G.7 TRAFFIC AND TRANSPORT

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Traffic Impact Assessment

Rye Park Wind Farm TIA Update

Prepared for Tilt Renewables
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1 Introduction

This report provides an updated assessment of the traffic and transport impacts for the proposed modified Rye Park Wind Farm. The report compares the traffic and transport impacts of the modified project with those of the original traffic and transport assessment completed for the development, assuming re-baselined traffic for the approved project, given that the approved project differed to that considered in the original traffic assessment.

The Rye Park Wind Farm is a renewable energy project within the Yass Valley, Hilltops and Upper Lachlan Shire Councils. It is approximately 45 km in length and 2-3 km wide. In 2017, approval was received for the project with 92 wind turbines at a maximum tip height of 157m. A modification is currently being sought to increase the maximum tip height to 200m and reduce the number of turbines to 80. Associated infrastructure for the wind turbines such as crane hardstands, access tracks, overhead powerlines, a concrete batch plant, substation and an operations and maintenance building will need to be constructed.

The last Traffic and Transport Assessment for the Rye Park Wind Farm was completed by Epuron in 2016. The report analysed the traffic generation and impacts associated with a 109-turbine layout.

The report discussed the following points:

- Existing Traffic and Transport conditions
- Construction traffic generation
- Upgrades to the proposed routes that may be necessary
- Details on expected council road upgrades that might be required
- Assessment of potential impact to local community
- Recommendations and mitigation measures.

This assessment will cover much of the same points as the previous report. As an updated traffic and transport assessment was never completed for the approved 92 turbine wind farm, the construction traffic inputs have been re-baselined against the 92-turbine layout to calculate the estimated loads and trips required for construction. Subsequently, this assessment will compare the traffic impacts of the proposed 80 turbine layout against the re-baselined 92 turbine layout. This assessment accounts for changes to the preferred route to site and changes to the project specifications. These specification changes include the use of fewer turbines with larger dimensions, as well as changes to the internal access tracks, wind farm site, and connection infrastructure. It will be assumed that no other significant changes will occur that would affect the outcome of this report.

As part of the proposed modification, a preferred transport route has been selected from the approved over-dimensional and heavy vehicle designated routes in the Development Consent. In this preferred route, vehicles access the site at three of the eight approved site access points. The northern section of the site has two access points and will be accessed via Grassy Creek Road, Rye Park. The southern section of the site has one access point and will be accessed via Dalton Road, Rye Park.

Construction vehicles, including over-dimensional and heavy vehicles, will access these points via the local roads in the town of Boorowa and Rye Park. Vehicles will enter Boorowa via the Hume Highway and Lachlan Valley Way. The local roads selected in the preferred route are a subset of local roads in the designated route approved in the Development Consent. For the purpose of this assessment, it has been assumed that wind turbine components will be delivered from Port Kembla and/or from the Port of Newcastle, subject to contract award for wind turbine components and suppliers preferred port of entry.

As per the previously completed TIA, operational traffic is expected to be relatively minor as compared to that of the construction phase (and is not proposed to change as part of the modification to the project). Hence, in this analysis, traffic during the construction period will be of main focus.

1.1 Project Location

The location of the proposed Rye Park Wind Farm has not changed since the previous TIA. The wind farm is located within three Local Government Areas of Hilltops Council, Upper Lachlan Shire Council and Yass Valley Council. Both local roads, as well as Roads and Maritime Services (RMS) roads are proposed to be used. The site is located to the east of the town of Rye Park and extends from about 10 km north of Yass to about 6 km south east of Hilltops Council. It extends approximately 45 km from north to south and 3 km from east to west.

The Rye Park Wind Farm is adjacent to the planned Bango Wind Farm. It has been assumed that the construction of the Bango Wind Farm will be completed before construction of the Rye Park Wind Farm commences. As such, it will be assumed that there is no traffic overlap between the two development sites.

1.2 Traffic Generation

The general overview of the project has not changed significantly from the approved project specification. The main change is that the project now consists of up to 80 wind turbines with larger turbine dimensions. Associated infrastructure including access tracks, crane hardstands, overhead powerlines, underground cabling, and a new electrical substation will still be installed for the project.

As per the previous TIA, traffic generated will be made up of the following:

- Construction traffic for the roadworks, foundation works, turbine erection works, substation and collector station works, cabling and transmission line works
- Delivery of imported Wind Turbine Components including: Tower Segments, Nacelle (Engine housings), Hub Units, Blades
- Delivery of locally sourced road base materials for onsite access roads and council road modifications
- Delivery of locally sourced sand and concrete materials for onsite batching for foundations of wind turbine units and minor buildings
- Delivery of water for roadworks, concrete batching, and dust suppression practices
- Delivery of building materials for all buildings and structures proposed on the site area.

It is expected that there will be a slight change in the traffic generated due to project description changes. These changes and their effect on traffic generation have been captured in this report.

1.3 Wind Farm Equipment Features

As per the previous TIA, a representative indicative turbine has been used when assessing component delivery. The assumption for the definition of over-sized vehicles will be maintained, however, as specified below, the blade length has now increased.

Over-dimensional vehicles

Wind turbine blade length is 84m.

Over-sized vehicles

Those over 19m in length, 2.5m in width and 4.3m in height or over 42.5 tonnes are defined as over-size.

2 Director General's Requirements

Director General Requirements (now known as SEARs) were provided on 14th February 2011 for the project. Supplementary Requirements were also provided on 16th August 2011. Those relating to Traffic and Transport state that the EA must assess the construction and operational traffic impacts of the project including:

- Details of the traffic volumes (both light and heavy vehicles) and transport routes during construction and operation
- Assess the potential traffic impacts of the project on road network function (including intersection level of service) and safety
- Assess the capacity of the existing road network to accommodate the type and volume of traffic generated by the project (including over-dimensional traffic) during construction and operation, including full details of any required upgrades to roads, bridges, site access provisions (for safe access to the public road network) or other road features
- Details of measures to mitigate and/or manage potential impacts, including construction traffic control, road dilapidation surveys and measures to control soil erosion and dust generated by traffic volumes
- Details of access roads within the site including how these connect to the existing public road network (i.e. site access) and ongoing operational maintenance requirements for on-site roads; and
- Consideration of relevant council traffic/road policies.

3 Existing Conditions

In order to access the wind farm site, a combination of local council roads and RMS managed strategic roads will be used. Other transport modes, such as rail or air, are not viable options and have not been considered in this assessment.

3.1 Local Roads

The majority of local roads used by the project are managed by the Hilltops Council. The preferred transport route results in over-dimensional and heavy vehicles entering the site via local roads north of the site, exiting from the Hume Highway to Lachlan Valley Way and onto subsequent local roads, as specified in Section 4.2. The approved designated route in the Development Consent allows for over-dimensional and heavy vehicles to access the site from the south via Jerrawa Road and subsequent local roads, the selected preferred route will not include these roads. A summary of recommended modifications to allow over-dimensional vehicles to use these local roads is specified in Section 4.2. Section 6.3 outlines the existing conditions (as well as recommended upgrades) on the local roads that will form part of the preferred route.

Analysing traffic count data yields important information on the expected vehicle volumes on these local roads. Hilltops Council and Upper Lachlan Shire Councils do not have traffic count data available while Yass Valley Council does. The following roads were identified as transport route options in the previous TIA. Whilst they are not proposed to be used as part of the preferred route, the counts do however give an idea of expected vehicle volumes in the vicinity of the site (Epuron, 2016).

- 23 vehicles per day (13% heavy vehicles) on Coolalie Road at the Yass Valley Council boundary from 2003
- 12 - 52 vehicles per day (5 - 7% heavy vehicles) at various places on Bushs Road from 2009
- 118 – 298 vehicles per day (9 – 19% heavy vehicles) at various places on Cook Hill Road from 2009
- 89 – 91 vehicles per day (12 – 14% heavy vehicles) at various places on Blakney Creek Road from 2006 and 2011.

Despite the fact that the counts are relatively old, it is evident from this data that local road usage is low and significantly lower than that on major roads.

3.2 RMS Roads

For the purpose of the original assessment, delivery via Port Kembla was considered as an option for the delivery of wind turbine components. This route was deemed to be well suited to accommodate over-dimensional loads, for the indicative turbine dimensions approved.

For the purpose of this assessment, delivery of turbine components has been considered from two ports, Port Kembla and the Port of Newcastle. In order to assess the suitability of the route from Port of Newcastle, a route survey from Newcastle(via Gunning) to the site was conducted by *Rex J Andrews Pty Ltd* on *26-02-2020* and is attached in Appendix A. A reassessment of the suitability of the route from Port Kembla, considering larger turbine dimensions was conducted by *Vestas* on *28-02-2020* and is attached in Appendix B. A summary of the recommended upgrades from these route studies is discussed in Section 4.2.

It is understood that the route(s) will be finalised subject to the selection of a final turbine and contract award. The routes will be detailed in the project Traffic Management Plan and will be subject to approval of over-dimensional vehicle permits via the Heavy Vehicle National Law (NSW).

The majority of the Port of Newcastle delivery route is via the Pacific Motorway, Hume Highway and Lachlan Valley way. The majority of the Port Kembla delivery route is via Picton Road, Hume Highway and Lachlan Valley way. The most recent traffic counts (per direction) on RMS roads near the site are as follows (TfNSW, 2019):

- 4,350 vehicles per day (41% heavy vehicles) - 0.5 km west of Yass Valley Way on Hume Highway, as measured in 2019
- 7,800 vehicles per day (27% heavy vehicles) - 0.58 km East of Lachlan Valley Way, as measured in 2019
- 1,600 vehicles per day - corner of Marsden and Pudman Streets in Hilltops Council, as measured in 2012.

3.3 Roads Users

Per the information provided by local Council and RMS, it can be deduced that while the majority of road users within the local roads are light vehicles, there is still a significant percentage of heavy vehicles using these roads. This number is significantly higher on RMS roads.

3.4 Council Road and Traffic Policies

It is necessary to assess the impacts that the estimated construction traffic will have on local roads. The previous TIA outlined road upgrades agreed between the proponent and local councils, which are specified in Condition 27 of the Development Consent relating to the 92 turbine layout. These upgrades were based on pavement design standards which considered the estimated construction traffic in the 2016 TIA. Based on consultation with councils, the proponent advises that the previously agreed pavement design standards, as outlined in Section 6.5.2 of the EIS, are proposed to remain unchanged.

Existing conditions and proposed upgrades considering the modified project specifications are based on the results obtained from a *Preliminary Road Upgrade Investigation* report conducted on *24-03-2020* by *Genium Civil Engineering Pty Ltd*, that can be found in Appendix D. These have been compared to the upgrades specified in Condition 27 of the Development Consent for the approved development application, this comparison can be found in Section 6.3.3.

4 Transport Routes

4.1 Road Transport via the Local Road Network

Local roads which form part of the preferred transport route are presented in Table 4-1 below, with a diagram showing the location of these roads presented in Figure 4-1**Error! Reference source not found.**. Compared with the transport route options permitted by the existing Development Consent, access is no longer being proposed from the south, off the Hume Highway via Jerrawa and subsequent local roads. Other roads that have been permitted in the Development Consent, such as Flakney Creek Road and Maryvale Road, will also not form part of the preferred route to site.

Table 4-1: Updated Site access routes via local council road

Over-dimensional and over-mass routes				
Road	**Purpose**	**Start - End**	**Length (m)**	**LGA**
Trucking Yard Road	Rye Park Township	Lachlan Valley Way to Dillion Street	660	Hilltops Council[1]
Dillion Street	Rye Park Township	Trucking Yard Road to Long Street	990	Hilltops Council
Long Street	Rye Park Township	Lachlan Valley Way to Rye Park Road	1,100	Hilltops Council
Rye Park Road	Rye Park Township	Long Street to Yass Street	19,400	Hilltops Council
Grassy Creek Road	Access Point 2 & 10	Rye Park Road to site access point 10	6,500	Hilltops Council
Yass Street/ Gunning Road	Access Point 12	Rye Park Road to Dalton Road	1,900	Hilltops Council
Dalton Road	Access Point 12	Yass Street to Access Point 12	12,800	Hilltops Council

4.1.1 Access onto the Site

The Development Consent allows for eight site access points, to which three have been chosen (to provide more certainty), as part of the preferred transport route. These will be accessed via Rye Park Dalton Road and Grassy Creek Road. Details concerning proposed site access points is presented in Table 4-2 with a diagram showing their location in Figure 4-1.

Table 4-2: Site Access Points

Site Access Point	**Town**	**Access Road**	**Proposed use**
2	Rye Park	Grassy Creek Road	Access via Grassy Creek Road to northern section of site
10	Rye Park	Grassy Creek Road	Access via Grassy Creek Road northern section of site
12	Rye Park	Dalton Road	Access to the southern section of the site south of Flakney Creek Road

[1] When the initial TIA was done, the Local Government Area (LGA) was Boorowa Shire Council.

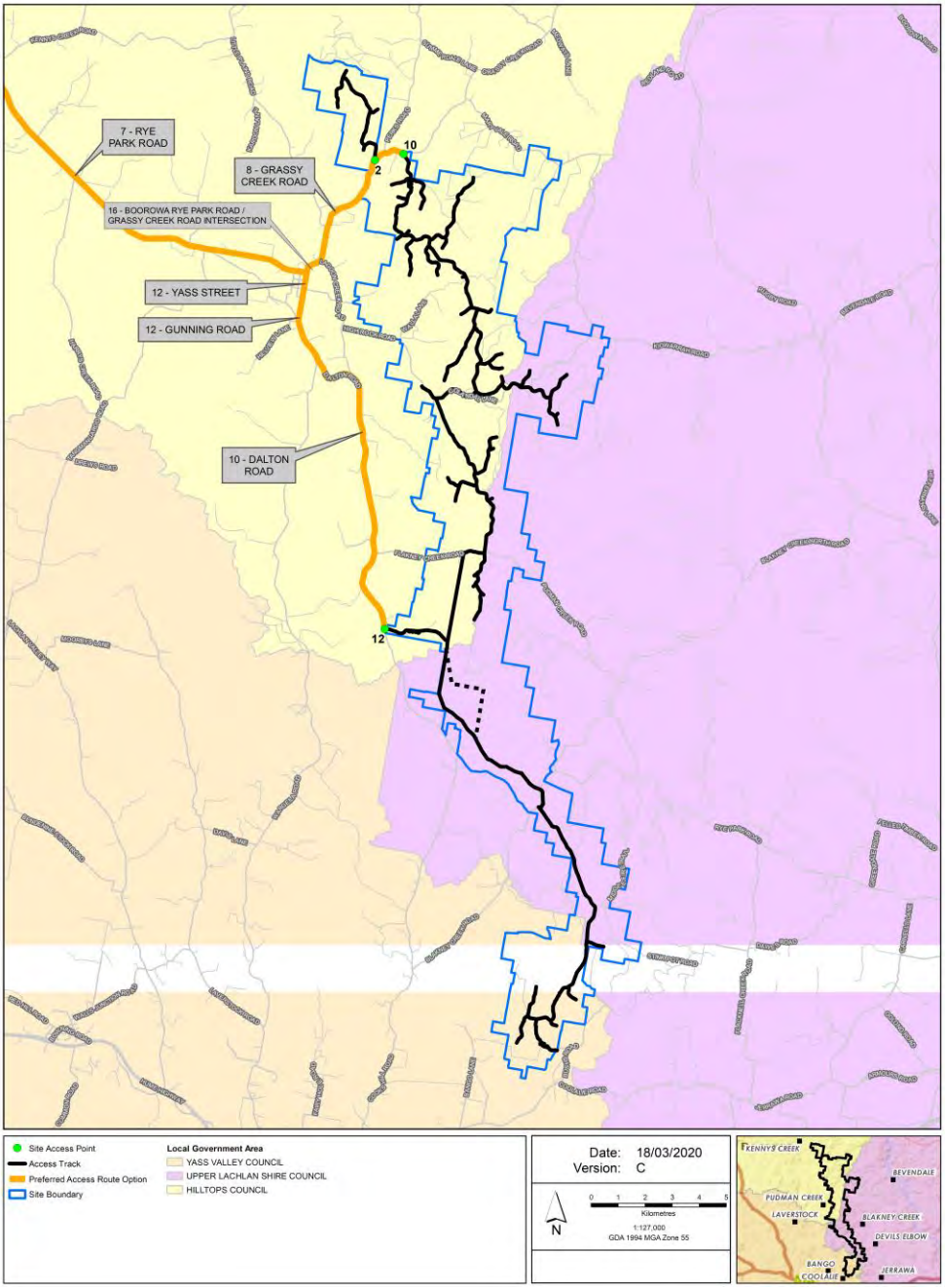


Figure 4-1: Updated Site access routes via local council roads

4.1.2 Access within Site

The wind farm layout has been refined in the modified project to ensure constructability. Part of this refinement includes changes to the internal access tracks. The modified project assumes a larger average width of internal tracks and decrease in the total length of internal tracks, as compared to the approved project.

The design process for the internal tracks aimed to minimise ground disturbance (e.g. the need for cut and fill) and to avoid areas of sensitivity (e.g. significant vegetation). Additionally, the design of the internal access tracks will ensure ample turning space inside the site to avoid the need for over-dimensional vehicles using public roads for reversing, which has been allowed for in the preliminary design of the wind farm. However, as these tracks are on private property, and they do not differ significantly from access tracks in the approved project, there will be no change in the impact of on-site movement to the general public.

4.2 Road Transport via Major Road Network

This assessment considers two routes which could deliver wind turbine components to the site via Port Kembla and via the Port of Newcastle. The suitability of these routes to handle over-dimensional vehicles was assessed in two separate route survey reports, which can be found in Appendix A and Appendix B respectively and which are summarised in the following sections.

4.2.1 Port of Newcastle Route Assessment

The Port of Newcastle has been used to import wind turbine components in the past, specifically for *CWP Renewables' Sapphire Wind Farm,* however, the blades were 63m instead of the assumed 84m used for this project. The suitability of the port was assessed based on an 83.5m blade length in the route survey report included in Appendix A. The route assessed in this report is from the Port of Newcastle to the site via Gunning. Figure 4-2 shows this proposed route.

The route was assessed in three separate stages:

- Stage 1 - Port of Newcastle (via Gunning) to Rye Park Township (before the intersection of Rye Park Road and Yass Street)
- Stage 2 - Rye Park Road and Grassy Creek Road to Access Points 2 and 10
- Stage 3 - Rye Park Road, Yass Street, Gunning Street and Dalton Road to Access Point 12.

The report determined that whilst several modifications to roads and intersections would be required to accommodate over-dimensional vehicles, the transport route from the Port of Newcastle is a viable option. It concluded that within Newcastle, several roads and intersections will need to be modified to allow for over-dimensional vehicles, specifically the blade swept paths. These upgrades include but are not limited to signal relocation, hardstand addition, pinch point consideration, median modification, and other operational requirements. Additional modifications and upgrades will also be required at road segments and intersections along RMS roads, intersection of RMS roads and local roads, road segments and intersections along local roads, and site access points.

At this early stage of the project, the respective turbine suppliers are considering all feasible options for transporting over-dimensional vehicles to site. In addition to the transport route from Newcastle to site, via Gunning, *Vestas Australian Wind Technology P/L* are investigating an alternative transport route from Newcastle via Dubbo. Vestas advise that this route could enable transportation of the larger bottom tower sections of the turbines. A detailed route survey, including a swept path analysis is currently being undertaken to fully assess the feasibility of this route. Figure 4-3 shows the proposed route from the Port of Newcastle to the site via Dubbo.

4.2.2 Port Kembla Route Assessment

The suitability of Port Kembla to handle over-dimensional vehicles was assessed in a route survey report prepared by Vestas, which can be found in Appendix B. An 81.1m blade length was used in this assessment. Figure 4-4 shows the proposed route from Port Kembla to the site.

There are two different routes from Port Kembla that have been assessed in this report:

1. Route for high loads, via North Wollongong
2. All other loads travel along the M1 Princes Motorway.

It was determined through the route survey that whilst several modifications to roads and intersections would be required to accommodate over-dimensional vehicles, the transport route from Port Kembla to the site is a viable option. The report recommended several operational requirements, modifications and upgrades to RMS and local roads/intersections. As the route from Port Kembla will be identical to the route from the Port of Newcastle after vehicles coming from Port Kembla turn from Picton Road onto the Hume Highway, recommended upgrades to allow for over-dimensional vehicles will be the same for both ports after this point.

4.3 Road Upgrades in Development Consent

Condition 27 of the Development Consent outlines road upgrades, which are only on local roads. It should be noted that as the roads on the preferred route are a subset of the approved designated route in the Development Consent, many of the roads requiring modifications per the Development Consent will no longer need to be upgraded. A more detailed discussion of local road upgrades pertaining to all construction traffic is presented in Section 6.3.

As per the recommendations in the route survey report, in addition to upgrades on local roads, several modifications to RMS managed roads (and intersections) will need to be implemented if components are to be delivered from the

Port of Newcastle and/or Port Kembla. These upgrades will be addressed by the proponent and relevant authorities once the delivery route is finalised. Prior to the commencement of any construction activities, consultation will be undertaken with RMS and Council to develop a Traffic Management Plan to manage traffic impacts of over-dimensional vehicles.

Regarding local road upgrades as it pertains to over-dimensional vehicles, whilst the recommended modifications in the route survey do not differ significantly to those referred to in the Development Consent, there are additional measures along certain roads and intersections (e.g. addition of hardstand, recommendation by Rex J Andrews for vertical curve check, modifications at site access points, etc.) that have not been specified in the Development Consent. These additional modifications will also be addressed with relevant authorities in the Traffic Management Plan.

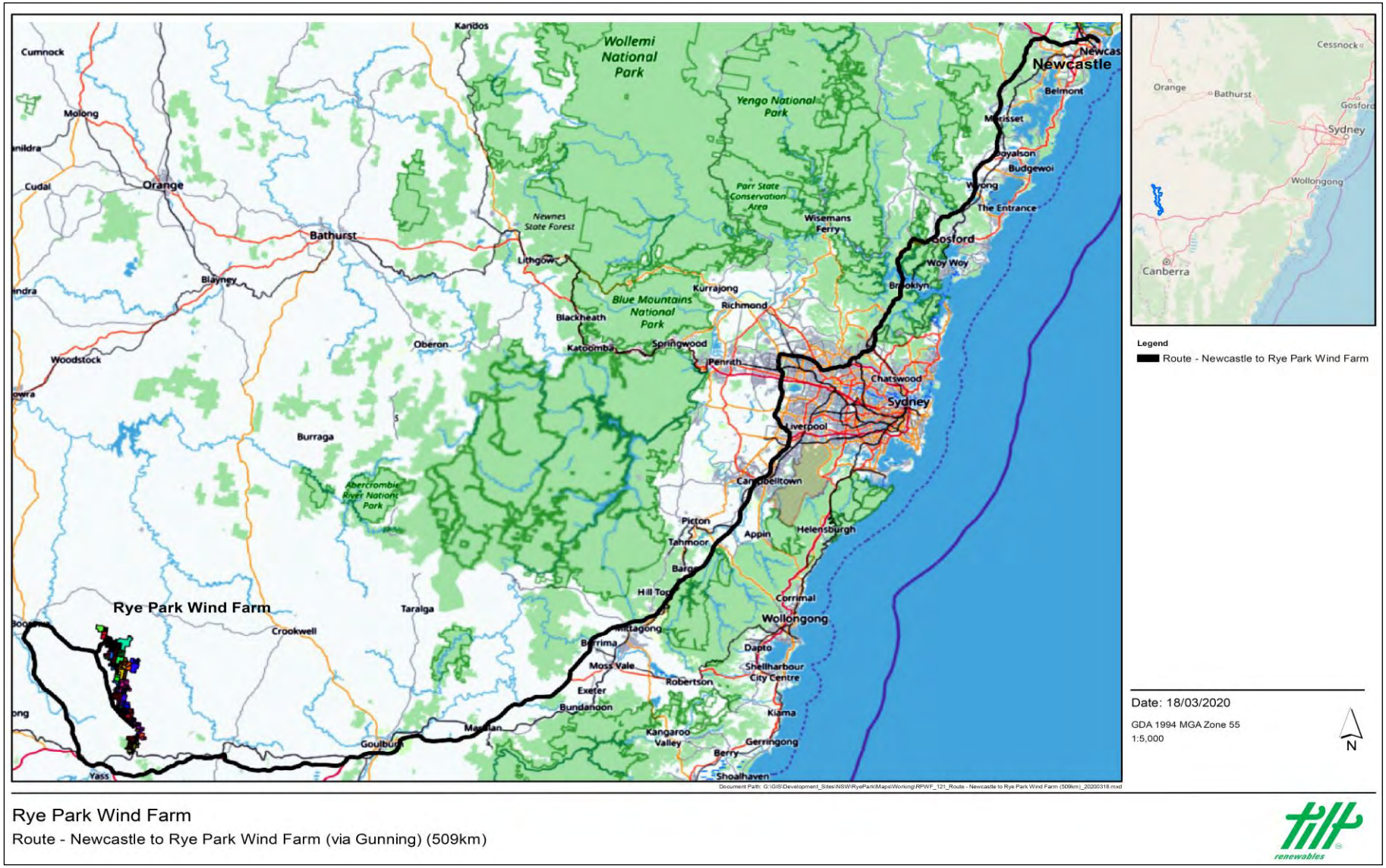


Figure 4-2: Transport Route from Newcastle to Rye Part Wind Farm (Via Gunning)

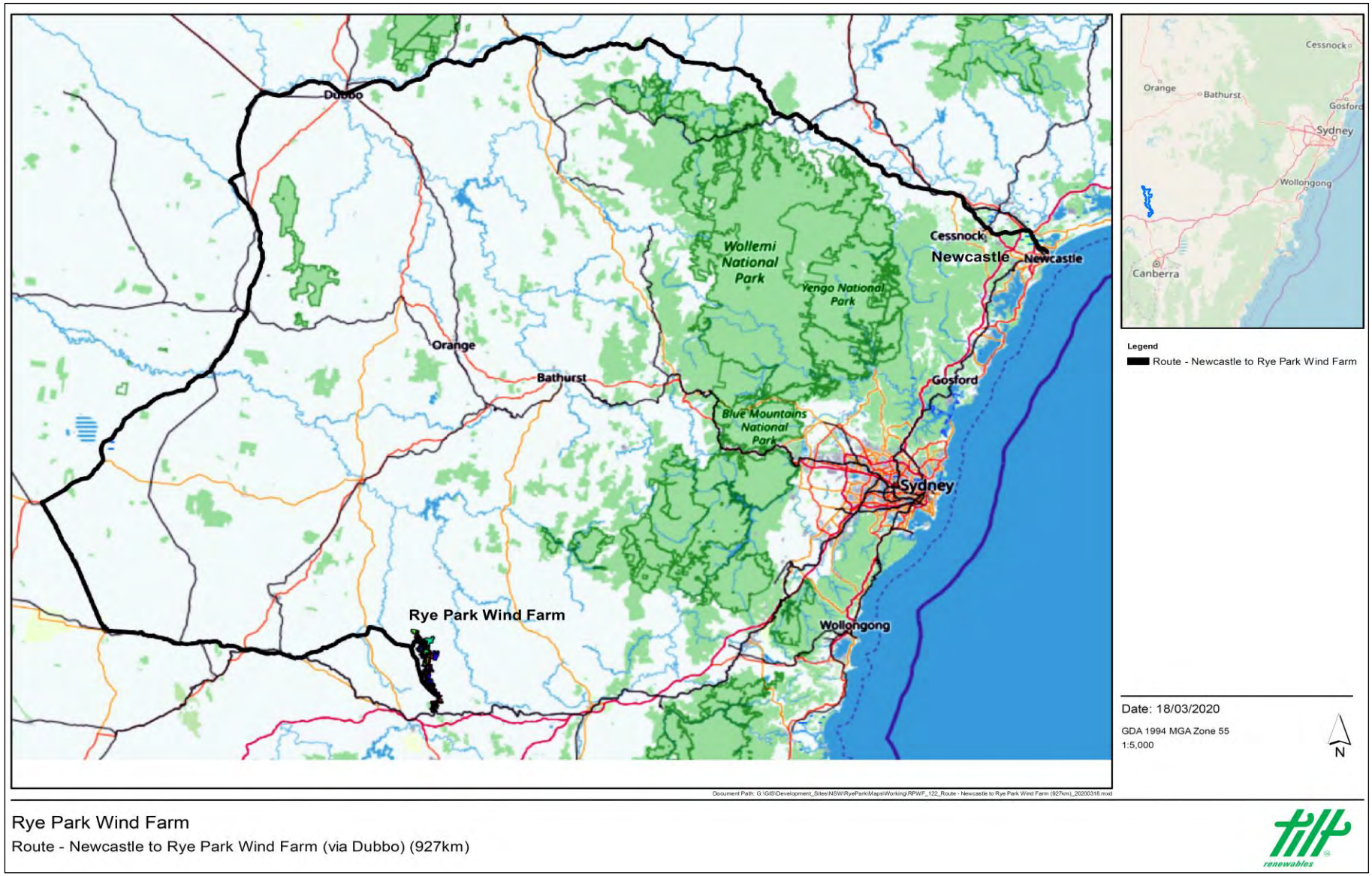


Figure 4-3: Transport route from Newcastle to Rye Part Wind Farm (Via Dubbo)

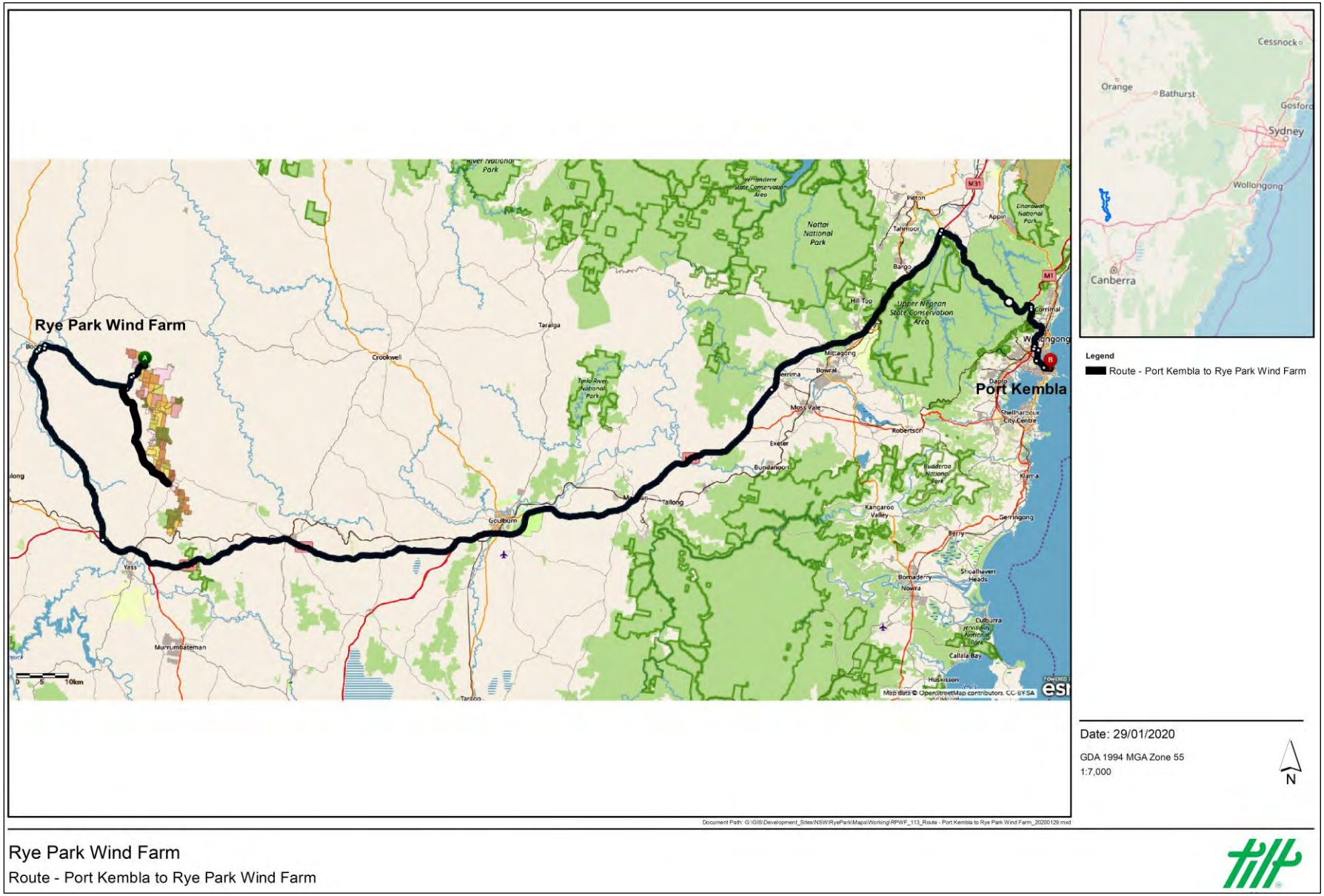


Figure 4-4: Transport Route from Port Kembla to Rye Part Wind Farm

5 Predicted Traffic and Transport Vehicle Movement

The proposed wind farm will generate a significant amount of additional traffic on local roads. The majority of this impact will be during the construction phase of the project, with operational traffic expected to be minimal. As such, the focus of this analysis will be on the traffic during the construction phase only. In comparison to the traffic generated by the approved project, based on the modified project specifications, it is expected there will be a reduction in traffic generated during the construction phase.

5.1 Construction Traffic

The construction phase of the project will generate traffic due to the delivery of equipment, materials and transportation of workforce.

It has been assumed in this analysis that there will not be an on-site quarry present to source materials. Should an on-site quarry be proposed this would likely reduce the number of traffic movements. Construction traffic generated will use RMS roads, local council roads and roads within the site.

Roads used within the site will be on private land, meaning they will not have an effect on the general public and hence will be omitted from analysis.

The previously prepared TIA by Epuron in 2016 analysed traffic generation associated with 109 turbines. The project was however approved for a 92-turbine layout. As such, the construction traffic has been re-baselined against the 92-turbine layout to generate an estimated construction traffic generation for the approved project. This will be compared to the traffic generation associated with the proposed modification application to assess the impacts of project specifications changes on construction traffic generation. The construction traffic estimated in the 2016 TIA will also be compared to that of the approved and modified project.

Table 5-1 summarises the total and daily predicted heavy vehicle construction traffic volumes for the following:

- Construction Traffic Generation Assessed in Previous TIA - 109 Turbine Layout
- Approved Project Traffic Generation – 92 Turbines with maximum tip height of 157m
- Modified Project Traffic Generation – 80 Turbines with maximum tip height of 200m

These traffic volumes do not include vans and cars used for workers, visitors and escort vehicles.

It has been assumed that daily construction traffic is distributed uniformly over the entire construction phase. It has also been assumed that excess spoil does not require to be transported from the site, as it will be reused on site as general fill, as well as to produce pavement material amongst other uses.

Table 5-1: Heavy Vehicle Construction Traffic Generation

Traffic Generated	2016 TIA- 109 Turbines	Approved Project - 92 Turbines	Modified Project - 80 Turbines
Total Traffic (One-way)	15,055	33,031 (re-baselined)	32,986
Change from 2016 TIA (%)	-	***119.4% (Increase)***	***119.1% (Increase)***
Change from Approved Project (%)	-	-	***-0.1% (Decrease)***

The modified project represents a 119% increase in traffic from the 2016 TIA, from a one-way heavy vehicle volume of 15,055 to 32,986. It is important to note that whilst this is a significant increase, the assumptions used to estimate the 2016 TIA construction traffic are significantly different to those used to estimate the construction traffic in the re-baselined approved project, and modified project.

The differences in assumptions considered in the 2016 TIA include, but are not limited to, changes in vehicle types (load capacity), changes in amount of road base required for access track construction (25km of access track in 2016 TIA, 75km of access track in modified project), and trips required for water during general construction. Additionally, the construction traffic in the previous TIA did not account for several tasks that are considered in the re-baselined

and modified construction traffic, such as the materials required to be imported for public roads, water delivery required for internal OHL construction, imported material for internal OHL roads capping, amongst others. Appendix C provides more detail on the assumptions used in the 2016 TIA.

The proponent believes that the assumptions used to estimate construction traffic in the previous TIA were incorrect and are not an accurate representation of construction traffic for that layout. Therefore, the significant increase in construction traffic in the approved project and modified project from the 2016 TIA will be (for the most part), not due to project specification changes, but rather changes in assumptions/tasks considered.

It is estimated that the heavy vehicle traffic in the modified project will be slightly less (0.1% reduction) than that of the approved project specifications (92 wind turbines). Table 5-2 provides a breakdown of generated heavy vehicle one-way traffic in the approved and modified project, based on vehicle type. Table 5-3 summarises construction generated traffic based on required construction activities/tasks in the approved project, whilst

Table 5-4 summarises construction traffic in the modified project.

