

PALING YARDS WIND FARM

State Significant Development
SSD-29064077
Traffic Impact Assessment

Prepared for:

Paling Yards Development Pty Ltd
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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Paling Yards Development Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
640.30153.00010-R01-v3.1	29 May 2023	Kanella Dimos	Charlie Seventekin	Jeffrey Baczynski

EXECUTIVE SUMMARY

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Global Power Generation Australia (GPG) in the care of Tract Consultants (Tract) to prepare a Traffic Impact Assessment (TIA) for a wind farm development in Paling Yards, New South Wales.

GPG is a Naturgy Group Company dedicated to the electricity generation business. GPG develops and manages generation assets with a global approach, and offers development, construction, operation and maintenance services for its facilities.

The application proposes an up to 287-Megawatt (MW) wind farm to be constructed on land holdings known as “Mingray Park”, “Middle Station”, “Paling Yards” and “Hilltop” located at approximately 60km south of Oberon and 60km north of Goulburn.

The proposed wind farm development will comprise an arrangement of 47 wind turbines, two substations and associated electrical equipment. The development will also provide a ~9km long high voltage transmission line that will connect the site with the external power network. Ancillary elements of the development include internal access tracks and temporary construction facilities.

A State Significant Development (SSD) application (#29064077) was made in February 2022 and this TIA will form a part of the EIS preparation process.

Based on the analysis and discussion documented in this report, the following is concluded:

- The proposed development will generate an additional traffic of approximately 40,600 trips during the construction period of the proposed development (475 days – 22 months) and therefore approximately 85/86 trips a day;
- The proposed access locations satisfy the sight distance requirements of the Austroads Guidelines;
- The proposed access locations can accommodate the transportation of the required Oversize and Over Mass (OSOM) materials;
- All access locations should be designed to Basic Right Turn (BAR) and Basic Left Turn (BAL) as per Austroads Guidelines;
- No operational assessment was undertaken due to the low existing traffic volumes along Abercrombie Road and low daily traffic generation potential of the proposed construction works;
- The publicly available crash dataset indicates some recurring crash types and themes; therefore, it is recommended that construction workforce is briefed on the geometric challenges of the existing road network with a Driver’s Code of Conduct; and
- It is also recommended that a construction traffic management plan be prepared following the approval of this development application.

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1 Introduction

1.1 Context

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Global Power Generation Australia (GPG) in the care of Tract Consultants (Tract) to prepare a Traffic Impact Assessment (TIA) for a wind farm development in Paling Yards, New South Wales.

The application proposes a wind farm of up to 287-Megawatts (MW) to be constructed on land holdings known as “Mingray Park”, “Middle Station”, “Paling Yards” and “Hilltop”, located at approximately 60km south of Oberon and 60km north of Goulburn.

The proposed wind farm development will comprise an arrangement of 47 wind turbines, two substations and associated electrical equipment. The development will also provide a ~9km long high voltage transmission line that will connect the site with the external power network. Ancillary elements of the development include internal access tracks and temporary construction facilities.

The development plan, prepared by GPG, is reproduced at Appendix A.

1.2 Application

This TIA has been prepared to inform a request from Department of Planning and Environment (DPE) for Secretaries Environmental Assessment Requirements (SEARs), which will ultimately inform a State Significant Development (SSD) application.

This report has been prepared based on the requirements provided by DPE in their SEARs. It is also worth noting that several references were made to Austroads Guidelines.

1.3 Assessment Scope

This TIA report assesses the consistency of the development with Council and State planning and evaluates the impacts of the proposed Paling Yards Wind Farm development on the surrounding transport network. This TIA identifies the transport infrastructure required to support the development, and provides an assessment of the traffic- and transport-specific aspects of the development against the requirements of the following relevant authorities:

- Oberon Regional Council; and
- Transport for New South Wales (TfNSW).

1.4 Report Structure

The structure of this TIA report is shown in Table 1.

Table 1 TIA Report Structure

Section	Title	Description
1	Introduction	Identifies the context of the project.
2	Project Description	Describes the project including location, site design and access arrangements.
3	Existing Conditions Appraisal	Describes the existing transport network including traffic volumes, crash history and bus services.
4	Project Traffic Demands	Details the project generated traffic demands and assessed traffic volumes.
5	Traffic Engineering Considerations	Outlines the technical analysis undertaken to confirm the appropriateness of proposed development from traffic engineering perspective.
6	Recommendations	Outlines the recommended actions for the applicant following the lodgement of SSD application.
7	Conclusion	Summarises the findings of the assessment and recommends approval conditions.

1.5 DPE Requirements (SEARs)

Table 2 replicates the traffic- and transport-specific requirements issued by DPE.

Table 2 DPE Requirements (SEARs)

Requirement	Addressed / Response
An assessment of the construction, operational and decommissioning traffic impacts of the development on the local and State Road network;	This report details the construction phase of the proposed wind farm. Operational and decommissioning impacts of wind farms are sufficiently small that, if construction impacts are satisfied, infrastructure provided for construction can readily accommodate the operational and decommissioning traffic demands. Please refer to Section 2.2.2 for operational and decommissioning works.
Provide details of the peak and average traffic volumes (including light, heavy and over-mass / over-dimensional vehicles) and transport and haulage routes during construction, operation and decommissioning, including traffic associated with sourcing raw materials (water, sand and gravel);	Section 3 – Existing Conditions Section 4 – Project Traffic Demands Section 4.1.2 – Operation Phase Traffic Generation Section 4.1.3 – Decommissioning Phase Traffic Generation
An assessment of the potential traffic impacts of the project on road network function including intersection performance, site access arrangements, site access and haulage routes, and road safety, including school bus routes and school zones;	Section 3 – Existing Conditions Section 4 – Project Traffic Demands Section 5 – Traffic Engineering Considerations

Requirement	Addressed / Response
An assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the project (including over-mass / over-dimensional traffic haulage routes from port) during construction, operation and decommissioning;	Throughout the report.
An assessment of the likely transport impacts to the site access and haulage routes, site access point, any rail safety issues, any Crown Land (including existing Travelling Stock Route network), particularly in relation to the capacity and conditions of the roads and use of rail level crossings (and rail safety assessment if required), and impacts to rail underbridges and overbridges;	Throughout the report.
A Cumulative impact assessment of traffic from nearby developments including, Crookwell 3 Wind Farm; and	Section 4.2
Provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road and / or rail authority.	Section 5.2 Section 6

Detailed comments provided by TfNSW is provided in Appendix B.

2 Project Description

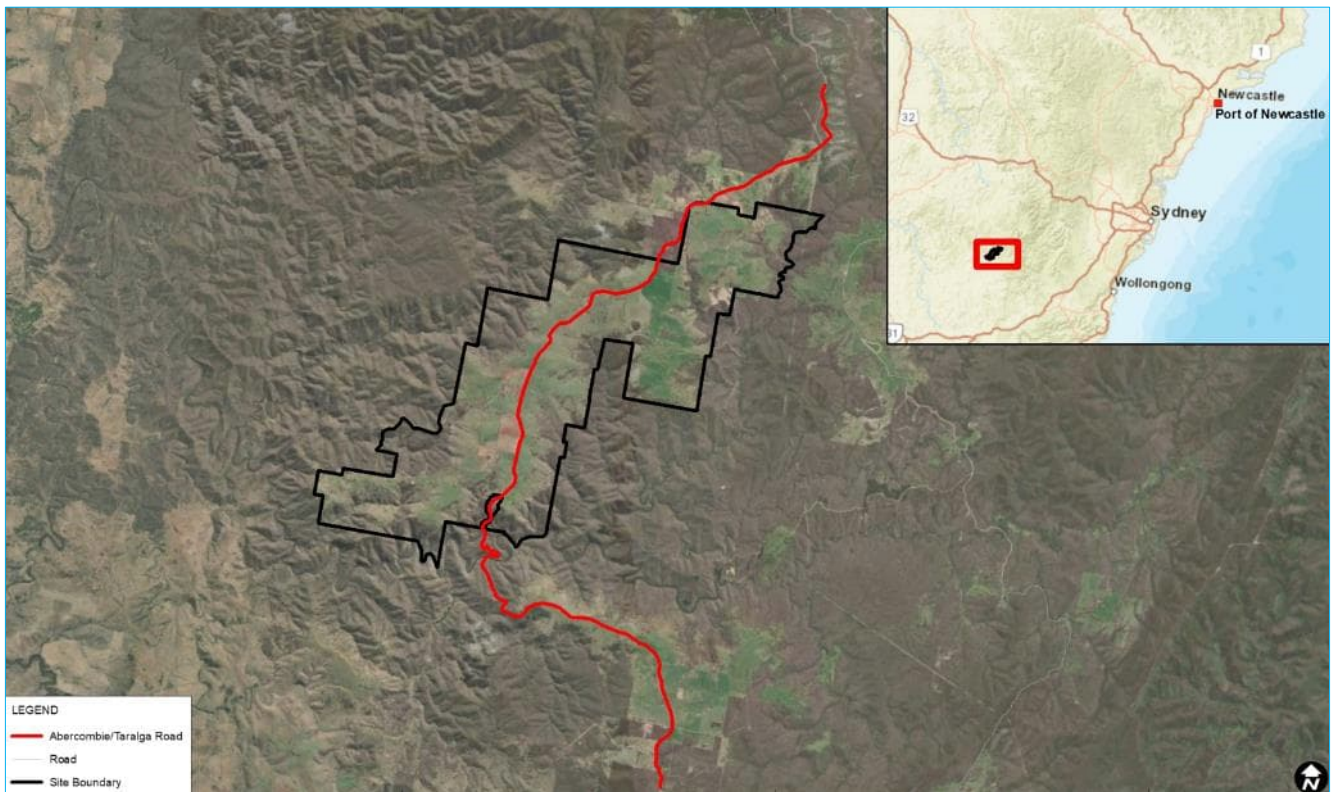
2.1 Overview

The development proposes the construction of 47 wind turbines with a total output of up to 287 MW on rural land holdings known as “Mingary Park”, “Middle Station”, “Paling Yards” and “Hilltop”. The site is traversed by Abercrombie Road which runs in a northerly & southerly direction.

The development site is located within the jurisdiction of Oberon Local Government Area (LGA), and is zoned as “Rural”, under the *RU1: Primary production* in the provisions of the *Oberon Local Environmental Plan 2013* (LEP). The adjacent and surrounding land are comprised of *RU1: Primary production* and *C1: National Parks and Nature Reserves* lots. Lots that are parts of the proposed development is provided in detail in Appendix C.

Figure 1 provides an overview of the site location in the regional context.

Figure 1 Site Location in the Regional Context

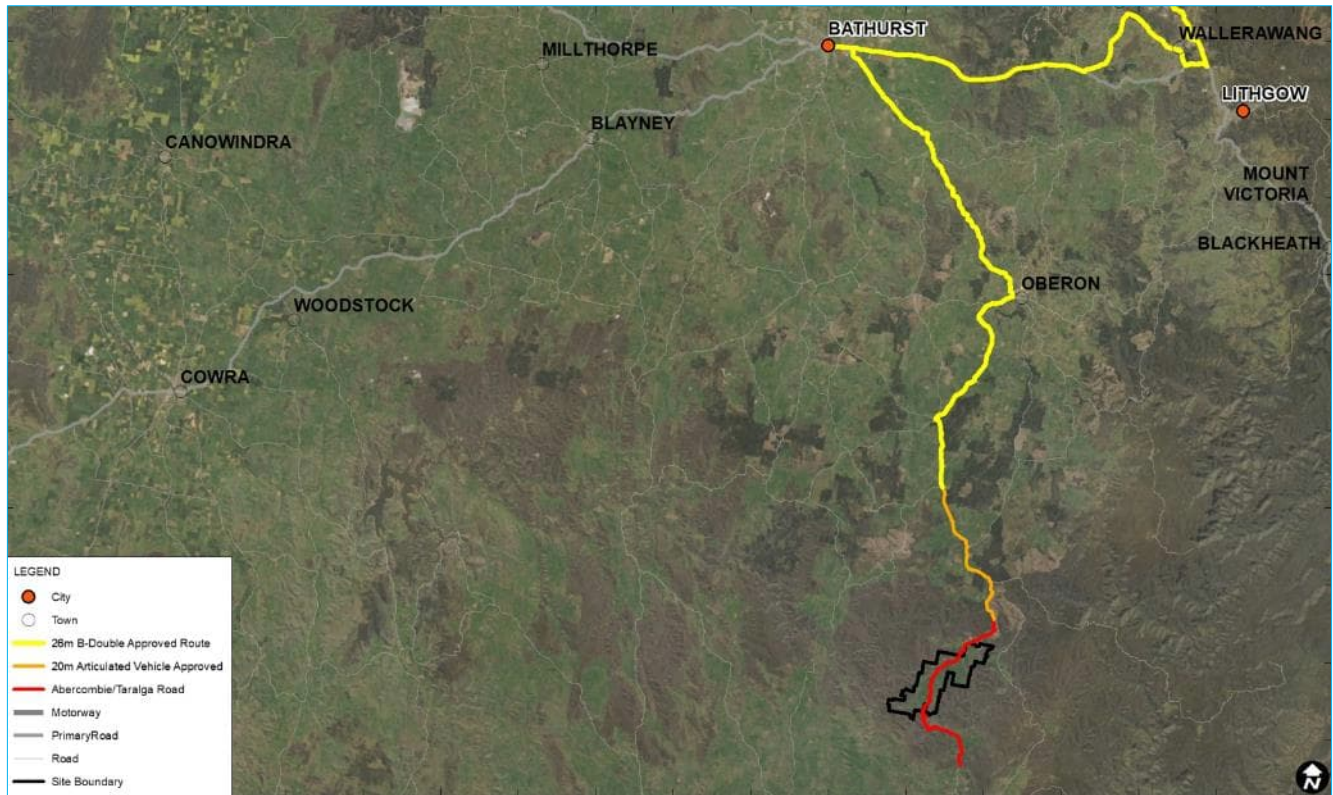


Source: SLR

It is proposed that there will be a total of 47 turbines which will be accessed from five different access locations (all from Abercrombie Road). The turbines will be connected to the site's substations via an underground electrical and communications network. The substations will link the site to the external power grid via ~9km of high voltage overhead transmission lines. The turbines, electrical network and associated infrastructure will be accessed via a series of internal site roads that will ultimately connect to the five access locations on Abercrombie Road.

Figure 2 provides an overview of the site location in the local context.

Figure 2 Site Location in the Local Context



Source: SLR

2.2 Project Program

2.2.1 Construction Phase

The proponent (GPG) has advised that the development will be constructed over a 22-month period with construction commencing in late-2023. A linear traffic generation estimate has been applied for construction movements associated with material, equipment and workforce mobilisation and decommissioning. The development will be decommissioned and rehabilitated at the end of its operational life.

2.2.2 Operation & Decommissioning Phase

The development is expected to operate for approximately 30 years providing short-, medium- and long-term local employment opportunities. A Transmission Network Service (TNSP) provider is expected to deliver, own and operate the windfarm's transmission infrastructure. Before commissioning, the TNSP will formally take possession of the required and interests to own and operate the grid connection assets. At the end of the project's operational life, GPG, as the consent holder, will be responsible for decommissioning and rehabilitating the wind farm, including the collector substation, transmission line and the switching station. The operation and decommissioning processes will have much lesser traffic generation than the construction period, based on the fact that wind turbines are low maintenance machinery, and their blades will be disassembled into several parts before disposal.

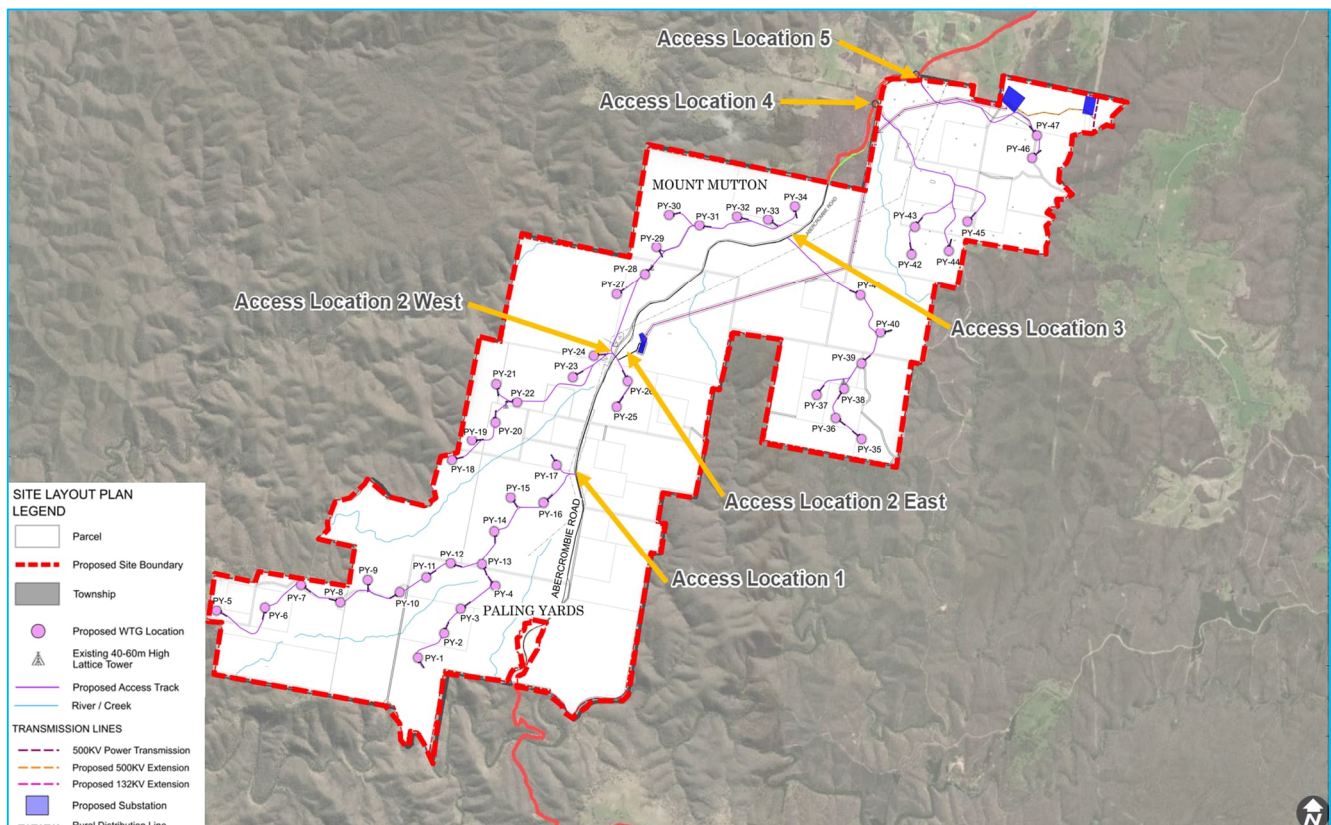
It is important to note that the construction scenario of any wind farm have the largest traffic impacts, compared to their impacts during the operation and demobilisation phases. Based on this, no detailed assessments are undertaken for operational and demobilisation phases.

2.3 Site Access

It is proposed that access to/from the development will be provided from Abercrombie Road via five new intersections as illustrated in Figure 3.

At the time of preparing this report it is proposed that the project will be serviced by five access locations, with a dual access at Access Location 2. Access Locations 1 and 2 will service the western portion of site and Access Locations 3, 4 and 5 will service the eastern portion of the site. Internal access tracks will be utilised throughout to facilitate vehicle movements between the access locations and site infrastructure.

Figure 3 Proposed Five Access Locations



Source: SLR

2.3.1 Access Staging

Access Location 5 will provide access to the substation, which requires construction lead time if project commissioning is not to be delayed. Therefore, for the purposes of the construction staging, it is anticipated, subject to detailed planning, that Access Location 5 will be constructed first. This is anticipated to be followed by Access Location 2 which will enable the construction of collector substation, construction laydown area and concrete batching plant. The construction of Access Locations 1, 3 and 4 is anticipated to follow Access Location 2.

2.4 Haulage

2.4.1 Turbine Specifications

The 'base-case' wind turbines used for this study are General Electric (GE) Cypress 158 – 50/60Hz. Technical specifications of this wind turbine are provided in Appendix D.

Turbines will be transported to the site in various components, as per the below:

- Turbine blade components:
 - Blade tip: 15.1m long x 2.4m wide x 2.4m high with an approx. weight of 2.5 tonnes; and
 - Blade root: 65.4m long x 4.0m wide x 3.3m high with an approx. weight of 28 tonnes.
- Turbine tower components:
 - Base Tower (Section 1): 9.3m long x 5.5m wide x 5m high with an approx. weight of 73 tonnes;
 - Section 2 Tower: 12.6m long x 4.85m wide x 5.0m high with an approx. weight of 74 tonnes;
 - Section 3 Tower: 14.0m long x 4.6m wide x 4.85m high with an approx. weight of 74 tonnes;
 - Section 4 Tower: 19.8m long x 4.6m wide x 4.3m high with an approx. weight of 90 tonnes;
 - Section 5 Tower: 23.5m long x 4.3m wide x 4.3m high with an approx. weight of 82 tonnes;
 - Section 6 Tower: 30.8m long x 4.3m wide x 4.3m high with an approx. weight of 75 tonnes;
 - Top Tower (Section 7): 35.9m long x 4.3m wide x 3.7m high with an approx. weight of 63 tonnes.
- Hub: 4.6m long x 4.2m wide x 3.85h with an approx. weight of 51 tonnes.
- Machine Heads (Nacelle): 14.12 m long x 3.97m wide x 3.45m high with an approx. weight of 98 tonnes.
- Drive trains: 6.6m long x 3.98m wide x 3.45m high with an approx. weight of 82 tonnes.

As detailed above, it is anticipated that each turbine is expected to weigh around 850-900 tonnes and assembled by 16 major components. It is worth noting that each turbine will require three blade roots and three blade tips as listed above.

The longest load that will be transported to the site is the blade root which has the following specifications:

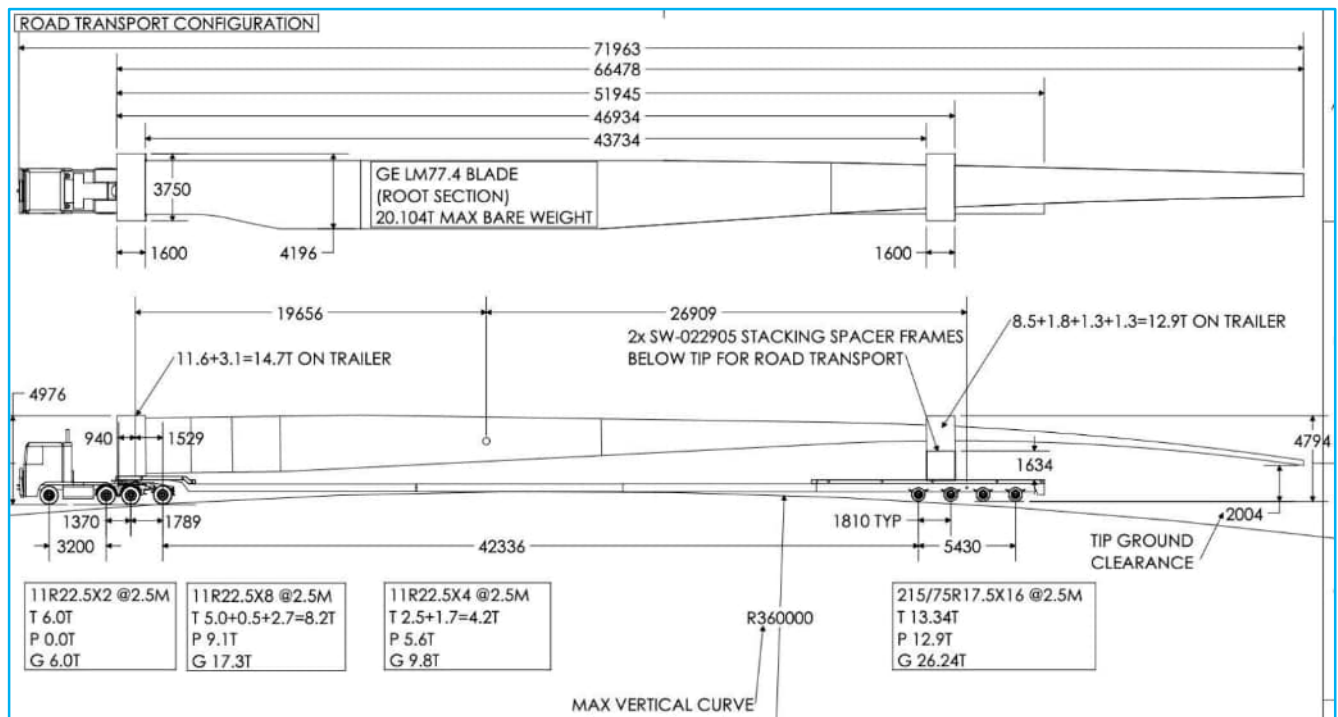
- Blade root: 65.4m long x 4.0m wide x 3.3m high with an approximate weight of 28 tonnes.

