APPENDIX I ROUTE STUDY

REX J ANDREWS
ENGINEERED TRANSPORTATION

ROUTE STUDY: SOMEVA P/L

PROJECT: HILLS OF GOLD WINDFARM

EX PORT OF NEWCASTLE.

24/10/2022 REV 09

Rev.	Date	Change	Responsible	Checked
00	17/06/19	Route Assessed	W Andrews	
00	03/07/19	Report compiled	W Andrews	
00	19/07/19	Report completed	W Andrews	
01	04/09/19	Updated drawings	W Andrews	✓
02	19/03/21	Revised routes	W Andrews	✓
03	30/03/21	Updated survey drawings	W Andrews	✓
04	08/04/21	Various revisions	W Andrews	✓
05	28/04/21	Various revisions	W Andrews	✓
06	28/05/21	Various updates	W Andrews	✓
07	04/06/21	Minor updates	W Andrews	✓
08	20/10/22	Crawney Road route added	W Andrews	✓
09	24/10/22	Additional edits	W Andrews	✓

Index:

1.0 Introduction

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

The latest route survey took place on 24-10-22.

2.0 Evaluation

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

(Mark below boxes with an X)

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

3.0 Project data.

Date of latest Route Assessment. 24/10/2022
Survey undertaken by. (Rex J Andrews P/L & Someva)
Project name. Hills of Gold Wind Farm
Location. Newcastle port (NSW) to Nundle (NSW)
Turbine type.
64 x GE158, with 151 Metre H/H (Split blade).
64 x V162, with 149 Metre H/H.

4.0 Transport combinations

GE 158:

Machine heads (14.3l x 4.8w x 4.2h x 100T)
Possible transport configuration. Prime mover with 10x8 platform trailer and backup prime mover.
Overall dimensions: 48.0l x 4.8w x 5.2h x 175.0T.

Drivetrains (7.4l x 3.3w x 3.2h x 80.0T)
Possible transport configuration. Prime mover with 8x8 platform trailer.
Overall dimensions: 30.0l x 4.3w x 4.8h x 136.0T.

Hubs (4.0l x 3.5w x 3.8h x 48T)
Possible transport configuration. Prime mover with 5x8 Low Loader.
Overall dimensions: 26.0l x 3.6w x 5.0h x 82.0T.

Blades (Root) (66.6l x 4.2w x 3.4h x 30T)
Possible transport. Prime mover with 2x8 dolly and 4x4 Extending trailer.
Overall dimensions: 77.0l x 4.5w x 5.2h x 68.5T.

Blades (Tip) (15.1l x 2.4w x 2.4h x 2.5T)
Possible transport. Prime mover with 3x4 Extending trailer.
Overall dimensions: 22.0l x 2.5w x 4.0h x 32.5T.

Tower Base (10.9l x 5.5 x 5.0 x 73T)
Configuration. Prime mover with 4x8-4x8 Bookend.
Overall dimension: 40.0l x 5.6w x 5.7h x 140.5T (+ Push truck)

Tower Section E (14.3l x 5.0 x 4.8 x 71T)
Configuration. Prime mover with 6x8 Low platform.
Overall dimension: 30.0l x 5.0w x 5.7h x 108.5T

Tower Section D (18.2l x 4.8 x 4.3 x 73T)
Configuration. Prime mover with 6x8 Low platform.
Overall dimension: 30.0l x 5.0w x 5.7h x 110.5T

Tower Section C (21.8l x 4.3 x 4.3 x 77T)
Configuration. Prime mover with 8x8 Low platform.
Overall dimension: 34.0l x 4.3w x 5.3h x 125.5T

Tower Section E (23.8l x 4.3 x 4.3 x 72T)
Configuration. Prime mover with 4x8-4x8 platform trailer.
Overall dimension: 37.0l x 4.3w x 5.3h x 136.5T

Tower Section E (30.0l x 4.3 x 4.3 x 67T)
Configuration. Prime mover with 4x8-4x8 platform trailer.
Overall dimension: 43.0l x 4.3w x 5.3h x 131.5T

Tower Top (29.8l x 4.3w x 3.7h x 50T)
Configuration. Prime mover with 4x4 dolly 2x8 Jinker trailer.
Overall dimension: 42.0l x 4.3w x 5.3h x 102.5T

Vestas V162:

Nacelles (18.3l x 4.2 w x 4.35h x 86.0T)
Configuration. Prime mover with 4x8-4x8 extending platform
Overall dimensions without push truck: 34.9l x 4.3w x 5.6h x 146.5T
Overall dimensions with push truck: 44.9l x 4.3w x 5.6h x 171.0T

Power Trains (8.1l x 3.0w x 3.4h x 96.7T)
Configuration. Prime mover with 8x8 Platform
Overall dimensions without push truck: 28.0l x 4.3w x 4.6h x 150.5T
Overall dimensions with push truck: 39.0l x 4.3w x 4.6h x 175.0T

Hubs (5.0l x 4.4w x 4.0h x 64.0T)
Configuration. Prime mover with 2x8 5x8 Platform
Overall dimensions without push truck: 26.0l x 4.49w x 5.2 x 95T

Blades (80.0l x 4.5w x 4.0h x 32T)
Configuration. Prime mover with 2x4 dolly 4x4 Blade trailer
Overall dimensions: 91.0l x 5.0w x 5.2h x 77.0T

Base Towers (9.3 x 5.92 x 5.6 x 84T)
Configuration. Prime mover with 4x8-4x8 Bookend
Overall dimensions without push truck: 39.0l x 6.0w x 6.2h x 155.5T
Overall dimensions with push truck: 50.0l x 6.0w x 6.2h x 180.0T

Section 2 Towers (16.5l x 5.5 x 5.5 x 85.5T)
Configuration. Prime mover with 4x8-5x8 extending low platform
Overall dimensions without push truck: 32.0l x 5.6w x 6.2h x 164.5T
Overall dimensions with push truck: 43.0l x 5.6w x 6.2h x 189T

Section 3 Towers (18.5l x 5.5 x 5.5 x 80.5T)
Configuration. Prime mover with 4x8-5x8 extending low platform.
Overall dimensions without push truck: 34.9l x 5.6w x 6.2h x 164.5T
Overall dimensions with push truck: 44.9l x 5.6w x 6.2h x 189T

Section 4 Towers (20.4l x 5.5 x 5.0 x 78T)
Configuration. Prime mover with 5x8-4x8 extending low platform.
Overall dimensions without push truck: 39.0l x 5.6w x 6.2h x 164.5T
Overall dimensions with push truck: 50.0l x 5.6w x 6.2h x 189T

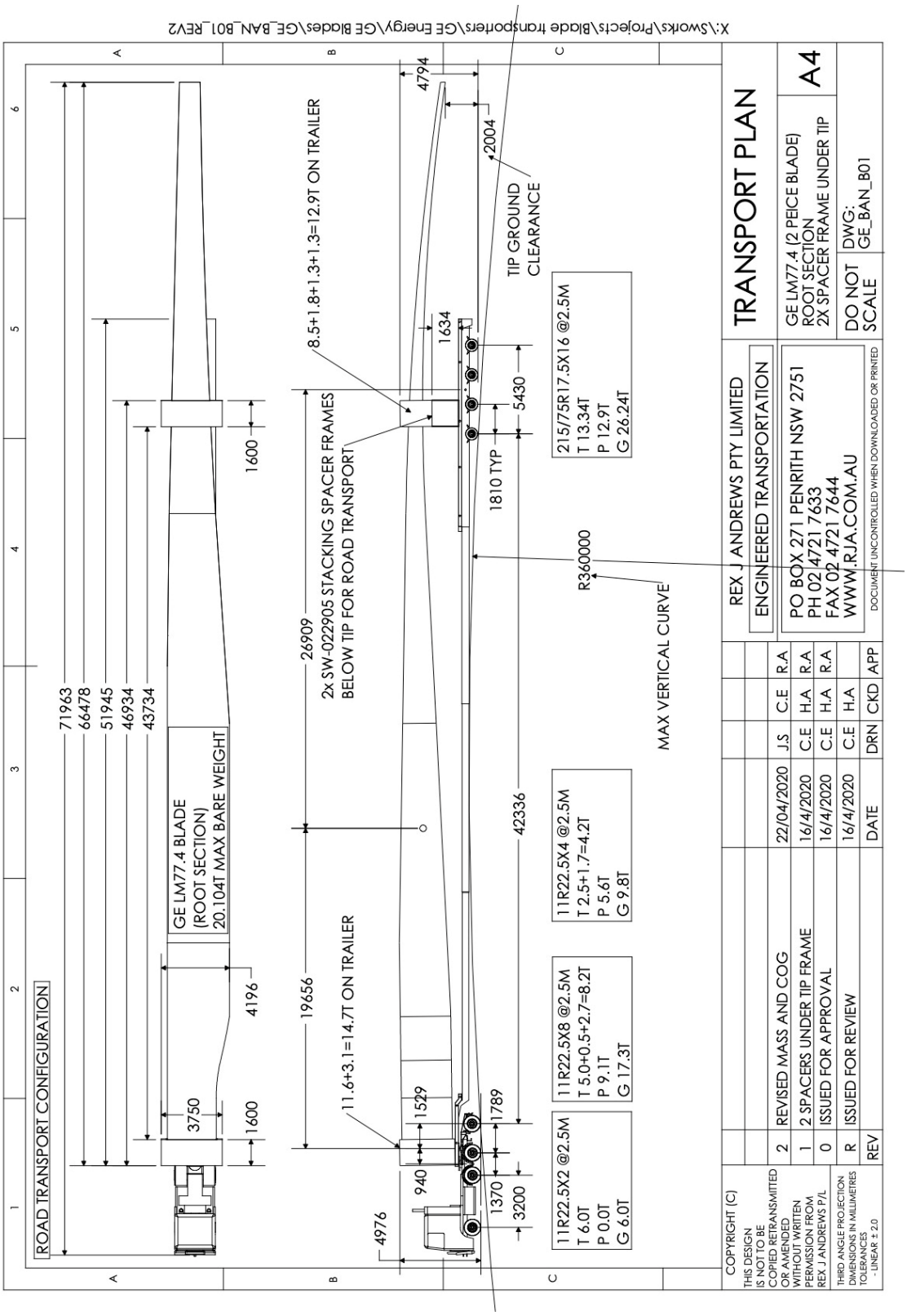
Section 5 Towers (23.5l x 5.0 x 5.0 x 75.5T)
Configuration. Prime mover with 4x8-5x8 extending low platform.
Overall dimensions without push truck: 43.9l x 5.2w x 6.2h x 164.5T
Overall dimensions with push truck: 54.9l x 5.2w x 6.2h x 189T

Section 6 Towers (28.0l x 5.0 x 4.7 x 73.5T)
Configuration. Prime mover with 4x8-5x8 extending low platform.
Overall dimensions without push truck: 43.9l x 5.2w x 6.2h x 164.5T
Overall dimensions with push truck: 54.9l x 5.2w x 6.2h x 189T

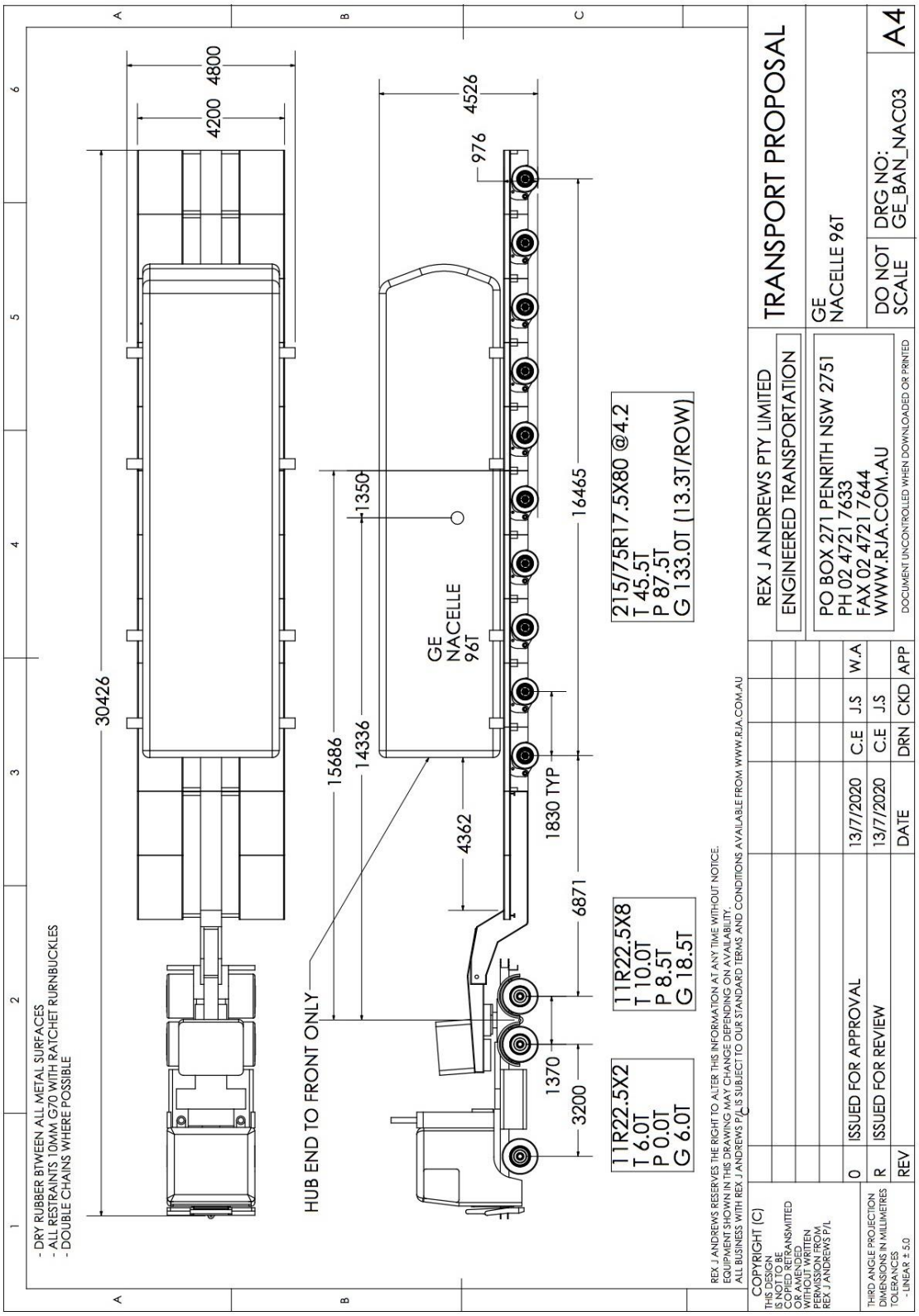
Top Towers (30.0l x 4.7 x 4.0 x 70T)
Configuration. Prime mover with 3x8 dolly 4x8 platform trailer.
Overall dimensions without push truck: 45.0l x 4.7w x 5.8h x 130.5T
Overall dimensions with push truck: 56.0l x 4.7w x 5.8h x 155T

5.0 Transport drawings for GE158.

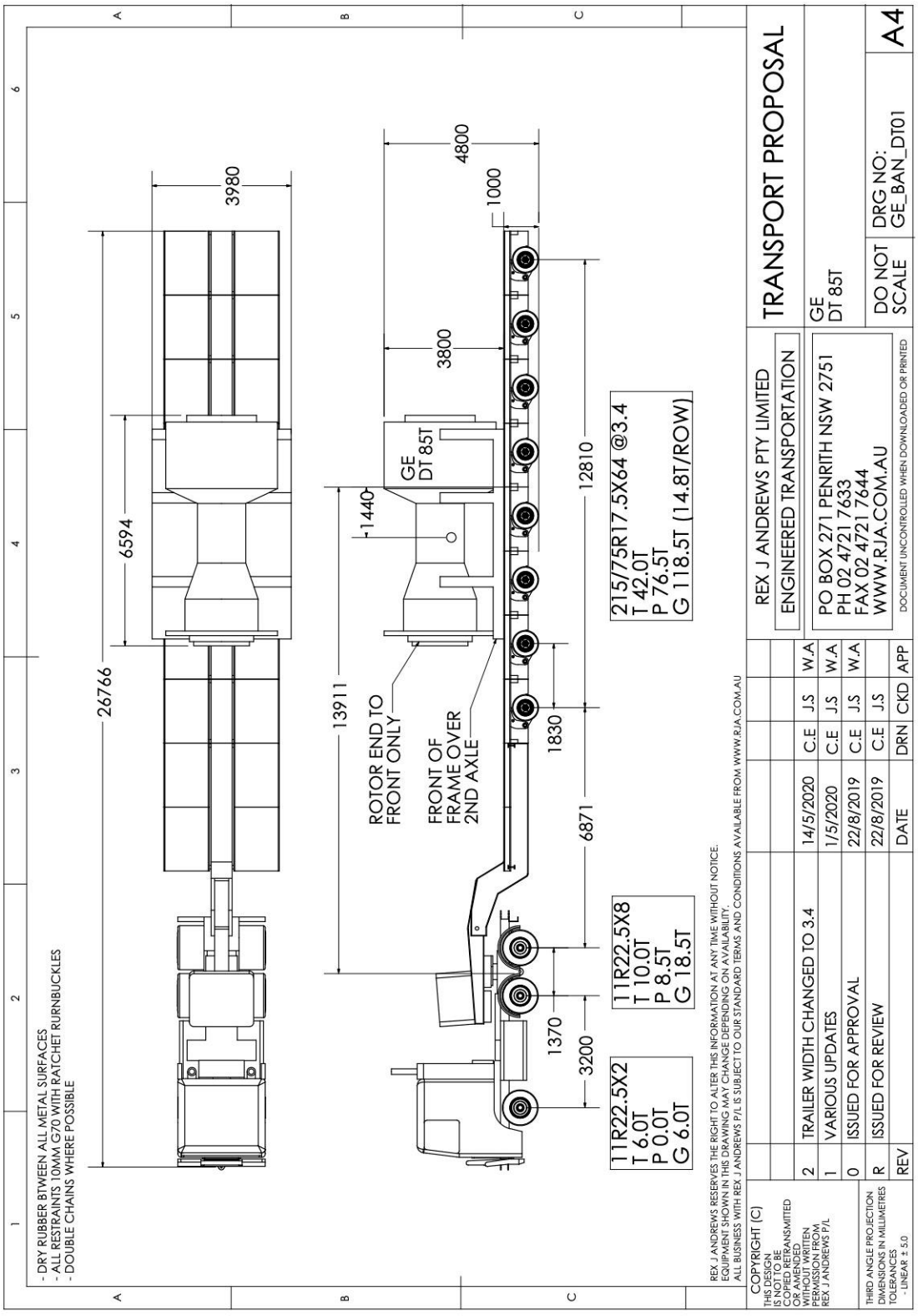
GE158 Blade diagram:



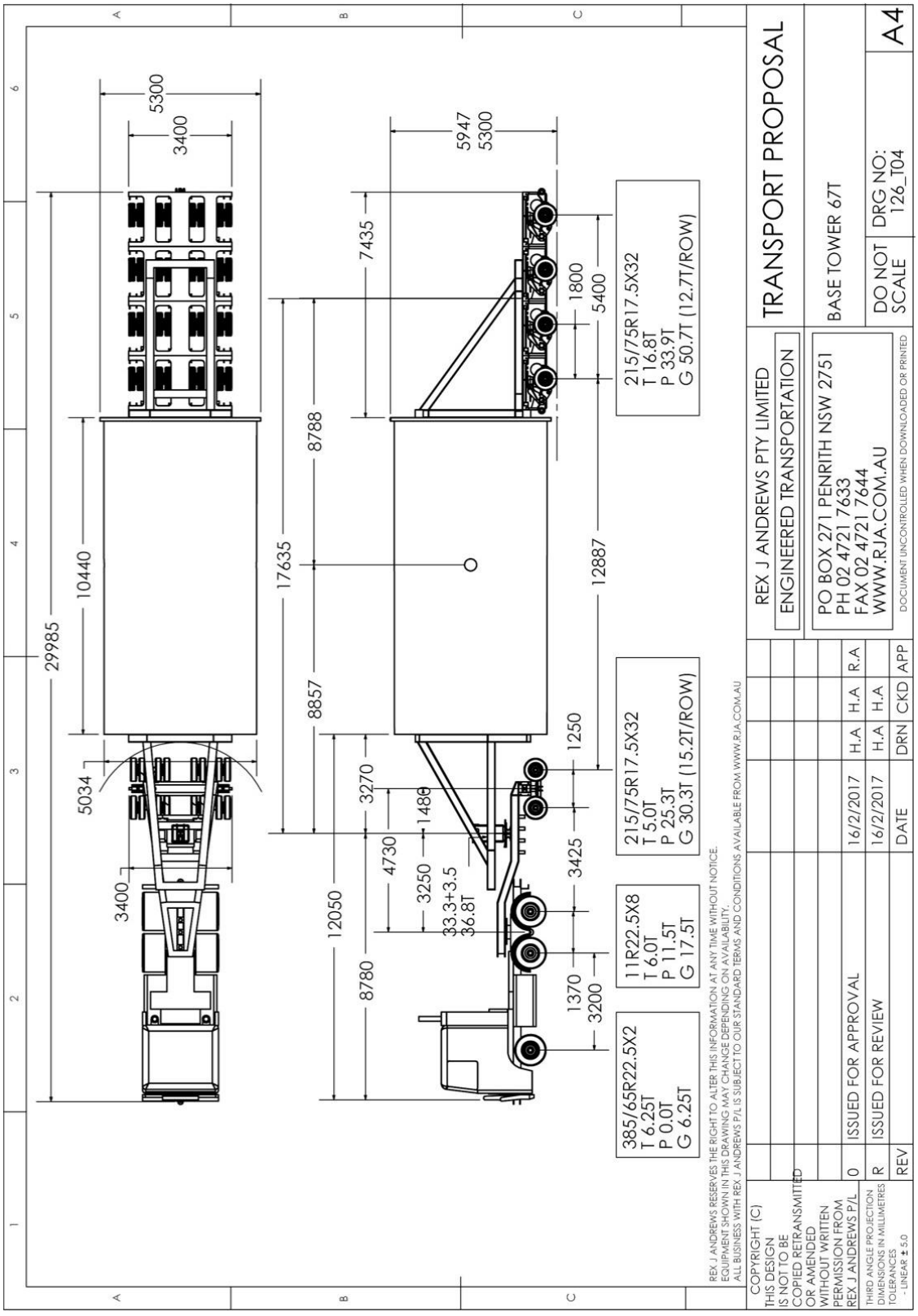
GE158 Machine Head diagram:



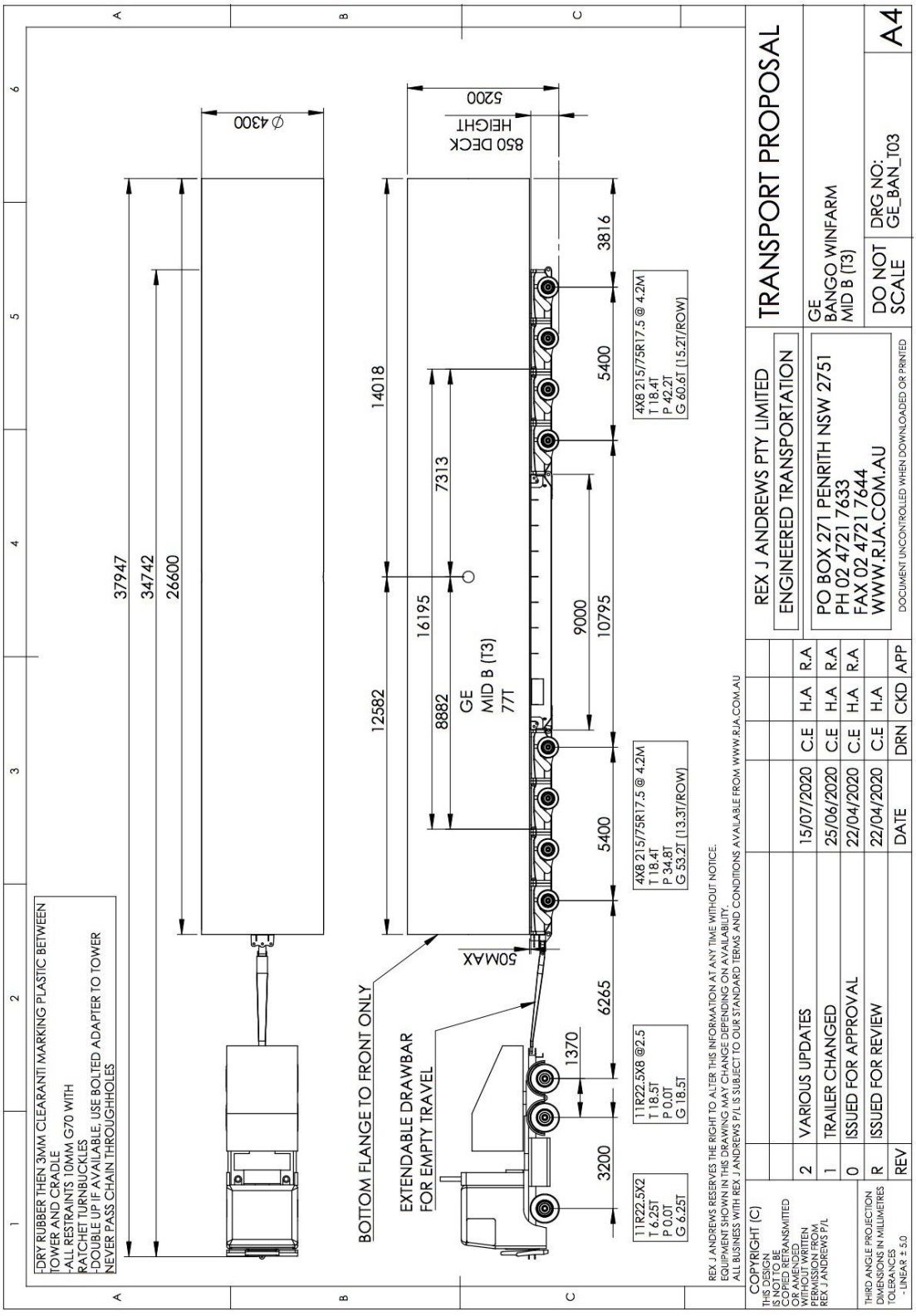
GE158 Drive train diagram:



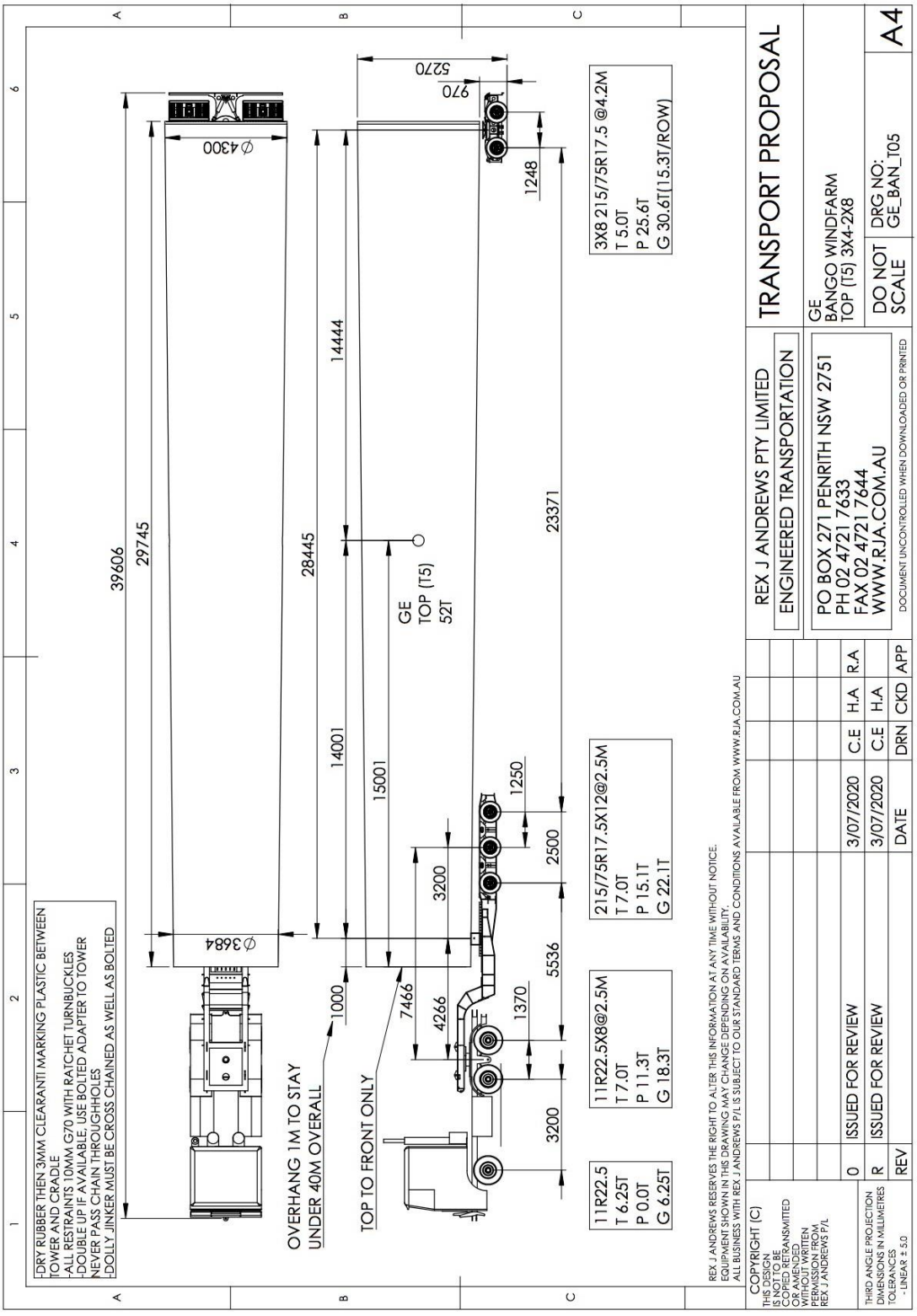
GE158 tower diagram: Bookend



GE158 tower diagram: Extending platform

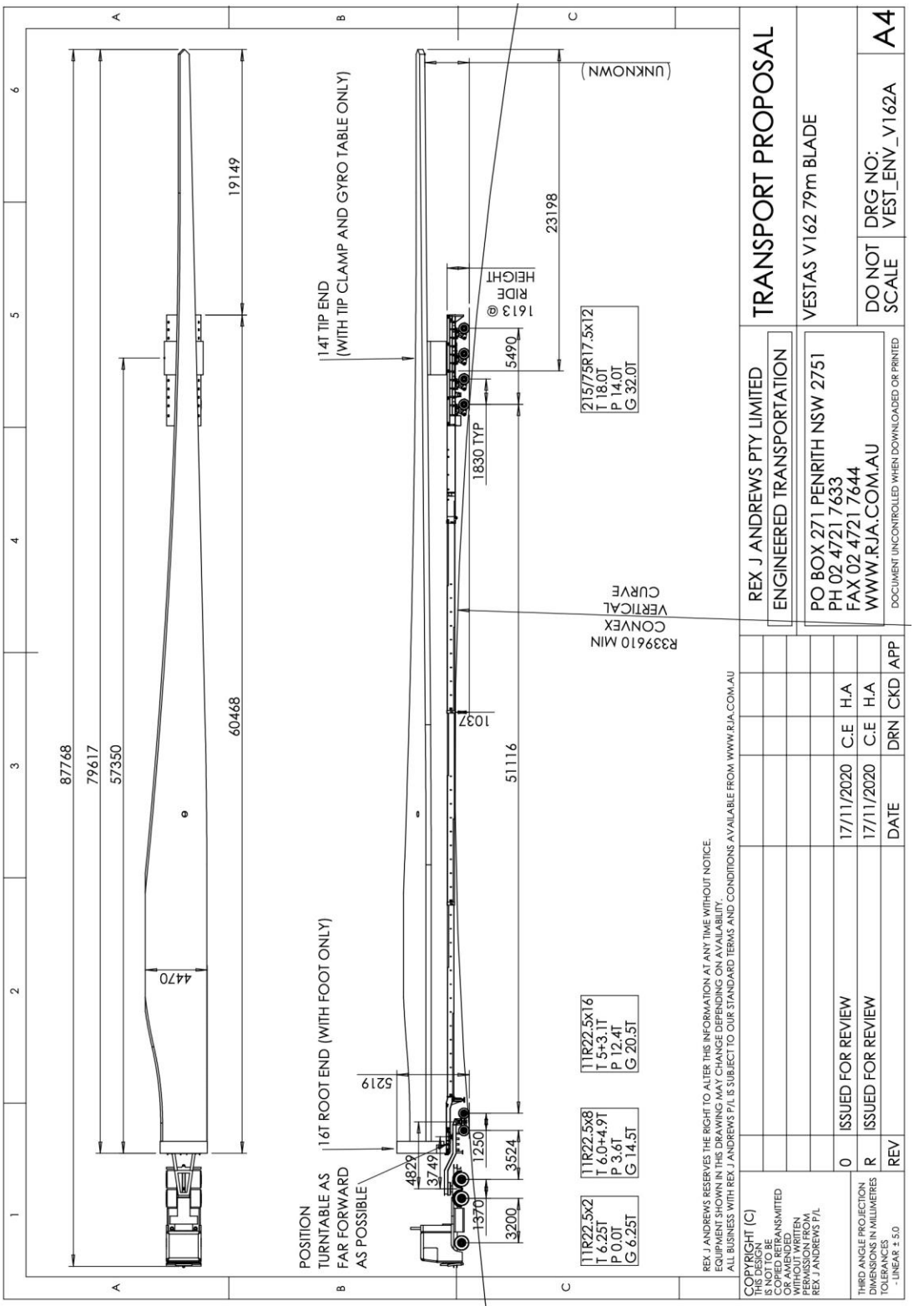


GE158 tower diagram: Dolly Jinker combo

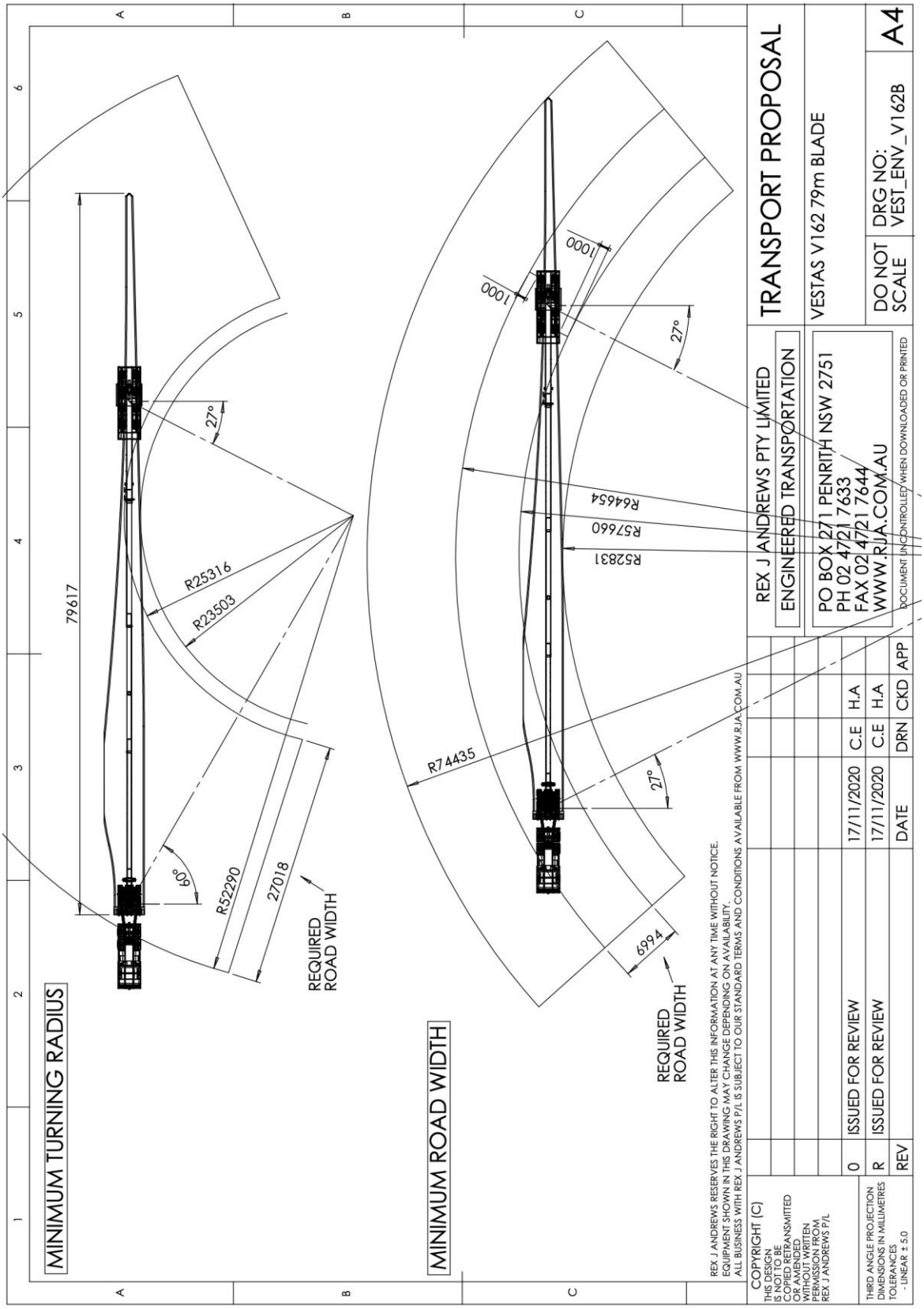


6.0 Transport drawings for V162.

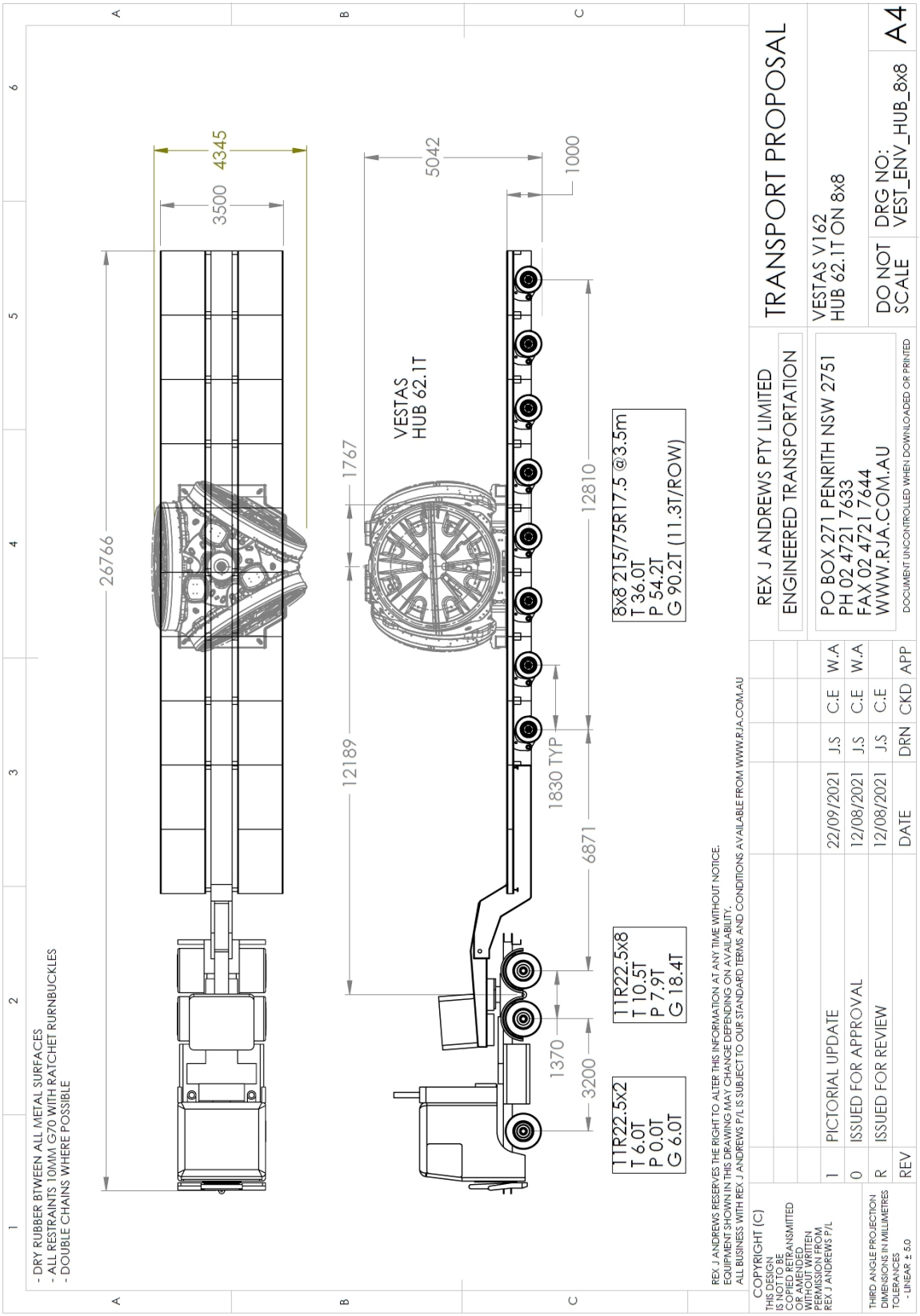
Vestas blade diagram (Profile)