Table 5-2: Construction generated one-way heavy vehicle traffic; by vehicle type

Delivery Vehicle	Number of trips	
	Approved Project - 92 Turbines	Modified Project - 80 Turbines
Truck Tanker	7,190	6,513
Flat Bed	887	646
Low Loader	1,764	1,646
Truck and Dog	19,939	21,493
Cement Delivery	910	420
Concrete Pump	276	240
Franna crane	286	250
Truck Trailer	1,672	1,672
Semi-Trailer	107	107
Total	33,031	32,986

Table 5-3: Construction generated one-way heavy vehicle traffic (Approved Project); by task type

Operation	Purpose	tonnes / load (conservative)	total tonnage (estimate)	Anticipated Delivery Vehicle	Approximate Trips	Comments
General					**105**	**Number of weeks**
Construction	Water delivery	15	na	Truck Tanker	6,300	Generally assume nominal 10 trips per day for dust settling and road construction
Operations	Fuel delivery	15	na	Truck Tanker	210	Generally assume 2 per week
	Skip delivery	3	na	SM Flat Bed	158	1 - 2 / week (nominal assumption)
	Portaloo Deliveries	12	na	L Low Loader	263	2-3 / week (nominal assumption)
Wind Farm Construction					**92**	**Number of turbines**
Site Set-Up	Miscellaneous Establishment Deliveries	5	na	L Low Loader	40	Large scale construction compound (includes containers) - nominal volume assumed
	Earthworks equipment delivery	30	na	H Low Loader	30	Nominal value assumed
Road & Hard standings	Imported material for site roads capping (200mm)	30	0	Truck and Dog	0	6.2km of 6m wide access track
	Internal material for site roads capping (200mm)	30	198,660	Truck and Dog	7,284	86.0km of 5.5m wide access track (100% of required material to be imported from local area)
	Imported material for public roads	30	0	Truck and Dog	0	No public road upgrade
	Imported material for crane hardstands (200mm)	30	111,573	Truck and Dog / B-Double	4,091	55 x 35m hardstands 300mm pavement

Operation	Purpose	tonnes / load (conservative)	total tonnage (estimate)	Anticipated Delivery Vehicle	Approximate Trips	Comments
	Imported material for construction site compound (200mm)	30	8,400	Truck and Dog	308	200m x 100m x 0.2m x 2.1d (20% of required material to be imported from local area)
	Imported material for batching plant (200mm)	30	8,400	Truck and Dog	308	200m x 100m x 0.2m x 2.1d (20% of required material to be imported from local area)
Foundation	Heavy equipment delivery	30	na	H Low Loader	10	Excavator, project concrete pump et al - nominal movements assumed
Construction	Misc works	5	na	SM Flat Bed	10	Concrete curing materials, minor equipment etc - nominal movements assumed
	Aggregate delivery to batching plant	32	135,750	Truck and Dog	4,242	Given 135,750T Sand & Agg
	Concrete binder for batching	28	22,700	Cement Delivery	811	Given 22,700T Cement
	Water delivery to batching plant	20	13,600	Truck Tanker	680	- assuming 6% water by mass/(13,600T)
	Reinforcing steel delivery	20	9,050	HT Flat bed	453	Advised83 T per footing
	Foundation bolts or steel insert delivery	12	na	L Low Loader	92	1 delivery per turbine likely assumed
	Concrete pump for foundation	25	na	Concrete Pump	276	Assumes 3 visits per foundation (blinding, structure, backfill)
	Attendant mobile/Franna crane	15	na	Franna crane	276	Assumes 3 visits per foundation (Bottom mat reinforcing, top mat reinforcing, bolt set installation)
Turbine Components	Tool container delivery	15	na	L Low Loader	15	Various equipment for turbine install crew HV - nominal amount estimated
	WTG container delivery	25	na	Flat bed	92	Nacelle sit packs
	Tower container delivery	25	na	Flat bed	92	Anchor cages and tower site packs
	Top section delivery	50	na	Low loader - Towers	0	5 section tower
	Top Section	50	na	Low loader - Towers	92	4 section tower
	Middle Section	50	na	Low loader - Towers	92	4 section tower
	Middle Section	50	na	Low loader - Towers	92	4 section tower
	Bottom Section Delivery	50	na	Low loader - Towers	92	4 section tower
	Blades delivery - single blade transport	10	na	Low loader - Blade	276	3 blade turbine - assume non reticulated blades OD
	Nacelle and Transformer	80	na	Low loader - Nacelle	92	1 OD delivery per turbine
	Drive Train	80	na	Low loader - Drive Train	92	1 OD delivery per turbine
	Hubs + Spinner	15	na	L Low Loader	92	1 OD delivery per turbine
	Power module	24	na	H Low Loader	92	1 OD delivery per turbine
	Escort Vehicles	***na***	***na***	***Light Cars***	***2,024***	***2 small vehicles per OD delivery assumed (Not included in HV traffic)***

Operation	Purpose	tonnes / load (conservative)	total tonnage (estimate)	Anticipated Delivery Vehicle	Approximate Trips	Comments
Cable Installation	Cable delivery	15	na	L Low Loader	184	- 2 delivery per turbine assumed
	Excavator delivery	30	na	H Low loader	8	Cable install support equipment - nominal amount assumed
	Cable laying equipment	15	na	L Low loader	2	Specialised trenching equipment - nominal amount assumed
	Cable Bedding Sand	30	15,744	Truck and Dog	525	- advised 82km of underground cabling
Cranage	Terrain crane (130t)	130	na	H Low Loader	6	- associated HV movements
	Terrain crane (220t)	220	na	H Low Loader	8	- associated HV movements
	Terrain crane (500t)	500	na	H Low Loader	4	- associated HV movements
	Main Crane	30	na	H Low Loader	48	- associated HV movements
Internal Sub Station Construction						
Sub Station Civils	Lime / Cement Stabilisation	17	90	Redimix Concrete Truck	2	- 3% lime stabilisation by mass
	Imported Stone for substation compound	30	2,993	Truck and Dog	110	95m x 75m x 0.2m x 2.1d
		30	na	Truck and Dog	-	To be confirmed subject to detailed methodology
Sub Station Electrical	Transformer delivery - substation	130	130	Low loader - Trans	2	
	Switchgear etc.	15	na	L Low Loader	4	
	Misc electrical equipment	5	na	SM Flat Bed	2	
	Switchgear cable and pylon delivery	24	450	H Low Loader	2	
	Operations building	15	59	L Low Loader	4	
Internal OHL	Water delivery	15	na	Truck Trailer	1,512	- advised 28km of internal overhead line/Construction duration 80 weeks
	Fuel delivery	15	na	Truck Trailer	160	Based on DD (28km upsized)
	Skip delivery	3	na	SM Flat Bed	80	
	Earthworks equipment delivery	30	na	H Low Loader	10	Nominal value assumed
	Imported material for site roads capping	30	60,480	Truck and Dog	2,218	28km -132kV & 8km -33kV of 4m wid 0.2m thick access track
	Imported material for pole hardstands	30	9,999	Truck and Dog	367	16m x 16m hardstands 200mm pavement (132kV)
	Imported material for pole hardstands	30	1,134	Truck and Dog	42	10m x 10m hardstands 200mm pavement (33kV)
	Terrrain Crane	130	na	H Low Loader	4	
	Imported material for site compound	30	8,400	Truck and Dog	308	200m x 100m x 0.2m x 2.1d (20% of required material to be imported from local area)
	Heavy equipment delivery	30	na	H Low Loader	10	Excavator, project concrete pump etc.
	Tower section delivery	30	na	Semi Trailer	1	2 Towers, 3 sections each, 6 section per trailer
	Concrete delivery	30	na	Concrete Truck	73	2 deliveries per strain pole, 0.2

Operation	Purpose	tonnes / load (conservative)	total tonnage (estimate)	Anticipated Delivery Vehicle	Approximate Trips	Comments
						deliveries per intermediate pole
	Concrete delivery	30	na	Concrete Truck	23	1 deliveries per strain pole, 0.1 deliveries per intermediate pole
	Transmission line	30	201	Semi Trailer	7	132kV
	Transmission line	30	12	Semi Trailer	0	33kV
	Conductor Fuel	24	na	Semi Trailer	12	44 drums at 5T per drum. Total line length 108km (3x28km)
	Pole delivery	30	na	Semi Trailer	47	93 poles, 3 sections, 6 sections per trailer
	Reo delivery	30	na	Semi Trailer	40	1 delivert per strain pole
	Attendant mobile/Franna crane	20	na	Franna crane	10	Assume Franna stays on site
Connection Sub Station						
Sub Station Civils	Lime / Cement Stabilisation	17	252	Redimix Concrete Truck	2	- 3% lime stabilisation by mass
	Imported Stone for substation compound	30	2,993	Truck and Dog	110	95m x 75m x 0.2m x 2.1d
Sub Station Electrical	Transformer delivery - substation	130	130	Low loader - Trans	2	
	Switchgear cable and pylon delivery	24	450	H Low Loader	2	
	Switchgear etc.	15	na	L Low Loader	2	
	Imported material for 330kV tower hardstands	30	756	Truck and Dog	28	30mx30m hardstands 200mm pavement (assume 2 towers)
	Misc. Elec equipment	5	na	SM Flat Bed	1	
	Total estimated HV Traffic (one-way)				**33,031**	

Table 5-4: Construction generated one-way heavy vehicle traffic (Modified Project); by task type

Operation	Purpose	tonnes / load (conservative)	total tonnage (estimate)	Anticipated Delivery Vehicle	Approximate Trips	Comments
General					**93**	**Number of weeks**
Construction	Water delivery	15	na	Truck Tanker	5,580	Generally, assume nominal 10 trips per day for dust settling and road construction
Operations	Fuel delivery	15	na	Truck Tanker	186	Generally, assume 2 per week
	Skip delivery	3	na	SM Flat Bed	140	1 - 2 / week (nominal assumption)
	Portaloo Deliveries	12	na	L Low Loader	233	2-3 / week (nominal assumption)
Wind Farm Construction					**80**	**Number of turbines**
Site Set-Up	Miscellaneous Establishment Deliveries	5	na	L Low Loader	40	Large scale construction compound (includes containers) - nominal volume assumed
	Earthworks equipment delivery	30	na	H Low Loader	30	Nominal value assumed
Road & Hard standings	Imported material for site roads capping (200mm)	30	0	Truck and Dog	0	6.2km of 6m wide access track
	Internal material for site roads capping (200mm)	30	173,250	Truck and Dog	6,353	75.0km of 5.5m wide access track (20% of required material to be imported from local area)
	Imported material for public roads	30	63,840	Truck and Dog	2,341	19km of 8m wide public road upgrade
	Imported material for crane hardstands (200mm)	30	120,960	Truck and Dog / B-Double	4,435	60 x 40m hardstands 300mm pavement Total = 120,960t (20% of required material to be imported from Salt Creek area)
	Imported material for construction site compound (200mm)	30	8,400	Truck and Dog	308	200m x 100m x 0.2m x 2.1d (20% of required material to be imported from local area)
	Imported material for batching plant (200mm)	30	8,400	Truck and Dog	308	200m x 100m x 0.2m x 2.1d (20% of required material to be imported from local area)
Foundation	Heavy equipment delivery	30	na	H Low Loader	10	Excavator, project concrete pump et al - nominal movements assumed
Construction	Misc works	5	na	SM Flat Bed	10	Concrete curing materials, minor equipment etc - nominal movements assumed
	Aggregate delivery to batching plant	30	121,280	Truck and Dog	4,043	- 800m3 concrete per footing - approx. 50 deliveries per footing (20 sand, 28 heavy ag) (not required as onsite quarry developed)
	Concrete binder for batching	60	19,200	Cement Delivery	320	- 240T binder per footing, 4 deliveries per tower (60T per truck) (14% binder by mass)
	Water delivery to batching plant	15	11,200	Truck Tanker	747	- assuming 6% water by mass (140T/footing)
	Reinforcing steel delivery	30	7,600	HT Flat bed	253	Advised95 T per footing
	Foundation bolts or steel insert delivery	12	na	L Low Loader	80	1 delivery per turbine likely assumed
	Concrete pump for foundation	25	na	Concrete Pump	240	Assumes 3 visits per foundation (blinding, structure, backfill)
	Attendant mobile/Franna crane	15	na	Franna crane	240	Assumes 3 visits per foundation (Bottom mat reinforcing, top mat reinforcing, bolt set installation)
Turbine Components	Tool container delivery	15	na	L Low Loader	15	Various equipment for turbine install crew HV - nominal amount estimated
	WTG container delivery	25	na	Flat bed	80	Nacelle sit packs
	Tower container delivery	25	na	Flat bed	80	Anchor cages and tower site packs
	Top section delivery	50	na	Low loader - Towers	80	5 section towers
	Middle Section	50	na	Low loader - Towers	80	5 section towers
	Middle Section	50	na	Low loader - Towers	80	5 section towers
	Middle Section	50	na	Low loader - Towers	80	5 section towers
	Bottom Section Delivery	50	na	Low loader - Towers	80	5 section towers
	Blades delivery - single blade transport	10	na	Low loader - Blade	240	3 blade turbine - assume non reticulated blades OD
	Nacelle and Transformer	80	na	Low loader - Nacelle	80	1 OD delivery per turbine
	Drive Train	80	na	Low loader - Drive Train	80	1 OD delivery per turbine
	Hubs + Spinner	15	na	L Low Loader	80	1 OD delivery per turbine
	Power module	24	na	H Low Loader	80	1 OD delivery per turbine
	Escort Vehicles	***na***	***na***	***Light Cars***	***1,920***	***2 small vehicles per OD delivery assumed (Not included in HV traffic)***
Cable Installation	Cable delivery	15	na	L Low Loader	160	- 2 delivery per turbine assumed

Operation	Purpose	tonnes / load (conservative)	total tonnage (estimate)	Anticipated Delivery Vehicle	Approximate Trips	Comments
	Excavator delivery	30	na	H Low loader	8	Cable install support equipment - nominal amount assumed
	Cable laying equipment	15	na	L Low loader	2	Specialised trenching equipment - nominal amount assumed
	Cable Bedding Sand	30	15,744	Truck and Dog	525	- advised 82km of underground cabling
Cranage	Terrain crane (130t)	130	na	H Low Loader	6	- associated HV movements
	Terrain crane (220t)	220	na	H Low Loader	8	- associated HV movements
	Terrain crane (500t)	500	na	H Low Loader	4	- associated HV movements
	Main Crane	30	na	H Low Loader	48	- associated HV movements
Internal Sub Station Construction						
Sub Station Civils	Lime / Cement Stabilisation	17	90	Redimix Concrete Truck	2	- 3% lime stabilisation by mass
	Imported Stone for substation compound	30	2,993	Truck and Dog	110	95m x 75m x 0.2m x 2.1d
		30	na	Truck and Dog	-	To be confirmed subject to detailed methodology
Sub Station Electrical	Transformer delivery - substation	130	130	Low loader - Trans	2	
	Switchgear etc.	15	na	L Low Loader	4	
	Misc electrical equipment	5	na	SM Flat Bed	2	
	Switchgear cable and pylon delivery	24	450	H Low Loader	2	
	Operations building	15	59	L Low Loader	4	
Internal OHL	Water delivery	15	na	Truck Trailer	1,512	- advised 28km of internal overhead line/Construction duration 80 weeks
	Fuel delivery	15	na	Truck Trailer	160	Based on DD (28km upsized)
	Skip delivery	3	na	SM Flat Bed	80	
	Earthworks equipment delivery	30	na	H Low Loader	10	Nominal value assumed
	Imported material for site roads capping	30	60,480	Truck and Dog	2,218	28km -132kV & 8km -33kV of 4m wid 0.2m thick access track
	Imported material for pole hardstands	30	9,999	Truck and Dog	367	16m x 16m hardstands 200mm pavement (132kV)
	Imported material for pole hardstands	30	1,134	Truck and Dog	42	10m x 10m hardstands 200mm pavement (33kV)
	Terrain Crane	130	na	H Low Loader	4	
	Imported material for site compound	30	8,400	Truck and Dog	308	200m x 100m x 0.2m x 2.1d (20% of required material to be imported from local area)
	Heavy equipment delivery	30	na	H Low Loader	10	Excavator, project concrete pump etc.
	Tower section delivery	30	na	Semi-Trailer	1	2 Towers, 3 sections each, 6 section per trailer
	Concrete delivery	30	na	Concrete Truck	73	2 deliveries per strain pole, 0.2 deliveries per intermediate pole
	Concrete delivery	30	na	Concrete Truck	23	1 delivery per strain pole, 0.1 deliveries per intermediate pole
	Transmission line	30	201	Semi-Trailer	7	132kV
	Transmission line	30	12	Semi-Trailer	0	33kV
	Conductor Fuel	24	na	Semi-Trailer	12	44 drums at 5T per drum. Total line length 108km (3x28km)
	Pole delivery	30	na	Semi-Trailer	47	93 poles, 3 sections, 6 sections per trailer
	Reo delivery	30	na	Semi-Trailer	40	1 delivery per strain pole
	Attendant mobile/Franna crane	20	na	Franna crane	10	Assume Franna stays on site
Connection Sub Station						
Sub Station Civils	Lime / Cement Stabilisation	17	252	Redimix Concrete Truck	2	- 3% lime stabilisation by mass
	Imported Stone for substation compound	30	2,993	Truck and Dog	110	95m x 75m x 0.2m x 2.1d
Sub Station Electrical	Transformer delivery - substation	130	130	Low loader - Trans	2	
	Switchgear cable and pylon delivery	24	450	H Low Loader	2	
	Switchgear etc.	15	na	L Low Loader	2	
	Imported material for 330kV tower hardstands	30	756	Truck and Dog	28	30mx30m hardstands 200mm pavement (assume 2 towers)
	Misc. Elec equipment	5	na	SM Flat Bed	1	
	Total estimated HV Traffic (one-way)				**32,986**	

5.2 Operational Traffic

Operational traffic is expected to be low. It is expected that operational staff will carry out scheduled and un-scheduled maintenance during working hours on Monday to Friday using service vans. Operational traffic is estimated to generate approximately 8 trips per day on local roads. On-site track maintenance may be required for road deterioration or decommissioning.

6 Impact Assessment

6.1 General

The main traffic and transport impacts of the development will be the increase in construction vehicles on roads during the construction phase. Impacts of the construction phase on local roads are expected to cause some disturbance to local traffic and are the focus of this discussion; impacts on RMS roads are expected to be minimal.

The modified project is estimated to have a slight reduction in heavy vehicle traffic generated during the construction phase from 33,031 to 32,986 (one-way) vehicles, which represents an 0.1% decrease from the approved project.

The proponent advises that based on recent consultation with councils, the pavement design standards specified within Section 6.5.2 of the EIS are not proposed to be modified. Consequently, proposed road upgrades are not significantly different from those proposed in the 2016 TIA, except that a preferred transport route has been identified (from the options permitted by the consent) and therefore the extent of road upgrades required has been reduced. Additionally, as an updated Preliminary Road Upgrade Investigation has been undertaken, there are additional recommended upgrades, in addition to those required by the Development Consent, that may need to be implemented, which will be discussed with relevant authorities. Further details on the required design standards and upgrades are provided in 6.3 of this report.

6.2 Structural Capacity of Existing Roads and Drainage Structures

Several bridges and culverts that require upgrading along the preferred route have been identified by the preliminary route survey and council. In consultation with Hilltops Council, the proponent is in the process of conducting structural assessments to determine the level of upgrades required.

6.3 Local Road Upgrades

In accordance with the Development Consent, a number of road upgrades identified in the Preliminary Road Upgrade Investigation report, will be required prior to the construction of the Rye Park Wind Farm. Councils have been consulted regarding the proposed local road upgrades, including Hilltops Council where the preferred transport route is selected.

6.3.1 Design Standards:

The proponent advises that the following design standards for road sections requiring to be upgraded, as specified in Section 6.5.2 of the EIS, have been agreed with Councils:

- Unsealed roads to be sealed: 200 mm road base topped with double spray seal (14/7 double/double). 7.0 m seal and 8.5 m formation width (as per Upper Lachlan Shire Council recommendation).
- Unsealed Roads: Construction width minimum 6 metres wide, maximum 8 metres wide. Pavement minimum thickness 100 mm on existing sheeted road (as per Upper Lachlan Shire Council recommendation).

Where separate roads have been identified for light vehicle operational traffic only, appropriate road conditions and safety measures will be agreed with councils and be implemented in advance of construction.

It was also agreed with Upper Lachlan Shire Council, that road widths required for Regional Roads (Rye Park-Dalton Road) are to be a 9m formation with 8m seal.

Additionally, the proponent advises that based on recent consultation with Hilltops Council, the design standards along Grassy Creek Road will be reduced to a required 7m formation/seal width. Desirable standard is 7.4m wide formation and seal with edge lines to delineate travel lanes.

The above are not comprehensive of all road standards, refer to Appendix D for more detail.

6.3.2 Road Maintenance

Dilapidation surveys will be undertaken as referred to in Condition 28 of the Development Consent for the approved application, as follows:

(a) A dilapidation survey of the designated over-dimensional and heavy vehicle route:

(i) prior to the commencement of any construction or decommissioning works other than pre-construction minor works;

(ii) within 1 month of the completion of any construction or decommissioning works other than pre-construction minor works;

(b) Rehabilitation and/or making good any development-related damage:

(i) identified during the carrying out of the relevant construction and/or decommissioning works if it could endanger road safety, as soon as possible after the damage is identified but within 7 days at the latest; and

(ii) identified during any dilapidation survey carried out following the completion of the relevant construction and/or decommissioning works within 2 months of the completion of the survey, unless the relevant roads authority agrees otherwise, to the satisfaction of the relevant roads authority.

6.3.3 Existing Road Condition and Proposed Local Road Upgrades

The tables below provide a summary of the current road conditions and proposed upgrades for each section of the preferred transport route to site. These are based on the recommendations in the Preliminary Road Upgrade Investigation report completed by *Genium Civil Engineering* on *24-03-2020*, which is included in Appendix D, Swept Path Analysis, which is included in Appendix E, which assumes blade lengths of 79m, as well as the Port of Newcastle Route Survey Report, which is included in Appendix A, and assumes blade lengths of 83.5m.

Condition 27 of the Development Consent outlines road upgrades that are required to be implemented per the approved project. At a few locations along the preferred route, the upgrades as recommended in the Preliminary Road Upgrade Investigation and Swept Path Analysis go beyond the required upgrades for the approved project (per the Development Consent). These reports will be reviewed with all relevant authorities to address any additional upgrades that may be necessary

The recommended upgrades below do not account for modifications to RMS managed roads. The impacts of heavy vehicles on RMS roads are expected, and will be addressed in a Traffic Management Plan once the route has been finalised.

Additionally, the proponent has commenced structural assessment of culverts and bridges of concern that have been identified by Hilltops Council and Genium in the Preliminary Road Upgrade Investigation. The proponent will secure agreement with Hilltops Council on the final specific upgrade requirements prior to construction and ensure any upgrades are completed prior to substantial construction traffic on the respective roads.

The following tables provide only an overview of proposed upgrades. Refer to the relevant appendices, as well as the Development Consent for more detail.

In and around the Township of Boorowa

Table 6-1: Township of Boorowa road conditions and proposed upgrades

Road	Length (m)	Existing condition	Proposed upgrades in Genium Report	Required Upgrades per Development Consent
Trucking Yard Road/ Dillon Street (Lachlan Valley Way to Long Street)	1,650	Currently sealed	Requirement for widening and pavement strengthening. Trucking Yard Road causeway will require upgrading.	Widen and strengthen pavement as necessary to proposed sealed standard. Widen causeway as necessary.
Long Street (Dillon Street to Rye Park Road)	1,100	Currently sealed	Requirement for widening and pavement strengthening.	Widen and strengthen pavement as necessary to proposed sealed standard.
Junction: Lachlan Valley Way/ Trucking Yard Road			Upgrades required to allow access for over-dimensional vehicles.	No mention.

Junction: Dillon Street / Long Street junction	-		Upgrades required to allow access for over- dimensional vehicles.	Upgrade as necessary within road reserve to allow access for over-dimensional vehicles.
Junction: Long Street /Rye Park Road	-		Upgrades required to allow access for over- dimensional vehicles.	Upgrade as necessary within road reserve to allow access for over-dimensional vehicles.

Rye Park Road

The relevant length of road is some 19.4 km long and is generally in appropriate condition and width to carry wind farm delivery loads. There are some sections that will require widening/pavement strengthening, as well as bridges and culverts that require upgrading/widening. Table 6-2 details the current condition and possible upgrades required.

Table 6-2: Rye Park Road current road description and required upgrades

Road or drainage structure	Length (m)	Existing Road condition	Proposed upgrades in Genium Report	Required Upgrades per Development Consent
Rye Park Road (Long Street to Yass Street)	19,400	Currently sealed	Upgrading required including widening, pavement strengthening and reconstruction.	Widen and strengthen pavement as necessary to proposed sealed standard. Upgrade bridge over Dirthole Creek as necessary.
Rye Park Road reinforced concrete bridge over Dirthole Creek (S010)	-	-	The bridge over Dirthole Creek will likely require upgrading. To assess suitability and structural integrity prior to construction (Epuron, 2016)	
Rye Park Road – concrete bridge- Harry's Creek Bridge	-	-	Signs of deterioration to piers, unlikely to meet current standards. Will require replacement.	No mention.

Grassy Creek Road

Table 6-3 details the existing road conditions and proposed upgrades.

Table 6-3: Grassy Creek current road description and required upgrades

Road	Length (m)	Existing Road condition	Proposed upgrades in Genium Report	Required Upgrades per Development Consent
Grassy Creek Road (Yass Street to Site Access 10)	6,500	Currently sealed	Requirement for widening, realignment, pavement strengthening and heavy patching (assume 10% of road area). Assume replacement required for concrete causeway and large culvert over Pudman Creek (corrugated metal pipes). Significant vegetation impacts due to upgrades originally specified by Council. The proponent is currently working with	Widen and strengthen pavement as necessary to proposed sealed standard. Upgrade large culvert over Pudman Creek.

Road	Length (m)	Existing Road condition	Proposed upgrades in Genium Report	Required Upgrades per Development Consent
			the Biodiversity and Conservation Division of DPIE and Hilltops Council to revise the road standard required and reduce the impacts to vegetation.	
Junction: Rye Park Road / Grassy Creek Road	-	-	Upgrades required to allow access for over- dimensional vehicles.	Upgrade as necessary within road reserve to allow access for over-dimensional vehicles.

Dalton Road

The section of Dalton Road to be used in the preferred route is in the Hilltops Council. Table 6-4 provides details of the existing road condition and proposed upgrade for segments used in the preferred path.

Table 6-4: Dalton Road current road condition and required upgrades

Road or drainage structure	Length (m)	Existing condition	Proposed upgrades in Genium Report	Required Upgrades per Development Consent
Yass Street/Gunning Road/ Dalton Road (Rye Park Road to Access Point 12)	14,700	Currently sealed	Requirement for widening, resealing and realignment. Upgrades/replacements required for multiple culverts and causeways.	Upgrade as necessary to proposed sealed standard. Upgrade bridges over Pudman Creek, Flakney Creek and Blakney Creek as necessary.
Junction: Yass Street/Rye Park Road	-	-	Upgrades required to allow access for over- dimensional vehicles.	Upgrade as necessary within road reserve to allow access for over-dimensional vehicles.
Dalton Road bridge over Pudmans Creek	-	-	Some upgrades may be required to the concrete bridge (Epuron, 2016). In this regard, the Proponent has commenced structural assessment of culverts and bridges identified by Hilltops Council and Genium in the preliminary investigation report.	Upgrade bridges over Pudman Creek, Flakney Creek and Blakney Creek as necessary.
Dalton Road over Flakney Creek	-	-	Some upgrading may be required	

6.4 Commitments

The proposed road upgrade commitments and design standards will be maintained from the previous TIA, where relevant, as follows:

- The agreed design standards and upgrades will only be implemented on the roads or road sections to be used for over-mass and over-dimensional construction traffic based on the final wind farm layout or staged development

construction. Appropriate and adequate safety measures will be agreed with Councils prior to commencement on all access roads, including roads identified for normal light vehicle access only

- The proposed road upgrades are based on the current anticipated traffic numbers and proposed access routes for constructing the wind farm. Should the final construction layout and design result in materially different construction traffic numbers or different routes to be considered, the Proponent and the council will negotiate in good faith appropriate alternative standards in conjunction with appropriate traffic management measures to ensure safe construction activities
- The dimensions proposed are subject to on-site assessments to ensure there are no significant impacts on sensitive native vegetation within the road reserves or significant physical constructability constraints. Council and the Proponent will negotiate in good faith to agree on appropriate options to avoid or minimise significant impacts where this will be the case
- The proposed upgrades are subject to the roads not being upgraded by council or a 3rd party prior to the Rye Park wind farm construction. The Proponent, in consultation with the councils, will undertake a final review of road conditions and suitability prior to construction to confirm road conditions and upgrade requirements based on the agreed design standards for each road
- The Proponent will agree with councils on a suitable method for determining and capturing road conditions before and after upgrades, including how best to undertake any dilapidation report requirements that may be required under the development consent conditions
- Any bridge or other structures to be upgraded will be assessed for suitability and upgraded as required to comply with the appropriate standards
- These commitments will be reflected in the final Traffic Management Plan which will be developed in consultation with the roads authorities prior to the commencement of any construction activities.

6.5 Suitability of Existing Road Layout for OD Vehicles

A route survey was conducted from the Port of Newcastle via Gunning to the site. Another route survey looked at the suitability for delivery from Port Kembla to the site. These reports determined that whilst modifications to the roads would be required to accommodate over-dimensional vehicles, the transport route from the Port of Newcastle (via Gunning) and Port Kembla are viable options. The suitability of these routes for over-dimensional vehicles is discussed in Section 4.2. Consultation will be held with RMS and Council to develop a Traffic Management Plan to manage the traffic impacts of over-dimensional vehicles.

6.6 Disturbance to Local Community

The main impacts of wind farm construction traffic on the local communities will generally be the same as that for the approved project and will involve:

- Movement of vehicles through the Boorowa and Rye Park townships, along the Hume Highway, and to and from the site entry
- Increased frequency of vehicle movements on the surrounding roads to the wind farms that would otherwise have low traffic volumes
- Potential safety risks arising from increased traffic movements.

The volume of construction traffic is assumed to be distributed evenly over the entire construction phase, however, it would be expected that volumes would fluctuate significantly over the lifetime of the project. These volumes are expected to be less in the modified project than the re-baselined approved project.

The general increase in daily traffic has the potential to increase the short-term traffic noise levels along the proposed access route. The level of disturbance to residents will be directly related to the proximity of the existing premises to the access roads. During construction the timing of vehicle movements will be mostly within normal site working hours.

The over-size and over-mass vehicles are likely to travel at lower speeds than those normally used by local residents. Some delays may be experienced by local residents due to the nature of the vehicles being used to deliver materials to the site. Special consideration will be applied to routes that pass residential areas, schools, school bus routes and intersections to schedule deliveries outside of peak or important times. These will be detailed in the Traffic Management Plan. Consultation with local stakeholders will be undertaken prior to the finalisation and implementation of the Traffic Management Plan.

6.7 Road Safety

The local roads utilised for the preferred route to site generally have low accident numbers, with one fatality recorded. Transport for NSW provides crash data from the year 2014 to 2018 (TfNSW, 2018) which can be seen in Table 6-5. Transport for NSW also provides the number of crashes for each LGA in the South Eastern Region, as can be seen Table 6-6.

Table 6-5: Accident Numbers on Local Roads Used by Preferred Route (2014-2018)

Local Government Area	Fatal Crash	Moderate Injury Crash	Non-casualty (towaway)	Total Crashes
Local Roads	1	2	4	**7**

Table 6-6: Number of crashes and crash severity in the South Eastern Region LGAs

Local Government Area	Fatal Crash	Serious Injury Crash	Moderate Injury Crash	Other Crash	Total Casualty Crash
Bega Valley	4	22	36	7	69
Eurobodalla	0	21	57	11	89
Goulburn Mulwaree	2	15	45	10	72
Hilltops	2	16	32	5	55
Queanbeyan-Palerang Regional	2	3	57	48	110
Snowy Monaro Regional	3	17	35	17	72
Upper Lachlan	3	11	21	9	44
Yass Valley	3	1	32	20	56
TOTAL	**19**	**106**	**316**	**127**	**587**

This number of crashes are generally low in the surrounding LGA's suggesting generally safe conditions within the locality. With the presence of over-dimensional vehicles during the construction phase, it would be expected that there will be some impact on road safety. This would especially be the case once construction commences, as local drivers get used to driving alongside larger and slower vehicles. A Traffic Management Plan will be prepared to outline measures to address any safety concerns.

7 Recommendations and Mitigation Measures

A number of measures will be used during the construction and operation of the proposed wind farm to ensure that traffic and transport impacts arising from the proposed modified development are managed and minimised. As it is anticipated that there will be a minor reduction in traffic from the re-baselined approved project, and that there will not be major changes to road upgrades, recommendations and mitigation measures are not significantly different to those from the previous TIA.

In general, mitigation measures will need to be incorporated into a Traffic Management Plan for the project and developed in consultation with the RMS and relevant Councils to ensure that applicable safety standards are achieved and disruption to traffic is minimised.

An important mitigation measure during the construction period will be the implementation of the projects Stakeholder and Community Engagement Plan. This will ensure that local residents are fully aware of the planned construction activities and construction traffic. The program will include notices in the local newspapers, newsletters to local residents and up to date information available of the project website.

Temporary signage will be erected during the construction period in consultation with the RMS and councils to provide specific warning of construction traffic. In addition, other mitigation measures will include:

- Use of a licensed and experienced haulage contractor, to be responsible for obtaining all necessary permits and approvals from the RMS and councils and for complying with conditions of consent
- Escorts for over-size and over-mass vehicles will be provided in accordance with RMS requirements
- Development of a Traffic Management Plan that will identify detail actions such as scheduling of deliveries, managing timing of transport through major centres to avoid peak times (beginning / end of school), consultation activities during haulage activities, designing and implementing modifications to intersections and street furniture and managing the haulage process
- The Traffic Management Plan will establish a procedure to monitor traffic impacts during construction, such as noise, dust nuisance and travel timings, so adjustments can be made to minimise impacts
- Improvements to public roads impacted by the project in consultation with the RMS & councils. The improvements may include upgrades to the intersection at the site entrance, provision of entry/exit lanes and upgrades to gates and cattle grids
- Re-instating pre-existing conditions after temporary modifications, if required
- Providing a 24hr telephone contact during construction to enable any issue or concern to be rapidly identified and addressed
- Prepare a road dilapidation report in accordance with the Development Consent
- Should deterioration of roads occur during construction activities, an inspection and maintenance program would be established, if required by the council
- Agreed road upgrades and control measures will be implemented on the specific roads prior to substantial construction activities and traffic commences on the respective roads
- Implementation of appropriate dust control measures for unsealed tracks within the site.

8 Conclusion

It is expected that there will be minimal levels of traffic during the operational phase, and hence little impact on local traffic. However, due to the volume of traffic during the construction phase, it is expected that there will be a noticeable impact on local traffic, during this period.

Over-dimensional and heavy vehicles are especially likely to affect local traffic. Traffic management procedures, in accordance with the development consent, will need to be implemented to ensure that the impacts of over-dimensional and heavy vehicles are minimised. Additionally, safety and protection measures will need to be implemented to reduce the risks of accidents.

In comparing traffic volumes from this assessment to the re-baselined traffic generated by the approved 92 turbine layout, it is evident that heavy vehicle traffic volumes will be slightly less and impacts similar. The modified project results in an estimated 0.1% reduction in heavy vehicle construction traffic compared to the re-baselined approved project.

The impact of traffic on the local road network may be minimised if the proposed road upgrades are implemented, proposed access routes are used, as well as thorough implementation of mitigation measures recommended in this report. Further, the Traffic Management Plan that will be developed in accordance with the Development Consent and implemented in consultation with the RMS and relevant councils will ensure that any traffic and transport issues arising as a result of the project are appropriately addressed and have minimal impact on the local community and the local environment.

The majority of recommended mitigation measures and road upgrades are substantially the same as those identified in the previous Traffic Impact Assessment, with differences arising mainly due to a more recent road assessment report being completed, change in estimated construction traffic, as well as selection of a preferred transport route to site. Most importantly, as some of the roads to site will no longer be used, these roads will no longer be impacted, or require to be upgraded.

9 References

Epuron. (2016). Traffic and Transport Assessment.

TfNSW. (2018). Road Traffic Casualty Crashes In New South Wales. Retrieved from https://roadsafety.transport.nsw.gov.au/downloads/crashstats2018.pdf

TfNSW. (2019). Traffic Volume Viewer. Retrieved from https://www.rms.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/aadt-map/index.html#/?z=6

Appendix A Port of Newcastle (via Gunning) Route Survey

REX J ANDREWS
ENGINEERED TRANSPORTATION

ROUTE STUDY

CLIENT: SIEMENS/GAMESA
PROJECT: RYE PARK WIND FARM
PORT OF IMPORT: NEWCASTLE

26/02/2020 REV 00

Rev.	Date	Change	Responsible	Checked
00	09/08/18	Route Assessed	W Andrews	✓
00	26/02/20	Report compiled	W Andrews	✓
00	26/02/20	Report completed	W Andrews	✓

Index:

1.0 Introduction

This document describes observations and previous experience on sections of this route and explains the Transport of Wind turbine equipment from Newcastle to Rye Park wind farm.

This Route survey took place on 09-08-18.

2.0 Evaluation

1	No work required
2	Some Work required
3	Moderate amount of works required
4	Large amount of works required

(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: 09/08/2017
Survey undertaken by: (Rex J Andrews P/L)
Project name: Rye Park Windfarm
Location: Newcastle (NSW) to Rye Park (NSW)
Turbine type: 70 x SG170, 115 metre H/H, 5 section tower.

4.0 Transport combinations and escort requirements.

70 x Nacelles (14.7l x 4.7w x 3.5h x 98.0T)
Configuration. Prime mover with 10x8 platform trailer and backup prime mover.
Overall dimension: 40.0l x 4.7w x 5.0h x 164.5T.
Escort requirement: (3 x Company pilots).

70 x Drive trains (6.7l x 3.2 w x 2.3h x 76.3T)
Configuration. Prime mover with 2x8-5x8 Low loader.
Overall dimension: 30.0l x 4.2w x 9.9h x 112T.
Escort requirement: (2 x Company pilots).

70 x Hubs (4.6l x 4.2w x 4.0h x 54.9T)
Configuration. Prime mover with 2x8-4x8 Low loader.
Overall dimension: 28.0l x 4.7w x 5.1h x 105.5T.
Escort requirement: (2 x Company pilots).

210 x Blades (83.5l x 4.7w x 3.5h x 30.5T)
Option 1. Prime mover with 2x8 low dolly & 3x4 Extendable Blade trailers.
Option 2. Prime mover with 1x4 dolly/bookend & 3x4 Extendable Blade trailers.
Overall dimension: 95.0l x 4.7w x 5.2h x 76.5T.
Escort requirement: (4 x Company pilots, 2 x NSW Police).

70 x Section 1 Towers (13.5l x 4.7 x 4.7 x 85T)
Configuration. Prime mover with 3x8-4x8 Bookend trailer.
Overall dimension: 36.0l x 4.7w x 5.2h x 126.5T.
Escort requirement: (3 x Company pilots).

70 x Section 2 Towers (18.2l x 4.7 x 4.4 x 85T)
Configuration. Prime mover with 3x8-4x8 Bookend trailer.
Overall dimension: 42.0l x 4.7w x 5.2h x 126.5T.
Escort requirement: (1 x NSW police, 3 x Company pilots).

