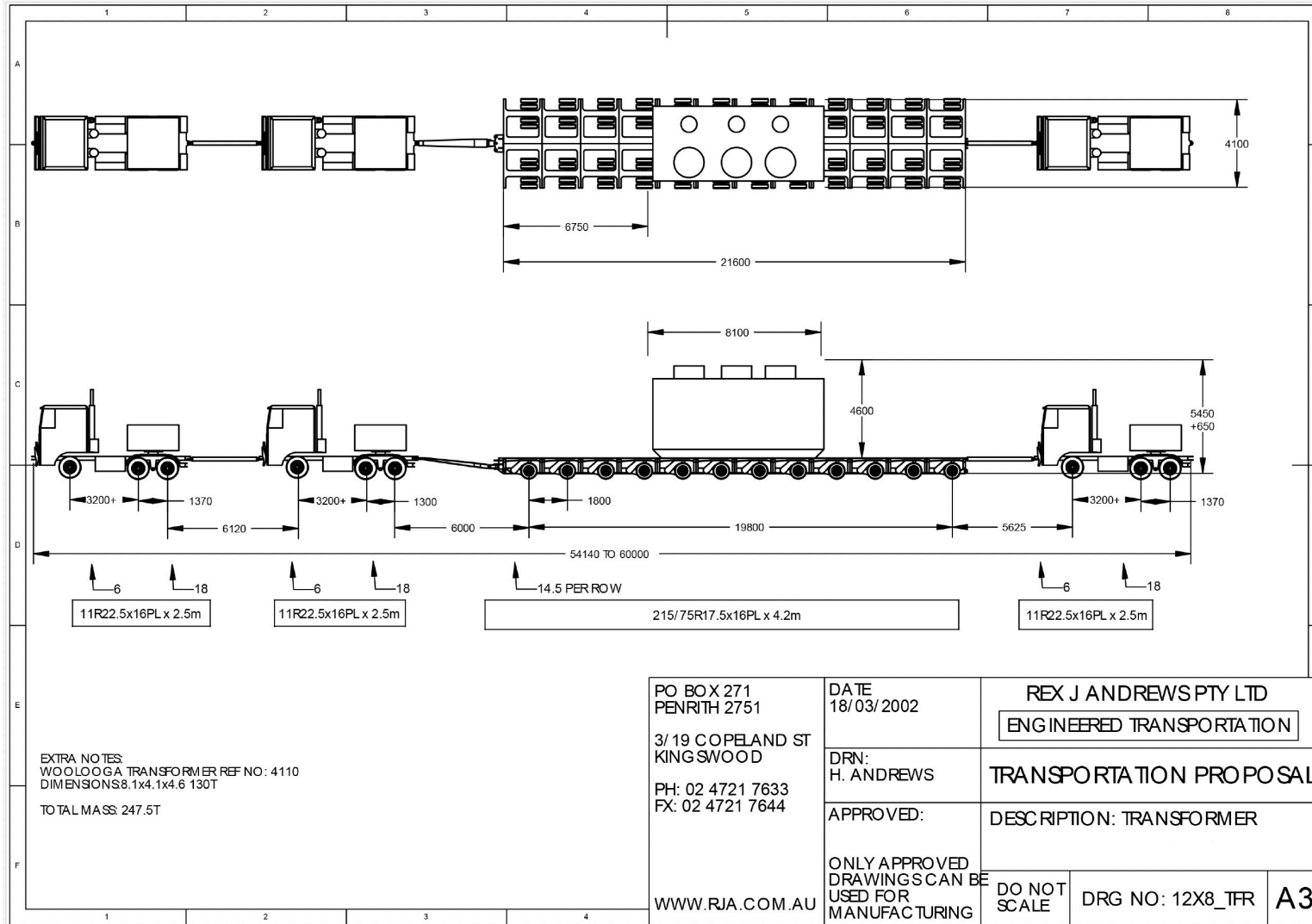


Figure 86 – 150MVA Transformer Trailer 12x8 Platform

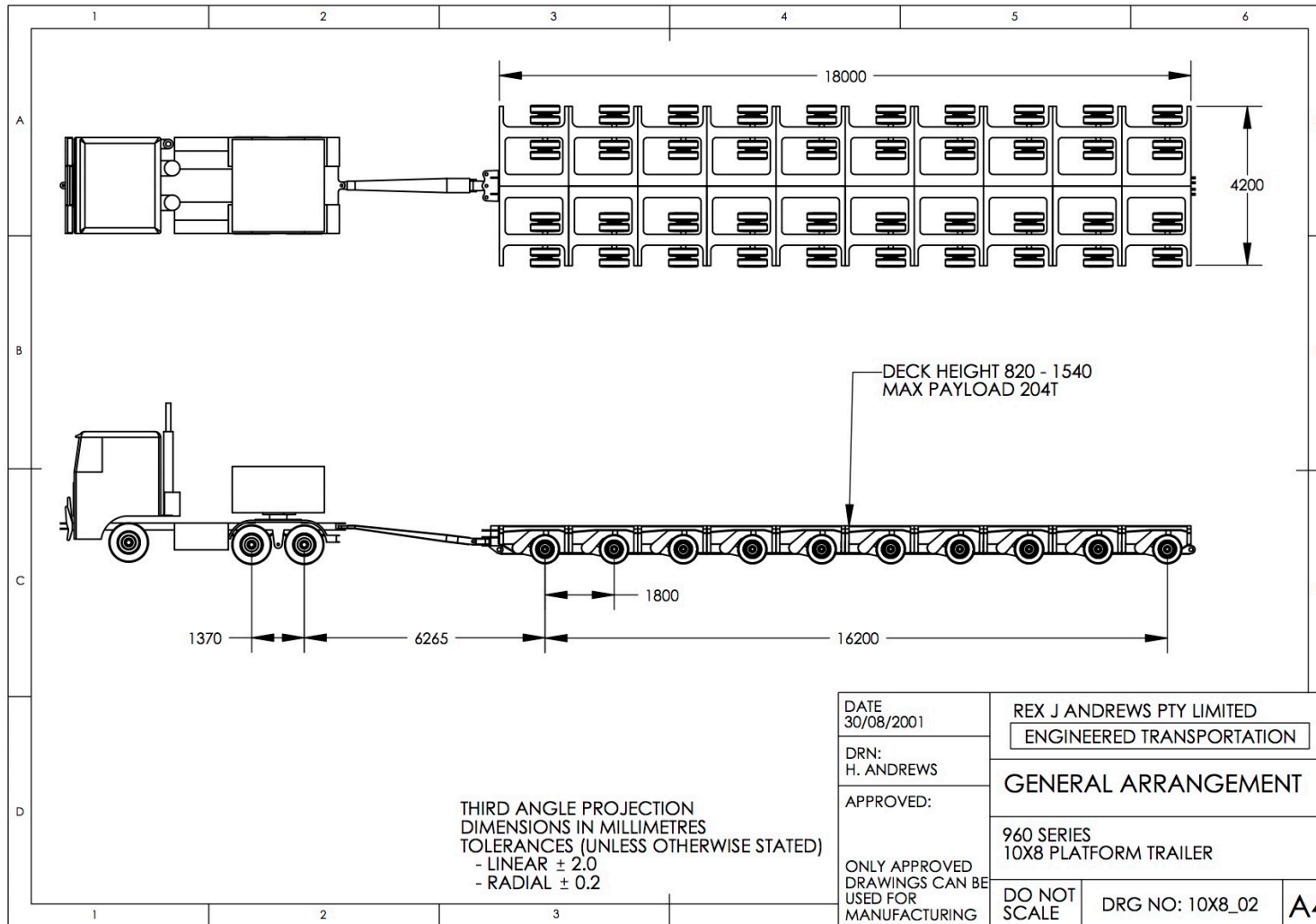


Figure 87 - Crane Trailer 10x8 Platform

18.0 Appendix 3 – Draft delivery schedules

DRAFT BURRENDONG WINDFARM TURBINE DELIVERY SCHEDULE:						
SCHEDULE VERSION: REV00						
MONDAY						
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	DEPART WELLINGTON	ARRIVE BURRENDONG
BLADE (93l x 4.5w x 5.2h x 84.5T)	TRUCK 1	2 X POLICE, 4 X PILOTS	3.00AM	8.00AM	1.00PM	3.00PM
BLADE (93l x 4.5w x 5.2h x 84.5T)	TRUCK 2	2 X POLICE, 4 X PILOTS	3.15AM	8.15AM	1.15PM	3.15PM
T6 TOWER (39.9l x 4.3w x 5.5h x 136.5T)	TRUCK 3	3 X PILOTS	3.30AM	8.30AM	1.30PM	3.30PM
T5 TOWER (37l x 4.3w x 5.5h x 138.5T)	TRUCK 4	3 X PILOTS	3.45AM	8.45AM	1.45PM	3.45PM
TUESDAY						
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	DEPART WELLINGTON	ARRIVE BURRENDONG
T7 TOWER (45l x 4.3w x 5.5h x 102.5T)	TRUCK 5	3 X PILOTS	3.00AM	8.00AM	1.00PM	3.00PM
T4 TOWER (35l x 5.2w x 5.5h x 144.5T)	TRUCK 6	3 X PILOTS	3.15AM	8.15AM	1.15PM	3.15PM
T3 TOWER (35.0l x 5.2w x 5.5h x 144.5T)	TRUCK 7	3 X PILOTS	3.30AM	8.30AM	1.30PM	3.30PM