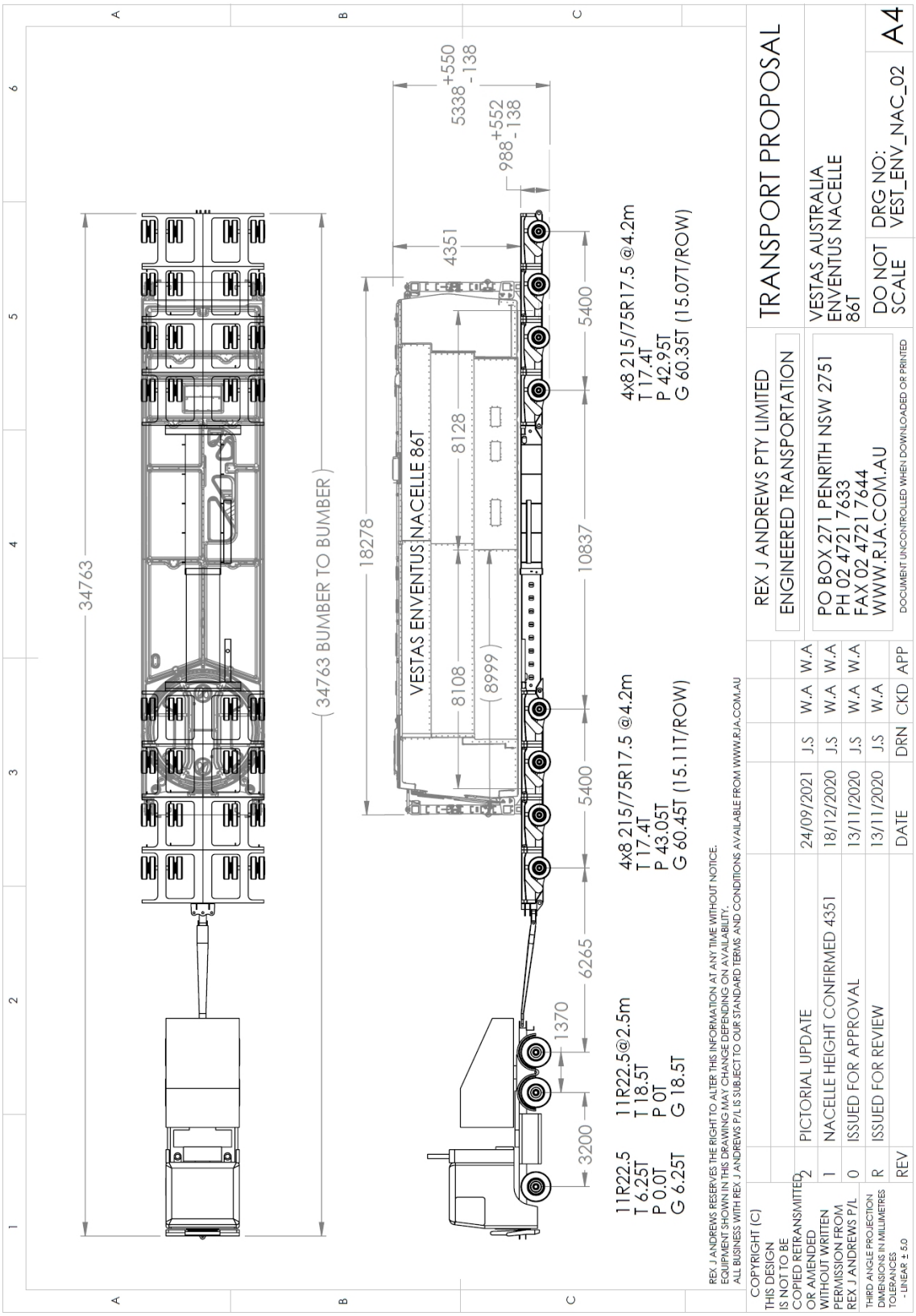
Vestas blade diagram (Swept path)



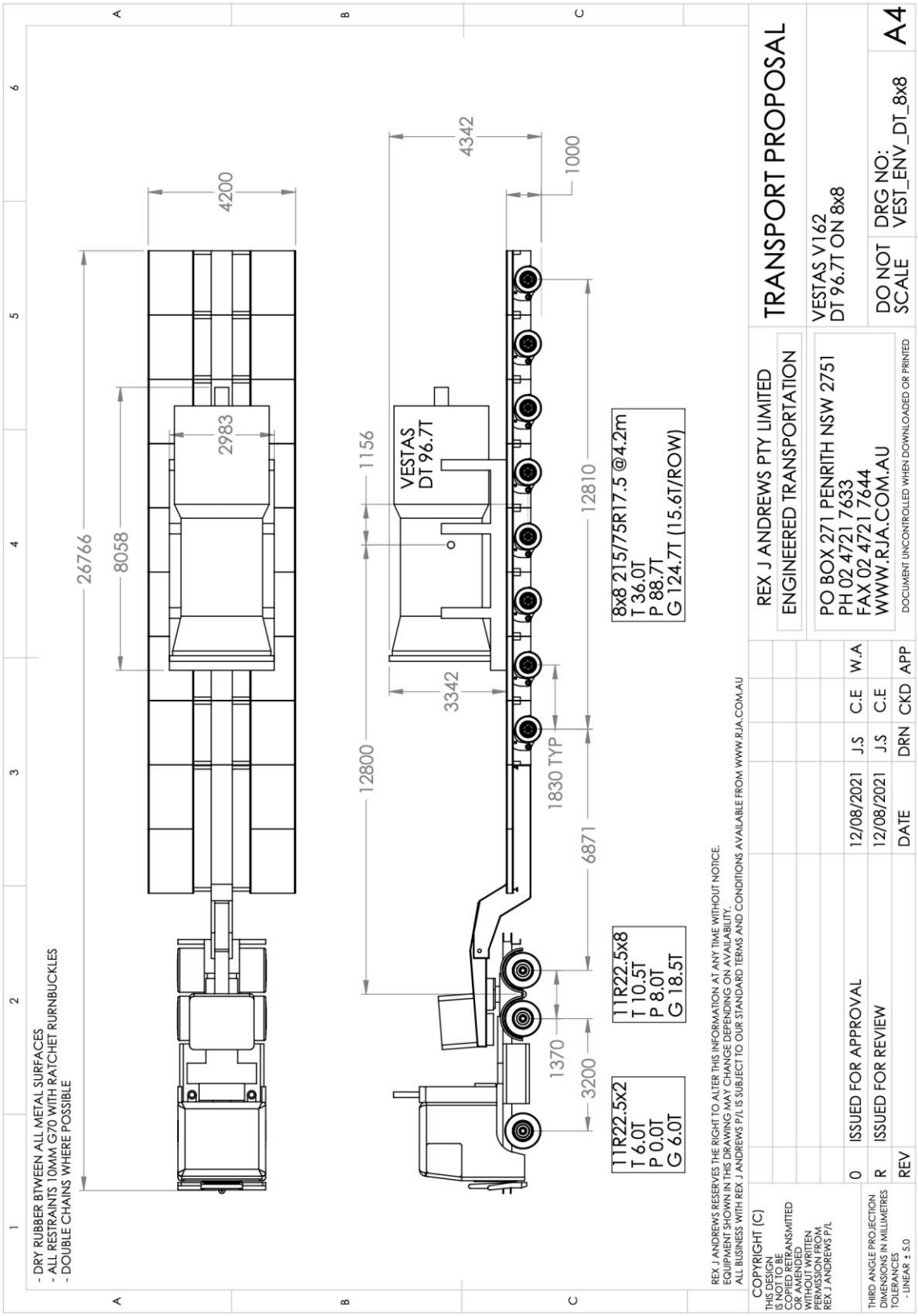
Vestas hub diagram:



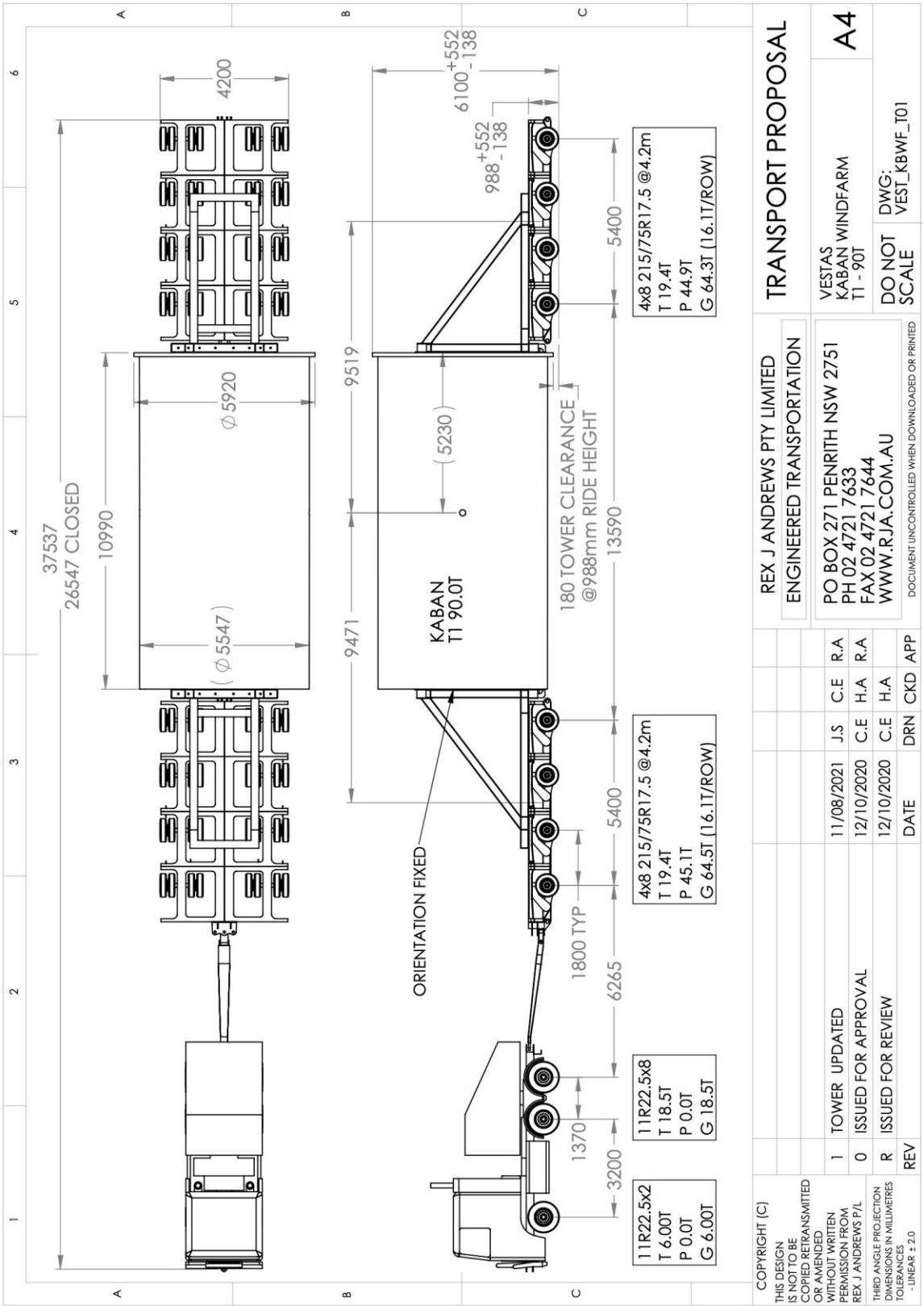
Vestas nacelle diagram:



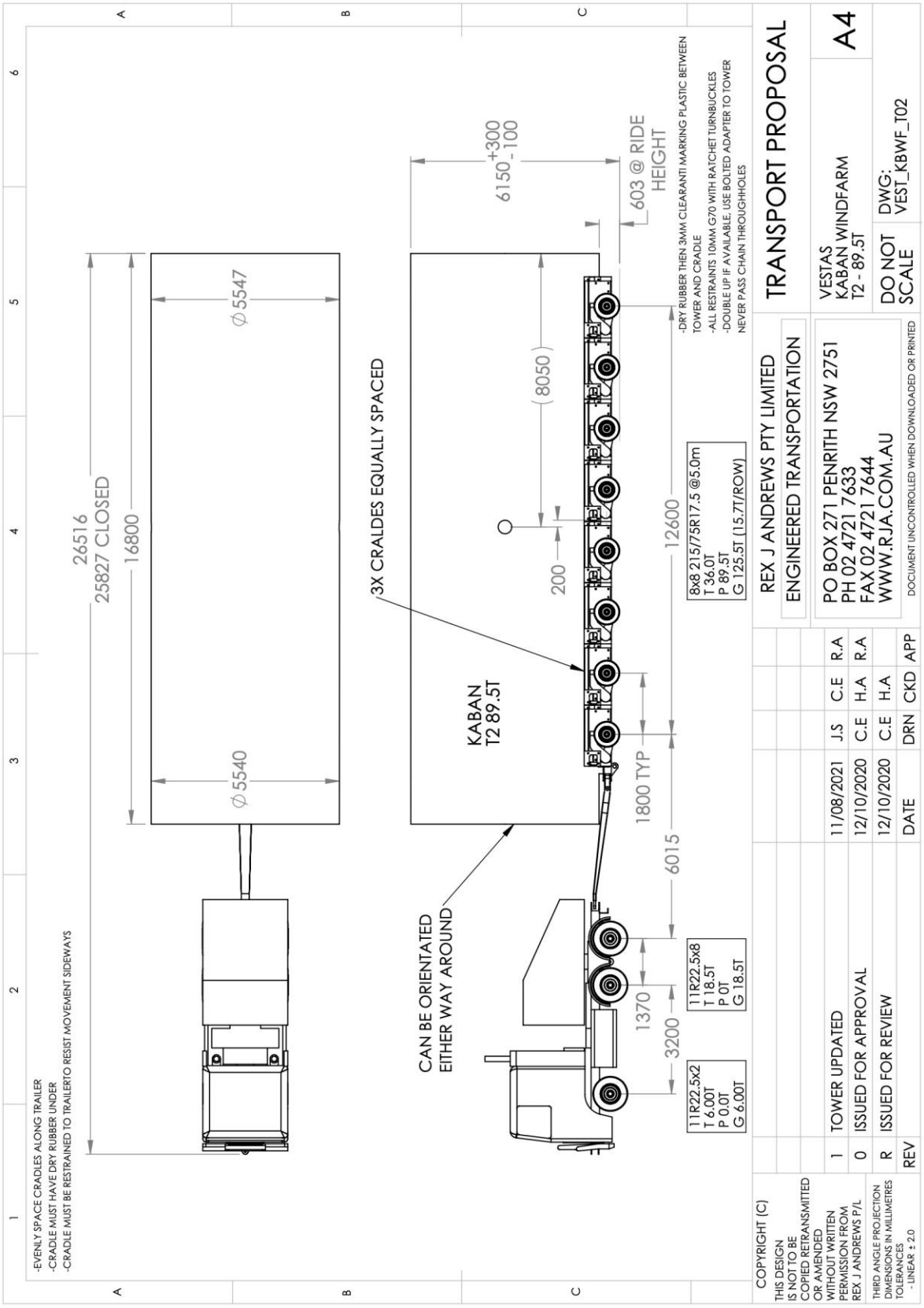
Vestas powertrain diagram:



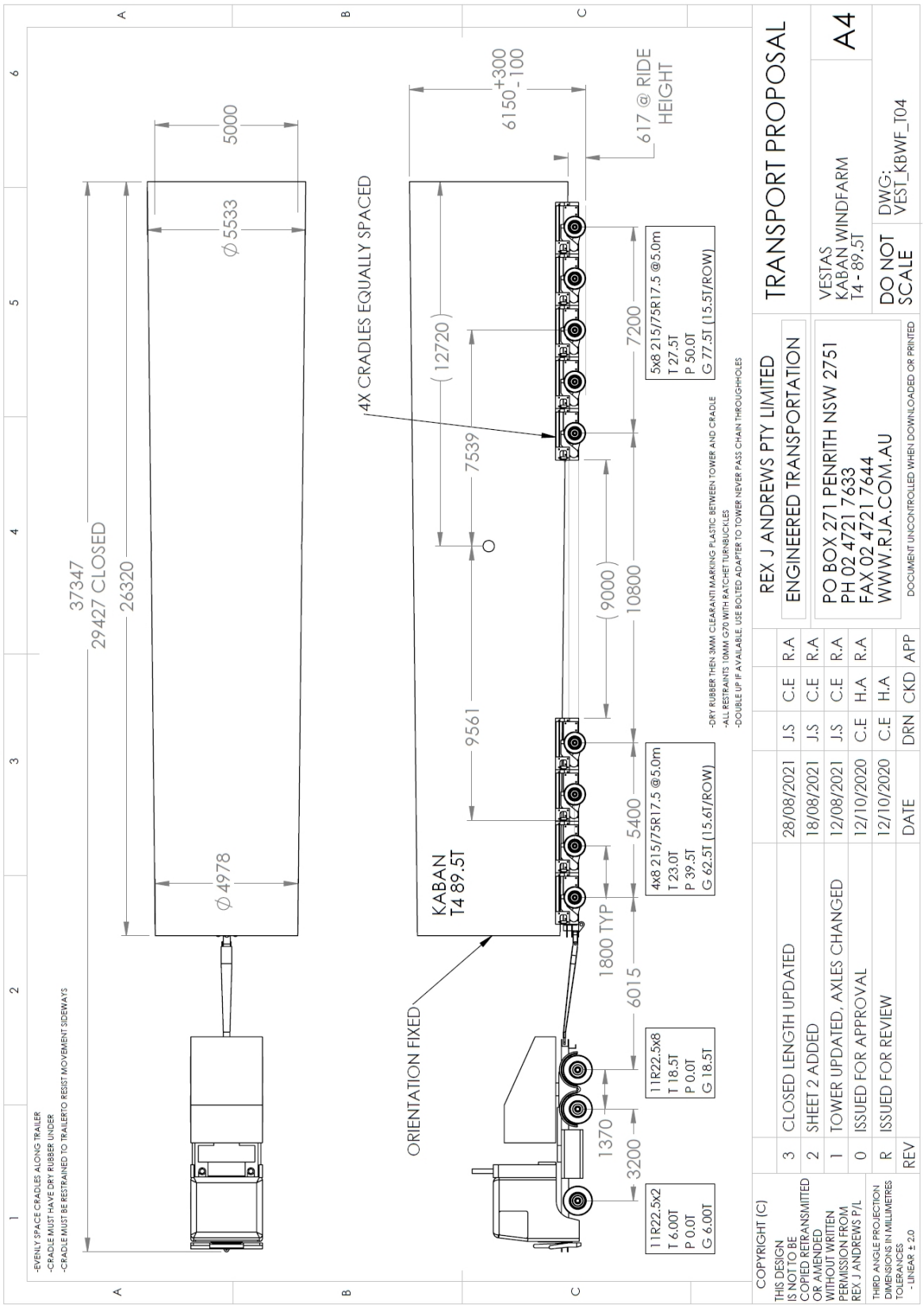
Vestas bookend diagram:



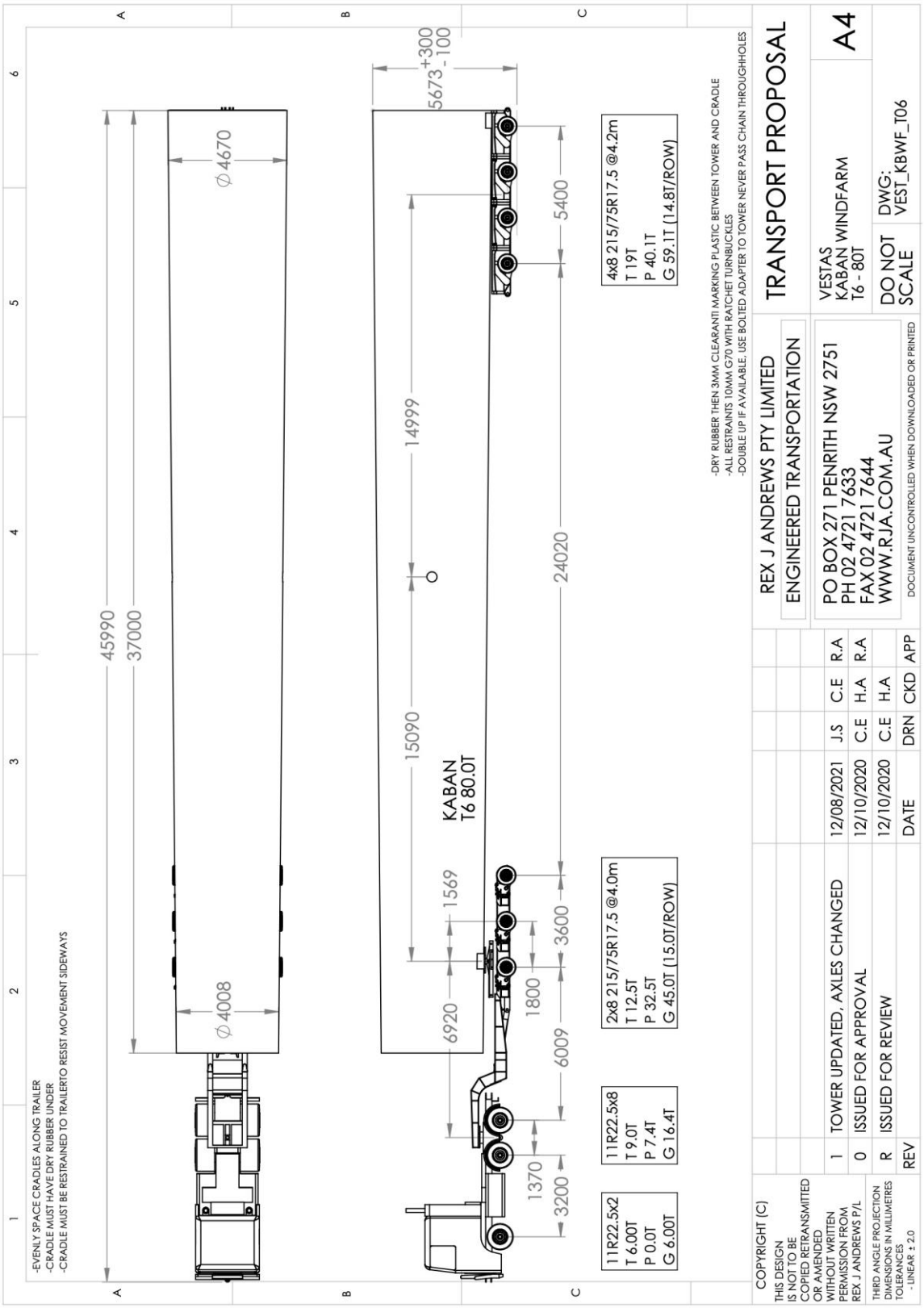
Vestas platform diagram:



Vestas extending platform diagram:

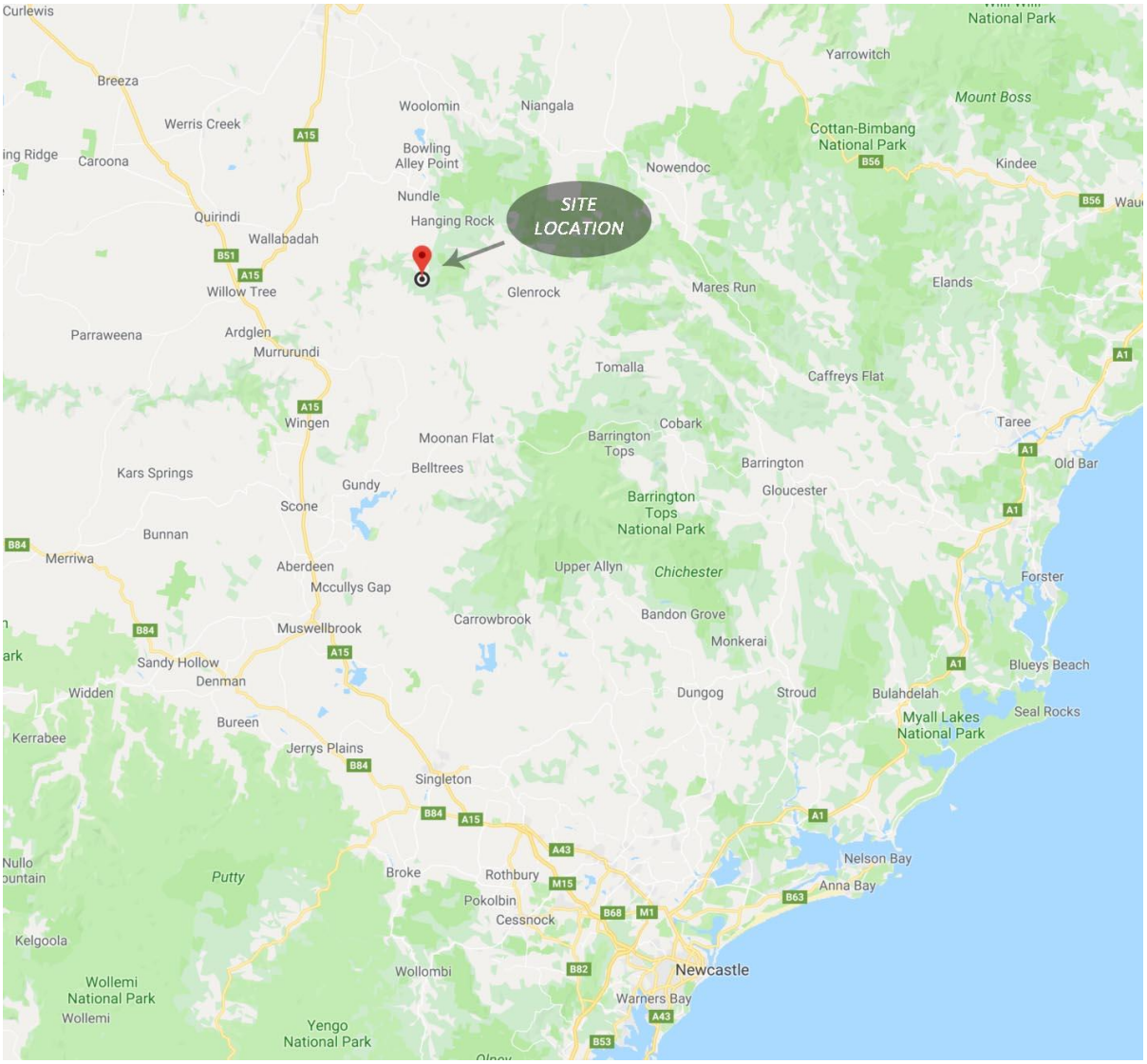


Vestas dolly jinker diagram:

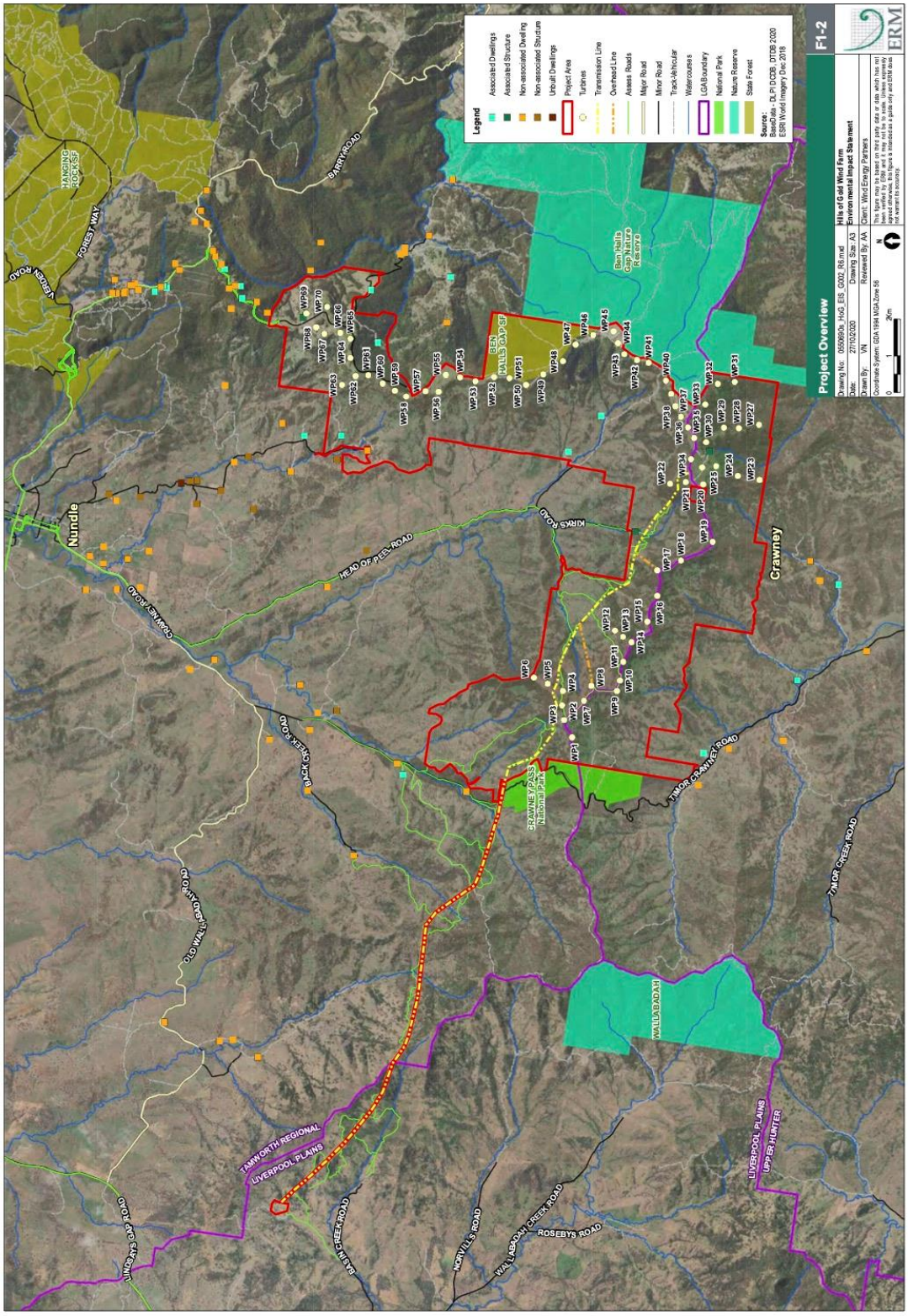


7.0 Site Location.

The Hill of Gold wind farm is located 8 Km's south of Nundle NSW and 300 Kilometres by road from the Port of Newcastle.



8.0 Windfarm site map.



9.0 Port of Import.

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

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

Image 1: Port overview.

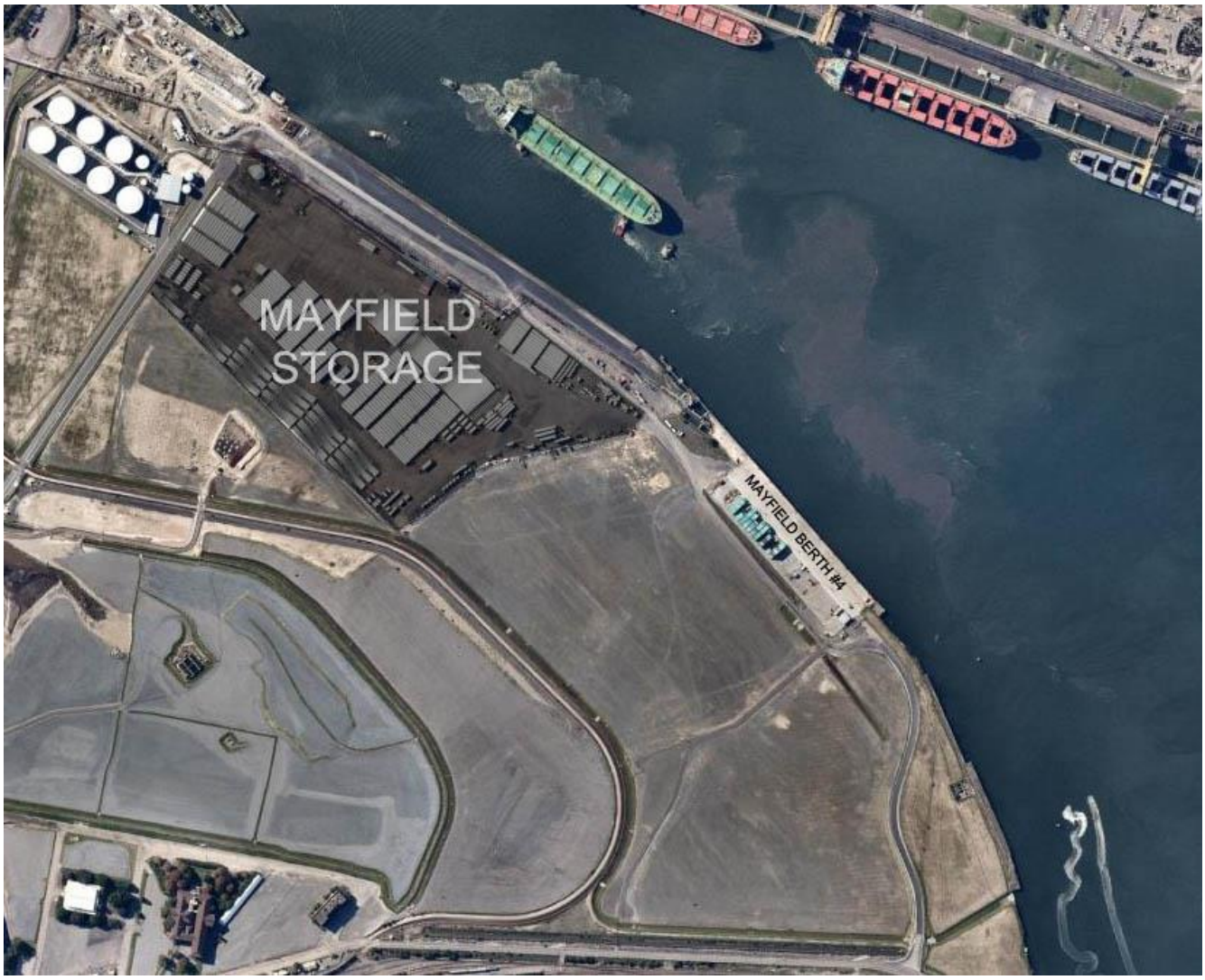


Image 2: Mayfield #4 Berth

Image 3: Mayfield #4 Port storage area.

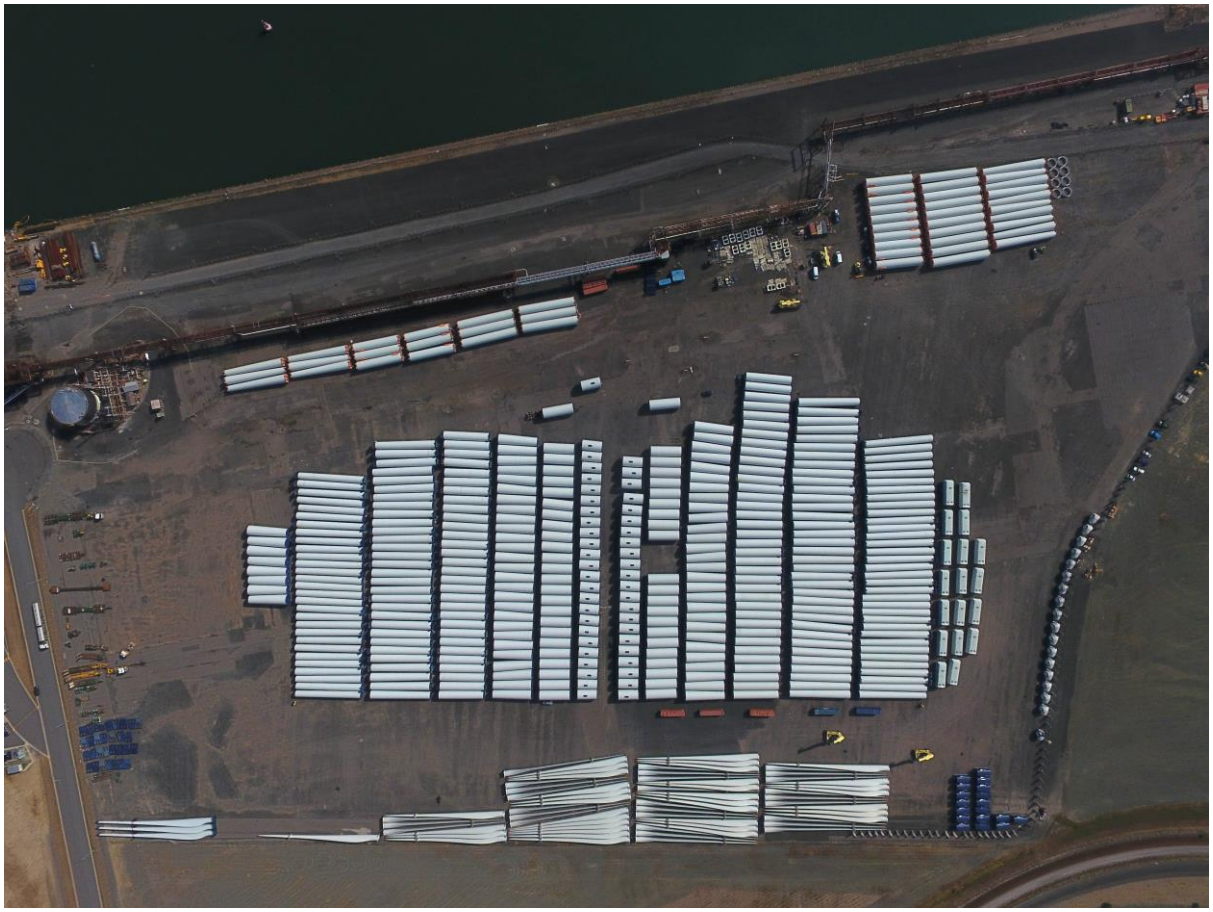


Image 4: Mayfield #4 Port storage area.

10.0 Transport Summary.

We have based this study on the turbine components, and towers entering Australia via the Port of Newcastle. The following shows the blade route and 3 additional routes depending on the size of the load.

ROUTE 1: PORT OF NEWCASTLE TO NUNDLE VIA BENGALLA RD:

Components: Blades and towers over 5.2 metres in height.

Distance: 311.0 Kilometres

Route: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Denman Road, (Muswellbrook bypass via Bengalla Road, Wybong Road, Kayuga Road, Ivermein Street, Dartbrook mine access Road), New England Highway, Lindsays Gap Road, Nundle Road, Oakenville Street.

GPS Link for section of route: https://goo.gl/maps/FxAJ7fTXcXbwLmHv8

ROUTE 1A: NUNDLE BYPASS OPT 1 TO CRAWNEY RD:

Components: Blades only.

Distance: 1.4 Kilometres

Route: Oakenville Street, Private land behind hotel, Jenkins Street, Crawney Road.

GPS Link for section of route: https://goo.gl/maps/gEVdPm1a7w7tpmYq5

ROUTE 1B: NUNDLE BYPASS OPT 2 TO CRAWNEY RD:

Components: Blades only.

Distance: 4.9 Kilometres

ROUTE: Oakenville Street, Old Hanging Rock Rd, Happy Valley Road, Jenkins Street, Crawney Road.

GPS Link for section of route: https://goo.gl/maps/yczMGxsAnSYgYVLY8

ROUTE 2: PORT OF NEWCASTLE TO CRAWNEY RD NUNDLE VIA LIDDELL UNDERPASS: (283.0)

Components: Towers and motors under 5.2 metres in height.

Distance: 270.0 Kilometres

Route: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Bell Street, Victoria Street, Market Street, New England Highway, Lindsays Gap Road, Nundle Road, Crosby Street, Oakenville Street, Heron Street North, Innes Street, Jenkins Street, Crawney Road.

GPS Link for section of route: https://goo.gl/maps/uGMwAMysbWn4zERh9

ROUTE 3: PORT OF NEWCASTLE TO CRAWNEY RD NUNDLE VIA THOMAS MITCHELL DVE:

Components: Towers and motors over 5.2 metres in height.

Distance: 315.0 Kilometres

Route: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Denman Road, Thomas Mitchell Drive, New England Highway, Bell Street, Victoria Street, Market Street, New England Highway, Lindsays Gap Road, Nundle Road, Crosby Street, Oakenville Street, Heron Street North, Innes Street, Jenkins Street, Crawney Road.

GPS Link for section of route: https://goo.gl/maps/zGxCcceTx48RJK7BA

ROUTE 4: PORT OF NEWCASTLE TO CRAWNEY RD NUNDLE, STANDARD LOADS:

Components: Standards loads.

Distance: 270.0 Kilometres

Route: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Lindsays Gap Road, Nundle Road, Crosby Street, Oakenville Street, Heron Street North, Innes Street, Jenkins Street, Crawney Road.