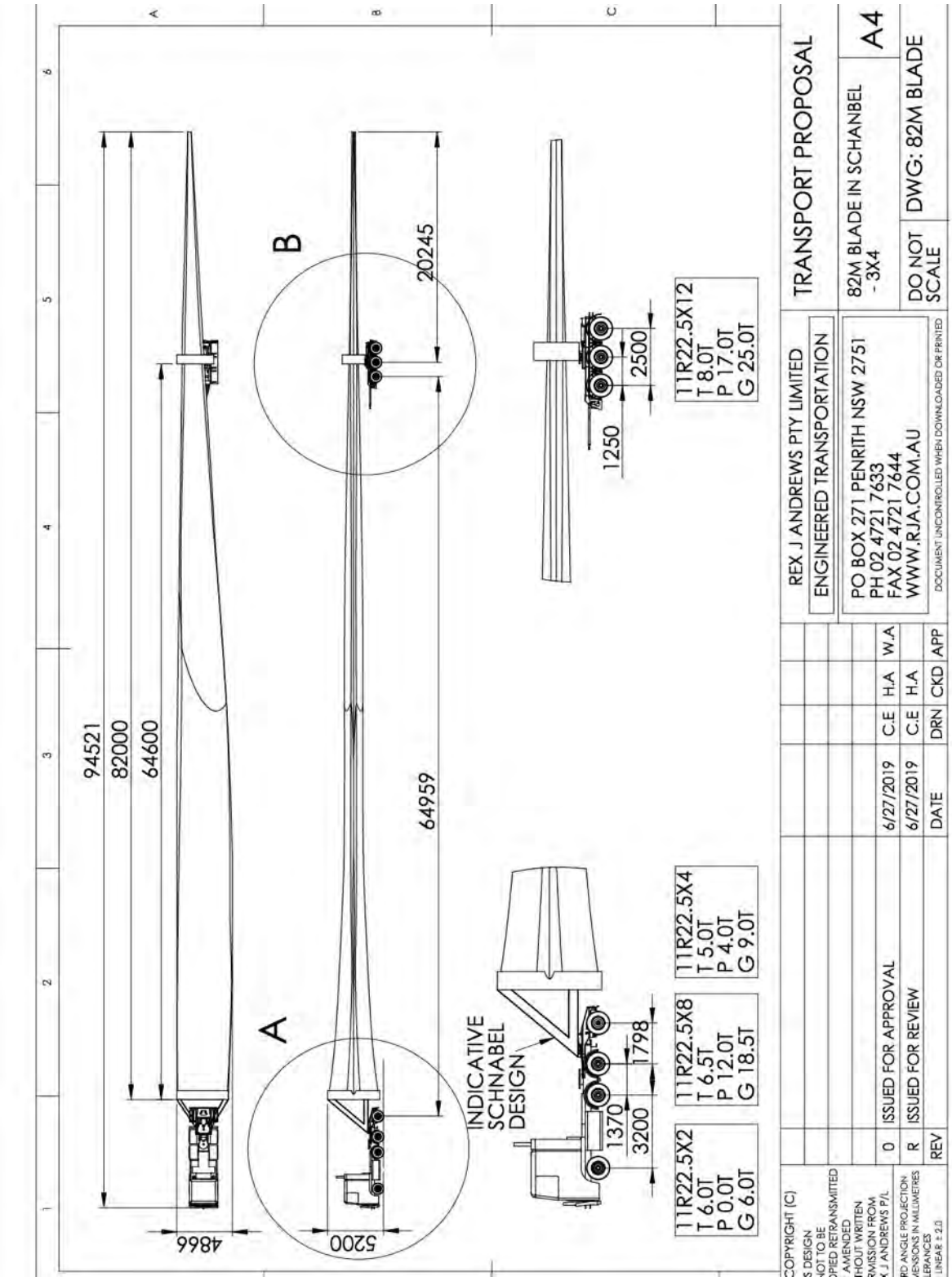
70 x Section 3 Towers (23.7l x 4.45 x 4.45h x 85T)
Configuration. Prime mover with Low 8x8 extending platform trailer.
Overall dimension: 35.0l x 4.5w x 5.2h x 128.5T.
Escort requirement: (3 x Company pilots).

70 x Section 4 Towers (27.0l x 4.45 x 3.6h x 75T)
Configuration. Prime mover with 3x8-3x8 extending platform trailer.
Overall dimension: 39.0l x 4.5w x 5.2h x 118.5T.
Escort requirement: (3 x Company pilots).

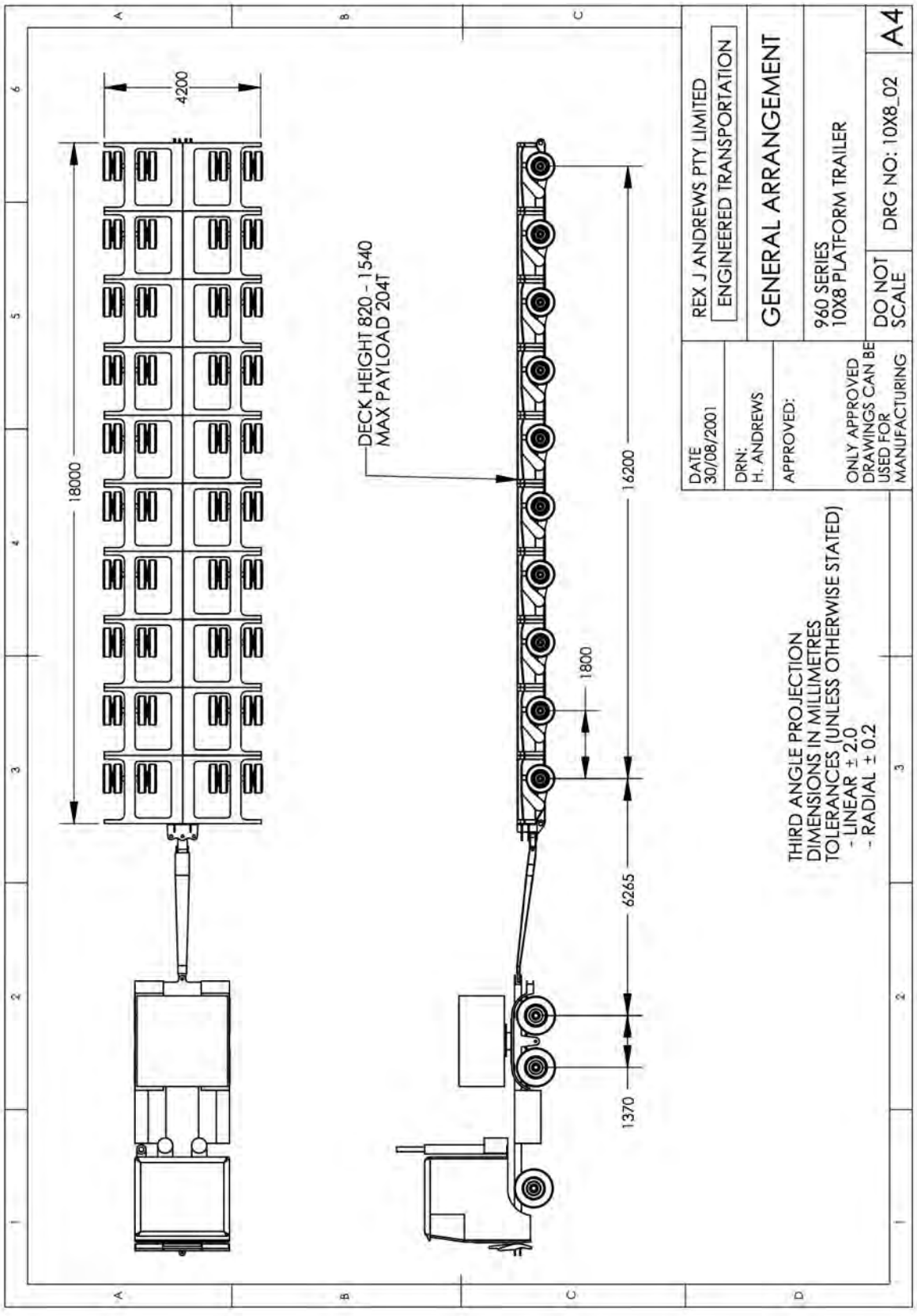
70 x Section 5 Towers (29.9l x 3.6 x 3.4h x 66T)
Configuration. Prime mover with 4x4-3x8 Dolly and Jinker.
Overall dimension: 42.0l x 4.3w x 5.2h x 102.5T.
Escort requirement: (1 x NSW police, 3 x Company pilots).

5.0 Transport drawings.

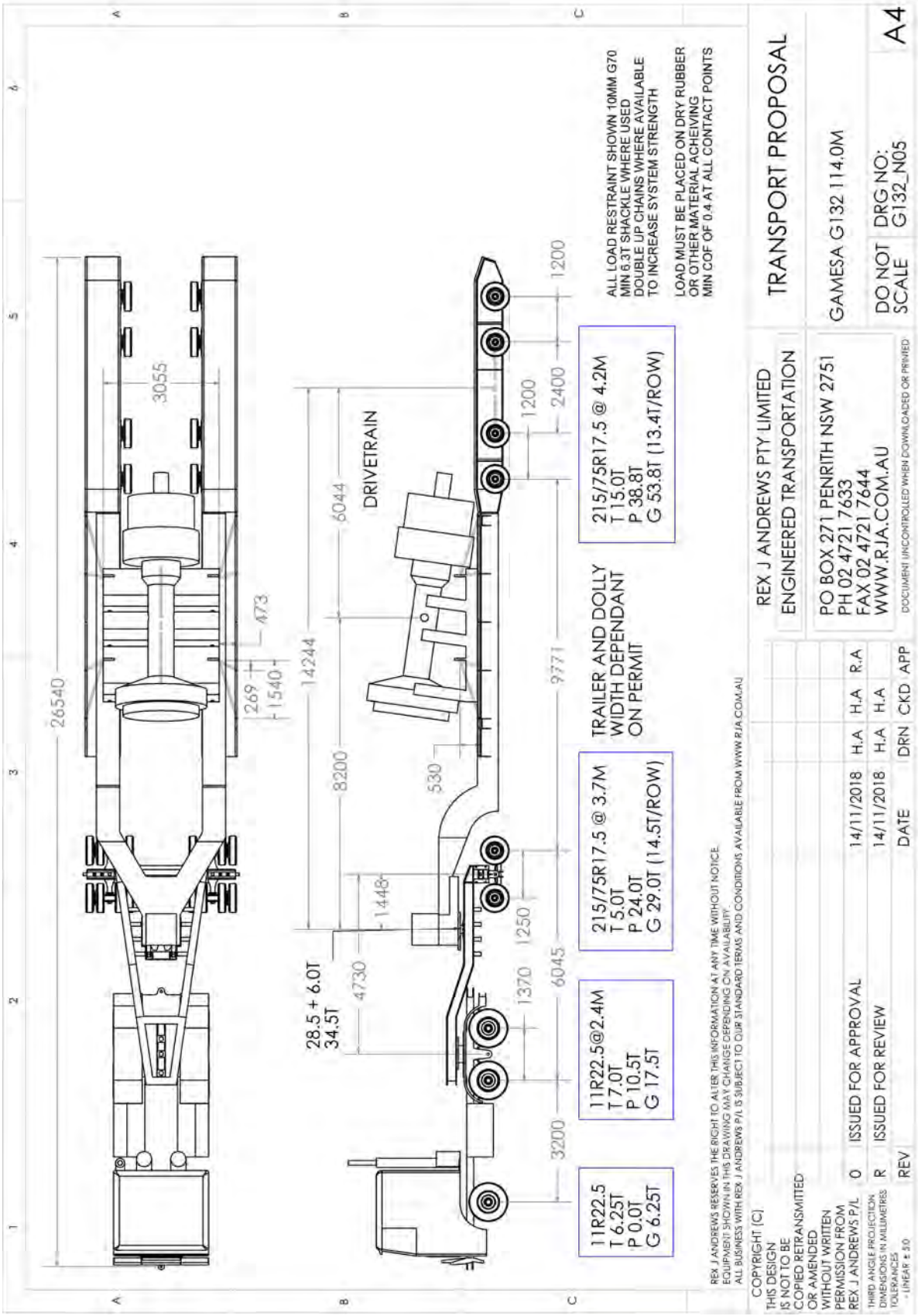
Blade Combination: Example



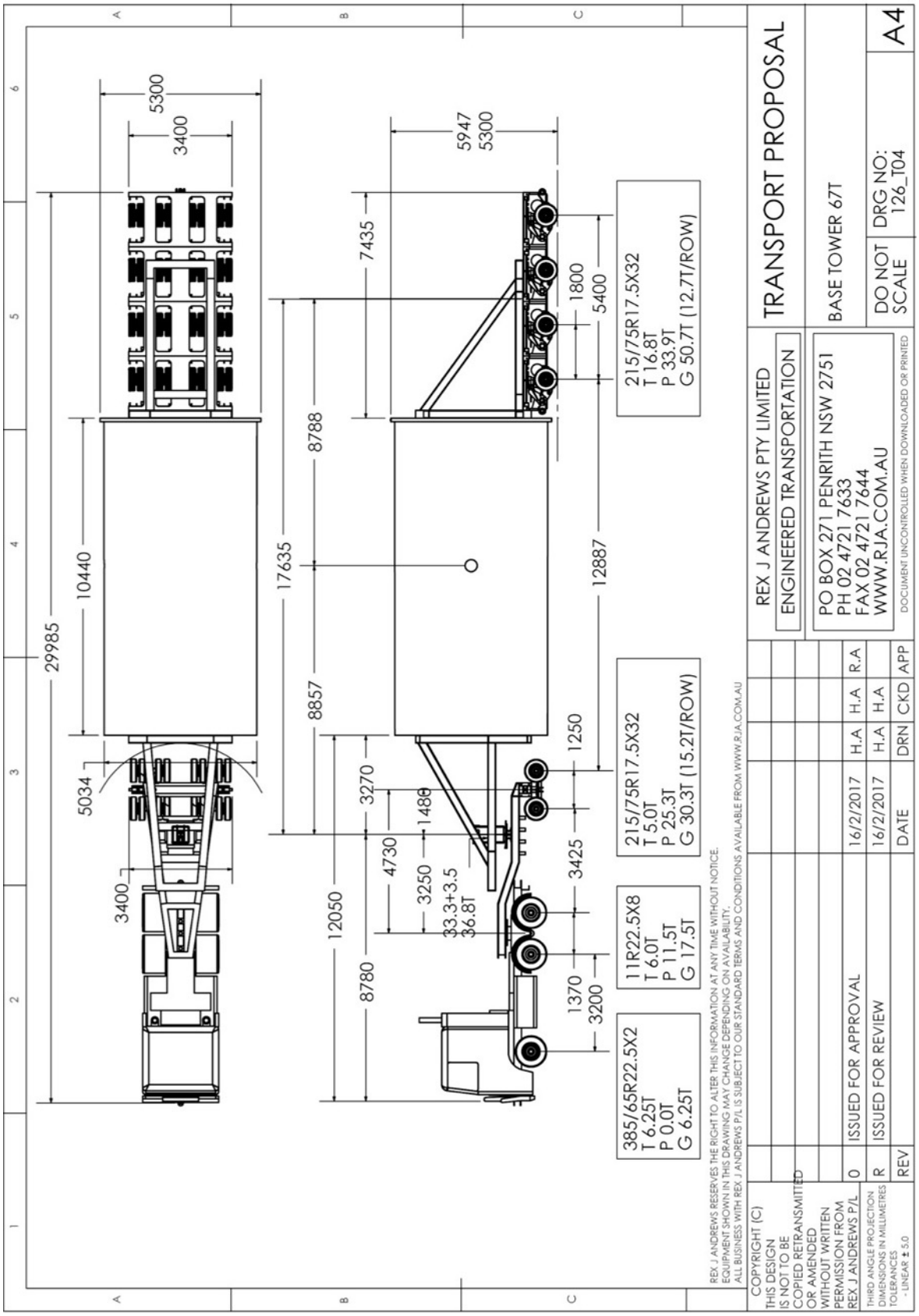
Nacelle combination: Example

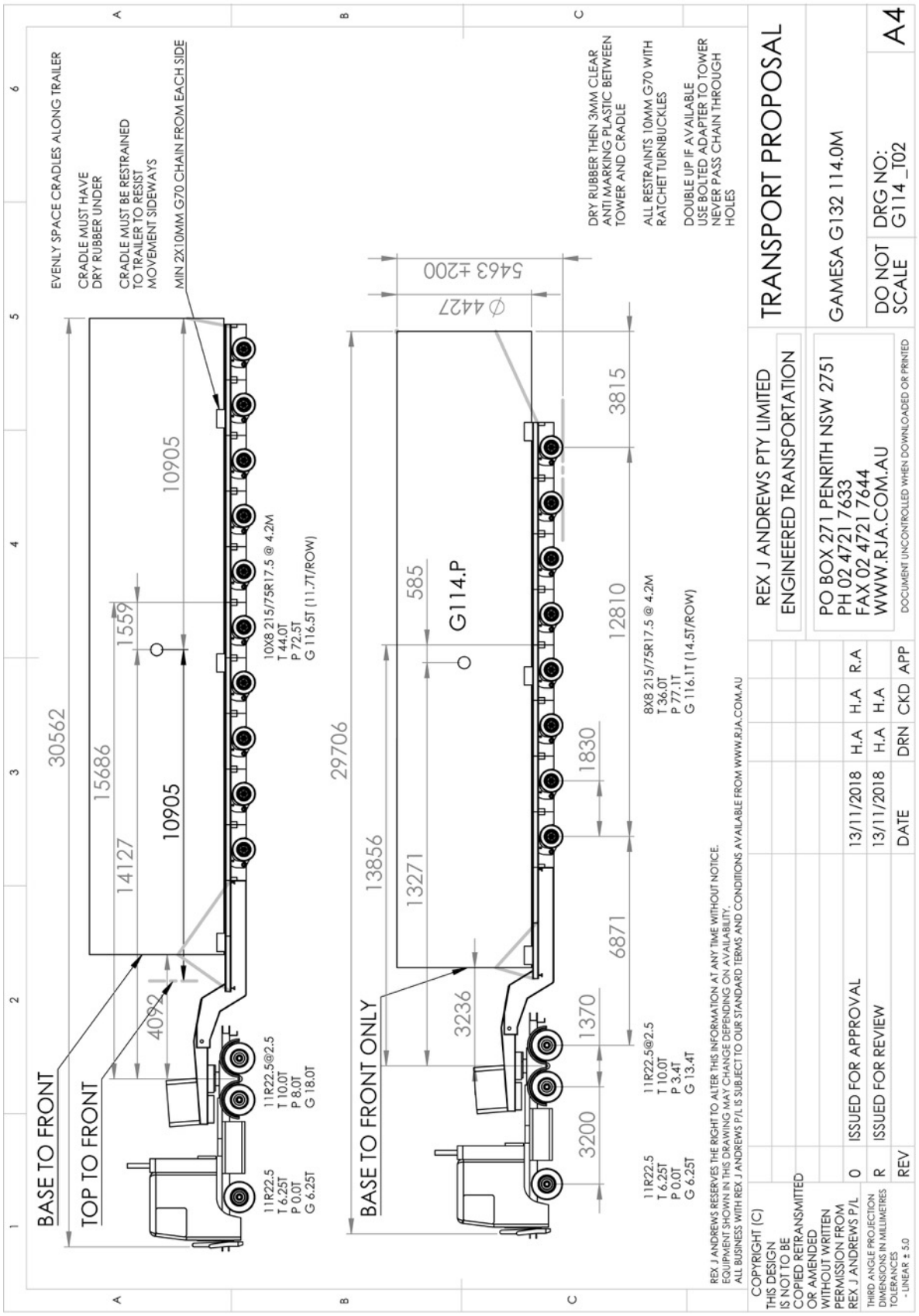


Drivetrain/Hub combination: Example



Tower combinations: Examples




BASE TO FRONT
TOP TO FRONT
30562
15686
14127
10905
1559
4092
10905
EVENLY SPACE CRADLES ALONG TRAILER
CRADLE MUST HAVE DRY RUBBER UNDER
CRADLE MUST BE RESTRAINED TO TRAILER TO RESIST MOVEMENT SIDEWAYS
MIN 2X10MM G70 CHAIN FROM EACH SIDE
11R22.5 T 6.25T P 0.0T G 6.25T
11R22.5@2.5 T 10.0T P 8.0T G 18.0T
10X8 215/75R17.5 @ 4.2M T 44.0T P 72.5T G 116.5T (11.7T/ROW)
BASE TO FRONT ONLY
29706
13856
13271
3236
585
G114.P
5463 ±200
Ø 4427
3815
12810
1830
6871
1370
3200
11R22.5 T 6.25T P 0.0T G 6.25T
11R22.5@2.5 T 10.0T P 3.4T G 13.4T
8X8 215/75R17.5 @ 4.2M T 36.0T P 77.1T G 116.1T (14.5T/ROW)
DRY RUBBER THEN 3MM CLEAR ANTI MARKING PLASTIC BETWEEN TOWER AND CRADLE
ALL RESTRAINTS 10MM G70 WITH RATCHET TURNBUCKLES
DOUBLE UP IF AVAILABLE USE BOLTED ADAPTER TO TOWER NEVER PASS CHAIN THROUGH HOLES
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TOLERANCES - LINEAR ± 5.0
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DO NOT SCALE
DRG NO: G114_T02
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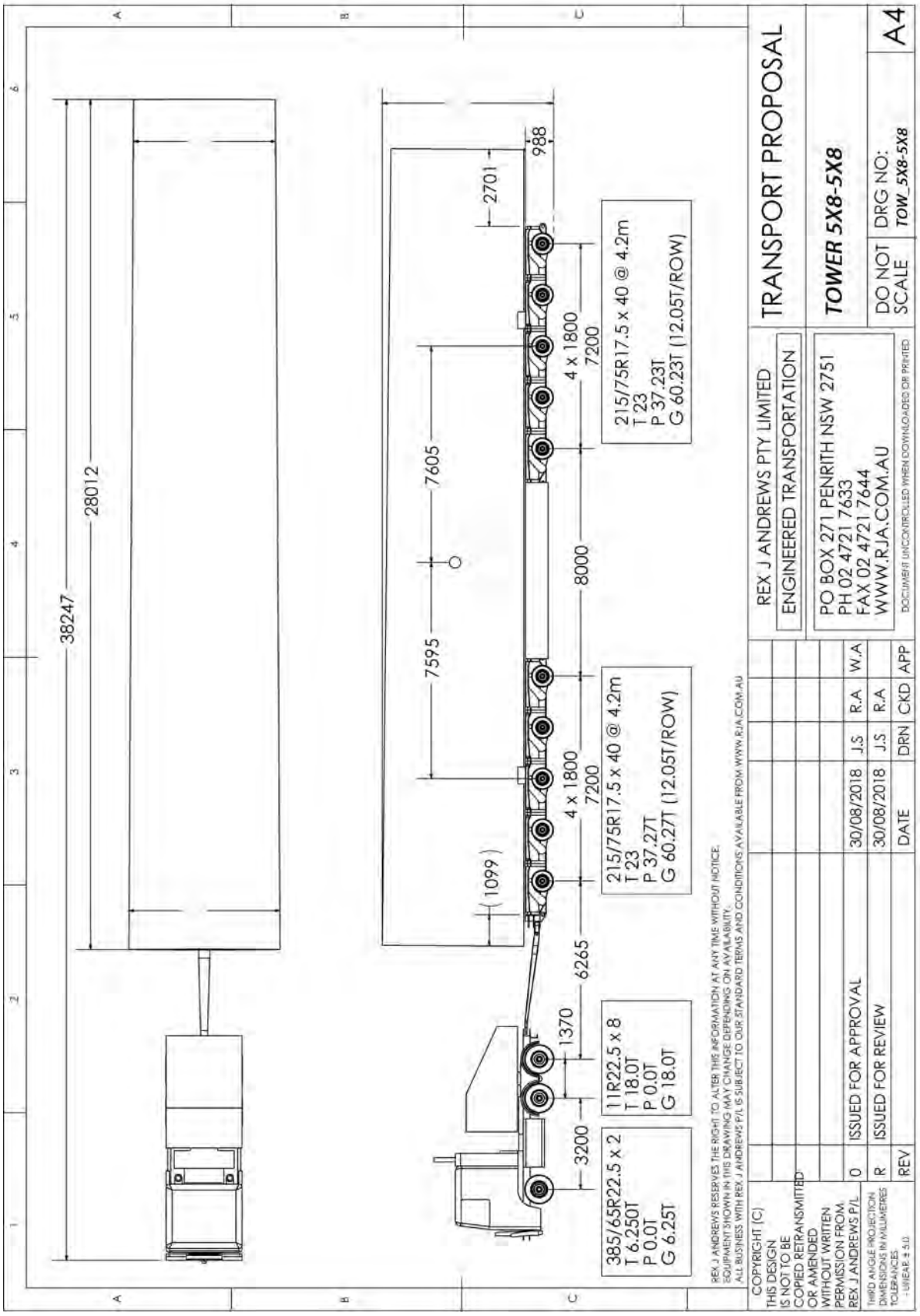
38247
28012
385/65R22.5 x 2
T 6.250T
P 0.0T
G 6.25T
3200
11R22.5 x 8
T 18.0T
P 0.0T
G 18.0T
1370
6265
(1099)
7595
7605
2701
988
4 x 1800
7200
8000
215/75R17.5 x 40 @ 4.2m
T 23
P 37.27T
G 60.27T (12.05T/ROW)
215/75R17.5 x 40 @ 4.2m
T 23
P 37.23T
G 60.23T (12.05T/ROW)
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TOLERANCES
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TOWER 5X8-5X8
DO NOT SCALE
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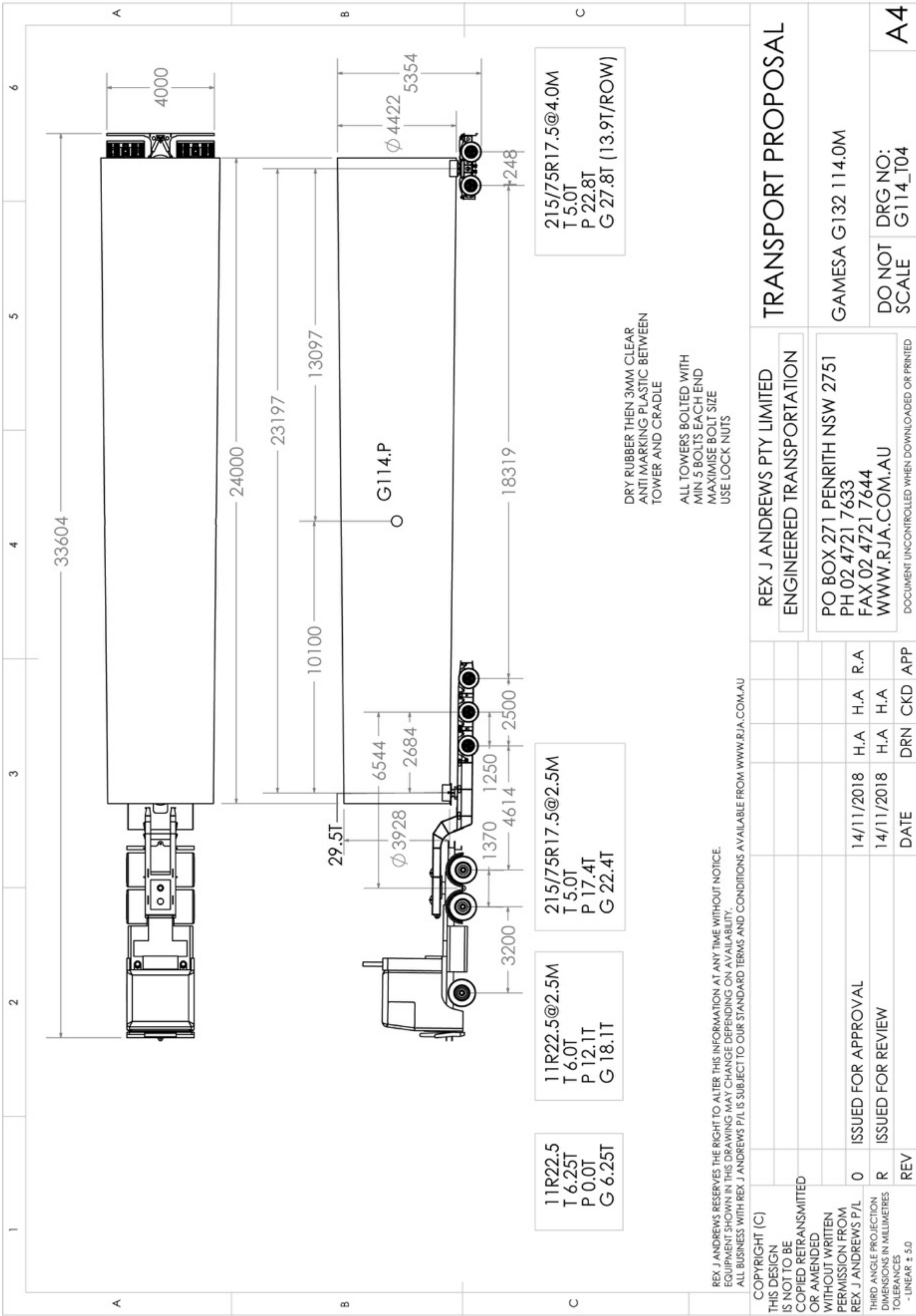
TOW_5X8-5X8
A4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DO NOT SCALE
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THIRD ANGLE PROJECTION DIMENSIONS IN MILLIMETRES TOLERANCES - LINEAR ± 5.0
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DRY RUBBER THEN 3MM CLEAR ANTI MARKING PLASTIC BETWEEN TOWER AND CRADLE
ALL TOWERS BOLTED WITH MIN 5 BOLTS EACH END MAXIMISE BOLT SIZE USE LOCK NUTS
215/75R17.5@4.0M
T 5.0T
P 22.8T
G 27.8T (13.9T/ROW)
215/75R17.5@2.5M
T 5.0T
P 17.4T
G 22.4T
11R22.5@2.5M
T 6.0T
P 12.1T
G 18.1T
11R22.5
T 6.25T
P 0.0T
G 6.25T
G114.P
29.5T
33604
4000
24000
23197
13097
10100
18319
5354
Ø 4422
248
6544
2684
Ø 3928
2500
1250
4614
1370
3200

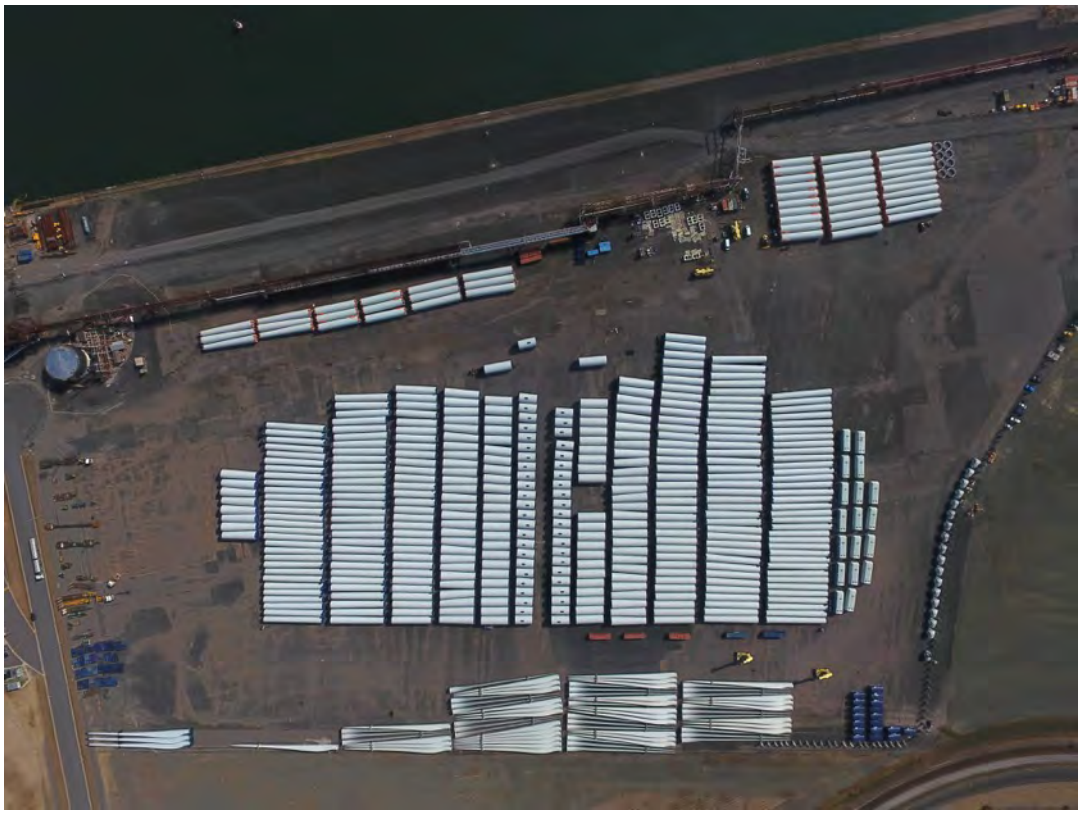
6.0 Port of Import.

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.

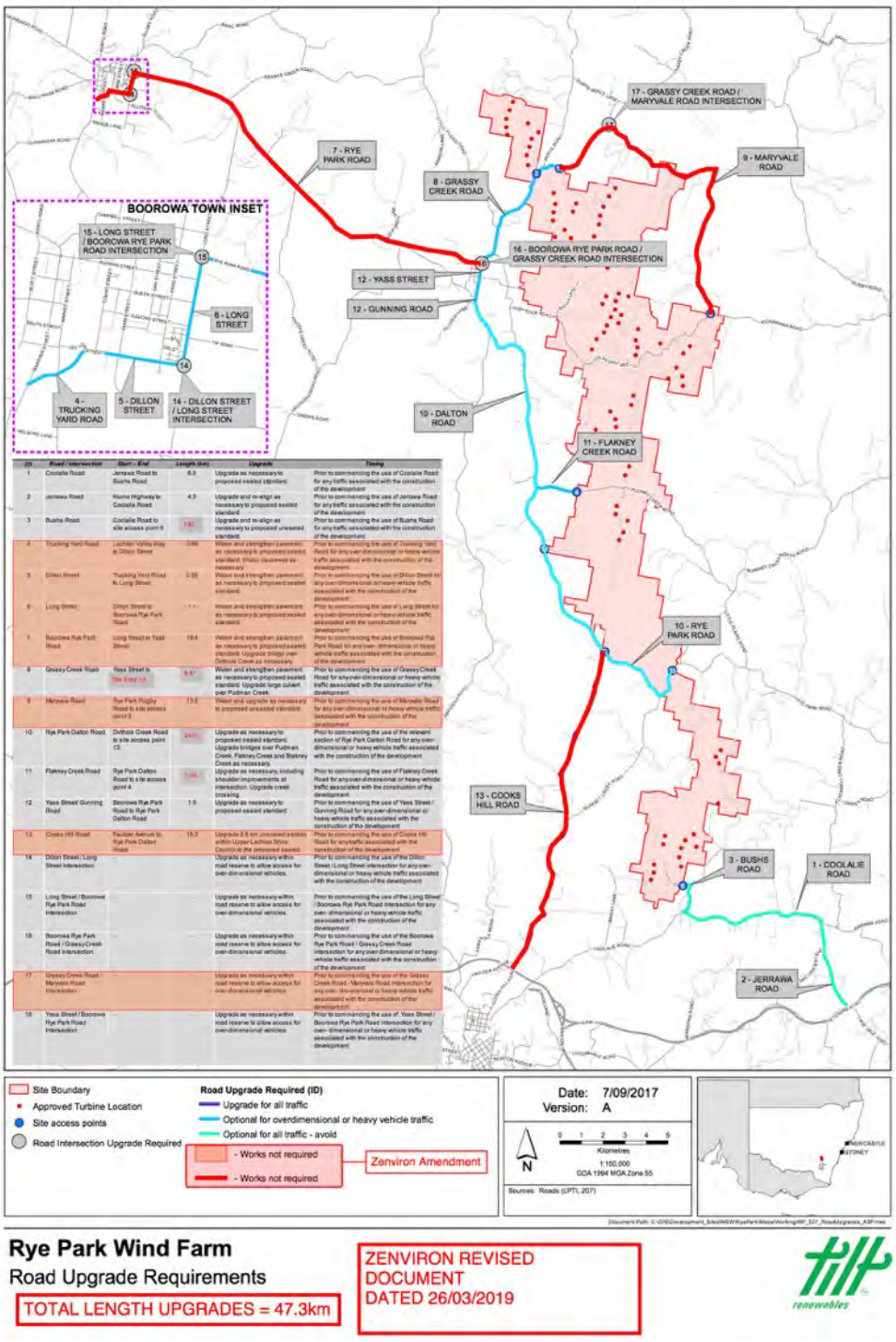
Image 1: Port overview.

Image 2 & 3: Mayfield #4 Port storage area.



7.0 Site Location and layout.

The Rye Park Wind farm is located to the north of Yass and east of Boorowa and is 515 Kilometers by road from Newcastle.