It was also identified that the heaviest load that will be transported to the site is the Machine Head (Nacelle), which has the following specifications:

- Machine Heads (Nacelle): 14.12 m long x 3.97m wide x 3.45m high with an approx. weight of 98 tonnes.

The transportation of the blade root will require a special vehicle to transport, as illustrated in Figure 4.

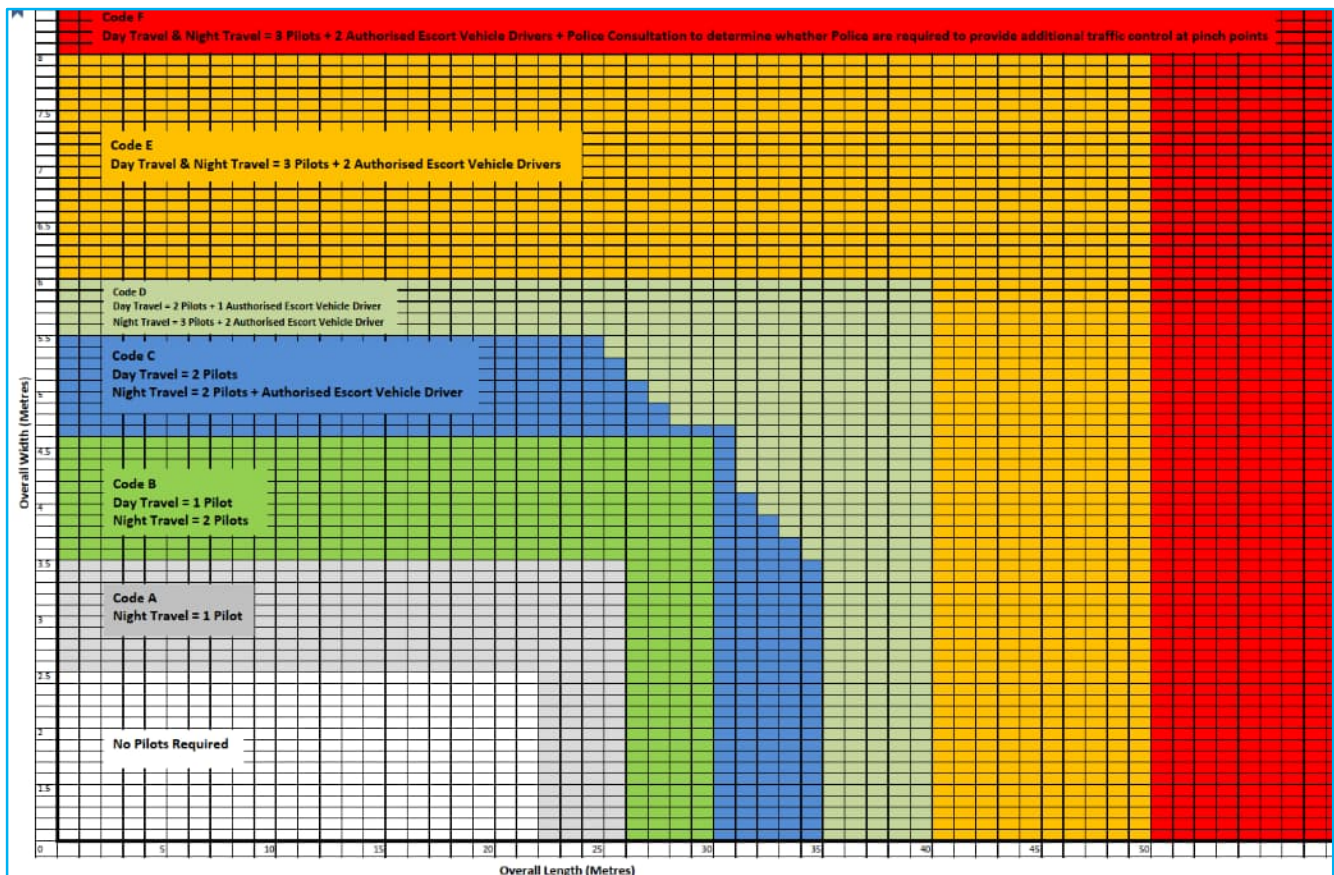
Figure 4 Largest Design Vehicle to Be Utilised



Source: Rex J Andrews

Transporting such loads requires specialised Oversize and Over mass (OSOM) permits and mitigation measures outlined in Figure 5.

Figure 5 OSOM Load Requirements (Pilot, Police and Escort Vehicles)



Source: [TFNSW¹](https://roads-waterways.transport.nsw.gov.au/documents/business-industry/heavy-vehicles/osom-minimum-pilot-aevd-matrix.pdf)

Based on a review of the Figure 5 above, it is identified that the transportation of:

- Blade roots will trigger Code F; and
- Top towers will trigger Code D or Code E, subject to overall vehicle dimensions.

2.4.2 Proposed Haulage Route

The wind turbine components will be imported to the Port of Newcastle from overseas manufacturing plants and transported via road freight to the Paling Yards site.

GPG commissioned a OSOM transportation specialist (Rex J Andrews – RJA) to conduct a series of route feasibility studies considering the transportation details of all OSOM materials, inclusive of the turbine blade roots via an extendable trailer arrangement with a remote-controlled bogie.

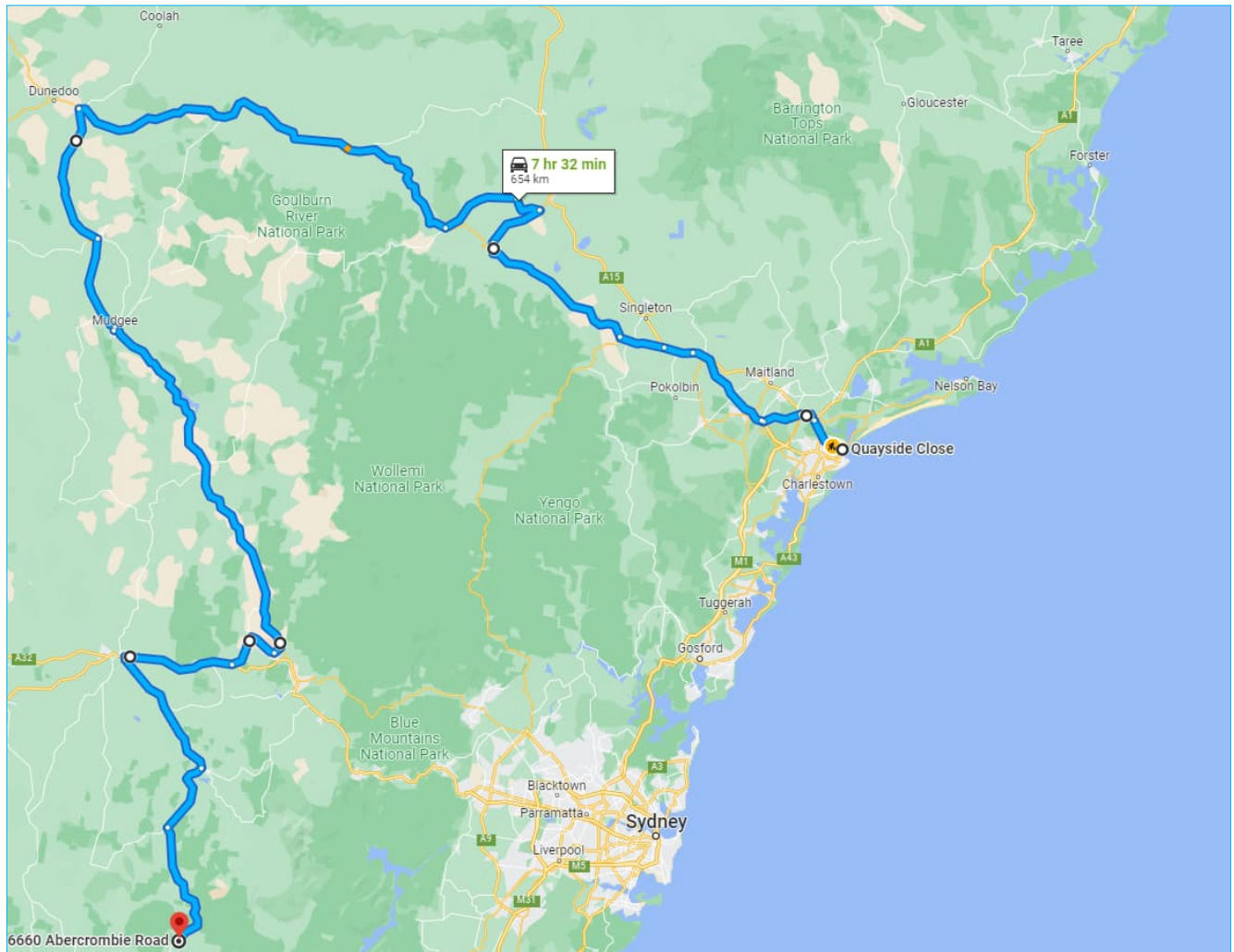
In their report, RJA assessed various pinch points along the route to ensure that the road geometry could accommodate the transportation of all OSOM materials required.

¹ <https://roads-waterways.transport.nsw.gov.au/documents/business-industry/heavy-vehicles/osom-minimum-pilot-aevd-matrix.pdf>

The transportation of the blade roots requires careful consideration due to its geometric specifications. Accordingly, the route assessment provides a “worst case scenario,” which therefore will accommodate the transportation requirements of all other smaller turbine components.

Consistent with TfNSW comments provided in the SEARs, the Blue Mountains route (Great Western Highway) will not be used for OSOM materials. RJA has reviewed three route options from Port of Newcastle to the subject site and identified that the route via Mudgee is the most favourable one, which is illustrated in Figure 6.

Figure 6 Proposed Access Route



RJA report should be read in conjunction with this TIA. RJA’s report also provides the technical specifications of each turbine material. Please refer to Appendix E.

Further analysis of key intersections in relation to the transportation of OSOM materials, their potential land impacts and the ownership details of these lands are detailed in Appendix F1, Appendix F2 and Appendix F3; respectively.

The entire route (via Mudgee) covers approximately 654 kilometres. This route considers the transportation of the blades out of the Port of Newcastle via Selwyn Street and then north via Industrial Drive. The route continues onto Maitland Road through Tarro then onto New England Highway through Belford (via John Renshaw Dr and the Hunter Express-way). From New England Highway, the route continues onto the Golden Highway through Jerry Plains. The vehicles will then exit the Golden Highway to travel north on Denman Road through Elderton and Wybong via Wybong Road. The route then connects back to the Golden Highway off Denman Road and continues west through Sandy Hollow. The vehicles will then exit the Golden Highway at Dunedoo and begin travelling south onto Castlereagh Highway through Mudgee. The route continues south to Wallerawang where it connects with the Great Western Highway moving west towards Bathurst via Kelso. Once at Kelso the vehicles will travel south onto Littlebourne Street and continue onto O'Connell Road through Oberon which connects with Abercrombie Road. Once on Abercrombie Road, vehicles will travel to their designated locations via six access intersections.

It is anticipated that the return trip will require approximately three days per wind turbine root blade. This estimation considers both the additional time required to navigate a load of such scale and the NSW Heavy Vehicle Fatigue management regulations which mandate a maximum 12 hours of work time for heavy vehicle drivers.

Below is the anticipated schedule of the typical transportation of a turbine blade:

- Day 1: Load material at Port of Newcastle and travel to Kelso and rest;
- Day 2: Travel from Kelso to Paling Yards and unload material; and
- Day 3: Travel with no load from Paling Yards to Port of Newcastle (return).

Based on this estimation it is possible that the site will receive two turbine blades per week. However, this is subject to variability given the demands of other concurrent site works, including transmission line and substation installation as well as a range of other external variables like weather.

2.5 Construction Phase

2.5.1 Activities

For the purposes of forecasting peak development traffic demands associated with the construction stage, the following construction activities are anticipated to generate traffic on the external road network:

- Site clearance and establishment;
- Construction machinery deliveries;
- Equipment and material deliveries; and
- Workforce transportation.

2.5.2 Workforce

There are anticipated to be 150 persons maximum on-site comprised of 140 labourers travelling via coaster buses and ten supervisors travelling to the site via light vehicles. This represents the highest volume of personnel potentially on site at a given time. On a typical day there will likely be fewer workers on site. However, for a conservative assessment, it has been assumed that there will be 150 workers accessing the site throughout the duration of the construction phase.

2.6 Operation Phase

2.6.1 Activities

Once the proposed development is operational, there will be no activities that require large numbers of workforce on-site. It is understood that for the majority of the development's life, operations will involve a range of preventative, corrective and condition-based maintenance activities which would entail various maintenance, inspection and servicing for the turbines, the associated electrical network and internal road infrastructure. The external movements associated with these tasks will generally be performed by 5.2m long VANS, 6.4m long small rigid vehicles (SRVs) and 8.8m long medium rigid vehicles (MRVs).

2.6.2 Workforce

There are anticipated to be ten full time equivalent (FTE) staff on site, with potentially up to an additional ten FTE contractors. There will likely be fewer workers on site on a typical day, however for a conservative assessment, it has been assumed that there will be 20 FTE workers on site throughout the project's operation phase.

3 Existing Conditions Appraisal

3.1 Road Network

The characteristics of the road network surrounding the site are summarised in Table 3.

Table 3 Surrounding Road Network

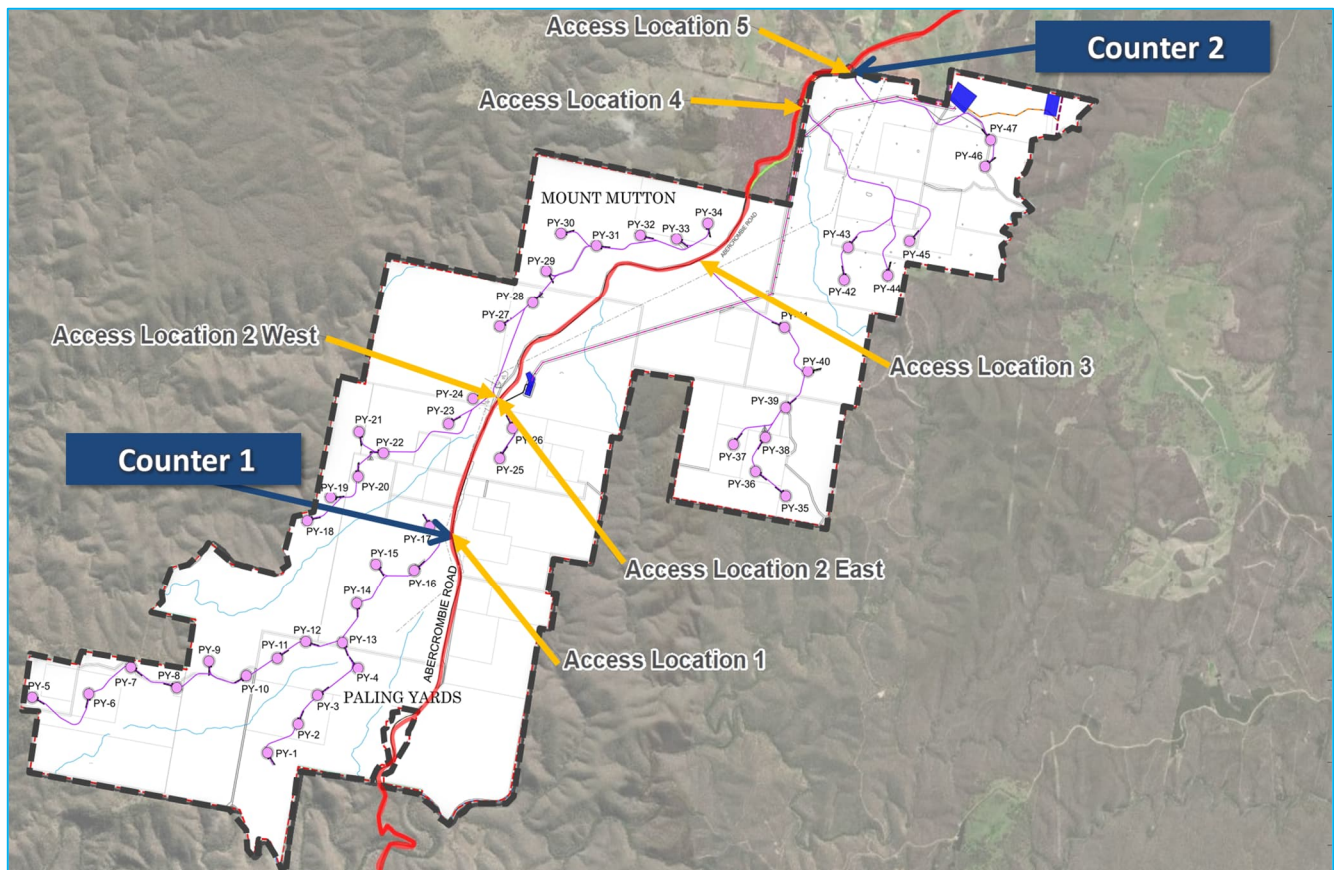
Road Name	Jurisdiction	Average Daily Weekday Traffic	Average Daily Weekend Traffic	Average Daily Traffic	Posted Speed Limit	Road Classification
Abercrombie Road	Oberon Council	280 ^[1]	460 ^[1]	330 ^[1]	100km/h	Regional Road (Road Number 256)

[1] Average Daily traffic was obtained from traffic survey data collected from 31 May to 7 June (Appendix G).

3.2 Traffic Surveys

To ascertain the existing traffic demands of the road network surrounding the site, automated tube count (ATC) surveys were undertaken from Tuesday 31 May 2022 to Tuesday 7 June 2022 at two locations within the site boundary. To be specific, tubes were installed adjacent to the southernmost (Access Location 1) and northernmost (Access Location 5) access locations. The locations of the counters are illustrated in Figure 7.

Figure 7 Traffic Volume Counter (ATC) Locations



Source: SLR

Based on the traffic survey data, it was established that the network peak hour occurred between 11:00am and 12:00pm on a typical day. The 7-day average peak hour volumes are illustrated below in Table 4.

Table 4 Traffic Survey Peak Hour Volumes

Counter	No. Southbound vehicles	No. Northbound vehicles
Counter 1 (Access Location – 1)	15	19
Counter 2 (Access Location – 5)	16	19

The traffic volumes used for this assessment are provided in Appendix G.

3.3 National Heavy Vehicle Regulator Approved Routes

A review of the National Heavy Vehicle Regulator (NHVR) approved routes has been completed to identify any potential constraints associated with construction vehicle access. Table 5 summarises the NHVR classification of the roads included in the proposed OSOM material haulage route (Also refer to Section 2.4.2).

Table 5 NHVR Approved Roads

Road Name	NHVR Allowances
Selwyn St, George St, Industrial Dr, Maitland Rd, New England Hwy, John Renshaw Dr, Hunter E-Way, Golden Hwy, Denman Rd	B-double 25/26m
Bengalla Rd	B-double 25/26m (partially)
Wybong Rd	20m Articulated Vehicle (AV)
Golden Hwy (Merriwa Rd), Castlereagh Hwy	B-double 25/26m
Main St, Pipers Flat Rd, Range Rd	B-double 25/26m “Only for use in emergency situations when directed by Roads and Maritime Services personnel or NSW Police”
Great Western Hwy, Littlebourne St, O’Connell Rd	B-double 25/26m
Abercrombie Rd	B-double 25/26m (partially)

3.4 Railway Crossings

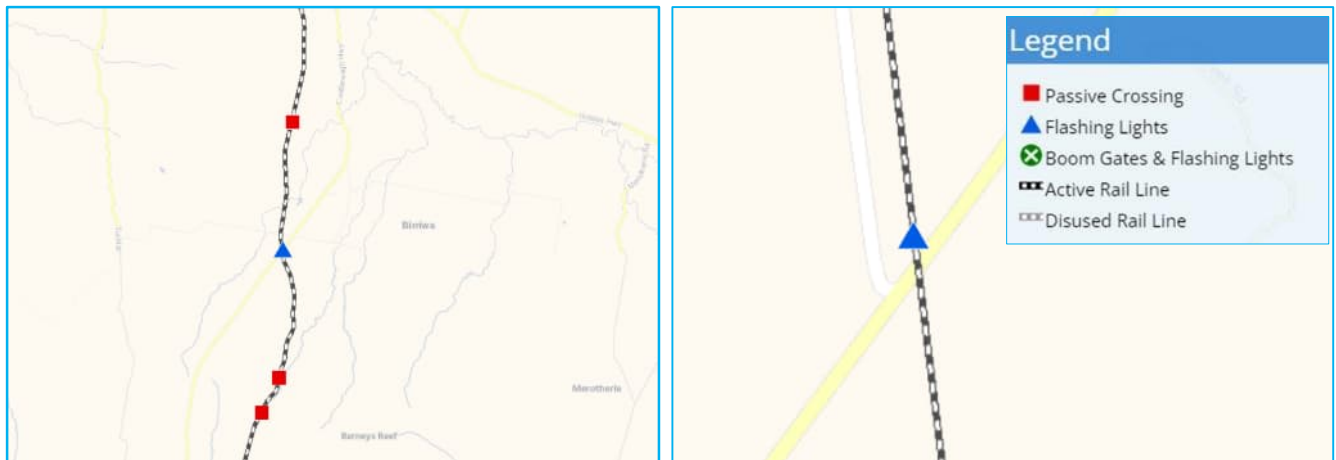
SLR undertook a review of the railway crossings that will need to be negotiated during the transportation of OSOM materials. According to NSW Public Level Crossing Finder², railway crossings are classified into three groups, which are as follows:

- Flashing light crossings;
- Passive crossings; and
- Boom gate and flashing light crossings.

There are a total four of Flashing Light crossings along the OSOM material transport route and no Passive crossings or boom gate crossings. The locations of these four crossings are provided in Figure 8 to Figure 11.