GPS Link for section of route: https://goo.gl/maps/MSDmuw7bmFHszijQA

ROUTE 5: CRAWNEY RD NUNDLE TO HILLS OF GOLD WINDFARM:

Components: All components.

Distance: 12.5 Kilometres

Route: Crawney Road.

GPS Link for section of route: https://goo.gl/maps/13mmxXAF7WNaxstg8

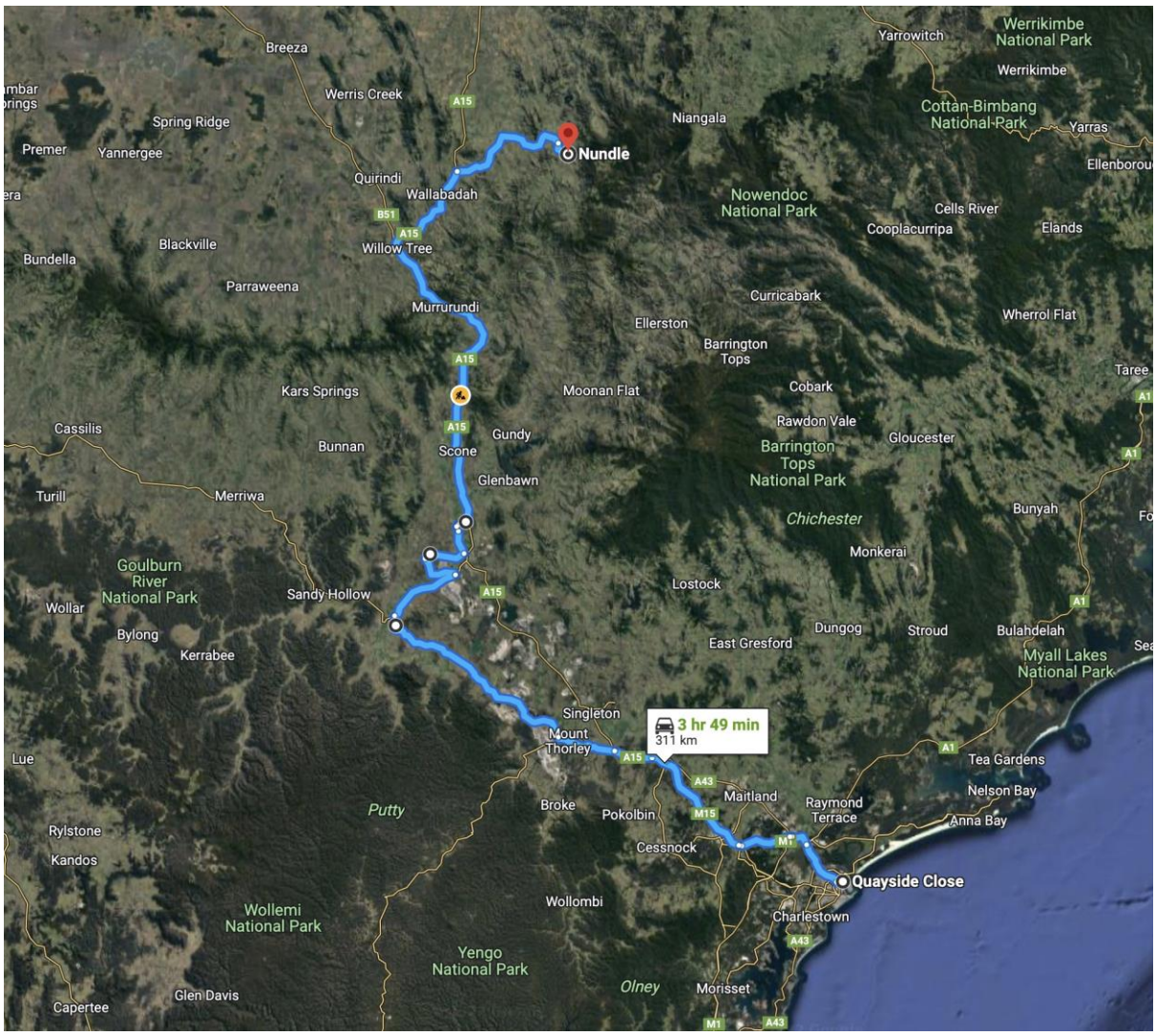
11.0 Route 1 Survey: Newcastle port to Nundle Via Bengalla Road.

Components: Blades and towers over 5.2 metres in height.

Distance: 311.0 Kilometres

Route: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Denman Road, (Muswellbrook bypass via Bengalla Road, Wybong Road, Kayuga Road, Ivermein Street, Dartbrook mine access Road), New England Highway, Lindsays Gap Road, Nundle Road, Oakenville Street.

GPS Link for section of route: https://goo.gl/maps/FxAJ7fTXcXbwLmHv8



REX J ANDREWS
ENGINEERED TRANSPORTATION

ROUTE STUDY
Newcastle to Hills of Gold Windfarm

KEY	
SIGNIFICANT AMOUNTS OF MODIFICATIONS REQUIRED	
MODERATE AMOUNTS OF MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Current Measurement	Procedure	Comments 170.0m rotor	Comments 158.0m rotor
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street GPS link: https://goo.gl/maps/afLwPYKuNdm	Clearance: Length: 70.0 metres	Right hand turn	Both options will require the fence to be relocated on the left-hand side. Some hardstand will need to be added to the left side entering the corner and while exiting the corner.	Fence may need to be modified.
0.4	Mayfield	Selwyn Street rail crossing GPS link: https://goo.gl/maps/AmohE54hKSz	Clearance: Width: 9.0 metres	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.	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/gXeHvBtCp4D2	Clearance: Length: 70.0 metres	Right hand turn	The sign on the inside of the corner will need to be made removable.	No problem with this section of road.
1.4	Mayfield	George Street onto Industrial Drive https://goo.gl/maps/s4ayrsuoAsD2	Clearance: Length: 70.0 metres	Right-hand turn	Load to travel across to the correct side to the correct side. The traffic signal in the middle of the intersection will need to be relocated. Additionally, hardstand will need to be placed on the south side of the intersection.	Load to travel across to the correct side to the correct side. Hardstand will need to be placed on the south side of the intersection.

4.9	Mayfield	Industrial Drive under traffic signals GPS link: https://goo.gl/maps/YmqhiS2iR582	Clearance: Height: 5.4 Metres	Travel directly ahead	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 meters will need to travel in the right-hand lane.	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 meters will need to travel in the right hand lane.
5.5	Mayfield West	Industrial Drive onto Maitland Road GPS link: https://goo.gl/maps/Kn49dhWG2qG2	Clearance: Length: 70.0 metres	Moderate right hand turn	The blades will need to cross to the incorrect side 150 metres prior to the intersection, then return to the correct side 120 metres past the intersection. No road modifications required.	The blades will need to cross to the incorrect side 150 metres prior to the intersection, then return to the correct side 120 metres past the intersection. No road modifications required.
13.9	Hexham	New England Highway under gantry GPS link: https://goo.gl/maps/YTMoFe7Aick	Clearance: Height: 5.95 Metres	Travel directly ahead	This is the lowest structure on route. There is no bypass around the gantry. A maximum loaded height of 5.9 metres should not be exceeded.	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.
17.4	Tarro	New England Highway onto John Renshaw Drive GPS link: https://goo.gl/maps/SRDr5JigkBp	Clearance: Width: 12.0 metres	Left hand merge	No problems with this section of road.	No problems with this section of road.
18.4	Beresfield	John Renshaw Drive through M1 intersection GPS link: https://goo.gl/maps/N19vJih1Fgr	Clearance: Width: 9.0 metres Height: 5.9 metres	Travel directly ahead	No problems with this section of road.	No problems with this section of road.
28.7	Buchanan	John Renshaw Drive onto the Hunter Expressway GPS link: https://goo.gl/maps/FH5DqHBXwSkntAmz9	Clearance: Length: 65.0 metres	Right hand turn	The blades will need to 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, this may require additional hardstand. Traffic control and or police will be required to perform this procedure.	Travel around the roundabout and take the third exit onto the Hunter Expressway onramp. A sign will need to be made removable. Spotter to guide load through this pinchpoint.

58.9	Branxton	The Hunter Expressway onto New England Highway GPS link: https://goo.gl/maps/7rauNuxzqjq	Clearance: Width: 9.0 metres	Travel directly ahead	No problems with this section of road.	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	Clearance: Width: 12.0 metres	Left Hand turn	The NSW Government is currently upgrading this intersection. The intersection in its current form has a number of signs that would need to be made removable, but no modifications are required on the existing corner. At this stage the data that is available for the upgrades shows that the section of road that we would need to access does not change considerably. However, it is recommended that you monitor the progress of the upgrades, and that any changes are thoroughly looked at.	The NSW Government is currently upgrading this intersection. The intersection in its current form has a number of signs that would need to be made removable, but no modifications are required on the existing corner. At this stage the data that is available for the upgrades shows that the section of road that we would need to access does not change considerably. However, it is recommended that you monitor the progress of the upgrades, and that any changes are thoroughly looked at.
67.4	Whittingham	Golden Highway GPS link: https://goo.gl/maps/R86RFuPnmFU2	Clearance: 115.0 x 9.0 metres	Parking Bay	Suitable parking for Fatigue breaks.	Suitable parking for Fatigue breaks.
77.3	Whittingham	Golden Highway intersection with the Putty Road GPS link: https://goo.gl/maps/7hQdEmK1EgE2	Clearance: Length: 85.0 metres	Left hand turn	Blades to cross from the incorrect side to the incorrect side. Some signs will need to be made removable.	Blades to cross from the incorrect side to the incorrect side. Some signs will need to be made removable.
77.4	Mount Thorley	Golden Highway GPS link: https://goo.gl/maps/zGvdupDuixx	Clearance: 100.0 x 10.0 metres	Parking Bay	Suitable parking for Fatigue breaks.	Suitable parking for Fatigue breaks.
80.8	Mount Thorley	Golden Highway intersection with the Putty Road GPS link: https://goo.gl/maps/VyA42n1CqZx	Clearance: Length: 85.0 metres	Right hand turn	Blades to cross from the incorrect side and cross back to the correct side approx. 500 metres west of the intersection.	Blades to cross from the incorrect side and cross back to the correct side approx. 500 metres west of the intersection.

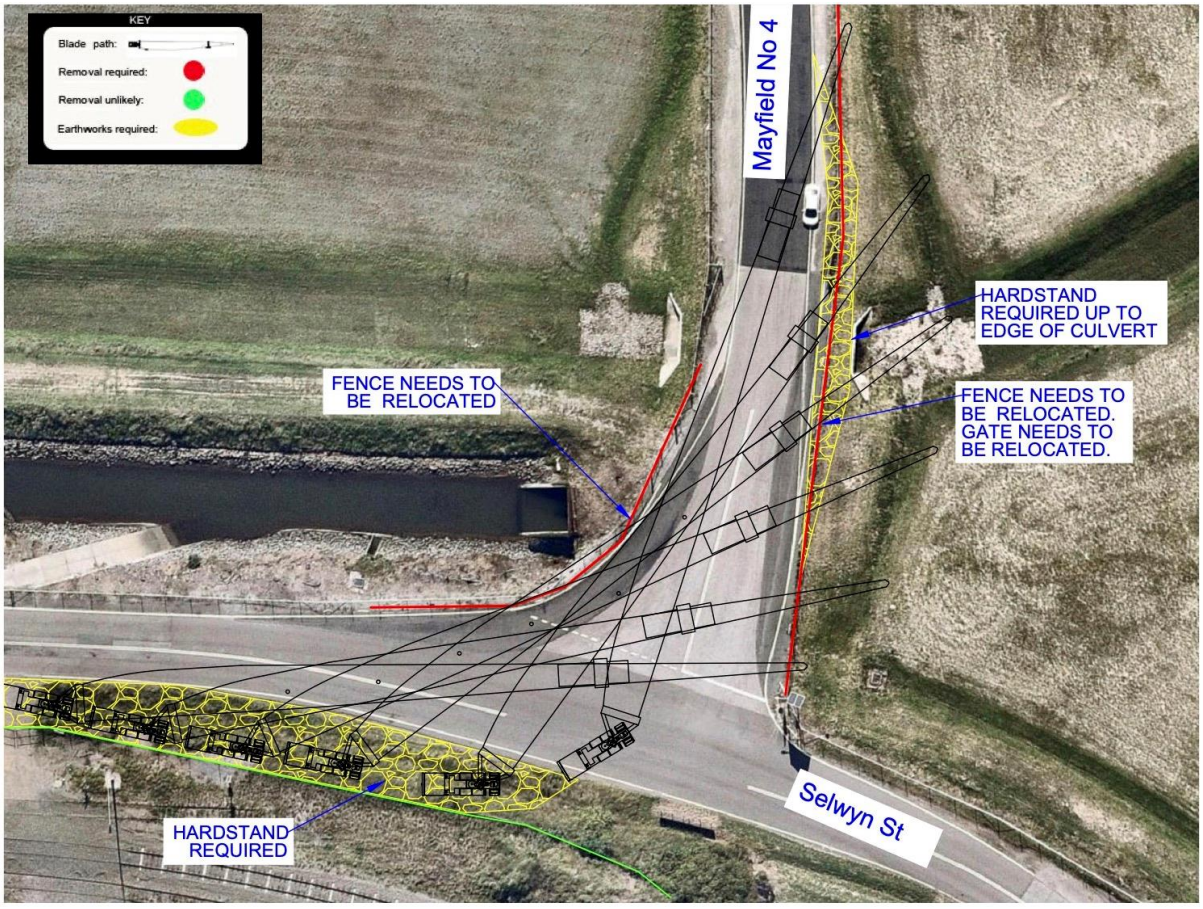
98.0	Warkworth	Golden Highway GPS link: https://goo.gl/maps/Y6V6EXaCwxq	Clearance: 100.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.	Suitable parking for Fatigue breaks.
107.0	Jerrys Plains	Golden Highway through Jerrys Plains village GPS link: https://goo.gl/maps/AiuT8MMVTh5crs348	Clearance: Length: 70.0 metres	Dogleg	Blades to cross from the incorrect side to the incorrect side. Some hardstand will need to be added to the outside of the right-hand corner. The swept path will stay within the road reserve.	No problems with this section of road.
126.0	Ogilvy	Golden Highway GPS link: https://goo.gl/maps/ShT4hrj8WQeMcris7	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.	This section of road has a steep mountain range that will require additional pull trucks to assists loads that exceed 80T gross weight.
141.9	Denman	Golden Highway onto Denman Road GPS link: https://goo.gl/maps/sf4PNnycxB32	Clearance: Length: 60.0 metres	Right hand turn	The blades will travel around the corner from correct side onto the correct side. The existing corner will require hardstand to be added and signs made removable. The swept path will stay within the road reserve.	The blades will travel around the corner from correct side onto the correct side. The existing corner will require hardstand to be added and signs made removable.
149.0	Muswellbrook	Denman Road onto Bengalla Road GPS link: https://goo.gl/maps/CJYMtSMTttJ2	Clearance: Length: 65.0 metres	Left hand turn	Blades to cross from the incorrect side to the incorrect side. Some signs will need to be made removable and some hardstand added to the inside and outside of the corner. The swept path will enter a landowner's boundaries on the inside of the corner.	Blades to cross from the incorrect side to the incorrect side. No works required on this intersection.
158.5	Muswellbrook	Bengalla Road onto Wybong Road GPS link: https://goo.gl/maps/vibQtvHkxXE2	Clearance: Length: 70.0 metres	Right hand turn	Blades to cross from the correct side to the correct side. Some signs will need to be made removable.	Blades to cross from the correct side to the correct side. Some signs will need to be made removable.

168.1	Muswellbrook	Wybong Road onto Kayuga Road OPTION 1: GPS link: https://goo.gl/maps/xVscKUT1isJ2	Clearance: Length: 40.0 metres	Left hand turn	Blades to cross from the incorrect side to the incorrect side. Some signs will need to be relocated or made removable. Permission will be required from the landowner to travel over the private land. This will require removal and realigning the fence, and adding hardstand.	Blades to cross from the incorrect side to the incorrect side. Some signs will need to be relocated or made removable. Permission will be required from the landowner to travel over the private land. This will require removal and realigning the fence, and adding hardstand.
173.3	Muswellbrook	Kayuga Road onto Ivermein Street GPS link: https://goo.gl/maps/JpTfmcsZ6Sk	Clearance: Length: 85.0 metres	Travel directly ahead	No problems with this section of road.	No problems with this section of road.
174.0	Muswellbrook	Ivermein Street onto Dartbrook mine access Road GPS link: https://goo.gl/maps/ddMHa4CmXK32	Clearance: Length: 50.0 metres	Right hand turn	Blades to cross from the correct side to the correct side. Some signs will need to be made removable and some hardstand added to the inside and outside of the corner. Additionally, a drainage pipe will need to be extended on the inside of the corner.	Blades to cross from the correct side to the correct side. Some signs will need to be made removable and some hardstand added to the inside and outside of the corner. Additionally, a drainage pipe will need to be extended on the inside of the corner.
174.8	Muswellbrook	Dartbrook Road GPS link: https://goo.gl/maps/u9vSXiSV7Jt	Clearance: Length: 60.0 metres	Right hand turn	Blades to cross from the correct side to the correct side but cut across the inside of the corner. Some signs will need to be made removable and some hardstand added to the inside of the corner.	Blades to cross from the correct side to the correct side but cut across the inside of the corner. Some signs will need to be made removable and some hardstand added to the inside of the corner.
177.0	Muswellbrook	Dartbrook Road onto New England Highway GPS link: https://goo.gl/maps/twTsmUKaED82	Clearance: Length: 60.0 metres	Left hand turn	Blades to cross from the incorrect side to the incorrect side. Some signs will need to be made removable on the corner and some hardstand added.	Blades to cross from the incorrect side to the incorrect side. Some signs will need to be made removable on the corner and some hardstand added.
240.8	Murrurundi	New England highway (Township) GPS link: https://goo.gl/maps/Sj3ixAkhujt	Clearance: 60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.	Suitable parking for Fatigue breaks.
245.4	Murrurundi Hill	New England highway Nowlands Gap GPS link: https://goo.gl/maps/R5yufobPeMG2	Clearance: 120.0 x 12.0 metres	Parking Bay	Emergency parking only.	Emergency parking only.

251.3	Willow Tree	New England highway GPS link: https://goo.gl/maps/XLTg7CRV7EU2	Clearance: Width: 7.0m Length: 35m Height: 5.2m	Kankool weighbridge	It is likely that the towers and defiantly the blades will not fit into this facility. Engineered documentation showing correct weights for all loads will be required.	It is likely that the towers and defiantly the blades will not fit into this facility. Engineered documentation showing correct weights for all loads will be required.
257.9	Willow Tree Township	New England highway GPS link: https://goo.gl/maps/gw38qmvVfTC2	Clearance: 60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.	Suitable parking for Fatigue breaks.
259.5	Willow Tree Truck Stop N	New England highway GPS link: https://goo.gl/maps/RRdPVHupGCs	Clearance: 120.0 x 12.0 metres	Parking Bay	Suitable parking for Fatigue breaks for small loads only.	Suitable parking for Fatigue breaks for small loads only.
269.0	Wallabadah	New England highway GPS link: https://goo.gl/maps/QWCyeHQSohS2	Clearance: 80.0 x 5.0 metres	Parking Bay (side of road)	Suitable parking for Fatigue breaks.	Suitable parking for Fatigue breaks.
276.0	Wallabadah	New England highway onto Lindsay's Gap Road GPS link: https://goo.gl/maps/ePbYctjJootkBZiM9	Clearance: Length: 50.0 metres	Right hand turn	Blades to cross from the correct side to the correct side but cut across the inside of the corner. Some signs will need to be made removable and some hardstand added to the inside of the corner.	Blades to cross from the correct side to the correct side but cut across the inside of the corner. Some signs will need to be made removable on the inside of the corner.
287.7	Garoo	Lindsay's Gap Road over Goonoo Goonoo Creek GPS link: https://goo.gl/maps/9ELSk5ZLRWnf14tm7	Clearance: Axle width: 3.60m Overall width: 6.20m Guard rail height: 850mm	Travel directly ahead over bridge in the centre of the road.	The blades will fit over the structure in its current condition. Loads that are been carried on trailers with an axle width exceeding 3.5 meters will not fit over this structure in its current form. This bridge will need to be replaced or modified before the towers or motors can be delivered on this route. A trafficable deck width of at least 4.6 meters is required for these heavier loads.	The blades will fit over the structure in its current condition. Loads that are been carried on trailers with an axle width exceeding 3.5 meters will not fit over this structure in its current form. This bridge will need to be replaced or modified before the towers or motors can be delivered on this route. A trafficable deck width of at least 4.6 meters is required for these heavier loads.

295.7	Garoo	Lindsay's Gap Road over Middlebrook Creek GPS link: https://goo.gl/maps/DyxGUid9JucoAHhHA	Clearance: Axle width: 4.50m Overall width: 6.10m Guard rail height: 750mm	Travel directly ahead over bridge in the centre of the road.	The blades will fit over the structure in its current condition. This bridge will need to be modified or replaced before the towers or motors can be delivered on this route. A trafficable deck width of at least 4.6 meters is required for these heavier loads.	The blades will fit over the structure in its current condition. This bridge will need to be modified or replaced before the towers or motors can be delivered on this route. A trafficable deck width of at least 4.6 meters is required for these heavier loads.
301.2	Garoo	Lindsay's Gap Road through Lindsay's Gap GPS link: https://goo.gl/maps/GGKmqemziKdth8wH9	Clearance: Length: 90.0 metres	Travel directly ahead	Load to travel in the centre of the road, escorts to warn traffic 500 metres to the east of the gap.	Load to travel in the centre of the road, escorts to warn traffic 500 metres to the east of the gap.
306.8	Nundle	Lindsay's Gap Road onto Nundle Road GPS link: https://goo.gl/maps/FX4ZRx2YG9i2BsXMA	Clearance: Length: 50.0 metres	Right hand turn	Blades to cross from the correct side to the correct side but cut across the inside of the corner. Some signs will need to be made removable and some hardstand added to the inside of the corner. A power pole will also need to be relocated.	Blades to cross from the correct side to the correct side but cut across the inside of the corner. Some signs will need to be made removable.
310.3	Nundle	Nundle Road onto Crosby Street GPS link: https://goo.gl/maps/uVvcN9QkPyTDP1YR6	Clearance: Width: 8.0 metres	Travel directly ahead	No problems with this section of road.	No problems with this section of road.
310.6	Nundle	Crosby Street onto Oakenville Street GPS link: https://goo.gl/maps/aZNDKURdSBERedMr9	Clearance: Width: 8.0 metres	Travel directly ahead	No problems with this section of road.	No problems with this section of road.

0.0 Km's: Mayfield #4 onto Selwyn Street at Mayfield.
170 Metre rotor:



PROCEDURE: Right hand turn.

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

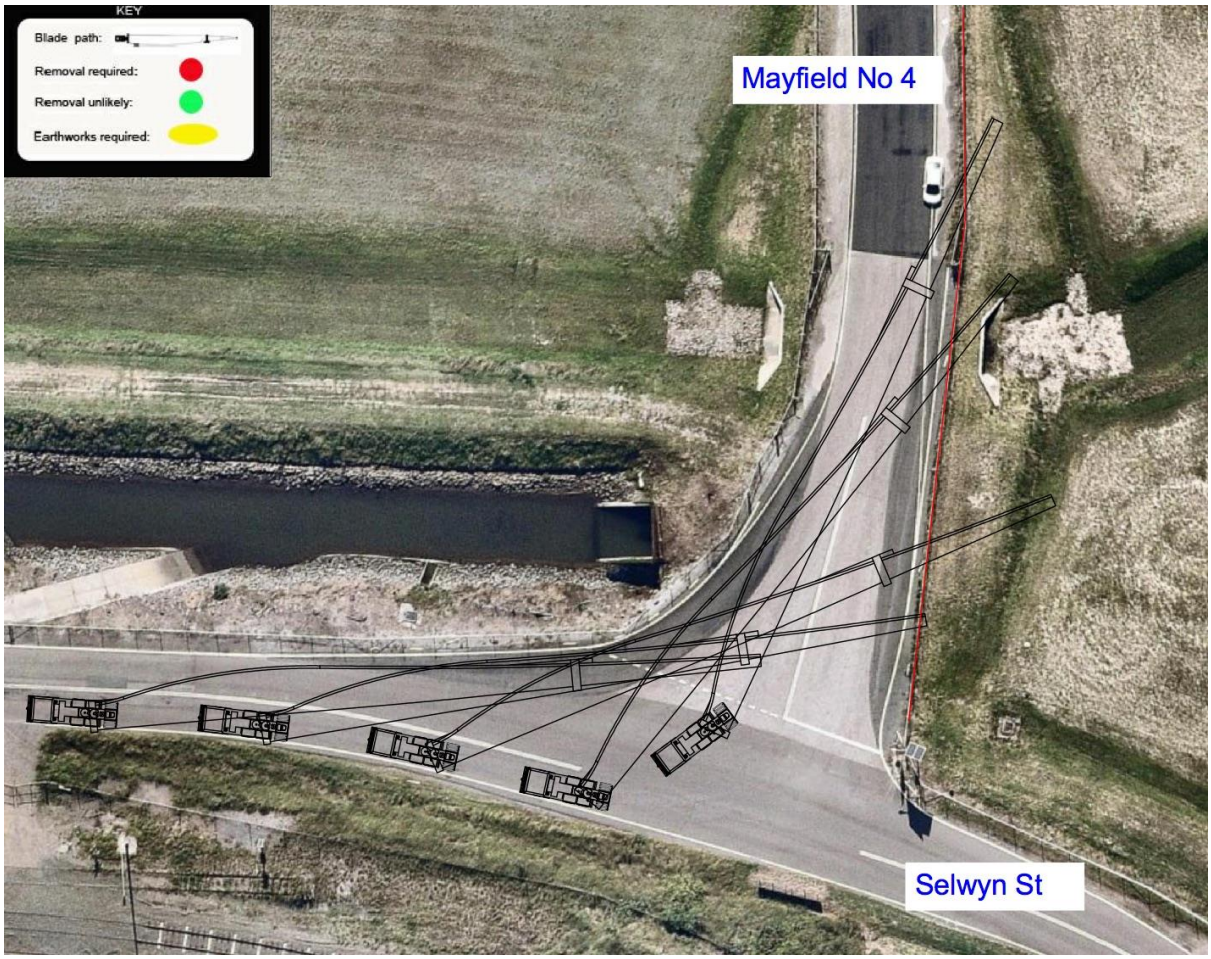
COMMENTS: Some hardstand will need to be added to the left entry up to but not past the culvert and also the exit of the corner. Some signs will need to be relocated and or made removable and some fence will need to be relocated.

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

ROAD MODIFICATIONS: Yes, moderate amounts of work are required.

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

158 Metre rotor:



PROCEDURE: Right hand turn.

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

COMMENTS: Fence may need to be modified.

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

ROAD MODIFICATIONS: Yes small amounts of work are required.

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

PROCEDURE: Travel directly ahead over the crossing.

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

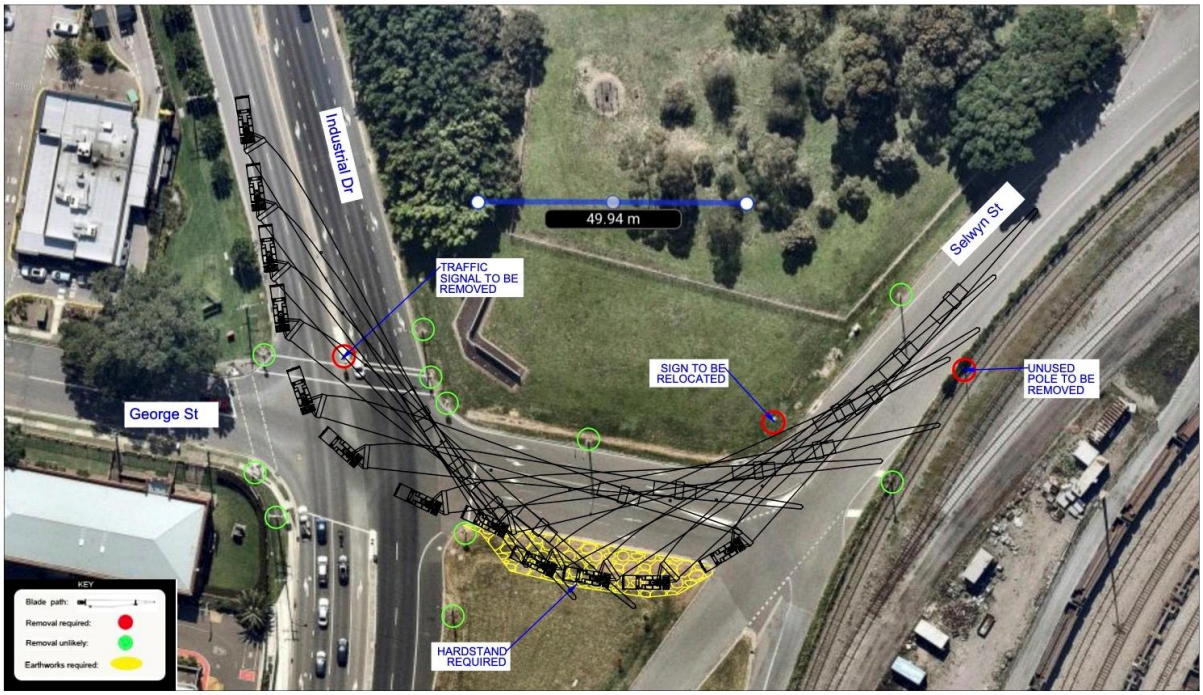
COMMENTS: Large width clearance and good ground clearance over this crossing.

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

ROAD MODIFICATIONS: No works required.

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

170 Metre rotor:



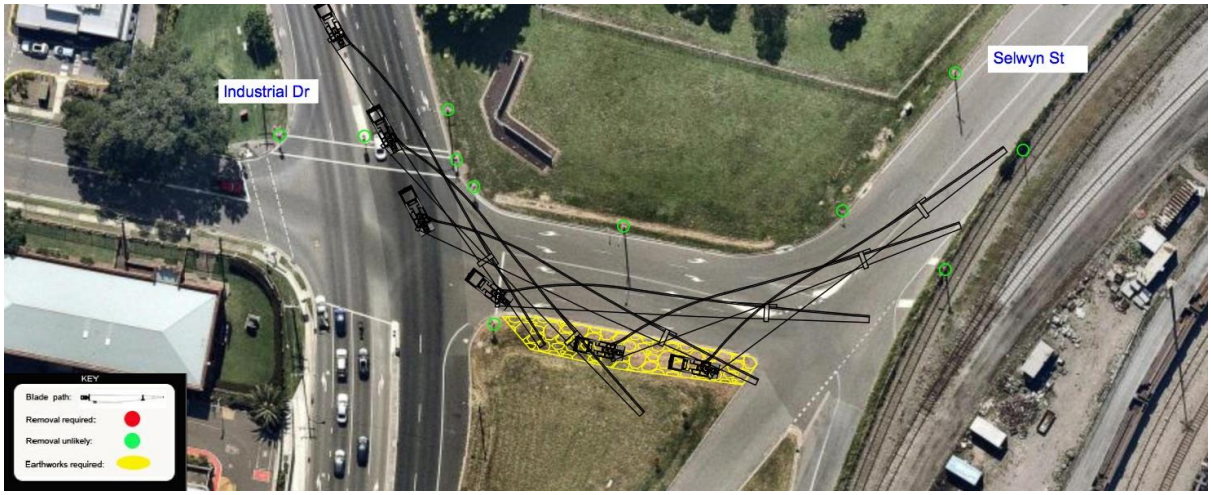
PROCEDURE: Right hand turn from Selwyn Street through George Street and onto Industrial Drive.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/brPRAckLr572

COMMENTS: The first right hand turn through George Street will need a sign made removable. Entering Industrial Drive the loads will cross from the correct side to the correct side. The traffic signal in the centre median will need to be relocated. Some hardstand will need to be placed on the south side of the intersection. spotter would need to help the load through this intersection.

ROAD MODIFICATIONS: Yes, large amounts of works are required.

158 Metre rotor:



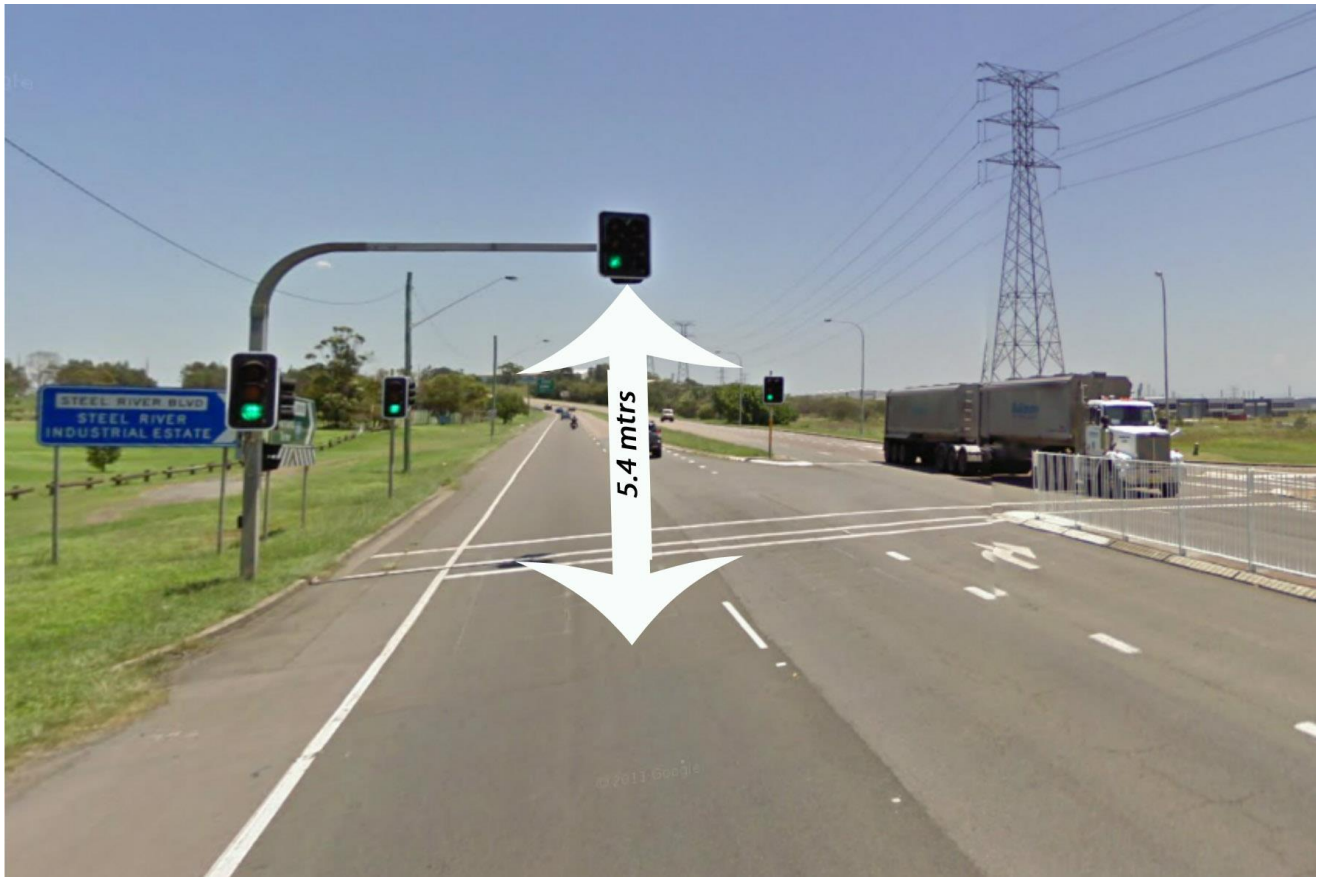
PROCEDURE: Right hand turn from Selwyn Street through George Street and onto Industrial Drive.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/brPRAckLr572

COMMENTS: Entering Industrial Drive the loads will cross from the correct side to the correct side. Some hardstand will need to be placed on the south side of the intersection. A spotter would need to help the load through this intersection.

ROAD MODIFICATIONS: Yes, moderate amounts of works are required.

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



PROCEDURE: Overhanging signals while travelling through the intersection.

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

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

ROAD MODIFICATIONS: No works are required.

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

170 Metre rotor:

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

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

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

Spotter to keep the driver informed throughout the procedure.

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

ROAD MODIFICATIONS: Nil.

158 Metre rotor:

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

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

COMMENTS: The loads will need to cross to the incorrect side of the intersection, before crossing back over 200 metres to the north. The centre median strip will need to be modified so the trucks can cross over safely.

Spotter to keep the driver informed throughout the procedure.

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

ROAD MODIFICATIONS: Nil.

13.9 Km's: Lowest structure (Bridge or Sign) between Mayfield and the Hunter Expressway.

Image 1:

PROCEDURE: Travel directly ahead in the centre lane.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/YTMoFe7Aick

COMMENTS: This is the lowest structure on route. There is no bypass around the gantry. A maximum loaded height of 5.8 metres should not be exceeded.

ROAD MODIFICATIONS: No works are required.

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

170 Metre rotor and 158 Metre rotor:

PROCEDURE: Travel directly ahead in the centre lane.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/MYSBciVvcwB2

COMMENTS: The roundabout has been demolished. The new intersection has 2 lanes directly ahead with a width clearance of 9.0 metres.

ROAD MODIFICATIONS: No works are required.

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

170 Metre rotor:

170 Metre rotor:

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

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/FH5DqHBXwSkntAmz9

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

ROAD MODIFICATIONS: No works required.

158 Metre rotor:

PROCEDURE: Travel around the roundabout and take the third exit onto the Hunter Expressway onramp.

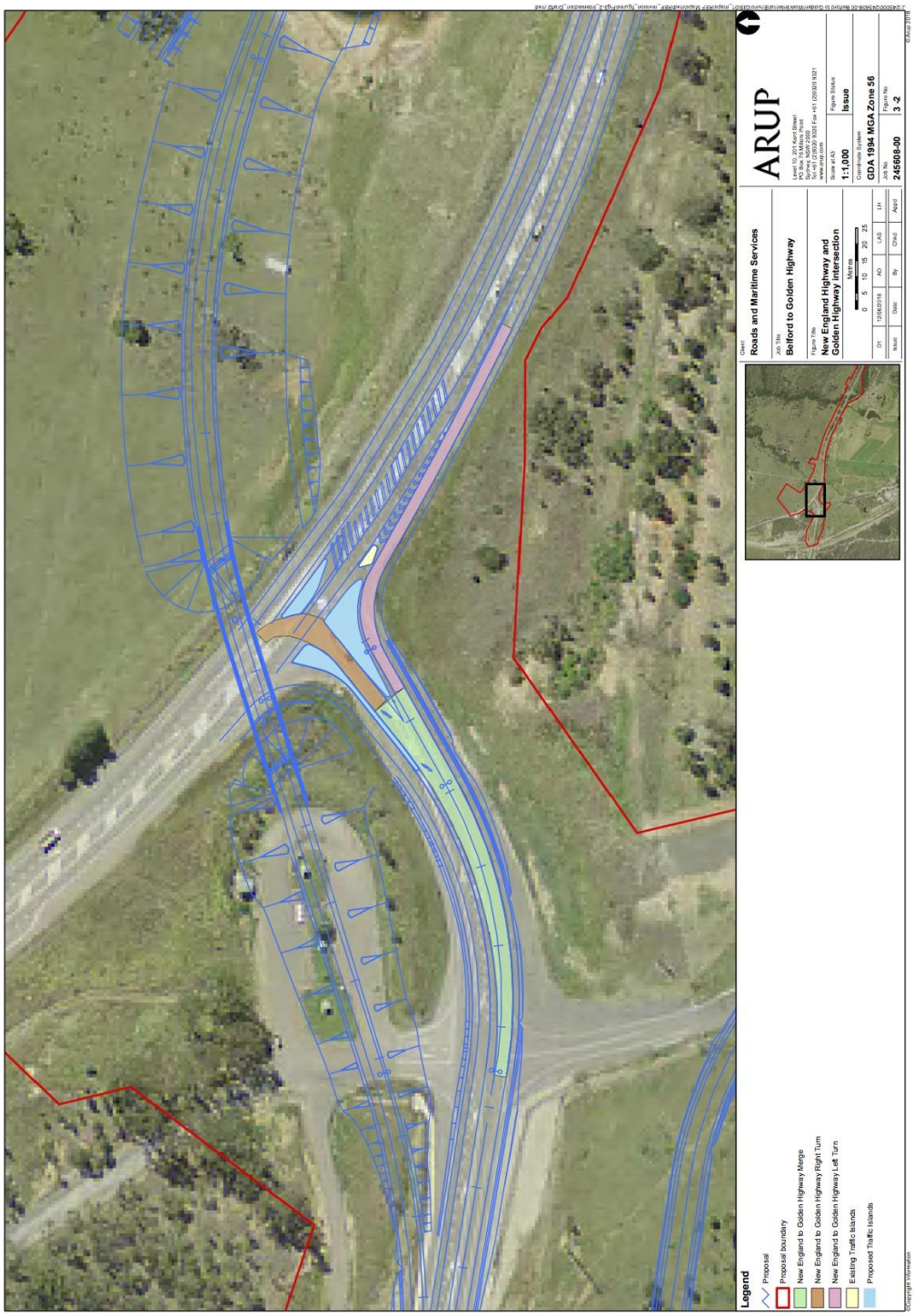
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/cEnuC5th1p52

COMMENTS: A sign will need to be made removable. Spotter to guide load through this pinchpoint.