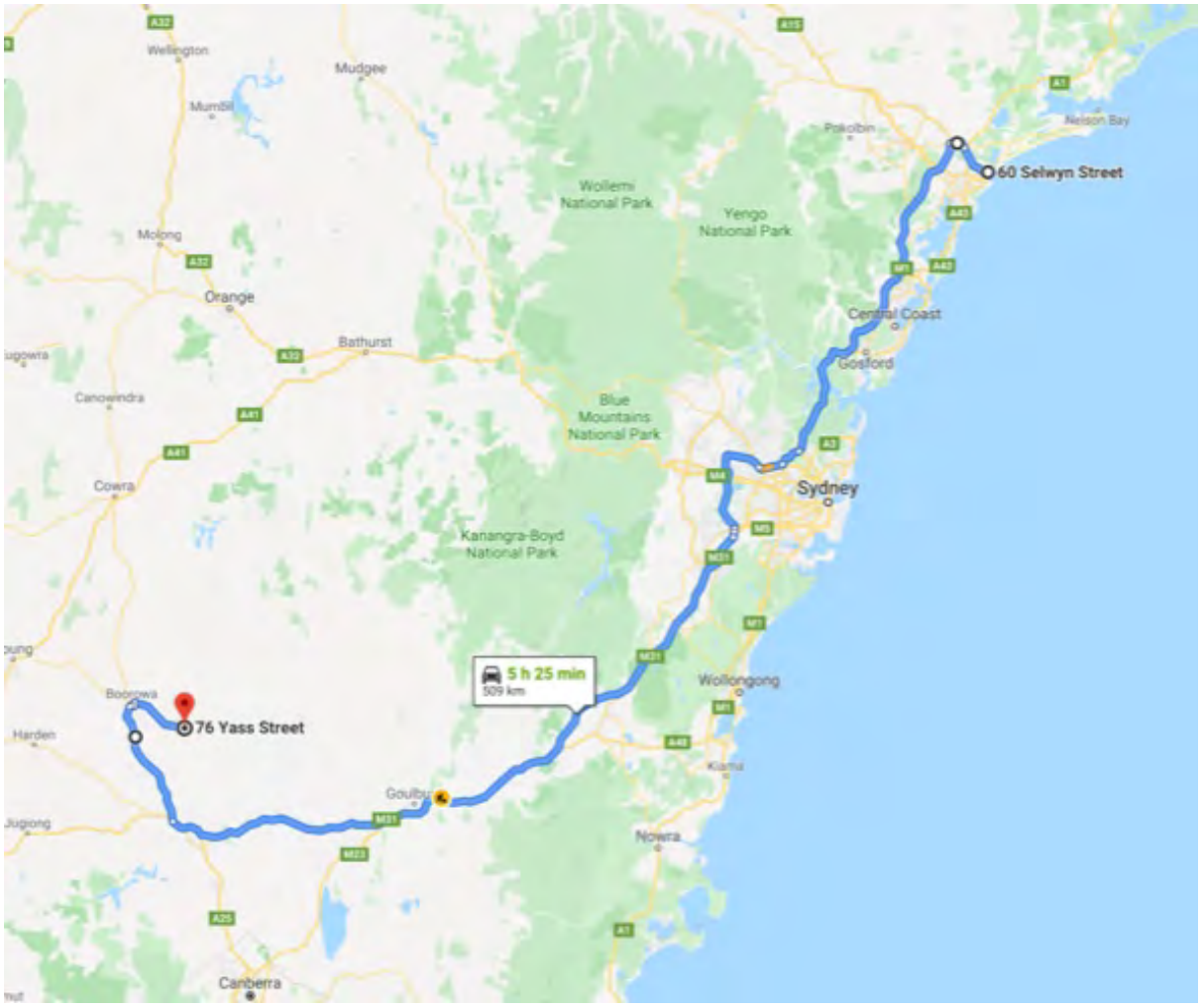
8.0 Selected routes: Newcastle to Rye Park Wind Farm.

We have based this study on the turbine components, and all imported towers entering Australia via the Mayfield # 4 Berth at Newcastle. The study will show 3 sections of route. Stage 1 study is from Newcastle Port to Rye Park township. Stage 2 will travel from Rye Park township through to the North Access entrance, and Stage 3 will travel from Rye Park township through to the South access entrance.

STAGE 1:

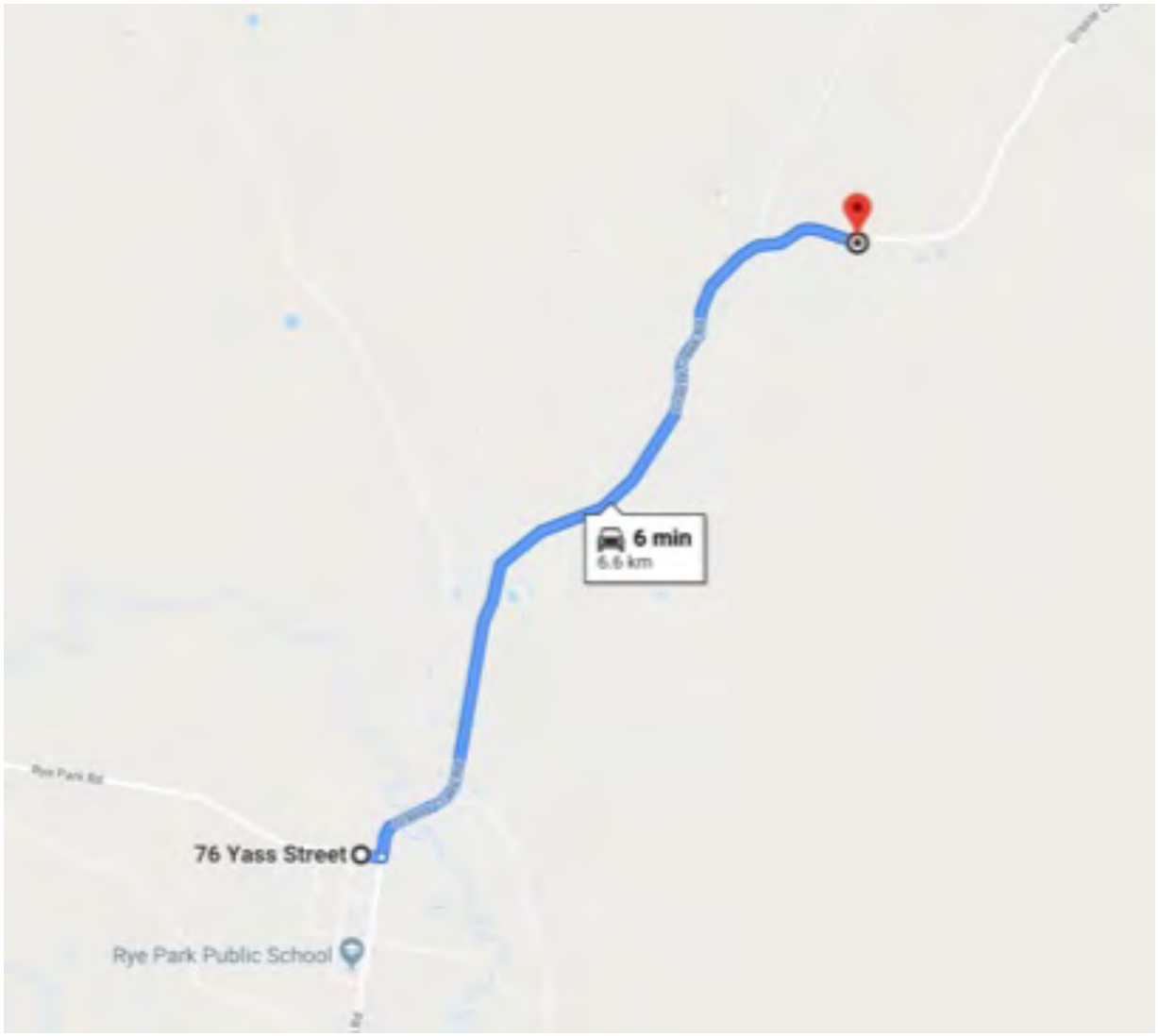
DISTANCE: 509.0 kilometres:

This route took us via Selwyn street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, M1, Pennant Hills Road, M2, M7, M5, Hume Highway, Lachlan Valley Way, Trucking Yard Road, Dillon Street, Long Street, Rye Park Road.



GPS LINK: https://goo.gl/maps/8iDNh9ibXyutKboP7

STAGE 2:
DISTANCE: 6.6 kilometres:
This route took us via Rye Park Road, Grassy Creek Road.

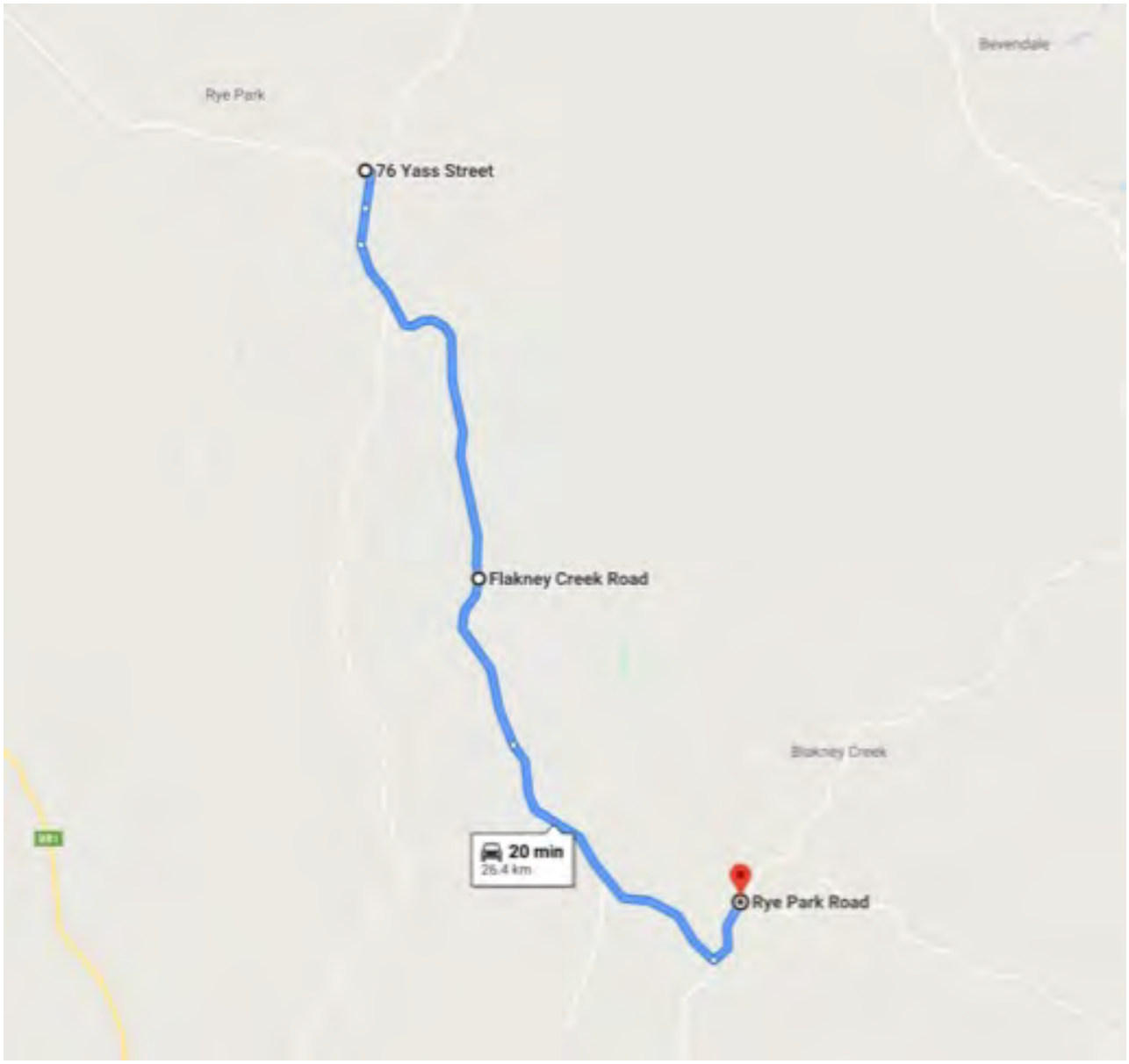


GPS LINK: https://goo.gl/maps/NC1AQuTTZPJHDDfk9

STAGE 3:

DISTANCE: 26.4 kilometres:

This route took us via Rye Park Road, Yass Street, Gunning Street, Dalton Road, Rye Park Road. (Including a possible site access point off Flackney Creek Road).



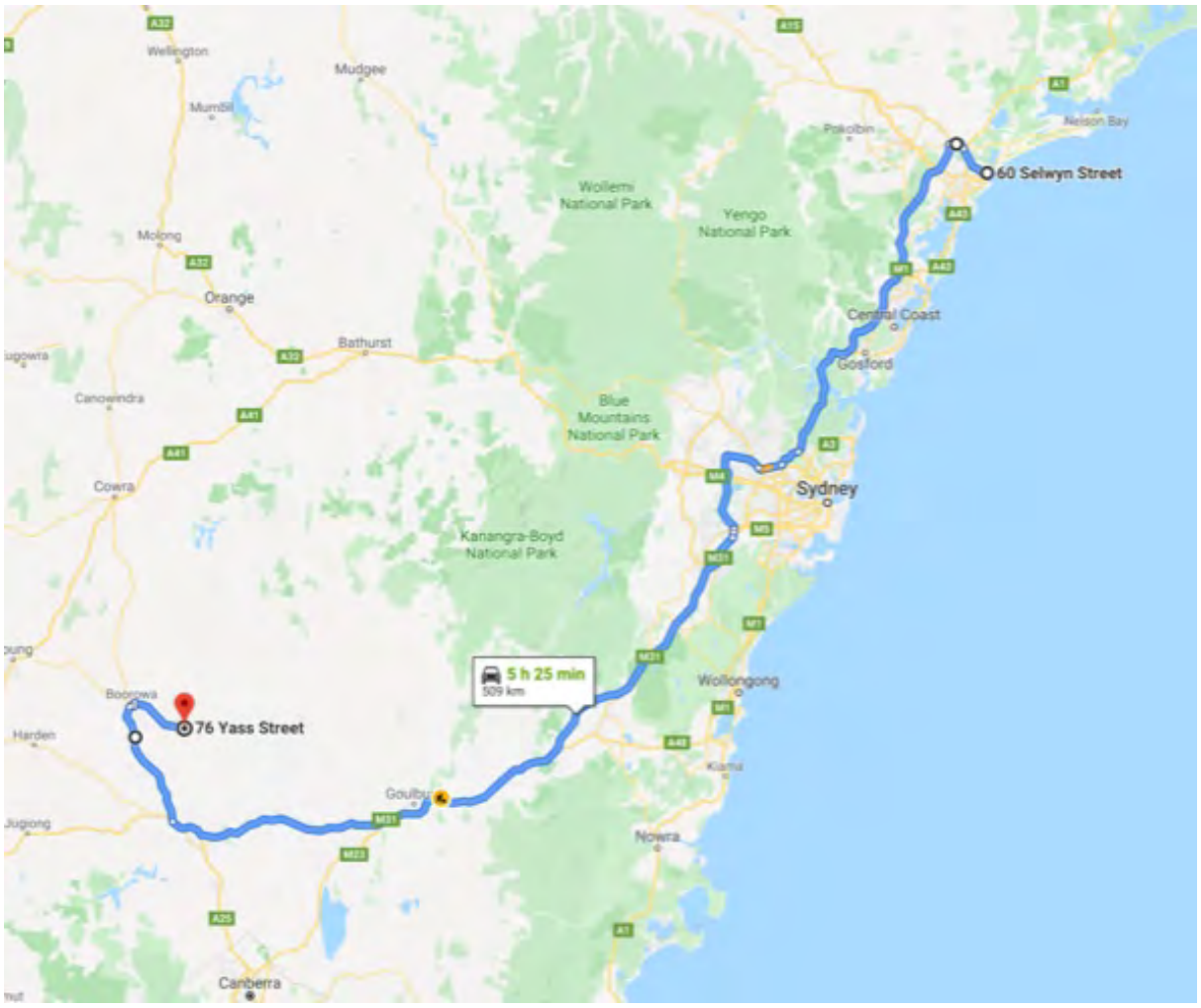
GPS LINK: https://goo.gl/maps/xsk8nmSVdquTpEZDA

9.0 Stage 1 Route survey (Newcastle to Rye Park township)

STAGE 1:

DISTANCE: 509.0 kilometres:

This route took us via Selwyn street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, M1, Pennant Hills Road, M2, M7, M5, Hume Highway, Lachlan Valley Way, Trucking Yard Road, Dillon Street, Long Street, Rye Park Road.



GPS LINK: https://goo.gl/maps/8iDNh9ibXyutKboP7

KEY	
MODIFICATIONS REQUIRED	
PINCH POINT	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
Route: Newcastle to Rye Park township					
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street GPS link: https://goo.gl/maps/afLwPYKuNdm	70.0 metres clearance	Moderate right hand turn	Some hardstand will need to be added on the left entrance and exit of the corner. The fence on both sides of the road and the gate will need to be relocated.
0.4	Mayfield	Selwyn Street rail crossing GPS link: https://goo.gl/maps/AmohE54hKSz	9.0 Metres wide	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
1.3	Mayfield	Selwyn Street onto Industrial Drive via George Street GPS link: https://goo.gl/maps/gXeHvBtCp4D2	70.0 metres clearance	Right hand turn	Truck will need to travel over the hardstand area than return to the correct side of Industrial Drive. The trailer will need to cross over to the incorrect side before travelling over the centre median and returning to the correct side of Industrial Drive. The traffic signal in the centre of the intersection will need to be relocated. A sign will also need to be relocated on the inside of the corner and a pole removed on the outside of the corner. A hardstand area will need to be constructed on the south side of the intersection.
5.5	Mayfield West	Industrial Drive onto Maitland Road GPS link: https://goo.gl/maps/Kn49dhWG2qG2	70.0 metres clearance	Right hand turn	The blades will need to cross to the incorrect side metres prior to the intersection, then return to the correct side 120 metres past the intersection. The centre median strip will need to be lowered, or the trucks are to cross to the incorrect side of Industrial drive further to the east of the intersection.
17.4	Tarro	New England Highway onto John Renshaw Drive GPS link: https://goo.gl/maps/SRDr5JigkBp	100.0 metres clearance	Left hand merge	No problems with this section of road.
18.5	Beresfield	John Renshaw Drive onto the M1 GPS link: https://goo.gl/maps/A34ihxCjM5wfRDdq6	100.0 metres clearance	Left hand bend	No problems with this section of road.

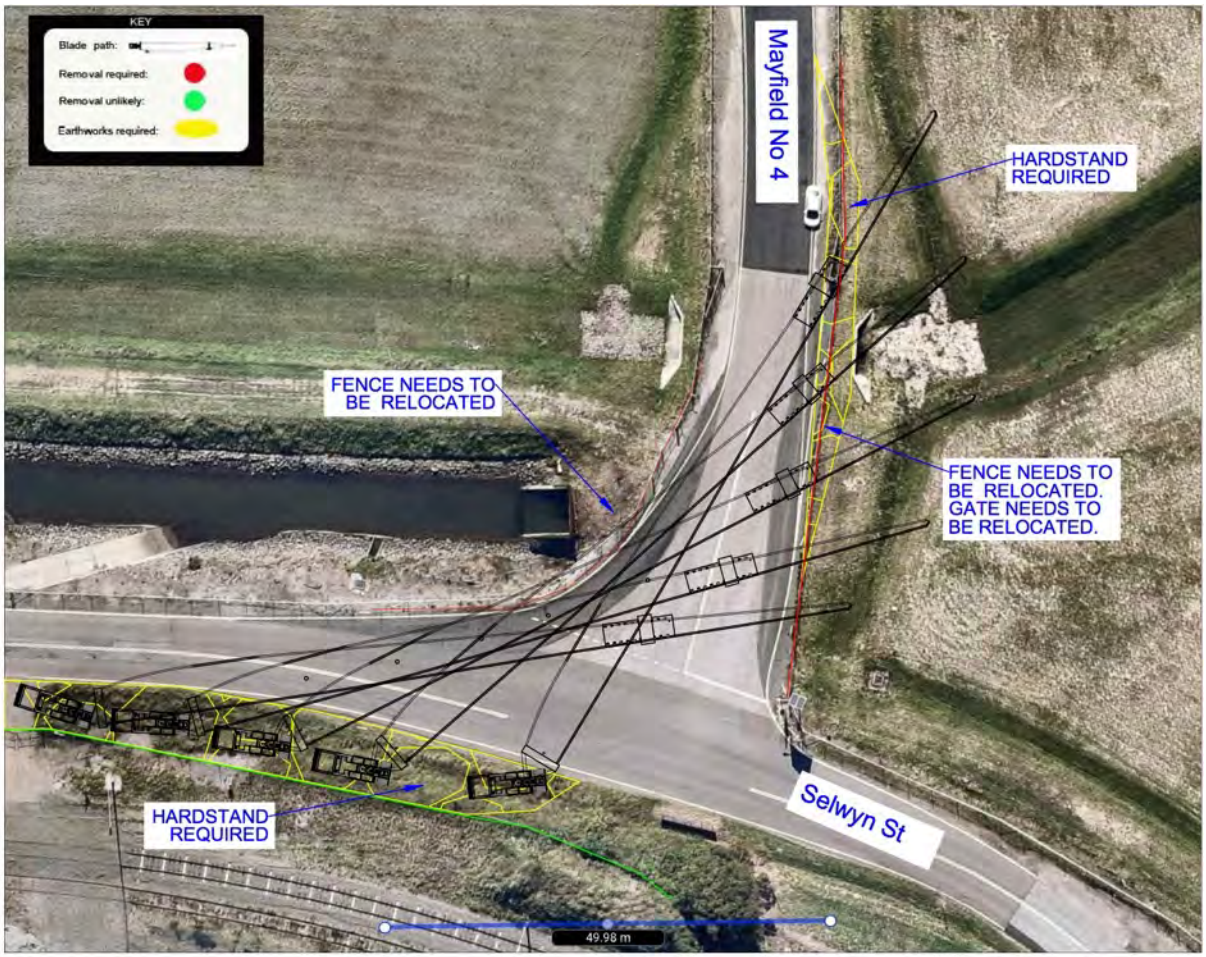
KM index	Location	Section of road	Critical Measurement	Procedure	Notes
113.0	Mt White	M1 Motorway under Mt White overpass GPS link: https://goo.gl/maps/K3fPPe4fNx63xB3j7	Left Lane: 5.2 mtrs Centre Lane: 5.3 mtrs Right Lane: 5.4 mtrs	Travel directly ahead	Loads that exceed 5.3 metres high are not to travel under this structure. Loads over 5.2 metres high are to travel under the bridge in the far-right lane, and at a speed of no more than 5 km's per hour. Spotter to guide load through this section of road.
122.0	Hawkesbury River	M1 Motorway GPS link: https://goo.gl/maps/yDzjirEKLAbREE8B6	100.0 long x 6.0 wide	Merge to left	Large parking area
146.0	Wahroonga	M1 onto Pennant Hills Rd GPS link: https://goo.gl/maps/bskC8kD4CdW9xmwYA	75.0 metres clearance	Left hand turn	It is recommended that the centre median strip be modified to allow a suitable clearance for the truck to travel over. Blade loads are to turn from the correct side to the incorrect side of the road. The prime mover will need to turn from the far-right lane and cross onto the incorrect side of Pennant Hills Road, before returning to the correct side once the trailer has cleared the corner.
147.0	Normanhurst	Pennant Hills Road under Pedestrian overpass GPS link: https://goo.gl/maps/nYbjkf5AJ9D2xvUt7	Left Lane: 5.15 mtrs Centre Lane: 5.2 mtrs Right Lane: 5.3 mtrs	Travel directly ahead	Loads that exceed 5.3 metres high are not to travel under this structure. Loads over 5.2 metres high are to travel under the bridge in the far-right lane, and at a speed of no more than 5 km's per hour. Spotter to guide load through this section of road.
151.0	Beecroft	Pennant Hills Road under Pedestrian overpass GPS link: https://goo.gl/maps/sjnLQqYRudUSKgTQ8	Left Lane: 5.3 mtrs Centre Lane: 5.4 mtrs Right Lane: 5.5 mtrs	Travel directly ahead	Loads that exceed 5.3 metres high are not to travel under this structure. Loads over 5.2 metres high are to travel under the bridge in the centre lane, and at a speed of no more than 5 km's per hour. Spotter to guide load through this section of road.
154.0	West Pennant Hills	Pennant Hills Rd onto M2 Motorway GPS link: https://goo.gl/maps/cCsJwSt1NsRj5cSs6	75.0 metres clearance	Right hand turn	A traffic signal will need to be relocated, and a section of fence removed on the inside of the corner. A barrier will also need to be relocated on the outside of the corner. Trucks are to turn from the correct side to the correct side of the road. The prime mover will need to turn from the far left lane on Pennant Hills Road and enter the on ramp as wide as possible. Spotter to guide the load through the corner.
163.0	Winston Hills	M2 Motorway onto M7 Motorway GPS link: https://goo.gl/maps/PC96cBq2xqtW85vG7	75.0 metres clearance	Travel directly ahead	No problems with this section of road.
167.0	Kings Park	M7 Motorway GPS link: https://goo.gl/maps/T8WcbR9T84Zs7WpF7	100.0 long x 6.0 wide	Merge to left	Large parking area

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
201.0	Prestons	M7 Motorway onto M5 Motorway GPS link: https://goo.gl/maps/FA2mF7PxZkxrRDTR9	75.0 metres clearance	Travel directly ahead	No problems with this section of road.
229.0	Menangle	Hume Highway https://goo.gl/maps/KPMdLS1XuRWHrcyb6	200.0 long x 8.0 wide	Merge to left	Large parking area for towers and motors, no blades to enter this parking bay.
238.0	Wilton	Hume Highway under Farm access overpass GPS link: https://goo.gl/maps/2ZsVqYJ9j9qPTGqa9	Left Lane: 5.5 mtrs Centre Lane: 5.4 mtrs Right Lane: 5.3 mtrs	Travel directly ahead	Loads that exceed 5.3 metres high are not to travel under this structure. Loads over 5.2 metres high are to travel under the bridge in the left lane, and at a speed of no more than 5 km's per hour. Spotter to guide load through this section of road.
303.0	Sutton Forest	Hume Highway https://goo.gl/maps/uT1ubtSuawS2	150.0 long x 10.0 wide	Merge to left	Large parking area
352.0	Goulburn	Hume Highway https://goo.gl/maps/7HywRcjZiJv	180.0 long x 15.0 wide	Merge to left	Large parking area
375.0	Breadalbane	Hume Highway https://goo.gl/maps/PmpDm5ymjjnK7ciW8	140.0 long x 12.0 wide	Merge to left	Large parking area
388.0	Cullerin ridge	Hume Highway https://goo.gl/maps/3r7x8uzs9Fy7pVmp8	100.0 long x 10.0 wide	Merge to left	Large parking area
409.0	Oolong	Hume Highway https://goo.gl/maps/EVyT3US6dgcapAWWA	130.0 long x 15.0 wide	Merge to left	Large parking area
444.0	Bowning	Hume Highway onto Lachlan Valley Way GPS link: https://goo.gl/maps/j1Nvy5sXDonei1K99	75.0 metres clearance	Right hand turn	Some signs in the centre median strip will need to be relocated. Truck to turn from the far left lane and enter the corner as wide as possible.
486.0	Boorowa	Lachlan Valley Way onto Trucking Yard Road GPS link: https://goo.gl/maps/qCR2CX4EADMGK3WR8	75.0 metres clearance	Right hand turn	Some signs in the inside of the corner will need to be relocated.
487.0	Boorowa	Trucking Yard Road GPS link: https://goo.gl/maps/HTJCwCnUerjtgc5z9	50.0 metres clearance	Right hand bend	The causeway will need to be widened, and hardstand added to the inside of the corner.
487.2	Boorowa	Trucking Yard Road onto Dillon Street GPS link: https://goo.gl/maps/sQFVtnE3CPvhVibS8	90.0 metres clearance	Travel directly ahead.	No Problems with this section of road.
488.0	Boorowa	Dillon Street onto Long Street GPS link: https://goo.gl/maps/mnV8spf8JGG6LsT99	50.0 metres clearance	Left hand turn	Access through a landowner's boundary will be required to make this turn. Hardstand is required on the inside of the corner, and a fence relocated within the landowner's boundaries. Additionally, some vegetation needs to be removed.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
489.5	Boorowa	Long Street onto Rye Park Road GPS link: https://goo.gl/maps/Ry5s7svqx1BDzRAMA	50.0 metres clearance	Right hand turn	Access through a landowner's boundary will be required to make this turn. Hardstand is required on the inside of the corner, and a fence relocated within the landowner's boundaries. Additionally, some vegetation needs to be removed.
509.0	Boorowa to Rye Park township	Rye Park Road GPS link: https://goo.gl/maps/LGqWeQKDCERMsHQy7	90.0 metres clearance	Travel directly ahead	No problems with this section of road.

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

Image 1:



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

PROCEDURE: Right hand turn.

COMMENTS: Some hardstand will need to be added on the left entrance and exit of the corner. The fence on both sides of the road and the gate will need to be relocated.

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

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

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

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

PROCEDURE: Travel directly ahead over the crossing.

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

ROAD MODIFICATIONS: No works required.

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

Image 1:

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

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

COMMENTS: The traffic signal in the centre of the intersection will need to be relocated. A sign will also need to be relocated on the inside of the corner and a pole removed on the outside of the corner.

A hardstand area will need to be constructed on the south side of the intersection.

Truck will need to travel over the hardstand area than return to the correct side of Industrial Drive. The trailer will need to cross over to the incorrect side before travelling over the centre median and returning to the correct side of Industrial Drive.

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

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

Image 1:

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

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

COMMENTS: The centre median strip will need to be lowered, or the trucks are to cross to the incorrect side of Industrial drive further to the east of the intersection.

The blades will need to cross to the incorrect side metres prior to the intersection, then return to the correct side 120 metres past the intersection.

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

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

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/A34ihxCjM5wfRDdq6

PROCEDURE: Merge to the left and travel around a left-hand bend before merging to the right onto the M1 Motorway.

COMMENTS: Loads to turn left onto the slip lane. Spotter to guide the load through the corner.

ROAD MODIFICATIONS: No modifications required.

146.0 Km's: M1 Motorway onto Pennant Hills Road at Wahroonga.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/bskC8kD4CdW9xmwYA

PROCEDURE: Left hand turn from the M1 Motorway onto Pennant Hills Road.

COMMENTS: It is recommended that the centre median strip be modified to allow a suitable clearance for the truck to travel over.

Blade loads are to turn from the correct side to the incorrect side of the road. The prime mover will need to turn from the far-right lane and cross onto the incorrect side of Pennant Hills Road, before returning to the correct side once the trailer has cleared the corner.

ROAD MODIFICATIONS: Yes moderate amounts of works are required.

154.0 Km's: Pennant Hills Road onto the M2 Motorway at West Pennant Hills.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/cCsJwSt1NsRi5cSs6

PROCEDURE: Right hand turn from Pennant Hills Road onto the M2 Motorway.

COMMENTS: A traffic signal will need to be relocated, and a section of fence removed on the inside of the corner. A barrier will also need to be relocated on the outside of the corner.

Trucks are to turn from the correct side to the correct side of the road. The prime mover will need to turn from the far-left lane on Pennant Hills Road and enter the on ramp as wide as possible. Spotter to guide the load through the corner.

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

418.0 Km's: Hume Highway onto Lachlan Valley Highway at Yass.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/j1Nvy5sXDonei1K99

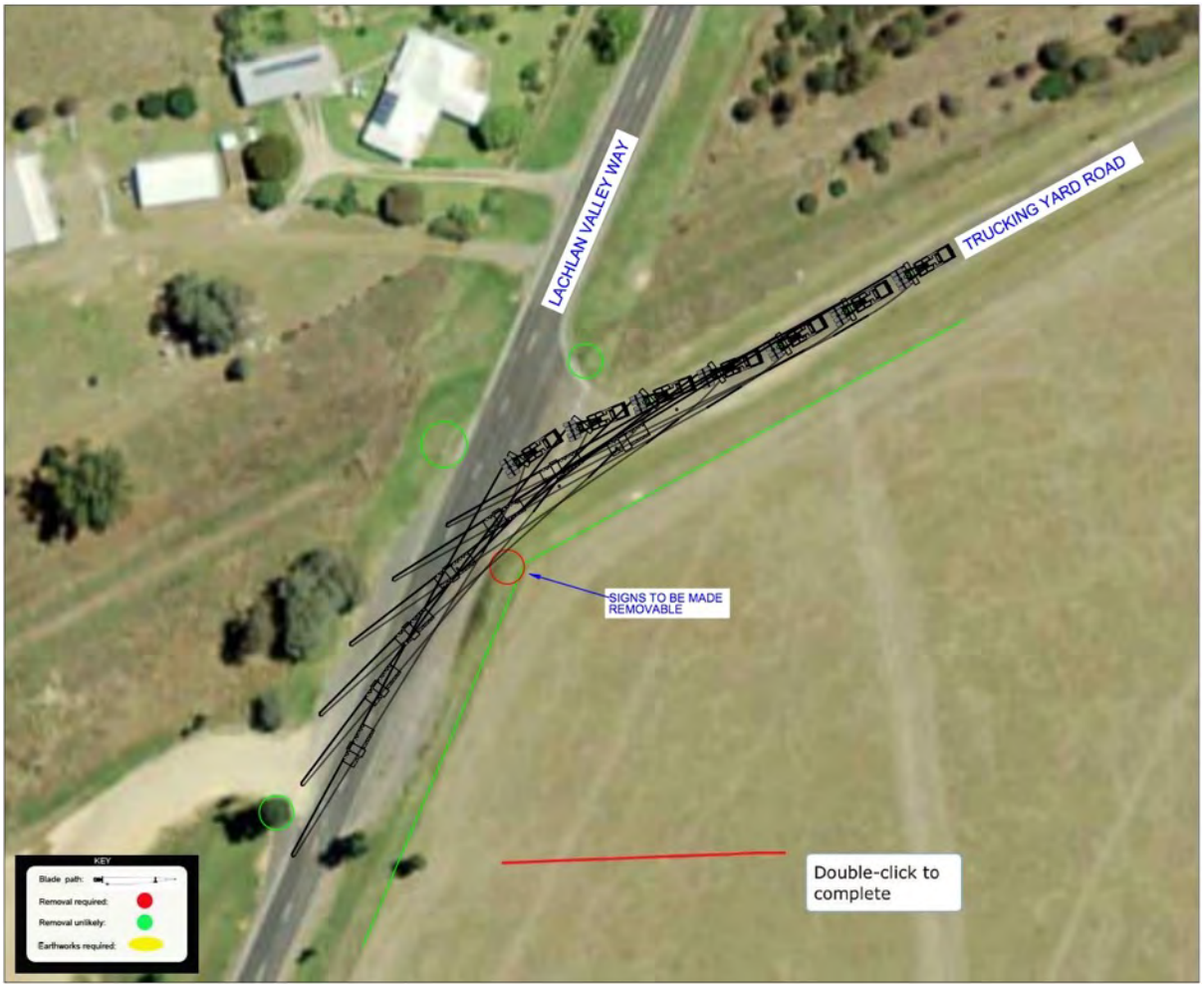
PROCEDURE: Right hand turn from Hume Highway onto Jerrawa Road.

COMMENTS: Load to turn from the far-left lanes onto the correct side of Jerrawa Road. Some signs will need to be relocated or made removable in the centre median strip.

ROAD MODIFICATIONS: Moderate amounts of works are required on this section of road.

486.0 Km's: Lachlan Valley way onto Trucking Yard Road at Boorowa.

Image 1:



PROCEDURE: Right hand turn from Lachlan Valley Way onto Trucking Yard Road.
COMMENTS: Some signs in the inside of the corner will need to be relocated.
ROAD MODIFICATIONS: Small amounts of works are required on this section of road.
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/qCR2CX4EADMGK3WR8

487.0 Km's: Trucking Yard Road at Boorowa

Image 1:

Image 2:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/HTJCwCnUerjtgc5z9

PROCEDURE: Right-hand bend on Trucking Yard Road.

COMMENTS: The causeway will need to be widened, and hardstand added to the inside of the corner.

ROAD MODIFICATIONS: Large amounts of works are required on this section of road.

488.0 Km's: Dillon Street onto Long Street at Boorowa

Image 1:

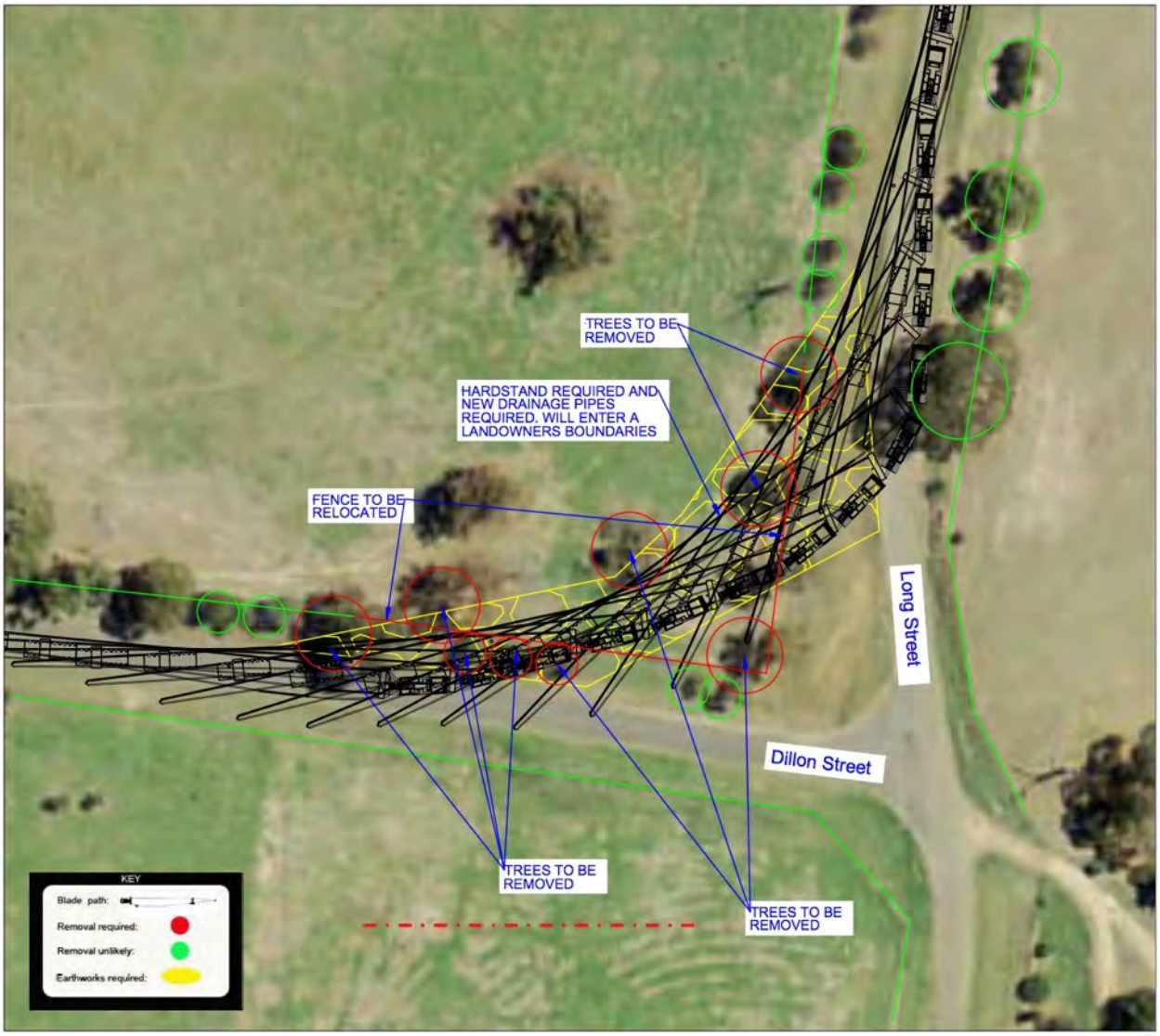


Image 2:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/mnV8spf8JGG6LsT99

PROCEDURE: Left-hand turn from Dillon Street onto Long Street.