DRIVE TRAIN (28l x 4.2w x 4.8h x 134.5T)	TRUCK 8	2 X PILOTS	3.45AM	8.45AM	1.45PM	3.45PM
HUB (26l x 4.2w x 5.0h x 88.5T)	TRUCK 9	1 X PILOT	4.00AM	9.00AM	2.00PM	4.00PM
WEDNESDAY						
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	DEPART WELLINGTON	ARRIVE BURRENDONG
BLADE (93l x 4.5w x 5.2h x 84.5T)	TRUCK 1	2 X POLICE, 4 X PILOTS	3.00AM	8.00AM	1.00PM	3.00PM
BLADE (93l x 4.5w x 5.2h x 84.5T)	TRUCK 2	2 X POLICE, 4 X PILOTS	3.15AM	8.15AM	1.15PM	3.15PM
T2 TOWER (35.0l x 5.2w x 5.6h x 144.5T)	TRUCK 10	3 X PILOTS	3.30AM	8.30AM	1.30PM	3.30PM
T1 TOWER (39.9l x 5.6w x 5.6h x 144.5T)	TRUCK 11	3 X PILOTS	3.45AM	8.45AM	1.45PM	3.45PM
MACHINE HEAD (39.9l x 4.8w x 5.3h x 220.5T)	TRUCK 12	3 X PILOTS	4.00AM	9.00AM	2.00PM	4.00PM
THURSDAY						
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	DEPART WELLINGTON	ARRIVE BURRENDONG
T6 TOWER (39.9l x 4.3w x 5.5h x 136.5T)	TRUCK 3	3 X PILOTS	3.00AM	8.00AM	1.00PM	3.00PM
T5 TOWER (37l x 4.3w x 5.5h x 138.5T)	TRUCK 4	3 X PILOTS	3.15AM	8.15AM	1.15PM	3.15PM
T7 TOWER (45l x 4.3w x 5.5h x 102.5T)	TRUCK 5	3 X PILOTS	3.30AM	8.30AM	1.30PM	3.30PM