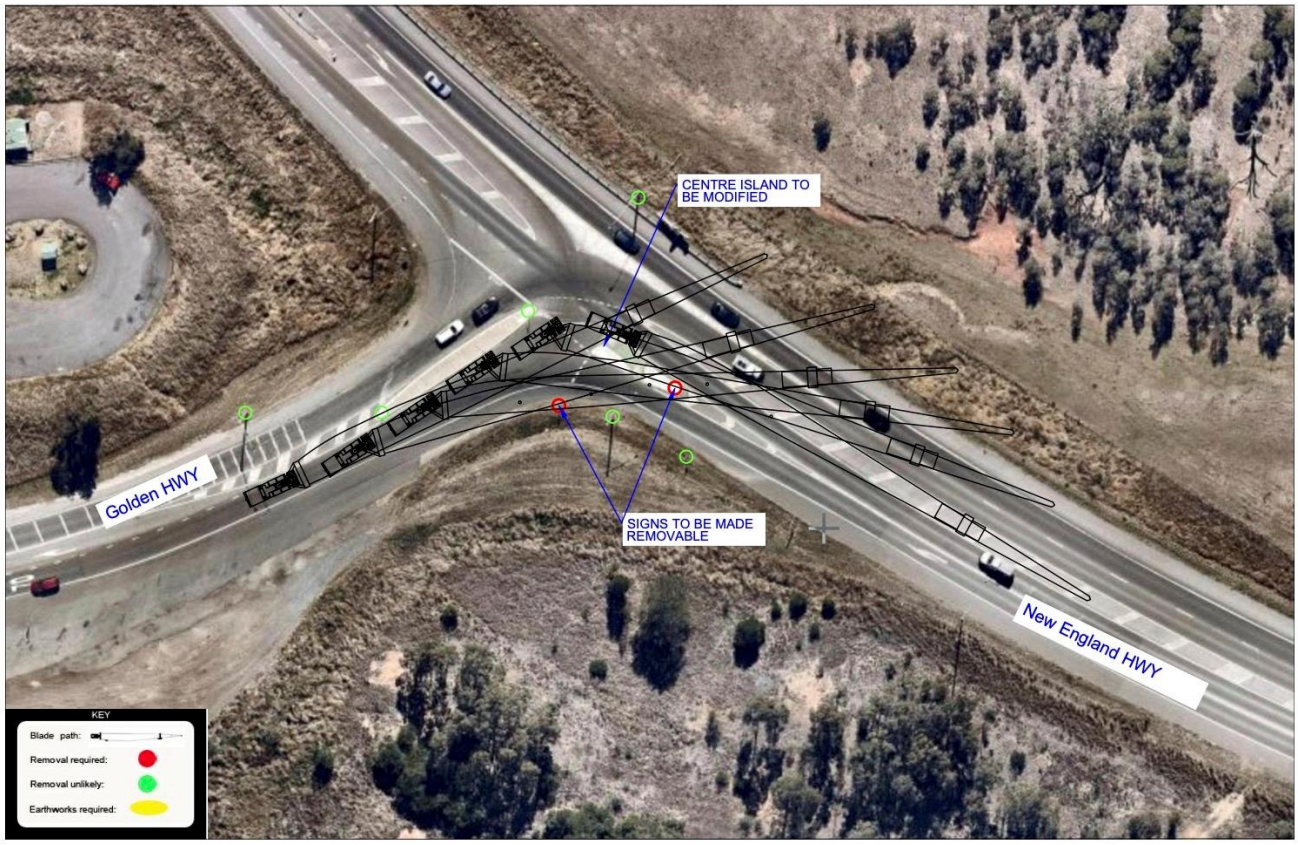
ROAD MODIFICATIONS: No works required.

67.3 Km's: New England Highway onto Golden Highway at Whittingham.

Image 1: Proposed upgrades



170 Metre rotor:



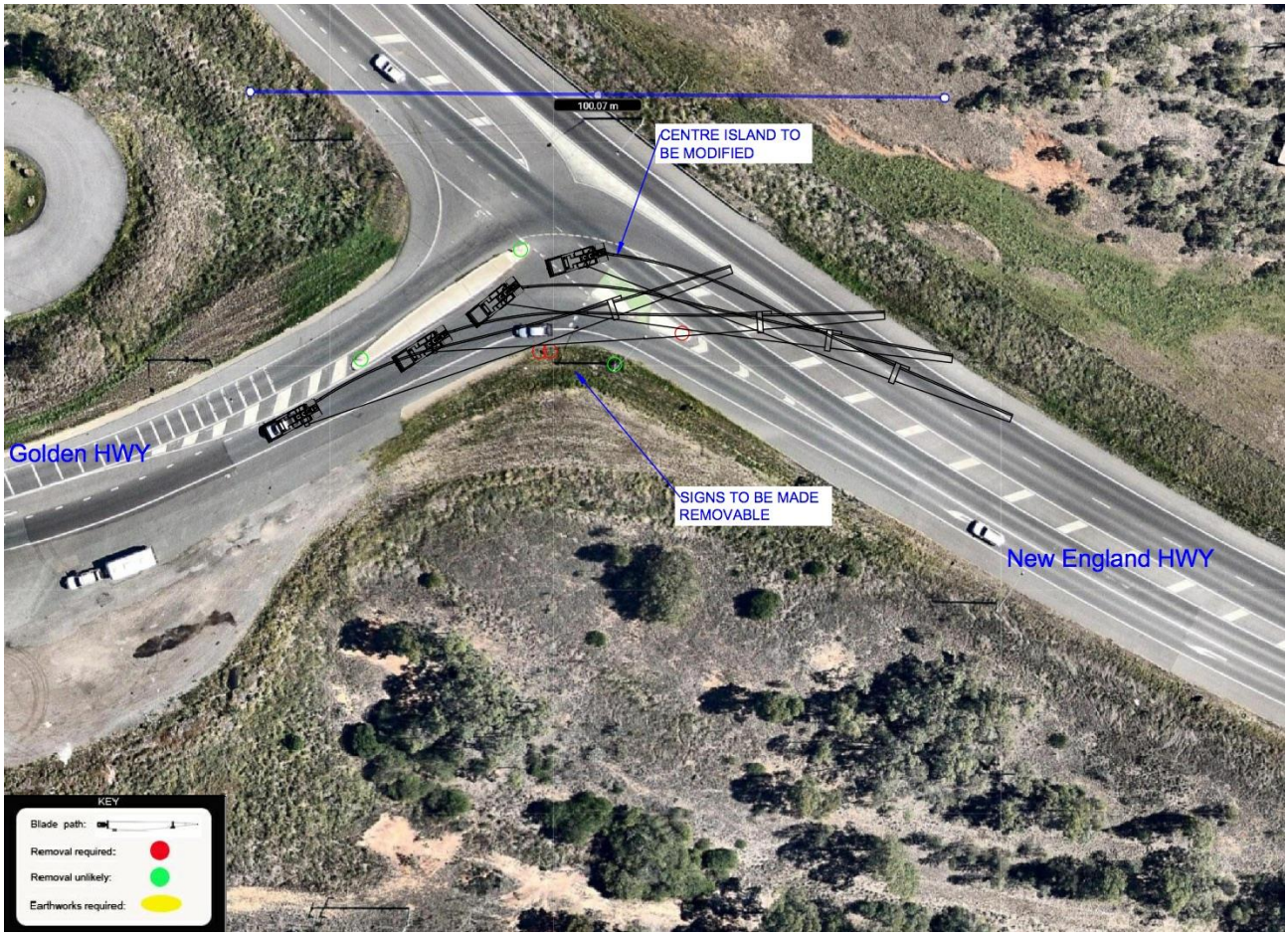
PROCEDURE: Left hand turn from the New England Highway onto the Golden Highway.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/GZ3VbkLrKf42

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

ROAD MODIFICATIONS: NOTE: This intersection is currently in line to be upgraded. The details on image 1 shows that the changes should not affect the swept path, however it is recommended that this is monitored.

158 Metre rotor:



PROCEDURE: Left hand turn from the New England Highway onto the Golden Highway.

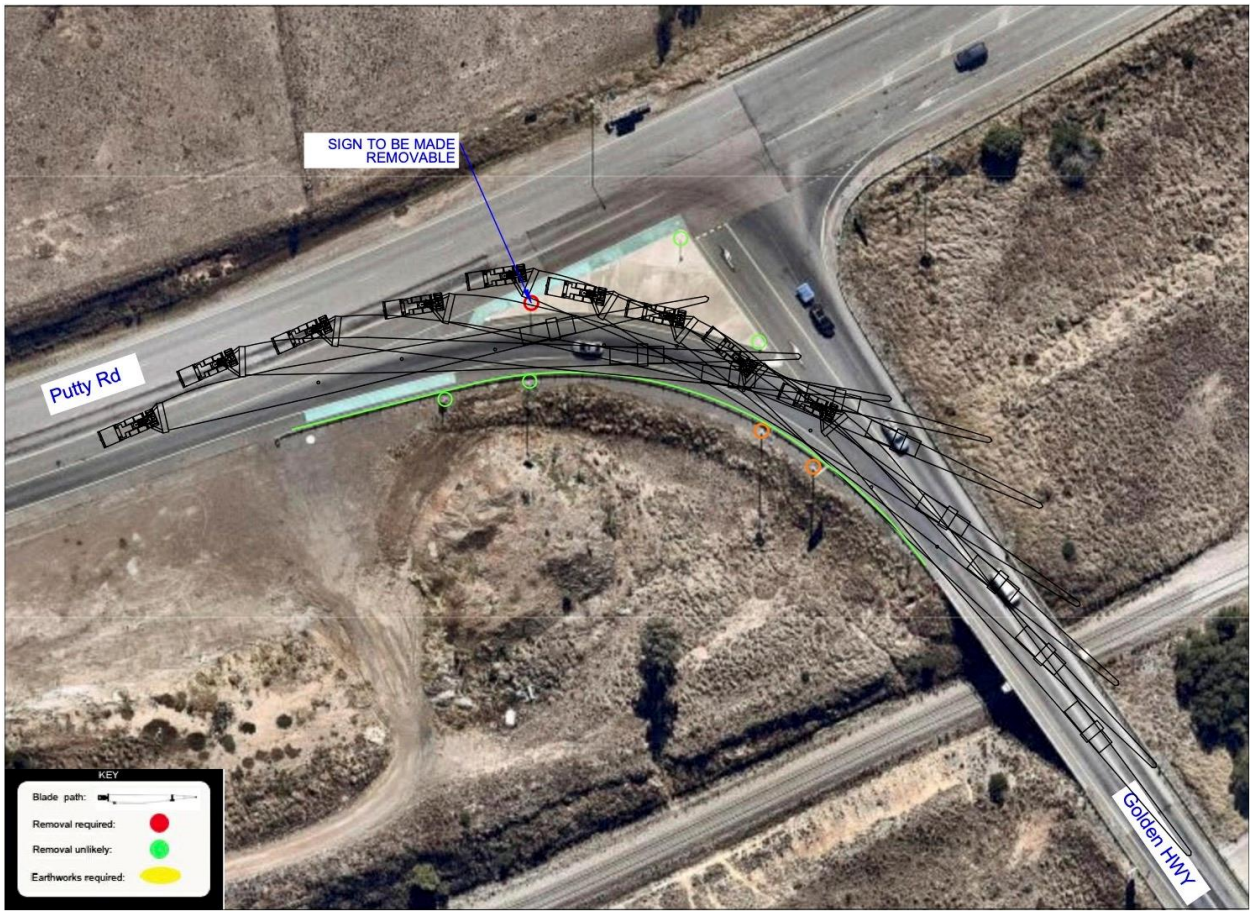
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/GZ3VbkLrKf42

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

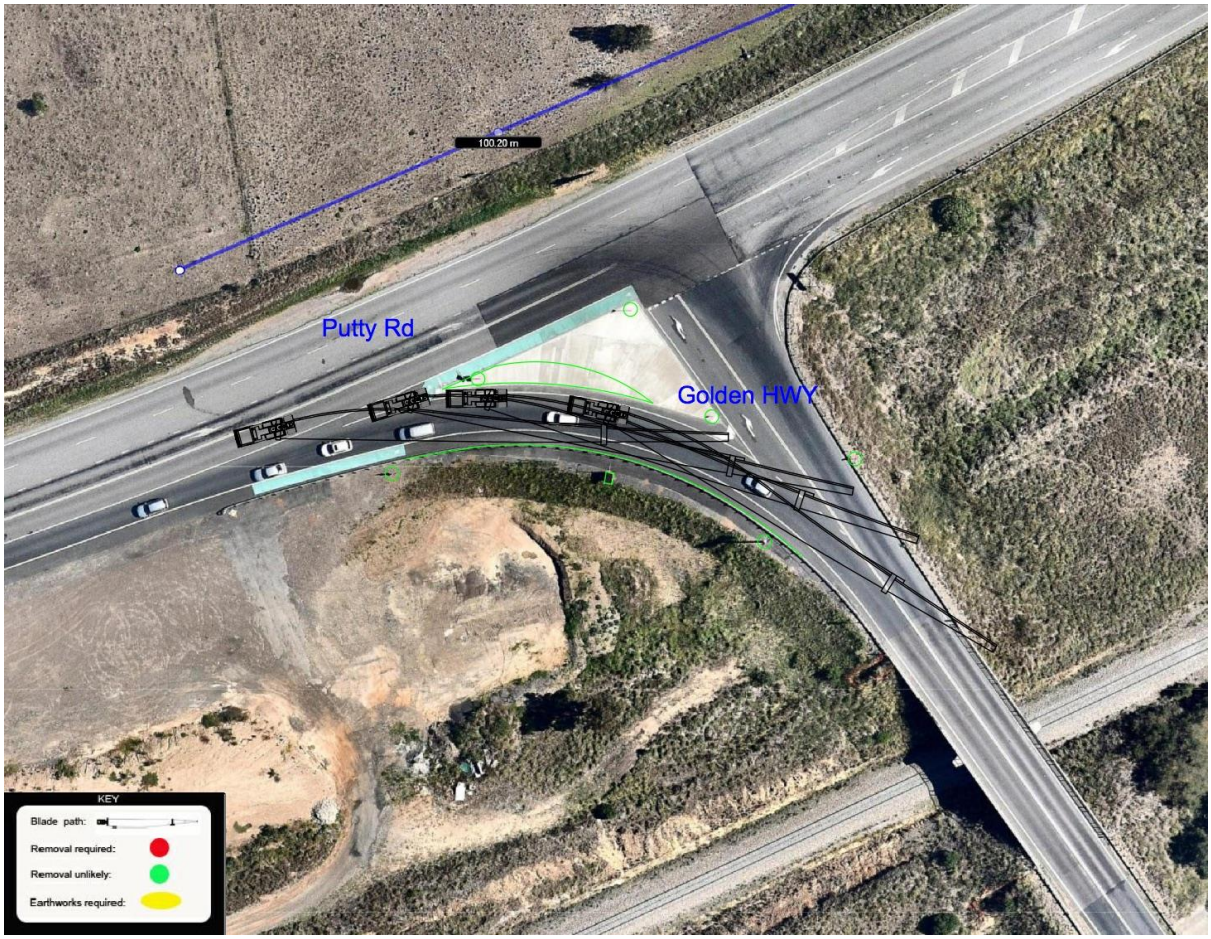
ROAD MODIFICATIONS: NOTE: This intersection is currently in line to be upgraded. The details on image 1 shows that the changes should not affect the swept path, however it is recommended that this is monitored.

77.3 Km's: Golden Highway intersection with Putty Road at Whittingham.

170 Metre rotor:



158 Metre rotor:



PROCEDURE: Left hand turn from the Golden Highway at the intersection of the Putty Road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/esuS6TUUwQ92

COMMENTS: Loads to turn from the incorrect side to the incorrect side. Spotter to keep the driver informed throughout the procedure.

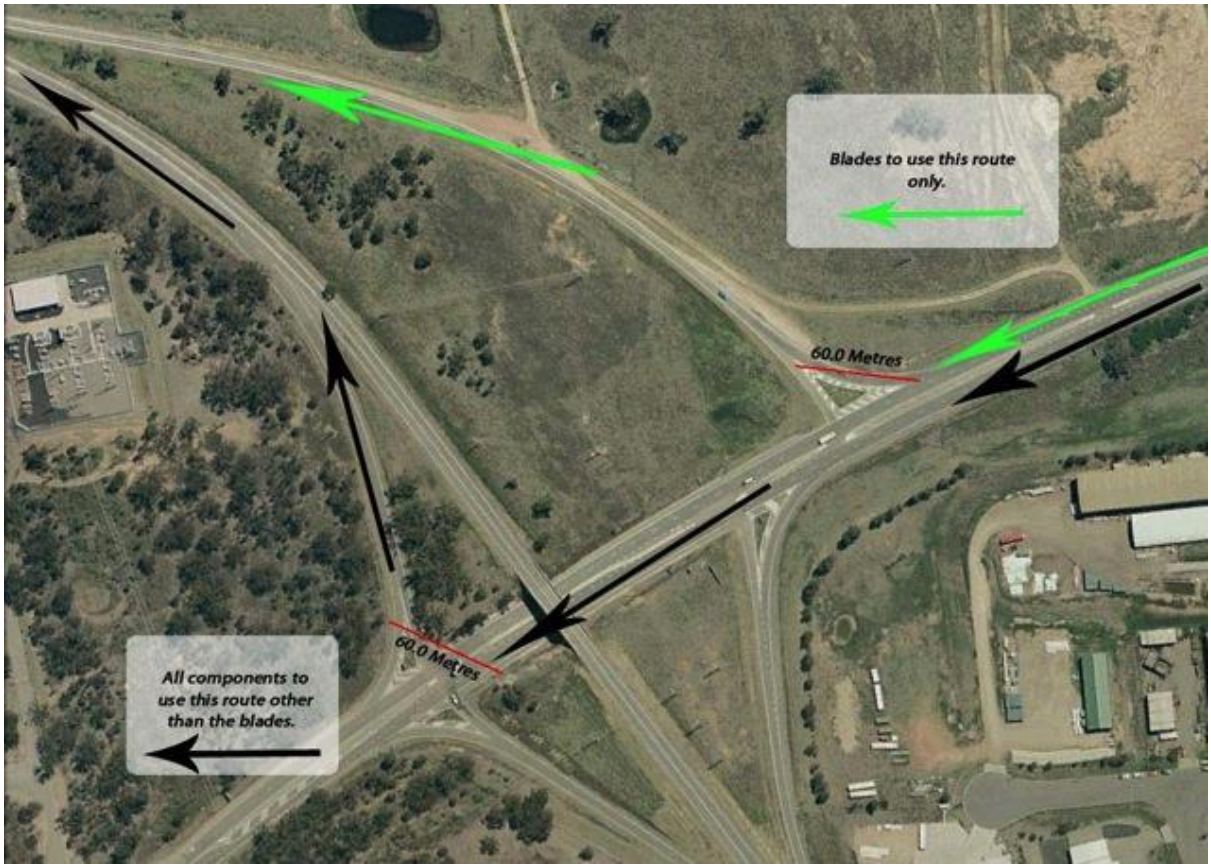
Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: No works required.

80.8 Km's: Golden Highway intersection with Putty Road at Mount Thorley.

170 Metre rotor:

Image 2:



PROCEDURE: Right hand turn from the Putty Road onto the Golden Highway.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/Qj4tjSSjN932

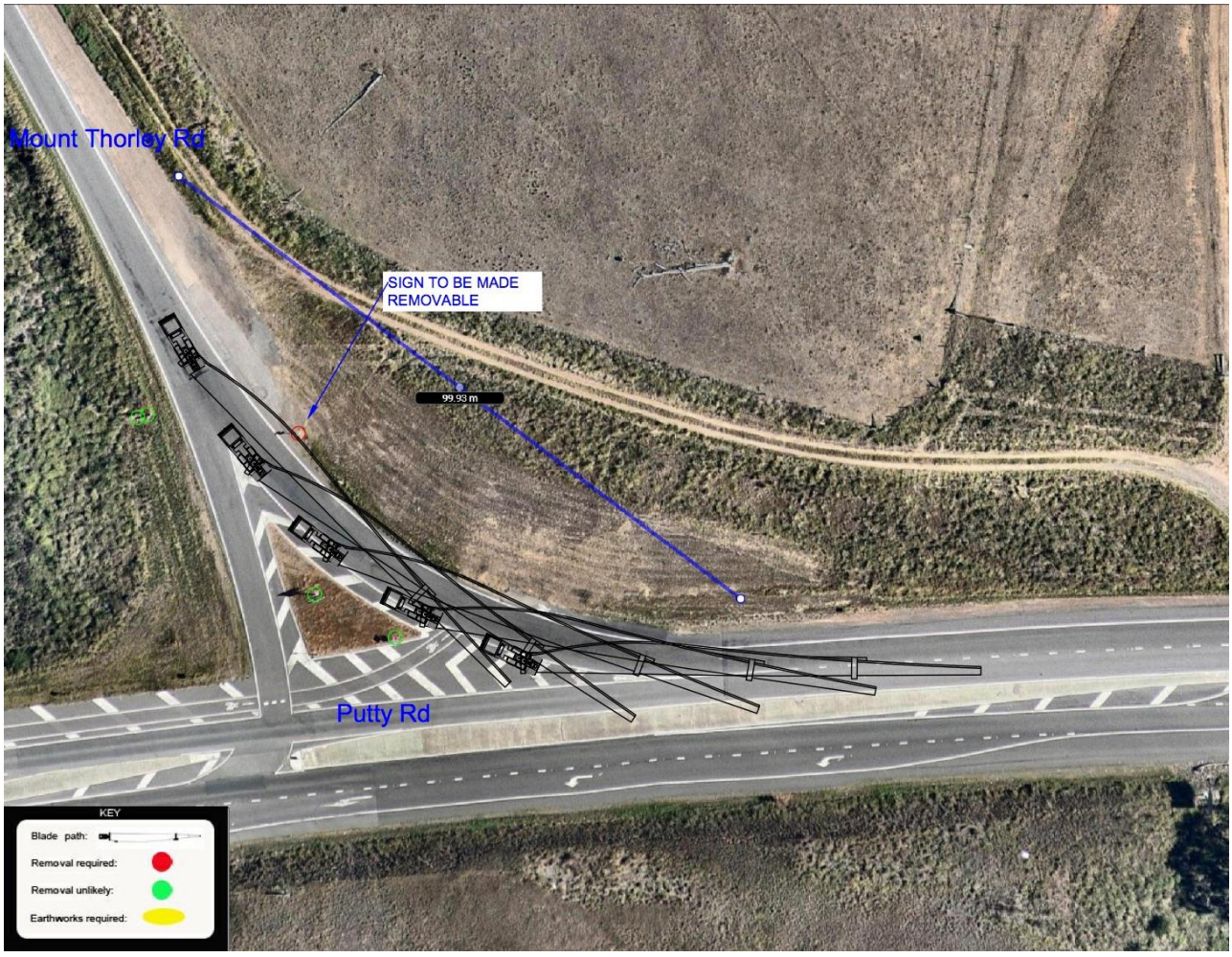
COMMENTS: Loads to turn from the incorrect side to the incorrect side. Blades to cross to the incorrect side prior to the intersection, and return to the correct side when the lanes remerge. Spotter to keep the driver informed throughout the procedure.

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

NOTE: Towers and general loads will travel under the overpass and stay on the correct side of the road. The overpass is 5.6 in the center of the road. Loads that exceed 5.6 high will need to take the blade detour.

ROAD MODIFICATIONS: No works required.

158 Metre rotor



PROCEDURE: Right hand turn from the Putty Road onto the Golden Highway.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/Qj4tjSSjN932

COMMENTS: Loads to turn from the incorrect side to the incorrect side. Blades to cross to the incorrect side prior to the intersection, and return to the correct side when the lanes remerge. Spotter to keep the driver informed throughout the procedure.

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

NOTE: Towers and general loads will travel under the overpass and stay on the correct side of the road. The overpass is 5.6 in the center of the road. Loads that exceed 5.6 high will need to take the blade detour.

ROAD MODIFICATIONS: No works required.

107.0 Km's: Golden Highway through Jerrys Plains.
170 Metre rotor:

170 Metre rotor:

PROCEDURE: Right and left hand turn through the village.

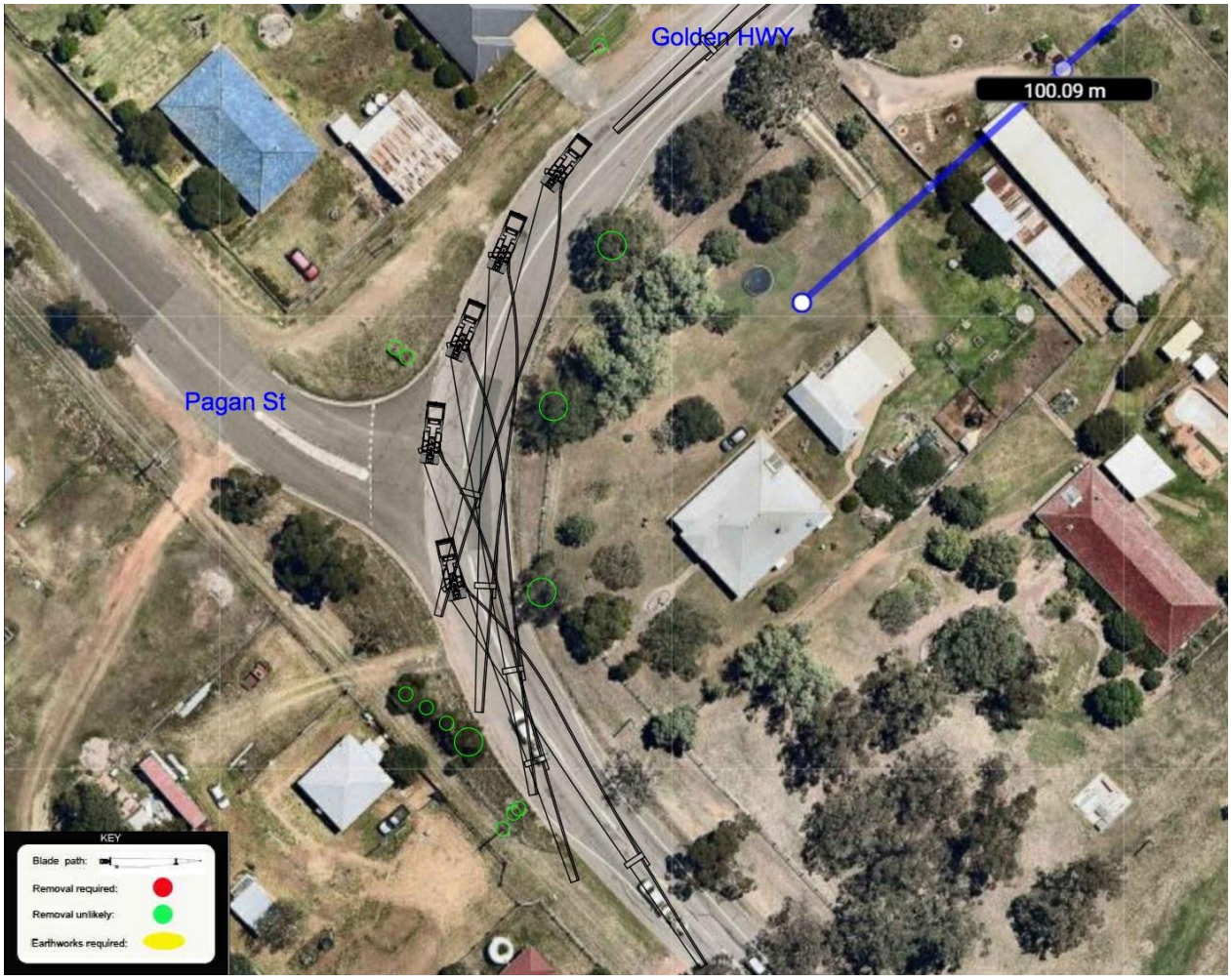
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/AiuT8MMVTh5crs348

COMMENTS: Blades to cross from the incorrect side to the incorrect side. Some hardstand needs to be added to the outside of the corner for the right-hand turn. The swept path will stay within the existing road reserve.

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

ROAD MODIFICATIONS: Moderate amounts of work are required.

158 Metre rotor:



158 Metre rotor:

PROCEDURE: Right and left hand turn through the village.

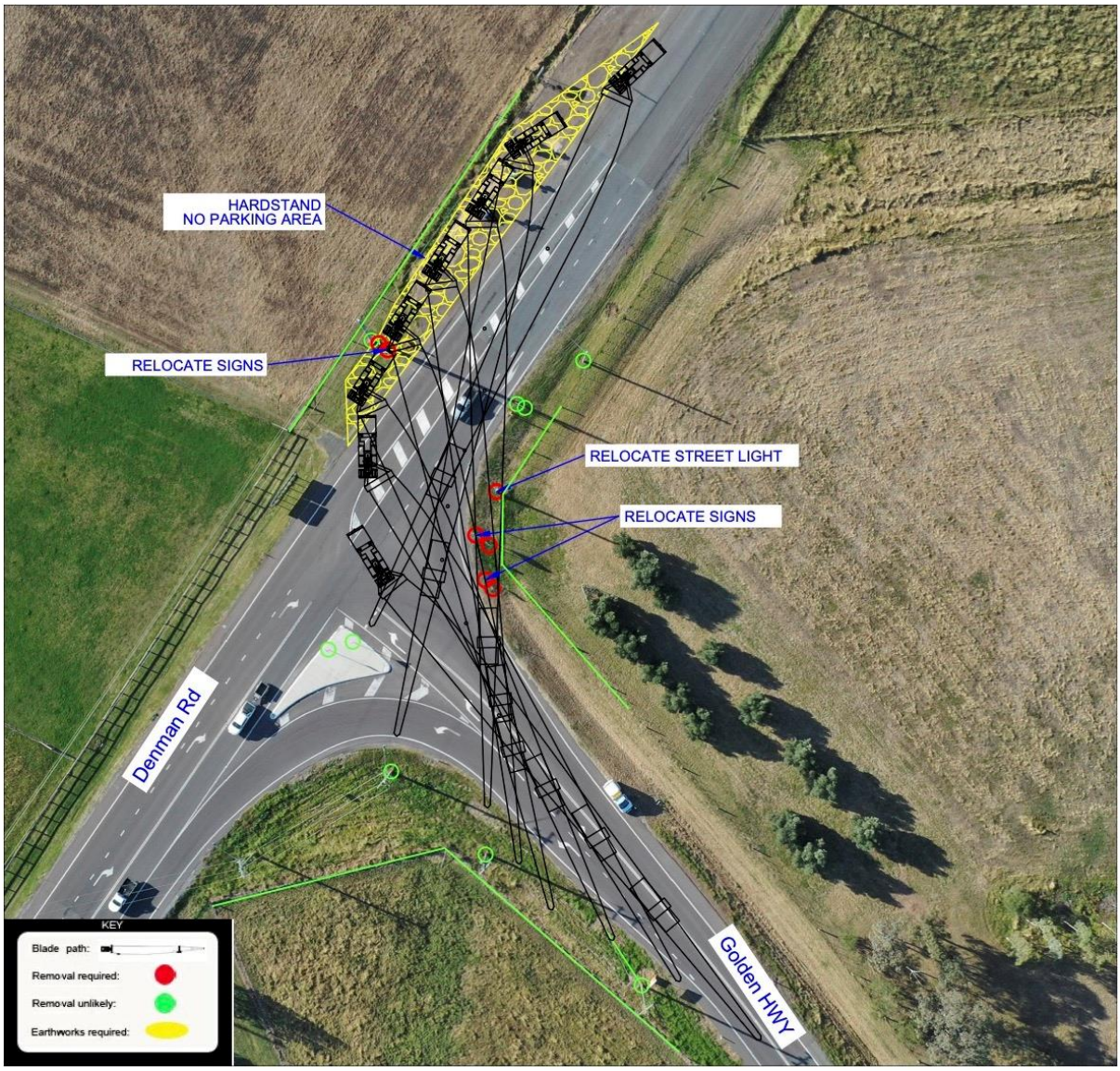
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/AiuT8MMVTh5crs348

COMMENTS: Blades to cross from the incorrect side to the incorrect side. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: No works required.

141.9 Km's: Golden Highway intersection with Denman Road at Denman.

170 Metre rotor:



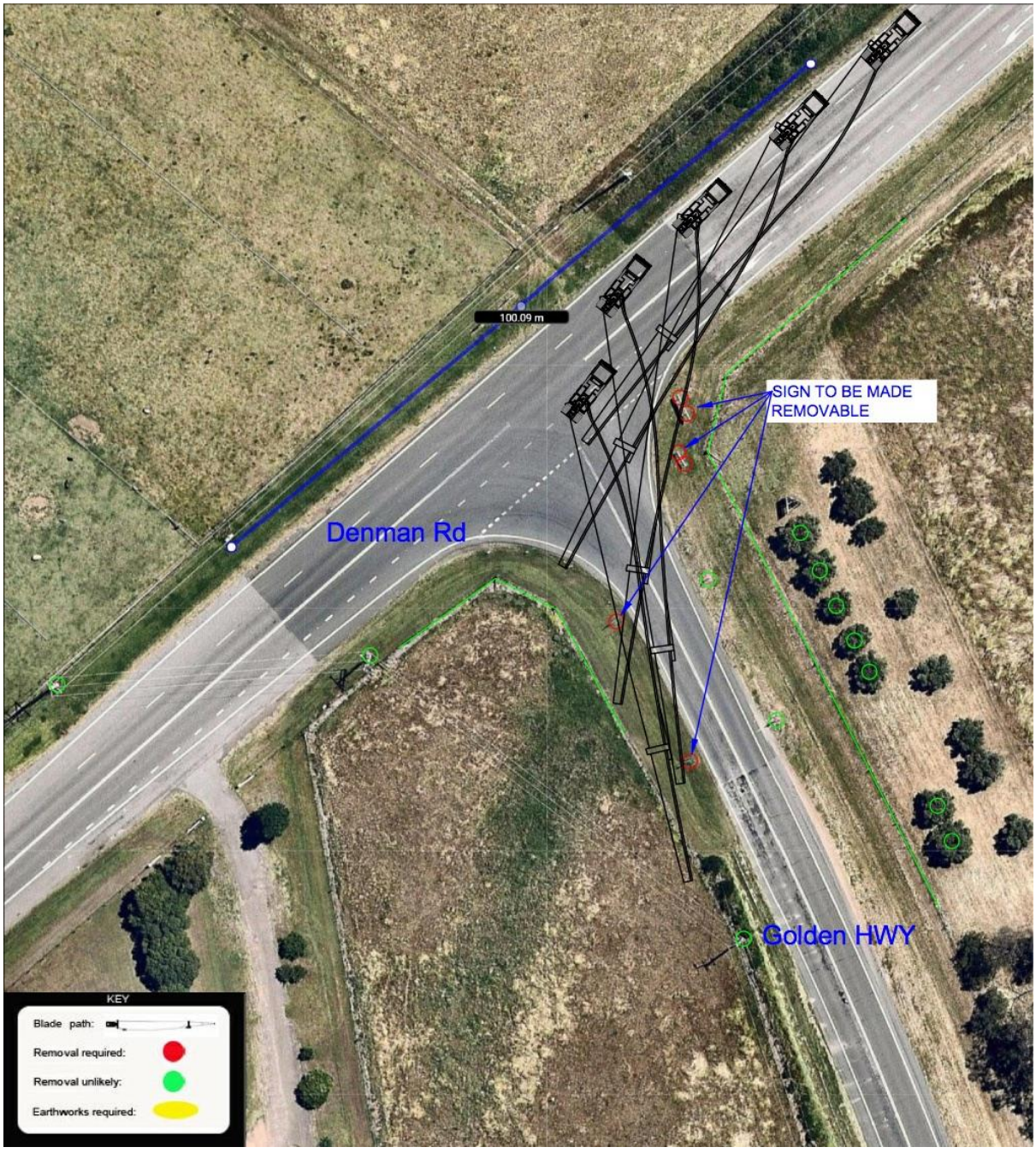
PROCEDURE: Right hand turn from the Golden Highway at the intersection of Denman Road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/T4m46bBNuro

COMMENTS: Blades to cross from the correct side to the correct side. Some signs will need to be made removable and some hardstand added to the outside exit of the turn. Police and escorts to control local traffic either side of the intersection. Loads swept path will stay within the road reserve.

ROAD MODIFICATIONS: Moderate amounts of work are required.

158 Metre rotor:



PROCEDURE: Right hand turn from the Golden Highway at the intersection of Denman Road.

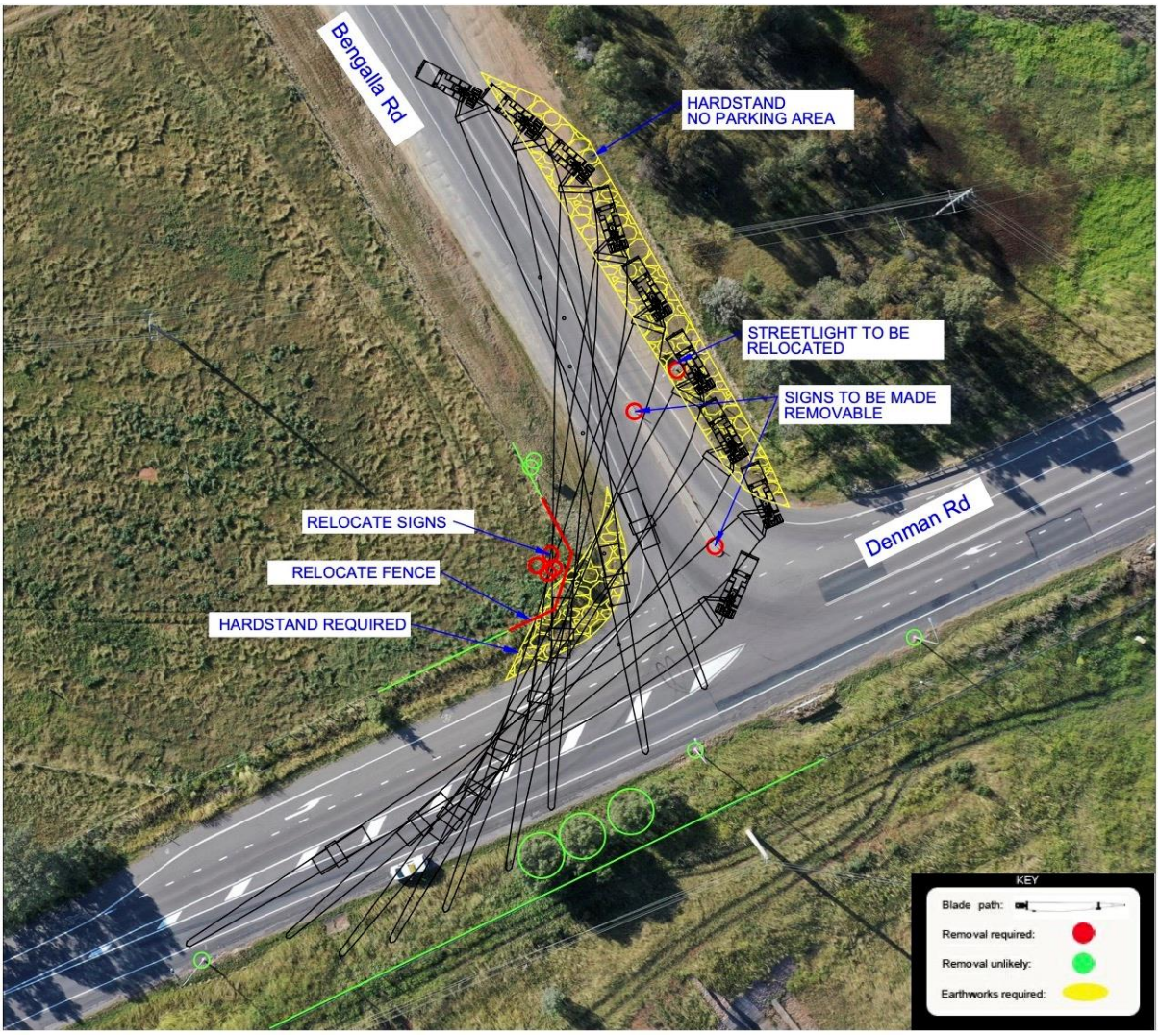
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/T4m46bBNuro

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

ROAD MODIFICATIONS: Small amounts of work are required.