COMMENTS: Access through a landowner's boundary will be required to make this turn. Hardstand is required on the inside of the corner, and a fence relocated within the landowner's boundaries. Additionally, some vegetation needs to be removed.

ROAD MODIFICATIONS: Large amounts of works are required on this section of road.

489.5 Km's: Long Street onto Rye Park Road at Boorowa

Image 1:

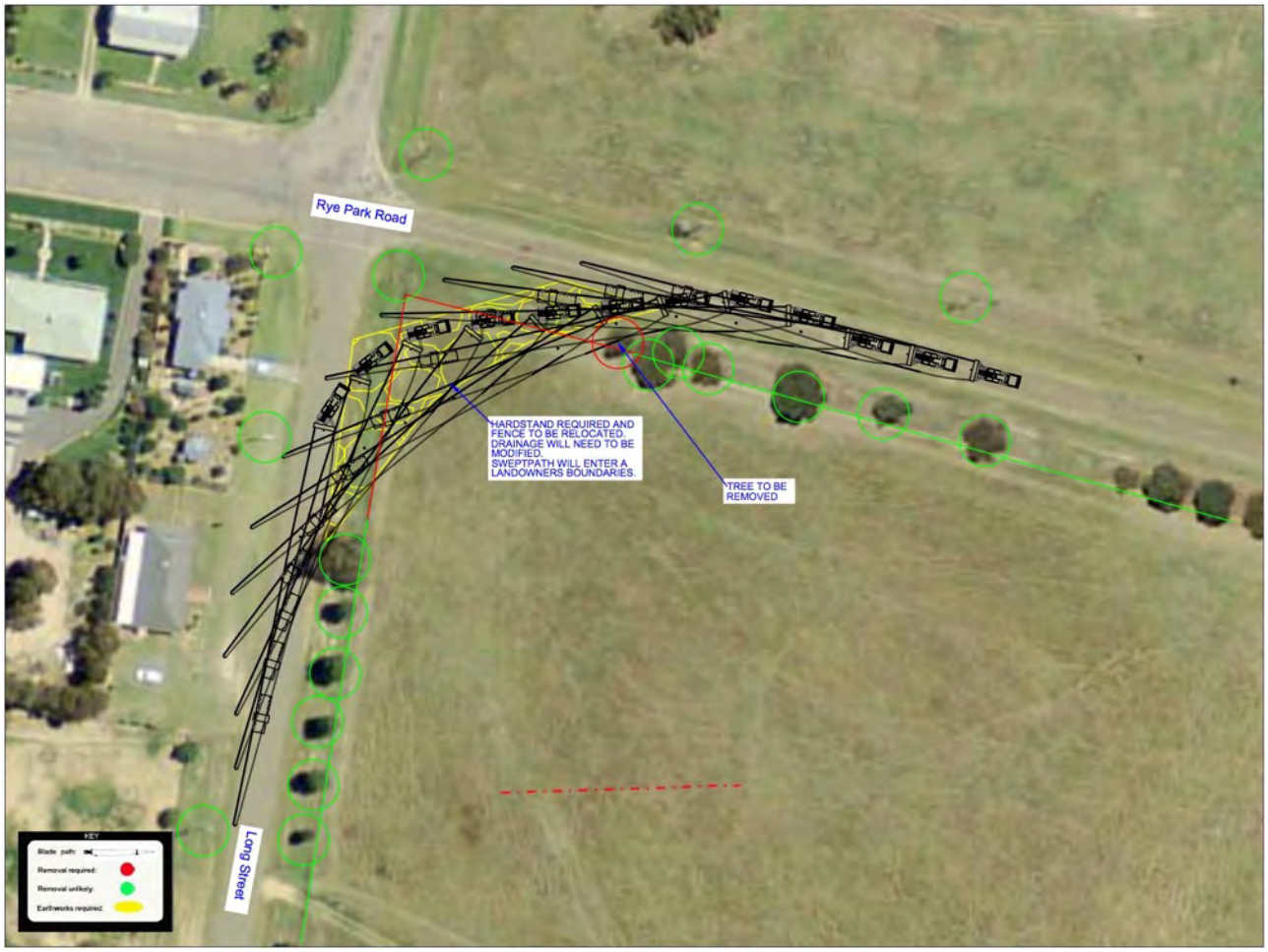


Image 2:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/Ry5s7svgx1BDzRAMA

PROCEDURE: Right-hand turn from Long Street onto Rye Park Road.

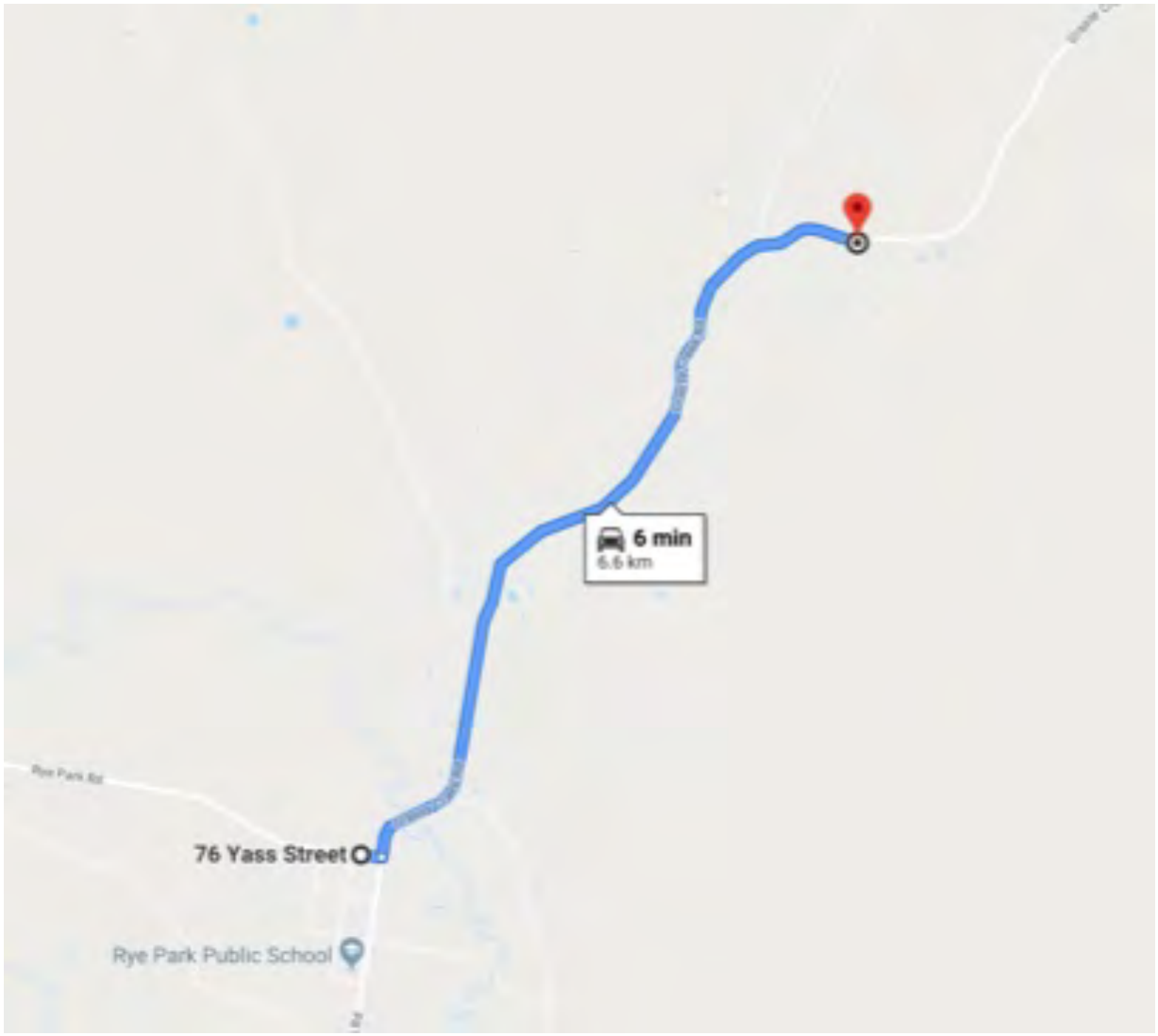
COMMENTS: Access through a landowner's boundary will be required to make this turn. Hardstand is required on the inside of the corner, and a fence relocated within the landowner's boundaries. Additionally, some vegetation needs to be removed.

ROAD MODIFICATIONS: Large amounts of works are required on this section of road.

10.0 Stage 2 Route survey (Rye Park Township to Rye Park North)

DISTANCE: 6.6 kilometres:

This route took us via Rye Park Road, Grassy Creek Road.



GPS LINK: https://goo.gl/maps/NC1AQuTTZPJHDDfk9

KEY	
MODIFICATIONS REQUIRED	
PINCH POINT	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
Route: Rye Park Township to Rye Park Windfarm North					
0.0	Rye park	Rye Park Road onto Grassy Creek Road GPS link: https://goo.gl/maps/LGgWeQKDCERMsHQv7	Length: 30 Metres	Left hand turn	Access through a landowner's boundary will be required to make this turn. Hardstand is required on the landowner's property and some trees and fence will need to be removed.
0.0 to 6.6	Rye Park	Grassy Creek Road GPS link: https://goo.gl/maps/NC1AQuTTZPJHDDfk9	Width: 4.5 metres	Travel directly ahead	Grassy Creek road is generally 4.5 metres of width with no shoulder. The pavement is in fair condition but may show wear with the volume of heavy traffic. Some trees will need to be trimmed and removed on sections of this road. The floodway has an adequate swept path.
5.4	Rye park	Grassy Creek Road into site entrance # 2 https://goo.gl/maps/5LwRX2EKMkNAFYsT8		Left turn	Site entrance to be made suitable for the swept path of the largest loads.
6.6	Rye park	Grassy Creek Road into site entrance # 1 https://goo.gl/maps/B2bjRMNjVvybbfZt6		Right turn	Site entrance to be made suitable for the swept path of the largest loads.

0.0 Km's: Rye Park Road onto Grassy Creek Road at Rye Park

Image 1:

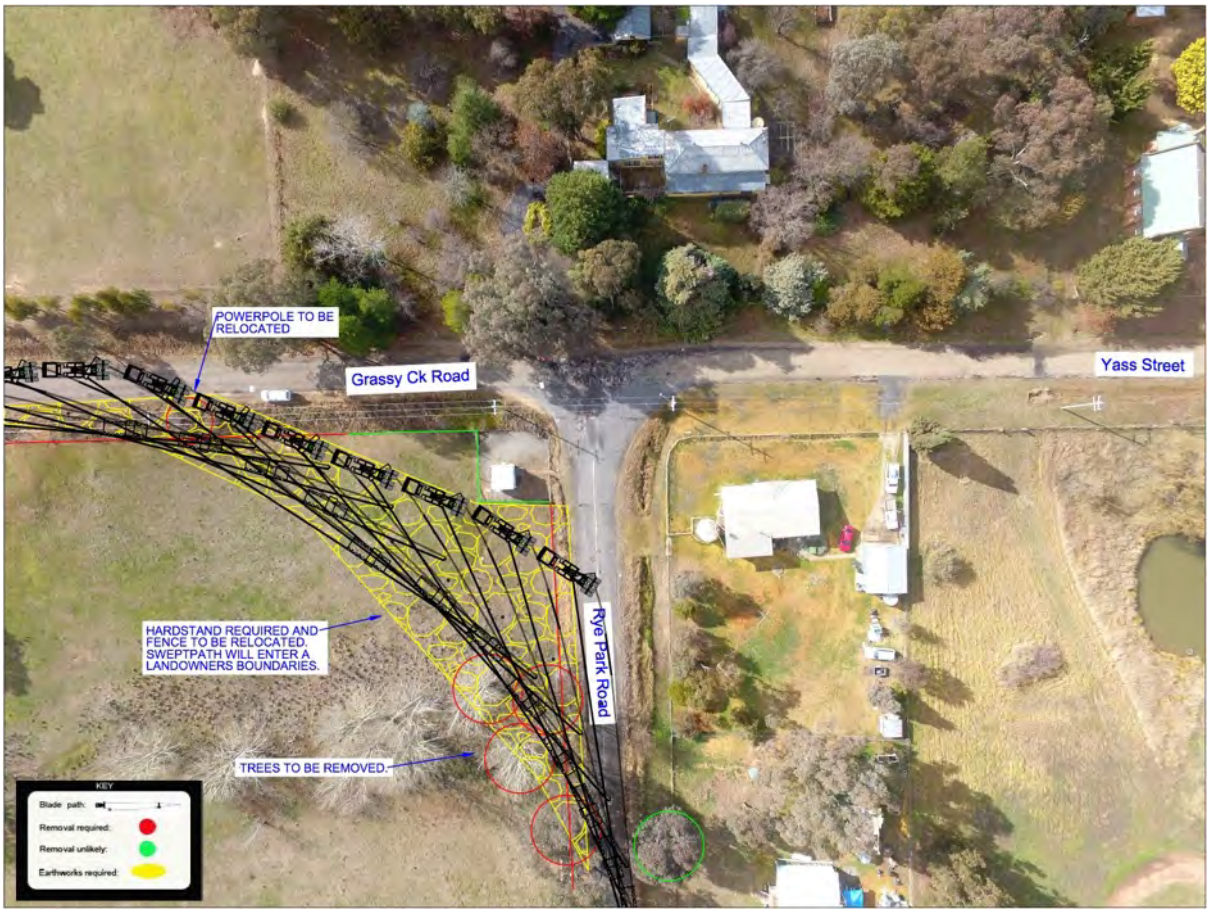


Image 2:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/LGgWeQKDCERMsHQy7

PROCEDURE: Left-hand turn from Rye Park Road onto Grassy Creek Road.

COMMENTS: Access through a landowner's boundary will be required to make this turn. Hardstand is required on the landowner's property and some trees and fence will need to be removed.

ROAD MODIFICATIONS: Large amounts of works are required on this section of road.

0.0 to 6.6 Km's: Grassy Creek Rd.

Image 1:

Image 2:

PROCEDURE: Travel directly ahead on Grassy Creek Road.

COMMENTS: Grassy Creek road is generally 4.5 metres of width with no shoulder. The pavement is in fair condition but may show wear with the volume of heavy traffic. Some trees will need to be trimmed and removed on sections of this road. The floodway has an adequate swept path.

ROAD MODIFICATIONS: Moderate amounts of works are required on this section of road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/Aw2n6KdNtLz

5.4 Km's: Grassy Creek Rd looking north towards site entrance # 2 at Rye Park

Image 1:

PROCEDURE: Loads to turn left off Grassy Creek Road into site access Road.

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

ROAD MODIFICATIONS: Moderate amounts of works are required on this section of road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/8EToBmm8FqL2

6.6 Km's: Grassy Creek Rd looking south towards site entrance # 1 at Rye Park

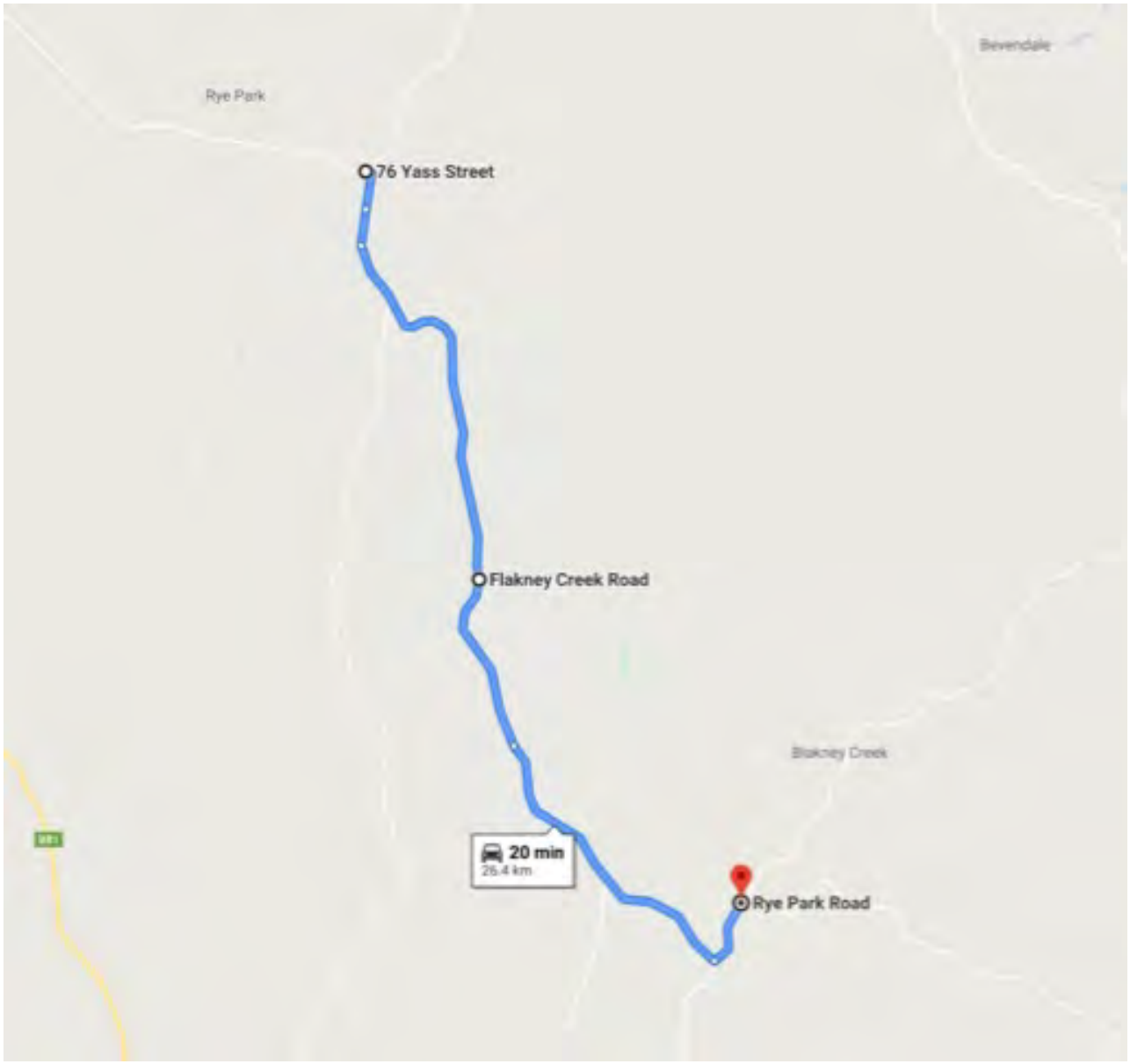
Image 1:

PROCEDURE: Loads to turn right off Grassy Creek Road into site access Road.
COMMENTS: Site entrance to be made suitable for the swept path of the largest loads.
ROAD MODIFICATIONS: Moderate amounts of works are required on this section of road.
GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/8EToBmm8FqL2

11.0 Stage 3 Route survey (Rye Park Township to Rye Park South)

DISTANCE: 26.4 kilometres:

This route took us via Rye Park Road, Yass Street, Gunning Street, Dalton Road, Rye Park Road. (Including a possible site access point off Flackney Creek Road).



GPS LINK: https://goo.gl/maps/xsk8nmSVdquTpEZDA

KEY	
MODIFICATIONS REQUIRED	
PINCH POINT	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
Route: Rye Park Township to Rye Park Windfarm North					
0.0	Rye park	Rye Park Road onto Yass Street Road GPS link: https://goo.gl/maps/LGgWeQKDCERMsHQv7	Length: 30 Metres	Right turn	Access through a landowner's boundary will be required to make this turn. Hardstand is required on the landowner's property and some trees and fence will need to be removed.
0.0 to 26.4	Rye Park	Yass street through to Site entrance #13 https://goo.gl/maps/DV4fpirJ45k6HGvD7	4.5 Metres width clearance	Travel directly ahead	This section of road will need to be checked for swept path and vertical curve of the largest loads. Some sections of this road will require upgrades. Sections of this road have trees that would need to be trimmed/removed.
1.0	Rye Park	Yass Street onto Gunning Road https://goo.gl/maps/LLydmFC4TMxwjSzH7	5.5 Metres width clearance	Travel directly ahead	No problem with this section of road.
2.0	Rye Park	Gunning Road onto Dalton Road https://goo.gl/maps/zC4FNES8z1B1iJYk7	5.5 Metres width clearance	Travel directly ahead	No problems with this section of road.
12.0	Rye Park	Dalton Road onto Flakney Creek Road. (Site entrance #4) GPS link: https://goo.gl/maps/SWaaW7LWhcnekCJc7	30.0 metres clearance	Left turn	This corner and through to site will need to be made suitable for the swept path of the largest loads.
16.7	Rye Park	Dalton Road onto Rye Park Road https://goo.gl/maps/ah3wGy1QP5BrZzoU6	5.5 Metres width clearance	Travel directly ahead	No problems with this section of road.
24.7	Blakney Creek	Rye Park Road intersection of Blakney Creek South Road GPS link: https://goo.gl/maps/CGWNggq3i9ANQbMx8	30.0 metres clearance	Left turn	
26.4	Blakney Creek	Rye Park windfarm (Site entrance # 13) onto Rye Park Road GPS link: https://goo.gl/maps/saww6PjtwotzvKB36	0.0 metres clearance	Left turn	Site to supply adequate access for the swept path of the largest loads.

0.0 Km's: Rye Park Road onto Yass Street at Rye Park

Image 1:

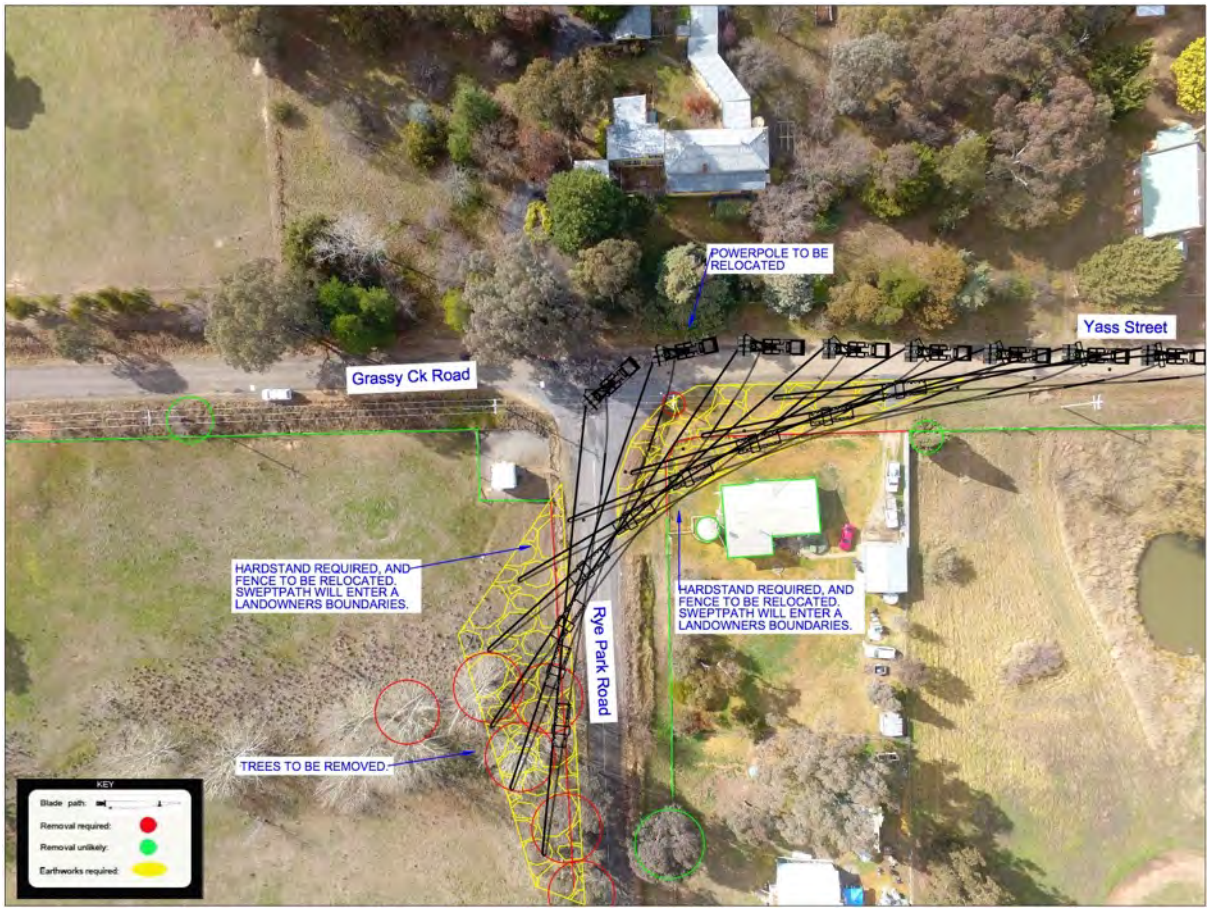


Image 2:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/LGgWeQKDCERMsHQy7

PROCEDURE: Right-hand turn from Rye Park Road onto Yass Street.

COMMENTS: Access through a landowner's boundary will be required to make this turn. Hardstand is required on the landowner's property and some trees and fence will need to be removed.

ROAD MODIFICATIONS: Large amounts of works are required on this section of road.

12.0 Km's: Dalton Road onto Flakney Creek Road at Blakney Creek. (Site entrance # 4).

Image 1: (Option 1)

Image 2:

PROCEDURE: Turn Left from Dalton Road onto Flakney Creek Road.

COMMENTS: This corner and through to site will need to be made suitable for the swept path of the largest loads. This procedure will require hardstand and tree removal.

ROAD MODIFICATIONS: Large amounts of works are required on this section of road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/SWaaW7LWhcnekCJc7

24.7 Km's: Rye Park Road intersection of Blakney Creek South Road at Blakney Creek.

Image 1:

Image 2:

PROCEDURE: Turn left from Rye Park Road onto Rye Park Road.

COMMENTS: The existing turn would need to be relocated and made substantially wider. Large amounts of hardstand are required, and it is likely that some trees and fences will need to be removed. The causeway will also require modifications.

ROAD MODIFICATIONS: Large amounts of works are required on this section of road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/CGWNggq3i9ANQbMx8

26.4 Km's: Rye Park Road into Site entrance #13 at Blakney Creek.

Image 1: (Looking south-west along Rye Park Road from site entrance 13)

PROCEDURE: Right hand turn from rye Park Road into site entrance # 13.

COMMENTS: Site to supply adequate access for the swept path of the largest loads to re-enter the local road network.

ROAD MODIFICATIONS: Large amounts of works are required on this section of road.

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/saww6PjtwotzvKB36

12.0 Conclusion:

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

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

BRIDGES:

- There are a number of bridges on route that will require bridge assessments. The route up to the turnoff of the Hume Highway is likely to be okay.

OVERHEAD STRUCTURES: (5.3 Maximum loaded height)

- There are a large number of overhead structures between Newcastle and Rye Park. The lowest of these structures is the pedestrian bridge over Pennant Hills Road at Normanhurst. There are a number of other structures noted as pinch points in the survey. Each of these pinch points will show the height clearance in each lane.

OVERHEAD UTILITIES:

- This route will need to be checked by an authorised scoping company. It is likely that a route of at least 5.3 metres is required for this project.

OVERHEAD TREES:

- The route up until Boorowa is clear of vegetation. All roads from this point through to site will need to be checked for a clear passage of at least 5.3 metres for overhead branches. Some trimming/removal is likely from this point onwards.

WIDTH:

- The route up until Rye Park is suitable for a width of up to 5.0 metres. From Rye Park through to each site entrance there are sections that will require widening.
- Site entrance #1 through to Site entrance #13 has a number of sections that will need some widening. Rye Park Road from Rye Park and Grassy Creek road are particularly tight in some sections.

FLOODWAYS:

- All floodways on the local roads need to be checked. These floodways should be checked for axle loadings and width as well as the vertical curve of the trailers.

PAVEMENT:

- The route up until Boorowa is of Highway standard. From this point on the pavement varies from 5.0 metres in width with a good surface in some sections to patchy thin asphalt with poor surface in others as well as some gravel roads. There is likely to be some wear during the deliveries on these lesser roads.
- Site access # 11 through to Site access # 13: The pavement changes from good asphalt to gravel in sections of this route. There is likely to be some wear during the deliveries on these lesser roads. All gravel roads will need to be made suitable for all weather travel.

ROADWORKS:

- The project will need to start discussions with government authorities at least 18 months prior to turbine transport to understand if the project would conflict with any upcoming roadworks. Once a TMP has been approved for the transport of the turbines, then the exact movement dates need to be communicated with transport NSW to make all road stakeholders aware of the movements.

NEWCASTLE:

- Several intersections will need modifications to allow the blades a suitable swept path around these corners. This will include relocation of a traffic signal, several signs and a pole. Additionally, some hardstand is required on 2 corners and a median strip will need to be lowered.

SYDNEY:

- The turn from the M1 Motorway onto Pennant Hills Road requires only a small amount of work on the centre median. However, this corner needs to be rechecked on completion of the Northconnex.
- The turn from Pennant Hills Road onto the M2 Motorway will require modifications This will include relocation of a traffic signal, a section of fence removed, and the relocating of a barrier.

YASS:

- Some signs need to be relocated or made removable on the turnoff from the Hume Highway onto Lachlan Valley way.

BOOROWA:

- Several intersections will need to be upgraded to allow a suitable swept path. Two of these corners will travel through a landowner's boundaries.

RYE PARK:

- The route from Site entrance # 1 to Site entrance # 13 was found to be in fair condition with the route needing some widening in some sections. A large amount of works would be required on all intersections and site access points.
- Grassy Creek Road will require some tree pruning/Removal; however the swept path seems to be suitable in it's current form.
- Site entrances off Grassy Creek Road will need to be made suitable for the swept path of the largest loads.

BLACKNEY CREEK:

- Site entrances off Rye Park Road will need to be made suitable for the swept path of the largest loads.

EMPTY RETURN:

- It would be advisable that the project discusses additional return routes for empty travel, which would avoid all of the Northern traffic returning via the Southern Site. We would suggest seeking approval for Cooks Hill Road and Faulder Avenue to be used for empty return travel to Yass.

13.0 References:

Australian Load Restraint Guide
Rex J Andrews P/L Drawings
Rex J Andrews route survey # 248 REV03
Tilt Renewables
Siemens/Gamesa
Google Earth/Maps
Nearmaps
NHVR (OSOM)
NHVAS Maintenance Management (NHVAS21193)
NHVAS Basic Fatigue Management (NHVAS21193)

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

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

Appendix B Port Kembla Route Survey

Vestas Australian Wind Technology P/L

Route Survey – Port Kembla to Rye Park Wind Farm

Varsha Hariharan
0436 921 346
vahah@vestas.com

Date: 28 February 2020
Prepared by ARES TRANSPORT GROUP PTY LTD
ABN: 24 614 163 754

Declaration and Revision Status

Rev	Issued	Creator	Reviewed	Approved by and Date		Revision Type
0	28/02/2020	Ian Wong		Jason Millar		Preliminary issue

Revision: 0
Prepared By: Ian Wong
Name of Organisation: Ares Transport Group Pty Ltd
Date: 28 February 2020
Prepared For: Vestas Australian Wind Technology P/L

Table of Contents

Cover photograph

Courtesy of Drake Trailers © Drake

1 INTRODUCTION

ARES Transport Group is an Australian owned heavy haulage transport company specializing in infrastructure logistics and heavy haulage.

ARES are premier service providers who demonstrate world's best practice in health, safety and risk mitigation. The senior team have been the market leaders in this sector for the past 15 years in each of their respective fields. This extends to award winning equipment, innovation and business know-how.

Our development team, communication systems and project planning brings reliable, safe trouble free results to you ensuring that your project is delivered, safely, on time and on budget every time. As a result, the customer at the end of the day can rest assured that they will receive the same level of service and appreciation through the whole project/contract that they have previously become accustomed to from us.

Through continual innovation, we have raised industry standards with our advanced planning and engineering, clear policies, robust procedures and experienced qualified staff.

ARES are currently bidding on the onshore logistics scope of Vestas wind turbine components for the construction of the Rye Park Wind Farm (RPWF).

This preliminary Route Survey covers the proposed transport route of oversized components from the port of discharge Port Kembla to the wind farm site.

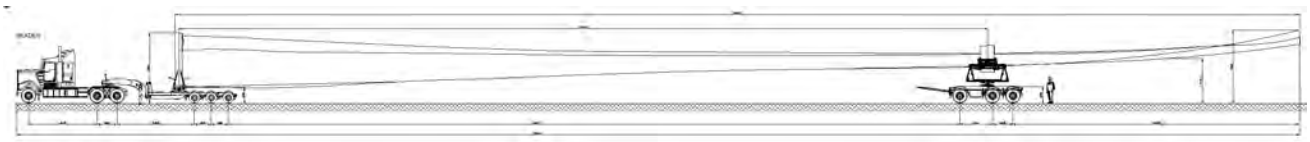
1.1 Methodology

This preliminary Route Survey has been conducted as a mix of physical survey by driving the proposed route, and desktop assessment for sections of the route which have not been driven. ARES intend to perform a full physical survey of the route to validate the desktop assessment results if we are selected for the transport scope for RPWF.

The wind turbine proposed for the wind farm is the Vestas EnVentus V162-5.6MW. Based on dimensional information provided by Vestas, we have based our swept path analyses on the worst-case component, which is the 81.1m-long blade.

Dimension	Measure	SOURCE
Length	81,100mm	Preliminary Weights and Dimensions – Vestas EnVentus V162-5.6MW
Width	4,500mm	
Height	4,000mm	
Weight	28.1 Tons	

Using a dolly and jinker configuration, the overall length of the truck and trailer configuration would be around 91.5m.



2 PROPOSED ROUTES

From the Port there are 2 routes:

1. High loads via North Wollongong.
2. All other loads to travel along the M1 Princes motorway.

The next section outlines the obstacles on the routes in detail and time taken.

2.1 Current Known Restrictions

ARES note the following restrictions along the proposed transport route:

1. NSW Police escorts required on High Risk Moves (over 40mL) and potential limitations for Police escorts on Saturdays
2. Picton Rd roadworks
3. Curfew travel time restrictions from the edge of Wollongong Metro per below table:

Vehicle Dimensions	Wollongong Metro Monday - Friday (not public holidays)	Wollongong Metro Saturdays, Sunday & public holidays	Rural Areas	Major Roads	Freeways
Up to 2.5m wide and/or 22.0m Long	At All times	At All times	At All times	At All times	At All times
Over 2.5m wide and/or 19.0m long	Sunrise - 7:00 am 9.00 am - 4.00 pm 6.00 pm - sunset	Sunrise – Sunset **No Travel** on Public Holiday weekends	Sunrise to Sunset	Sunrise to Sunset	Sunrise to Sunset

2.2 Route 1: Port Kembla to Rye Park Wind Farm (excl. high loads)

This route information is current as at February 2020.

- This route is to be used for all configurations except those over 5.0mH.
- Contact to be made with roadworks site on Picton Road to ensure loads can be accommodated

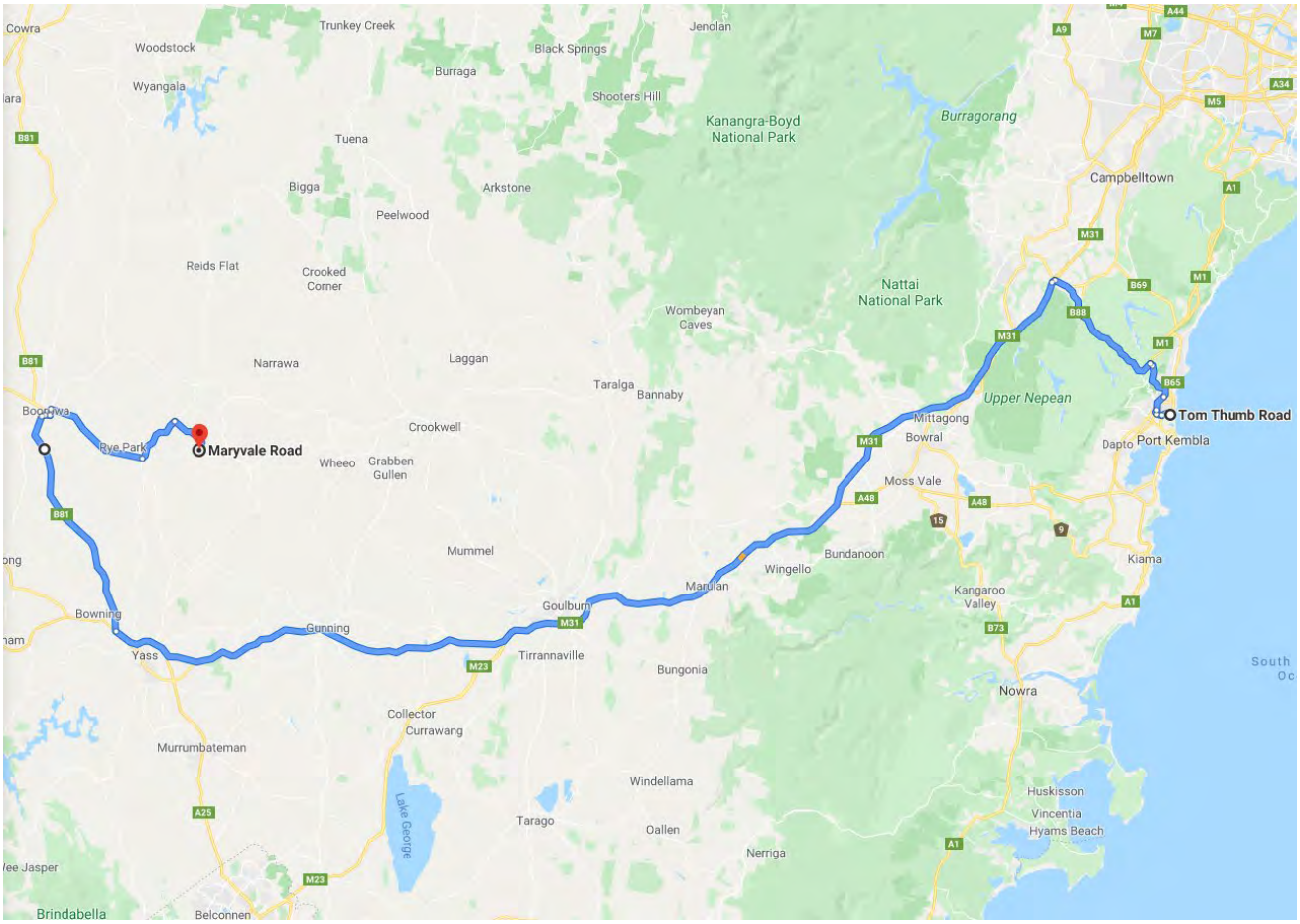
Road Modifications

Several road modifications on the proposed route in the Boorowa vicinity would be required to allow oversized components to traverse – please refer to the following section for details.