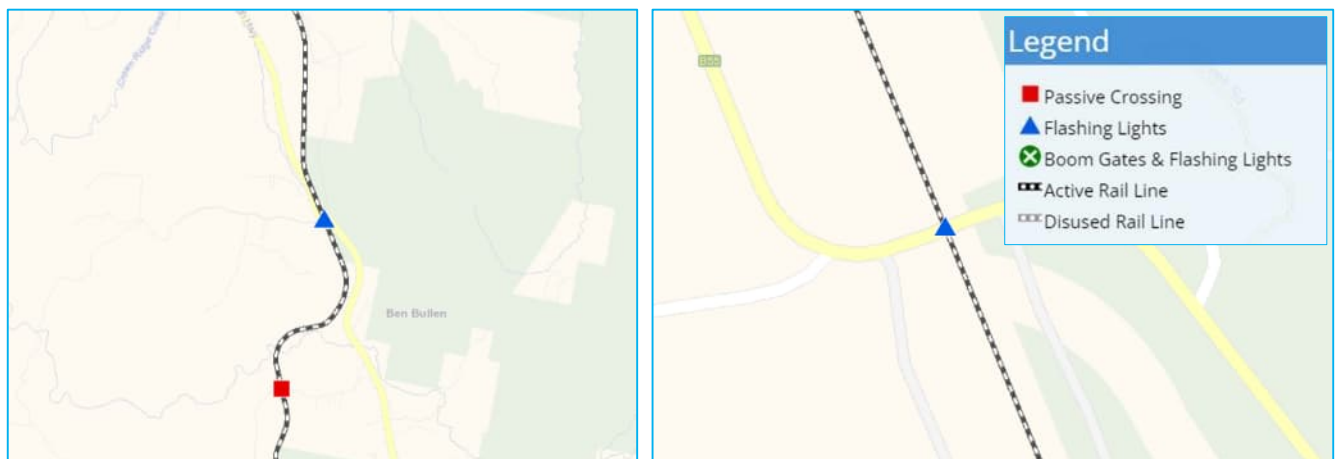
² <https://appln.transport.nsw.gov.au/mapservices/proxy/levelCrossings/map.html>

Figure 8 Castlereagh Highway through Birriwa (Flashing Lights – LXM ID 1425)



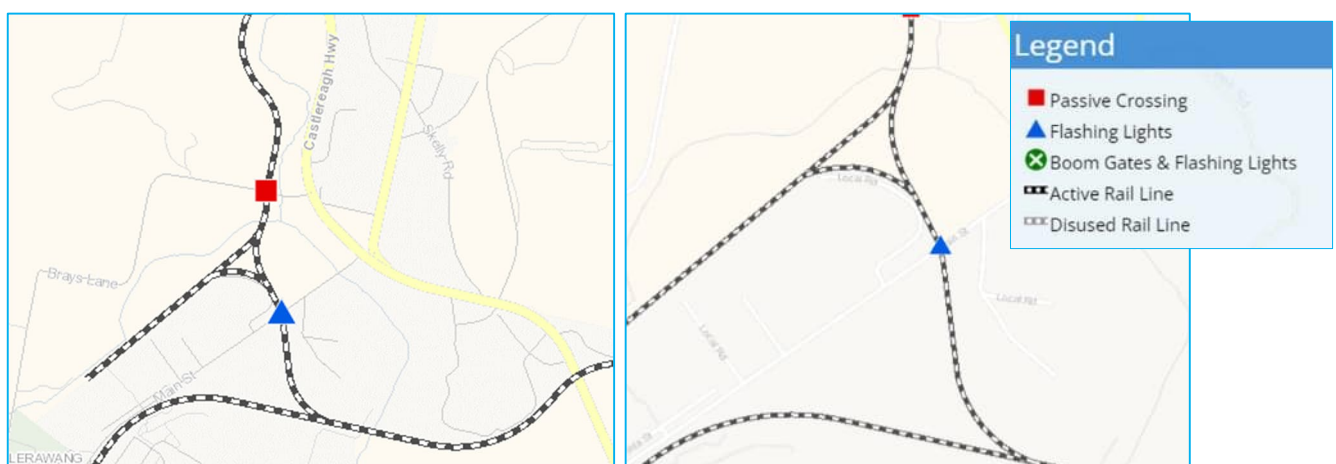
Source: ¹ <https://applan.transport.nsw.gov.au/mapservices/proxy/levelCrossings/map.html>

Figure 9 Castlereagh Highway before Ben Bullen (Flashing Lights – LXM ID 1385)



Source: ¹ <https://applan.transport.nsw.gov.au/mapservices/proxy/levelCrossings/map.html>

Figure 10 Main Street off Castlereagh Highway (Flashing Lights – LXM ID 1436)



Source: ¹ <https://applan.transport.nsw.gov.au/mapservices/proxy/levelCrossings/map.html>

Figure 11 Pipers Flat Road off Main Street



Source: ¹ <https://apln.transport.nsw.gov.au/mapservices/proxy/levelCrossings/map.html>

3.5 Crash History

To highlight any safety deficiencies in the surrounding road network in proximity to the subject site, crash data has been extracted from TfNSW Centre for Road Safety website. Crashes are reported for the latest five-year period (between 2016 - 2020).

The locations of the reported crashes are illustrated in Figure 12 with details and RUM codes summarised in Table 6.

Figure 12 Study Road Network Crash Data

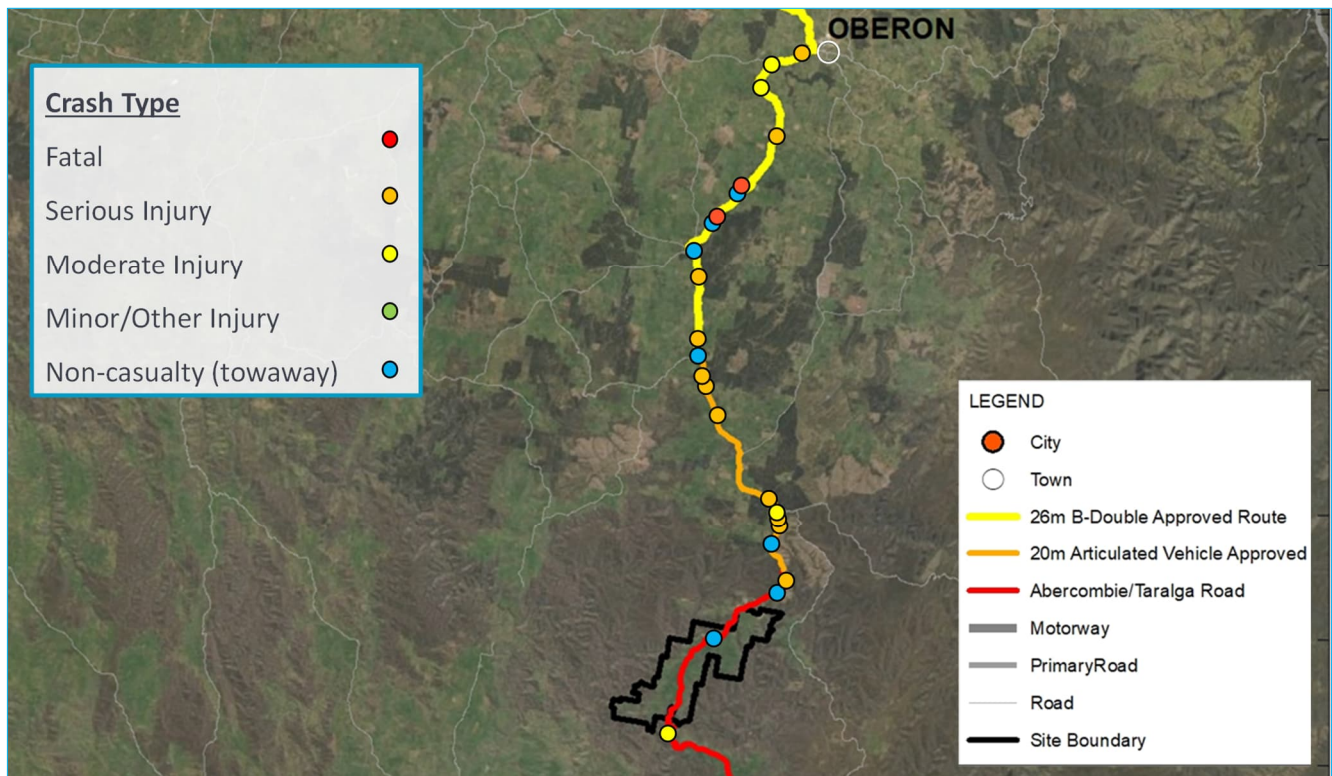


Table 6 Crash Locations (2016 – 2020)

Crash Ref.	Year	Location	Crash Severity	RUM Code	RUM description
1130843	2017	Abercrombie Road	Non-casualty (Towaway)	81	Off bend, hit object
1217052	2019		Non-casualty (Towaway)	86	Off left bend
1247865	2020		Serious Injury	84	Off right/left bend
1114194	2016		Non-casualty (Towaway)	67	Struck Animal
1116801	2016		Serious Injury	74	On Road – Out of Control
1162749	2018		Serious Injury	71	Off road left, hit object
1242953	2020		Moderate Injury	81	Off left/right bend, hit object
1144770	2017		Serious Injury	88	Out of Control on bend
1111082	2016	Aberc. Rd & Gormans Lane	Serious Injury	73	Off road right, hit object
1152909	2017	Abercrombie Road	Serious Injury	72	Off Road to Right
1152120	2017		Serious Injury	88	Out of Control on bend
1236453	2020	Aberc. Rd & Isabella Road	Non-casualty (Towaway)	67	Struck Animal
1161569	2018	Abercrombie Road	Serious Injury	73	Off road right, hit object
1199171	2019		Serious Injury	67	Struck Animal
1208212	2019		Non-casualty (Towaway)	87	Off left Bend, hit object
1201558	2019		Fatal	71	Off road left, hit object
1250591	2020		Non-casualty (Towaway)	71	Off road left, hit object
1105281	2016		Non-casualty (Towaway)	88	Out of Control on bend
1204493	2019		Moderate Injury	83	Off right bend, hit object
1190733	2019		Fatal	71	Off road left, hit object
1163980	2017		Serious Injury	85	Off bend, hit object
1189305	2018		Moderate Injury	88	Out of Control on bend
1207832	2019	Aberc. Rd & Sewells Creek Rd	Moderate Injury	21	Right through
1149958	2017	Abercrombie Road	Serious Injury	81	Off left/right bend, hit object

As shown in Table 6, there were a total of 24 crashes along Abercrombie Road between Oberon and the proposed development. Of these crashes:

- Two resulted in fatal injuries;
- 11 resulted in serious injuries;
- Four resulted in moderate injuries; and
- Seven were non-casualty crashes.

A review of the RUM codes of these crashes indicate that the majority of the crashes occurred due to loss of vehicle control (particularly at bends) and vehicles leaving the carriageway before colliding into objects on the side of the road. It is recommended the drivers' code of conduct, which is provided in Appendix K, are reviewed and signed by the construction workforce to enable a better understanding of the features of the haul road.

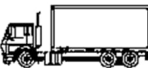
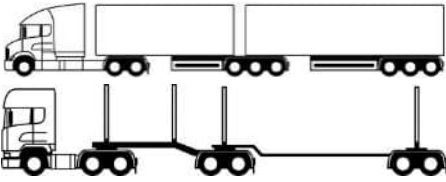
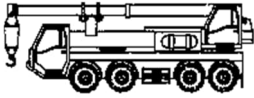
4 Project Traffic Demands

4.1 Traffic Generation

4.1.1 Construction Phase Traffic Assumptions

The vehicle fleet anticipated to be associated with the development is shown in Table 7.

Table 7 Vehicle Fleet

Vehicle	Typical Vehicle Profile	Haulage Material
Private vehicle		Miscellaneous workforce travel
Coaster bus		Workforce
Concrete Truck		Concrete
12.5m Heavy Rigid Vehicle (HRV)		Waste removal
20m Six Axle Articulated Vehicle (AV)		Quarry products Miscellaneous materials Miscellaneous equipment Fuel delivery Contractor supplies
20m 32t truck and dog		Aggregate
20m Low Loader (Float)		Miscellaneous equipment Construction mobilisation Construction de-mobilisation
26m B-Double		Quarry products Miscellaneous materials Miscellaneous equipment Construction mobilisation Construction de-mobilisation
Crane		Construction mobilisation
OSOM		Miscellaneous equipment Construction mobilisation Construction de-mobilisation

Traffic that will be generated during the construction of the proposed development will largely be associated with the transportation of the workforce and materials / equipment. In order to simplify the construction traffic, SLR has broken down the traffic generating elements of the proposed works into four classes, as follows:

- Construction workforce;
- Erection of turbines, inclusive of the engineering materials and consumables;
- Transportation of concrete; and
- Construction of transmission line and sub-stations.

Table 8 provides an overview of the workforce assumptions.

Table 8 Traffic Generation Assumptions (Construction Workforce)

Element	Assumption	Source
Workforce	150 persons maximum on-site (140 Laborers and 10 Supervisors)	GPG
Roster	5 days on / 2 days off	SLR Assumption
Shift rotation	Up to 9 hours during daylight (8 hours average)	GPG
Construction Duration	22 Months (475 days)	GPG
Construction Progress	Linear progress across 22 months	SLR Assumption
Travel Arrangements	Labourers via coaster bus Supervisors via private (light) vehicle	GPG
Light vehicle occupancy	1 passenger per vehicle	SLR Assumption
Coaster bus occupancy	14 passengers per vehicle	SLR Assumption
Total Staff Movements	9,500 Coaster bus trips 9,500 Light Vehicle trips 19,000 trips in total (Workforce)	SLR Assumption
Staff Movements per day	20 Coaster bus trips 20 Light Vehicle trips	SLR Assumption
Accommodation	Oberon and Bathurst (preferred)	GPG
Workforce Distribution	100% to/from North (70% Bathurst, 30% Oberon)	GPG

As summarised in Table 8 above, it is anticipated that 19,000 return trips associated with the workforce will occur during the construction of the proposed development (across 475 days – 22 months).

Table 9 provides an overview of the anticipated traffic associated with the transportation of wind turbine components.

Table 9 Traffic Generation Assumptions (Erection of Turbines)

Element	Location	Assumption	Vehicle Type	Source
Wind Turbine Blades (Two pieces per blade)	Newcastle Port	564 trips ³	Custom Vehicles	Rex J Andrews
Wind Turbine Tower (Seven pieces per tower)	Newcastle Port	658 trips ⁴	Custom Vehicles	
Consumables	Bathurst	150 trips total	20m AV	GPG
Fuel	Bathurst	150 trips total	20m AV	
Quarry product (Road base)	Oberon or on-site	4,200 trips total ⁵	20m Truck & Dog	SLR Assumption
Quarry product (Wearing coarse)	Oberon or on-site	2,100 trips total ⁶	20m Truck & Dog	
Miscellaneous materials	Bathurst	600 trips total	20m Truck and Dog	
Miscellaneous equipment	Bathurst	60 trips total	20m AV	
Construction mobilisation	Bathurst	200 trips total	20m AV	
Construction de-mobilisation	Bathurst	200 trips total	20m AV	
Total Turbine Specific Movements		8,882 trips in 22 months		

As summarised in Table 9 above, it is anticipated that 8,882 trips associated with the transportation of wind turbine components will occur during the construction of the proposed development (across 475 days – 22 months).

Table 10 provides an overview of the anticipated traffic associated with the transportation of concrete from the batching plant to the 47 turbine locations. It should be noted that the concrete batching plant will be accessed via Access Location 2 West.

Table 10 Traffic Generation Assumptions (Transportation of Concrete)

Element	Location	Assumption	Vehicle Type	Source
Blinding concrete, for cleaning and leveling of excavation funds	from/to Access Location 2 West	338 trips total	Agitator Truck (7.4 m ³)	SLR
Structural concrete for WTG foundations		4,989 trips total		
Structural concrete for WTG pedestal foundations		166 trips total		
Supply and placement of cyclopean concrete		160 trips total		
Total Concrete Batching Plant Movements		5,651 trips in 22 months		

As summarised in Table 10 above, it is anticipated that 5,651 internal trips will be generated within the site to/from the concrete batching plant.

³ A total of 47 turbines with each turbine having three blades which will be transported in two pieces.

⁴ A total of 47 turbines with each turbine having their tower transported in seven pieces (refer to Rex J Andrew report).

⁵ A total of 21,000m³ of road base - Assumed 10km long, 7m wide and 0.3m deep. (20t per truck & density 2t/m³).

⁶ A total of 7,000m³ of wearing coarse - Assumed 10km long, 7m wide and 0.1m deep. (20t per truck & density 2t/m³).

Table 11 provides an overview of the anticipated traffic associated with the construction of the transmission line and installation of substations.

Table 11 Traffic Generation Assumptions (Transmission Line and Substations)

Element	Location	Assumption	Vehicle Type	Source
500kV Substation	Via Bathurst	1,426 trips total	Trucks	TransGrid / GPG
		170 trips total	Semi-trailer	
		50 trips total	Crane	
		50 trips total	OSOM	
132kV substation		944 trips total	Trucks	
		102 trips total	Semi-trailer	
		38 trips total	Crane	
		46 trips total	OSOM	
Transmission Lines		3,848 trips total	Trucks	
		312 trips total	Semi-trailer	
		14 trips total	Crane	
		14 trips total	OSOM	
Total		7,014 trips in 22 months		

As summarised in Table 11 above, it is anticipated that 7,014 trips associated with the transportation of substation and transmission line components will occur during the construction of the proposed development (across 475 days – 22 months).

Based on the information and assumptions provided in Table 8 to Table 11, it is anticipated that the total traffic generated by the construction of the proposed Paling Yards Wind Farm will be in the order of 40,547 across a construction duration of 475 days. Based on this, it is anticipated that daily traffic generation will be in the order of 86 movements a day (43 inbound and 43 outbound per day).

4.1.2 Operation Phase Traffic Generation

The operational traffic demands associated with the development is expected to be minimal and limited to maintenance crew's movements. Therefore, the operational traffic of this development is not considered as a critical element within this traffic assessment. Nonetheless, the operational workforce assumptions were provided by the applicant and are summarised below in Table 12 for completeness.

Table 12 Operational Workforce

Element	Assumption
Permanent Workforce (GPG)	4 persons
Contractor Workforce	10 persons
Anticipated Fleet	Light vehicles, Disposal trucks (Small and Medium Rigid Vehicles)
Distribution ⁷	50% to/from Bathurst (North) 50% to/from Goulburn (South)

Note: Maximum operational workforce calculated by adopting a 'worst-case' scenario with all permanent and sub-contracted personnel being on-site at given time.

4.1.3 Decommissioning Phase Traffic Generation

Currently information is not available on the decommissioning traffic of the proposed development however it is known that the largest OSOM materials, which are turbine blades and tower segments, will be disassembled into several pieces before being transported to the designated recycling centre.

4.2 Cumulative Traffic Impacts

The applicant, GPG, is currently developing another wind farm called Crookwell 3 (SSD-6695) which is located 25km to the north of Goulburn and 35km to the south of Paling Yards Wind Farm. Discussions were held with the applicant to understand the anticipated construction timeline of Crookwell 3 with a view to determine any possible cumulative traffic impacts should the construction of two wind farms were to overlap.

It is understood that the construction of Crookwell 3 will commence in the second half of 2022 and continue in the first half of 2023. However, at the time of writing, the construction of Paling Yards Wind Farm is set to commence in the second part of 2023 at the earliest.

Based on the above information provided by GPG, no overlaps in the construction of two these wind farms are expected and therefore it was not considered necessary to determine the cumulative traffic impacts of both developments.

⁷ A 50%/50% north and south distribution was adopted considering that operational workforce trips may be generated internally from GPG's Crookwell site located to the south of the Paling Yards development.

4.3 Traffic Volumes

The peak hour development traffic volumes were calculated using the traffic volumes outlined in Section 4.1. The construction traffic generation was considered in five separate sections (See Appendix H) as per the below. Also, it was assumed that the works progress simultaneously and at a linear speed:

- Wind turbine elements;
- Transportation of concrete;
- 132kV electrical substation construction;
- 500kV electrical substation construction; and
- ~9km long transmission line construction.

The construction traffic generation was assumed to progress linearly over the 22-month period with all materials arriving from the north via Bathurst and Oberon. With this assumption, a daily construction traffic generation was determined by adopting a 5-day work week. For conservatism, a peak hour estimate was established by assuming that all construction vehicles were to arrive at the site within a 6-hour period instead of spreading out equally across the day (9-hours).

The trip distribution across the five access locations is unique to each of the five construction phases. The trip distributions adopted align with the input provided from several consultations with GPG, Tract and TransGrid, and as follows:

- Wind turbine construction traffic was distributed by considering the number of turbines serviced by each access location;
- Concrete batching plant construction traffic was generated by considering the amount of 7.4 m³ concrete trucks required to service the total volume of concrete needed on site for various excavation and turbine foundation requirements. The total volume of concrete required on site was provided to SLR by GPG and is summarised in Table 13 below:

Table 13 Concrete Volume and Associated Trips

Element	Total Concrete volume (m ³)	Total 7.4 m ³ concrete truck trips (return)
Blinding concrete, for cleaning and leveling of excavation funds	1,957	528
Structural concrete for WTG foundations	28,912	7,814
Structural concrete for WTG pedestal foundations	960	259
Supply and placement of cyclopean concrete	925	250
TOTAL	32,754	8,851

The trips associated with the total concrete volume was distributed by considering the number of turbines serviced by each access location.

- Traffic related to the 132kV electrical substation was concentrated to the eastern entry of Access Location 2 as it is in proximity to the substation;
- Traffic related to the construction of the 500kV electrical substation was concentrated to Access Location 5; and

- The transmission line traverses the eastern portion of the site, covering land serviced by Access Locations 3, 4 and 5 and the eastern entry of Access Location 2. Hence, the construction traffic was distributed evenly between these four access locations.

The traffic generated by the workforce was determined by considering a maximum 150 workers comprised of:

- Ten supervisors, travelling in light vehicles (10 vehicles);
- 140 labourers travelling in 14-seater coaster buses (10 vehicles).

It was assumed that all workforce related trips were generated from the north (70% via Bathurst and 30% via Oberon). These trips were then distributed evenly between all access locations.

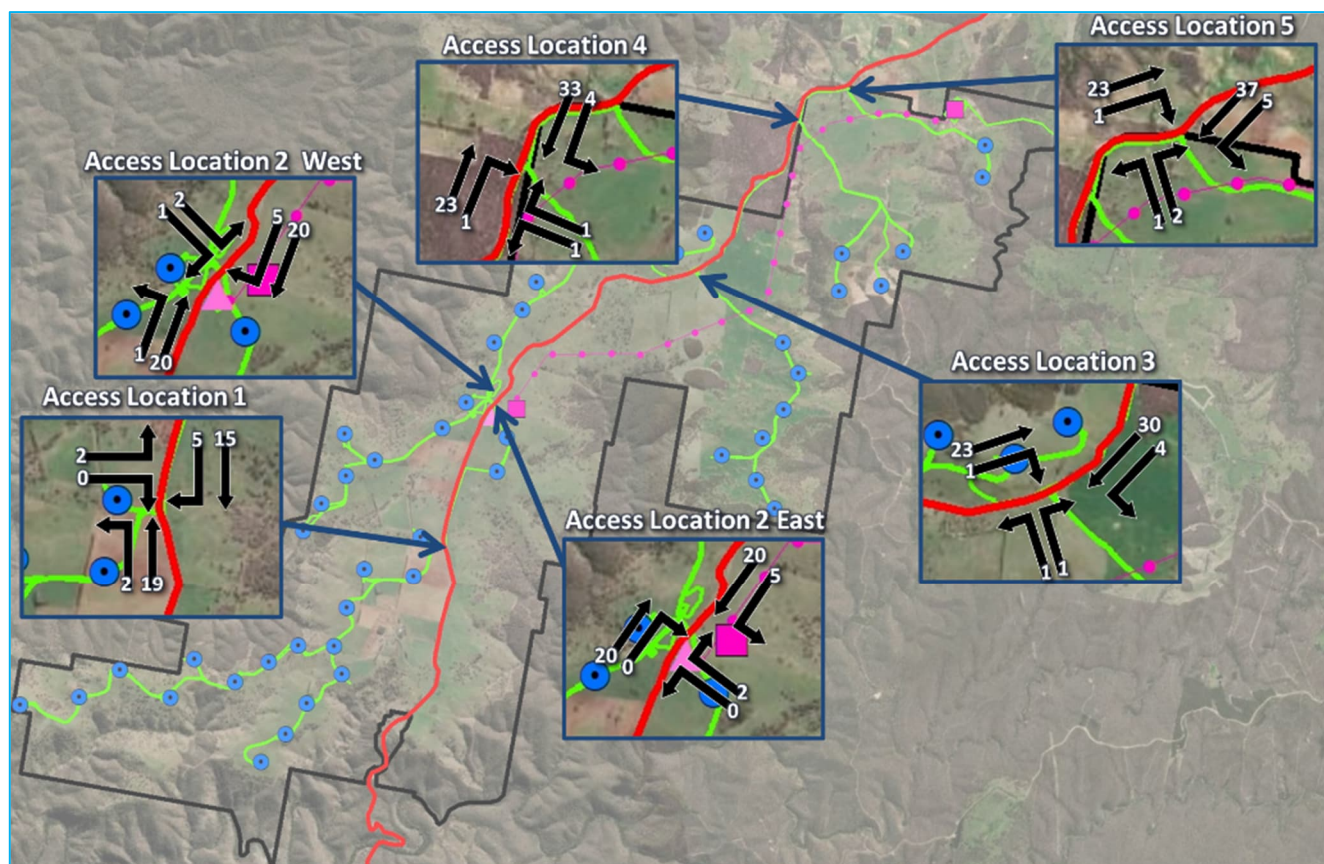
Two peak hours were determined by assuming that all workforce vehicles will enter the site within one hour period in the mornings and will exit the site within one hour period in the evenings. It is also assumed that all coaster buses will remain on site for the duration of the workday.

The background traffic was determined by conducting tube surveys along Abercrombie Road in the vicinity of the site. Peak hour traffic was determined from these surveys as discussed in Section 3.2 earlier in this report.

The peak hour movements generated by the construction traffic, the anticipated work force and the determined background traffic were collated and summed up in a desktop model which is provided in Appendix H.

The outcomes of this assessment, which illustrates the anticipated peak traffic activity during the construction period in Figure 13.

Figure 13 Peak Hour Construction Traffic



5 Traffic Engineering Considerations

5.1 Sight Distance Assessment

A sight distance assessment was undertaken for each of the five access locations in accordance with:

- *Part 4A: Unsignalised and Signalised Intersection of the Austroads Guide to Road Design*; and
- *Part 3: Guide to Road Design: Geometric Design of the Austroads Guide to Road Design*.

Safe Intersection Sight Distance (SISD) is the minimum sight distance which should be provided on the major road at any intersection, providing sufficient distance for a driver of a vehicle on the major road to observe a vehicle on the minor road moving into a collision situation (e.g. in the worst case, stalling across the traffic lanes), and to decelerate to a stop before reaching the collision point.