149.0 Km's: Denman Road onto Bengalla Road at Muswellbrook.

170 Metre rotor:



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

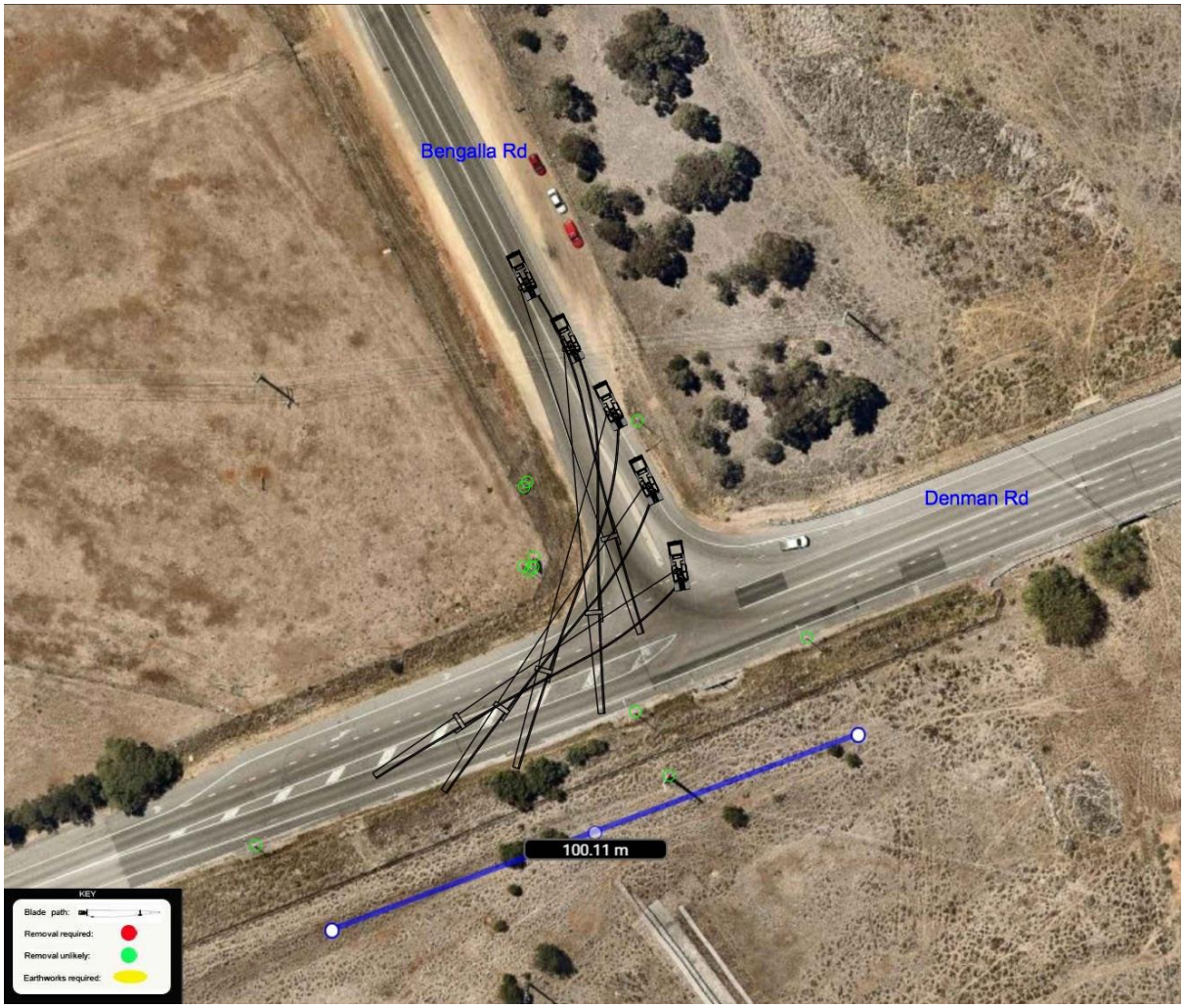
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/CJYMtSMTttJ2

COMMENTS: Blades to cross from the incorrect side to the incorrect side. Some signs will need to be made removable and some hardstand added to the inside of the corner as well as a fence removed. Loads swept path will enter a landowner's boundaries on the inside of the corner.

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

ROAD MODIFICATIONS: Moderate amounts of work are required.

158 Metre rotor:



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

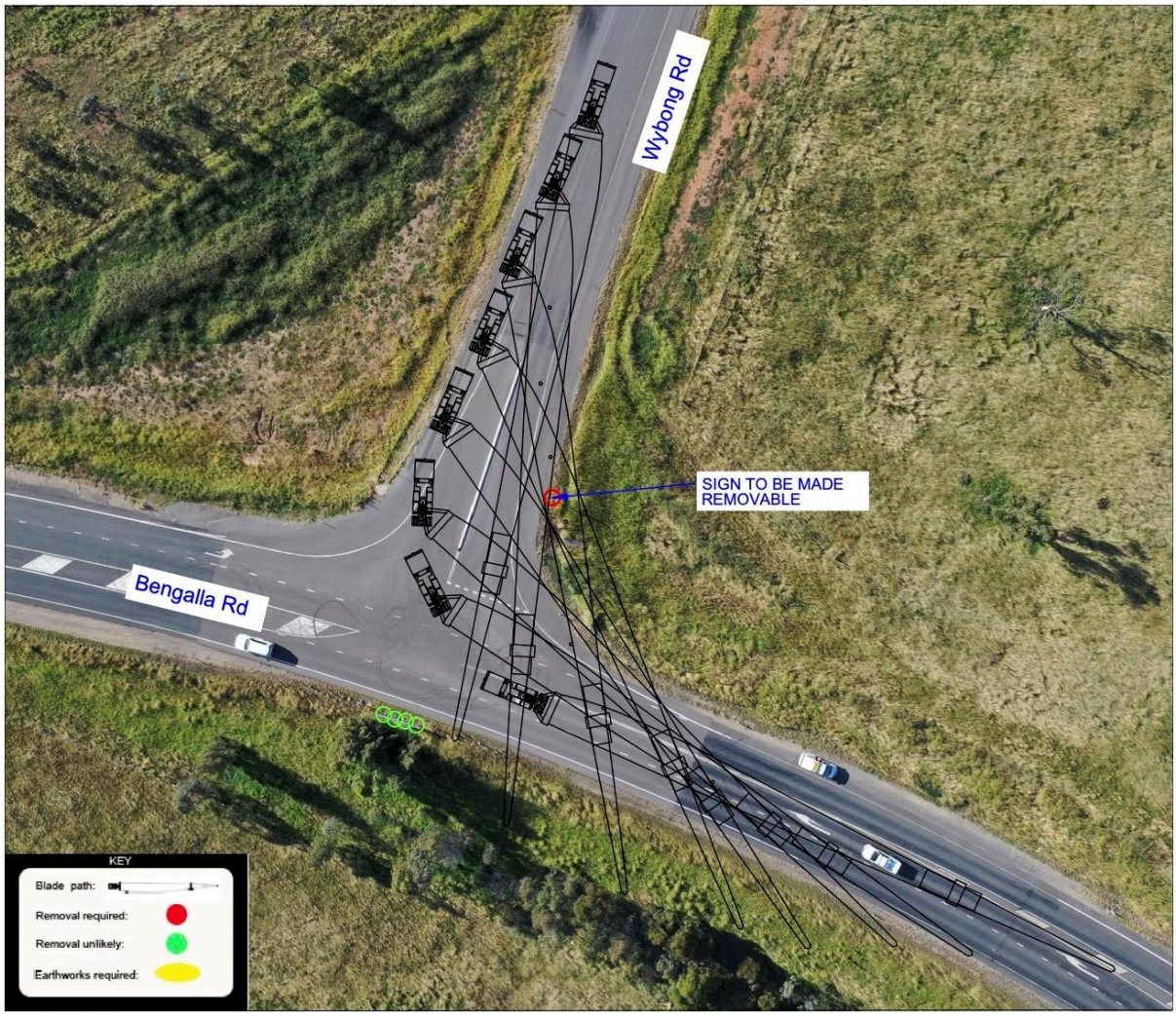
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/CJYMtSMTttJ2

COMMENTS: Blades to cross from the incorrect side to the incorrect side. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: No works required.

158.5 Km's: Bengalla Road onto Wybong Road at Muswellbrook.

170 Metre rotor:



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

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

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

ROAD MODIFICATIONS: Small amounts of work are required.

158 Metre rotor:

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

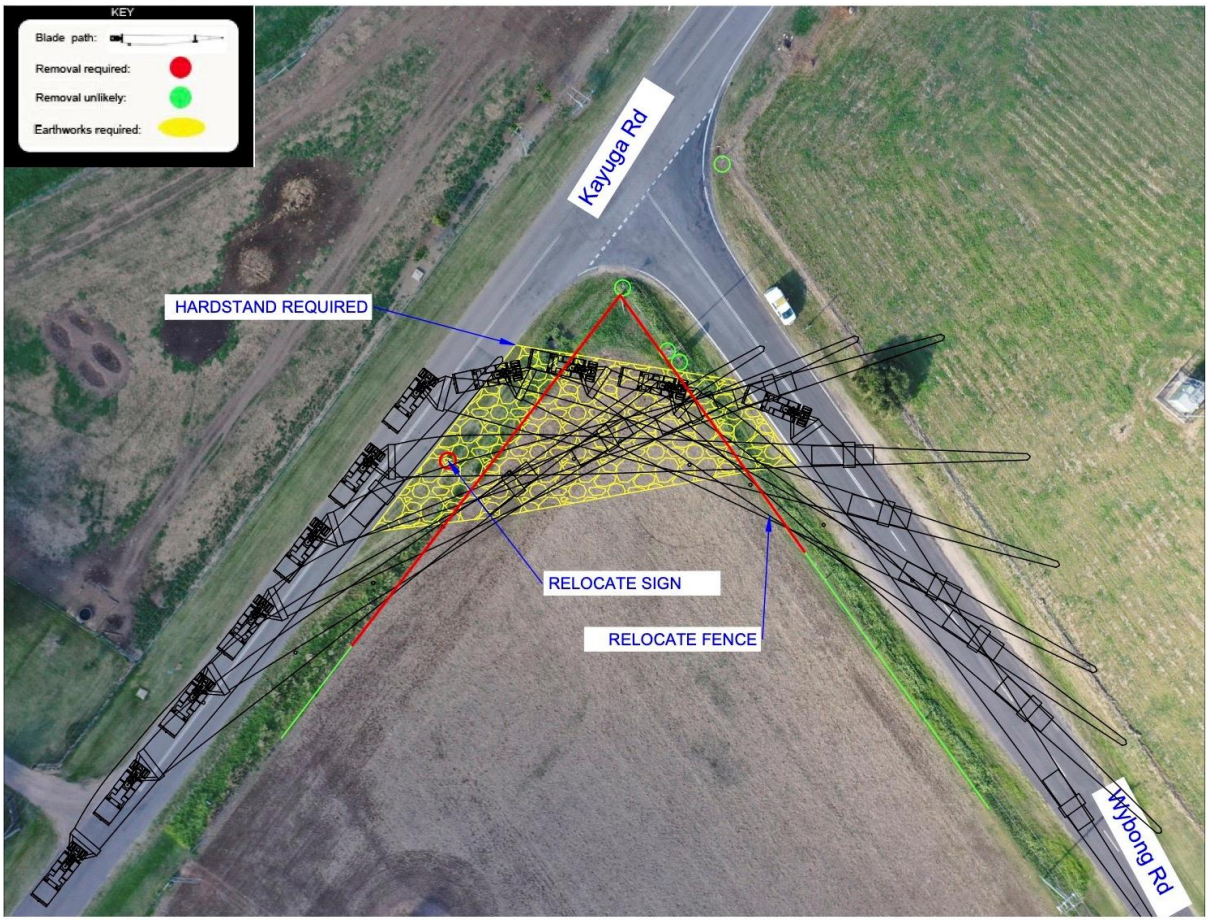
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/vibQtvHkxXE2

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

ROAD MODIFICATIONS: Small amounts of work are required.

168.1 Km's: Wybong Road onto Kayuga Road at Muswellbrook. OPTION 1

170 Metre rotor:



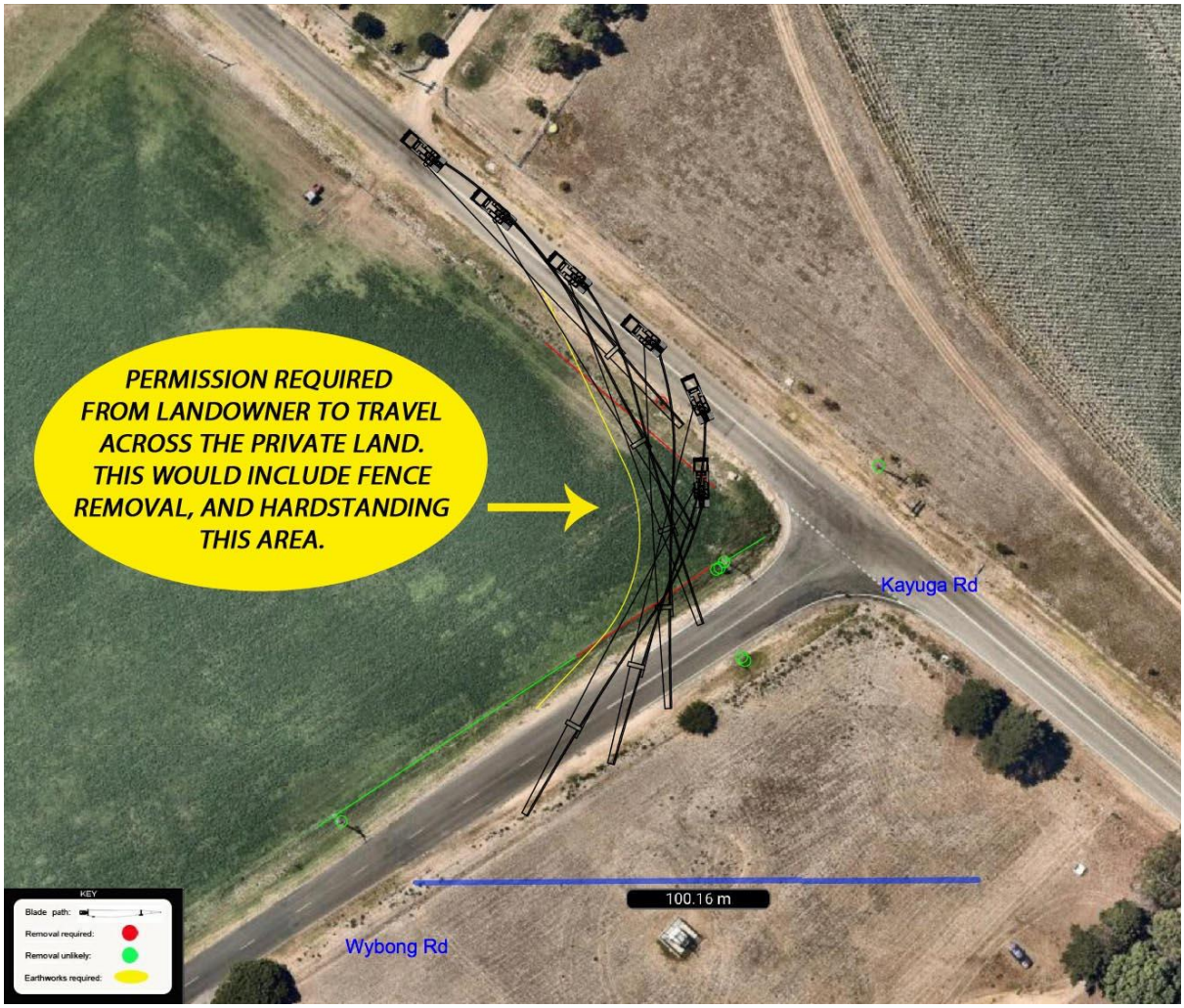
PROCEDURE: Left hand turn from Wybong Road onto Kayuga Road.

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

COMMENTS: Blades to cross from the incorrect side to the incorrect side with the load travelling across the inside of the telegraph pole and through private land.
Permission will be required from the landowner to travel over the private land. This will require removal and realigning the fence and adding hardstand.
Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: Large amounts of work are required.

158 Metre rotor:



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

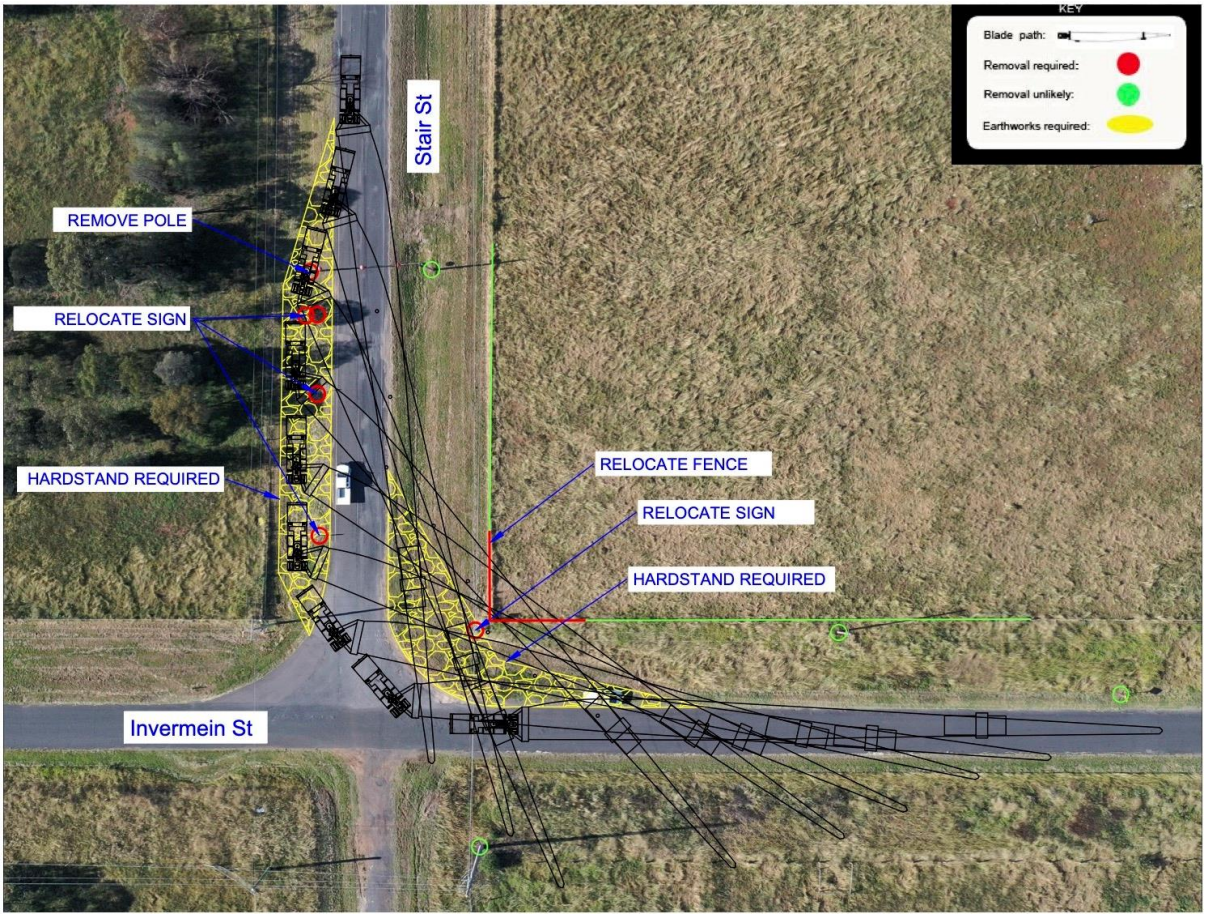
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/xVscKUT1isJ2

COMMENTS: Blades to cross from the incorrect side to the incorrect side. Permission will be required from the landowner to travel over the private land. This will require removal and realigning the fence and adding hardstand. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: Large amounts of work are required.

174.0 Km's: Ivermein Street onto Dartbrook access Road at Muswellbrook.

170 Metre rotor:



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

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

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

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

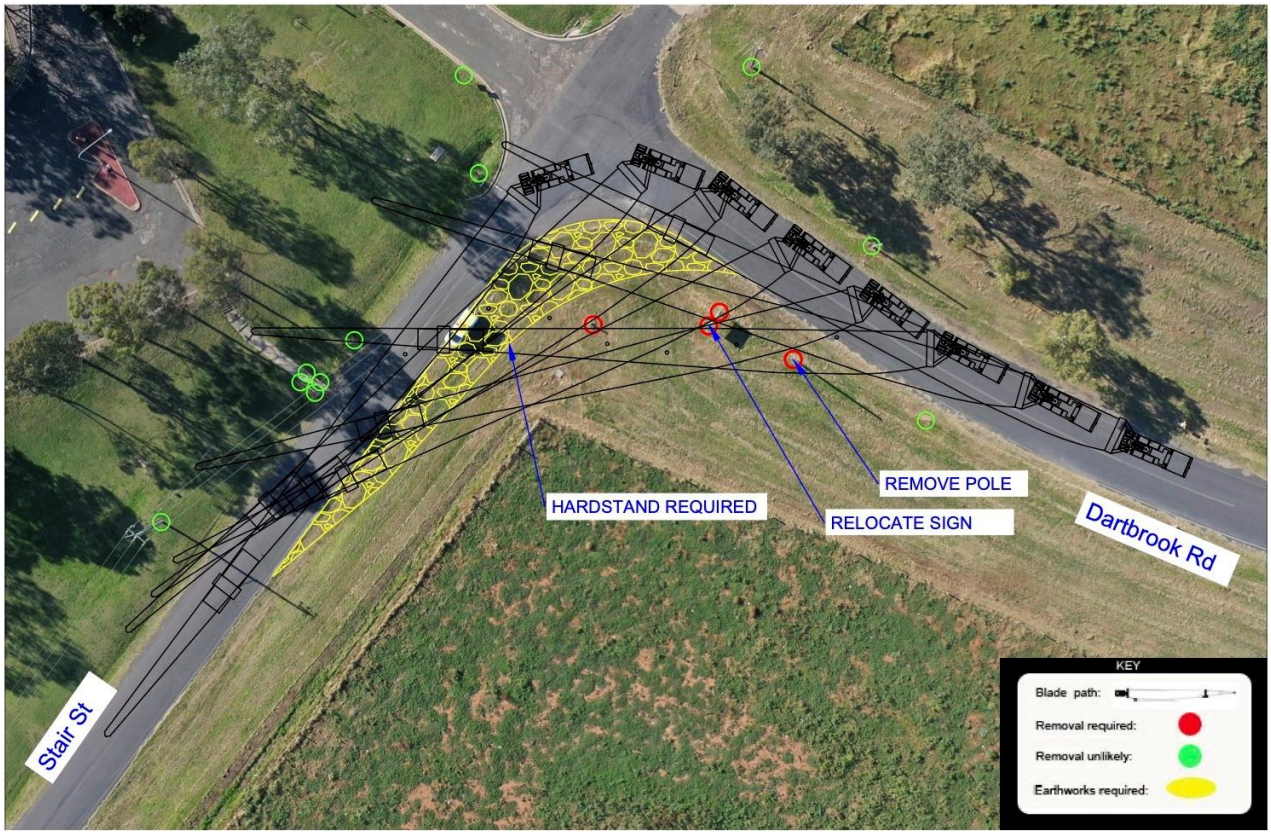
ROAD MODIFICATIONS: Moderate amounts of work are required.

158 Metre rotor:

PROCEDURE: Right hand turn from Ivermain Street onto the Dartbrook mine access Road.
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/ddMHa4CmXK32
COMMENTS: Blades to cross from the correct side to the correct side. Some signs will need to be made removable and some hardstand added to the inside and outside of the corner. Additionally, a drainage pipe will need to be extended on the inside of the corner. Police and escorts to control local traffic either side of the intersection.

ROAD MODIFICATIONS: Moderate amounts of work are required.

174.8 Km's: Dartbrook access Road at Muswellbrook.
170 Metre rotor:



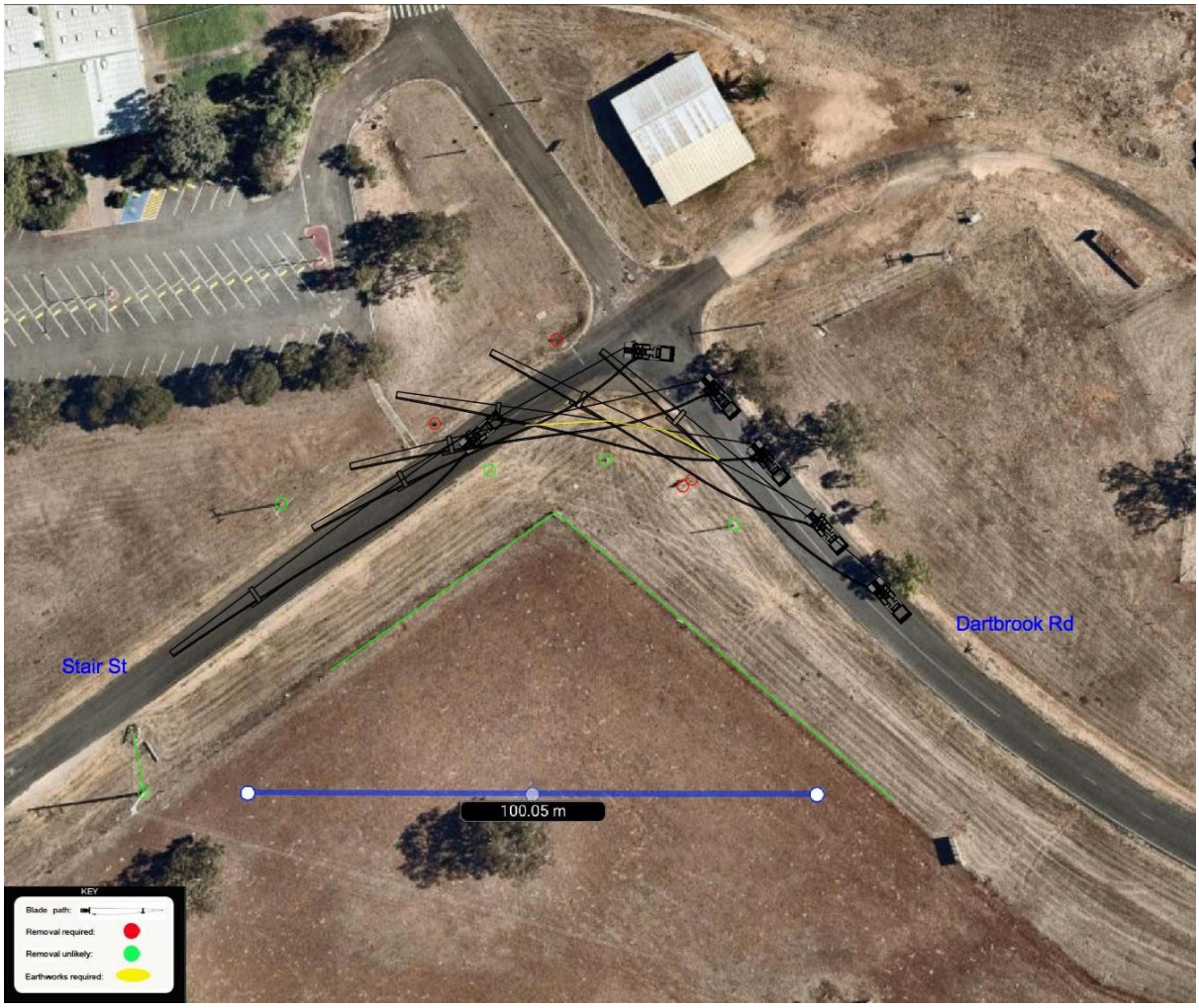
PROCEDURE: Right hand turn on the Dartbrook mine access Road.

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

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

ROAD MODIFICATIONS: Moderate amounts of work are required.

158 Metre rotor:



PROCEDURE: Right hand turn on the Dartbrook mine access Road.

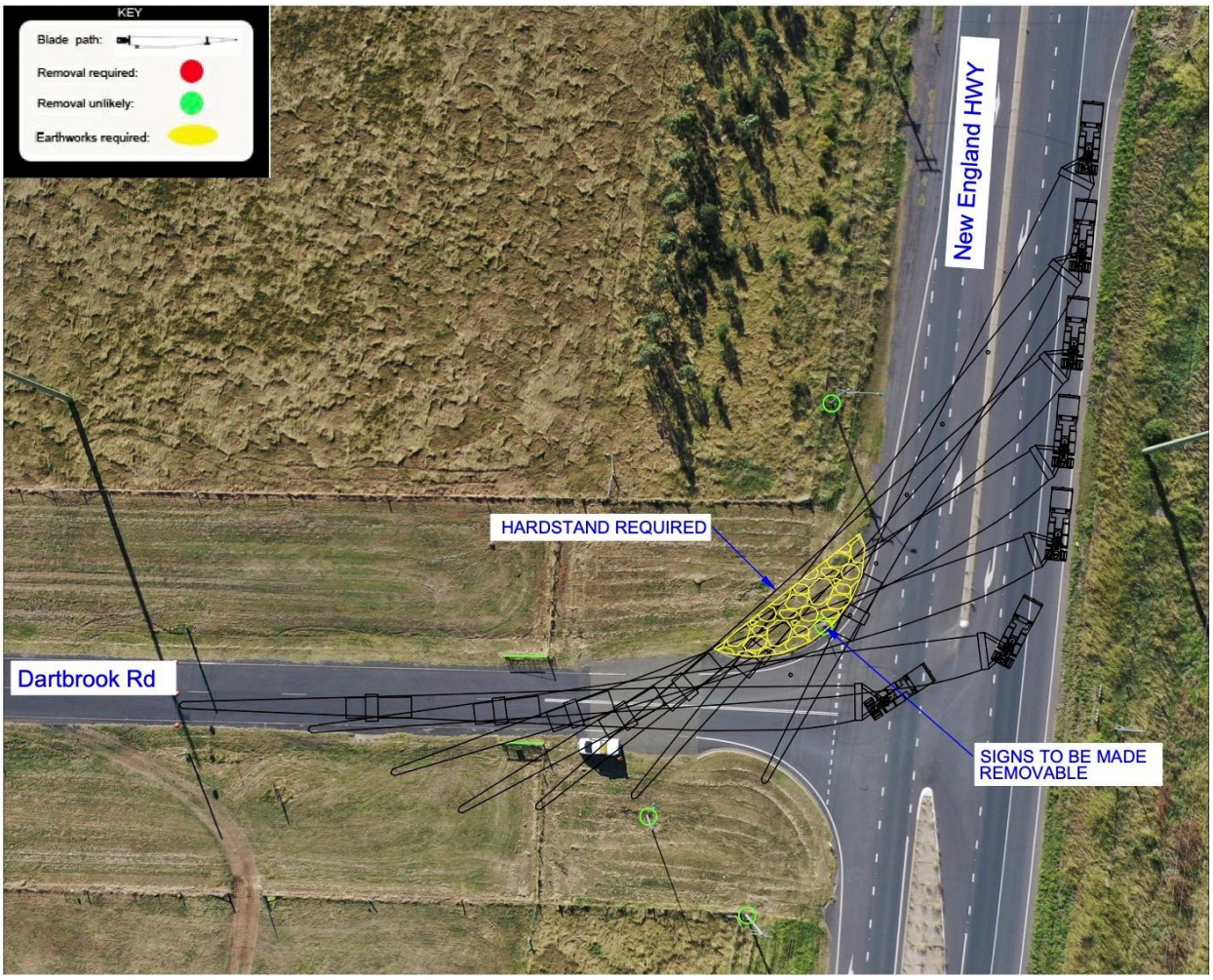
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/u9vSXiSV7Jt

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

ROAD MODIFICATIONS: Small amounts of work are required.

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

170 Metre rotor:



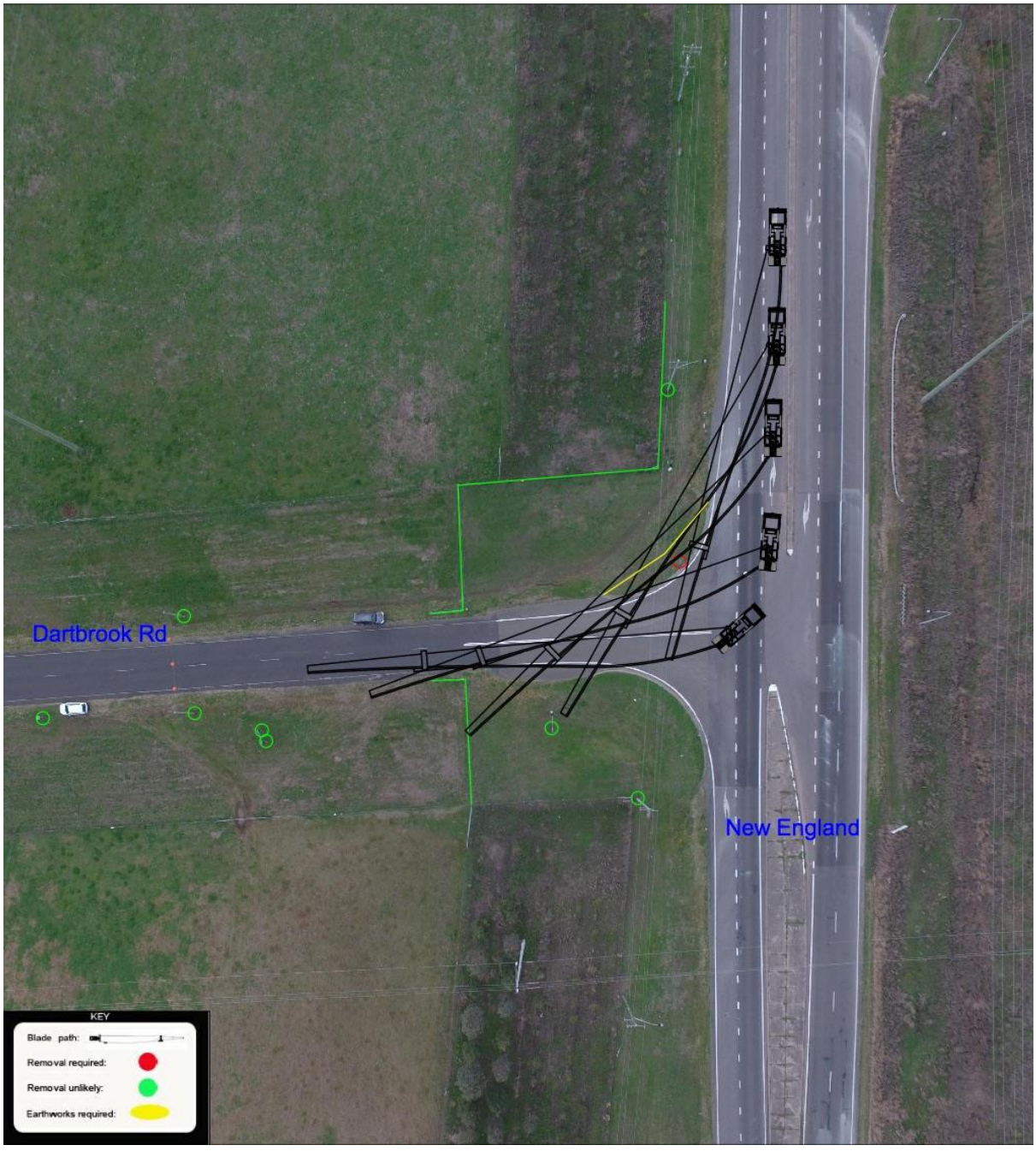
PROCEDURE: Left hand turn from the Dartbrook mine access Road onto the New England Highway.

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

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

ROAD MODIFICATIONS: Moderate amounts of work are required.

158 Metre rotor:



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

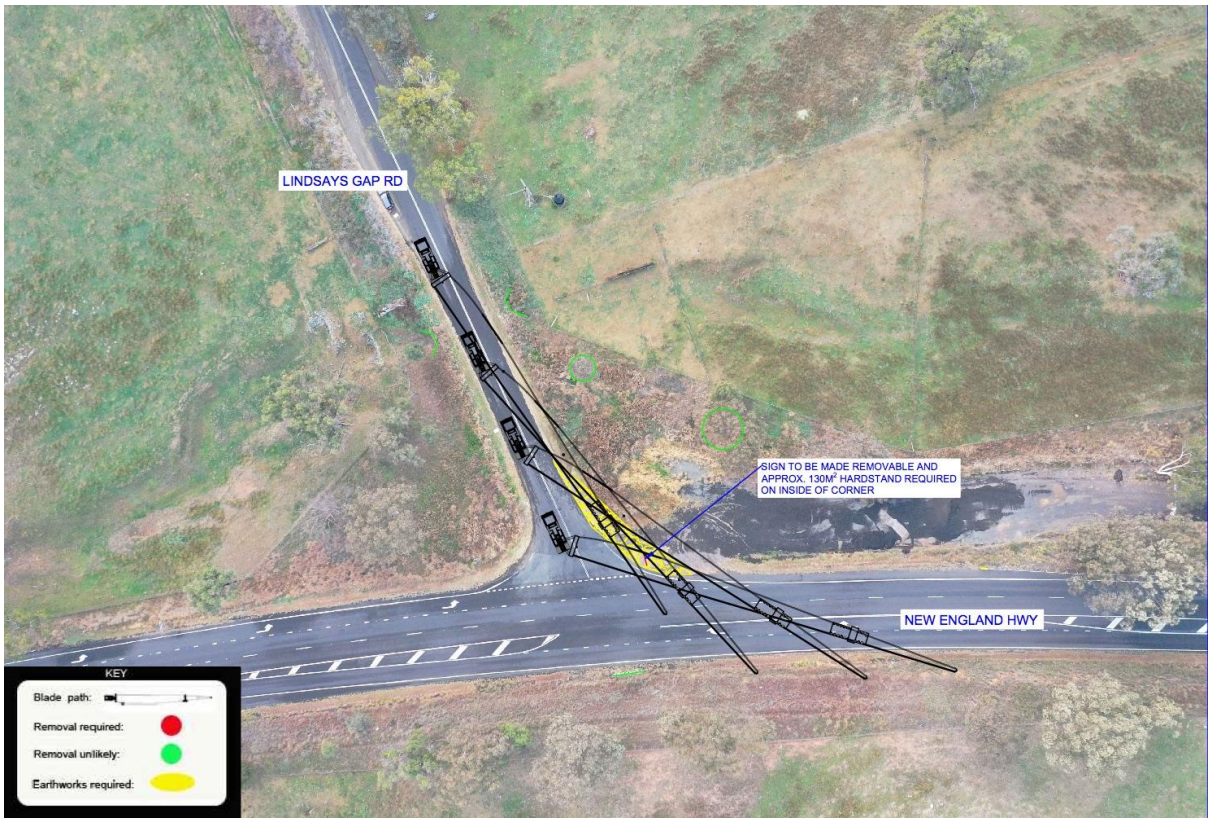
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/twTsmUKaED82

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

ROAD MODIFICATIONS: Moderate amounts of work are required.

276.0 Km's: New England Highway onto Lindsay's Gap Road at Wallabadah.

170 Metre rotor:



PROCEDURE: Right hand turn from the New England Highway onto Lindsay's Gap Road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/ePbYctjJootkBZiM9

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

ROAD MODIFICATIONS: Moderate amounts of work are required.

158 Metre rotor:

PROCEDURE: Right hand turn from the New England Highway onto Lindsay's Gap Road.
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/ePbYctjJootkBZiM9
COMMENTS: Blades to cross from the correct side to the correct side but cut across the inside of the corner. Some signs will need to be made removable.
ROAD MODIFICATIONS: Small amounts of work are required.

287.7 Km's: Lindsay's Gap Road over Goonoo Goonoo Creek at Garoo.

Image 1:

PROCEDURE: Travel directly ahead in the centre of the bridge.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/9ELSk5ZLRWnf14tm7

COMMENTS: The blades will fit over the structure in its current condition.

Loads that are been carried on trailers with an axle width exceeding 3.5 meters will not fit over this structure in its current form.

This bridge will need to be replaced or modified before the towers or motors can be delivered on this route.

A trafficable deck width of at least 4.6 meters is required for these heavier loads. And possibly turn the bridge into dual lane.

ROAD MODIFICATIONS: Yes, a large amount of works is required.