HUB (26l x 4.2w x 5.0h x 88.5T)	TRUCK 9	1 X PILOT	3.45AM	8.45AM	1.45PM	3.45PM
FRIDAY						
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	DEPART WELLINGTON	ARRIVE BURRENDONG
BLADE (93l x 4.5w x 5.2h x 84.5T)	TRUCK 1	2 X POLICE, 4 X PILOTS	3.00AM	8.00AM	1.00PM	3.00PM
BLADE (93l x 4.5w x 5.2h x 84.5T)	TRUCK 2	2 X POLICE, 4 X PILOTS	3.15AM	8.15AM	1.15PM	3.15PM
T2 TOWER (35l x 5.2w x 5.5h x 144.5T)	TRUCK 6	3 X PILOTS	3.30AM	8.30AM	1.30PM	3.30PM
T3 TOWER (35.0l x 5.2w x 5.5h x 144.5T)	TRUCK 7	3 X PILOTS	3.45AM	8.45AM	1.45PM	3.45PM
SATURDAY						
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	DEPART WELLINGTON	ARRIVE BURRENDONG
T1 TOWER (35.0l x 5.2w x 5.6h x 144.5T)	TRUCK 10	3 X PILOTS	3.00AM	8.00AM	1.00PM	3.00PM
BASE (39.9l x 5.6w x 5.6h x 144.5T)	TRUCK 11	3 X PILOTS	3.15AM	8.15AM	1.15PM	3.15PM
MACHINE HEAD (39.9l x 4.8w x 5.3h x 220.5T)	TRUCK 12	3 X PILOTS	3.30AM	8.30AM	1.30PM	3.30PM
DRIVE TRAIN (28l x 4.2w x 4.8h x 134.5T)	TRUCK 8	2 X PILOTS	3.45AM	8.45AM	1.45PM	3.45PM

Figure 88: Draft turbine delivery schedule

**ROUTE STUDY
BURRENDONG WINDFARM**



DRAFT BURRENDONG WINDFARM EMPTY TRAVEL SCHEDULE:

SCHEDULE VERSION: REV00

MONDAY					
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART BURRENDONG	DEPART MERRIWA	ARRIVE NEWCASTLE
BLADE (26l x 3.5w x 4.3h x 54.5T)	TRUCK 1	NIL	6.00AM	9.00AM	12.00PM
BLADE (26l x 3.5w x 4.3h x 54.5T)	TRUCK 2	NIL	6.15AM	9.15AM	12.15PM
T6 TOWER (26l x 3.5w x 4.3h x 54.5T)	TRUCK 3	NIL	6.30AM	9.30AM	12.30PM
T5 TOWER (30l x 3.5w x 4.3h x 64.5T)	TRUCK 4	1 X PILOT	6.45AM	9.45AM	12.45PM
TUESDAY					
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	ARRIVE BURRENDONG
T7 TOWER (26l x 3.5w x 4.3h x 54.5T)	TRUCK 5	NIL	6.00AM	9.00AM	12.00PM
T4 TOWER (30l x 3.5w x 4.3h x 64.5T)	TRUCK 6	1 X PILOT	6.15AM	9.15AM	12.15PM
T3 TOWER (30l x 3.5w x 4.3h x 64.5T)	TRUCK 7	1 X PILOT	6.30AM	9.30AM	12.30PM
DRIVE TRAIN (28l x 3.5w x 4.3h x 56.5T)	TRUCK 8	1 X PILOT	6.45AM	9.45AM	12.45PM
HUB (22l x 2.5w x 4.3h x 36.5T)	TRUCK 9	NIL	7.00AM	10.00AM	1.00PM
WEDNESDAY					
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	ARRIVE BURRENDONG
BLADE (26l x 3.5w x 4.3h x 54.5T)	TRUCK 1	NIL	6.00AM	9.00AM	12.00PM
BLADE (26l x 3.5w x 4.3h x 54.5T)	TRUCK 2	NIL	6.15AM	9.15AM	12.15PM
T2 TOWER (30l x 3.5w x 4.3h x 64.5T)	TRUCK 10	1 X PILOT	6.30AM	9.30AM	12.30PM
T1 TOWER (30l x 4.2w x 5.0h x 69.5T)	TRUCK 11	1 X PILOT	6.45AM	9.45AM	12.45PM
MACHINE HEAD (30l x 3.5w x 4.3h x 64.5T)	TRUCK 12	1 X PILOT	7.00AM	10.00AM	1.00PM
THURSDAY					
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	ARRIVE BURRENDONG
T6 TOWER(39.9l x 4.3w x 5.5h x 136.5T)	TRUCK 3	3 X PILOTS	6.00AM	9.00AM	12.00PM
T5 TOWER (37l x 4.3w x 5.5h x 138.5T)	TRUCK 4	3 X PILOTS	6.15AM	9.15AM	12.15PM
T7 TOWER (45l x 4.3w x 5.5h x 102.5T)	TRUCK 5	3 X PILOTS	6.30AM	9.30AM	12.30PM
HUB (26l x 4.2w x 5.0h x 88.5T)	TRUCK 9	1 X PILOT	6.45AM	9.45AM	12.45PM
FRIDAY					
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	ARRIVE BURRENDONG
BLADE (93l x 4.5w x 5.2h x 84.5T)	TRUCK 1	2 X POLICE, 4 X PILOTS	6.00AM	9.00AM	12.00PM
BLADE (93l x 4.5w x 5.2h x 84.5T)	TRUCK 2	2 X POLICE, 4 X PILOTS	6.15AM	9.15AM	12.15PM
T2 TOWER (35l x 5.2w x 5.5h x 144.5T)	TRUCK 6	3 X PILOTS	6.30AM	9.30AM	12.30PM
T3 TOWER (35.0l x 5.2w x 5.5h x 144.5T)	TRUCK 7	3 X PILOTS	6.45AM	9.45AM	12.45PM
SATURDAY					
SECTION:	TRUCK	ESCORT REQUIREMENT	DEPART NEWCASTLE	DEPART MERRIWA	ARRIVE BURRENDONG
T1 TOWER (35.0l x 5.2w x 5.6h x 144.5T)	TRUCK 10	3 X PILOTS	6.00AM	9.00AM	12.00PM
BASE (39.9l x 5.6w x 5.6h x 144.5T)	TRUCK 11	3 X PILOTS	6.15AM	9.15AM	12.15PM
MACHINE HEAD (39.9l x 4.8w x 5.3h x 220.5T)	TRUCK 12	3 X PILOTS	6.30AM	9.30AM	12.30PM
DRIVE TRAIN (28l x 4.2w x 4.8h x 134.5T)	TRUCK 8	2 X PILOTS	6.45AM	9.45AM	12.45PM

Figure 89: Draft empty travel schedule