Street Furniture

Removal and replacement of any road signs (Keep Left, Give Way, etc.) are easily achieved with the signs being held in place by bolts or wedges. The lead pilot will remove signs with the rear pilot replacing after the load has passed through.

Route: https://goo.gl/maps/TUYvQzWFoxnEyQfy8
Total distance to site: 329 km



Proposed Route 1 – Port Kembla to Rye Park

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
LHT	Exit Tom Thumb Road	0.0	**intersection**				●	Light and trees to be removed
RHT	Masters Road	1.2	**intersection**				●	Slow travel
STR	M1	4.6	**Bridge**	5.05	5.18	5.31	●	Slow travel
STR	M1	6.7	**Bridge**	5.43	5.35	5.28	●	Slow travel
LHT	Picton Road	13.8	**intersection**				●	Oncoming traffic to be stopped by police
STR	Picton Road	31.0	**Road works**				●	Take caution- slow travel
LHT	Hume Highway	40.9	**intersection**				●	Steering required. Light pole to be moved
STR	Hume Highway	126.2	**HVIS**				●	slow travel
RHT	Lachlan Valley Way	244.4	**intersection**				●	Take Caution
RHT	Trucking Yard Rd	287.5	**intersection**				●	Take Caution
LHT	Long Rd	289.2	**Intersection**				●	Trees and fences obstruct turn. Requires modification of corner.
RHT	Rye Park Rd	290.3	**Intersection**				●	Sharp corner, requires modification.
LHT	Grassy Creek Rd	309.7	**intersection**				●	Power pole and Telstra box obstruct turn. Requires modification of corner.
RHT	Maryvale Rd	319.5	**Roundabout**				●	Take Caution

LEGEND

●	Take Caution
●	Medium Maneuver
●	Difficult Maneuver

Notes:

- The route from Port Kembla to Goulburn was physically surveyed by ARES in 2019 and all pinch points are well known
- The route from Goulburn to Boorowa via Yass has not been physically surveyed recently but is very familiar to ARES. The Hume Highway (Goulburn to Yass) and Lachlan Valley Way (Yass to Boorowa) are well established oversize routes and are being used for other wind farm projects in 2020

2.2.1 Tom Thumb Road Exit

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
LHT	Exit Tom Thumb Road	0.0	**intersection**				●	Light and trees to be removed

INTERSECTION OF:
TOM THUM RD &
SPRINGHILL RD

OBSTACLES:
- POWERPOLES / LIGHTS
- TREES ON OUTSIDE EDGE

SUGGESTION
LIHT & TREES TO BE REMOVED BY NSW PORTS

AFFECTED LAND OWNERS: NIL

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK SWEPT PATHS
DRAWING NAME	RYE PARK SWEPT PATHS.DWG
SIZE	A3
SCALE	NTS
SHEET No	
REV	A3

2.2.2 Springhill Rd / Masters Rd RHT

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
RHT	Masters Road	1.2	**intersection**				●	Slow travel

INTERSECTION OF:
SPRINGHILL RD &
MASTERS RD

OBSTACLES:
- TRAFFIC LIGHTS
- MEDIAN STRIP

SUGGESTION
TRUCK WILL TRAVERSE THE MEDIAN STRIP. HARD STAND WILL BE REQUIRED ON THIS MEDIAN STRIP.

AFFECTED LAND OWNERS: Nil

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

2.2.3 University Ave Bridge

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
STR	M1	4.6	**Bridge**	5.05	5.18	5.31	●	Slow travel

2.2.4 New Mt Pleasant Rd Bridge

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
STR	M1	6.7	**Bridge**	5.43	5.35	5.28	●	Slow travel

2.2.5 Mt Ousley Rd / Picton Rd LHT

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
LHT	Picton Road	13.8	**intersection**				●	Oncoming traffic to be stopped by police

INTERSECTION OF:
MOUNT OUSLEY RD &
PICTON RD

OBSTACLES:
ONCOMING SOUTHBOUND TRAFFIC

SUGGESTION
POLICE WILL NEED TO STOP SOUTHBOUND TRAFFIC AS THEY DO ON ALL BLADES ALREADY

AFFECTED LAND OWNERS: Nil

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

2.2.6 Picton Rd / Hume Motorway LHT

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
LHT	Hume Highway	40.9	**intersection**				●	Steering required. Light pole to be moved

INTERSECTION OF:
PICTON RD &
HUME HIGHWAY RD

OBSTACLES:
LIGHT POLE ON INSIDE EDGE

SUGGESTION
MOVE LIGHTPOLE INWARDS 3 METERES

AFFECTED LAND OWNERS: NIL

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

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TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK SWEPT PATHS
DRAWING NAME	RYE PARK SWEPT PATHS.DWG

SIZE A3 | SCALE NTS | SHEET No | REV A3

2.2.7 Hume Hwy / Lachlan Valley Way RHT

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
RHT	Lachlan Valley Way	244.4	**intersection**				●	Take Caution

INTERSECTION OF:
HUME HIGHWAY &
LAUCHLAN VALLEY WAY

OBSTACLES:
NIL

SUGGESTION
NIL

AFFECTED LAND OWNERS: NIL

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

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ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK SWEPT PATHS
DRAWING NAME	RYE PARK SWEPT PATHS.DWG

SIZE A3 | SCALE NTS | SHEET No | REV A3

2.2.8 Lachlan Valley Way / Trucking Yard Rd RHT

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
RHT	Trucking Yard Rd	287.5	**intersection**				●	Take Caution

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

2.2.9 Dillon Rd / Long Rd LHT

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
LHT	Long Rd	289.2	**Intersection**				●	Trees and fences obstruct turn. Requires modification of corner.

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

Plot date: Tuesday, 29 October 2019 8:21:30 PM

2.2.10 Long Rd / Rye Park Rd RHT

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
RHT	Rye Park Rd	290.3	**Intersection**				●	Sharp corner, requires modification.

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

Plot date: Tuesday, 29 October 2019 8:21:42 PM

2.2.11 Rye Park Rd / Grassy Creek Rd LHT

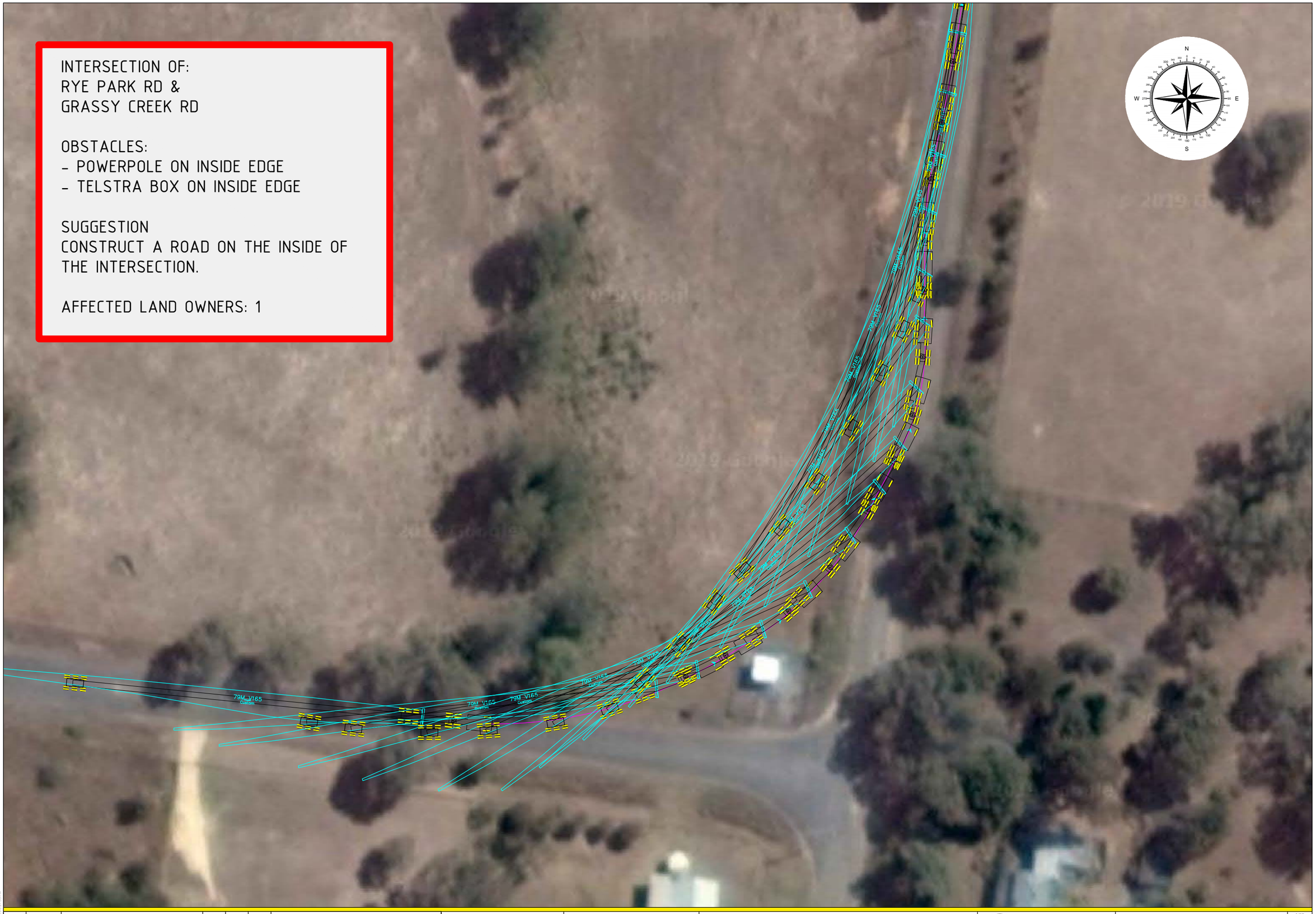
ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
LHT	Grassy Creek Rd	309.7	**intersection**				●	Power pole and Telstra box obstruct turn. Requires modification of corner.

INTERSECTION OF:
RYE PARK RD &
GRASSY CREEK RD

OBSTACLES:
- POWERPOLE ON INSIDE EDGE
- TELSTRA BOX ON INSIDE EDGE

SUGGESTION
CONSTRUCT A ROAD ON THE INSIDE OF THE INTERSECTION.

AFFECTED LAND OWNERS: 1



REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

Plot date: Tuesday, 30 October 2018 9:53:53 PM

2.3 Route 2: Port Kembla to Rye Park Wind Farm (high load detour)

This route information is current as at February 2020.

- This route is to be used for all configurations **exceeding 5.0mH**
- The maximum height limitation (excluding high wire) is 5.3 meters.
- Contact to be made with roadworks site on Picton Road to ensure loads can be accommodated

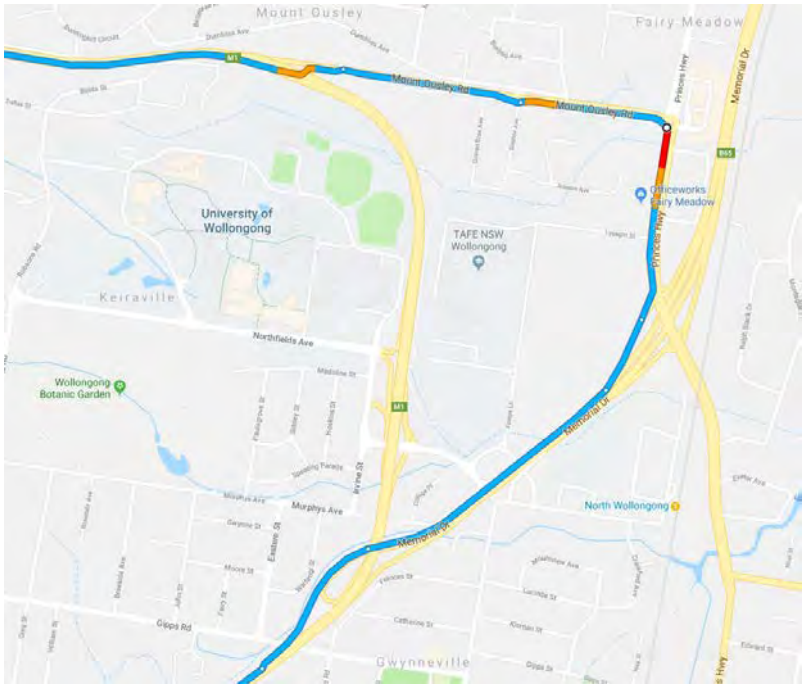
Road Modifications

Several road modifications on the proposed route in the Boorowa vicinity would be required to allow oversized components to traverse – please refer to the following table for details.

Street Furniture

Removal and replacement of any road signs (Keep Left, Give Way, etc.) are easily achieved with the signs being held in place by bolts or wedges. The lead pilot will remove signs with the rear pilot replacing after the load has passed through.

Route: https://goo.gl/maps/GdaTJm5LQvvoEGe7A
Total distance to site: 330 km



North Wollongong diversion for >5.0m high configurations

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
LHT	Exit Tom Thumb Road	0.0	**intersection**				●	Light and trees to be removed
RHT	Masters Road	1.2	**intersection**				●	Slow travel
STR	Memorial drive	7.5	**Bridge**	5.21	5.40	5.61	●	Take caution
LHT	Princes Highway	7.9	**intersection**				●	Slow travel
LHT	Mt Ousley Road	8.5	**Roundabout**				●	Take caution- slow travel
STR	Mt Ousley Road	8.9	**Roundabout**				●	Slow travel
RHT	Mt Ousley Road	9.3	**intersection**				●	slow travel
LHT	Picton Road	13.8	**intersection**				●	Oncoming traffic to be stopped by police
STR	Picton Road	31.0	**Road works**				●	Take caution- slow travel
LHT	Hume Highway	40.9	**intersection**				●	Steering required. Light pole to be moved

STR	Hume Highway	126.2	**HVIS**				●	slow travel
RHT	Lachlan Valley Way	244.4	**intersection**				●	Take Caution
RHT	Trucking Yard Rd	287.5	**intersection**				●	Take Caution
LHT	Long St	289.2	**Intersection**				●	Trees and fences obstruct turn. Requires modification of corner.
RHT	Rye Park Rd	290.3	**Intersection**				●	Sharp corner, requires modification.
LHT	Grassy Creek Rd	309.7	**intersection**				●	Power pole and Telstra box obstruct turn. Requires modification of corner.
RHT	Maryvale Rd	319.5	**Roundabout**				●	Take Caution

LEGEND

●	Take Caution
●	Medium Maneuver
●	Difficult Maneuver

2.3.1 University Ave Bridge (Memorial Dr)

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
STR	Memorial drive	7.5	**Bridge**	5.21	5.40	5.61	●	Take caution

2.3.2 Memorial Dr / Princes Hwy LHT

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
LHT	Princes Highway	7.9	**intersection**				●	Slow travel

2.3.3 Princes Hwy / Mt Ousley Rd LHT

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
LHT	Mt Ousley Road	8.5	**Roundabout**				●	Take caution- slow travel

2.3.4 Mt Ousley Rd / Gaynor Ave Roundabout

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
STR	Mt Ousley Road	8.9	**Roundabout**				●	Slow travel

2.3.5 Mt Ousley Rd / Princes Motorway RHT

ACTION	LOCATION	KM	OBSTRUCTION	HEIGHT			Rating	COMMENT
				L	M	R		
RHT	Mt Ousley Road	9.3	**intersection**				●	slow travel

2.4 Site Entrances

As part of the route assessment, ARES also conducted swept path analyses on the four proposed site entrances at the wind farm:

- Cockerill
- Cotter
- Howard
- Ross

These are attached in the following pages.

SITE ENTRANCE
NAMED: COCKERILL SUPER

OBSTACLES:
- TREES
- ROAD WILL NEED TO BE BUILT

SUGGESTION
CONSTRUCT A ROAD THAT CUTS DIRECTLY THROUGH AND REMOVE THE DOG LEG IN THE CORNER.

AFFECTED LAND OWNERS: 1

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK SWEPT PATHS
DRAWING NAME	RYE PARK SWEPT PATHS.DWG
SIZE	A3
SCALE	NTS
SHEET No	
REV	A3

SITE ENTRANCE
NAMED: COTTER

OBSTACLES:
- TREES
- ROAD WILL NEED TO BE BUILT

SUGGESTION
CONSTRUCT A ROAD ON THE INSIDE OF THE INTERSECTION.

AFFECTED LAND OWNERS: 1

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

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ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK SWEPT PATHS
DRAWING NAME	RYE PARK SWEPT PATHS.DWG

SIZE A3
SCALE NTS
SHEET No
REV A3

SITE ENTRANCE
NAMED: HOWARD

OBSTACLES:
- TREES
- ROAD WILL NEED TO BE BUILT

SUGGESTION
NEW ROAD WILL NEED TO BE CONTRUCTED

AFFECTED LAND OWNERS: 1

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

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ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK SWEPT PATHS
DRAWING NAME	RYE PARK SWEPT PATHS.DWG
SIZE	A3
SCALE	NTS
SHEET No	
REV	A3

Plot date: Friday, 26 February 2016 8:47:13 AM

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

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ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

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DRAWN BY:
DRAWN DATE:
CHECKED BY:

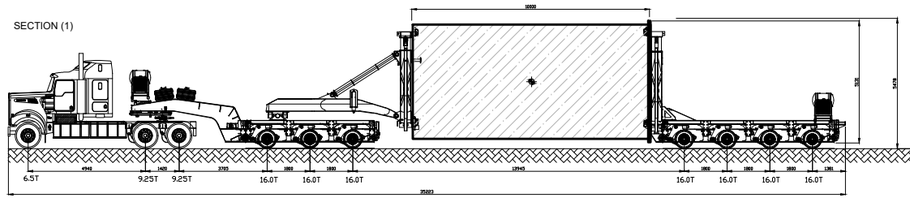
CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

Plot date: Friday, 28 February 2020 8:57:26 AM

Head Office

Ares Transport Group Pty LTD
Suite 1.05, 480 St Kilda Rd
Melbourne, VIC 3004 Australia
T 1300 243 289
F (03) 8560 7020
www.aresgroup.com.au

SECTION (1)



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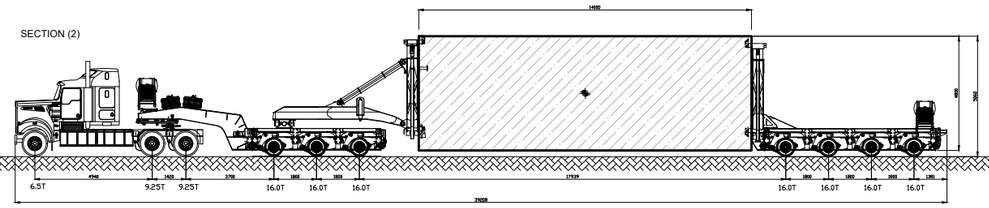

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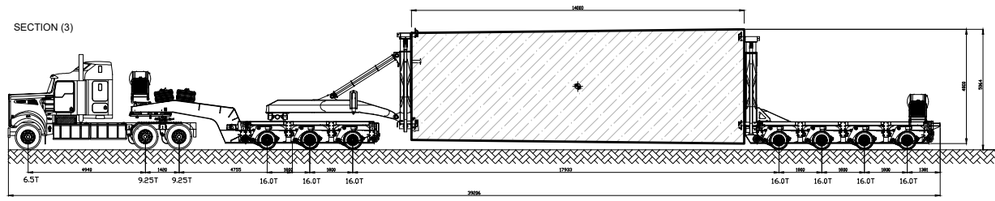

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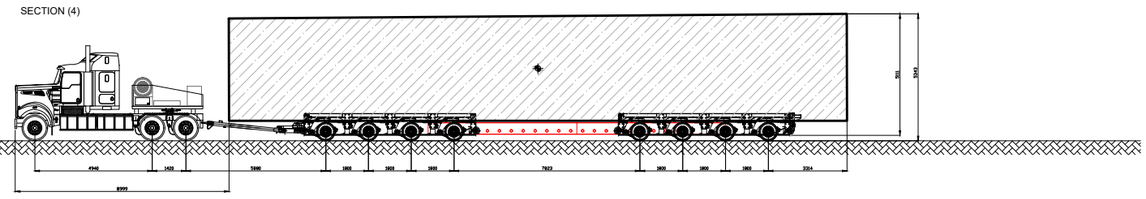

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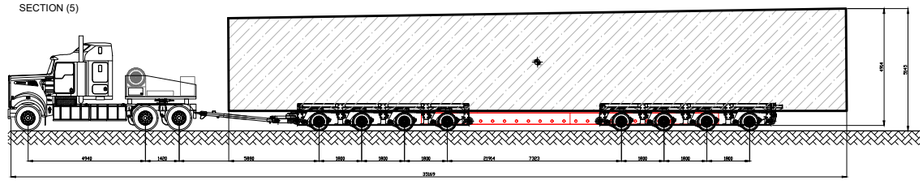

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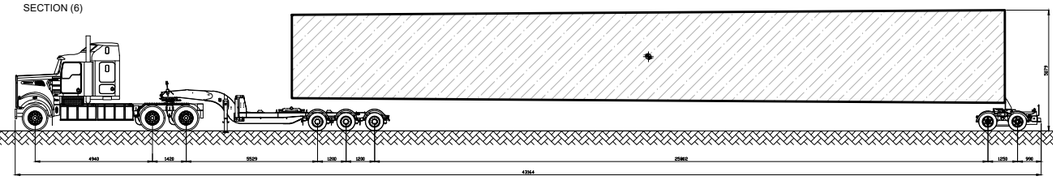

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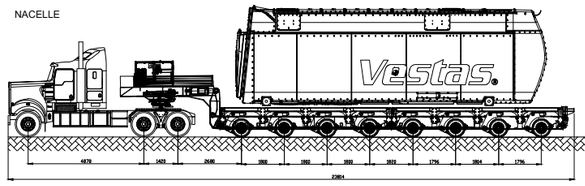

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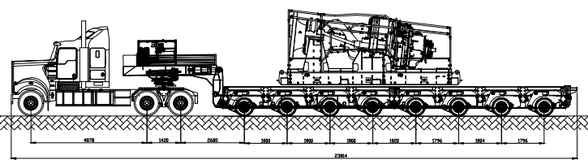

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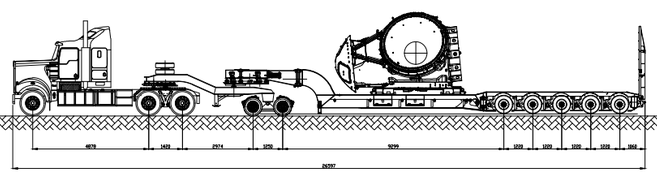
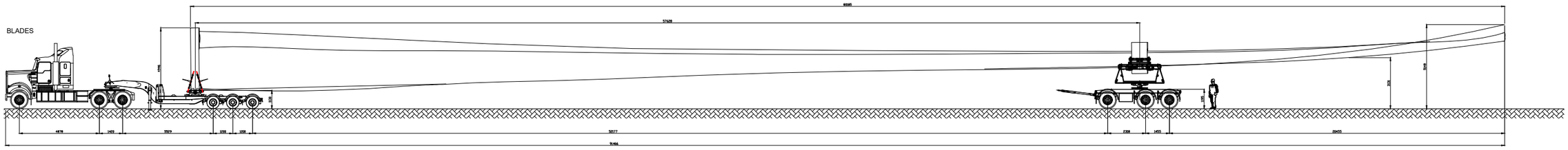
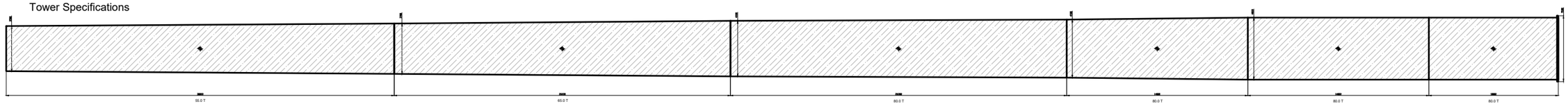


BLADES



Tower Specifications



Plot date: Friday, 28 February 2020 12:13:46 AM

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	14/Jul/17	INITIAL DRAWING	JM			

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ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

DRAWN BY:

DRAWN DATE:

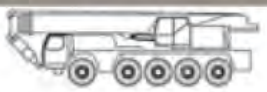
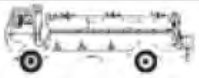
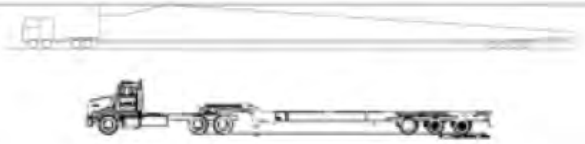
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK
DRAWING NAME	VES_RYEPARK_.R1.DWG
SIZE	A3
SCALE	NTS
SHEET No	
REV	A3

Appendix C Construction Traffic Assumptions in Previous TIA

Assumptions from Traffic and Transport Assessment (Epuron, 2016)

Total transport task and typical vehicles

Vehicle	Estimated trips*	Typical Vehicle
Mobile crane	16	
20t Tanker	6,948	
Tanker (28t)	1,620	
Heavy Rigid Vehicle	520	
Six Axle Articulated	3,736	
32t truck and dog	15,270	
Low Loader	38	
Extendable Trailer / Dolly (various sizes)	1,962	
Total	**30,110**	

Note: A trip is defined as a vehicle movement in a single direction, either to the site or from the site.

External project construction traffic generation

Item		Loads	Typical Vehicle	Total Trips	Assumptions
Access Track Construction					
Delivery of Plant		18	Low Loader	36	Nominal
Road Base		3,350	32t truck and dog	6,700	107,250t for 25km of road/access track + 10%
Stabiliser		25	32t truck and dog	50	Allowance - one load per km
Geofabric		25	Six Axle Articulated	50	Allowance - one load per km
Fuel		90	20t Tanker	180	Nominal Allowance
Foundation Preparation and Turbine Construction					
Turbine Parts	Tower sections	436	Extendable Trailer	872	Four sections per turbine
Nacelles (Generators)		109	Extendable Trailer	218	One per turbine
Blades		327	Extendable Trailer	654	Three per turbine
Hubs		109	Extendable Trailer	218	One per turbine
Cables/controllers		109	Six Axle Articulated	218	One load per turbine
Tools, misc goods for erection		109	Six Axle Articulated	218	One load per turbine
Plant and Equipment	Delivery of plant for civil work	80	Six Axle Articulated	160	Allowance of 20 items of plant per work face
Cranes - Crawler		40	Six Axle Articulated	80	Four work faces, each with one crane - 10 loads per crawler crane
Cranes - Mobile		8	Mobile crane	16	Four work faces, each with two mobile cranes
Equipment (Generators, lighting etc)		40	Six Axle Articulated	80	Allowance of 10 loads of equipment per work face
Fuel		104	20t Tanker	208	One truck fill per week
Site and Foundations	Slab	-	Concrete Truck	-	Sourced from batching plant
Walls		20	Six Axle Articulated	40	To be confirmed
Yard		20	Six Axle Articulated	40	To be confirmed
Fencing		4	Six Axle Articulated	8	Four work faces, each with one load of fencing
Concrete		-	Concrete Truck	-	Sourced internally from batching plant
Reinforcing Steel		450	Six Axle Articulated	900	5% of concrete; 181,000t concrete = 9,050t steel; 20t per truck
Batching Plant	Delivery of batching plant	9	Six Axle Articulated	18	Estimated from typical modular plant
Cement		810	Cement Tanker (28t)	1,620	22,700t (181,000 tonnes of concrete)
Sand and Aggregate		4,260	32t truck and dog	8,520	135,750t (181,000 tonnes of concrete)
Water		680	20t Tanker	1,360	13,600t (60% of cement mass)
Sub Station Transformer		1	Low Loader	2	
Switch Grid		20	Six Axle Articulated	40	Estimate to be confirmed
Fencing		10	Six Axle Articulated	20	
Power Transmission	Transmission Cables	50	Six Axle Articulated	100	10km, nominal 10 lines, 3km rolls, 2 rolls per vehicle
Transmission Pylons		500	Six Axle Articulated	1,000	To be confirmed - nominal 10 loads per pylon, pylons spaced at 200m
Support	Delivery of site offices	164	Six Axle Articulated	328	nominal 1.5 loads per turbine, assuming support office serves several turbines
Deliveries		130	Heavy Rigid Vehicle	260	One load every second week day, 24 month duration
Waste Disposal		130	Heavy Rigid Vehicle	260	One load every second week day, 24 month duration
Water		2,600	20t Tanker	5,200	10 loads per day for duration, road construction, dust suppression, concrete
Site Rehabilitation					
Delivery of plant for civil work		-	Low Loader	-	Re-used from construction
Equipment		109	Six Axle Articulated	218	One load per turbine
Seed/Plants		109	Six Axle Articulated	218	One load per turbine
Total		**15,055**		**30,110**	

Appendix D Preliminary Road Upgrade Investigation

RYE PARK WINDFARM

Preliminary Road Upgrade Investigation

Version 4, 3 April 2020

Rye Park Windfarm

Preliminary Road Upgrade Investigation

Client: Tilt Renewables Pty Ltd

Prepared by:

Genium Civil Engineering Pty Ltd
10 Crago Street
Yass NSW 2582

ABN: 36 169 355 122

Contact: Simon Cassidy
m: 0418 484 138
e: simon.cassidy@genium.com.au

Table of Contents

1. Introduction

1.1 Background

The Rye Park Wind Farm is an approved $700 million development north of Yass and east of Boorowa near the village of Rye Park. The project area extends into the three Local Government Areas (LGA's) of Hilltops, Upper Lachlan (ULSC) and Yass Valley (YVC).

The Rye Park Wind Farm received development consent in May 2017 and since this time there have been advancements in wind turbine technology and the proponents are intending to submit an application to modify the current development consent to incorporate the use of the latest, most efficient wind turbines on the project.

The current consent contains a number of options with regard to access routes for the site. In order to provide certainty and allow more detailed environmental assessment to be undertaken, it is intended to identify and commit to a preferred route/s as part of the proposed modification application.

In order to narrow down options for road access and obtain further agreement with partner Council's, a preliminary road investigation is required to assess the various access options and develop high level cost estimates which will assist decision making processes.

1.2 Scope and Objectives

The scope of the project is to undertake visual inspections of each of the proposed access routes to:

- Identify likely upgrade requirements along each road section;
- Identify bridges and major culverts which may require upgrade;
- Locate obvious areas where road upgrades may lead to works within private property which would require land acquisition;
- Identify approximate areas of impact on vegetation as a result of any identified upgrade work;
- Determine high level cost estimates for identified upgrade works.

The objective of the above scope of works is to provide sufficient high level information on each of the various access routes to enable discussion and consideration of the most appropriate route/s for the project moving forward. This will allow adoption of a preferred route/s and enable completion of detailed environmental assessment, and engineering design such that early agreement can be reached with the partner Council's.

1.3 Route Options

A project locality plan showing proposed wind turbine locations is included as **Attachment A**. A plan showing the current approved access route options which includes the project site boundary, access route options, and LGA boundaries has been included as **Attachment B**.

For the purposes of this assessment the access routes have been broken into six separate road sections as follows:

Road Section No.	Description	Approx. Length
1	Jerrawa Rd/Coolalie Rd/Bushs Rd Roads from Hume Highway to southern end of site	13.5km
2	Rye Park/Dalton Rd from site access 12, to site access 13	11km
3	Rye Park/Dalton Rd from the Boorowa-Rye Park Road intersection to site access 12	14.7km
4	Grassy Creek Rd from Boorowa-Rye Park Rd to site access 2	5.3km
5	Grassy Creek Rd from site access 2 to site access 10	1.2km
6	Trucking Yard Road /Long Street/Boorowa-Rye Park Rd from Lachlan Valley Way to Yass Street in Rye Park	22km

Table 1 – Sections of Road Assessed

The following map shows the location of each of the six road sections:

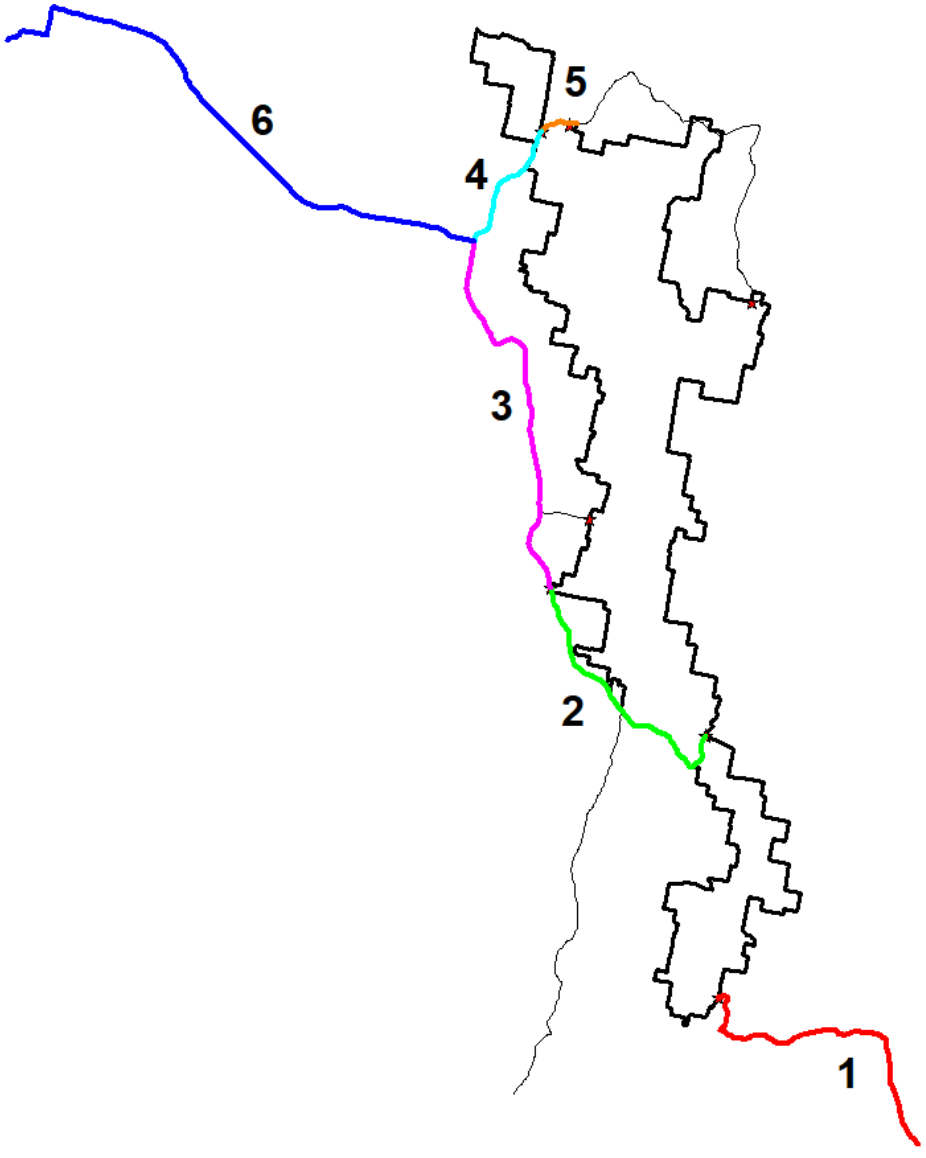


Figure 1 – Sections of Road Assessed

2. Existing Road Conditions

2.1 Jerrawa Road

Jerrawa Road runs between the Hume Highway and the village of Jerrawa and is 4.1km long. The road is sealed and is generally 6.0m wide with some sections up to 6.5m. The road is generally in satisfactory condition with some sections showing signs of age with potholes and minor pavement defects present.

The road pavement is likely to have been constructed of local materials and would be unlikely to have sufficient pavement strength or to cater for large numbers of heavy vehicles. In addition the existing narrow road width would not be suitable for use by heavy vehicles.

Upper Lachlan Council has indicated that all roads proposed for use as access roads for the wind farm, would need to be brought up to current Austroads standards including widening and pavement strengthening.

The road reserve is heavily vegetated and contains Box Gum Woodland which is identified as a Threatened Ecological Community.

2.2 Coolalie Road

Coolalie Road runs from Jerrawa, west to Yass with the section between Jerrawa and Bushs Road (6.6km) proposed for use as an access route for the wind farm. The first 880m of the road is sealed but is very narrow at 5.0 – 6.0m wide. The remainder of the road is unsealed and is generally 6.0 – 6.5m within ULSC and 7.0 – 8.0m wide on the section within YVC.

The alignment would generally meet an 80km/h horizontal design speed apart from two 90 degree bends located approximately 2km west of Jerrawa. This section of road is likely to need realignment to meet Council requirements and also to allow for use by over dimension vehicles.

The current vertical alignment of the road is substandard and significant earthworks would be expected to enable the road to be upgraded to the required standards.

The road reserve has significant amounts of native vegetation and earthworks associated with widening and vertical alignment improvements would impact on this vegetation.

2.3 Bushs Road/Days Road

Bushs Road and Days Road are very low standard unsealed roads that currently provide access to a handful of farms and residences. Both roads are approximately 3.0 – 4.0m wide and would need significant works to upgrade them to meet Council standards.