The required SISD was calculated for each access location as per of *Austroads Guide to Road Design, Part 4A, Section 3.2.2 (Safe Intersection Sight Distance (SISD))*. The formula applied is illustrated in Equation 1.

Equation 1 SISD Formula

$$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$

where

SISD = safe intersection sight distance (m)

D_T = decision time (sec) = observation time (3 sec) + reaction time (sec) – refer to *AGRD Part 3 (Austroads 2016b)* for a guide to values

V = operating (85th percentile) speed (km/h)

d = coefficient of deceleration – refer to Table 3.3 and *AGRD Part 3* for a guide to values

a = longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade)

5.1.1 SISD Methodology

The sight distance assessment was conducted using results obtained from a field investigation conducted on 28 March 2022. The results from the field investigation were verified with calculated sight distances conducted using aerial imagery as well as the review of the dashcam footage obtained during the site visit. The results of the SISD assessment are outlined in Table 14 below.

5.1.2 SISD Calculations

The SISD requirements were calculated for each of the five access locations using the formula outlined in Section 5.1.

Table 14 summaries the determined SISD requirements for each access location.

Table 14 Access Locations SISD and Parameters

Access Locations	D_T (s)	V (km/h)	d	a (%)	SISD (m)
1 North Approach	5	100	0.46	0	224
1 South Approach	5	100		0	224
2 North Approach	5	100		+4.5%	216
2 South Approach	5	100		0	224
3 North Approach	5	90		-1.3%	196
3 South Approach	4	90		+2.3%	166
4 North Approach	5	100		-4.0%	232
4 South Approach	5	100		0	224
5 North Approach	5	90		+7.1%	185
5 South Approach	5	90		-8.9%	210

Table 15 below provides a justification for the applied parameters in the SISD calculations used in Table 14.

Table 15 SISD Parameter justification

Parameter	Justification
V (km/h)	The 85th percentile operating speed for each access location was determined using the data obtained from the tube surveys that were commissioned on Tuesday 31 May 2022 to Tuesday 7 June 2022. The data identified that the average 85th percentile operating speeds were: 98.7 km/h adjacent to Access Locations 1 and 2; and 84.2 km/h adjacent to Access Locations 3, 4 and 5. For a conservative approach, the following 85th percentile operating speeds were adopted: 100 km/h for Access Locations 1 and 2; 90 km/h for Access Locations 3 and 5; and 100 km/h for Access Location 4 (This access is situated on a relatively linear stretch of carriageway; therefore, a conservative 100km/h operating speed was applied).
d	<i>Austroads Guide to Road Design, Part 3: Guide to Road Design, Section 5.2.3 (Longitudinal Deceleration)</i> specifies that a coefficient of deceleration of 0.46 is the “maximum value for calculating absolute minimum stopping sight distance.” Therefore, 0.46 was applied for all access locations.
a (%)	SLR reviewed the vertical alignment of the carriageway and sight lines for each of the access locations for both approaches (north and south). Longitudinal grades were obtained from Google Earth to determine the SISD. It is also worth noting that longitudinal grades that were obtained from Google Earth were consistent with SLR’s findings from the site inspection.

D_T (s)	A decision time of 5 seconds was adopted for all access locations, excluding the south approach of Access Location 3. The 5 second decision time consists of a 3 seconds of observation time and 2 seconds of reaction time. An observation time of 3 seconds was applied as per the standard in <i>AGRD Part 4a, Section 3.2.2</i>, which states “<i>SISD allows for a 3 sec observation time for a driver on the priority legs of the intersection to detect a problem ahead</i>”. <i>AGRD Part 3 (Austroads 2016b)</i>, table 5.2 states that a reaction time of 2.0 seconds is suitable for: • “<i>Alerted driving situations in rural areas</i>” • “<i>General minimum value for most road types, including those with alert driving conditions.</i>” SLR recognise that <i>AGRD Part 3, 5.2.2</i> states that it is ‘<i>desirable for designers to adopt a reaction time of 2.5 seconds,</i>’ and that the utilisation of a lower reaction time requires an assessment of the road conditions. <i>AGRD Part 3 (Austroads 2016b)</i>, C11.1 “<i>Driver Reaction time,</i>” outlines the methodology behind the various reaction time values. The commentary describes how studies have identified that the “<i>variance of the distribution of reaction times is very high,</i>” as it is associated with a driver’s “<i>level of alertness,</i>” which ultimately varies from person-to-person. SLR are confident that the stretch of Abercrombie Road within the site bounds has sufficient geometric variation to generate an alerted response from drivers. This resolution has been reached after completing a site visit, reviewing the dashcam footage obtained during the visit and undertaking a desktop review of aerial imagery. Key factors which contribute to/ indicate alert driver conditions along Abercrombie Road include: • <u>Geometric features</u>: SLR are confident that the geometric features within the stretch of Abercrombie Road in the site boundary provide sufficient variation to maintain driver interest. The carriageway contains a series of back-to-back bends and changes in both the horizontal and vertical alignment. <i>AGRD Part 3 (Austroads 2016b)</i>, table 5.2, identifies that a 2.5 second reaction time is required in conditions with ‘<i>isolated geometric features to maintain driver interest.</i>’ This clause simply does not apply to the stretch of Abercrombie Road within the site boundary due to the geometric attributes of the carriageway. • <u>Low crash volume</u>: There was only one crash, a ‘non-casualty towaway,’ within a 5-year period (2016-2020) on the stretch of Abercrombie Road within the site boundary. This is a strong indicator of high driver alertness within the site boundary. • <u>Speed</u>: The average speed taken from the two traffic counters for the 7-day period was 86.25 km/h which is 13.75km/h lower than the posted speed limit of 100km/h speed. Therefore, it can be inferred that the road geometry generates alert driving conditions, with drivers operating below the speed limit, taking higher precautions. • <u>Volume of HV’s</u>: Table 4.5 of <i>AGRD Part 3 (Austroads 2016b)</i> specifies the carriageway specifications for rural roads. Based on SLR’s review of the carriageway (approx. 9.2m wide) and AADT data (Existing: 330 a day, With Construction: 416 a day), Abercrombie Road satisfies the minimum requirements of Austroads with and without the construction traffic.
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AGRD Part 3 (Austroads 2016b), table 5.2, identifies the conditions in which certain reaction times can be used. With reference to table 5.2, Austroads recommends the use of 2.5 second reaction time in the following conditions (commentary in blue).

- “Areas with high driver workload/complex decisions”
 - The stretch of Abercrombie Road does not require complex driver decisions, being a single carriageway with a consistent speed limit and no signalisation / intersections.
- “Unalerted driving conditions due to the road only having isolated geometric features to maintain driver interest”
 - As discussed earlier in this report, the driving conditions within the site bounds are conducive to an alerted driver response due to geometric features of the carriageway.
- “High speed roads with long distances between towns”
 - Although the posted speed limit may be considered high, 85th percentile speeds are approximately 5 km/h are lower than the posted speed limit at Access Location 3. Features of the carriageway provides sufficient geometric variation to elicit an alerted driver response. The geometric features are not isolated, and the road provides a series back-to-back bends and changes in elevation to maintain driver interest.

Based on the above, a driver reaction time of 2.5 seconds is not strictly necessary at Access Location 3 and a reaction time of 2.0 seconds is complies with Austroads guidance.

Based on this, for the south approach of Access Location 3, a decision time of 4.0 seconds was adopted which consists of a 2.0 second reaction time and a 2.0 observation time.

The utilisation of a 2.0 reaction time is consistent with that applied to all other access locations and follows the same justification discussed above. A 2.0 observation time falls within the parameters of an Extended Design Domain (EDD).

AGRD Part 2 – Section 2.3 ‘Extended Design Domain’ outlines that EDD values typically used ‘for existing roads in constrained situations’ and that the values applied in EDD are ‘below the minimum values traditionally specified for new roads in road design guideline.’ Section 2.3 also states that an EDD can be applied where investigation has demonstrated that ‘the adoption of EDD will not result in significantly higher crash rates.’

An EDD has only been applied for the south approach of Access Location 3 because it is a ‘constrained situation’ located in proximity to a left bend which presents a more constrained geometry compared to the other access locations.

To investigate whether the use of an EDD is appropriate for the access location, SLR reviewed AGRD Part 4a: Appendix A – A.2 which outlines ‘compliance with EDD for sight distance at intersections.’

Appendix A – A.2, Point 5 outlines the ‘General considerations for sight distance at intersections,’ which have been discussed below (SLR commentary in blue):

- a) ‘Application of EDD sight distance at intersections is only appropriate when crash data indicates that there are no sight distance related crashes.’

- There was only one reported non-casualty (towaway) crash (2016-2020) along the stretch of Abercrombie Road within the site bounds. This crash was not in proximity to any intersection.
- b) *'Because EDD uses less conservative values, there is less margin for error (although some margin is still provided in the EDD values). Design issues such as choosing the correct operating speed and allowing for the effect of grade become more critical.'*
 - The operating speed utilised in the calculations was obtained from automated tube surveys and moderated with added conservatism discussed in above (Table 15, row 2). An assessment of the vertical alignment was not possible due to a lack of topographical data. However, dashcam footage obtained from the site visit indicates that the site distance can be achieved from each of the various approaches. A capture of the Access Location 3 south approach SISD view is provided in Figure 19 below.
- c) *'Generally, an EDD value should not be combined with any other lower order geometric value for the same element.'*
 - All other geometric values applied in the SISD assessment are not of a lower order.
- d) *'Zones clear of obstructions, defined by 'sight triangles' for each of the appropriate sight distance models, are required at intersections and must be maintained.'*
 - From the site visit and review of Dashcam footage SLR are confident that there are no obstructions present within the 'sight triangles.'
- e) *'Future arrangements/ planning must be satisfied (e.g. allow for future fencing, safety barriers).'*
 - There are no plans for future works along Abercrombie Road within the site boundaries which could potentially limit the SISD.
- f) *'Geometric and other features of the road should not be misleading and should not distract drivers.'*
 - The south approach of Access Location 3 is located on an uphill segment of carriageway. There is simply no chance that trucks will be able to maintain a high-speed and negotiate the vertical curve at the 85th percentile operating speed applied in the SISD calculation. Therefore, the geometric features of the road are conducive to safer driving conditions.

In addition, a review of Dashcam footage obtained from the site visit has allowed SLR to confirm that there are no features of the road which should be "misleading" or "distract drivers."
- g) *'Horizontal curves and vertical curves should not be considered in isolation. Sight distances/ lines should be checked in both the vertical and horizontal planes taking into account both the horizontal and vertical curvature.'*
 - The horizontal curvature has been assessed in both the desktop review of NearMap imagery and the review of Dashcam footage obtained from the site visit. As discussed above the vertical curve, being uphill is in favour of a safer approach conditions.
- h) *'Particular attention must be given to checking truck requirements on routes with high numbers of heavy vehicles. Some capability for trucks should be provided on all roads.'*
 - The construction phase will see increased truck volumes utilising Abercrombie Road. As discussed above, the vertical alignment, being uphill on the southern approach of Access Location 3, is conducive to safer driving conditions, especially for trucks, which will have to operate at a lower speed in order to safely negotiate the uphill segment of the road.

AGRD Part 4a: Appendix, Table A8, identifies the requirements for the driver observation times in the extended design domain. An observation time of 2.0 seconds is appropriate for:

Parameter	Justification
	'T-intersections on single carriageway roads (two-lane, two-way roads and one-way roads) that have a traffic volume ≥ 4000 veh/d' 'Cross intersections on single carriageway roads (two-lane, two-way roads and one-way roads) that have a traffic volume ≥ 400 veh/d' Survey data has indicated that Abercrombie Road has an AADT of 330, (Table 3) therefore, satisfying the requirement for T-intersections, at Access Locations 1, 3, 4 and 5, being less than 4,000 vehicles per day requirement. In addition, the cross intersection at Access Location 2 is also suitable for a 2.0 observation time as it satisfies the requirement of less than 400 vehicles per day. Therefore, considering the factors discussed above the application of an EDD, the use of a 2.0 second observation time is appropriate for Abercrombie Road within the site boundaries.

5.1.3 Access Location 1

The calculated SISD for this location is 224m in each direction. The south approach is located on a straight with no substantial horizontal bends or vertical curves that limit sight distance. The north approach is situated on a minor horizontal bend. However, to maintain the required sight distance, vegetation on the verge to the east of the carriageway needs to be cleared on a regular basis. It is worth noting it was identified at the site inspection that vegetation is currently low and not obstructing the sight distances.

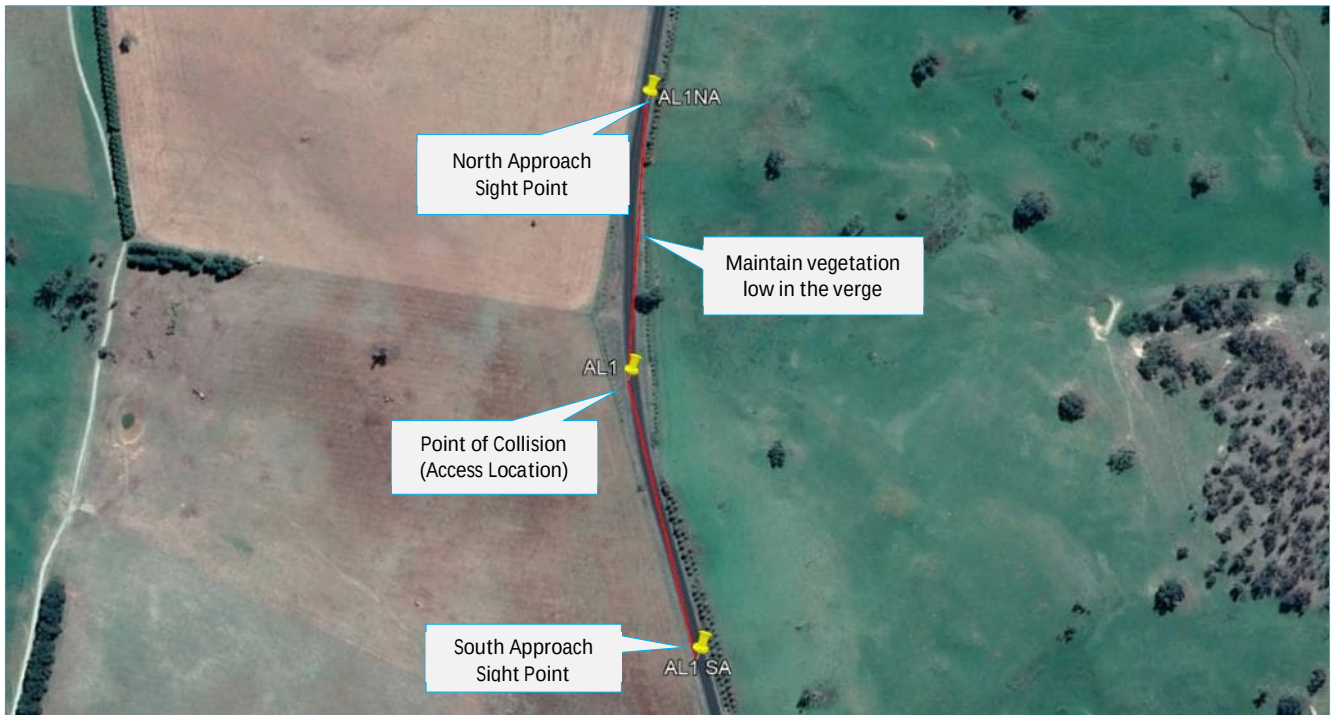
Table 16 outlines the location of the sight points and their associated sight distances for this access location.

Table 16 Access Location 1 - Sight Points and Sight Distance

South Approach			North Approach			Required Distance
Sight point		Distance	Sight point		Distance	
Latitude	Longitude	(m)	Latitude	Longitude	(m)	(m)
34° 9'42.20"S	149°44'47.57"E	231	34° 9'27.72"S	149°44'46.02"E	225	224

Figure 14 provides an overview of Access Location 1 and the sight distances to the point of collision from each approach.

Figure 14 Access Location 1 and Relevant Sight Distances



Source: www.nearmap.com.au

Figure 15 Access Location 1 - SISD Dashcam Capture



Source: SLR

5.1.4 Access Location 2

The calculated SISD for this location is 216m in the north approach and 224m in the south approach. Both the north and south approaches are located on a straight with no substantial horizontal bends or vertical curves that limit sight distance.

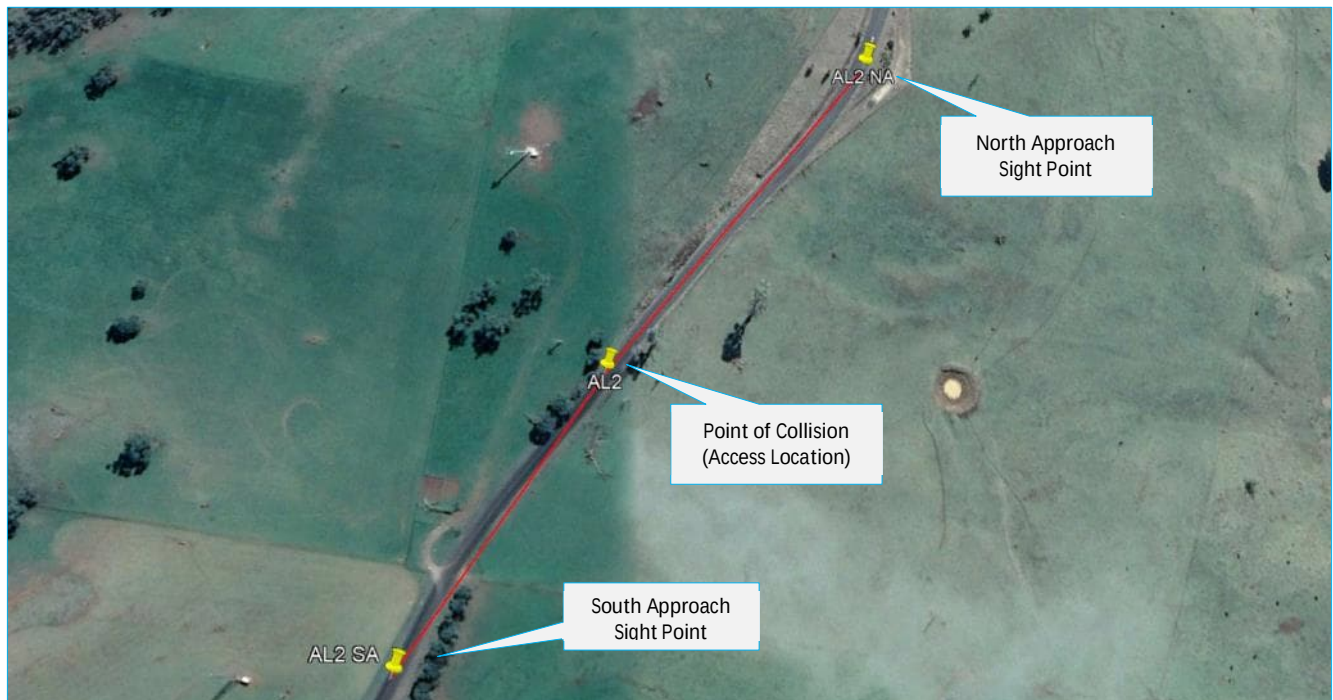
Table 17 outlines the location of the sight points and their associated sight distances for this access location.

Table 17 Access Location 2 - Sight Points and Sight Distance

South Approach				North Approach			
Sight point		Distance	Required Distance	Sight point		Distance	Required Distance
Latitude	Longitude	(m)	(m)	Latitude	Longitude	(m)	(m)
34° 8'44.16"S	149°45'2.95"E	230	216	34° 8'30.68"S	149°45'15.07"E	289	224

Figure 16 provides an overview of Access Location 2 and the sight distances to the point of collision from each approach.

Figure 16 Access Location 2 and Relevant Sight Distances



Source: www.nearmap.com.au

Figure 17 Access Location 2 - SISD Dashcam Capture



Source: SLR

5.1.5 Access Location 3

The calculated SSD for this location is 196m in the north approach and 166m in the south approach. The north approach is located on a straight with no substantial horizontal bends that limit sight distance. The vertical alignment of the north approach is partially impacted by a crest in the carriageway. Notwithstanding, a footage review (using recordings captured during the site inspection) was undertaken which confirmed that the sight distance was satisfactory.

The south approach satisfies sight distance requirements under an EED for the observation time (discussed in Table 15). There is a left bend near the access location which provides challenging horizontal geometry. It is recommended that the appropriate signage is provided in the operational traffic management plan (OTMP) to warn the drivers of the heavy vehicle activity ahead.

Table 18 outlines the location of the sight points and their associated sight distances for this access location.

Table 18 Access Location 3 - Sight Points and Sight Distance

South Approach				North Approach			
Sight point		Distance	Required Distance	Sight point		Distance	Required Distance
Latitude	Longitude	(m)	(m)	Latitude	Longitude	(m)	(m)
34° 7'43.82"S	149°46'38.39"E	170	166	34° 7'37.96"S	149°46'52.13"E	227	196

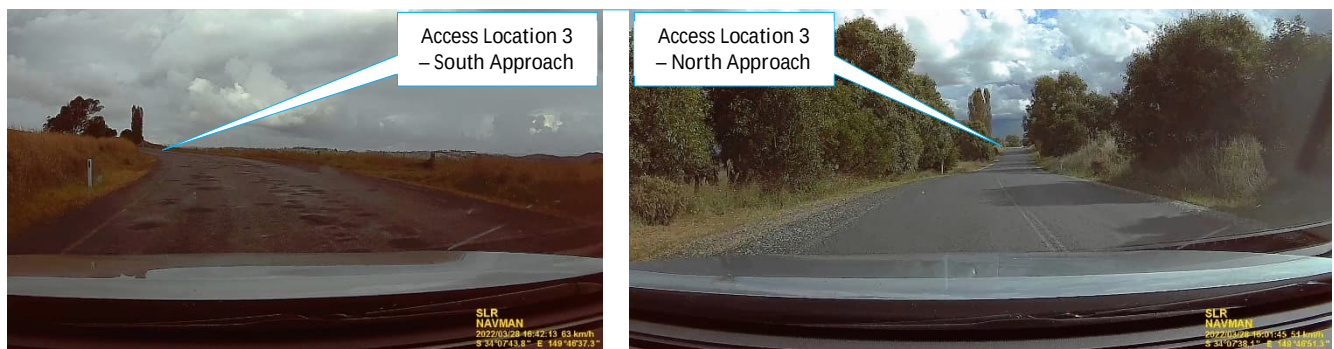
Figure 18 provides an overview of Access Location 3 and the sight distances to the point of collision from each approach.

Figure 18 Access Location 3 and Relevant Sight Distances



Source: www.nearmap.com.au

Figure 19 Access Location 3 - SISD Dashcam Capture



Source: SLR

5.1.6 Access Location 4

The calculated SISD for this location is 232m in the north approach and 224m in the south approach. Both the north and south approaches are located on a straight with no horizontal bends that limit sight distance. The vertical alignment of the south approach is partially impacted by a crest in the carriageway. Notwithstanding, a footage review was undertaken to ensure that the sight distance was satisfactory.

Table 19 outlines the location of the sight points and their associated sight distances for this access location.

Table 19 Access Location 4 - Sight Points and Sight Distance

South Approach				North Approach			
Sight point		Distance	Required Distance	Sight point		Distance	Required Distance
Latitude	Longitude	(m)	(m)	Latitude	Longitude	(m)	(m)
34° 6'46.34"S	149°47'30.18"E	243	224	34° 6'30.58"S	149°47'36.92"E	271	232

Figure 20 provides an overview of Access Location 4 and the sight distances to the point of collision from each approach.

Figure 20 Access Location 4 and Relevant Sight Distances



Source: www.nearmap.com.au

Figure 21 Access Location 4 - SISD Dashcam Capture



Source: SLR

5.1.7 Access Location 5

The calculated SISD for this location is 185m in the north approach and 210m in the south approach. The access location is situated at the centre of a horizontal curve with an eastern inflection. Both approaches satisfy sight distance requirements. However, the western shoulder of the south approach requires the regular clearance of vegetation to meet the required sight distance. It is worth noting it was identified at the site inspection that vegetation is currently short and not obstructing the sight distances. The change in elevation also assists with the satisfaction of sight distances.

Table 20 outlines the location of the sight points and their associated sight distances for this access location.