295.7 Km's: Lindsay's Gap Road over Middlebrook Creek at Garoo.

Image 1:

Image 2:

PROCEDURE: Travel directly ahead in the centre of the bridge before entering a right-hand bend.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/DyxGUid9JucoAHhHA

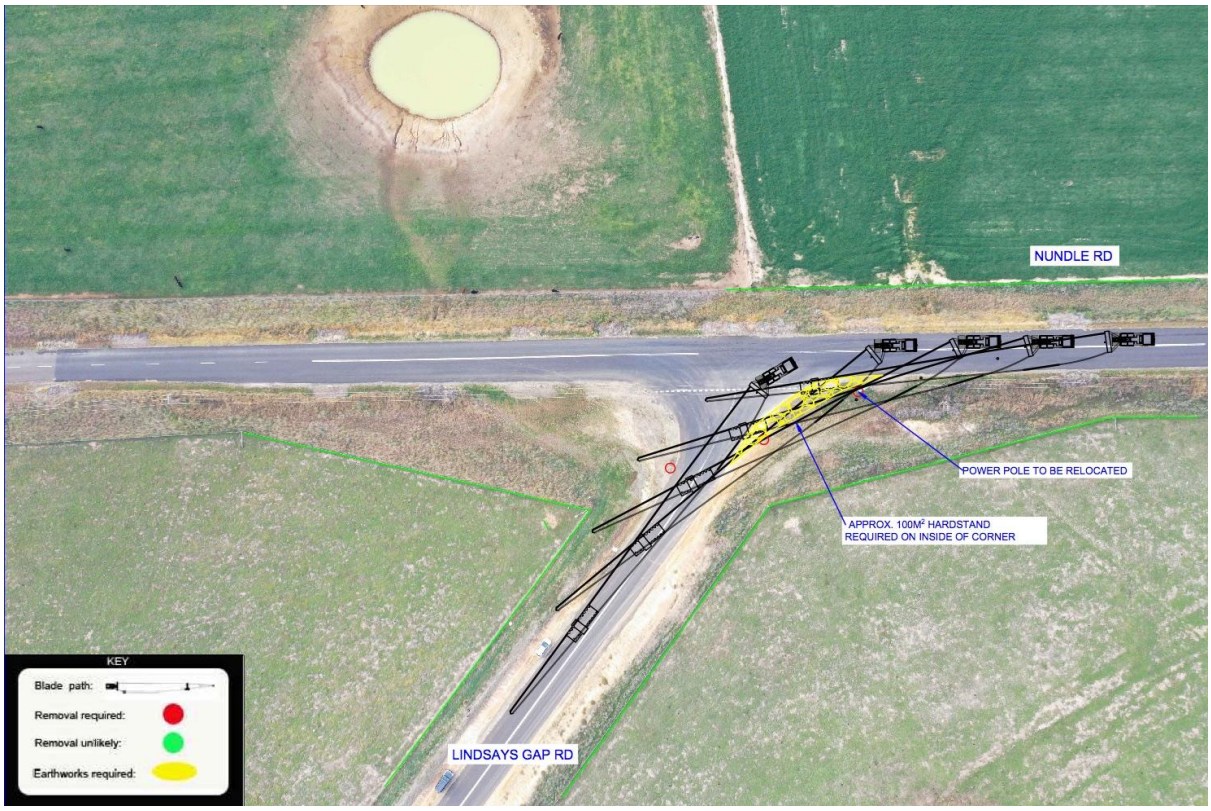
COMMENTS: The blades will fit over the structure in its current condition.

Loads that are been carried on trailers with an axle width exceeding 3.5 meters will not fit over this structure in its current form.

This bridge will need to be replaced or modified before the towers or motors can be delivered on this route. A trafficable deck width of at least 4.6 meters is required for these heavier loads. And possibly turn the bridge into dual lane.

ROAD MODIFICATIONS: Yes, a large amount of works is required.

306.8 Km's: Lindsay's Gap Road onto Nundle Road at Nundle.
170 Metre rotor:



PROCEDURE: Right hand turn from Lindsay's Gap Road onto Nundle Road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/FX4ZRx2YG9i2BsXMA

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

ROAD MODIFICATIONS: Large amount of work is required.

158 Metre rotor:

PROCEDURE: Right hand turn from Lindsay's Gap Road onto Nundle Road.

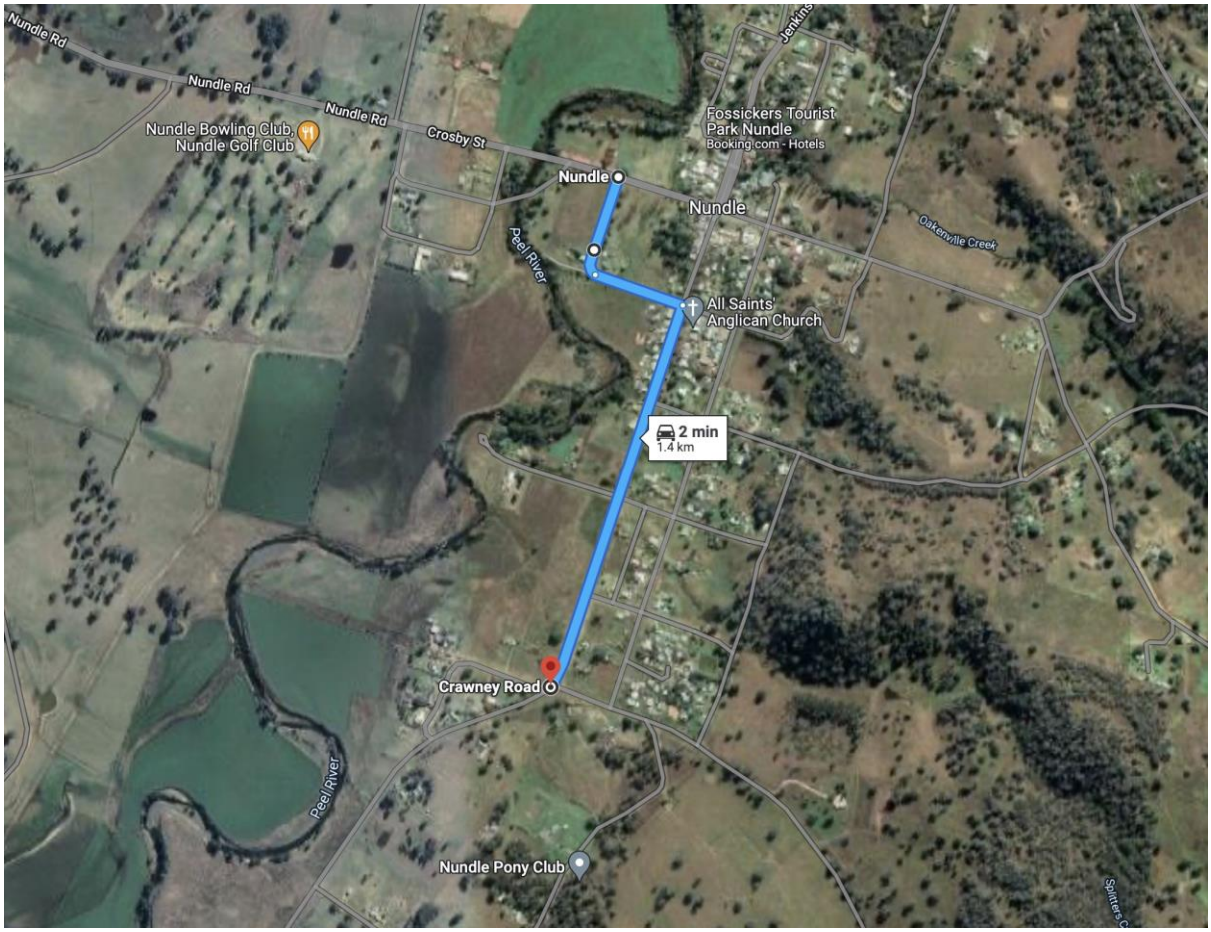
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/FX4ZRx2YG9i2BsXMA

COMMENTS: Blades to cross from the correct side to the correct side but cut across the inside of the corner. Some signs will need to be made removable.

ROAD MODIFICATIONS: Small amounts of work are required.

12.0 Route 1A Survey: Nundle Bypass Option 1 to Crawney Road.

Components: Blades only.
Distance: 1.4 Kilometres
Route: Oakenville Street, Private land behind hotel, Jenkins Street, Crawney Road.
GPS Link for section of route: https://goo.gl/maps/gEVdPm1a7w7tpmYq5

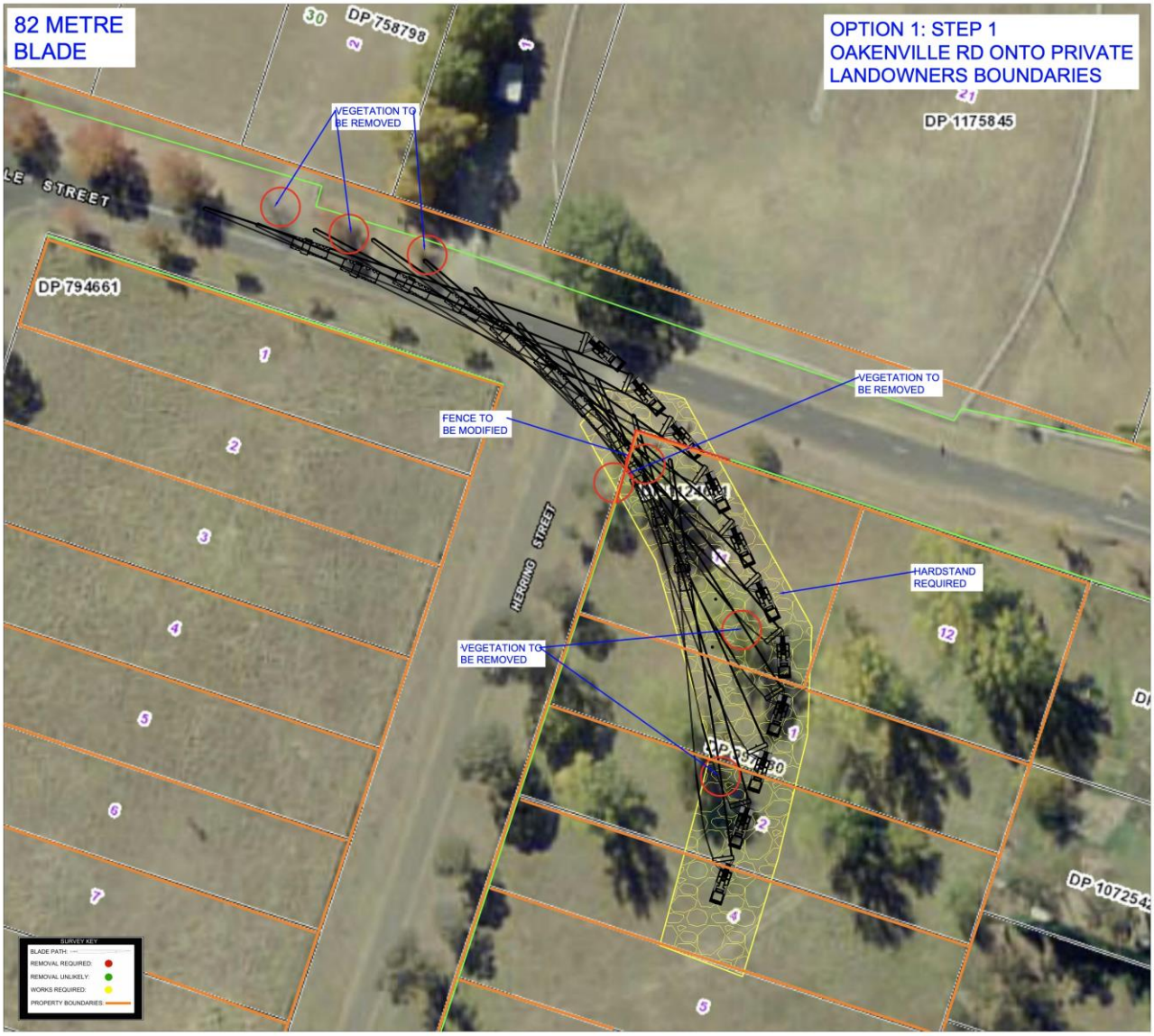


KEY	
SIGNIFICANT AMOUNTS OF MODIFICATIONS REQUIRED	
MODERATE AMOUNTS OF MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	

KM index	Location	Section of road	Current Measurement	Procedure	Notes
0.0	Nundle	Oakenville Street into private landowners' boundaries. GPS link: https://goo.gl/maps/1dtd4inX1u8LcDm9	Clearance: Length: N/A Width: N/A	Right hand turn	Corner to be made suitable for the swept path of the blades.
0.4	Nundle	Private landowners' boundaries onto Jenkins Street. GPS link: https://goo.gl/maps/akPcvxtteiS8ynHP6	Clearance: Length: N/A Width: N/A	Right hand turn	Corner to be made suitable for the swept path of the blades. – 2 options
1.4	Nundle	Jenkins Street onto Crawney Road GPS link: https://goo.gl/maps/akPcvxtteiS8ynHP6	Clearance: Length: 90 metres Width: 6.5 metres	Right hand bend	No problems with this section of road.

0.0 Km's: Oakenville Road into Private landowners boundaries.

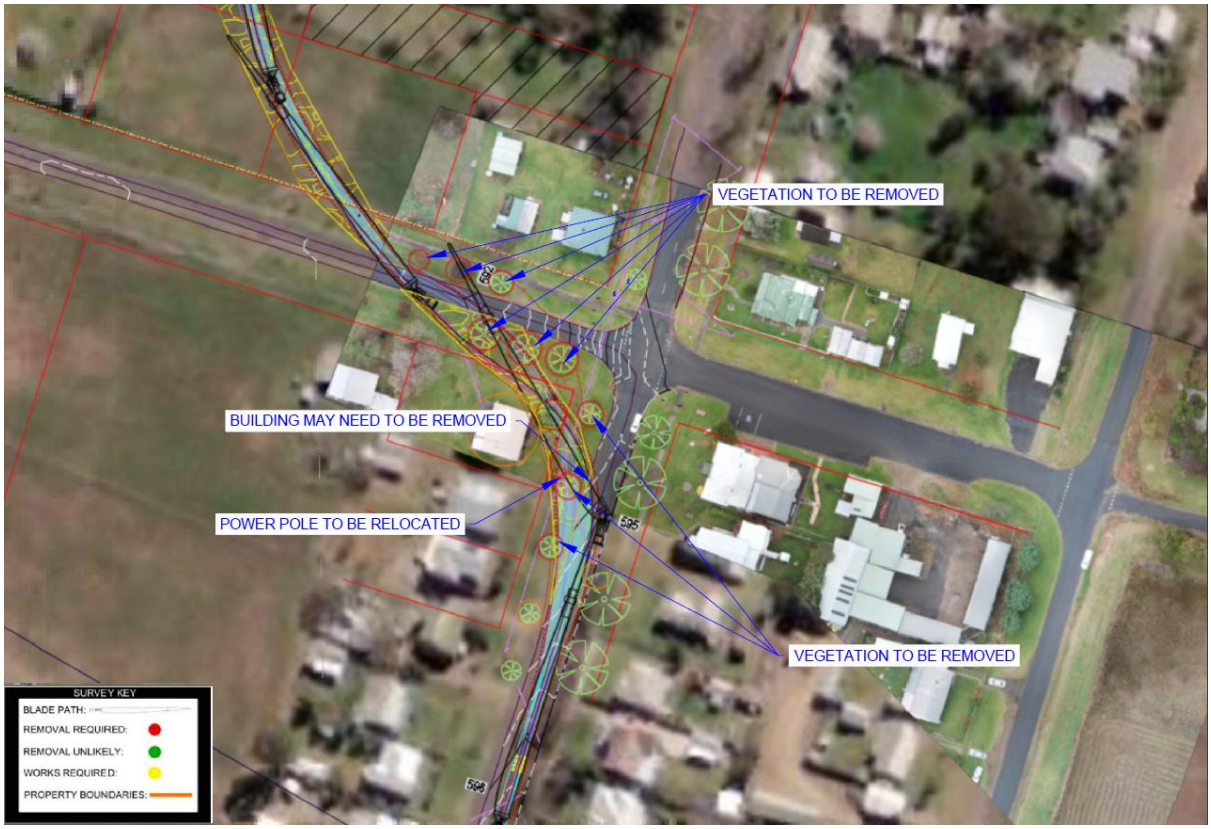
170 Metre rotor: Option 1 & 2, Step 1



170 Metre rotor: Option 1, Step 2

170 Metre rotor: Option 1, Step 3

170 Metre rotor: Option 2, Step 2



PROCEDURE: Right hand turn into a private landowners boundaries, before reentering onto Jenkins street.

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

COMMENTS: Some hardstand will need to be added across the private landowners boundaries. Several fences will need to be relocated, vegetation removed, and depending on what option is used some buildings will need to be removed and a power pole relocated.

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

ROAD MODIFICATIONS: Yes, large amounts of work are required.

13.0 Route 1B Survey: Nundle Bypass Option 2 to Crawney Road.

Components: Blades only.

Distance: 4.9 Kilometres

ROUTE: Oakenville Street, Old Hanging Rock Rd, Happy Valley Road, Jenkins Street, Crawney Road.

GPS Link for section of route: https://goo.gl/maps/yczMGxsAnSYgYVLY8

KEY	
SIGNIFICANT AMOUNTS OF MODIFICATIONS REQUIRED	
MODERATE AMOUNTS OF MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	

KM index	Location	Section of road	Current Measurement	Procedure	Notes
0.0	Nundle	Oakenville Street and Jenkins Street intersection GPS link: https://goo.gl/maps/7YM56hQq8bnCSoZy8	Clearance: Length: N/A Width: 5.0 Metres	Blades to travel directly ahead on the correct side of the road.	A no parking exclusion zone will need to be placed on the left-hand side while travelling through this intersection. Two signs will also need to be made removable.
0.8	Nundle	Oakenville Street onto Old Hanging Rock GPS link: https://goo.gl/maps/1UMr2EwZetiE76Ey9	35.0 metres length clearance	Left hand turn	Blades to turn left from the incorrect side to the incorrect side of the road. The swept path will have the blades travel through a landowner's boundaries. This will require a fence to be relocated and hardstand added. Additionally, while travelling over the bridge some signs will need to be relocated and some sections of guardrail relocated.
1.3	Nundle	Old Hanging Rock Road onto Happy Valley Road GPS link: https://goo.gl/maps/cfRnJ3BBQXEhg2AE8	40.0 metres clearance	Left hand turn	**Option 1:** Blades to turn left from the incorrect side to the incorrect side of the road. The swept path will have the blades travel through a landowner's boundaries. This will require hardstand to be added to the inside of the intersection. Additionally, vegetation will need to be removed. **Option 2:** Blades are to travel past the intersection than reverse into Happy Valley Road. The gradient cannot exceed 3% to be able to reverse back. Hardstand will be required and some vegetation will need to be removed.

KM index	Location	Section of road	Current Measurement	Procedure	Notes
2.2	Nundle	Happy Valley Road onto Jenkins Street https://goo.gl/maps/9bF75wcm6DrQk2Vj8	40.0 metres clearance	Left hand turn	**Option 1:** Blades to turn left from the incorrect side to the incorrect side of the road. The swept path will have the blades travel through a landowner's boundaries. This will require a fence to be relocated, hardstand added and a power pole to be relocated. Additionally, a sign will need to be made removable. **Option 2:** Loads will have reversed along Happy Valley Road from Old Hanging Rock Road and reverse into the landowners' boundaries at the T intersection. Once loads are past the intersection they will turn right and continue south onto Jenkins Street.
3.5	Nundle	Jenkins Street and Oakenville Street intersection GPS link: https://goo.gl/maps/YyGbrPmDguBFQT219	5.0 metres width clearance		Blades to travel directly ahead on the correct side of the road. A no parking exclusion zone will need to be placed on the left-hand side prior to and after Jenkins Street while travelling through this intersection.
4.9	Nundle	Jenkins Street onto Crawney Road GPS link: https://goo.gl/maps/akPcvxtteiS8ynHP6	Clearance: Length: 90 metres Width: 6.5 metres	Right hand bend	No problems with this section of road.

0.0 Km's: Oakenville Street at Nundle.

Image 1:

Image 2:

PROCEDURE: Travel directly ahead on Oakenville Street.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/7YM56hQq8bnCSoZy8

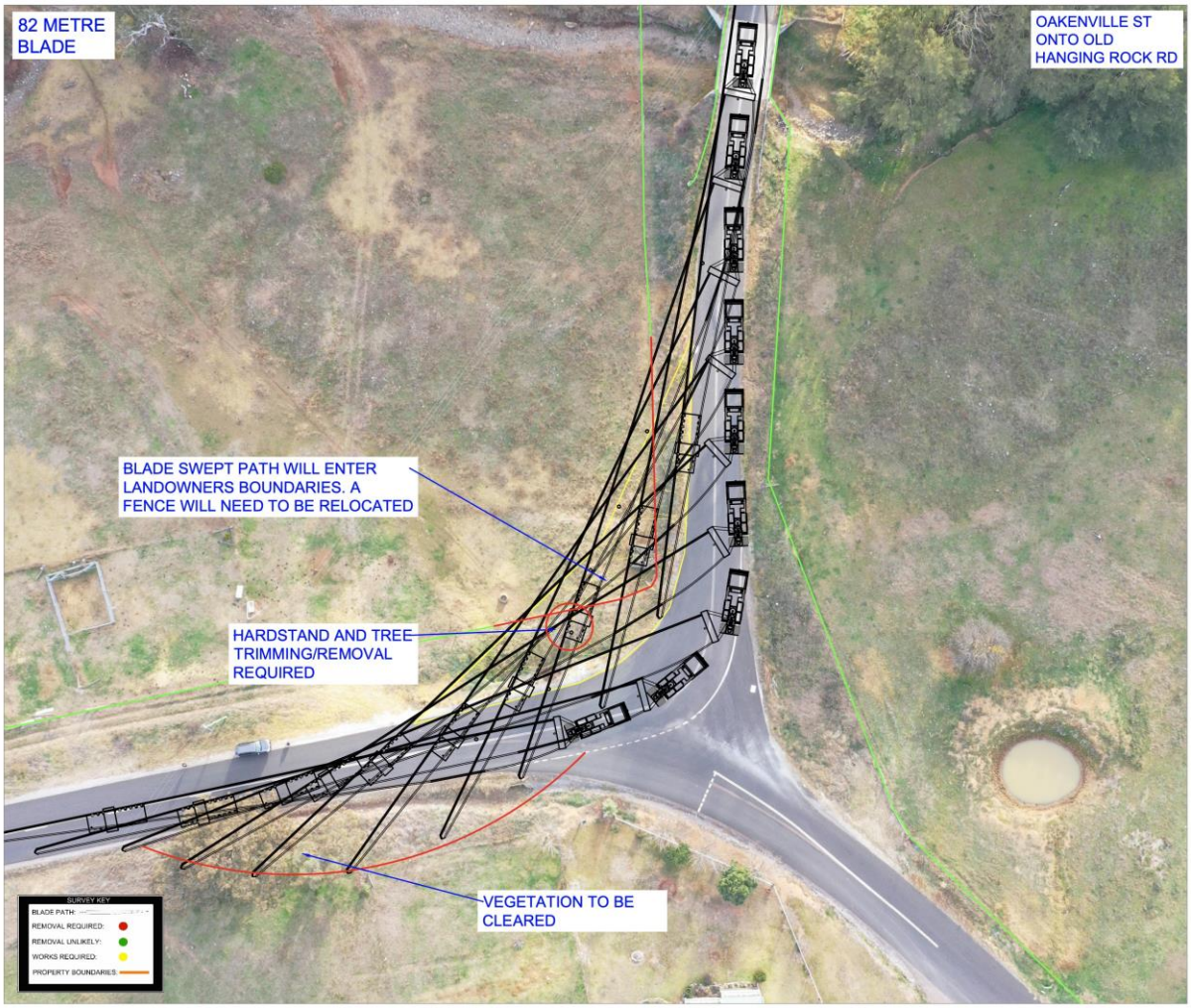
COMMENTS: Blades to travel directly ahead on the correct side of the road. A no parking exclusion zone will need to be placed on the left-hand side while travelling through this intersection. Two signs will also need to be made removable.

ROAD MODIFICATIONS: Small amounts of work are required.

0.8 Km's: Oakenville Street onto Hanging Rock Road at Nundle.

Image 1:

Image 2:



PROCEDURE: Left hand turn from Oakenville Street onto Old Hanging Rock Road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/1UMr2EwZetiE76Ey9

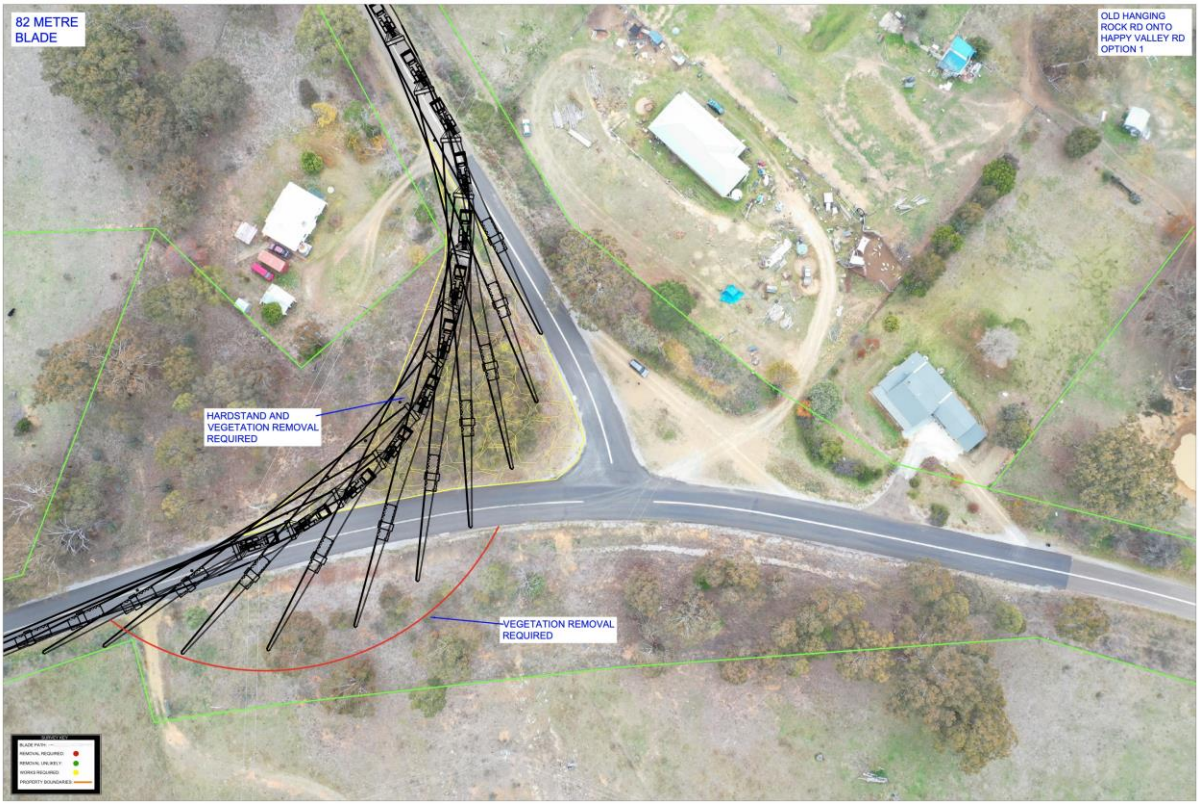
COMMENTS: Blades to turn left from the incorrect side to the incorrect side of the road. The swept path will have the blades travel through a landowner's boundaries. This will require a fence to be relocated and hardstand added. Additionally, while travelling over the bridge some signs will need to be relocated and some sections of guardrail relocated.

ROAD MODIFICATIONS: Large amounts of work are required.

1.3 Km's: Option 1, Hanging Rock Road onto Happy Valley Road at Nundle.

Image 1:

Image 2:



PROCEDURE: Left hand turn from Old Hanging Rock Road onto Happy Valley Road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/cfRnJ3BBQXEhg2AE8

COMMENTS: Blades to turn left from the incorrect side to the incorrect side of the road. The swept path will have the blades travel through a landowner's boundaries. This will require hardstand to be added to the inside of the intersection. Additionally, vegetation will need to be removed.

ROAD MODIFICATIONS: Large amounts of work are required.

1.3 Km's: Option 2, Hanging Rock Road onto Happy Valley Road at Nundle.

Image 1:

PROCEDURE: Left hand turn from Old Hanging Rock Road onto Happy Valley Road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/cfRnJ3BBQXEhg2AE8

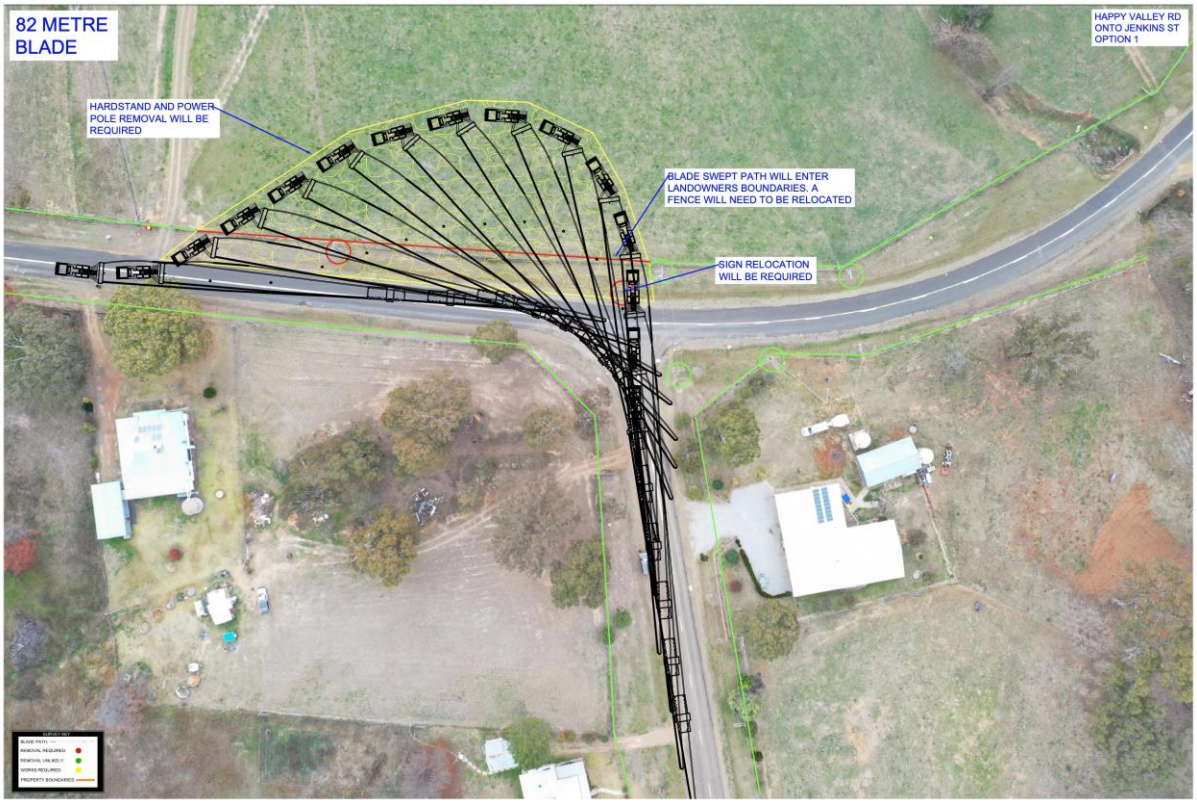
COMMENTS: Blades are to travel past the intersection than reverse into Happy Valley Road. The gradient cannot exceed 3% to be able to reverse back. Hardstand will be required, and some vegetation will need to be removed.

ROAD MODIFICATIONS: Large amounts of work are required.

2.2 Km's: Option 1, Happy Valley Road onto Jenkins Street at Nundle.

Image 1:

Image 2:



PROCEDURE: Left hand turn from Happy Valley Road onto Jenkins Road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/9bF75wcm6DrQk2Vj8

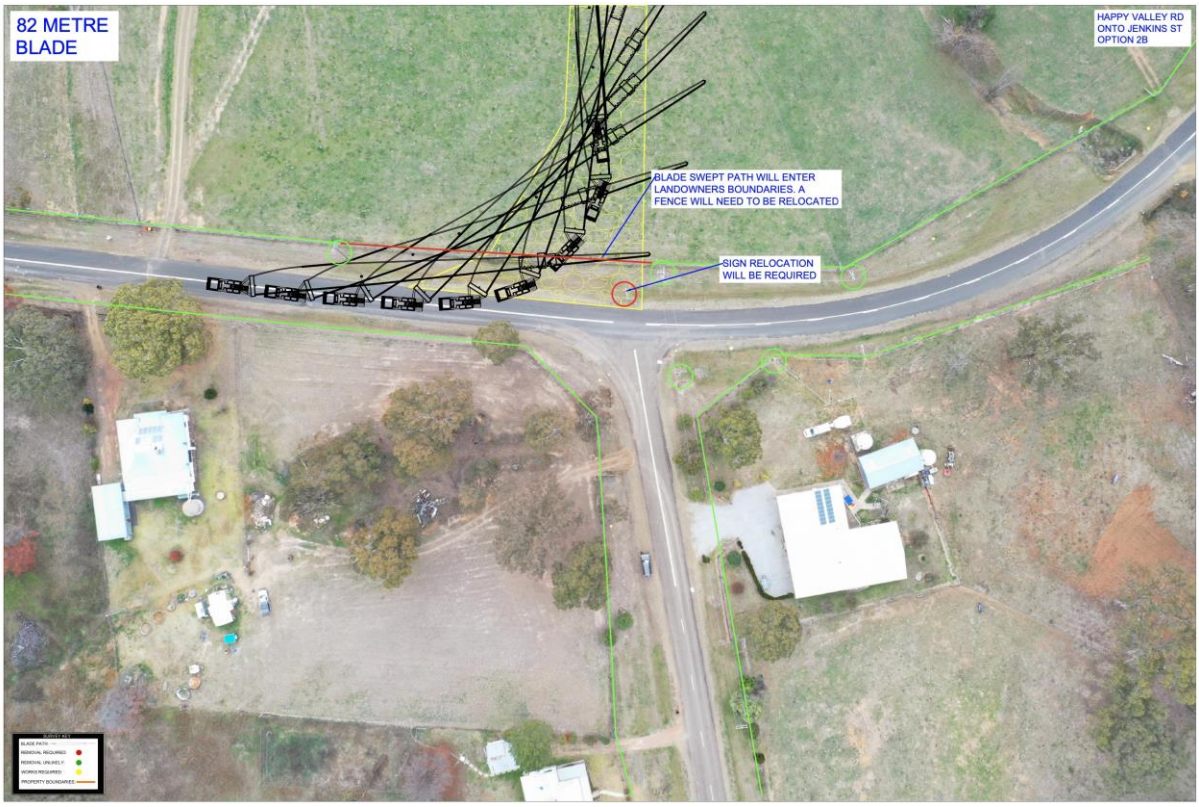
COMMENTS: Blades to turn left from the incorrect side to the incorrect side of the road. The swept path will have the blades travel through a landowner's boundaries. This will require a fence to be relocated, hardstand added and a power pole to be relocated. Additionally, a sign will need to be made removable.

ROAD MODIFICATIONS: Large amounts of work are required.

2.2 Km's: Option 2, Happy Valley Road onto Jenkins Street at Nundle.

Image 1:

Image 2:



PROCEDURE: Left hand turn from Happy Valley Road onto Jenkins Road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/9bF75wcm6DrQk2Vj8

COMMENTS: Loads will have reversed along Happy Valley Road from Old Hanging Rock Road and reverse into the landowners' boundaries at the T intersection. Once loads are past the intersection they will turn right and continue south onto Jenkins Street.

ROAD MODIFICATIONS: Large amounts of work are required.

3.5 Km's: Jenkins Street through Oakenville Street at Nundle.

Image 1:

PROCEDURE: Travel directly ahead on Jenkins Street.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/YyGbrPmDguBFQT219

COMMENTS: Blades to travel directly ahead on the correct side of the road. A no parking exclusion zone will need to be placed on the left-hand side prior to and after Jenkins Street while travelling through this intersection.

ROAD MODIFICATIONS: Small amounts of work are required.

Back creekBack creekBack creek

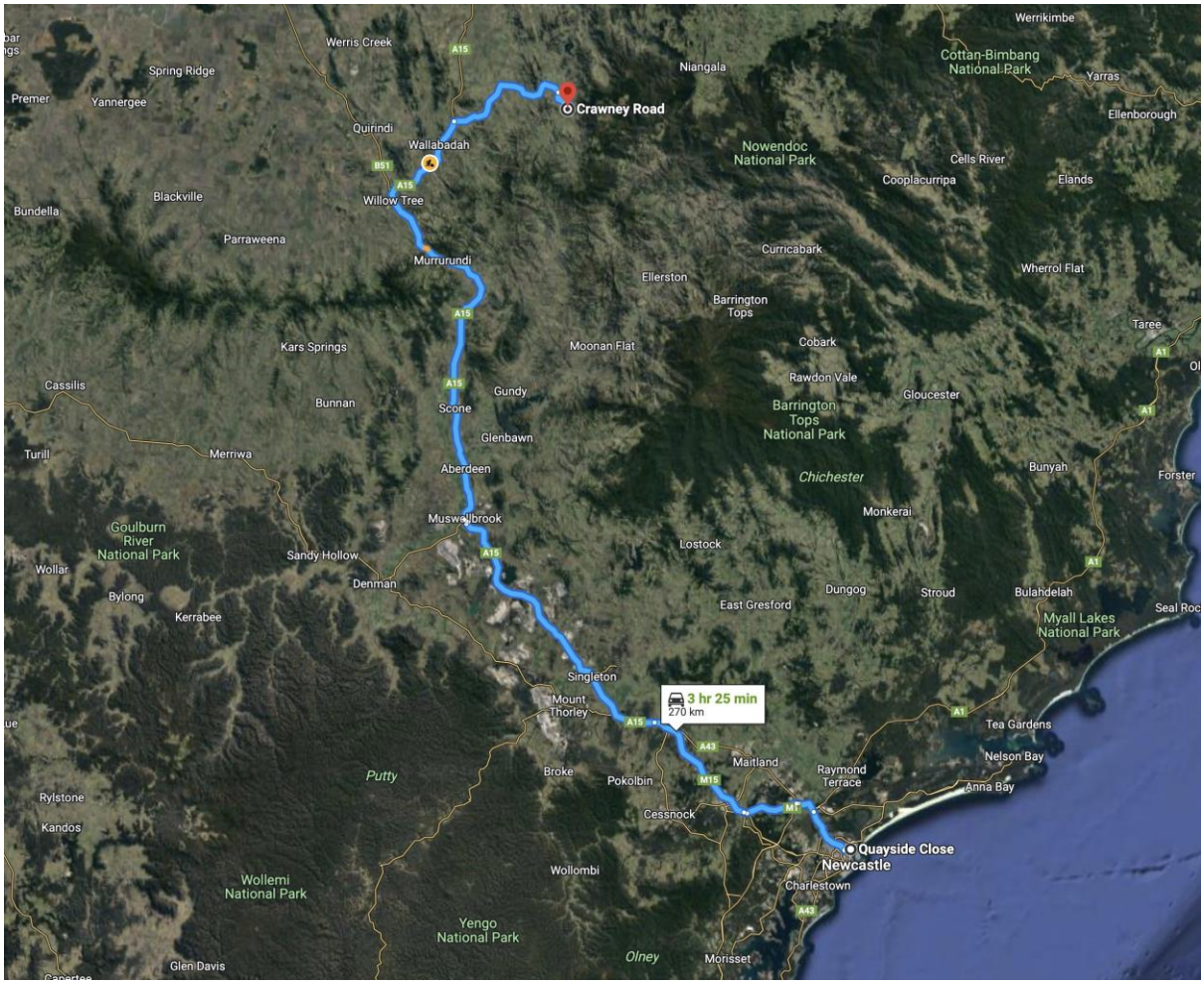
14.0 Route 2 Survey: Newcastle port to Crawney Rd Nundle Via Liddell Underpass.

Components: Towers and motors under 5.2 metres in height.

Distance: 270.0 Kilometres

Route: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Bell Street, Victoria Street, Market Street, New England Highway, Lindsays Gap Road, Nundle Road, Crosby Street, Oakenville Street, Heron Street North, Innes Street, Jenkins Street, Crawney Road.

GPS Link for section of route: https://goo.gl/maps/uGMwAMysbWn4zERh9



REX J ANDREWS
ENGINEERED TRANSPORTATION

ROUTE STUDY
Newcastle to Hills of Gold Wind Farm

KEY	
SIGNIFICANT AMOUNTS OF MODIFICATIONS REQUIRED	
MODERATE AMOUNTS OF MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Current Measurement	Procedure	Notes
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street GPS link: https://goo.gl/maps/afLwPYKuNdm	Clearance: Length: 70.0 metres Width: 8.0 metres	Right hand turn	No problems with this section of road.
0.4	Mayfield	Selwyn Street rail crossing GPS link: https://goo.gl/maps/AmohE54hKSz	Clearance: Width: 9.0 metres	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
1.3	Mayfield	Selwyn Street onto George Street GPS link: https://goo.gl/maps/gXeHvBtCp4D2	Clearance: Length: 70.0 metres Width: 8.0 metres	Right hand turn	No problems with this section of road.
1.4	Mayfield	George Street onto Industrial Drive https://goo.gl/maps/s4ayrsuoAsD2	Clearance: Length: 70.0 metres Width: 8.0 metres	Moderate right hand turn	No problems with this section of road.
4.9	Mayfield	Industrial Drive under traffic signals GPS link: https://goo.gl/maps/YmqhiS2iR582	Clearance: Height: 5.4 Metres	Travel directly ahead	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 metres will need to travel in the right hand lane.
5.5	Mayfield West	Industrial Drive onto Maitland Road GPS link: https://goo.gl/maps/Kn49dhWG2qG2	Clearance: Length: 50.0 metres Width: 10.0 metres	Right hand turn	No problems with this section of road.
13.9	Hexham	New England Highway under gantry GPS link: https://goo.gl/maps/YTMoFe7Aick	Clearance: Height: 5.95 Metres	Travel directly ahead	This is the lowest structure on route. There is no bypass around the gantry. A maximum loaded height of 5.8 metres should not be exceeded.
17.4	Tarro	New England Highway onto John Renshaw Drive GPS link: https://goo.gl/maps/SRDr5JigkBp	Clearance: Width: 12.0 metres	Left hand merge	No problems with this section of road.
18.4	Beresfield	John Renshaw Drive GPS link: https://goo.gl/maps/N19vJih1Fgr	Clearance: Width: 9.0 metres Height: 5.9 metres	Travel directly ahead	No problems with this section of road.