There is an existing railway crossing at the intersection of Bushs Road/Days Road which is also likely to require upgrading to enable use by large numbers of heavy vehicles and/or over dimension vehicles.

2.4 Rye Park-Dalton Road

Rye Park-Dalton Road as the name suggests, runs from Rye Park, south to the intersection with Blakney Creek South Road, and then heads predominantly east to the village of Dalton.

The sections proposed for use as part of the wind farm project include the 25.7km from the village of Rye Park to proposed site access 13 located approximately 1.5km north of Blakney Creek South Road. This section traverses both Hilltops and Upper Lachlan Council areas.

The portion of the road within the Hilltops Council area is all sealed and generally has a width of 8.0 – 8.2m. The portion in the Upper Lachlan Council area is predominantly unsealed with widths varying from 6.0 – 8m. Parts of the unsealed sections will need significant widening and earthworks to bring them up to the required standard.

There are numerous bridges, major culverts and causeways along the length of the road that may require upgrading or widening to cater for the proposed heavy vehicle usage.

The road reserve is well vegetated with large sections of the road being identified to contain the Threatened Ecological Community, Bow Gum Woodland. There are likely to be impacts to this community as a result of upgrade works on this section of the road.

2.5 Grassy Creek Road

Grassy Creek Road runs from the village of Rye Park, north toward the village of Rugby. The road is sealed but is quite narrow with the existing seal being 5.4 – 5.6m wide. The alignment of the road is meandering and there are numerous curves that would likely need realignment to meet design requirements.

The road reserve is well vegetated with large sections of the road being identified to contain the Threatened Ecological Community, Bow Gum Woodland. There are likely to be impacts to this community as a result of upgrade works on this section of the road.

2.6 Boorowa-Rye Park Road

Boorowa-Rye Park Road links Boorowa and Rye Park and the length proposed to be used by the wind farm is 18.9km long. The road is sealed for its entire length and is generally of a suitable standard to allow use by heavy vehicles on the project. There are isolated sections which will require widening and or pavement strengthening but this would involve minimal earthworks or disturbance.

There are numerous bridges and major culverts along this section of road which may require upgrading and/or widening to meet Council requirements.

It is not expected that there will be any significant impact on vegetation as a result of any upgrades to this road.

2.7 Trucking Yard Rd/Long Street

Trucking Yard Road and Long Street are urban streets within Boorowa. They are generally in reasonable condition but are quite narrow with some sections between 5.3 – 6.0m wide. It is likely that some sections will need widening and/or pavement strengthening to allow their use by large numbers of heavy vehicles.

3. Road Standards

3.1 Council Requirements

Meetings were held with relevant Council officers from Hilltops Council (20 September 2019) and Upper Lachlan Shire Council (1 November 2019) to confirm their requirements for road upgrades and identify any other expectation that would need consideration. A meeting was not held with Yass Valley Council due to the very small sections of road within their jurisdiction. It has been assumed that YVC requirements are as per previous discussions and the requirements of the development consent. A summary of upgrade requirements is below:

Hilltops Council

- Hilltops Council are happy to stick to the agreed standard contained in the Development Consent and EIS as follows:
  - Unsealed roads to be sealed: 200 mm road base topped with double spray seal (14/7 double/double). 7.0 m seal and 8.5 m formation width.
  - Unsealed Roads: Construction width minimum 6 metres wide, maximum 8 metres wide. Pavement minimum thickness 100 mm on existing sheeted road.
- 80km/h design speed is acceptable. Higher design speeds are likely to be unachievable.

- Where possible roads to be designed to follow existing road alignments to minimise impacts on vegetation and possible land acquisition. Some minor realignment may be required in isolated locations and at intersections;
- Council are willing to help with land acquisition issues surrounding road reserves if required;
- Council will require a dilapidation assessment, prefer visual assessment, report and video;
- Tilt Renewables will undertake an updated Traffic Impact Assessment when final route is decided on;
- Council will supply a copy of their Endangered Flora and Fauna Register;
- Council are happy to have a workshop with Tilt and OEH regarding road design and vegetation clearing if required;
- As routes are refined and design work progresses, Tilt Renewables will need to confirm size/mass of heavy vehicle loads and assess the capacity of existing bridges as necessary. Options such as strengthening or construction of temporary bypass tracks/crossings may be considered if current capacity is unsuitable.

Yass Valley Council

- Road standards as per the agreed standard contained in the Development Consent and EIS as follows:
  - Unsealed roads to be sealed: 200 mm road base topped with double spray seal (14/7 double/double). 7.0 m seal and 8.5 m formation width.
  - Unsealed Roads: Construction width minimum 6 metres wide, maximum 8 metres wide. Pavement minimum thickness 100 mm on existing sheeted road.
- 80km/h design speed in accordance with YVC Road Standards policy.

Upper Lachlan Shire Council

- Any roads to be upgraded will need to be upgraded to a sealed standard;
- Roads to be designed in accordance with Austroads standards. No specific design speed specified and will be determined as part of design process. Some flexibility will be allowed on a case by case basis to design the road generally along existing alignments and to minimise vegetation removal;
- Road widths required for Regional Roads (Rye Park-Dalton Road) is a 9m formation with 8m seal. Widths of Local Roads to be agreed as part of design process.
- Pavement construction works to utilise DGB20 road base or equivalent. Some potential for use of local gravel pits or alternate equivalent pavement designs (eg. stabilisation) where this can be justified;
- Sight distance to be addressed at all intersections;
- Cadastral survey of all road reserve boundaries is required to confirm that the road is within the existing road reserve;
- Geotechnical investigation is required to inform pavement design. Pavement designed in accordance with Austroads standard for 25 year design life;
- Council fees apply for review of designs. Approval for works to be via a Works Authorisation Deed (WAD) based on RMS template. Section 138 approval also required;
- Specific consideration to be given to upgrade of the Jerrawa Road and Cooks Hill Road intersections to meet community expectations.

3.2 Hilltops Council Workshops

Following initial meetings with stakeholder Council's a follow up workshop was held via telephone conference between Tilt Renewables, Hilltops Council and the NSW Biodiversity Conservation Department (BCD) on 31 January 2020. Outcomes of this meeting in relation to road upgrades were as follows:

- BCD raised concerns over the extent of vegetation removal required due to road widening as a result of the 80km/h design speed, and expressed particular concerns over impacts along Grassy Creek Road;
- Tilt Renewables outlined the process that had been undertaken to assess multiple routes to minimise impacts on vegetation communities. This has resulted in some proposed routes being abandoned;
- Discussion took place around opportunities to reduce the design standard in some locations in order to reduce overall impact on native vegetation and in particular along Grassy Creek Road. Hilltops Council indicated they would be open to considering reduced road design standards providing road safety objectives could be achieved. To this end a road safety audit of the route was suggested;
- Hilltops Council noted several bridges and culverts will require upgrades and tilt Renewables undertook to complete structural assessment to identify which structures would require upgrades.

This workshop was followed by a further teleconference meeting with Hilltops Council engineering staff on 7 February 2020 to further discuss road standards. Outcomes of this meeting were:

- Hilltops Council happy to accept a design that complies with the current road speed environment on Grassy Creek Road (estimated to be approx.. 60km/h);
- Minimum 7m formation/seal width required (reduced from 8.5m formation/7m seal width). Desirable standard is 7.4m wide formation and seal with edge lines to delineate travel lanes;
- The design process is to include a review by a Road Safety Auditor to identify potential safety issues that can be addressed as part of the design process.

3.3 Pavement Design

Upper Lachlan Shire Council requires a pavement design to be undertaken in accordance with the *Austroads Guide to Pavement Technology, Part 2: Pavement Structural Design 2017*. Essentially the two inputs into this design process are:

(i) **Traffic volumes** – traffic volumes are measured in Equivalent Standard Axles (ESA's) calculated over the 25 year design life of the pavement. An Equivalent Standard Axle is defined as a dual tyred single axle that transmits a load of 80kN (8.2 Tonne) to the road pavement. ESA's are used as a standard measure against which various size and configurations of heavy vehicle can assessed.

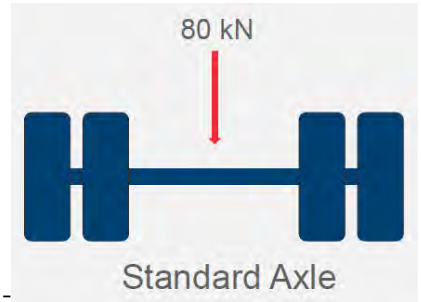


Figure 2 – Equivalent Standard Axle (ESA)

Given that heavy vehicle impacts as a result of the Rye Park Wind Farm development will be largely limited to the 18 month construction phase it is somewhat difficult to calculate ESA's over a 25 year period. In order to calculate design traffic ESA's, the following traffic volumes were adopted from SMEC 2020*:*

- Total of 67,896 (two way) heavy vehicle movements associated with wind farm construction over a 93 week construction period;
- Total of 58,240 (two way) light vehicle trips associated with construction over the 93 week construction period;
- Total 126,136 (two way) construction vehicle trips with 51% being heavy vehicles;
- 8 trips per day associated with O&M of the wind farm during the operational phase (Epuron Pty Ltd (2016), *Rye Park Windfarm Traffic and Transport Assessment – April 2016).*

Limited traffic data is available for the Council roads in question. A conservative existing traffic volume of 200 vehicles per day with 15% of these being heavy vehicles was adopted for use in the pavement design.

The table below provides details of key inputs and outputs of the design traffic calculation:

Traffic Source	**AADT**	**%HV**	**Comment**
Existing Traffic	200	15%	estimate only
Construction Traffic	13	51%	Averaged over 25 years
O&M Traffic	8	25%	Assumed %HV
Totals	**221**	**17%**	
Design Period	25 years		
Heavy Vehicle Growth Rate	0.5%		Assumed
Axle groups per Heavy vehicle (N_{HVAG})	2.8		Based on presumptive values provided in Austroads
Design ESA's	**4.08×10^5**		

Table 2 – Design Traffic

As a sensitivity analysis the AADT was increased by 10% and a 2% heavy vehicle growth rate was adopted. This resulted in a higher Design ESA value of 5.41×10^5 and an alternative pavement design was undertaken for this higher traffic volume.

(ii) **Subgrade CBR** – To undertake pavement design, a geotechnical investigation would normally be completed to obtain subgrade samples for analysis. These samples are tested to determine the soaked California Bearing Ratio (CBR) of the underlying subgrade material.

CBR provides an indication of the bearing capacity of the layer of soil directly below the road pavement which in turn provides an understanding of its ability to withstand repetitions of heavy vehicle loading. The lower the CBR, the thicker the road pavement is required to be.

For this high level analysis a conservative CBR value of 5 has been adopted for use in the pavement design. Based on experience and the predominantly clay soils in the region it is considered that this is a realistic representation of likely lower bound CBR values that would be encountered.

Using the above inputs and utilising the empirical design method for flexible pavement design as outlined in Austroads, pavement thicknesses of 335mm – 365mm were calculated. Copies of the detailed calculation sheets have been provided as **Attachment G**. For the purposes of cost estimation

a more conservative pavement thickness of 380mm was adopted for Upper Lachlan Shire Roads. A pavement thickness of 200mm was adopted for Yass Valley and Hilltops roads as previously agreed with these parties and specified in the development consent.

4. Cost Estimation

4.1 Road Construction

It is difficult to accurately estimate likely road construction costs without detailed design and quantities. In particular earthworks quantities are difficult to estimate and have a significant impact on the construction cost per kilometre.

Earthworks quantities can vary from project to project due to the following:

- Topography;
- Amount of widening required (a function of design standards and existing road width);
- Existing horizontal alignment and the need for improvements;
- Existing vertical alignment and need for additional cuts and fills.

In addition to earthworks costs, the biggest impact on rural road construction costs comes from pavement construction with the main variables being the distance from the worksite to a suitable gravel source, and pavement thickness (pavement design).

In order to provide per kilometre rates that more accurately reflect the potential variances in quantities due to the above factors, cost estimates were undertaken for a range of scenarios and each section of road was classified into one of the following types for the purposes of cost estimation:

Type	Earthworks	Formation Width (m)	Seal Width (m)	Pavement Thickness (mm)	Cost/km	Comment
Type 1	None/minimal	8.5	7	200	[redacted]	
Type 2	Minor	8.5	7	200		
Type 3	Significant	8.5	7	200		
Type 4	None/minimal	9	8	380		ULSC standard
Type 5	Minor	9	8	380		ULSC standard
Type 6	Significant	9	8	380		ULSC standard
Type 7	Significant	8.5	7	200		Road realignment
Type 8	Minor	8.5	7	200		Widening only

Table 4 – Road Types for Cost Estimation

Copies of the detailed cost estimates undertaken for each upgrade type have been included as **Attachment F.** Survey costs were added on the basis of $5000/km for detailed survey only, and $7000/km where full cadastral survey is also required (Upper Lachlan Shire Council requirement).

It was assumed that any required fill material would be available on site or within close proximity and as such earthworks costs are based on cut to fill scenarios where significant importation of fill material is not required.

Road pavement costs are based on a suitable available commercial gravel source within 100km of the sites. Sealing rates assume that more than 1km would be constructed and sealed at a time, minimising establishment costs.

No allowance has been made for design, geotechnical investigation, or project management and it is assumed that these costs will be essentially the same on a per kilometre basis for each road section.

4.2 Intersections

Intersections were identified for upgrade based on visual assessment and utilising swept path analysis previously undertaken by Rex J Andrews – Engineered Transportation. Indicative cost were then allocated to each intersection requiring upgrade based on the likely scope of works. It is noted that it is difficult to estimate these costs without an accurate scope and quantities and as such these costs should be treated as ballpark estimates only and are intended only for comparison purposes.

Intersection upgrade costs are estimated to vary from $50,000 to $500,000 depending on the scale of the required works.

4.3 Structures

As part of the assessment structures including bridges, major culverts, causeways, and railway crossings were identified and a brief visual assessment undertaken to determine dimensions, likely age and condition. From this a list of assumed upgrades has been developed.

Costs estimates for these structures are based on the following unit rates:

- [redacted]/m2 for bridge construction/replacement;
- [redacted]/m2 for concrete causeway construction/widening;
- Large box culvert extensions – based on indicative costs for each culvert;
- Railway crossing upgrade – indicative cost only.

4.4 Land Acquisition

Where areas of land acquisition were identified as being likely to facilitate road improvements, approximate areas were generated from online mapping tools. Land zoned RU1 – Primary Production generally sells for around [redacted]/ha (NSW GLOBE) in the region depending on location, agricultural productivity, and numerous other factors. Recognising the small areas of land to be acquired, potential resistance from wind farm detractors, and the likely premium that will need to be payed to get agreement from property owners, and unit rate of [redacted] has been adopted. For very small areas (<1000m2) a unit rate of [redacted] has been adopted to reflect the premium likely to be paid for these small areas and the higher proportion of fixed costs associated with the acquisition eg. survey and legal costs. Land areas identified for potential acquisition are shown in the maps provided as **Attachment H.**

5. Road Assessment Outcomes

Detailed schedules for identified upgrades to roads, intersections, structures and required land acquisition have been included as **Attachments C to E**. The following table provides a summary of the results of the assessment for each of the six road sections:

Cost Categories	**Road Section**					
	1	**2**	**3**	**4**	**5**	**6**
Road Upgrades	[redacted]					
Intersection Upgrades						
Structure Upgrades						
Land Acquisition						
Total						
Approx. Area of Vegetation Impact (m^2)	33000	11500	2000	10600	10450	100

Table 5 – Road Upgrade Costs and vegetation impact by Road Section

Road Sections 1 and 2 are predominantly within the Upper Lachlan Shire Council who have more stringent requirements when it comes to design and construction of road upgrades. This has led to significantly higher per kilometre rates and ultimately a high overall cost for upgrade of these roads. Section 1 also has the highest assumed vegetation impact with approximately three times the area of vegetation likely to be impacted in order to upgrade these roads. This is due to narrow existing road widths, Council expectations of road widths, and poor vertical alignment which is likely to lead to significant cuts and fills in some areas.

Road Section 6 appears by far the easiest section of road to upgrade as existing formation widths are generally adequate and upgrade works are generally limited to pavement strengthening with little or no impact on roadside vegetation. The relatively large number of structures on this section of road including a number of bridges with unknown structural capacity makes up for approximately 25% of the estimated upgrade costs.

6. Assumptions

The intention of this report is to provide a high level assessment of the various access route options to assist with decision making. With the limited available data currently available including no detailed road design it is not possible to accurately estimate construction costs and as such the cost estimates in this report are intended to indicate relative costs of upgrading the various road sections rather than absolute costs. Numerous assumptions have been necessary in compiling this report and these are listed below:

- Identified impact areas for vegetation should be considered indicative only and are based on a drive through of each road to identify obvious areas of vegetation impact. It was assumed that generally vegetation (generally grasslands) back to the existing tree line has previously been disturbed and is therefore of little value. No assessment of vegetation types, or qualitative assessment was undertaken;
- In order to determine which sections of road require upgrade, a visual assessment was undertaken to determine road width and pavement condition. Council requirements and previous correspondence with Councils was taken into account but ultimately the sections of road listed for upgrade were based on a judgement call and need to be confirmed with the Council's once the preferred routes are identified;
- There has been no structural assessment of bridges and other major structures to inform decision making. Where possible the age of some structures was identified and a visual inspection undertaken to determine condition. Where doubt existed over the structural capacity of structures it has been assumed that they will require full replacement. A detailed assessment of these structures will be needed and should be undertaken as soon as possible after the preferred access routes are confirmed;
- Major culverts and causeways have been individually listed where they are considered likely to require widening or replacement. No assessment was undertaken of smaller road culverts but allowance has been made for the extension of 5 small culverts (375mm – 600mm diameter) per kilometre.
- In order to determine an appropriate pavement design it was necessary to assume subgrade CBR values and also existing traffic volumes utilising the roads. Conservative values have been adopted for this purpose. A 380mm pavement thickness was adopted for ULSC roads;
- Land acquisition areas have been determined based on a desktop assessment of the road alignments based on achieving an 80km/h design speed. This is not intended to be an exhaustive list but rather to provide some relativity between the various road sections for comparison purposes;
- It has been assumed that Yass Valley Council road upgrade requirements have not changed since agreement was reached prior to issue of the current consent;
- Intersection upgrade costs are based on high level ballpark estimates in the absence of any detailed quantities;
- Quantities used in preparing costs estimates are estimated quantities only based on indicative works required for a typical kilometre of road. Unit rates were derived from previous projects in the region;
- It was assumed that the Council's would not accept unsealed roads being used as heavy vehicle access routes and as such all unsealed roads have been identified for upgrade to a sealed standard;
- It was assumed that any required fill material would be available on site or within close proximity and as such earthworks costs are based on cut to fill scenarios where significant importation of fill material is not required;

- Road pavement costs are based on a suitable available commercial gravel source within 100km of the sites.
- Sealing rates assume that more than 1km would be constructed and sealed at a time, minimising establishment costs.
- No allowance has been made for design, geotechnical investigation, structural assessment or project management and it is assumed that these costs will be essentially the same on a per kilometre basis for each road section.

7. References

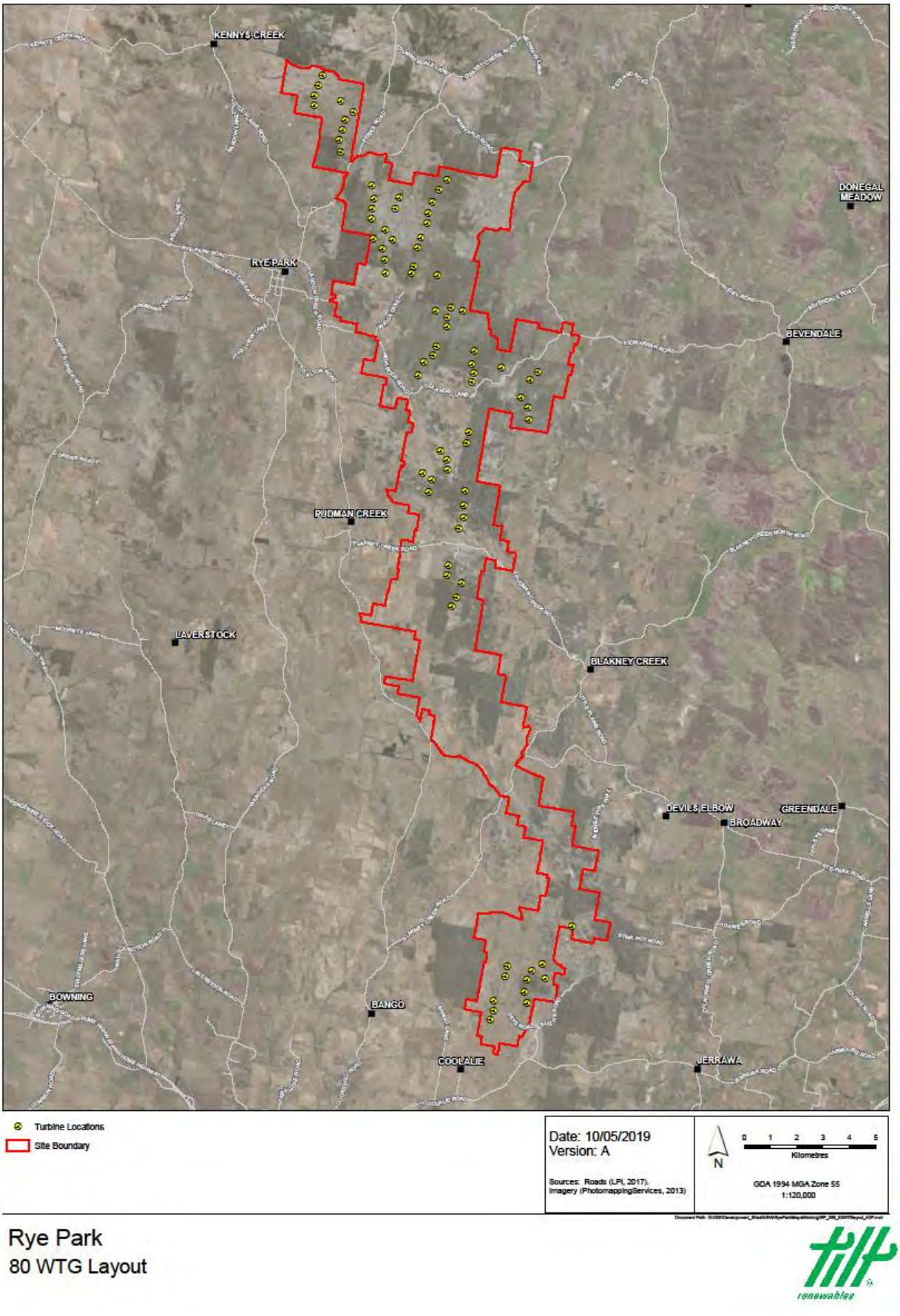
ZEM Energy Pty Ltd (2016), *Rye Park Windfarm Transport Route Assessment, (0005-RC-002)*

Epuron Pty Ltd (2016), *Rye Park Windfarm Traffic and Transport Assessment*

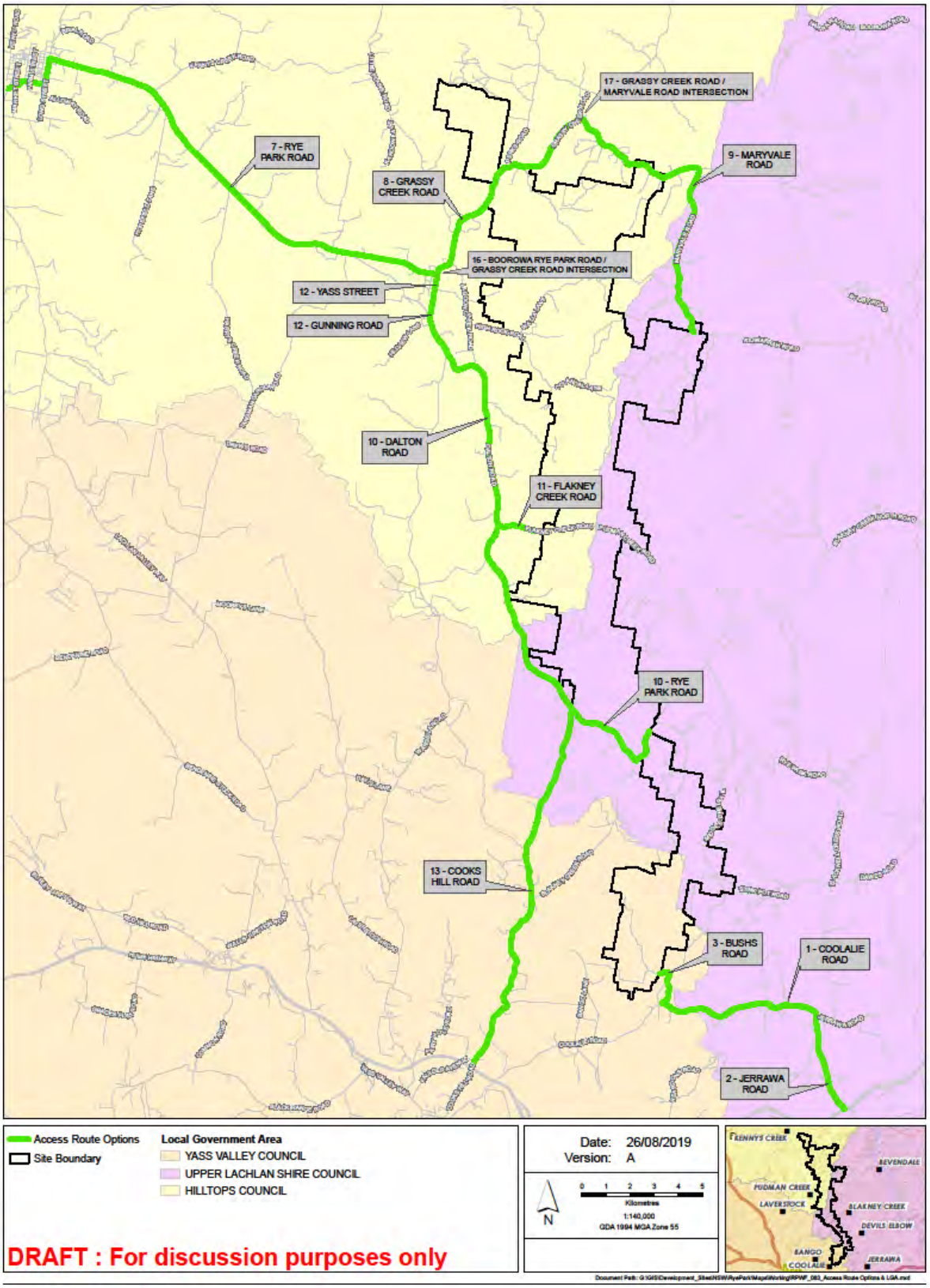
Rex J Andrews Engineered Transportation (2019), *Route Study: Vestas, Rye Park Windfarm: (82 Metre Blade), Ex Newcastle.*

SMEC 2020, RPWF_Construction Traffic Input_800_NOSQ_RevD.xlsx

Attachment A – Project Locality Plan



Attachment B – Current Access Route Options



Rye Park Wind Farm
Access Route Options & LGA

Attachment C – Detailed Road Upgrade Schedule

Road Section	LGA	Road Name	Start Loation	Start CH (km)	End CH (km)	Length (km)	Existing Surface	Existing Width (m)	Req'd P'ment Width	Pavement Thickness (mm)	Req'd Seal Width	Upgrade Category	Upgrade Cost per km	Total Upgrade Cost	Approx. Veg Impact	Comments
1	ULSC	Jerrawa Road	Hume Highway	0	4.1	4.1	Sealed	6.0 - 6.5	9	380	8	5	[redacted]		8000	Narrow and likely low pavement strength. Likley high impact on vegetation
1	ULSC	Coolalie Road	Jerrawa Road	0	0.88	0.88	Sealed	5.0 - 6.0	9	380	8	6			1000	Very narrow. Fair to poor pavement with low pavement strength. Powerline relocations may be required and likely high vegetation impacts.
1	ULSC	Coolalie Road	Jerrawa Road	0.88	5.2	4.32	Unsealed	6.0 - 6.5	9	380	8	6			17000	Powerlines likely to need relocation. Poor vertical alignment (sharp crests). High vegetation impact.
1	YVC	Coolalie Road	Shire Boundary (CH5.2)	5.2	6.6	1.4	Unsealed	7	8.5	200	7	3			7000	Very High vegetation impact
1	YVC	Bushs Road	Coolalie Road	0	1.3	1.3	Unsealed	3.0 - 4.0	8.5	200	7	3			0	Some earthworks required. Negligible vegetation impact. Possible rail crossing upgrade.
1	YVC	Days Road	Bushs Road	0	0.4	0.4	Unsealed	3	8.5	200	7	3			0	Significant earthworks required. Major culvert needed at Ch0.19km.
2	ULSC	Rye Park-Dalton Road	Site Access 12	1.3	1.57	0.27	Unsealed	7.0 - 8.0	9	380	8	4			0	Requires upgrade to sealed standard
2	ULSC	Rye Park-Dalton Road	Site Access 12	2.1	3.75	1.65	Unsealed	7.0 - 8.0	9	380	8	4			0	Requires upgrade to sealed standard. Minimal vegetation or earthworks required.
2	ULSC	Rye Park-Dalton Road	Site Access 12	4	5.6	1.6	Unsealed	7.0 - 8.0	9	380	8	4			1500	Requires upgrade to sealed standard. Minimal vegetation or earthworks required.
2	ULSC	Rye Park-Dalton Road	Site Access 12	5.6	9.15	3.55	Unsealed	6.0 - 6.5	9	380	8	6			10000	Requires upgrade to sealed standard. Significant wideing, earthworks & vegetation removal required. Significant realignment required approaching Blakney Creek causeway.
2	ULSC	Rye Park-Dalton Road	Site Access 12	9.15	10.5	1.35	Sealed	7.0 - 7.8	9	380	8	4			0	Road in good condition. Council likley to require widening and pavement strengthening
3	Hilltops	Rye Park-Dalton Road	Boorowa-Rye Park Road	0	1.05	1.05	Sealed	5.5 - 6.0	8.5	200	7	8			0	Yass Street Rye Park. Existing pavement OK. Widen and reseal only.
3	Hilltops	Rye Park-Dalton Road	Boorowa-Rye Park Road	3.95	4.5	0.55	Sealed	8	8.5	200	7	7			2000	Realignment of substandard bend near Pudman Creek Bridge
3	Hilltops	Rye Park-Dalton Road	Site Access 12	0	1.3	1.3	Sealed	8	8.5	200	7	N/A			0	Some Heavy patching required to address pavement defects. Assume 10% of road area.
4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	0	0.1	0.1	Sealed	5.4 - 5.6	8.5	200	7	8			0	Narrow and good to fair pavement condition. Assume widening and allowance for 10% heavy patching
4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	0.1	0.4	0.3	Sealed	5.4 - 5.6	8.5	200	7	7			0	Realignment of substandard bend near Boorowa/Rye Park Road
4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	0.4	2.4	2	Sealed	5.4 - 5.6	8.5	200	7	8			0	Narrow and good to fair pavement condition. Assume widening and allowance for 10% heavy patching
4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	2.4	2.6	0.2	Sealed	5.4 - 5.6	8.5	200	7	7			1000	Realignment of substandard bend
4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	2.6	4.5	1.9	Sealed	5.4 - 5.6	8.5	200	7	8			300	Narrow and good to fair pavement condition. Assume widening and allowance for 10% heavy patching
4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	4.5	4.7	0.2	Sealed	5.4 - 5.6	8.5	200	7	7			6000	Realignment of substandard bend
4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	4.7	5	0.3	Sealed	5.4 - 5.6	8.5	200	7	8			300	Narrow and good to fair pavement condition. Assume widening and allowance for 10% heavy patching
4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	5	5.2	0.2	Sealed	5.4 - 5.7	8.5	200	7	7			3000	Realignment of substandard bend. Site Access 2
5	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	0	0.65	0.65	Sealed	5.4 - 5.6	8.5	200	7	8			4000	Narrow and good to fair pavement condition. Assume widening and allowance for 10% heavy patching
5	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	0.65	0.95	0.3	Sealed	5.4 - 5.6	8.5	200	7	7			6000	Realignment of substandard bend
5	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	0.95	1.1	0.15	Sealed	5.4 - 5.6	8.5	200	7	8			450	Narrow and good to fair pavement condition. Assume widening and allowance for 10% heavy patching
6	Hilltops	Trucking Yard Road/Dillon Street	Lachlan Valley Way	0	1.6	1.6	Sealed	5.3 - 7.0	8.5	200	7	1			0	Good to fair pavement condition. Likely to require widening
6	Hilltops	Long Street	Dillon Street	0	0.4	0.4	Sealed	5	8.5	200	7	1			0	Narrow section of road. Requires widening
6	Hilltops	Boorowa-Rye Park Road	Long Street	0	1.2	1.2	Sealed	7.2	8.5	200	7	1			0	Poor pavement condition. Needs widening and reconstruction of pavement
6	Hilltops	Boorowa-Rye Park Road	Long Street	1.2	1.75	0.55	Sealed	5.7	8.5	200	7	1			0	Narrow and poor pavement condition. Needs widening and reconstruction
6	Hilltops	Boorowa-Rye Park Road	Long Street	5.85	6.7	0.85	Sealed	6	8.5	200	7	2			100	Narrow assume upgrade is required
6	Hilltops	Boorowa-Rye Park Road	Long Street	7.2	11.4	4.2	Sealed	6.0 - 6.5	8.5	200	7	2			0	Narrow and poor pavement condition. Needs widening and reconstruction
6	Hilltops	Boorowa-Rye Park Road	Long Street	17.8	18.9	1.1	Sealed	6.7 - 7.3	8.5	200	7	2			0	Fair to poor pavement condition. Assume upgrade
						39.92										

Attachment D – Detailed Structure Upgrade Schedule

Road Section	LGA	Road Name	Start Location	Approx Chainage (km)	Easting	Northing	Description	Trafficable Width (m)	Quantitiy	Unit Rate	Cost	Comments
1	ULSC	Jerrawa Road	Hume Highway	2.62	691004	6147246	4 x 2100 x 1500 RCBC	6.5	1	[redacted]		Will require widening
1	ULSC	Coolalie Road	Jerrawa Road	0.78	690168	6149091	box culvert and concrete causeway	5-6m	135			Will require widening or replacement
1	ULSC	Coolalie Road	Jerrawa Road	2	688980	6149109	Concrete causeway with small culvert	5	1			Relocate as part of road realignmnet
1	YVC	Days Road	Bushs Road	0.19	684683	6150475	Large culvert or causeway required (approx. 2.1m dia)		1			New culvert required
2	ULSC	Rye Park-Dalton Road	Boorowa-Rye Park Road	17.7	678939	6163175	4 x 1500 x 900 box culvert	8	1			3 cell culvert requires widening
2	ULSC	Rye Park-Dalton Road	Boorowa-Rye Park Road	19.45	680320	6162002	2 x 2100 x 1800 box culvert	8	1			2 cell culvert requires widening
2	ULSC	Rye Park-Dalton Road	Boorowa-Rye Park Road	22.3	682496	6160381	21 x 6 concrete causeway	6	84			Barlows Creek causeway
2	ULSC	Rye Park-Dalton Road	Boorowa-Rye Park Road	23.75	683391	6159194	18 x 6 concrete causeway	6	72			Blakney Creek causeway
3	Hilltops	Rye Park-Dalton Road	Boorowa-Rye Park Road	4.5	676316	6175360	20 x 6.1 concrete bridge	6.1	180			Pudman Creek - DMR 1951
3	Hilltops	Rye Park-Dalton Road	Boorowa-Rye Park Road	8.1	677358	6172377	16 x 6.2 concrete causeway & 2 x 1500 x 450 culverts	6.2	48			Flakney Creek causeway - reasonable condition assume widening only
4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	0.3	675323	6179458	3 x 3000mm dia corrugated metal pipes	5.6	108			Poor condition assume replacement
4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	4.4	677457	6182711	7 x 16m concrete causeway	7	144			Poor condition assume replacement
6	Hilltops	Trucking Yard Road	Lachlan Valley Way	0.55	657987	6187169	Narrow cuseway with 450mm culvert	6.1	120			Will require widening
6	Hilltops	Boorowa-Rye Park Road	Long Street	8.9	666284	6183088	27 x 7.5 concrete bridge	7.5	243			Harry's Creek Bridge - DMR 1969. Signs of deterioration to piers and unlikley to meet current standards. Assume replacement
6	Hilltops	Boorowa-Rye Park Road	Long Street	15.3	671613	6180054	16 x 7.6 concrete bridge	7.6	144			Dirthole Creek Bridge - DMR 1934

Attachment E – Detailed Intersection and Land Acquisition Schedules

Intersection Upgrades

Road Section	LGA	Road Name 1	Road Name 2	Easting	Northing	Est. Cost
1	ULSC	Jerrawa Road	Hume Highway	692082	6144807	[redacted]
1	ULSC	Jerrawa Road	Coolalie Road	690886	6148789	
1	YVC	Coolalie Road	Bushs Road	684524	6149185	
1	YVC	Bushs Road	Railway Crossing/Days Road	684828	6150377	
2	ULSC	Rye Park-Dalton Road	Blakney Creek South Road	683463	6159178	
6	Hilltops	Rye Park-Dalton Road	Boorowa-Rye Park Road	675192	6179196	
6	Hilltops	Boorowa-Rye Park Road	Long Street	659123	6188100	
6	Hilltops	Dillon Street	Long Street	658939	6187018	
6	Hilltops	Trucking Yard Lane	Lachlan Valley Way	657413	6186849	

Land Acquisition

Ref.	Road Section	LGA	Road Name	Start Loation	Approx Chainage (km)	Easting	Northing	Lot/DP	Approx. Land Area (m2)	Cost/m2	Total Cost
1	1	ULSC	Coolalie Road	Jerrawa Road	1.6	689241	6148983	Lot 239 DP 754122	2900	[redacted]	
2	1	ULSC	Coolalie Road	Jerrawa Road	2	688928	6149111	Lot 31 DP 754122 Lot 2 DP 1245971	10400		
	1	YVC	Bushs Road	Assume 2 x substandard bends will be accepted by Council given very low traffic volumes on road							
3	2	ULSC	Rye Park-Dalton Road	Site Access 12	6.9	618831	6160702	Lot 1 DP 838933	3550		
4	2	ULSC	Rye Park-Dalton Road	Site Access 12	8.4	682969	6159684	Lot 92 DP 754102	2600		
5	2	ULSC	Rye Park-Dalton Road	Site Access 12	8.95	683267	6159272	Lot 4 DP 1066057	3850		
6	3	Hilltops	Rye Park-Dalton Road	Boorowa-Rye Park Road	3.95	675986	6175291	Lot 60 DP 754135 Lot 61 DP 754135	26000		
7	4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	0.1	675249	6179419	Lot 2 DP 591580	2650		
8	4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	2.4	676120	6181333	Lot 154 DP 754145	3500		
9	4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	4.5	677479	6182772	Lot N DP 439287	3000		
10	4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	5	677710	6183344	Lot D DP 440134	5200		
11	5	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	0.65	678428	6183728	Lot B DP 439287	3200		
12	1	ULSC	Jerrawa road	Hume Highway	4.1	690860	6148792	Lot 63 DP 754122 Lot 39 754122	650		
13	1	YVC	Bushs Road	Coolaie Road	0	684566	6149204	Lot 215 DP 754122	5350		
14	1	YVC	Days Road	Bushs Road	0	684804	6150466	Lot 42 DP 754122	7000		
15	6	Hilltops	Dillon Street	Lachlan Valley Way	1.5	658909	6187007	Lot 14 DP 1055548	1250		
16	6	Hilltops	Boorowa-Rye Park Rd	Dillon Street	0	659149	6188067	Lot 1 DP 219928	530		
17	6	Hilltops	Boorowa-Rye Park Rd	Dillon Street	0	659155	6188118	Lot 63 DP 754103	530		
18	4	Hilltops	Grassy Creek Road	Boorowa-Rye Park Road	0	675173	6179228	Lot 1 DP 580999	3500		
19	3	Hilltops	Rye Park-Dalton Road	Boorowa-Rye Park Road	0	675179	6179181	Lot 1 DP 1810	190		
									85850		

Attachment F – Road Upgrade Cost Estimates

Attachment G – ULSC Pavement Design Calculations

Genium Civil Engineering

Granular Pavement Design with Thin Bituminous Surfacing - Austroads 2012

Project Reference:	**Rye Park Windfarm**	**Designed by:**	Simon Cassidy
Client:	**Tilt Renewables**	**Date:**	3/04/2020
Project Description:	**Upper Lachlan Shire Council - Typical pavement Design Rye Park Road**		

DESIGN TRAFFIC CALCULATIONS *(Refer Austroads 2012 Section 7)*

Design Parameters	**Austroads Ref.**	**Symbol**	**Value**	
(Note: Enter values in green cells)				
Design Period	7.4.2	(P)	25	*(Typically 20-40 years)*
Annual Average Daily Traffic	7.4.1, 7.4.4	(AADT)	122	vehicles/day
Direction Factor	7.4.1	(DF)	0.5	
% Heavy Vehicles	7.4.4	(%HV)	20	%
Lane Distribution Factor	7.4.3	(LDF)	1	*(Refer Table 2 in Tables Tab)*
Heavy Vehicle Growth Rate	7.4.5	(R)	0.5	%
Traffic Load Distribution	7.5	(TLD)	Rural Collector	*(Select from drop down list)*
Cumulative Growth Factor	7.4.5 Eq. 15	(CGF)	26.6	
Presumptive Axle Groups per Heavy Vehicle		(N_{HVAG})	2.8	axle groups per heavy vehicle
Design Traffic	Eq. 14	(N_{DT})	3.31E+05	Heavy Vehicle axle Groups
Presumptive Damage Index Values for the selected TLD	7.6.2	(ESA/HVAG)	0.8	
		(ESA/HV)	2.2	
Design ESA of Loading (DESA)	7.6.3	**(DESA)**	**2.65E+05**	

PAVEMENT DESIGN

Designed in accordance with Figure 8.4 and Figure 12.2 of Austroads 2012

Design CBR

Adopted Design CBR = **5** %

Design period

Design Traffic

Calculated DESA = 2.65E+05

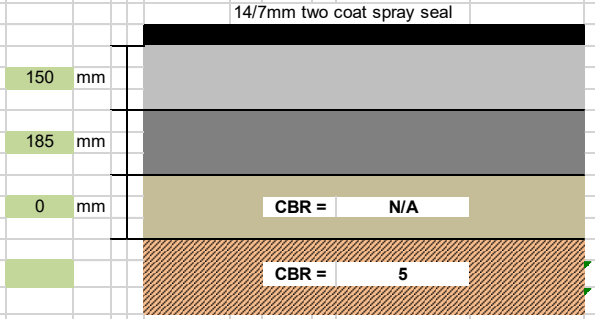
or Enter User Defined Value

Note: Entering a value will overide the calculated value

Granular Pavement Design (Empirical Design Method)

Total Granular Pavement Thickness =	**334**	mm
Minimum Base Thickness =	**113**	mm
Remaining Pavement Thickness =	**221**	mm

Adopted Pavement Design



Total depth of granular material required = 334 mm

Total depth of granular material provided = 335 mm

This design has been carried out in accordance with the Austroads Guide to Pavement Technology Part 2: Pavement Structucal Design, 2012. The recommended pavement design/s are based on sampling and testing undertaken by others. Sampling provides a snapshot of subsurface conditions at the time of testing from a limited number of boreholes at point locations across the site. Actual site conditions may vary both spatially and with climatic variations in ground conditions and should be confirmed on site during construction. It is assumed that adequate surface and subsurface drainage will be provided to the pavement and adjacent areas.