Table 20 Access Location 5 - Sight Points and Sight Distance

South Approach				North Approach			
Sight point		Distance	Required Distance	Sight point		Distance	Required Distance
Latitude	Longitude	(m)	(m)	Latitude	Longitude	(m)	(m)
34° 6'26.78"S	149°47'49.72"E	222	210	34° 6'20.08"S	149°48'4.23"E	225	185

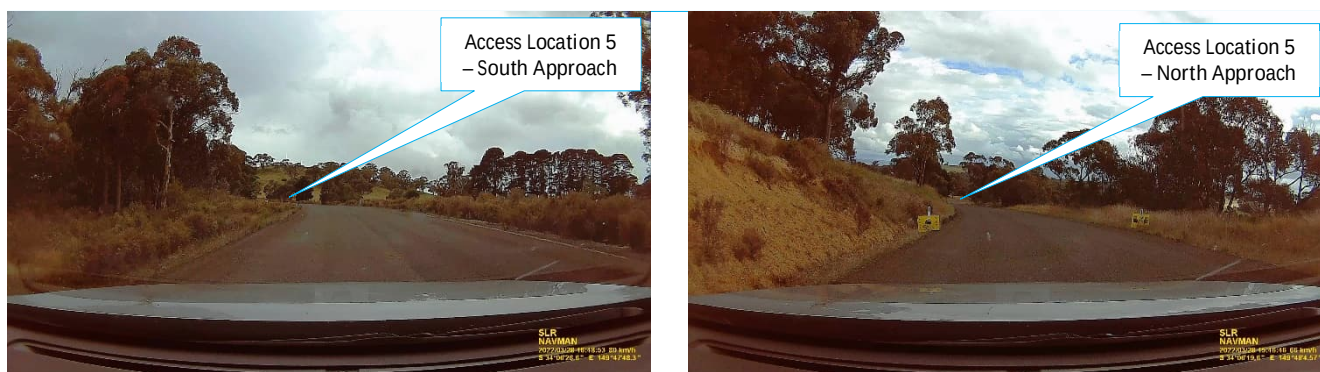
Figure 22 provides an overview of Access Location 5 and the sight distances to the point of collision from each approach.

Figure 22 Access Location 5 and Relevant Sight Distances



Source: www.nearmap.com.au

Figure 23 Access Location 5 - SISD Dashcam Capture

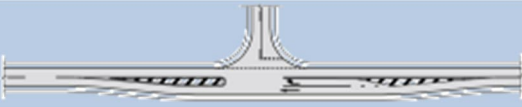
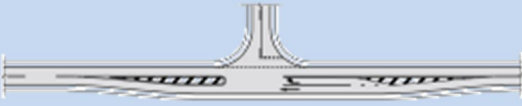
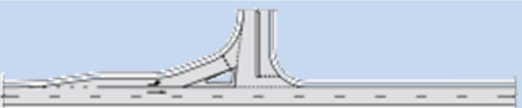


Source: SLR

5.2 Turn Lane Warrant Assessments

The assessment includes a variety of industry recognised analysis methods that determine the appropriate design requirements for each intersection location based on the anticipated future traffic demands as well as geometric considerations. A turn lane warrant assessment has been undertaken to establish the desirable form of the assessed intersections in accordance with the industry research summarised within *Austroads Guide to Road Design Part 4A*. The warrants provide guidance where turning lanes should be provided based on the design traffic volumes. To aid reader interpretation of the assessment Table 21 provides a pictorial description of the various turn treatments considered.

Table 21 Turn Treatment Types

Acronym	Right Turn Treatment	Left Turn Treatment
BAL or BAR	 BAR (Basic Right Turn)	 BAL (Basic Left Turn)
AUL(S) or CHR(S)	 CHR(S) (Channelised Right Turn (Short))	 AUL(S) (Auxiliary Left Turn (Short))
(AUL or CHL) or CHR	 CHR (Channelised Right Turn)	 CHL (Channelised Left Turn)
		 AUL (Auxiliary Left Turn)

Source: Austroads Guide to Road Design Part 4A (Austroads)

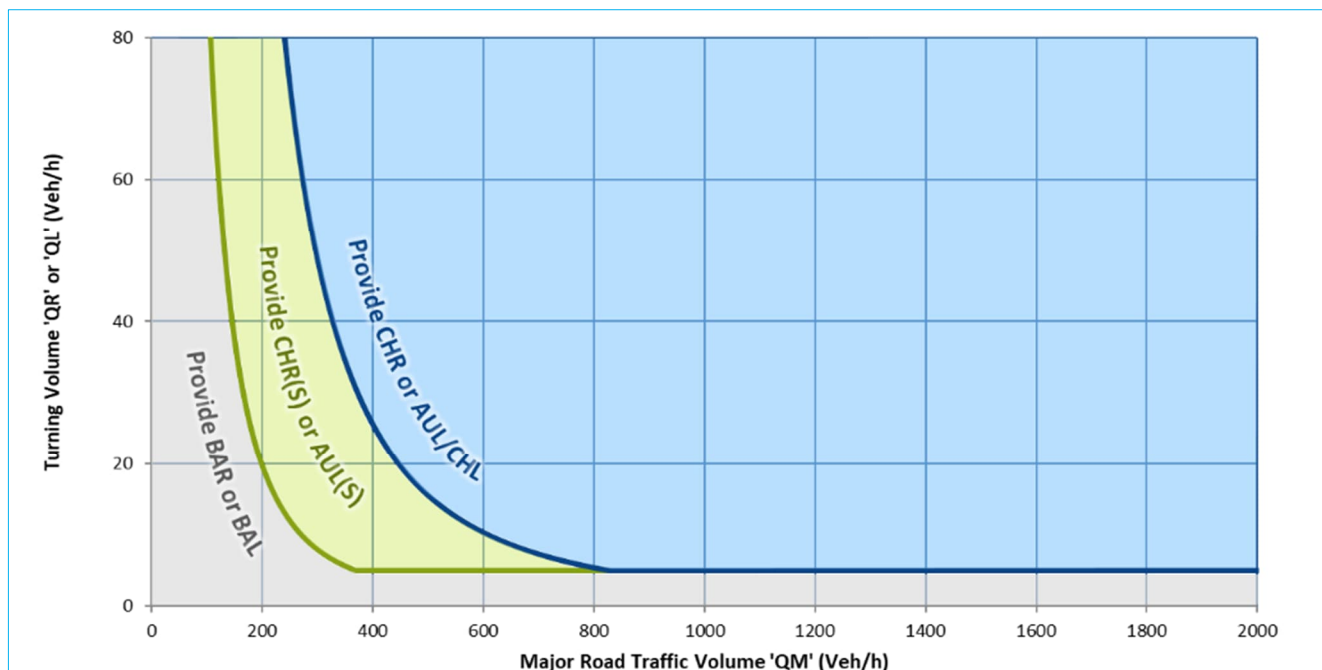
As background it is identified that the warrants were produced by establishing the conflicting traffic volumes at which the benefits of providing a higher level of treatment (i.e. the reduction in estimated crash costs) are equal to the additional construction costs associated with providing the higher treatment. The benefits and costs of a higher-level treatment were compared to the base case (minimum turn treatments).

Relevant to the assessment presented herein the research assumed the following:

- The warrants are strictly applicable to the construction of intersections on new roads (i.e. greenfield sites). For existing roads application of the warrants as adopted herein is therefore conservative as it tends to over-estimate the benefit ratio of providing higher order treatments; and
- The warrants are intended to be utilised to determine appropriate turn treatments at the intersection of public roads and are not strictly intended to be utilised for private access locations. Their application to private access locations as adopted herein is therefore conservative as it ensures that private accesses are afforded the same standard of safety as provided for public road intersections.

The turn warrants for a greenfield site with a design speed of greater than 100km/h are shown in Figure 24.

Figure 24 Turn Warrants – Major Road Turn Treatments (Design Speed $\geq 100\text{km/h}$)



Source: Austroads

5.3 Safety Assessment

Table 22 identifies the recommended intersection treatments for each of the access intersections.

Table 22 Summary of Safety Assessment Results

Intersection Location	Existing Treatment		Phase	Stipulated Treatment	
	Left Turn Lane	Right Turn Lane		Left Turn Lane	Right Turn Lane
Access Location 1	N/A – Currently greenfield.		Construction	BAL	BAR
			Operational	BAL	BAR
Access Location 2 (East)			Construction	BAL	BAR
			Operational	BAL	BAR
Access Location 2 (West)			Construction	BAL	BAR
			Operational	BAL	BAR
Access Location 3			Construction	BAL	BAR
			Operational	BAL	BAR
Access Location 4			Construction	BAL	BAR
			Operational	BAL	BAR
Access Location 5			Construction	BAL	BAR
			Operational	BAL	BAR

Based on the low through and turning volumes, no major turn lane treatments are proposed. It is recommended that all intersections are constructed with a basic left turn and basic right turn treatments.

Detailed outputs of the turn warrants assessment are included at Appendix I.

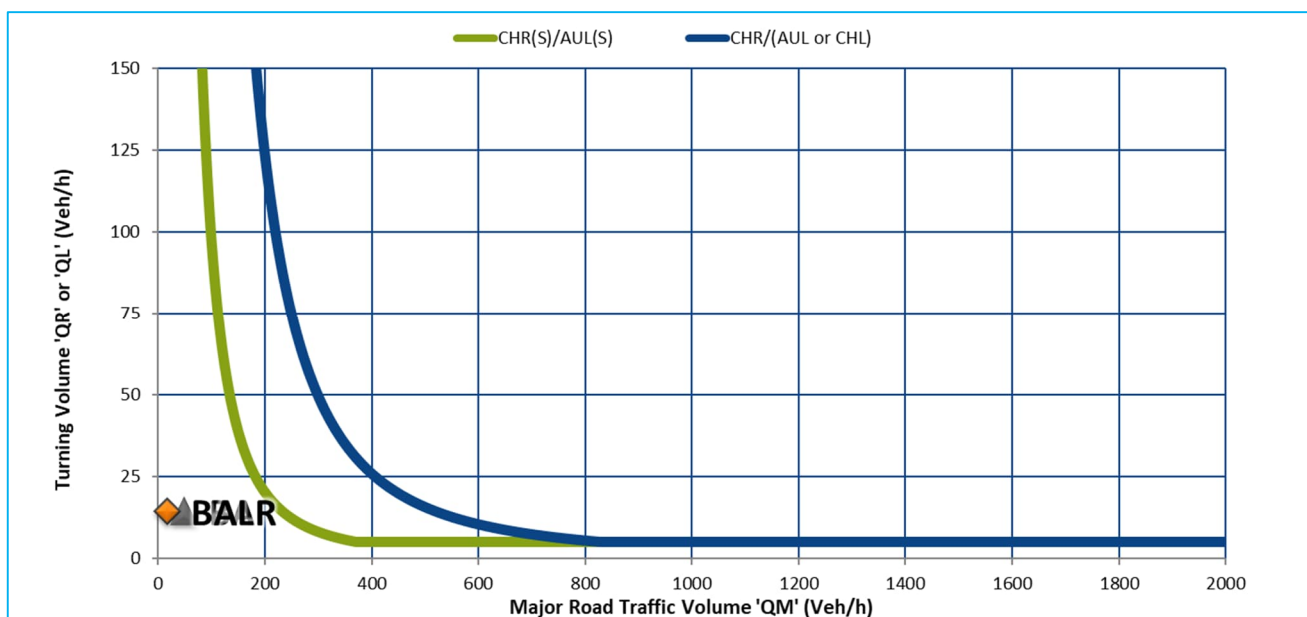
5.3.1 Access Staging

Access location 5 services the sites substation, which requires construction lead time if project commission is not to be delayed. Turn warrant assessments have been undertaken by SLR considering that all 85/86 trips per day use Access Location 5 to assess whether the BAR/BAL intersection form is sufficient.

To establish a peak, the total 86 trips were distributed across 6 hrs to yield of 14.33 movements in the peak hour (following the same logic in Section 4.3). For added conservatism, it was assumed that 14.33 vehicles enter and exit Access Location 5 during the peak.

This assessment produces a BAR/BAL result, as indicated in Figure 25 below.

Figure 25 Turn Warrant Assessment - All traffic via Access Location 5



6 Route Summary

It is important to note that OSOM materials transportation report and resulting impacts of the transportation of OSOM materials (See Appendix E, Appendix F1, Appendix F2 and Appendix F3) should be read in conjunction with this TIA. Rex J Andrew' report provides detailed information on the following:

- Specifications of the OSOM materials that will be transported to site;
- Specifications of the proposed vehicles that will transport the OSOM materials;
- Port of Import and where materials will be stored at Port of Newcastle;
- A detailed route study where transport challenges & advantages are itemised in a spreadsheet, such as some items being classified as "critical", "caution" and "emergency parking – rest / break";
- Swept path assessments for the blade roots at critical intersections along the route;
- Overhead structures along the route.

In addition to the swept path assessments undertaken by Rex J Andrews for the haul route, SLR has undertaken additional swept path assessments to confirm that each of the proposed access locations can accommodate the proposed turbine blade root and the transporting design vehicle. SLR's swept path assessments are provided in Appendix J.

7 Recommendations

It is recommended that a Construction Traffic Management Plan (CTMP) or equivalent document be prepared following approval but prior to the substantial commencement of construction activities. It would be appropriate for this document to be prepared in accordance with the requirements set out in the SEARs.

The purpose of the CTMP would be to identify any changes to development planning which occurs subsequent to preparation of this assessment and the impact of these changes on the conclusions of this assessment. In addition, the document would typically detail impact mitigation strategies including soft strategies such as busing the workforce as identified herein and hard strategies such as the road works near access locations identified herein. The CTMP should also provide mitigation strategies where the sight distances are below the requirements of Austroads Guidelines and operational information such as contact details of the maintenance contractor etc. However, it is not considered necessary to investigate the operational impacts in detail given the wind farms require very low maintenance.

8 Conclusion

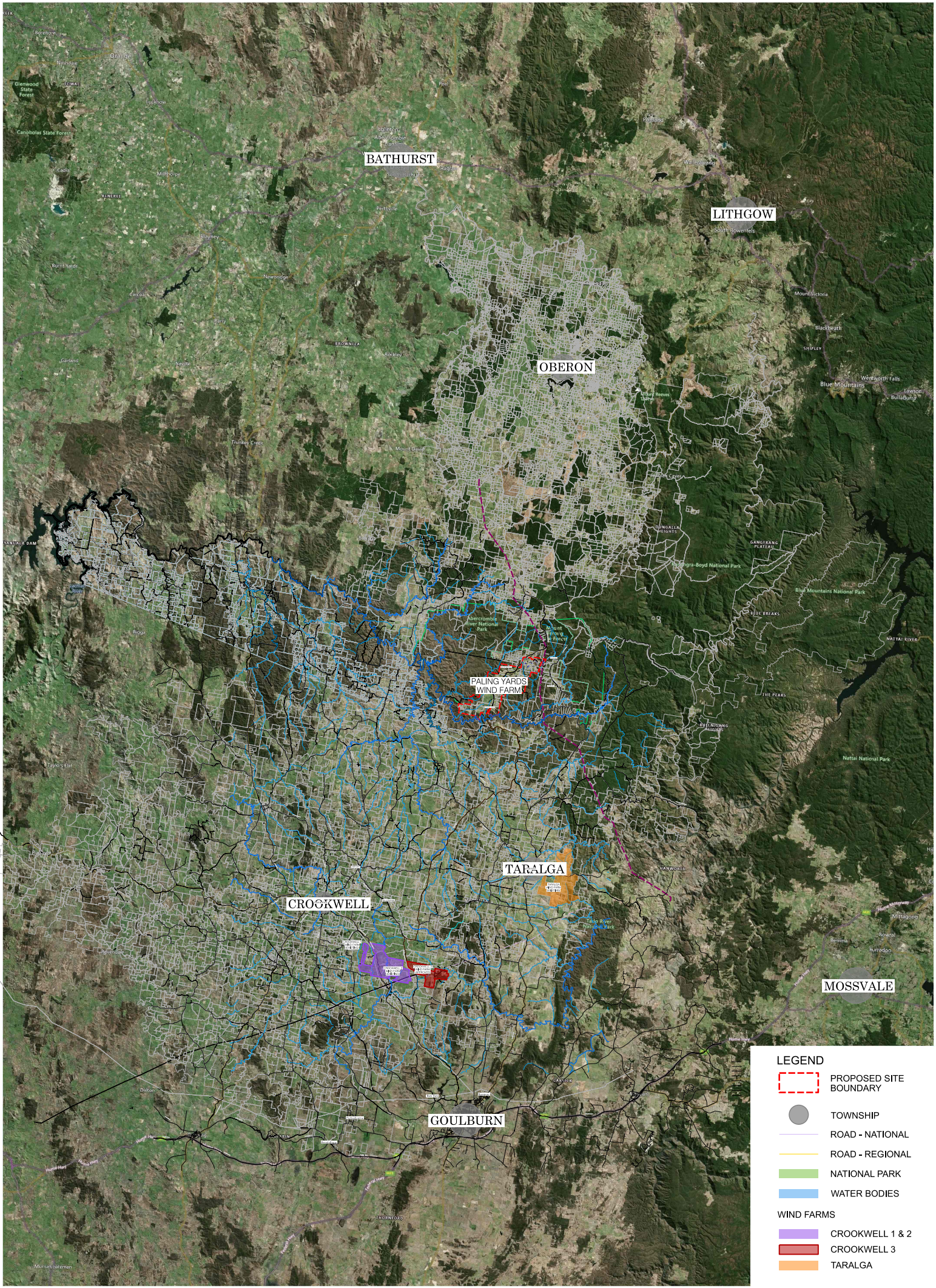
SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Global Power Generation Australia (GPG) via Tract Consultants (Tract) to prepare a Traffic Impact Assessment (TIA) for a wind farm development in Paling Yards, New South Wales.

Based on the analysis and discussion documented in this report, the following is concluded:

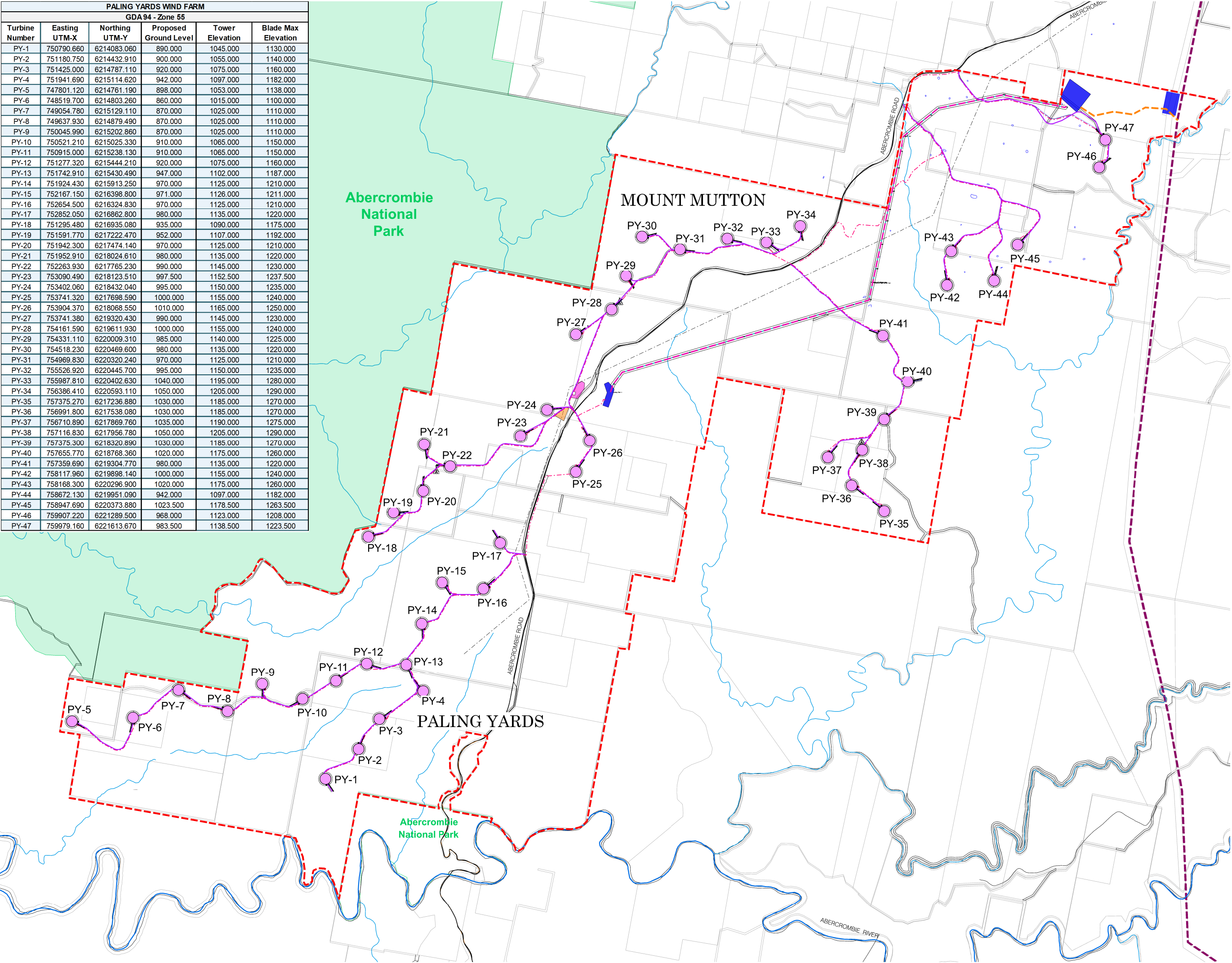
- The proposed development will generate an additional traffic of approximately 40,600 trips during the construction period of the proposed development (475 days – 22 months) and therefore approximately 85/86 trips a day;
- The proposed access locations satisfy the sight distance requirements of the Austroads Guidelines;
- The proposed access locations can accommodate the transportation of the required Oversize and Over Mass (OSOM) materials;
- All access locations should be designed to Basic Right Turn (BAR) and Basic Left Turn (BAL) as per Austroads Guidelines;
- No operational assessment was undertaken due to the low existing traffic volumes along Abercrombie Road and low daily traffic generation potential of the proposed construction works;
- The publicly available crash dataset indicates some recurring crash types and themes; therefore, it is recommended that construction workforce is briefed on the geometric challenges of the existing road network with a Driver's Code of Conduct; and
- It is also recommended that a construction traffic management plan be prepared following the approval of this development application.

Appendix A:

Development Plans



PALING YARDS WIND FARM					
GDA 94 - Zone 55					
Turbine Number	Easting UTM-X	Northing UTM-Y	Proposed Ground Level	Tower Elevation	Blade Max Elevation
PY-1	750790.660	6214083.060	890.000	1045.000	1130.000
PY-2	751180.750	6214432.910	900.000	1055.000	1140.000
PY-3	751425.000	6214787.110	920.000	1075.000	1160.000
PY-4	751941.690	6215114.620	942.000	1097.000	1182.000
PY-5	747801.120	6214761.190	898.000	1053.000	1138.000
PY-6	748519.700	6214803.260	860.000	1015.000	1100.000
PY-7	749054.780	6215129.110	870.000	1025.000	1110.000
PY-8	749637.930	6214879.490	870.000	1025.000	1110.000
PY-9	750045.990	6215202.860	870.000	1025.000	1110.000
PY-10	750521.210	6215025.330	910.000	1065.000	1150.000
PY-11	750915.000	6215238.130	910.000	1065.000	1150.000
PY-12	751277.320	6215444.210	920.000	1075.000	1160.000
PY-13	751742.910	6215430.490	947.000	1102.000	1187.000
PY-14	751924.430	6215913.250	970.000	1125.000	1210.000
PY-15	752167.150	6216398.800	971.000	1126.000	1211.000
PY-16	752654.500	6216324.830	970.000	1125.000	1210.000
PY-17	752852.050	6216862.800	980.000	1135.000	1220.000
PY-18	751295.480	6216935.080	935.000	1090.000	1175.000
PY-19	751591.770	6217222.470	952.000	1107.000	1192.000
PY-20	751942.300	6217474.140	970.000	1125.000	1210.000
PY-21	751952.910	6218024.610	980.000	1135.000	1220.000
PY-22	752263.930	6217765.230	990.000	1145.000	1230.000
PY-23	753090.490	6218123.510	997.500	1152.500	1237.500
PY-24	753402.060	6218432.040	995.000	1150.000	1235.000
PY-25	753741.320	6217698.590	1000.000	1155.000	1240.000
PY-26	753904.370	6218068.550	1010.000	1165.000	1250.000
PY-27	753741.380	6219320.430	990.000	1145.000	1230.000
PY-28	754161.590	6219611.930	1000.000	1155.000	1240.000
PY-29	754331.110	6220009.310	985.000	1140.000	1225.000
PY-30	754518.230	6220469.600	980.000	1135.000	1220.000
PY-31	754969.830	6220320.240	970.000	1125.000	1210.000
PY-32	755526.920	6220445.700	995.000	1150.000	1235.000
PY-33	755987.810	6220402.630	1040.000	1195.000	1280.000
PY-34	756386.410	6220593.110	1050.000	1205.000	1290.000
PY-35	757375.270	6217236.880	1030.000	1185.000	1270.000
PY-36	756991.800	6217538.080	1030.000	1185.000	1270.000
PY-37	756710.890	6217869.760	1035.000	1190.000	1275.000
PY-38	757116.830	6217956.780	1050.000	1205.000	1290.000
PY-39	757375.300	6218320.890	1030.000	1185.000	1270.000
PY-40	757655.770	6218768.360	1020.000	1175.000	1260.000
PY-41	757359.690	6219304.770	980.000	1135.000	1220.000
PY-42	758117.960	6219898.140	1000.000	1155.000	1240.000
PY-43	758168.300	6220296.900	1020.000	1175.000	1260.000
PY-44	758672.130	6219951.090	942.000	1097.000	1182.000
PY-45	758947.690	6220373.880	1023.500	1178.500	1263.500
PY-46	759907.220	6221289.500	968.000	1123.000	1208.000
PY-47	759979.160	6221613.670	983.500	1138.500	1223.500



- GENERAL NOTES
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 - THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE DETAILS, SPECIFICATIONS AND ENGINEERING DOCUMENTS.
 - LOCATE AND PROTECT ALL UNDERGROUND SERVICES PRIOR TO ANY EXCAVATION. MAKE GOOD ALL DAMAGE TO EXISTING WORKS CAUSED BY THE ACTIVITY OF THESE WORKS.
 - THESE DRAWINGS ARE TO BE PRINTED IN COLOUR.