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KM index	Location	Section of road	Current Measurement	Procedure	Notes
28.7	Buchanan	John Renshaw Drive onto the Hunter Expressway GPS link: https://goo.gl/maps/1STJ1PfQt9E2	Clearance: Length: 65.0 metres Width: 7.0 metres	Right hand turn	No problems with this section of road.
59.0	Branxton	The Hunter Expressway onto The New England Highway GPS link: https://goo.gl/maps/7rauNuxzqjq	Clearance: Width: 9.0 metres	Travel directly ahead	No problems with this section of road.
124.5	Muswellbrook	New England Highway onto Bell Street GPS link: https://goo.gl/maps/H94bMYQMeSHay7918	Clearance: Length: 40.0 metres Width: 6.0 metres	Right hand turn	No problems with this section of road.
125.0	Muswellbrook	Bell Street onto Victoria Street GPS link: https://goo.gl/maps/aHhW27teZy9y3WNq9	Clearance: Length: 40.0 metres Width: 7.0 metres	Left hand corners	Tight left-hand bend over a rail bridge before another tight left hand bend. Spotter to guide loads through this section of road, and approval from rail required to cross this structure.
125.5	Muswellbrook	Victoria Street onto Market Street GPS link: https://goo.gl/maps/pyiTUH25bANG3m9n9	Clearance: Width: 7.0 metres	Travel directly ahead	No problems with this section of road.
126.0	Muswellbrook	Market Street onto New England Highway GPS link: https://goo.gl/maps/3kpU6XdCBmCW75gM7	Clearance: Length: 30.0 metres Width: 7.0 metres	Right hand turn at roundabout	Loads may need to cross to the incorrect side of the roundabout if they exceed 30.0 meters in length, and do not exceed 42 meters in length.
201.8	Murrurundi	New England highway (Township) GPS link: https://goo.gl/maps/Sj3ixAkhujt	Clearance: 60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
206.4	Murrurundi Hill	New England highway Nowlands Gap GPS link: https://goo.gl/maps/R5yufobPeMG2	Clearance: 120.0 x 12.0 metres	Parking Bay (small)	Emergency parking only.
203.0	Willow Tree	New England highway GPS link: https://goo.gl/maps/XLTg7CRV7EU2	Clearance: Width: 7.0 metres Length: 35 metres Height: 5.2 metres	Kankool weighbridge	It is likely that the towers and defiantly the blades will not fit into this facility. We have engineered documentation showing correct weights for all loads.
208.9	Willow Tree Township	New England highway GPS link: https://goo.gl/maps/gw38qmvVfTC2	Clearance: 60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
210.5	Willow Tree Truck Stop N	New England highway GPS link: https://goo.gl/maps/RRdPVHupGCs	Clearance: 120.0 x 12.0 metres	Parking Bay (small)	Suitable parking for Fatigue breaks for small loads only.
230.0	Wallabadah	New England highway GPS link: https://goo.gl/maps/QWCyeHQSohS2	Clearance: 80.0 x 5.0 metres	Parking Bay (side of road)	Suitable parking for Fatigue breaks.

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KM index	Location	Section of road	Current Measurement	Procedure	Notes
235.0	Wallabadah	New England highway onto Lindsay's Gap Road GPS link: https://goo.gl/maps/ePbYctjJootkBZiM9	Clearance: Length: 50.0 metres	Right hand turn	If the upgrades are completed for the blades than this corner will be suitable for the remaining components.
245.7	Garoo	Lindsay's Gap Road over Goonoo Goonoo Creek GPS link: https://goo.gl/maps/9ELSk5ZLRWnf14tm7	Clearance: Axle width: 3.60m Overall width: 6.20m Guard rail height: 850mm	Travel directly ahead over bridge in the centre of the road.	Loads that are been carried on trailers with an axle width exceeding 3.5 meters will not fit over this structure in its current form. This bridge will need to be replaced or modified before the towers or motors can be delivered on this route. A trafficable deck width of at least 4.6 meters is required for these heavier loads.
253.7	Garoo	Lindsay's Gap Road over Middlebrook Creek GPS link: https://goo.gl/maps/DyxGUid9JucoAHhHA	Clearance: Axle width: 4.50m Overall width: 6.10m Guard rail height: 750mm	Travel directly ahead over bridge in the centre of the road.	Loads that are been carried on trailers with an axle width exceeding 3.5 meters will not fit over this structure in its current form. This bridge will need to be replaced or modified before the towers or motors can be delivered on this route.
259.2	Garoo	Lindsay's Gap Road through Lindsay's Gap GPS link: https://goo.gl/maps/GGKmqemziKdth8wH9	Clearance: Length: 90.0 metres	Travel directly ahead	Load to travel in the centre of the road, escorts to warn traffic 500 metres to the east of the gap.
264.8	Nundle	Lindsay's Gap Road onto Nundle Road GPS link: https://goo.gl/maps/FX4ZRx2YG9i2BsXMA	Clearance: Length: 50.0 metres	Right hand turn	If the upgrades are completed for the blades than this corner will be suitable for the remaining components.
268.3	Nundle	Nundle Road onto Crosby Street GPS link: https://goo.gl/maps/uVvcN9QkPyTDP1YR6	Clearance: Width: 8.0 metres	Travel directly ahead	No problems with this section of road.
268.6	Nundle	Crosby Street onto Oakenville Street GPS link: https://goo.gl/maps/aZNDKURdSBERedMr9	Clearance: Width: 8.0 metres	Right hand turn	No problems with this section of road.
267.0	Nundle	Oakenville Street Heron onto Street North. GPS link: https://goo.gl/maps/1dtd4inX1u8LcDrn9	Clearance: Length: N/A Width: N/A	Right hand turn	Depending on what works are undertaken by the blade road modifications, there may need to be some additional hardest and added to the corner.
267.2	Nundle	Heron Street North onto Innes Street GPS link: https://goo.gl/maps/1dtd4inX1u8LcDrn9	Clearance: Length: N/A Width: N/A	Left hand turn	Some hardstand will be required on the corner.

KM index	Location	Section of road	Current Measurement	Procedure	Notes
267.4	Nundle	Innes Street onto Jenkins Street. GPS link: https://goo.gl/maps/akPcvxtteiS8ynHP6	Clearance: Length: N/A Width: N/A	Right hand turn	No problems with this section of road.
270.0	Nundle	Jenkins Street onto Crawney Road GPS link: https://goo.gl/maps/akPcvxtteiS8ynHP6	Clearance: Length: 90 metres Width: 6.5 metres	Right hand bend	No problems with this section of road.

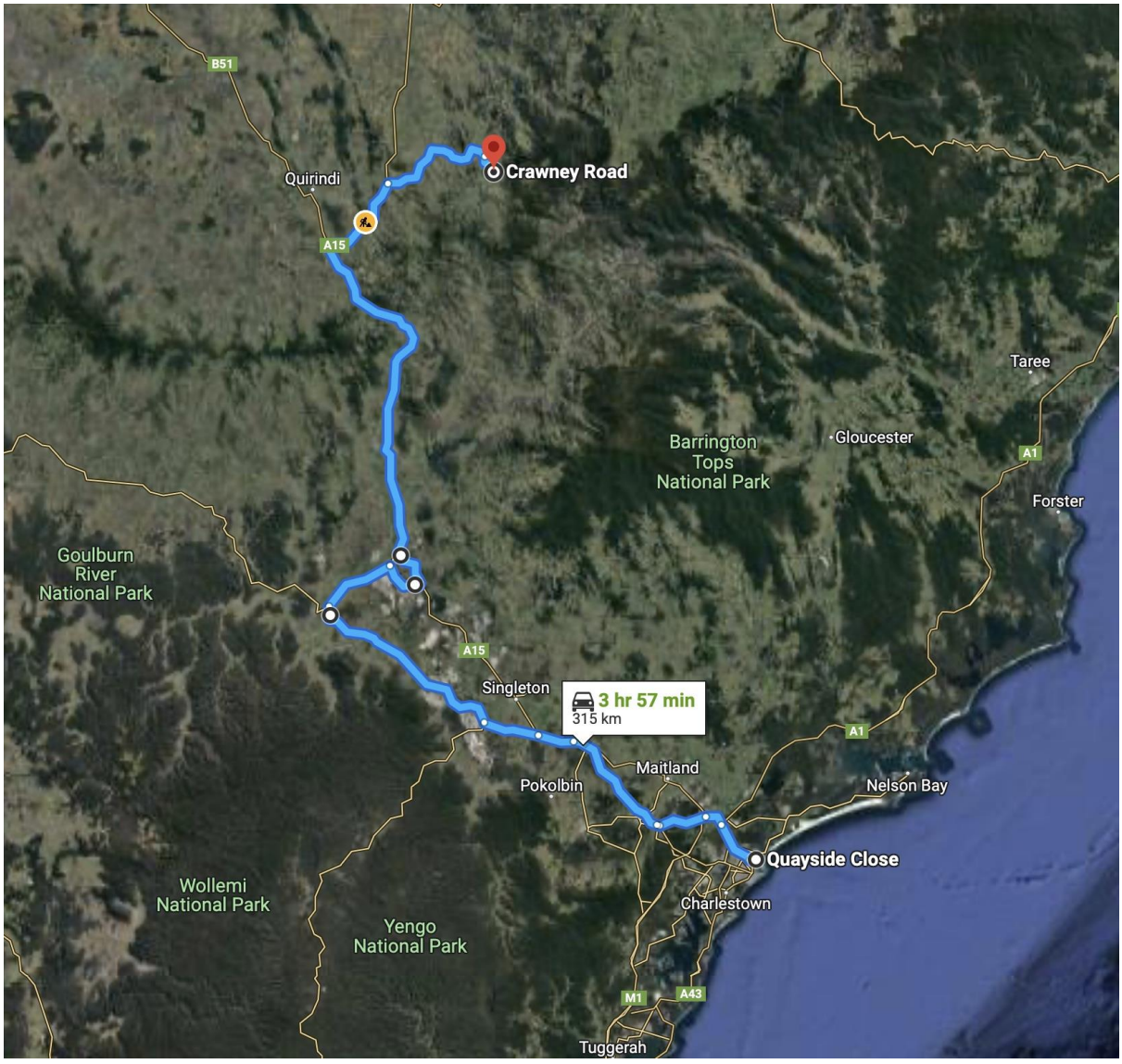
15.0 Route 3 Survey: Newcastle port to Crawney Rd Nundle Via Thomas Mitchell Drive.

Components: Towers and motors over 5.2 metres in height.

Distance: 315.0 Kilometres

Route: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Golden Highway, Denman Road, Thomas Mitchell Drive, New England Highway, Bell Street, Victoria Street, Market Street, New England Highway, Lindsays Gap Road, Nundle Road, Crosby Street, Oakenville Street, Heron Street North, Innes Street, Jenkins Street, Crawney Road.

GPS Link for section of route: https://goo.gl/maps/zGxCcceTx48RJK7BA



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KEY	
SIGNIFICANT AMOUNTS OF MODIFICATIONS REQUIRED	
MODERATE AMOUNTS OF MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Current Measurement	Procedure	Notes
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street GPS link: https://goo.gl/maps/afLwPYKuNdm	Clearance: Length: 70.0 metres Width: 8.0 metres	Right hand turn	No problems with this section of road.
0.4	Mayfield	Selwyn Street rail crossing GPS link: https://goo.gl/maps/AmohE54hKSz	Clearance: Width: 9.0 metres	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
1.3	Mayfield	Selwyn Street onto George Street GPS link: https://goo.gl/maps/gXeHvBtCp4D2	Clearance: Length: 70.0 metres Width: 8.0 metres	Right hand turn	No problems with this section of road.
1.4	Mayfield	George Street onto Industrial Drive https://goo.gl/maps/s4ayrsuoAsD2	Clearance: Length: 70.0 metres Width: 8.0 metres	Moderate right hand turn	No problems with this section of road.
4.9	Mayfield	Industrial Drive under traffic signals GPS link: https://goo.gl/maps/YmqhiS2iR582	Clearance: Height: 5.4 Metres	Travel directly ahead	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 metres will need to travel in the right hand lane.
5.5	Mayfield West	Industrial Drive onto Maitland Road GPS link: https://goo.gl/maps/Kn49dhWG2qG2	Clearance: Length: 50.0 metres Width: 10.0 metres	Right hand turn	No problems with this section of road.
13.9	Hexham	New England Highway under gantry GPS link: https://goo.gl/maps/YTMoFe7Aick	Clearance: Height: 5.95 Metres	Travel directly ahead	This is the lowest structure on route. There is no bypass around the gantry. A maximum loaded height of 5.8 metres should not be exceeded.
17.4	Tarro	New England Highway onto John Renshaw Drive GPS link: https://goo.gl/maps/SRDr5JigkBp	Clearance: Width: 12.0 metres	Left hand merge	No problems with this section of road.
18.4	Beresfield	John Renshaw Drive GPS link: https://goo.gl/maps/N19vJih1Fgr	Clearance: Width: 9.0 metres Height: 5.9 metres	Travel directly ahead	No problems with this section of road.

KM index	Location	Section of road	Current Measurement	Procedure	Notes
28.7	Buchanan	John Renshaw Drive onto the Hunter Expressway GPS link: https://goo.gl/maps/1STJ1PfQt9E2	Clearance: Length: 65.0 metres Width: 7.0 metres	Right hand turn	No problems with this section of road.
59.0	Branxton	The Hunter Expressway onto The New England Highway GPS link: https://goo.gl/maps/7rauNuxzqjq	Clearance: Width: 9.0 metres	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	Clearance: Width: 12.0 metres	Left Hand turn	No problems with this section of road.
67.4	Whittingham	Golden Highway GPS link: https://goo.gl/maps/R86RFuPnmFU2	Clearance: 115.0 x 9.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
77.3	Whittingham	Golden Highway intersection with the Putty Road GPS link: https://goo.gl/maps/7hQdEmK1EgE2	Clearance: Length: 85.0 metres Width: 12.0 metres	Left hand turn	No problems with this section of road.
77.4	Mount Thorley	Golden Highway GPS link: https://goo.gl/maps/zGvdupDuixx	Clearance: 100.0 x 10.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
80.8	Mount Thorley	Golden Highway intersection with Mt Thorley Road. GPS link: https://goo.gl/maps/VyA42n1CqZx	Clearance: Length: 45.0 metres Width: 8.0 metres Height: 5.6 metres	Right hand turn	Loads over the listed clearances will need to travel along the incorrect side of the road. Loads will need to cross to the incorrect side 100 metres prior to the Mt Thorley Road underpass.
98.0	Warkworth	Golden Highway GPS link: https://goo.gl/maps/Y6V6EXaCwxq	Clearance: 100.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
107.0	Jerrys Plains	Golden Highway through Jerrys Plains village GPS link: https://goo.gl/maps/WgSCRsJ9ZGt	Clearance: Length: 70.0 metres Width: 9.0 metres	Dogleg	No problems with this section of road.
126.0	Ogilvy	Golden Highway GPS link: https://goo.gl/maps/ShT4hrj8WQeMcris7	6% gradient	Travel directly ahead	This section of road has a steep mountain range that will require additional pull trucks to assists loads that exceed 80T gross weight. Additionally, the NSW Government is currently upgrading this section of road. It is recommended that you monitor the progress of the upgrades, and that any changes are thoroughly looked at.

KM index	Location	Section of road	Current Measurement	Procedure	Notes
141.9	Denman	Golden Highway onto Denman Road GPS link: https://goo.gl/maps/sf4PNnycxB32	Clearance: Length: 60.0 metres Width: 10.0 metres	Right hand turn	No problems with this section of road.
150.0	Muswellbrook	Denman Road onto Thomas Mitchell Drive GPS link: https://goo.gl/maps/XxZcg2MKqAgURuGu8	Clearance: Length: 65.0 metres Width: 12.0 metres	Right hand turn	No problems with this section of road.
160.6	Muswellbrook	Thomas Mitchell onto New England Highway GPS link: https://goo.gl/maps/3SyWufXF3gXqxaAt5	Clearance: Length: 70.0 metres Width: 10.0 metres	Left hand turn	No problems with this section of road.
169.5	Muswellbrook	New England Highway onto Bell Street GPS link: https://goo.gl/maps/H94bMYQMeSHay7918	Clearance: Length: 40.0 metres Width: 6.0 metres	Right hand turn	No problems with this section of road.
170.0	Muswellbrook	Bell Street onto Victoria Street GPS link: https://goo.gl/maps/aHhW27teZy9y3WNq9	Clearance: Length: 40.0 metres Width: 7.0 metres	Left hand corners	Tight left-hand bend over a rail bridge before another tight left hand bend. Spotter to guide loads through this section of road, and approval from rail required to cross this structure.
170.5	Muswellbrook	Victoria Street onto Market Street GPS link: https://goo.gl/maps/pyiTUH25bANG3m9n9	Clearance: Width: 7.0 metres	Travel directly ahead	No problems with this section of road.
171.0	Muswellbrook	Market Street onto New England Highway GPS link: https://goo.gl/maps/3kpU6XdCBmCW75gM7	Clearance: Length: 30.0 metres Width: 7.0 metres	Right hand turn at roundabout	Loads may need to cross to the incorrect side of the roundabout if they exceed 30.0 meters in length, and do not exceed 42 meters in length.
246.8	Murrurundi	New England highway (Township) GPS link: https://goo.gl/maps/Sj3ixAkhujt	Clearance: 60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
251.4	Murrurundi Hill	New England highway Nowlands Gap GPS link: https://goo.gl/maps/R5yufobPeMG2	Clearance: 120.0 x 12.0 metres	Parking Bay (small)	Emergency parking only.
248.0	Willow Tree	New England highway GPS link: https://goo.gl/maps/XLTg7CRV7EU2	Clearance: Width: 7.0 metres Length: 35 metres Height: 5.2 metres	Kankool weighbridge	It is likely that the towers and defiantly the blades will not fit into this facility. We have engineered documentation showing correct weights for all loads.
253.9	Willow Tree Township	New England highway GPS link: https://goo.gl/maps/qw38qmvVfTC2	Clearance: 60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
255.5	Willow Tree Truck Stop N	New England highway GPS link: https://goo.gl/maps/RRdPVHupGCs	Clearance: 120.0 x 12.0 metres	Parking Bay (small)	Suitable parking for Fatigue breaks for small loads only.

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KM index	Location	Section of road	Current Measurement	Procedure	Notes
275.0	Wallabadah	New England highway GPS link: https://goo.gl/maps/QWCyeHQSohS2	Clearance: 80.0 x 5.0 metres	Parking Bay (side of road)	Suitable parking for Fatigue breaks.
282.0	Wallabadah	New England highway onto Lindsay's Gap Road GPS link: https://goo.gl/maps/ePbYctjJootkBZiM9	Clearance: Length: 50.0 metres	Right hand turn	If the upgrades are completed for the blades than this corner will be suitable for the remaining components.
289.7	Garoo	Lindsay's Gap Road over Goonoo Goonoo Creek GPS link: https://goo.gl/maps/9ELSk5ZLRWnf14tm7	Clearance: Axle width: 3.60m Overall width: 6.20m Guard rail height: 850mm	Travel directly ahead over bridge in the centre of the road.	Loads that are been carried on trailers with an axle width exceeding 3.5 meters will not fit over this structure in its current form. This bridge will need to be replaced or modified before the towers or motors can be delivered on this route. A trafficable deck width of at least 4.6 metres is required.
297.7	Garoo	Lindsay's Gap Road over Middlebrook Creek GPS link: https://goo.gl/maps/DyxGUid9JucoAHhHA	Clearance: Axle width: 4.50m Overall width: 6.10m Guard rail height: 750mm	Travel directly ahead over bridge in the centre of the road.	Loads that are been carried on trailers with an axle width exceeding 3.5 meters will not fit over this structure in its current form. This bridge will need to be replaced or modified before the towers or motors can be delivered on this route.
303.2	Garoo	Lindsay's Gap Road through Lindsay's Gap GPS link: https://goo.gl/maps/GGKmqemziKdth8wH9	Clearance: Length: 90.0 metres	Travel directly ahead	Load to travel in the centre of the road, escorts to warn traffic 500 metres to the east of the gap.
308.8	Nundle	Lindsay's Gap Road onto Nundle Road GPS link: https://goo.gl/maps/FX4ZRx2YG9i2BsXMA	Clearance: Length: 50.0 metres	Right hand turn	If the upgrades are completed for the blades than this corner will be suitable for the remaining components.
311.3	Nundle	Nundle Road onto Crosby Street GPS link: https://goo.gl/maps/uVvcN9QkPyTDP1YR6	Clearance: Width: 8.0 metres	Travel directly ahead	No problems with this section of road.
312.6	Nundle	Crosby Street onto Oakenville Street GPS link: https://goo.gl/maps/aZNDKURdSBERedMr9	Clearance: Width: 8.0 metres	Travel directly ahead	No problems with this section of road.
313.0	Nundle	Oakenville Street Heron onto Street North. GPS link: https://goo.gl/maps/1dtd4inX1u8LcDrn9	Clearance: Length: N/A Width: N/A	Right hand turn	Depending on what works are undertaken by the blade road modifications, there may need to be some additional hardest and added to the corner.
313.4	Nundle	Heron Street North onto Innes Street GPS link: https://goo.gl/maps/1dtd4inX1u8LcDrn9	Clearance: Length: N/A Width: N/A	Left hand turn	Some hardstand will be required on the corner.

KM index	Location	Section of road	Current Measurement	Procedure	Notes
313.7	Nundle	Innes Street onto Jenkins Street. GPS link: https://goo.gl/maps/akPcvxtteiS8ynHP6	Clearance: Length: N/A Width: N/A	Right hand turn	Depending on what works are undertaken by the blade road modifications, there may need to be some additional hardest and added to the corner.
315.0	Nundle	Jenkins Street onto Crawney Road GPS link: https://goo.gl/maps/akPcvxtteiS8ynHP6	Clearance: Length: 90 metres Width: 6.5 metres	Right hand bend	No problems with this section of road.

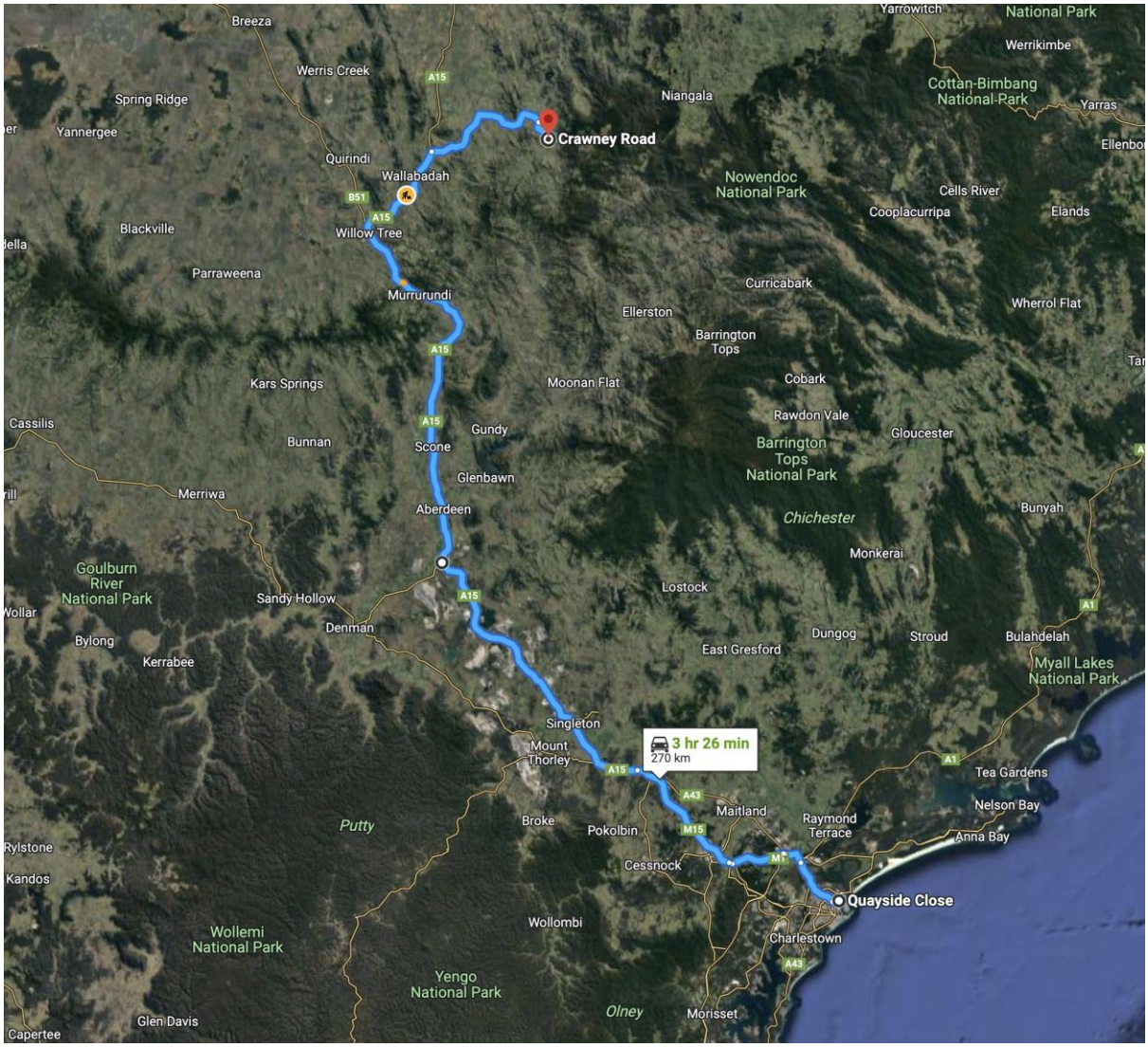
16.0 Route 4 Survey: Newcastle port to Crawney Rd Nundle for standard loads.

Components: Standards loads.

Distance: 270.0 Kilometres

Route: Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Lindsays Gap Road, Nundle Road, Crosby Street, Oakenville Street, Heron Street North, Innes Street, Jenkins Street, Crawney Road.

GPS Link for section of route: https://goo.gl/maps/MSDmuw7bmFHszijQA



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KEY	
SIGNIFICANT AMOUNTS OF MODIFICATIONS REQUIRED	
MODERATE AMOUNTS OF MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

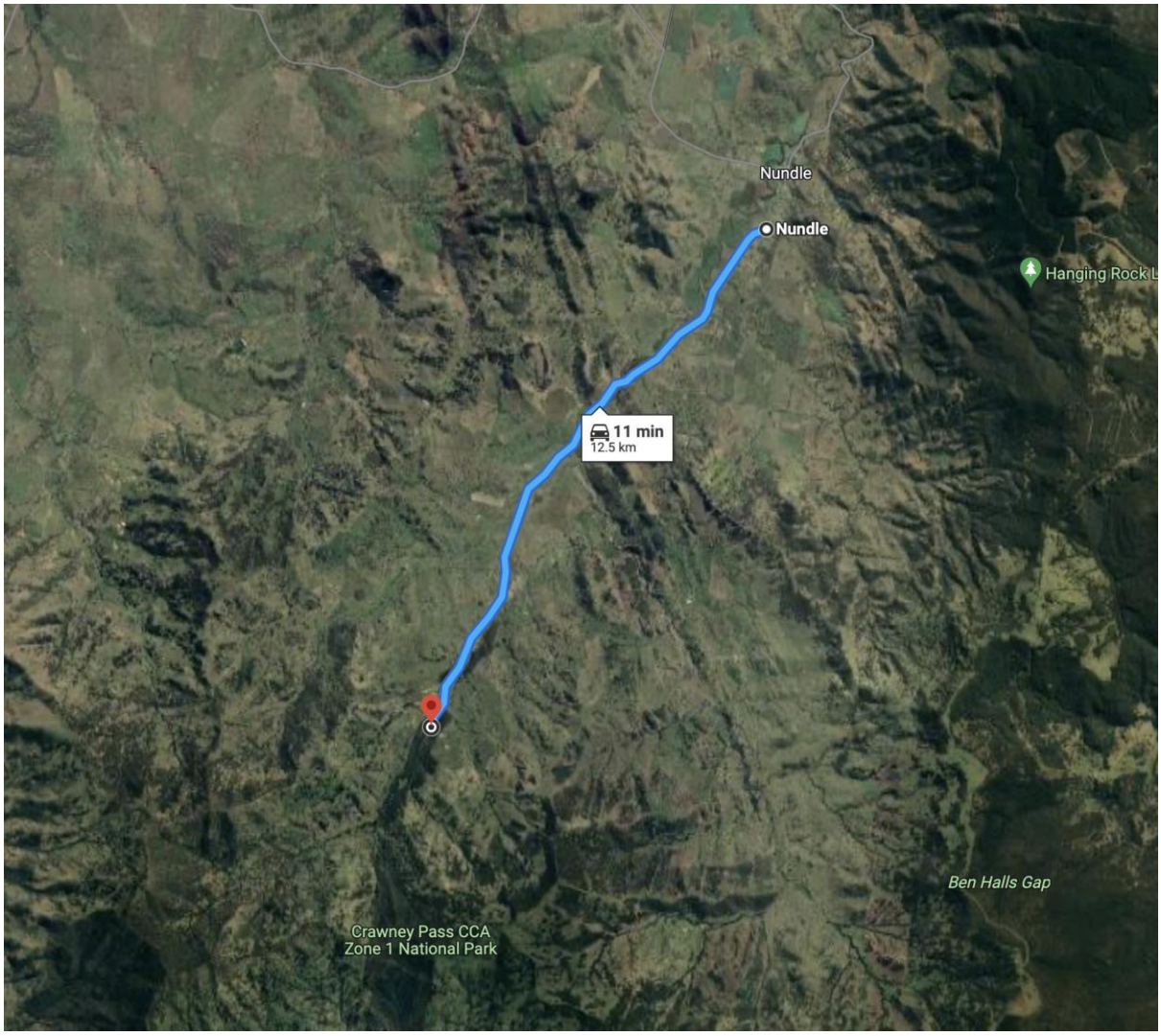
KM index	Location	Section of road	Current Measurement	Procedure	Notes
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street GPS link: https://goo.gl/maps/afLwPYKuNdm	Clearance: Length: 70.0 metres Width: 8.0 metres	Right hand turn	No problems with this section of road.
0.4	Mayfield	Selwyn Street rail crossing GPS link: https://goo.gl/maps/AmohE54hKSz	Clearance: Width: 9.0 metres	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
1.3	Mayfield	Selwyn Street onto George Street GPS link: https://goo.gl/maps/gXeHvBtCp4D2	Clearance: Length: 70.0 metres Width: 8.0 metres	Right hand turn	No problems with this section of road.
1.4	Mayfield	George Street onto Industrial Drive https://goo.gl/maps/s4ayrsuoAsD2	Clearance: Length: 70.0 metres Width: 8.0 metres	Moderate right-hand turn	No problems with this section of road.
4.9	Mayfield	Industrial Drive under traffic signals GPS link: https://goo.gl/maps/YmqhiS2iR582	Clearance: Height: 5.4 Metres	Travel directly ahead	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 metres will need to travel in the right hand lane.
5.5	Mayfield West	Industrial Drive onto Maitland Road GPS link: https://goo.gl/maps/Kn49dhWG2qG2	Clearance: Length: 50.0 metres Width: 10.0 metres	Right hand turn	No problems with this section of road.
13.9	Hexham	New England Highway under gantry GPS link: https://goo.gl/maps/YTMoFe7Aick	Clearance: Height: 5.95 Metres	Travel directly ahead	This is the lowest structure on route. There is no bypass around the gantry. A maximum loaded height of 5.8 metres should not be exceeded.
17.4	Tarro	New England Highway onto John Renshaw Drive GPS link: https://goo.gl/maps/SRDr5JigkBp	Clearance: Width: 12.0 metres	Left hand merge	No problems with this section of road.
18.4	Beresfield	John Renshaw Drive GPS link: https://goo.gl/maps/N19vJih1Fgr	Clearance: Width: 9.0 metres Height: 5.9 metres	Travel directly ahead	No problems with this section of road.

KM index	Location	Section of road	Current Measurement	Procedure	Notes
28.7	Buchanan	John Renshaw Drive onto the Hunter Expressway GPS link: https://goo.gl/maps/1STJ1PfQt9E2	Clearance: Length: 65.0 metres Width: 7.0 metres	Right hand turn	No problems with this section of road.
59.0	Branxton	The Hunter Expressway onto The New England Highway GPS link: https://goo.gl/maps/7rauNuxzqjq	Clearance: Width: 9.0 metres	Travel directly ahead	No problems with this section of road.
125.0	Muswellbrook	New England Highway intersection of Sydney Road GPS link: https://goo.gl/maps/HMs11pkPQWqQbJny7	Clearance: Length: 40.0 metres Width: 6.0 metres	Right hand turn	No problems with this section of road.
125.3	Muswellbrook	New England Highway under rail overpass GPS link: https://goo.gl/maps/2kU2zsFJrJamDe2a7	Clearance: Height: 5.1 metres Width: 4.0 metres	Travel directly ahead	Loads over the listed critical measurement are not to travel under this structure.
201.8	Murrurundi	New England highway (Township) GPS link: https://goo.gl/maps/Sj3ixAkhujt	Clearance: 60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
206.4	Murrurundi Hill	New England highway Nowlands Gap GPS link: https://goo.gl/maps/R5yufobPeMG2	Clearance: 120.0 x 12.0 metres	Parking Bay (small)	Emergency parking only.
203.0	Willow Tree	New England highway GPS link: https://goo.gl/maps/XLTg7CRV7EU2	Clearance: Width: 7.0 metres Length: 35 metres Height: 5.2 metres	Kankool weighbridge	No problems with this section of road.
208.9	Willow Tree Township	New England highway GPS link: https://goo.gl/maps/qw38qmvVfTC2	Clearance: 60.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
210.5	Willow Tree Truck Stop N	New England highway GPS link: https://goo.gl/maps/RRdPVHupGCs	Clearance: 120.0 x 12.0 metres	Parking Bay (small)	Suitable parking for Fatigue breaks for small loads only.
230.0	Wallabadah	New England highway GPS link: https://goo.gl/maps/QWCyeHQSohS2	Clearance: 80.0 x 5.0 metres	Parking Bay (side of road)	Suitable parking for Fatigue breaks.
235.0	Wallabadah	New England highway onto Lindsay's Gap Road GPS link: https://goo.gl/maps/ePbYctjJootkBZiM9	Clearance: Length: 50.0 metres	Right hand turn	No problems with this section of road.
245.7	Garoo	Lindsay's Gap Road over Goonoo Goonoo Creek GPS link: https://goo.gl/maps/9ELSk5ZLRWnf14tm7	Clearance: Axle width: 3.60m Overall width: 6.20m Guard rail height: 850mm	Travel directly ahead over bridge in the centre of the road.	No problems with this section of road.

KM index	Location	Section of road	Current Measurement	Procedure	Notes
253.7	Garoo	Lindsay's Gap Road over Middlebrook Creek GPS link: https://goo.gl/maps/DyxGUid9JucoAHhHA	Clearance: Axle width: 4.50m Overall width: 6.10m Guard rail height: 750mm	Travel directly ahead over bridge in the centre of the road.	No problems with this section of road.
259.2	Garoo	Lindsay's Gap Road through Lindsay's Gap GPS link: https://goo.gl/maps/GGKmqemziKdth8wH9	Clearance: Length: 90.0 metres	Travel directly ahead	No problems with this section of road.
264.8	Nundle	Lindsay's Gap Road onto Nundle Road GPS link: https://goo.gl/maps/FX4ZRx2YG9i2BsXMA	Clearance: Length: 50.0 metres	Right hand turn	No problems with this section of road.
268.3	Nundle	Nundle Road onto Crosby Street GPS link: https://goo.gl/maps/uVvcN9QkPyTDP1YR6	Clearance: Width: 8.0 metres	Travel directly ahead	No problems with this section of road.
268.6	Nundle	Crosby Street onto Oakenville Street GPS link: https://goo.gl/maps/aZNDKURdSBERedMr9	Clearance: Width: 8.0 metres	Travel directly ahead	No problems with this section of road.
267.0	Nundle	Oakenville Street Heron onto Street North. GPS link: https://goo.gl/maps/1dtd4inX1u8LcDrn9	Clearance: Length: N/A Width: N/A	Right hand turn	No problems with this section of road.
267.2	Nundle	Heron Street North onto Innes Street GPS link: https://goo.gl/maps/1dtd4inX1u8LcDrn9	Clearance: Length: N/A Width: N/A	Left hand turn	Some hardstand will be required on the corner.
267.4	Nundle	Innes Street onto Jenkins Street. GPS link: https://goo.gl/maps/akPcvxtteiS8ynHP6	Clearance: Length: N/A Width: N/A	Right hand turn	No problems with this section of road.
270.0	Nundle	Jenkins Street onto Crawney Road GPS link: https://goo.gl/maps/akPcvxtteiS8ynHP6	Clearance: Length: 90 metres Width: 6.5 metres	Right hand bend	No problems with this section of road.

17.0 Route 5 Survey: Crawney Road Nundle to Hills of Gold WF:

Components: All components.
Distance: 12.5 Kilometres
Route: Crawney Road.
GPS Link for section of route: https://goo.gl/maps/13mmxXAF7WNaxstg8



REX J ANDREWS
ENGINEERED TRANSPORTATION

ROUTE STUDY
Newcastle to Hills of Gold Wind Farm

KEY	
SIGNIFICANT AMOUNTS OF MODIFICATIONS REQUIRED	
MODERATE AMOUNTS OF MODIFICATIONS REQUIRED	
MINOR WORKS OR CAUTION	
PARKING	

KM index	Location	Section of road	Current Measurement	Procedure	Notes
0.0	Nundle	Jenkins Street onto Crawney Road (intersection with Point street) GPS link: https://goo.gl/maps/iaf98ARL2sQjVpPh9	Clearance: Length: N/A Width: 5.0 Metres	Blades to travel directly ahead on the correct side of the road.	Two signs will also need to be made removable. Removal of vegetation may be required.
0.3	Nundle	Continue along Crawney Road GPS link: https://goo.gl/maps/Ai8hwDJq2EU4vCDJ8	40.0 meters clearance	Right hand Bend into Left hand bend	Blades to continue along Crawney Road, May cross onto opposite side of road while navigating bends. No works forseen
1.3	Nundle	Continue along Crawney Road to Nundle Creek Bridge GPS link: https://goo.gl/maps/YHmxkK3qGma42SCG8	40.0 metres clearance	Straight along road through long winding undulating surface, crossing bridge	Bridge needs to be checked for capacity
4.3	Nundle	Continue along Crawney Road to Pearly Gates Bridge https://goo.gl/maps/tfZrFG7m7oJGFLjh9	40.0 metres clearance	Straight along road through long winding undulating surface, crossing bridge	Bridge needs to be checked for capacity. Sign needs to be made removable. Vegetation needs to be removed.
7.8	Nundle	Continue along Crawney Road to Back creek Bridge https://goo.gl/maps/grcKP9RhJjkTKLcr7		Straight along road through long winding undulating surface, crossing bridge	Bridge needs to be replaced.
8.6	Nundle	Continue along Crawney Road past back creek road. https://goo.gl/maps/t9miX24NKFShoMML9		Continue along Crawney road past Back creek road. Left hand bend to right hand bend	Continue along road. Spotter may be required to watch bank and swept path
9.5	Nundle	Continue along Crawney Road https://goo.gl/maps/GiX7V7CZfknDM3jRA		Continue along Crawney Road. Left hand bend to right hand bend	Continue along road. Spotter may be required to watch bank and swept path. Overhead vegetation. May require trimming.
9.8	Nundle	Site Entrance option A off Crawney Road https://goo.gl/maps/qW1U8VaGueXUzZGF8		Continue along Crawney road, turning onto site entrance on Left hand Side of road Cross. Wombramurra Creek	Access Road to be Built, crossing Crown Land onto Private Property. Vegetation removal required on Crawney Road with Hardstand built.

KM index	Location	Section of road	Current Measurement	Procedure	Notes
11.1	Nundle	Site Entrance option B off Crawney Road https://goo.gl/maps/WByFtwNmYRiR6AZ5A		Continue along Crawney road, turning onto site entrance on Left hand Side of road Cross. Wombramurra Creek	Access Road to be Built, crossing Crown Land onto Private Property. Vegetation removal required on Crawney Road with Hardstand built.
12.5	Nundle	Site Entrance option C off Crawney Road https://goo.gl/maps/HrH31XhPkpXrka4Z6		Continue along Crawney road, turning onto site entrance on Left hand Side of road. Cross Wombramurra Creek	Access Road to be upgraded crossing Crown Land onto Private Property. Vegetation removal required on Crawney Road with Hardstand built.