Version: 2 Created: 6/4/2017

Genium Civil Engineering

Granular Pavement Design with Thin Bituminous Surfacing - Austroads 2012

Project Reference:	**Rye Park Windfarm**	**Designed by:**	Simon Cassidy
Client:	**Tilt Renewables**	**Date:**	3/04/2020
Project Description:	**Upper Lachlan Shire Council - Typical pavement Design Jerrawa & Coolalie Roads**		

DESIGN TRAFFIC CALCULATIONS *(Refer Austroads 2012 Section 7)*

Design Parameters	**Austroads Ref.**	**Symbol**	**Value**	
(Note: Enter values in green cells)				
Design Period	7.4.2	(P)	25	*(Typically 20-40 years)*
Annual Average Daily Traffic	7.4.1, 7.4.4	(AADT)	222	vehicles/day
Direction Factor	7.4.1	(DF)	0.5	
% Heavy Vehicles	7.4.4	(%HV)	18	%
Lane Distribution Factor	7.4.3	(LDF)	1	*(Refer Table 2 in Tables Tab)*
Heavy Vehicle Growth Rate	7.4.5	(R)	2	%
Traffic Load Distribution	7.5	(TLD)	Rural Collector	*(Select from drop down list)*
Cumulative Growth Factor	7.4.5 Eq. 15	(CGF)	32.0	
Presumptive Axle Groups per Heavy Vehicle		(N_{HVAG})	2.8	axle groups per heavy vehicle
Design Traffic	Eq. 14	(N_{DT})	6.54E+05	Heavy Vehicle axle Groups
Presumptive Damage Index Values for the selected TLD	7.6.2	(ESA/HVAG)	0.8	
		(ESA/HV)	2.2	
Design ESA of Loading (DESA)	7.6.3	**(DESA)**	**5.23E+05**	

PAVEMENT DESIGN

Designed in accordance with Figure 8.4 and Figure 12.2 of Austroads 2012

Design CBR

Adopted Design CBR = **5** %

Design Traffic

Calculated DESA = 5.23E+05

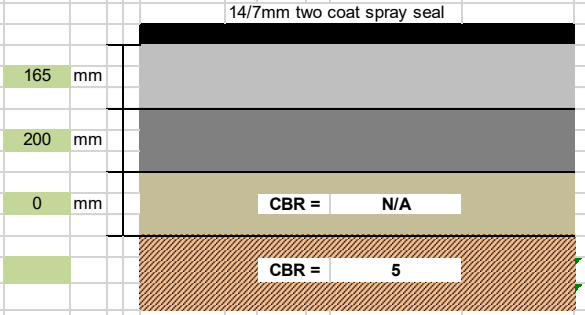
or Enter User Defined Value

Note: Entering a value will overide the calculated value

Granular Pavement Design (Empirical Design Method)

Total Granular Pavement Thickness =	**363**	mm
Minimum Base Thickness =	**123**	mm
Remaining Pavement Thickness =	**240**	mm

Adopted Pavement Design



Total depth of granular material required = **363** **mm**

Total depth of granular material provided = **365** **mm**

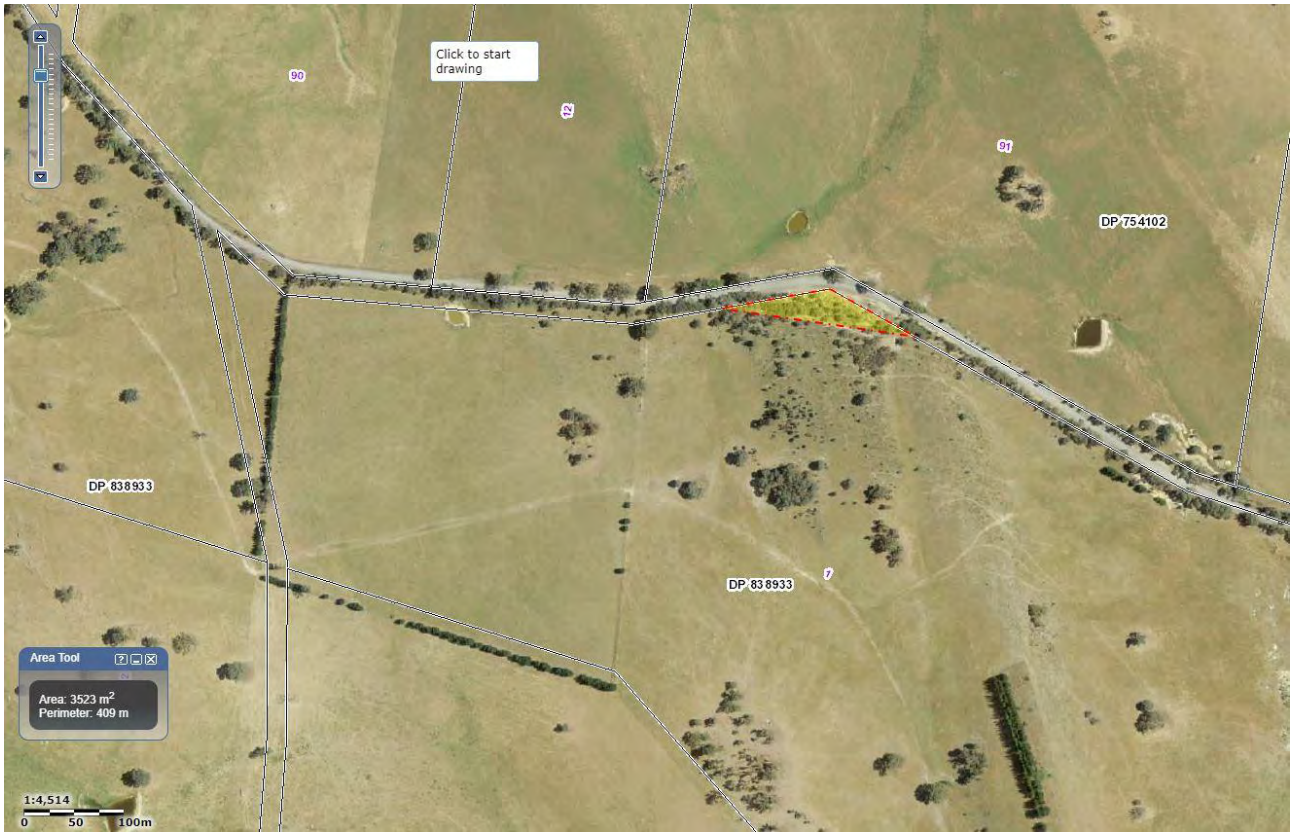
This design has been carried out in accordance with the Austroads Guide to Pavement Technology Part 2: Pavement Structucal Design, 2012. The recommended pavement design/s are based on sampling and testing undertaken by others. Sampling provides a snapshot of subsurface conditions at the time of testing from a limited number of boreholes at point locations across the site. Actual site conditions may vary both spatially and with climatic variations in ground conditions and should be confirmed on site during construction. It is assumed that adequate surface and subsurface drainage will be provided to the pavement and adjacent areas.

Version: 2 Created: 6/4/2017

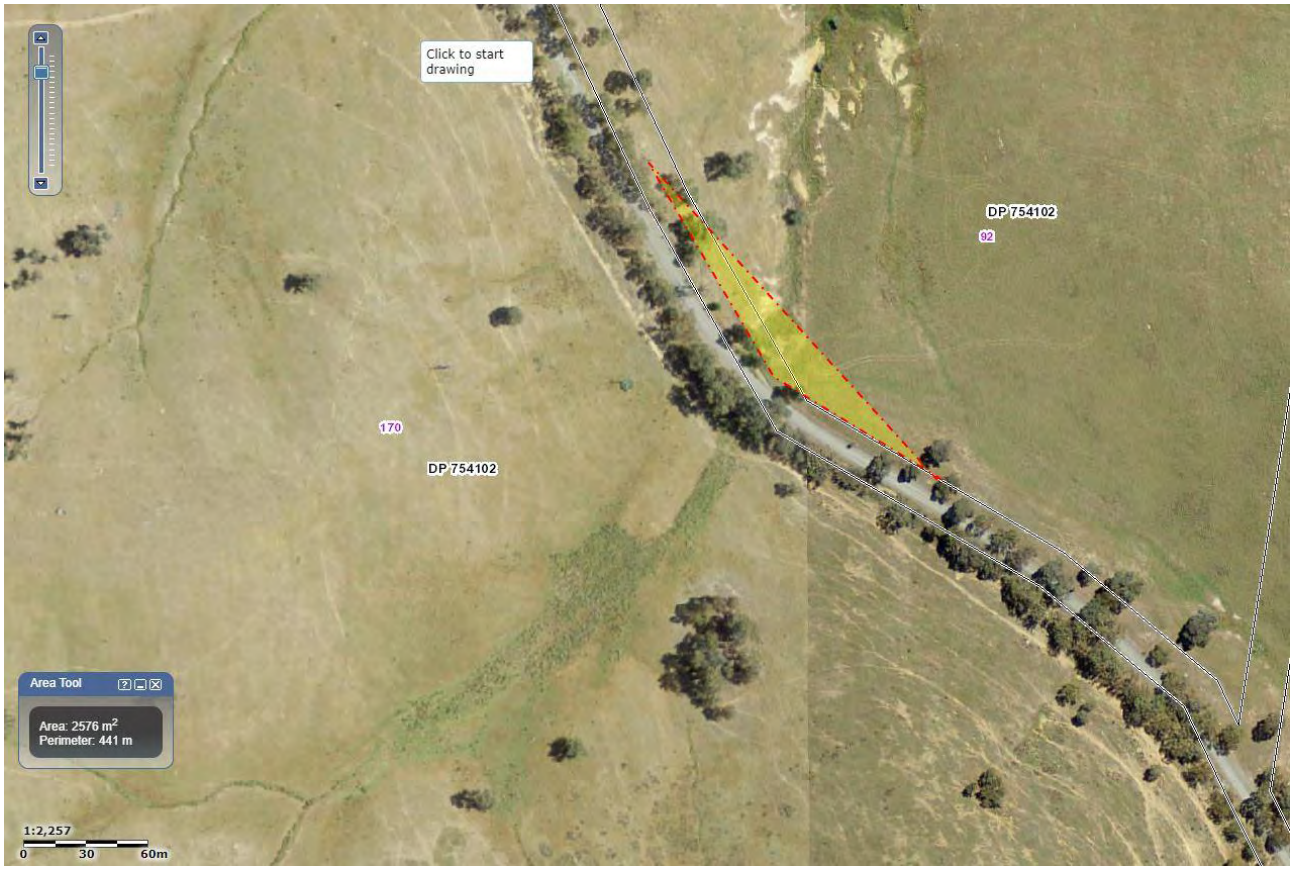
Attachment H – Potential Land Acquisition Areas

Site 1 – Coolalie Road

Site 2 – Coolalie Road



Site 3 – Rye Park-Dalton Road



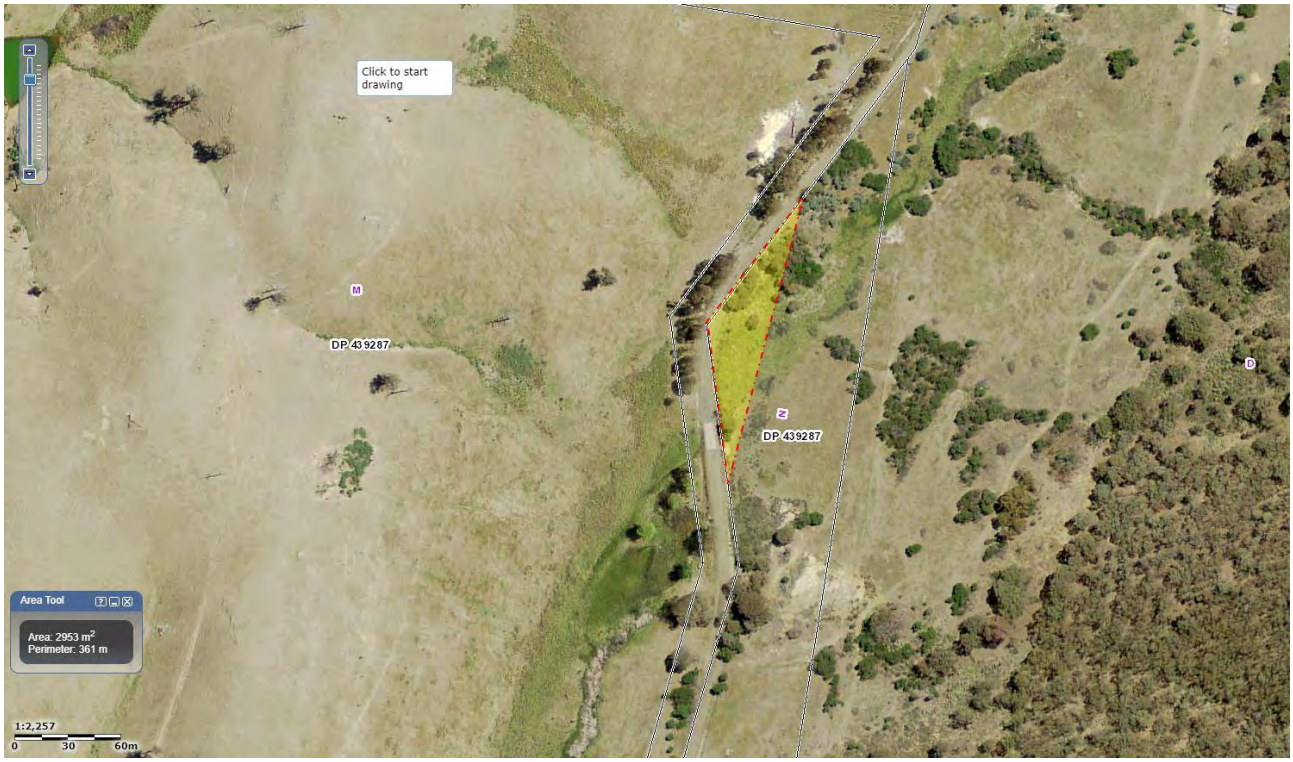
Site 4 – Rye Park-Dalton Road

Site 5 – Rye Park-Dalton Road

Site 6 – Rye Park-Dalton Road

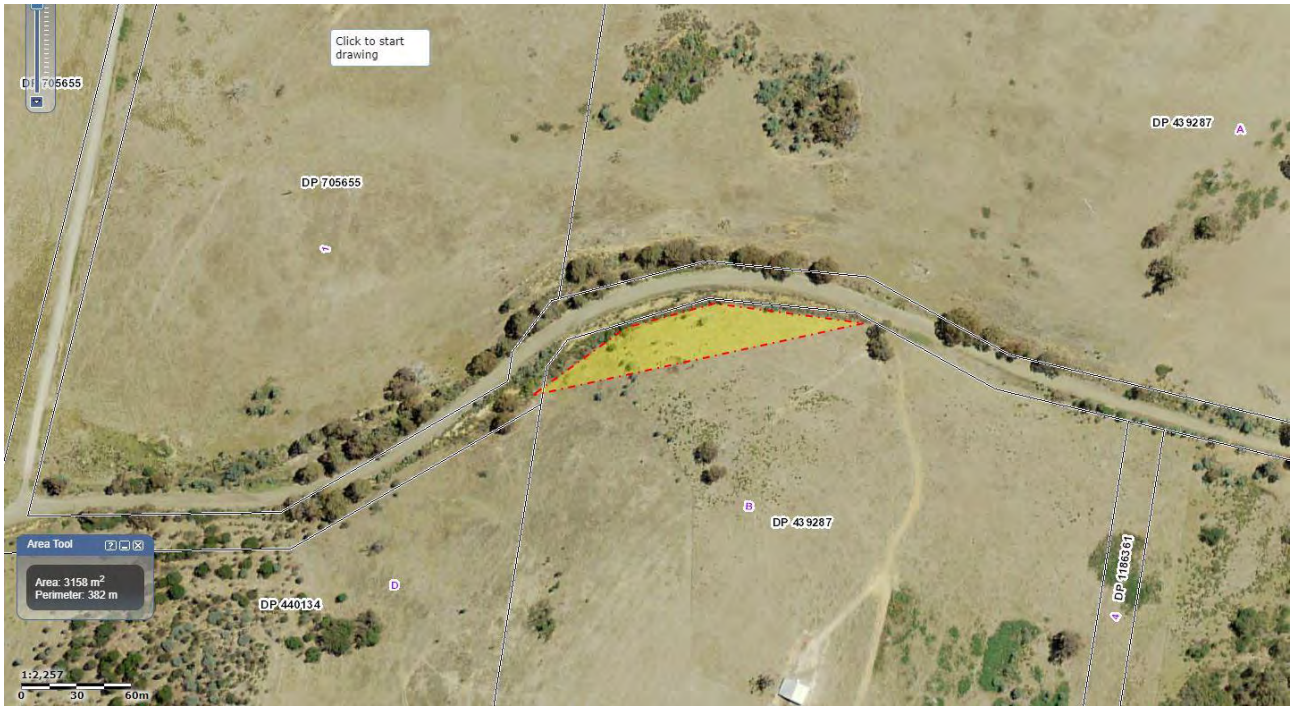
Site 7 – Grassy Creek Road

Site 8 – Grassy Creek Road



Site 9 – Grassy Creek Road

Site 10 – Grassy Creek Road



Site 11 – Grassy Creek Road

Site 12 – Jerrawa Road/Coolalie Rd Intersection

Site 13 – Bushs Road/Coolalie Rd Intersection

Site 14 – Days Road

Site 15 – Long Street/Dillon Street Intersection

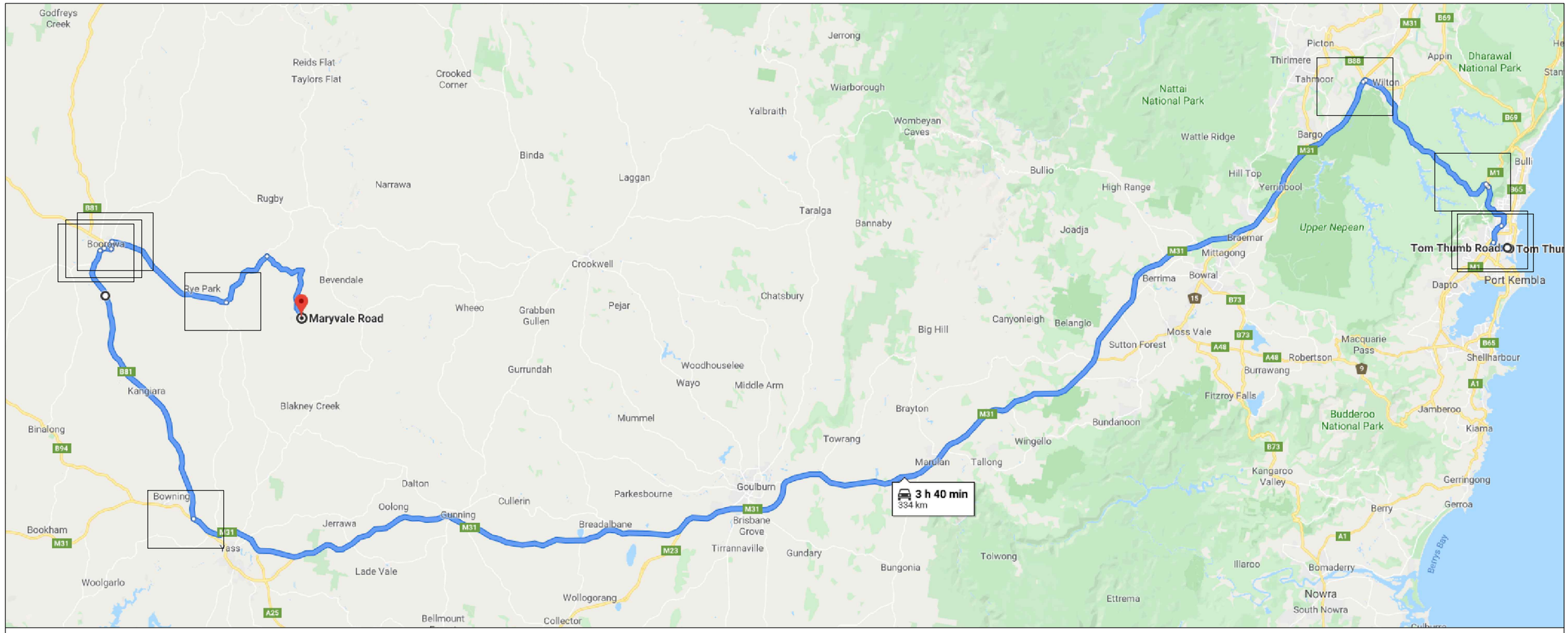
Site 16 – Dillon Street/Boorowa-Rye Park Rd Intersection

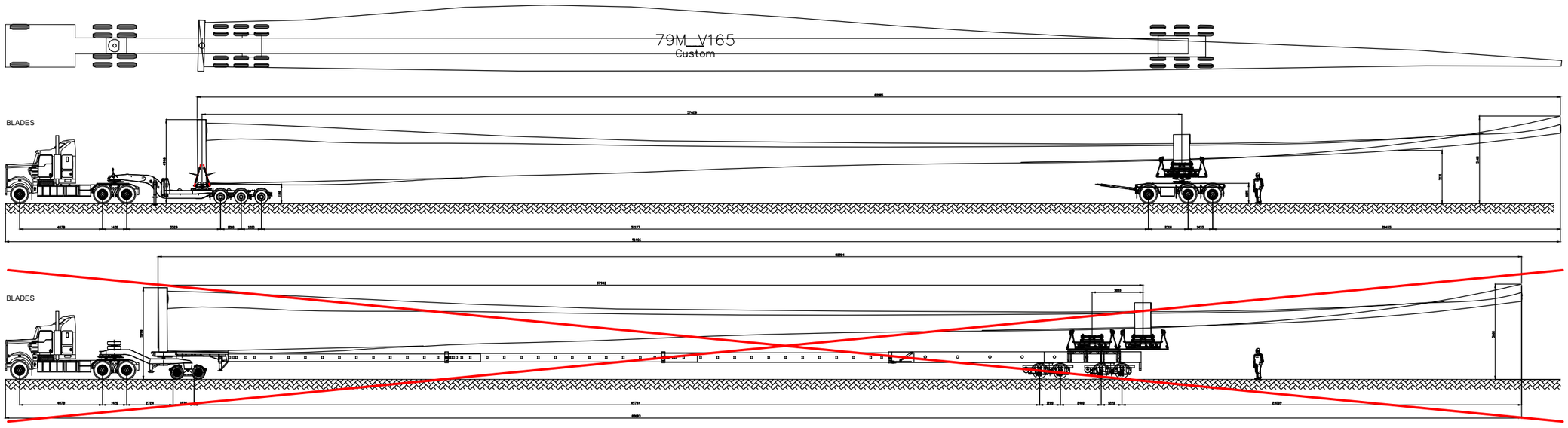
Site 17 – Dillon Street/Boorowa-Rye Park Rd Intersection

Site 18 – Boorowa-Rye Park Rd/Grassy Creek Rd Intersection

Site 19 – Jerrawa Road/Coolalie Rd Intersection

Appendix E Swept Path Analysis





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DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

INTERSECTION OF:
TOM THUM RD &
SPRINGHILL RD

OBSTACLES:
- POWERPOLES / LIGHTS
- TREES ON OUTSIDE EDGE

SUGGESTION
LIHT & TREES TO BE REMOVED BY NSW PORTS

AFFECTED LAND OWNERS: NIL

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE A3
PROJECT	RYE PARK	SCALE NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV A3

INTERSECTION OF:
SPRINGHILL RD &
MASTERS RD

OBSTACLES:
- TRAFFIC LIGHTS
- MEDIAN STRIP

SUGGESTION
TRUCK WILL TRAVERSE THE MEDIAN STRIP. HARD STAND WILL BE REQUIRED ON THIS MEDIAN STRIP.

AFFECTED LAND OWNERS: Nil

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE A3
PROJECT	RYE PARK	SCALE NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV A3

File path: T:\work\...\RYE PARK SWEPT PATHS.DWG 5/08/2016 10:13:08 AM

INTERSECTION OF:
MOUNT OUSLEY RD &
PICTON RD

OBSTACLES:
ONCOMING SOUTHBOUND TRAFFIC

SUGGESTION
POLICE WILL NEED TO STOP SOUTHBOUND TRAFFIC AS THEY DO ON ALL BLADES ALREADY

AFFECTED LAND OWNERS: Nil

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

INTERSECTION OF:
PICTON RD &
HUME HIGHWAY RD

OBSTACLES:
LIGHT POLE ON INSIDE EDGE

SUGGESTION
MOVE LIGHTPOLE INWARDS 3 METERES

AFFECTED LAND OWNERS: NIL

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

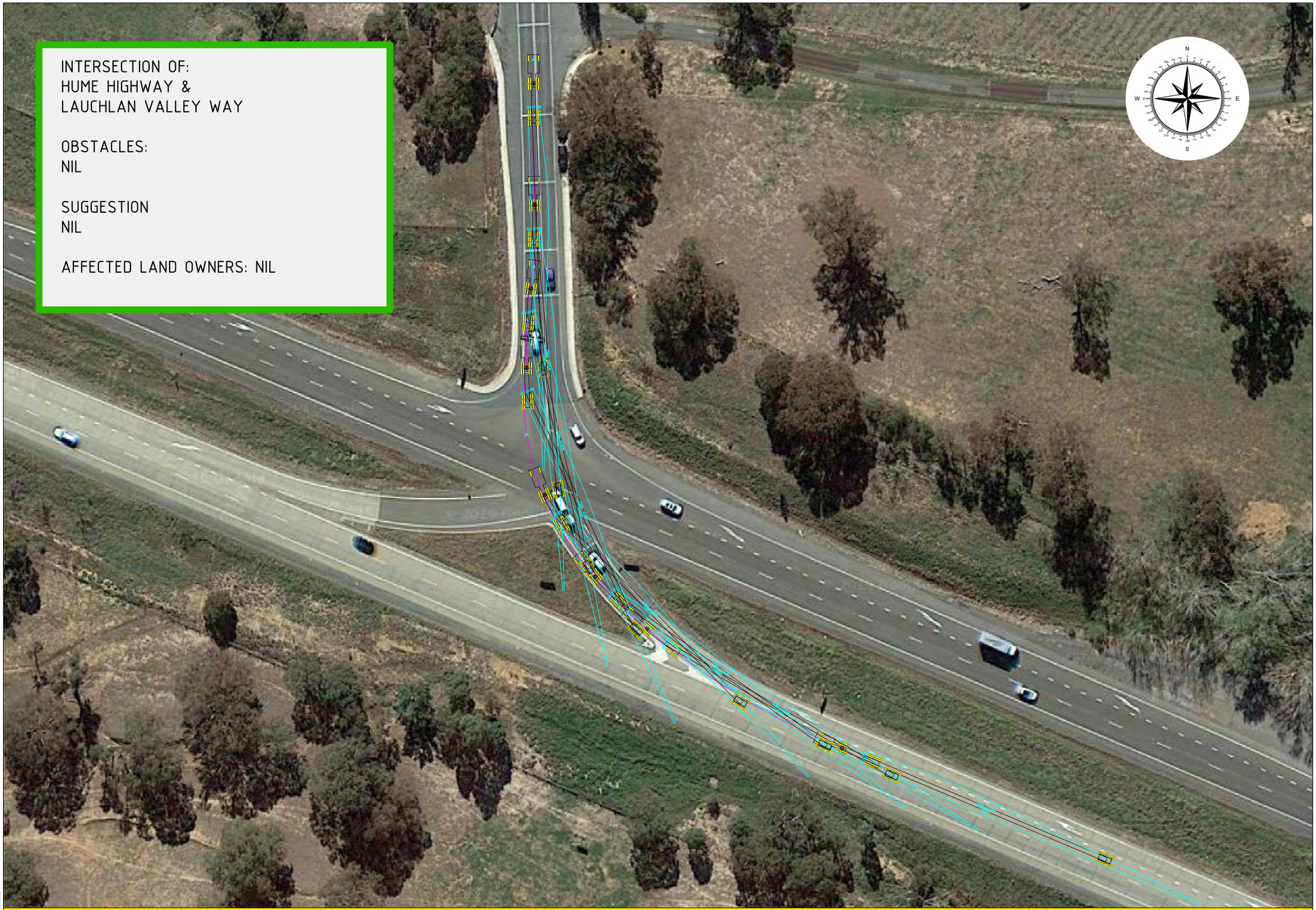
ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK SWEPT PATHS
DRAWING NAME	RYE PARK SWEPT PATHS.DWG

SIZE A3 | SCALE NTS | SHEET No | REV A3



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1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK SWEPT PATHS
DRAWING NAME	RYE PARK SWEPT PATHS.DWG

SIZE A3 | SCALE NTS | SHEET No | REV A3

Plot Date: Tuesday, 30 October 2018 8:31:14 PM

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1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:			
DRAWN DATE:			
CHECKED BY:			
CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

INTERSECTION OF:
DILLON RD &
LONG RD

OBSTACLES:
TREES AND FENCES

SUGGESTION
CONSTRUCT A ROAD THAT CUTS THROUGH
THE NORTHERN LAND OWNERS PROPERTY

AFFECTED LAND OWNERS: 1

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK SWEPT PATHS
DRAWING NAME	RYE PARK SWEPT PATHS.DWG

SIZE A3 | SCALE NTS | SHEET No | REV A3

Plot date: Sunday, 21 January 2018 2:43:55 PM

INTERSECTION OF:
LONG RD &
RYE PARK RD &

OBSTACLES:
- CORNER TOO SHARP
- FENCE AND GUTTER

SUGGESTION
CONSTRUCT A ROAD ON THE INSIDE OF THE INTERSECTION.

AFFECTED LAND OWNERS: 1

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

INTERSECTION OF:
RYE PARK RD &
GRASSY CREEK RD

OBSTACLES:
- POWERPOLE ON INSIDE EDGE
- TELSTRA BOX ON INSIDE EDGE

SUGGESTION
CONSTRUCT A ROAD ON THE INSIDE OF THE INTERSECTION.

AFFECTED LAND OWNERS: 1

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

Plot date: Tuesday, 30 October 2018 9:23:43 PM

SITE ENTRANCE
NAMED: COTTER

OBSTACLES:
- TREES
- ROAD WILL NEED TO BE BUILT

SUGGESTION
CONSTRUCT A ROAD ON THE INSIDE OF THE INTERSECTION.

AFFECTED LAND OWNERS: 1

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE A3
PROJECT	RYE PARK	SCALE NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV A3

SITE ENTRANCE
NAMED: HOWARD

OBSTACLES:
- TREES
- ROAD WILL NEED TO BE BUILT

SUGGESTION
NEW ROAD WILL NEED TO BE CONTRUCTED

AFFECTED LAND OWNERS: 1

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

WEIGHT, DIMENSIONS AND COG POSITION TO BE CONFIRMED BY CLIENT STRUCTURAL INTEGRITY TO BE CHECKED BY CLIENT OPERATIONAL DIAGRAMS AND MANUAL MUST BE OBSERVED HYDRAULIC STABILITY REFERS TO STATIC LOAD ONLY STABILITY PROVISIONAL UNTIL COG CONFIRMED

ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

SITE ENTRANCE
NAMED: ROSS

OBSTACLES:
- TREES
- ROAD WILL NEED TO BE BUILT

SUGGESTION
CONSTRUCT A ROAD THAT CUTS DIRECTLY THROUGH AND REMOVE THE DOG LEG IN THE CORNER.

AFFECTED LAND OWNERS: 1

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

TECHNICAL NOTES:

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ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS
PROJECT	RYE PARK
DRAWING TITLE	RYE PARK SWEPT PATHS
DRAWING NAME	RYE PARK SWEPT PATHS.DWG

SIZE A3 | SCALE NTS | SHEET No | REV A3

Plotted: Sunday, 21 January 2024 2:47:58 PM

SITE ENTRANCE
NAMED: COCKERILL SUPER

OBSTACLES:
- TREES
- ROAD WILL NEED TO BE BUILT

SUGGESTION
CONSTRUCT A ROAD THAT CUTS DIRECTLY THROUGH AND REMOVE THE DOG LEG IN THE CORNER.

AFFECTED LAND OWNERS: 1

REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS
1	5/08/2016	INITIAL DRAWING	JM			

DRAWING NOTES:

ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE (UNO) ALL WEIGHTS ARE IN t (METRIC TONNES) UNO ALL DETAILS ARE PROVISIONAL AND SUBJECT TO CONFIRMATION LASHINGS CALCULATIONS AS PER RESTRAINT GUIDELINES

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ARES TRANSPORT GROUP PTY LTD - ABN: 24 614 163 754

ARES

DRAWN BY:
DRAWN DATE:
CHECKED BY:

CUSTOMER	VESTAS	SIZE	A3
PROJECT	RYE PARK	SCALE	NTS
DRAWING TITLE	RYE PARK SWEPT PATHS	SHEET No	
DRAWING NAME	RYE PARK SWEPT PATHS.DWG	REV	A3

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global experience

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