SITE LAYOUT PLAN
LEGEND

- Parcel
- Proposed Site Boundary
- Township
- Proposed WTG Location
- Existing 40-60m High Lattice Tower
- Proposed Access Track
- National Park
- River / Creek
- 500KV Power Transmission
- Proposed 500KV Extension
- Proposed 132KV Extension
- Proposed Substation
- Rural Distribution Line
- 33kV Distribution Line Proposed

PRELIMINARY
NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	DRN	CHKD
A	PRELIMINARY	7.04.21	D.S.	L.S.
B	PRELIMINARY	28.09.21	D.S.	L.S.
C	PRELIMINARY	27.10.21	D.S.	L.S.
D	PRELIMINARY	10.12.21	D.S.	L.S.
E	PRELIMINARY	31.01.22	D.S.	L.S.
F	PRELIMINARY	15.06.22	D.S.	L.S.
G	PRELIMINARY	28.10.22	D.S.	L.S.
H	PRELIMINARY	05.05.23	D.S.	L.S.

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Sydney P: 02 9954 3733
Geelong P: 03 5221 0105
Adelaide P: 08 8223 1324
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PROJECT
PALING YARDS WIND FARM

CLIENT
GLOBAL POWER GENERATION
AUSTRALIA PTY LTD

DRAWING TITLE
SITE PLAN
GE 158 - 50/60Hz 6.1Mw Turbines

DRAWING NUMBER
220-0052-00-P-02-2D03

REVISION
H

DRAWN
D.S.

CHECKED
L.S.

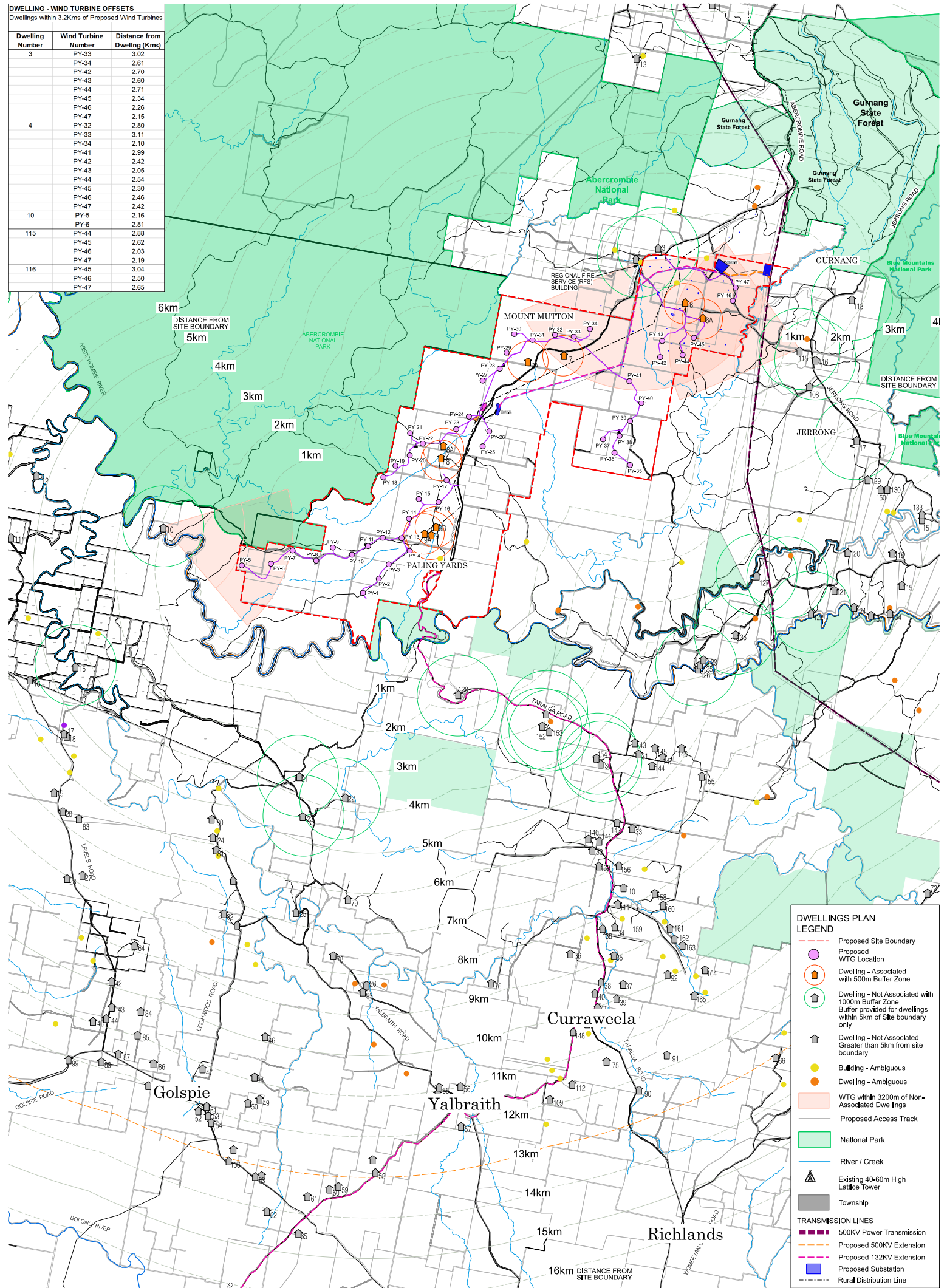
APPROVED
L.S.

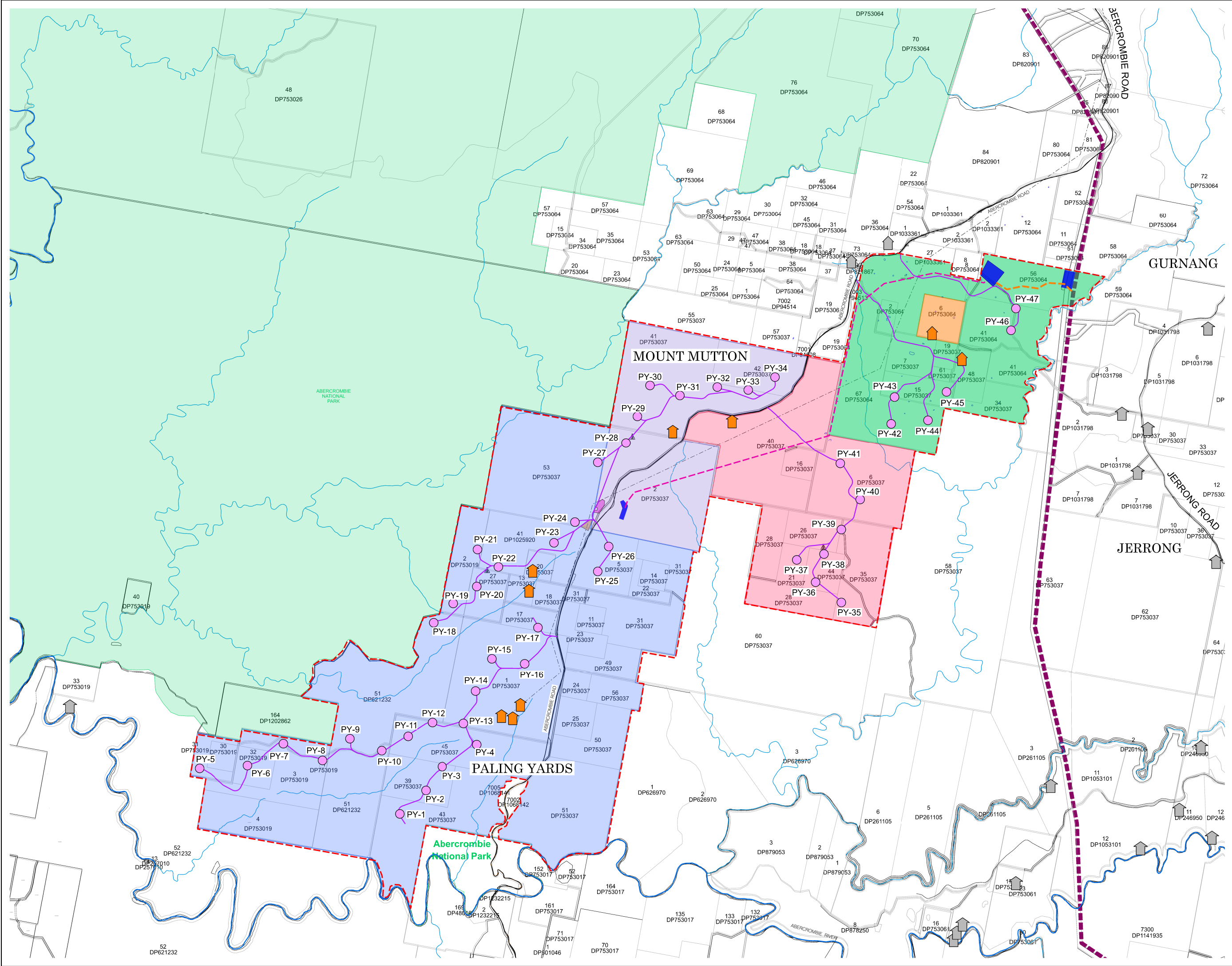
DATE
05.05.23

SCALE 1:20000 @ A1

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DWELLING - WIND TURBINE OFFSETS		
Dwellings within 3.2Kms of Proposed Wind Turbines		
Dwelling Number	Wind Turbine	Distance from Dwelling (Kms)
3	PY-33	3.02
	PY-34	2.61
	PY-42	2.70
	PY-43	2.60
	PY-44	2.71
	PY-45	2.34
	PY-46	2.26
4	PY-47	2.15
	PY-32	2.80
	PY-33	3.11
	PY-34	2.10
	PY-41	2.99
	PY-42	2.42
	PY-43	2.05
10	PY-44	2.54
	PY-45	2.30
	PY-46	2.46
	PY-47	2.42
	PY-5	2.16
115	PY-6	2.81
	PY-44	2.88
	PY-45	2.62
116	PY-46	2.03
	PY-47	2.19
	PY-45	3.04
	PY-46	2.50
	PY-47	2.65





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INVOLVED LOTS LEGEND

- Parcel
- Proposed Site Boundary
- Township
- Proposed WTG Location
- Proposed Access Track
- Existing 40-60m High Lattice Tower
- National Park
- River / Creek
- Dwelling - Associated
- Dwelling - Not Associated

LAND OWNER

- Land Owner 1
- Land Owner 2
- Land Owner 3
- Land Owner 4
- Land Owner 5

TRANSMISSION LINES

- 500KV Power Transmission
- Proposed 500KV Extension
- Proposed 132KV Extension
- Proposed Substation
- Rural Distribution Line

**PRELIMINARY
NOT FOR CONSTRUCTION**

REV	DESCRIPTION	DATE	DRN	CHKD
A	PRELIMINARY	19.10.21	D.S.	L.S.
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D	PRELIMINARY	05.05.23	D.S.	L.S.

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PROJECT
PALING YARDS WIND FARM

CLIENT
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DRAWING TITLE
INVOLVED LOTS

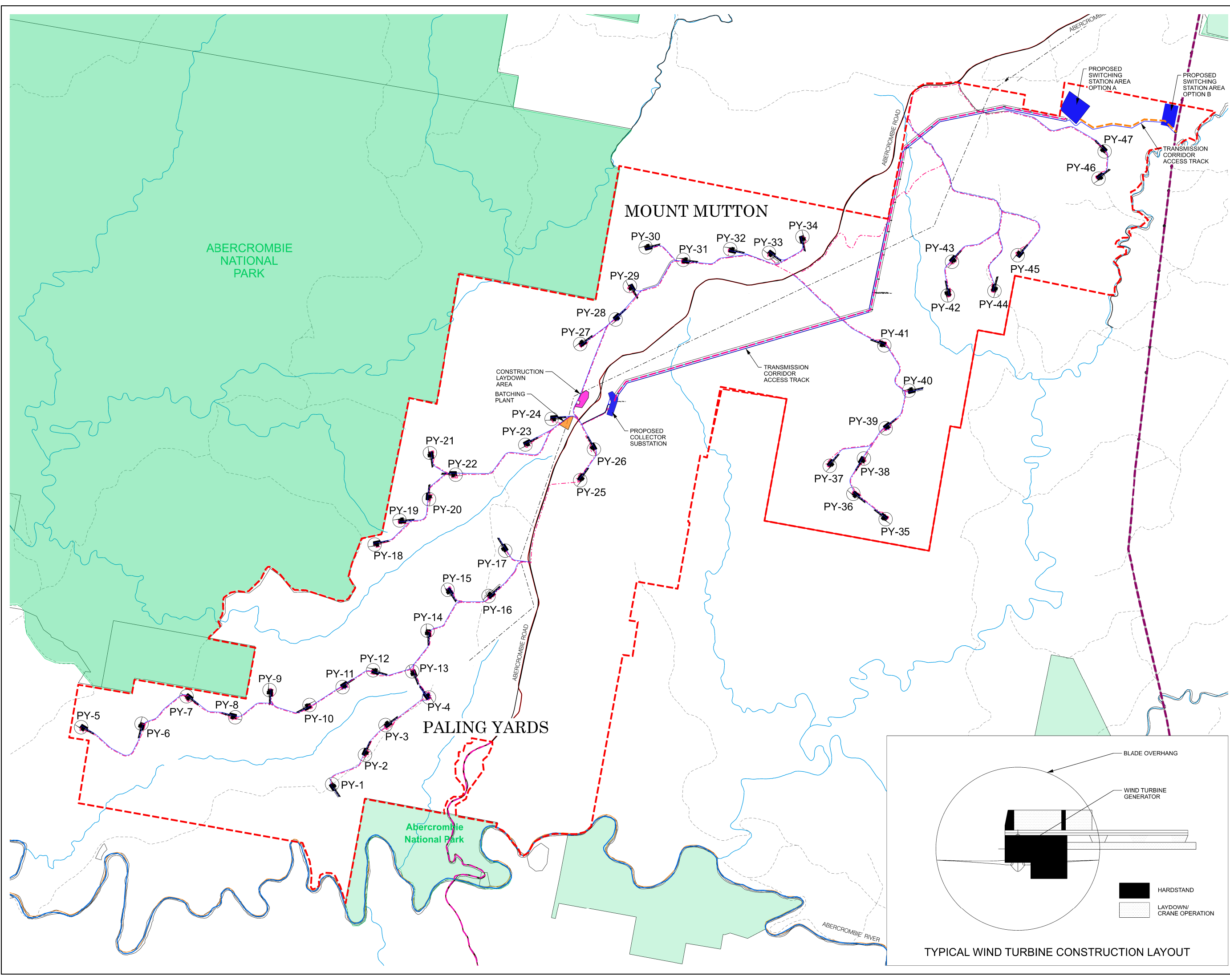
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220-0052-00-P-02-2D08

REVISION
D

DRAWN D.S. **CHECKED** L.S. **APPROVED** L.S. **DATE** 05.05.23

SCALE 1:25000 @ A1

0 250 500 1250m



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LEGEND

- Parcel
- Proposed Site Boundary
- Township
- Proposed WTG Location
- Proposed Access Track
- Proposed Transmission Line Access Track
- Proposed Construction Laydown Area
- Proposed Batching Plant
- National Park
- River / Creek

TRANSMISSION LINES

- 500KV Power Transmission
- Proposed 500KV Extension
- Proposed 132KV Transmission
- Proposed 33KV Reticulation
- Proposed Substation
- Rural Distribution Line
- 33KV Distribution Line Proposed

**PRELIMINARY
NOT FOR CONSTRUCTION**

REV	DESCRIPTION	DATE	DRN	CHKD
A	PRELIMINARY	28.10.22	D.S.	L.S.
B	PRELIMINARY	23.11.22	D.S.	L.S.
C	PRELIMINARY	05.05.23	D.S.	L.S.

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PROJECT
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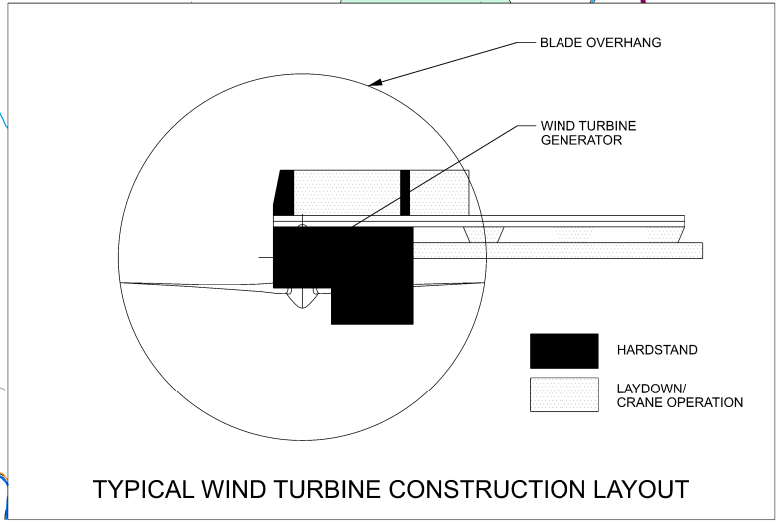
DRAWING NUMBER
220-0052-00-P-02-2D09

REVISION
C

DRAWN	CHECKED	APPROVED	DATE
D.S.	L.S.	L.S.	05.05.23

SCALE 1:20000 @ A1

0 200 400 1000m



TYPICAL WIND TURBINE CONSTRUCTION LAYOUT

Appendix B:

TfNSW Comments

24/02/2022

WST14/00033/04 | SF2014/02416

The Director
Resource and Energy Assessments
Department of Planning, Industry and Environment
GPO Box 39
Sydney NSW 2001

Attention: Anthony Ko

Dear Mr Ko

SSD-29064077: Request for SEARs for Paling Yard Windfarm, Oberon

Thank you for the referral to TfNSW via the Major Projects Portal requesting input into Secretary Environmental Assessment Requirements (SEARs) for Paling Yard Windfarm on the 10 of February 2022.

TfNSW understands that the proposed Paling Yard Windfarm project will encompass:

- Construction of 47 wind turbines with a blade tip height of 240m
- Construction of on-site electrical substations (collector substation and connection substation) with approximately 9km of overhead powerline (70m in width) to connect to the Mount Piper to Bannaby 500kV transmission line (including control room and other associated grid connection facilities).
- Construction workforce of 400 full time employees.
- Three proposed OSOM route from Port of Newcastle to Paling Yards via Mudgee (for loads up to 5.9m in height), via Sydney (for loads under 5.1m in height) and via Dubbo (for blades longer than 68m).
- Construction of a control room, maintenance buildings, switchgear, and associated control systems in the vicinity of the wind turbine towers.
- Roadworks and upgrades to local road infrastructure at key access points along Abercrombie Road in addition to internal tracks for vehicle access to turbines and infrastructure.

It is noted that discussions have been held prior to the request for SEARs for Paling Yard Wind Farm that have identified the OSOM components associated with the blade movements could not occur via the Blue Mountains and the Great Western Highway.

TfNSW provides the following comments for input into the SEARs:

- Due to the significant scope of the logistics assessment a concept-level route analysis is to be provided at the SSD application stage based on high-level 3D swept path analysis to generally indicate locations where civil works are likely to be required. The route analysis is to include at a minimum the following:
 - Identify the OSOM route to be utilised and any indicative pinch points within the network vertically, horizontally and laterally and the potential civil works required to accommodate the OSOM vehicles.

- The logistics assessment is to highlight each at-risk road structures that the haulage route crosses including bridges, traffic signals, signage, major culverts, and minor culverts that may not meet the desirable cover to cater for proposed axle loads.
 - The design vehicle templates used with the swept path analysis.
 - Identify OSOM vehicles proposed to be used for the project.
 - Maximum blade length.
 - Maximum blade overhang length,
 - Minimum overhang heights above the road surface,
 - Wheelbase dimensions,
 - Minimum mid-wheelbase height clearance,
 - Maximum load widths,
 - Maximum load heights (clearance to overhead obstructions such as structures, utilities and vegetation),
 - Maximum trailer articulation angle(s),
 - Axle loads and axle group loads in terms of both tonnes and Equivalent Standard Axles (refer to Austroads Guide to Pavement Technology).
- In addition to the above, a Traffic Impact Assessment (TIA) is required to be prepared in accordance with Austroads Guide to Traffic Management Part 12, the Roads and Maritime Supplements to Austroads and the RTA Guide to Traffic Generating Developments. The TIA is to address the following:
 - Detailed plans identifying the proposed location of any:
 - Project-related infrastructure within and outside of the project boundary.
 - Transmission line infrastructure, or any other project-related structures, within a classified road reserve.
 - Permanent or temporary connection/access to classified roads.
 - Project schedule:
 - Hours and days of work, number of shifts and start and end times.
 - Phases and stages of the project, including construction, operation and decommissioning.
 - Traffic volumes:
 - Existing background traffic.
 - Project-related traffic for each phase or stage of the project.
 - Projected cumulative traffic at commencement of operation, and a 10-year horizon post commencement.
 - Traffic characteristics:
 - Number and ratio of heavy vehicles to light vehicles,
 - Peak times for existing traffic,
 - Peak times for project-related traffic including commuter periods,
 - Proposed hours for transportation and haulage,
 - Interactions between existing and project-related traffic,
 - Inclusion of the traffic generated from ancillary components such as haulage from quarries to the project site, transmission lines etc.
 - Crash history should be considered at key intersections.
 - The origins, destinations and routes for:
 - Commuter (employee and contractor) light vehicles and pool vehicles and heavy (haulage) vehicles.
 - Over size and over mass vehicles.
 - Road safety assessment of key haulage route/s.
 - The impact of traffic generation on the public road network and measures employed to ensure traffic efficiency and road safety during construction, operation and decommissioning of the project.

- The need for improvements to the road network, and the improvements proposed such as road widening and intersection treatments, to cater for and mitigate the impact of project related traffic.
- An assessment in accordance with Austroads warrants for turn treatments will be required at key intersections with the classified road network.
- A 2D concept design inclusive of swept path analysis for the design vehicle will be required for any proposed road widening, intersection treatments etc identified as an outcome of the assessment of the austroads warrants.
- Proposed road facilities, access and intersection treatments are to be identified and be in accordance with Austroads Guide to Road Design including provision of Safe Intersection Sight Distance (SISD),
- Local climate conditions that may affect road safety during the life of the project (e.g. fog, wet and dry weather, icy road conditions),
- The layout of the internal road network, parking facilities and infrastructure,
- Impact on rail corridors and level crossings detailing any proposed interface treatments,
- Impact on public transport (public and school bus routes) and consideration for alternative transport modes such as walking and cycling,
- Identification and assessment of potential impacts of the project, lighting, visual, noise, dust and drainage on the function and integrity of all affected public roads.
- Controls for transport and use of any dangerous goods in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development*, the *Australian Dangerous Goods Code* and *Australian Standard 4452 Storage and Handling of Toxic Substances*.
- Propose a Traffic Management Plan (TMP) to be developed following approval of the EIS, in consultation with relevant Councils and TfNSW. The TMP would need to identify strategies to manage the impacts of project related traffic, including any community consultation measures for peak construction periods (further details in annexure).
- Propose a Driver Code of Conduct for construction and operation which could include, but not be limited to:
 - Safety initiatives throughout primarily the construction period in particular through residential areas and/or school zones.
 - An induction process for vehicle operators and regular toolbox meetings.
 - A public complaint resolution and disciplinary procedure.