0.0 to 12.5 Km's: Crawney Road

Image 1: Looking south along Crawney Rd from the Peel River

Image 2: Crawney Road at Pearly Gates bridge

Image 3: Crawney Road at Back Creek bridge

Image 4: A typical gravel section of Crawney Road

Image 5: A potential site entrance off Crawney Road

Image 6: Crawney Road at Wombramurra Creek

Image 7: A potential site entrance off Crawney Road

0.0 KM: Jenkins Street onto Crawney Road.

Image 1:

PROCEDURE: Travel along road Jenkins street onto Crawney Road. Slight right hand bend.

GPS LINK GOR SECTION OF ROAD: https://goo.gl/maps/iaf98ARL2sQjVpPh9

COMMENTS: Blades to continue along the road. Required crossing over the centerline as it navigates the bends.

ROAD MODIFICATIONS: No road, fencing or vegetations modifications are required.

0.3 KM: Crawney Road.

Image 1:

PROCEDURE: Travel along Crawney Road. Slight left hand bend.

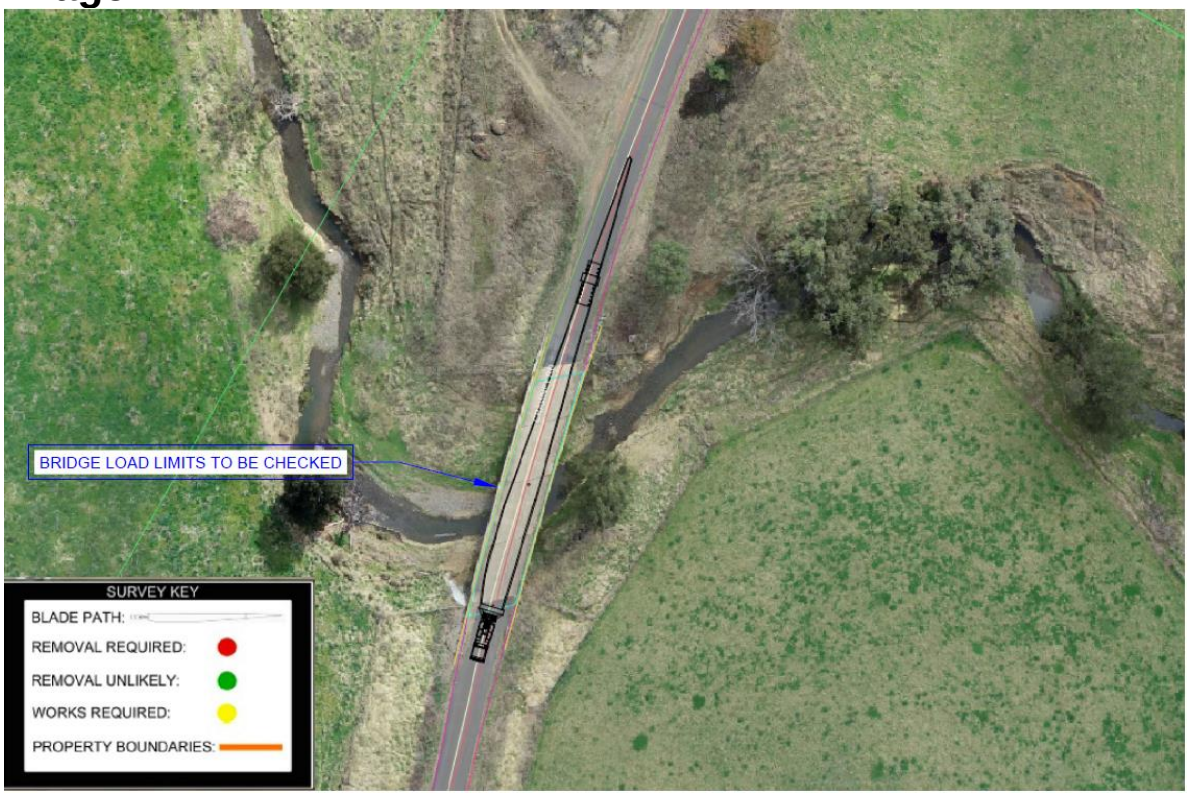
GPS LINK GOR SECTION OF ROAD: https://goo.gl/maps/Ai8hwDJq2EU4vCDJ8

COMMENTS: Blades to continue along the road. Required crossing over the centerline as it navigates the bends.

ROAD MODIFICATIONS: No road, fencing or vegetations modifications are required.

1.3 KM: Crawney Road to Nundle Creek Bridge.

Image 1:



PROCEDURE: Travel along Crawney Road over Nundle Creek bridge.

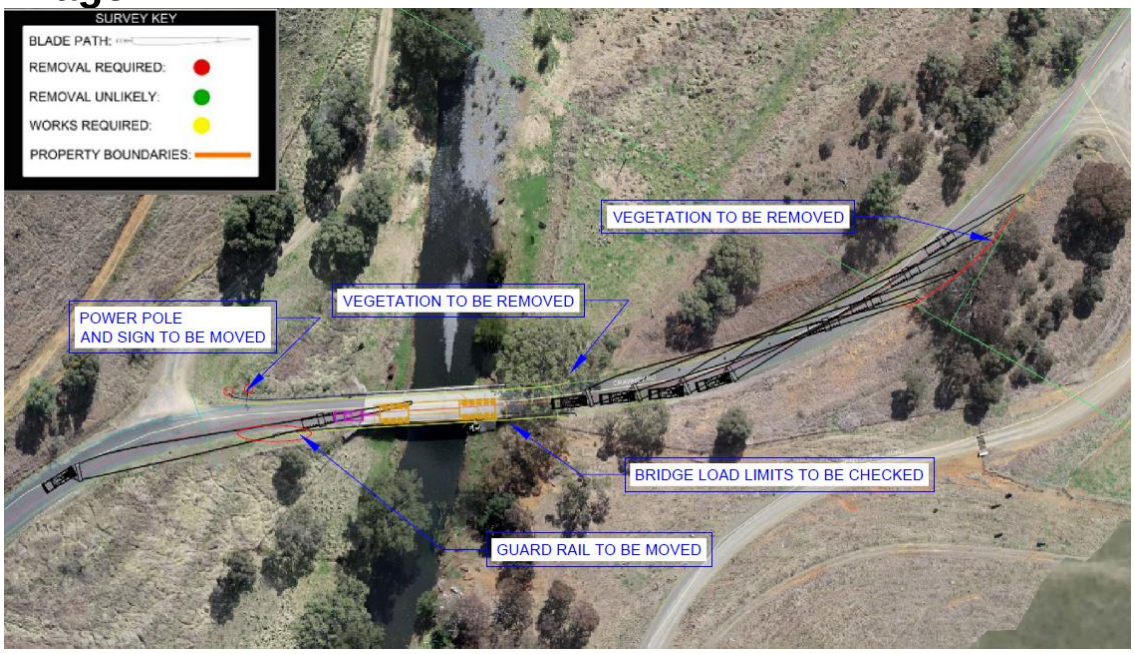
GPS LINK GOR SECTION OF ROAD: https://goo.gl/maps/YHmxkK3gGma42SCG8

COMMENTS: Blades to continue along the road. Required crossing over the centerline as the loads travel over the bridge.

ROAD MODIFICATIONS: Bridge load limits to be checked.

4.3 KM: Crawney Road to Pearly Gates Bridge.

Image 1:



PROCEDURE: Travel along Crawney Road around a right hand bend and over the Pearly gates bridge.

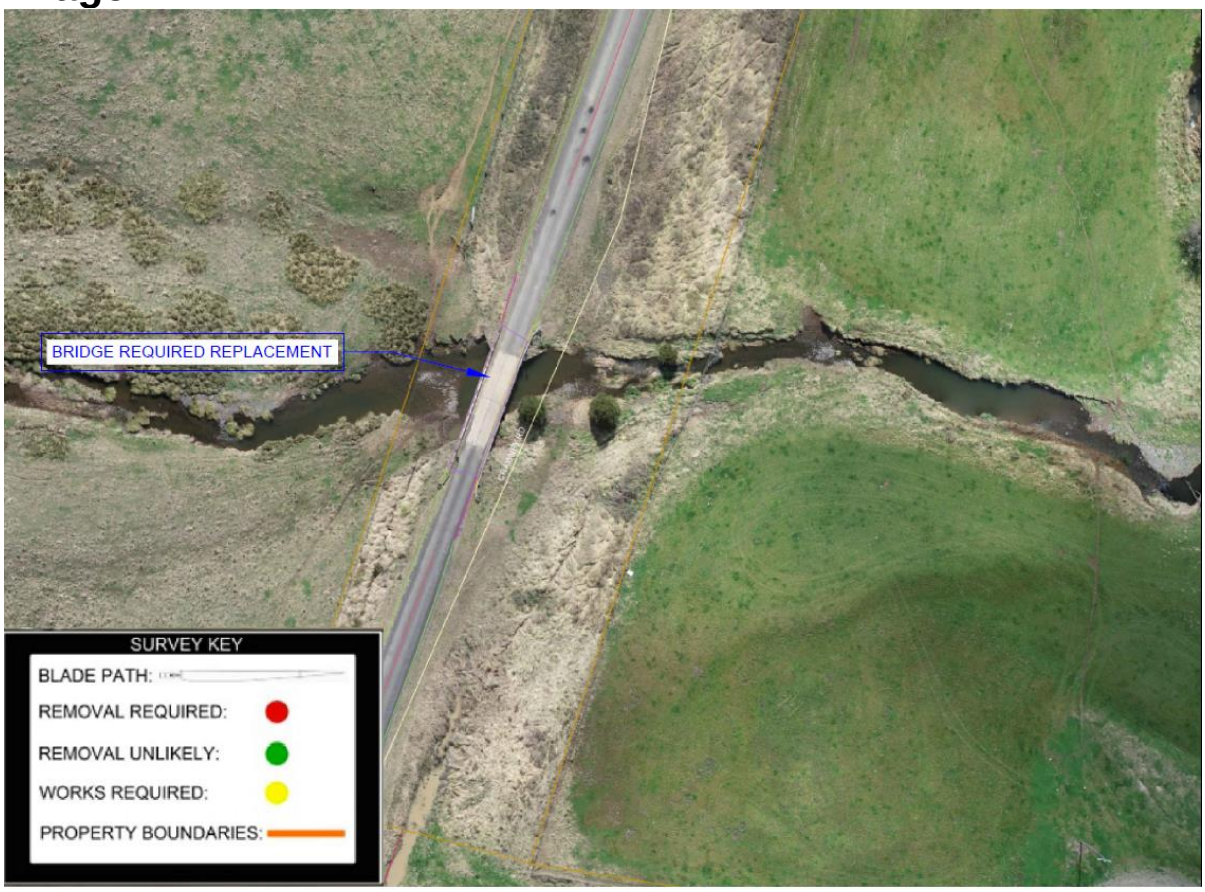
GPS LINK GOR SECTION OF ROAD: https://goo.gl/maps/tfZrFG7m7oJGFLjh9

COMMENTS: Blades to continue along the road. Required crossing over the centerline as it navigates the bends.

ROAD MODIFICATIONS: No work required. Bridge load limits to be checked.

7.8 KM: Crawney Road to Back Creek Bridge.

Image 1:



PROCEDURE: Travel along Crawney Road and over Back creek bridge

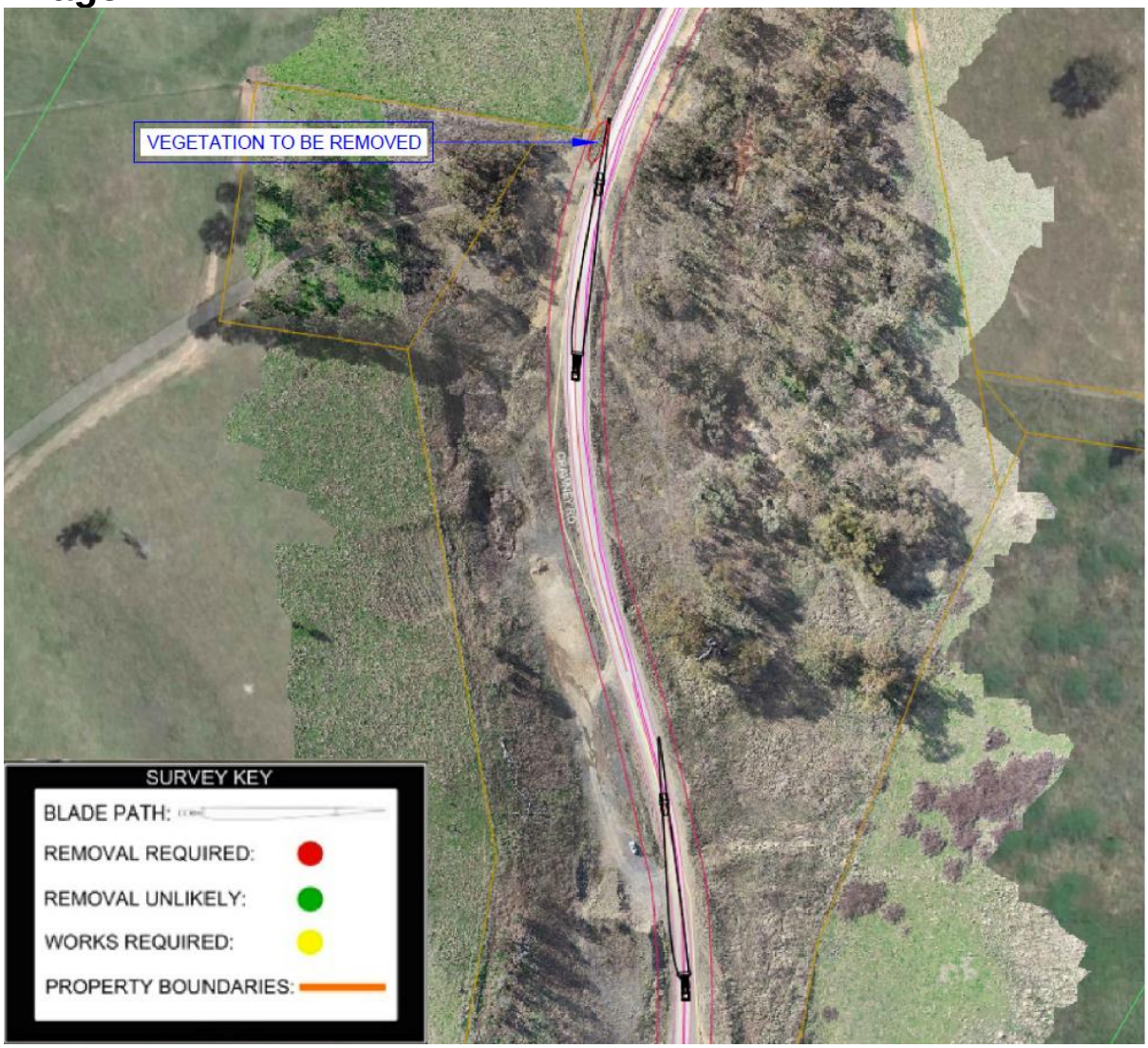
GPS LINK GOR SECTION OF ROAD: https://goo.gl/maps/grcKP9RhJjkTKLcr7

COMMENTS: Blades to continue along the road. Required crossing over the centerline as it navigates the bends. Loads over 2.5 metres in width will not fit over this structure.

ROAD MODIFICATIONS: Large amounts of work required. Bridge needs to be replaced.

8.6 KM: Crawney Road past Back Creek Road

Image 1:



PROCEDURE: Travel along Crawney Road. Slight right to left hand bends. Continue along road,

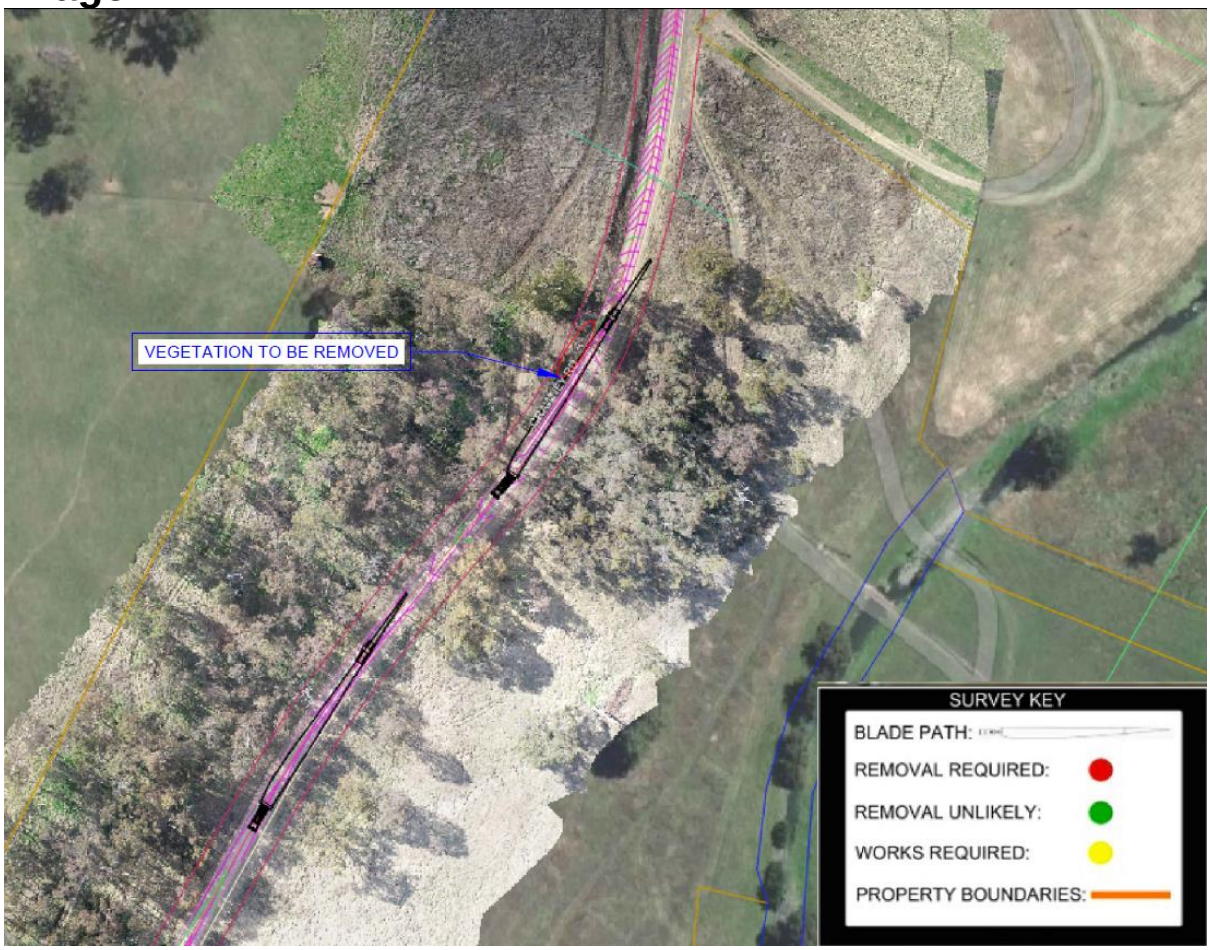
GPS LINK GOR SECTION OF ROAD: https://goo.gl/maps/t9miX24NKFShoMML9

COMMENTS: Blades to continue along the road. Required crossing over the centerline as it navigates the bends. Overhead and vegetation corridor. May require trimming/clearing

ROAD MODIFICATIONS: Moderate amounts of works required. Overhead vegetation and corridor of vegetation either side of the road.

9.5 KM: Crawney Road

Image 1:



PROCEDURE: Travel along Crawney Road. Slight right to left hand bends. Continue along road, Spotter may be required to watch bank as blades navigate the bends.

GPS LINK GOR SECTION OF ROAD: https://goo.gl/maps/t9miX24NKFShoMML9

COMMENTS: Blades to continue along the road. Required crossing over the centerline as it navigates the bends.

ROAD MODIFICATIONS: Moderate amounts of works required. Overhead vegetation and corridor of vegetation either side of the road.

9.5 KM: Crawney Road onto Site entrance option A past Dag Sheep Station

Image 1:

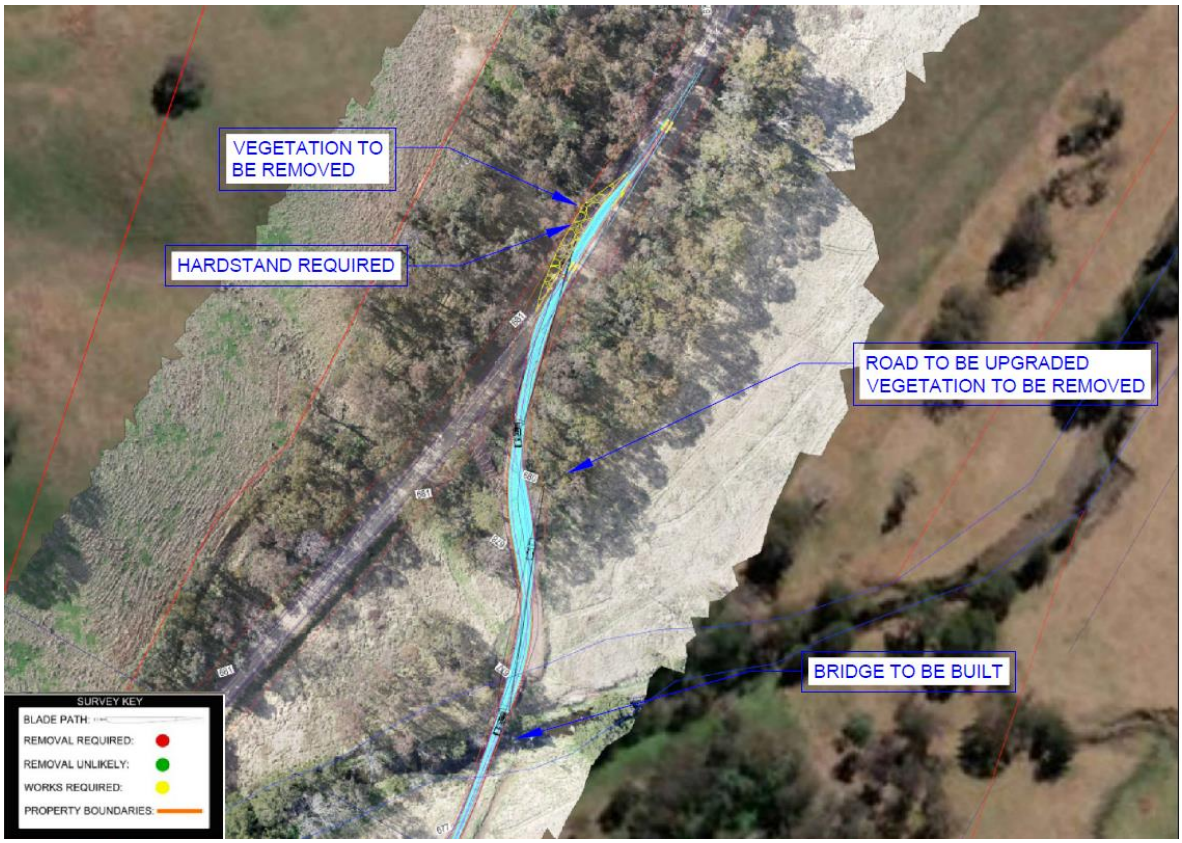


Image 2:

PROCEDURE: Travel along Crawney Road. Exit Crawney road past Dag sheep station onto site access option A.

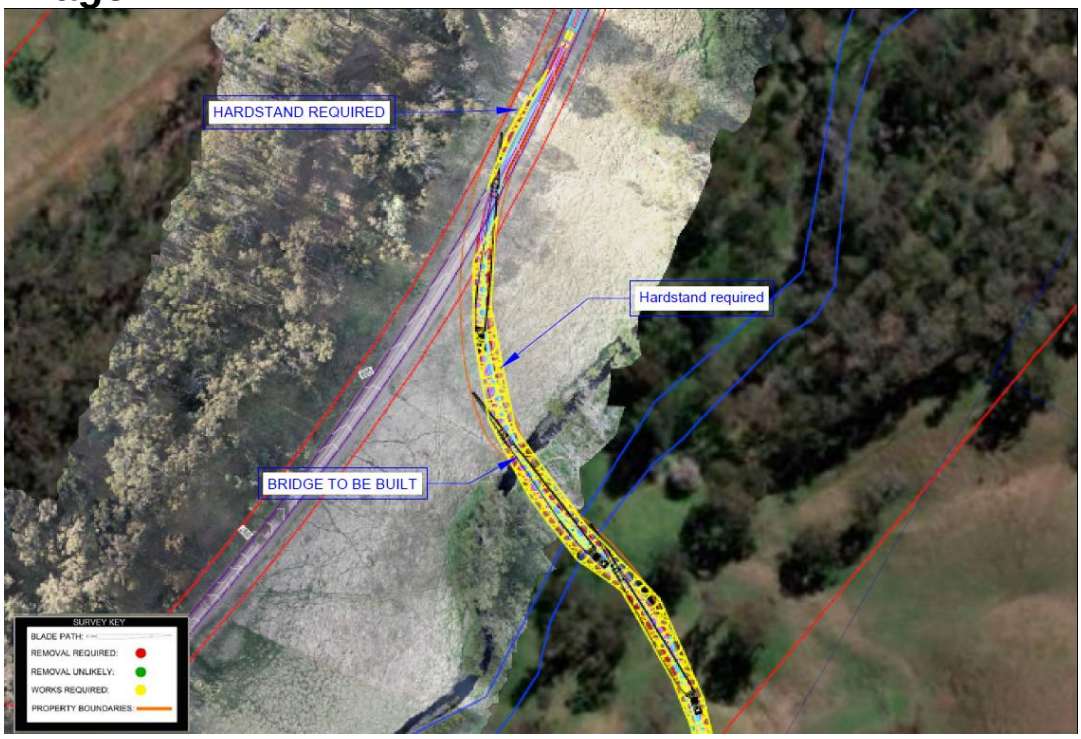
GPS LINK GOR SECTION OF ROAD: https://goo.gl/maps/qW1U8VaGueXUzZGF8

COMMENTS: Blades to continue along the road. Required crossing over the centerline as it navigates the bends. Vegetation removal and hardstand required for access road construction through Crown land to private land.

ROAD MODIFICATIONS: Large amounts of works required. Overhead vegetation and corridor of vegetation either side of the road will need to be removed. Access road and bridge will be constructed over Wombramurra Creek bridge accordingly.

9.8 KM: Crawney Road onto Site entrance option B.

Image 1:



PROCEDURE: Travel along Crawney Road. Exit Crawney road onto site access option B.

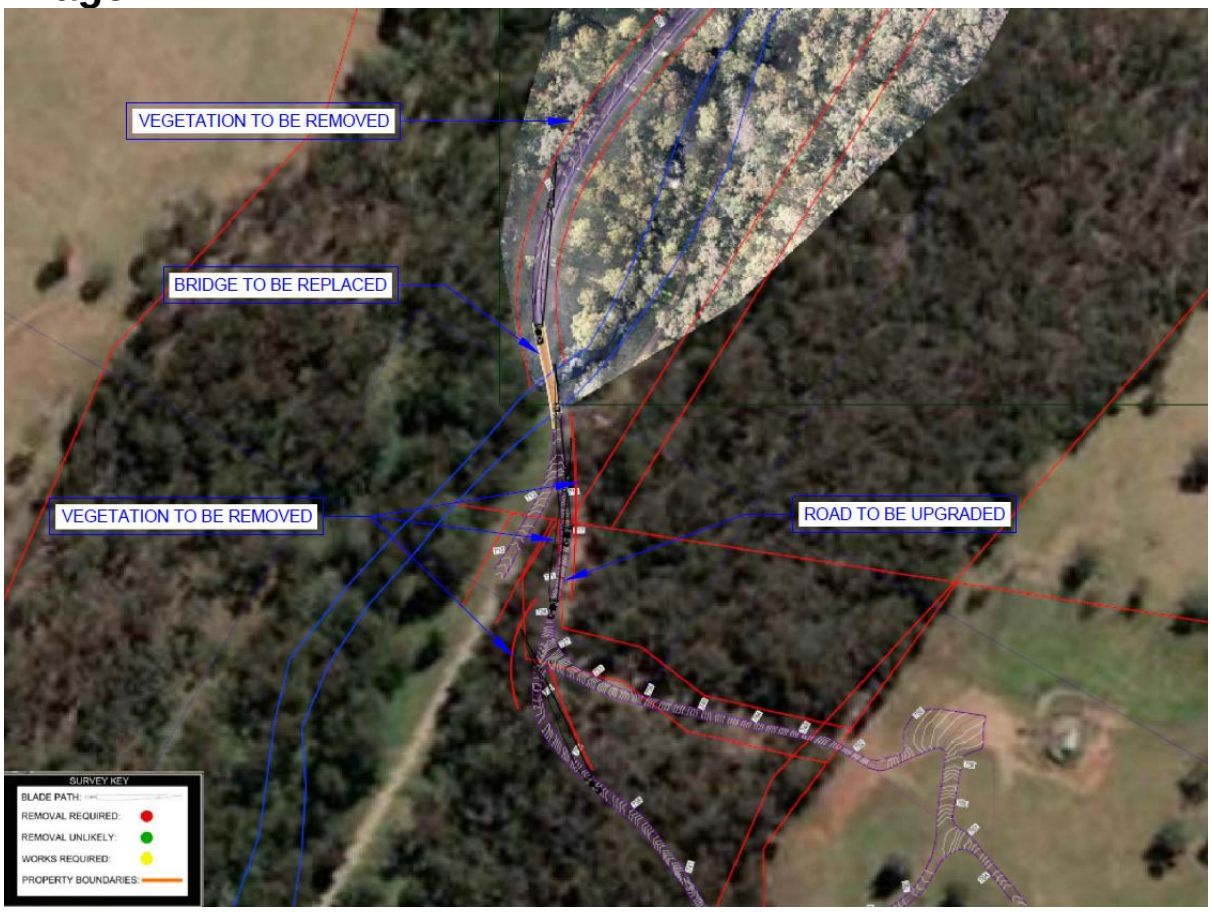
GPS LINK GOR SECTION OF ROAD: https://goo.gl/maps/qW1U8VaGueXUzZGF8

COMMENTS: Blades to continue along the road. Required crossing over the centerline as it navigates the bends. Vegetation removal and hardstand required for access road construction through Crown land to private land.

ROAD MODIFICATIONS: Large amounts of works required. Overhead vegetation and corridor of vegetation either side of the road will need to be removed. Access road and bridge will be constructed over Wombramurra Creek bridge accordingly.

12.5 KM: Crawney Road onto Site entrance option C past Teamsters Rest

Image 1:



PROCEDURE: Travel along Crawney Road. Slight right to left hand bends. Continue along road, Spotter may be required to watch bank as blades navigate the bends.

GPS LINK GOR SECTION OF ROAD: https://goo.gl/maps/CrgHLRsFbeyDUjkA7

COMMENTS: Blades to continue along the road. Required crossing over the centerline as it navigates the bends. Vegetation requires removal at Crawney Mountain Road.

Loads over 2.5 metres in width will not fit over Wombramurra Creek bridge.

ROAD MODIFICATIONS: Large amounts of works required. The Bridge will need to be replaced and overhead vegetation and corridor of vegetation either side of the road will need to be removed. Vegetation needs to be removed at the entrance to Crawney Mountain Road. Existing access tracks will need to be upgraded according.

18.0 Conclusion:

ROUTE SELECTION:

After studying all options and undertaking a route survey, it was observed that the components would need to be transported on several different routes through to the Hill of Gold project as listed in the report.

Route 1: Suitable for all loads if modifications are undertaken.

Route 1a: Suitable for blades only if modifications are undertaken.

Route 1b: Suitable for blades only if modifications are undertaken.

Route 2: Suitable for Loads up to 5.2 metres in height, but not blades.

Route 3: Suitable for Loads over 5.2 metres in height, but not blades.

Route 4: Suitable for standard loads up to 3.5 metres wide, and no higher than 5.2 metres in overall height.

Route 5: To be used for all loads from Nundle through to site..

NEWCASTLE:

The intersection of George Street and Industrial Drive at Mayfield looks to be the most difficult corner. Relocation of the traffic signal in the centre of the intersection would be necessary to allow the 83-metre blade to traverse the bend. The 65 Metre blade will not require traffic signals to be removed. However, both blades will require some hardstand to be added to the outside of the corner. Escorts and or traffic control have been proposed to help loads through this intersection.

The corner from Industrial Drive onto Maitland Road will require the centre median strips to be lowered while the blades traverse the corner on the incorrect side of the road for both blade options. Police, escorts and or traffic control to control local traffic either side of the intersection.

HUNTER EXPRESSWAY:

The 83-metre blades will not make it around the roundabout from John Renshaw Drive onto the Hunter Expressway. The 65 Metre blade can travel around the roundabout.

For the 83-metre blade traffic control/Police would be required to block the eastbound lanes of the Hunter expressway while the blades travel down the incorrect side before crossing over at the centre crossover point. Police and escorts to control local traffic either side of the intersection.

NEW ENGLAND HIGHWAY ONTO THE GOLDEN HIGHWAY:

This corner is currently in the design stage of modifications. The existing corner would need only a small amount of works to allow the blades a suitable swept path. It is recommended that the project keep a close eye on any potential changes that may affect the blades swept path around the corner.

THE GOLDEN HIGHWAY:

Several corners would need to have a moderate number of modifications. Additionally, the blades will need to travel onto the incorrect side of the Golden Highway for approx. 400 metres. This will require the police escorts and pilots to hold all eastbound traffic on the Golden Highway, and spotters to assist the load through this pinchpoint. Roadwork's are programmed to take place on this route over the next year, so it is recommended that the client discuss any upcoming road projects with Transport NSW.

MUSWELLBROOK:

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

- ROUTE 1 VIA: New England Highway, Golden Highway, Denman Road, Bengalla Road, Wybong Road, Kayuga Road, Ivermein Street, Dartbrook Mine access Road, New England Highway.

  This route will require upgrades; these include hard standing and relocating of power poles. The 65 metre blade requires around 50% of the upgrades that the 83 metre blade would require.

- ROUTE 2 VIA: New England Highway, Bell Street, Victoria street, Market Street, New England Highway.

  This route is suitable in its current form for loads up to 40 metres long and 5.2 metres in overall height.

- ROUTE 3 VIA: New England Highway, Golden Highway, Denman Road, Thomas Mitchell Drive, New England Highway, Bell Street, Victoria street, Market Street, New England Highway.

  This route is suitable in its current form for loads up to 40 metres long and 5.2 metres in overall height.

- ROUTE 4 VIA: New England Highway.

LINDSAY'S GAP ROAD THROUGH TO NUNDLE:

Loads to turn right from the New England Highway onto Lindsay's Gap Road, travelling across to Nundle Road before entering Nundle via Crosby Street and Oakenville Road.

- The section of Lindsay's Gap Road between the New England Highway and Nundle Road has several bridges that will need to be checked for axle loadings.

  The bridge over Goonoo Goonoo creek has a maximum axle width of 3.5 metres. The bridge over Middlebrook Creek also has axle width restrictions. These bridges will require replacement or upgrades before the towers or motors could be delivered to the project. A deck width of at least 4.6 metres is required for the heavier loads.

- Upgrades required on the turn off from the New England Highway onto Lindsay's Gap Road, and also from Lindsay's Gap Road onto Nundle Road. The 83 metre blade would require moderate upgrades on this section of road, whereas the 65 metre blades only require a small amount of work.

- Oakenville Street would require a temporary no parking area put in place throughout the deliveries, this location is listed in the survey.

NUNDLE:

- At this stage there are two options for the blades and one option for all remaining loads.
- Route 1a is the preferred option for the blades, however 1b could also be used if required. Both options require access into private landowners boundaries.
- The remaining loads will travel via Heron Street North and Innes Street

CRAWNEY ROAD:

- There are 4 bridges along Crawney Road. Both Back Creek and Wombramurra Creek will need to be replaced, and the Peel River and Nundle Creek bridges will need to be assessed for the capacity of all loads.
- Crawney Road is asphalt up until Back Creek. After Back Creek the road is gravel and in fair condition, however some sections will need to be upgraded for all weather travel. The swept path of this road is tight in several sections and would need to be checked to make sure that the road width is 5.5 metres wide with a .5 metre merge either side at a minimum.
  A swept path analysis has been undertaken on Crawney Road, and the blades would stay within the existing road reserve with some modifications required to the existing alignment.
- The upper section of Crawney Road will need to have vegetation removed.

GENERAL ROAD ACCESS:

BRIDGE CROSSINGS:

This route from Newcastle to Tamworth has been used in the past for wind turbine components up to 100T, which covers the components assessed in this survey. Further investigations would be required if item mass exceeds this. Additionally, once the loads turn off the New England Highway all structures that require the loads to travel over them, will need to be assessed for axle loads.

OVERHEAD STRUCTURES:

The lowest structure on this route is the Liddell overpass. This bridge is 5.2 metres in the centre carriageway and 5.3 metres in the far-right lane. Loads that exceed 5.2 metres in overall height will need to bypass the bridge via the Golden Highway. A maximum height of 5.9 metres would then be the lowest structure that cannot be avoided. This structure is on the New England Highway at Hexham.

OVERHEAD WIRES:

This route would need to be assessed to handle a loaded height of up to 5.9 metres.

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.

CRESTS:

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

PAVEMENT:

The Pavement up to Crawney Road is of suitable highway grade. Crawney Road is aphalt for the first section and appears to be in good condition, at Back Creek the road is gravel and could need widening in sections as well as upgrading to an all-weather surface.

ROADWORKS:

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

PORT:

The port has an excellent Break bulk berth that runs at approximately 60% berth occupancy. The berth has axle and crane loadings well above what is required for this project.
The storage area is asphalt hardstand with a current area of 100,000 s/q metres available, all level. It is adjacent to the port, and within 300 metres of the berth, all within the Port grounds. No local roads need to be used during the discharge.
Access to the local roads from the port will require some upgrades, including adding hardstand and relocating fences.

SUMMARY OF ROUTES:

After reviewing all routes, we are under the opinion that the loads could be delivered through to the Hill of Gold windfarm project with a number of upgrades.
The 83 metre and the 65 metre blades would require a detour around Muswellbrook via Route 1, and approvals would still need to be prior to delivery. The Towers and motors could use Route 1 up until Nundle if the upgrades are completed, and if the bridges have the capacity on the detour.
Access to the Hill of Gold windfarm once the loads arrive at Nundle has road modifications that would need to take place before it could become a reality for both blade types.
The additional routes based on the height, allows the project to source larger towers if required. We recommend however that a loaded height of 5.9 metres is not exceeded. In saying that we believe a 5.85 metre flange could be delivered to site but would require bookends to keep the height under 5.9 metres at critical locations.
We also recommend that a Blade dry run is undertaken once all road modifications have been completed, and prior to the first blade movement.

AXLE LOADS:

A comparison of wheel and axle loads for the various vehicle configurations to be used for the project transport has been done to demonstrate the impacts to the road compared to a standard B-Double (https://www.nhvr.gov.au/files/201901-0977-national-class2-b-double-operators-guide.pdf).

Vehicle	Group Config	Group Load (t)	Axle Load (t)	Tyre Load (t)
(Comparison Vehicle) B-Double	2x4 215/75R17.5 126L @2.5	16.5 (max)	8.25	2.0625
85m Blade in Schanbel	3x4 11R22.5x12 @2.5	25.0	8.33	2.0825
Hub	4x8 215/75R17.5 @3.5	42.6	10.65	1.33
Nacelle	10x8 215/75R17.5 @3.5	133	13.3	1.6625
Drivetrain	10x8 215/75R17.5 @3.5	134.8	13.5	1.69
Tower - Bookend	4x8 215/75R17.5 @4.2	64.4	16.1	2.0125
Tower – Low Platform	8x8 215/75R17.5 @5.0	126.0	15.75	1.96875
Tower – Extending Platform	5x8 215/75R17.5 @5.0	72.5	14.5	1.8125
Tower – Dolly and Jinker	2x8 215/75R17.5 @5.0	29.6	14.8	1.85
Transformer Trailer – Beamset	10x8 215/75R17.5 @4.2	150	15	1.875
Transformer Trailer - Platform	16x8 215/75R17.5 @4.2	240	15	1.875
Crane Trailer – Platform	10x8 215/75R17.5 @4.2	150	15	1.875

19.0 Approvals:

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

- NHVR
- TfNSW
- Newcastle Council
- Muswellbrook Council
- Tamworth Regional Council
- NSW Police
- Ausgrid
- Essential Energy
- Telstra
- CRN JHG (Rail)
- ARTC (Rail)

20.0 References:

Rex Andrews Engineered Transportation Pty. Ltd.
Someva Renewables
Engie
Rex J Andrews P/L Route Survey LL273 REV03.
Google Earth/Maps
Nearmaps
Sixmaps
NHVAS Maintenance Management (NHVAS21193)
NHVAS Basic Fatigue Management (NHVAS21193)

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.