If you wish to discuss this matter further, please contact Alexandra Power on 02 6861 1428.

Yours faithfully



Alexandra Power
Team Leader Development Services
Development Services West
Regional and Outer Metropolitan

TMP Annexure: Traffic Management Plan and Driver Code of Conduct

The Traffic Management Plan (TMP) and Driver Code of Conduct is to outline measures to manage traffic related issues associated with all phases of the development (e.g. deliveries, construction, operation, maintenance, decommissioning), any construction or excavated materials, machinery and personnel involved. The TMP is to detail the potential impacts associated with the development, the measures to be implemented, and the procedures to monitor and ensure compliance. The TMP is to address (but not be limited to):

- a. Specific commitments for the provision and use of buses and car-pooling during construction to limit peak hourly traffic in accordance with the approved Environmental Impact Statement (EIS) and conditions of consent. Plans and measures to manage the impacts of personal vehicle parking at pickup points (e.g. in towns) are to be detailed.
- b. An enforceable policy for staff and contractors to use the designated commuter route in preference to back roads, where the journey is not unreasonably lengthened, as detailed in the approved EIS.
- c. Details of origin, destination, quantity, size and frequency of vehicle movements associated with the development including those accessing and egressing the site.
- d. Timings and staging of construction and operation of the development.
- e. Existing and projected background traffic, peak hour volumes and types and their interaction with projected development related traffic.
- f. Loads, weights, lengths and number of movements of haulage and construction related vehicles including Over Size Over Mass (OSOM) loads.
- g. The management and coordination of construction and staff vehicle movements to the site and measures to limit disruption to other motorists, including special OSOM management measures.
- h. Scheduling of haulage vehicle movements to occur outside of daily commuter peak periods, local special event times, school bus (both in rural and town areas) and school zone operating hours.
- i. Active communication procedures for traffic such as school buses or haulage vehicles from other quarries, or near potential safety hazards.
- j. Scheduling of heavy vehicle movements to minimise convoy or platoon lengths.
- k. Consideration to minimise the route length for road transport, particularly for OSOM loads.
- l. Any OSOM will be the subject of separate permits through the National Heavy Vehicle Regulator.
- m. Mitigation of local climate conditions that may affect road safety for vehicles used during construction, operation and decommissioning of the facility (e.g. scheduling during daylight hours, or outside of fog, wet weather, ice or snow).
- n. Transport of hazardous materials in accordance with the relevant transport codes.
- o. Specific mitigation measures along the approved transport routes. Road and intersection improvement works are to be completed prior to the commencement of on-site construction unless specifically approved otherwise in the conditions of consent.
- p. Consultation and engagement with affected stakeholders, including regulatory authorities, landowners, businesses, bus operators and so forth.
- q. Policies and procedures for addressing concerns raised by the community on project related matters.
- r. Dust suppression and mitigation measures on public roads and within the site boundaries.

- s. Toolbox meetings to facilitate continuous improvement initiatives and incident awareness.
- t. Truckloads are to be covered at all times when being transported, to minimise dust and loss of material onto roads which may form a traffic hazard.
- u. Measures to ensure responsible fatigue management and discourage driving under the influence of alcohol and/or drugs, dangers of mobile phone use and driving to the conditions, and adherence to posted speed limits.

(End of TMP Annexure)

Appendix C:

Development Lots

Registered lots for Turbines		
Site Address	Lot	DP
7056 Abercrombie Road Paling Yards 2580	Lot 1	DP 753019
7056 Abercrombie Road Paling Yards 2580	Lot 2	DP 753019
7056 Abercrombie Road Paling Yards 2580	Lot 3	DP 753019
7056 Abercrombie Road Paling Yards 2580	Lot 4	DP 753019
7056 Abercrombie Road Paling Yards 2580	Lot 30	DP 753019
7056 Abercrombie Road Paling Yards 2580	Lot 31	DP 753019
7056 Abercrombie Road Paling Yards 2580	Lot 32	DP 753019
7056 Abercrombie Road Paling Yards 2580	Lot 1	DP 753037
6466 Abercrombie Road Paling Yards 2580	Lot 2	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 5	DP 753037
6335 Abercrombie Road Paling Yards 2580	Lot 6	DP 753037
6055 Abercrombie Road Paling Yards 2580	Lot 7	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 11	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 13	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 14	DP 753037
6055 Abercrombie Road Paling Yards 2580	Lot 15	DP 753037
6335 Abercrombie Road Paling Yards 2580	Lot 16	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 17	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 18	DP 753037
6055 Abercrombie Road Paling Yards 2580	Lot 19	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 20	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 21	DP 753037
6335 Abercrombie Road Paling Yards 2580	Lot 22	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 23	DP 753037
6335 Abercrombie Road Paling Yards 2580	Lot 26	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 27	DP 753037
6335 Abercrombie Road Paling Yards 2580	Lot 28	DP 753037
6055 Abercrombie Road Paling Yards 2580	Lot 34	DP 753037
6790 Abercrombie Road Paling Yards 2580	Lot 39	DP 753037
6335 Abercrombie Road Paling Yards 2580	Lot 40	DP 753037
6466 Abercrombie Road Paling Yards 2580	Lot 41	DP 753037
6466 Abercrombie Road Paling Yards 2580	Lot 42	DP 753037
6790 Abercrombie Road Paling Yards 2580	Lot 43	DP 753037
6335 Abercrombie Road Paling Yards 2580	Lot 44	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 45	DP 753037
6055 Abercrombie Road Paling Yards 2580	Lot 48	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 49	DP 753037
6650 Abercrombie Road Paling Yards 2580	Lot 53	DP 753037
6057 Abercrombie Road Paling Yards 2580	Lot 67	DP 753037
6057 Abercrombie Road Paling Yards 2580	Lot 2	DP 753064
6055 Abercrombie Road Paling Yards 2580	Lot 41	DP 753064
6055 Abercrombie Road Paling Yards 2580	Lot 56	DP 753064
6057 Abercrombie Road Paling Yards 2580	Lot 67	DP 753064
7056 Abercrombie Road Paling Yards 2580	Lot 2	DP 1025920
7056 Abercrombie Road Paling Yards 2580	Lot 41	DP 1025920
Abercrombie Road Paling Yards 2580	Lot 13	DP 257010
6790 Abercrombie Road Paling Yards 2580	Lot 51	DP 621232
Abercrombie Road, Paling Yards 2580	Lot 70	DP 1068142
Abercrombie Road, Paling Yards 2580	Lot 70	DP 1068142

Registered lots for Transmission Line		
Site Address	Lot	DP
6466 Abercrombie Road Paling Yards 2580	Lot 2	DP 753037
7056 Abercrombie Road Paling Yards 2580	Lot 5	DP 753037
6335 Abercrombie Road Paling Yards 2580	Lot 16	DP 753037
6335 Abercrombie Road Paling Yards 2580	Lot 40	DP 753037
6055 Abercrombie Road Paling Yards 2580	Lot 56	DP 753064
6057 Abercrombie Road Paling Yards 2580	Lot 67	DP 753064

Appendix D:

GE Cypress 158 Wind Turbine Technical Specifications

Technical Documentation

Wind Turbine Generator Systems

Cypress 158 - 50/60Hz



Technical Description and Data

Rev. 08 - Doc-0075288 - EN 2021-11-19



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Document Revision Table

Rev.	Date (YYYY/MM/DD)	Affected Pages	Change Description
06	2020-08-10	7	ADDED new HHs.
		11	EDITED section 2.11.
		13	ADDED Cypress 158m rotor the dimensional details in Section 4.
		14	EDITED section 3.1.
		15	MODIFIED section 4.
07	2021-06-17	5, 10, 12	ADDED information on 5.8/6.1 uprate
		8	UPDATED Section 2.12 Nacelle
		5, 12, 13	ADDED 117 m tower information
08	2021-11-19	14	MODIFIED section 2.2 UPDATED Table 5 CHANGED values for B1, D1, D4 and new on the list B3 and B4 UPDATED table chapter 3 table 1 UPDATED CW Temperature range chapter 3.1 table 3

1 Introduction

This document summarizes the technical description and specifications of the Cypress 158 wind turbine.

2 Technical Description of the Wind Turbine and Major Components

The Cypress -158 is a three-bladed, upwind, horizontal-axis wind turbine with a rotor diameter of 158 meters. The turbine rotor and nacelle are mounted on top of:

- a tubular steel tower with a hub height of 96 m
- a tubular steel tower with a hub height of 101 m (config supports 5.8/6.1)
- a tubular steel tower with a hub height of 107.4 m
- a tubular steel tower with a hub height of 117 m (config supports 5.8/6.1)
- a tubular steel tower with a hub height of 120.9 m (config supports 5.8/6.1)
- a tubular steel tower with a hub height of 125.4 m (config supports 5.8/6.1)
- a tubular steel tower with a hub height of 141 m
- a concrete hybrid tower with a hub height of 150 m
- a tubular steel tower with a hub height of 151 m
- a concrete hybrid tower with a hub height of 161 m

The Cypress 158 turbine, available with these ratings: 4.2/4.5/4.8/5.0/5.2/5.3/ 5.5/5.8/6.1 employs active yaw control (designed to steer the wind turbine with respect to the wind direction), active blade pitch control (to regulate turbine rotor speed) and a variable speed generator with a power electronic converter system.

The Cypress -158 turbine features a modular drive train design where the major drive train components, including main shaft bearing, gearbox, generator and yaw drives, are attached to a bedplate.

The increased ratings 5.8 and 6.1 are available for the listed configuration except for 96m, 107.4m, 141m and 150m. These configurations and others may be added on demand

2.1 Rotor

Rotor speed is regulated by a combination of blade pitch angle adjustment and generator/converter torque control. The rotor spins in a clockwise direction under normal operating conditions when viewed from an upwind location.

Full blade pitch angle range is approximately 90 degrees, with the zero degree position being with the blade flat to the prevailing wind. Pitching the blades to a full feather pitch angle of approximately 90 degrees accomplishes aerodynamic braking of the rotor, thus reduces the rotor speed.

2.2 Blades

There are three logistics optimized rotor blades used on the Cypress -158 wind turbine. Optionally, the blades can be equipped with Leading Edge Protection.

In order to optimize noise emissions, the rotor blades are equipped with Low-Noise-Trailing-Edges (LNTes) at the pressure side of the blade's rear edge. LNTes are thin jagged plastic strips. The rotor blades of the Cypress -158 are equipped with these strips at the factory.



Fig. 1: LNTes at the wind turbine rotor blade

Blade Split

To ease transportation of blade, GE developed a solution using a split blade which has transportation requirements comparable to 137 m product. The two parts of the blade are connected using a mechanical connection which has been extensively tested. The blade is also available in one piece; for turbines equipped with the Ice Mitigation System it is always one piece.

2.3 Blade Pitch Control System

The rotor utilizes a pitch system to provide adjustment of the blade pitch angle during operation.

The active pitch controller enables the wind turbine rotor to regulate speed, when above rated wind speed, by allowing the blade to “spill” excess aerodynamic lift. Energy from wind gusts below rated wind speed is captured by allowing the rotor to speed up.

Independent back up is provided to drive each blade in order to feather the blades and shut down the wind turbine in the event of a grid line outage or other fault. By having all three blades outfitted with independent pitch systems, redundancy of individual blade aerodynamic braking capability is provided.

2.4 Hub

The hub is used to connect the three rotor blades to the turbine main shaft. The hub also houses the blade pitch system and is mounted directly to the main shaft. To carry out maintenance work, the hub can be entered through one of three hatches at the area close to the nacelle roof.

2.5 Gearbox

The gearbox in the wind turbine is designed to transmit torsional power between the low-rpm turbine rotor and high-rpm electric generator. The gearbox is a multi-stage planetary/helical design. The gearbox is mounted to the wind turbine bedplate. The gearbox mounting is designed to reduce vibration and noise transfer to the bedplate. The gearbox is lubricated by a forced, cooled lubrication system and a filter assist to maintain oil cleanliness.

2.6 Bearings

The blade pitch bearing is designed to allow the blade to pitch about a span-wise pitch axis. The inner race of the blade pitch bearing is outfitted with a blade drive gear that enables the blade to pitch.

The spherical roller main bearing supports and aligns the main shaft to the main gearbox and is absorbing radial and axial loads from the rotor.

2.7 Brake System

The blade pitch system acts as the main braking system for the wind turbine. Braking under normal operating conditions is accomplished by feathering the blades out of the wind. Only two feathered rotor blades are required to decelerate the rotor safely into idling mode, and each rotor blade has its own backup to drive the blade in the event of a grid line loss.

2.8 Generator

The generator is a doubly fed induction generator. It is mounted to the generator frame with a mounting designed to reduce vibration and noise transfer to machine.

2.9 Gearbox/Generator Coupling

To protect the drive train from excessive torque loads, a special coupling including a torque-limiting device is provided between the generator and gearbox output shaft.

2.10 Yaw System

A bearing positioned between the nacelle and tower facilitates yaw motion. Yaw drives mesh with the gear of the yaw bearing and steer the wind turbine to track the wind in yaw. The yaw drive system contains an automatic yaw brake. This brake engages when the yaw drive is not operating and prevents the yaw drives from being loaded due to turbulent wind conditions.

The controller activates the yaw drives to align the nacelle to the wind direction based on the wind vane sensor mounted on the top of the nacelle.

The wind turbine records nacelle yaw position following excessive rotation in one direction, the controller automatically brings the rotor to a complete stop, untwists the internal cables, and restarts the wind turbine.

2.11 Tower

The wind turbine is mounted on top of a tubular steel tower (or a hybrid tower). Access to the turbine is through a door at the base of the tower. Internal service platforms and interior lighting is included. A ladder provides access to the nacelle and also supports a fall arrest safety system.

Optional climb assist or service lifts are available upon request.

2.12 Nacelle

The nacelle houses the main components of the wind turbine generator. Access from the tower into the nacelle is through the bottom of the nacelle. The nacelle is ventilated and illuminated by electric lights. A hatch provides access to the blades and hub. The nacelle enclosure floor is designed to collect liquids (e.g. oil, grease) in cases of leakage with a safety factor of 1.5. Such capability has been proven by a test.

2.13 Wind Sensor and Lightning Rod

An ultrasonic wind sensor and lightning rod are mounted on top of the nacelle housing. Access is accomplished through the hatch in the nacelle.

2.14 Lightning Protection (according to IEC 61400-24 Level I)

The rotor blades are equipped with lightning receptors mounted in the blade. The turbine is grounded and shielded to protect against lightning; however, lightning is an unpredictable force of nature and it is possible that a lightning strike could damage various components notwithstanding the lightning protection employed in the wind turbine.

2.15 Wind Turbine Control System

The wind turbine can be controlled locally. Control signals can also be sent from a remote computer via a Supervisory Control and Data Acquisition System (SCADA), with local lockout capability provided at the turbine controller.

Service switches at the tower top prevent service personnel at the bottom of the tower from operating certain systems of the turbine while service personnel are in the nacelle. To override any wind turbine operation, emergency-stop buttons located in the tower base and in the nacelle can be activated to stop the turbine in the event of an emergency.

2.16 Power Converter

The wind turbine uses a power converter system that consists of a converter on the rotor side, a DC intermediate circuit, and a power inverter on the grid side.

The converter system consists of a power module and the associated electrical equipment.

2.17 Transformer and Medium Voltage Switch Gear

Transformer

The 3 winding transformer is located at the rear of the nacelle. The transformer is a dry type transformer supporting medium voltage range of 10 - 35 kV range. The transformer is completely separated from the rest of machine head. The transformer is in GE scope, a pad mounted variant is not available.

Medium Voltage Switchgear

The medium voltage switchgear is mounted in the tower entry area.

3 Technical Data for the Cypress-158

Turbine	4.2/4.5/4.8/5.0/5.2/5.3/5.5/5.8/6.1 158
Rated output [MW]	4.2/4.5/4.8/5.0/5.2/5.3/5.5/5.8/6.1
Rotor diameter [m]	158
Number of blades	3
Swept area [m²]	19607
Rotational direction (viewed from an upwind location)	Clockwise
Maximum speed of the blade tips [m/s]	4.2-4.8MW 50Hz - 74.5 m/s 4.8-6.1MW 50Hz - 82.0 m/s 4.8-6.1MW 60Hz - 83.6 m/s
Orientation	Upwind
Speed regulation	Pitch control
Aerodynamic brake	Full feathering
Color of outer components	RAL 7035 (light grey) and RAL 7023 (concrete grey, for concrete sections of hybrid tower only)
Reflection degree/Gloss degree Steel tower	30 - 60 gloss units measured at 60° as per ISO 2813
Reflection degree/Gloss degree Rotor blades, Nacelle, Hub	60 - 80 gloss units measured at 60° as per ISO 2813
Reflection degree/Gloss degree Hybrid Tower	Concrete gray (similar RAL 7023); gloss matte

Table 1: Technical data Cypress-158 wind turbine

Atmospheric corrosion protection (corrosion categories as defined by ISO 12944 2:1998)	
Tower Shell Coating internal/external	C-2/C-3 (standard)/ C-4/C-5 (enhanced)
Tower Flange Bolts (TFB) internal/external	C-4/C-4 (standard) / C-4/C-4 (enhanced)
Tower Mechanical Fasteners and internals internal/external	C-3/C-3 (standard) / C-3/C-5 (enhanced)
Hub internal/external	C-5/C-5
Nacelle & Hub Fasteners internal/external	C-3/C-5
Automatic Lubrication System, Yaw Drive Bolts internal	C-3
Pitch Motor, Pitch Gearbox internal	C-4
Main Shaft, Pillow Block, Gearbox internal	C-4
Bedplate, Generator Frame internal	C-5

Table 2: Atmospheric corrosion protection

3.1 Operational Limits

Turbine	4.2/4.5/4.8/5.0/5.2/5.3/5.5/5.8/6.1-158
Hub height	96 m tubular steel tower (only 50Hz) 101 m tubular steel tower (50/60Hz) 107.4 m tubular steel tower (only 60Hz) 117 m tubular steel tower (only 60Hz) 120.9 m tubular steel tower (only 50Hz) 125.4 m tubular steel (only 60Hz) 141 m tubular steel tower (only 50Hz) 150 m hybrid tower (only 50Hz) 151 tubular steel tower (only 50Hz) 161 m hybrid tower (only 50Hz)
Wind turbine design standard	* IEC 61400-1, Ed. 3 ** DIBt 2012
Height above sea level	Maximum 1000 m with the maximum standard operational temperature of up to +40 °C. Above 1000 m, the maximum operational temperature is reduced per DIN IEC 60034 1 (e.g., maximum operational temperature reduced up to +30 °C at 2000 m). For installations above 1000 m isolation distances of medium voltage terminals must also be re-evaluated. De-rated operation additionally driven by ambient temperature, power rating or specific grid requirements and conditions may occur. Details on these can be found in Hot Weather High Altitude and the Grid Interconnection documentation.
Standard Weather Option (STW)	Operation from -15 °C up to +40 °C. De-rated operation driven by ambient temperature, power rating or specific grid requirements and conditions may occur. Details on these can be found in Hot Weather High Altitude and Grid Interconnection documentation. Survival temperature of -20 °C to +50 °C without the grid. Survival means turbine not in operation including the heat transfer system due to lack of energy supply by the grid.
Cold Weather Option (CW)	Operation from -30 °C up to +40 °C. De-rated operation driven by ambient temperature, power rating or specific grid requirements and conditions may occur. Details on these can be found in Cold Weather Options, Hot Weather High Altitude and Grid Interconnection documentation. Survive extreme temperature of -40 °C to +50 °C without the grid. Survive means: turbine not in operation including the heat transfer system due to lack of energy supply by the grid.
Wind class	IEC S + WZ (S)

Table 3: Operational limits

3.2 Cypress Overview Drawing and Dimensions

This document presents an overview of the relevant dimensions for the wind energy turbine with 158 m rotor diameter.

The table shown below fits to the GE drawing 450W1333.

Description		Dimension for hub height in [m]									
		96 m (tubular steel tower)	101 m (tubular steel tower)	107.4 m (tubular steel tower 60Hz only)	117m (tubular steel tower 60Hz only)	120.9 m (tubular steel tower)	125.4 m (tubular steel tower 60Hz only)	141 m (tubular steel tower)	150 m (hybrid tower)	151 m (tubular steel tower)	161 m (hybrid tower)
Hub height [m]	A2	96	101	107.4	117	120.9	125.4	141	150	151	161
Total height [m]	A3	175	180	186.4	196	199.9	204.4	220	229	230	240
Height upper daylight identification (only when required) [m]	A4	-	60	60	-	60	60	60	60	-	60
Height lower daylight identification (only when required) [m]	A5	-	40	40	-	40	40	40	40	-	40
Top of soil to top of foundation EU [m]	A6	1.3	1.3		-	1.3			1.51		1.31
Top of soil to top of foundation Australia [m]	A6	0.2	0.2		-	0.2			-		-
Top of soil to top of foundation Australia & North America [m]	A6	0.745	0.745	0.745	0.745	-	0.745	-	-		-
Height aviation light [m]	A7	100 ±1	105 ±1	111.7 ±1	-	125 ±1	129 ±1	145 ±1	154 ±1		165 ±1
Foundation diameter [m]	B2	22	22	20-25	20-25	25.8	20-25	25.8	23.5 and 25		23.5 and 25
Distance aviation lights (only when required) [m]	C1		52.5 ±4	52.5 ±4	-	62.5 ±4	62.5 ±4	72.5 ±4	77 ±4		82.5 ±4
Tower bottom diameter [m]	C7	4.3	4.3	4.3	4.56	4.3	4.3	5.0	7.9	5.3	8.5

Table 4: Description

General information for all hub heights		
Description	Parameter	Dimension
Rotor diameter	A1	158 m
Longest chord	A8	4.0 m
Chord at 90% rotor radius	A9	1.35 m
Aviation light spacing on machine head	B1	~ 4.4 m
Blade tip distance in ideal position	C2	9.55 m
Blade tip distance in operation position	C3	5.55 m
Blade tip distance in ideal position	C4	20.48 m
Blade tip distance in operation position	C5	16.53 m
Tower top diameter	C6	3.7 m
Nacelle length (incl. ventilation outlets)	D1	~ 12.8 m (~ 13.2 m)
Distance from Yaw Bearing to Centre line crossing	D2	1.38 m
Aviation marking stripe width	D3	2 m
Nacelle height	D4	~ 3.8 m
Distance tower center - hub center	D5	4.17 m
Overhang	D6	4.18 m
Distance tower top - hub center	D7	1.92 m
Tilt drivetrain	D8	4°
cone angle	D9	85°
Eccentricity area in idle	B3	20314,95 m ²
Eccentricity area in operation	B4	19989,58 m ²

Table 5: General information for all hub heights



Appendix E:

Rex J Andrews OSOM Material Transport Report



ROUTE STUDY: GPG

PROJECT: PALING YARDS WIND FARM

TURBINE TYPE: GE 158 SPLIT BLADE
FROM NEWCASTLE PORT.

16/09/2022 REV 02

Rev.	Date	Change	Responsible	Checked
00	11/02/21	Route Assessed	W Andrews	✓
00	12/08/22	Report compiled	W Andrews	✓
00	25/08/22	Report completed	W Andrews	✓
01	02/09/22	Several edits	W Andrews	✓
02	16/09/22	Several edits	W Andrews	✓

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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 Paling Yards wind farm.

This Route survey took place on 11-02-21.

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. 11/02/2021

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

Project name. Paling Yards Windfarm

Location. Newcastle (NSW) to Paling Yards (NSW)

Possible turbine types.

50 x GE158, with 151 Metre H/H

4.0 Transport dimensions for GE158.

Machine heads (14.12l x 3.97w x 3.45h x 98T)

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

Overall dimensions: 48.0l x 4.3w x 5.0h x 150.0T.

Drivetrains (6.6l x 3.98w x 3.45h x 82.0T)

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

Overall dimensions: 30.0l x 4.3w x 4.8h x 136.0T.

Hubs (4.6l x 4.2w x 3.85h x 51T)

Possible transport configuration. Prime mover with 5x8 Low Loader.

Overall dimensions: 26.0l x 4.2w x 5.0h x 82.0T.

Blades (Root) (65.4l x 4.0w x 3.3h x 28T)

Possible transport. Prime mover with 2x8 dolly and 4x4 Extending trailer.

Overall dimensions: 77.0l x 4.5w x 5.0h x 68.5T.

Blades (Tip) (15.1l x 2.4w x 2.4h x 2.5T)

Possible transport. Prime mover with 3x4 Extending trailer.

Overall dimensions: 22.0l x 2.5w x 4.0h x 32.5T.

Base Towers (9.3l x 5.5 x 5.0 x 73T)

Configuration. Prime mover with 4x8-4x8 Bookend.

Overall dimension: 40.0l x 6.0w x 5.7h x 140.5T (+ Push truck)

Section 2 Towers (12.6l x 4.85 x 5.0 x 74T)

Configuration. Prime mover with 6x8 Low platform.

Overall dimension: 30.0l x 5.0w x 5.7h x 117.5T

Section 3 Towers (14.0l x 4.6 x 4.85 x 74T)

Configuration. Prime mover with 6x8 Low platform.

Overall dimension: 30.0l x 5.0w x 5.7h x 117.5T

Section 4 Towers (19.8l x 4.6 x 4.3 x 90T)

Configuration. Prime mover with 9x8 Low platform.

Overall dimension: 34.0l x 4.7w x 5.5h x 159.5T (+ Push truck)

Section 5 Towers (23.5l x 4.3 x 4.3 x 82T)

Configuration. Prime mover with 4x8-4x8 platform trailer.

Overall dimension: 38.0l x 4.3w x 5.5h x 149.5T (+ Push truck)

Section 6 Towers (30.8l x 4.3 x 4.3 x 75T)

Configuration. Prime mover with 4x8-4x8 platform trailer.

Overall dimension: 45.0l x 4.3w x 5.5h x 144.5T (+ Push truck)

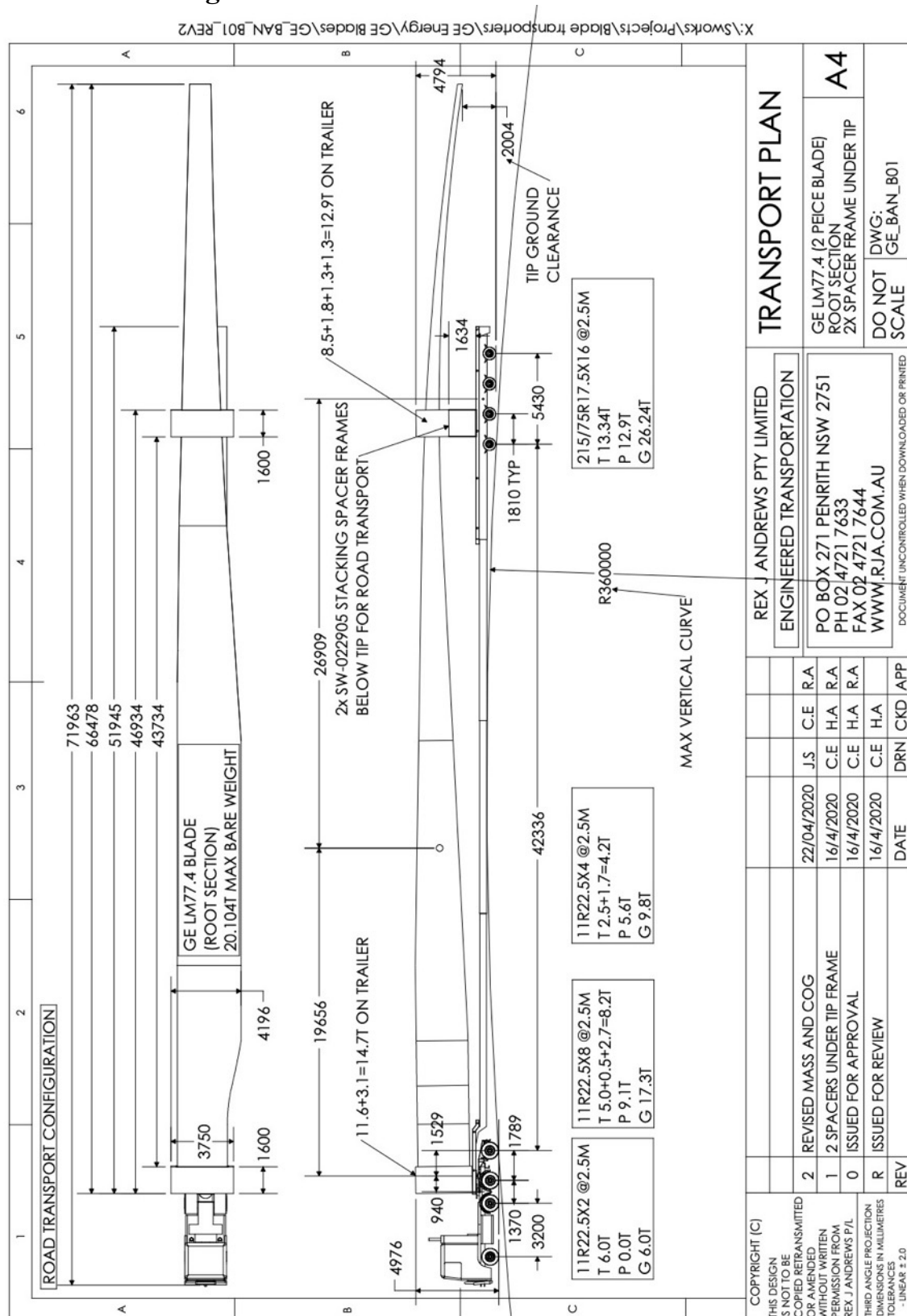
Top Towers (35.9l x 4.3w x 3.7h x 63T)

Configuration. Prime mover with 4x4 dolly 3x8 Jinker trailer.

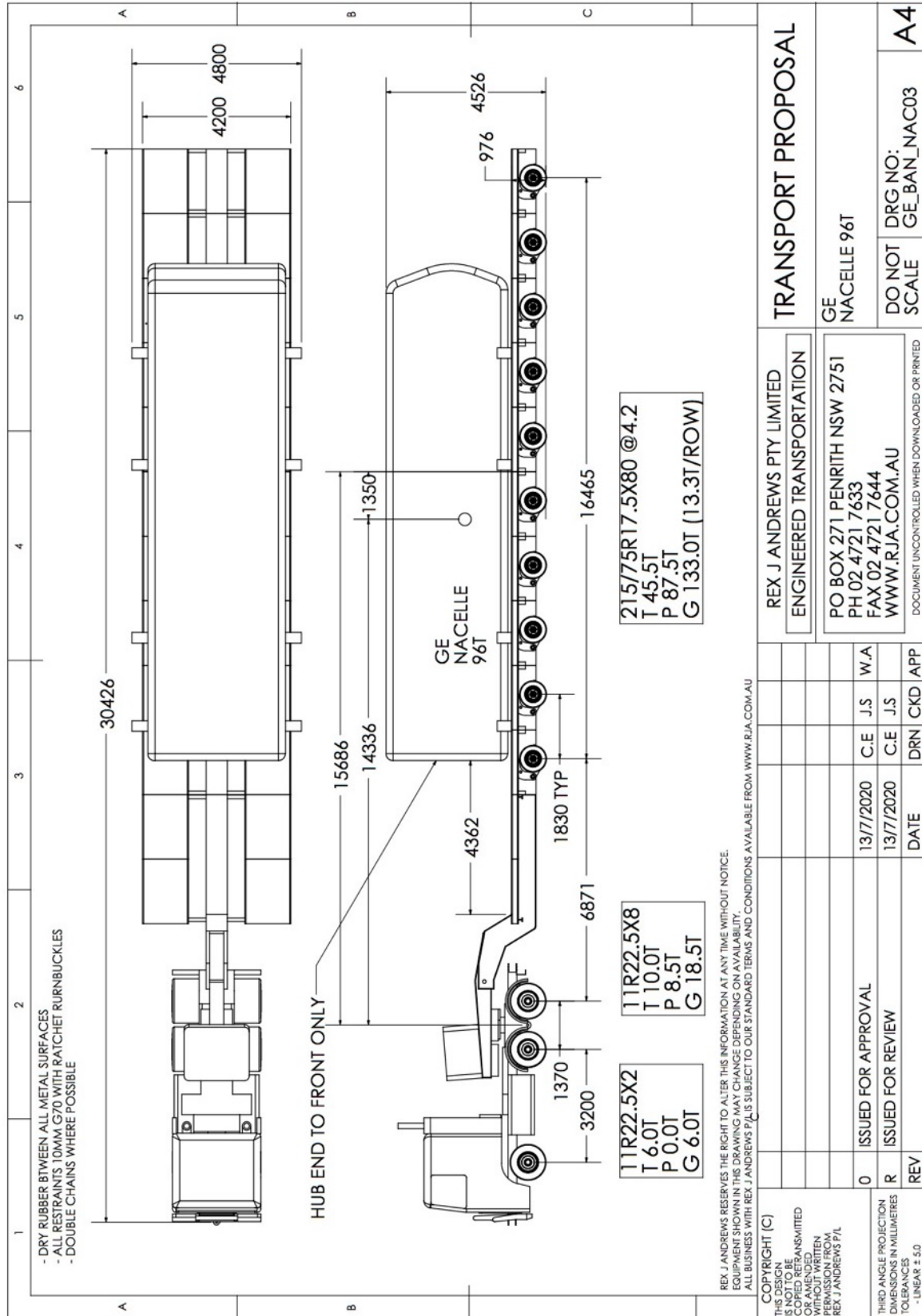
Overall dimension: 49.0l x 4.5w x 5.5h x 102.5T (+ Push truck)

5.0 Transport drawings for GE158.

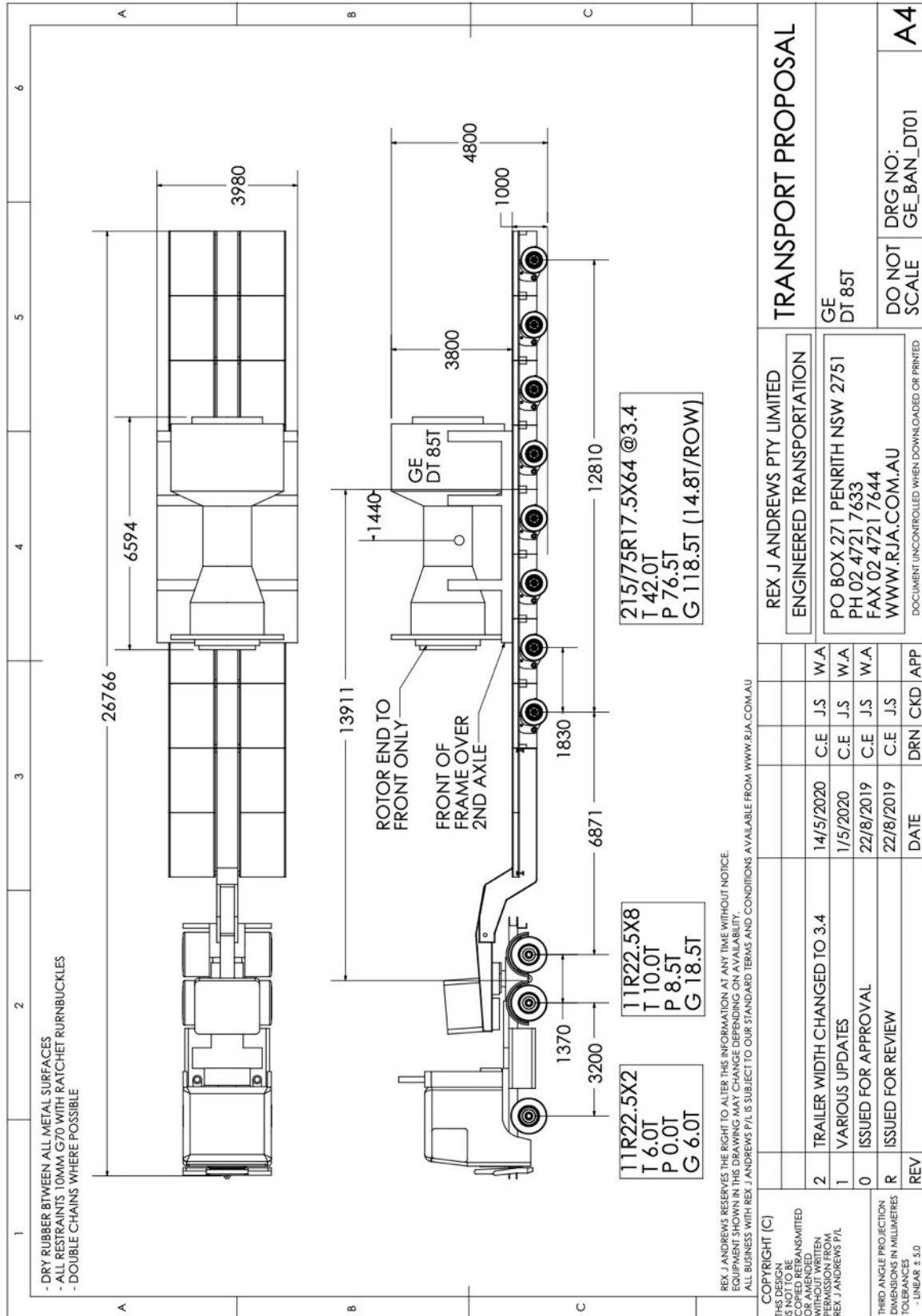
GE158 Blade diagram:



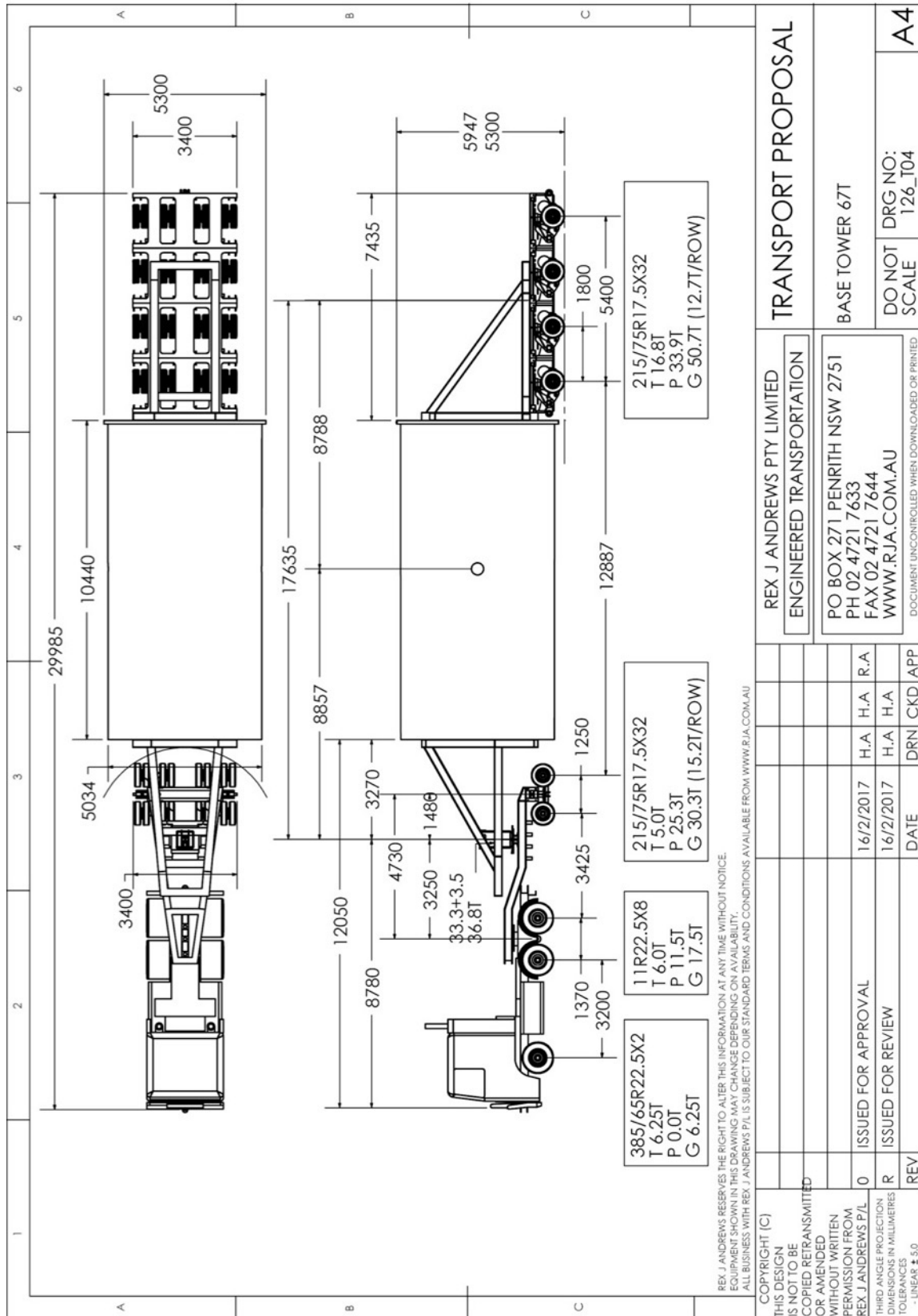
GE158 Machine Head diagram:



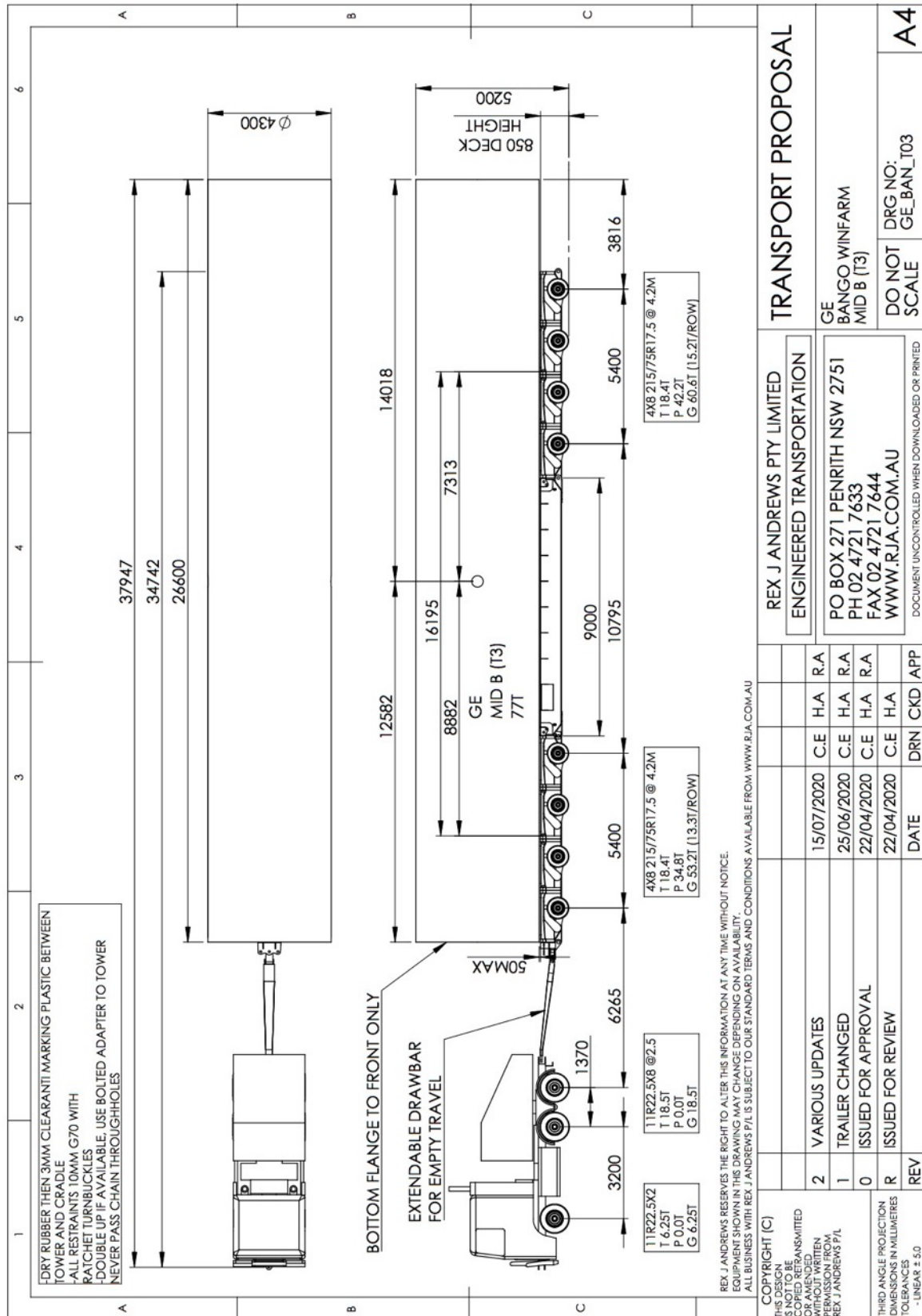
GE158 Drive train diagram:



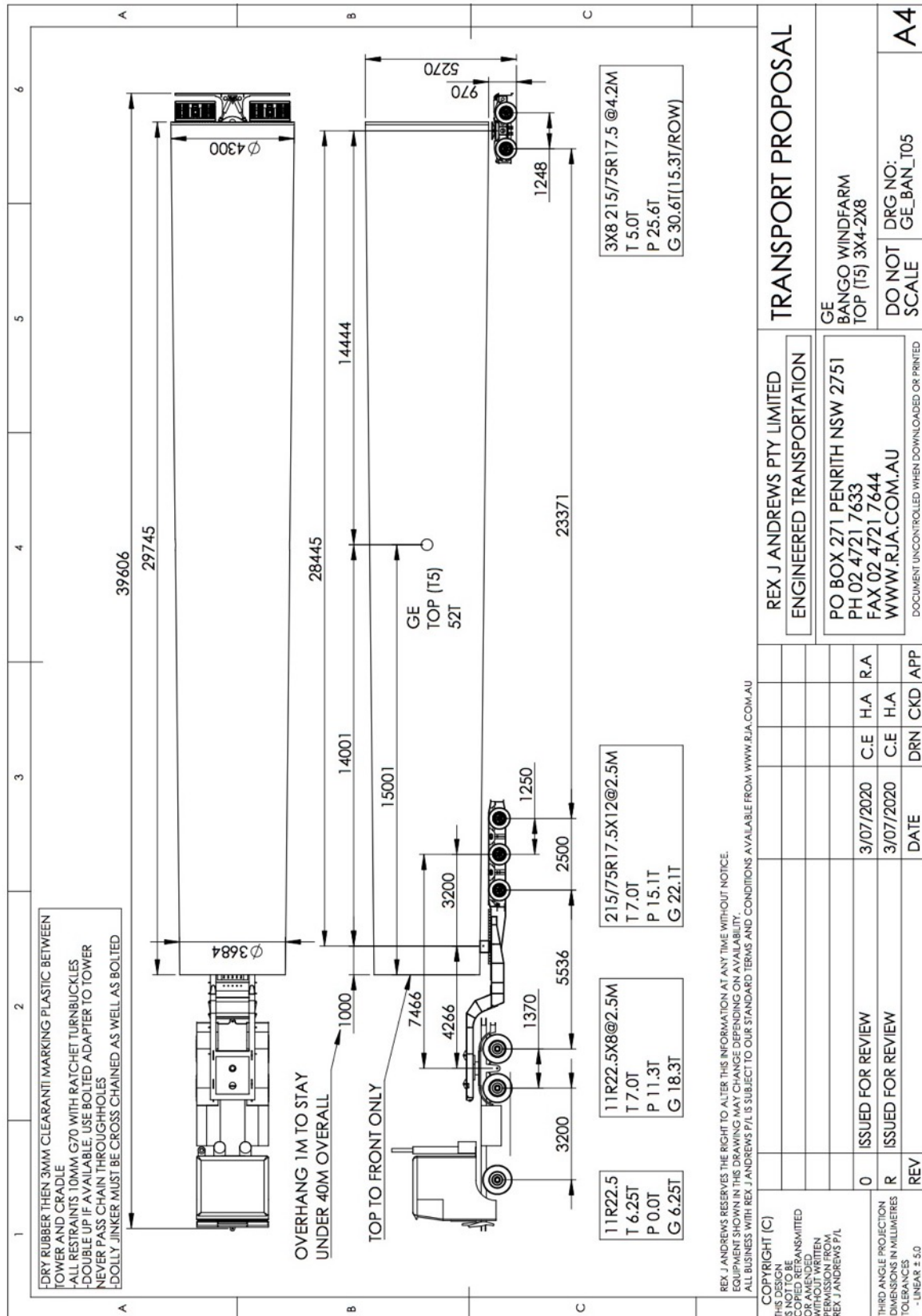
GE158 tower diagram: Bookend



GE158 tower diagram: Extending platform



GE158 tower diagram: Dolly Jinker combo



6.0 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.

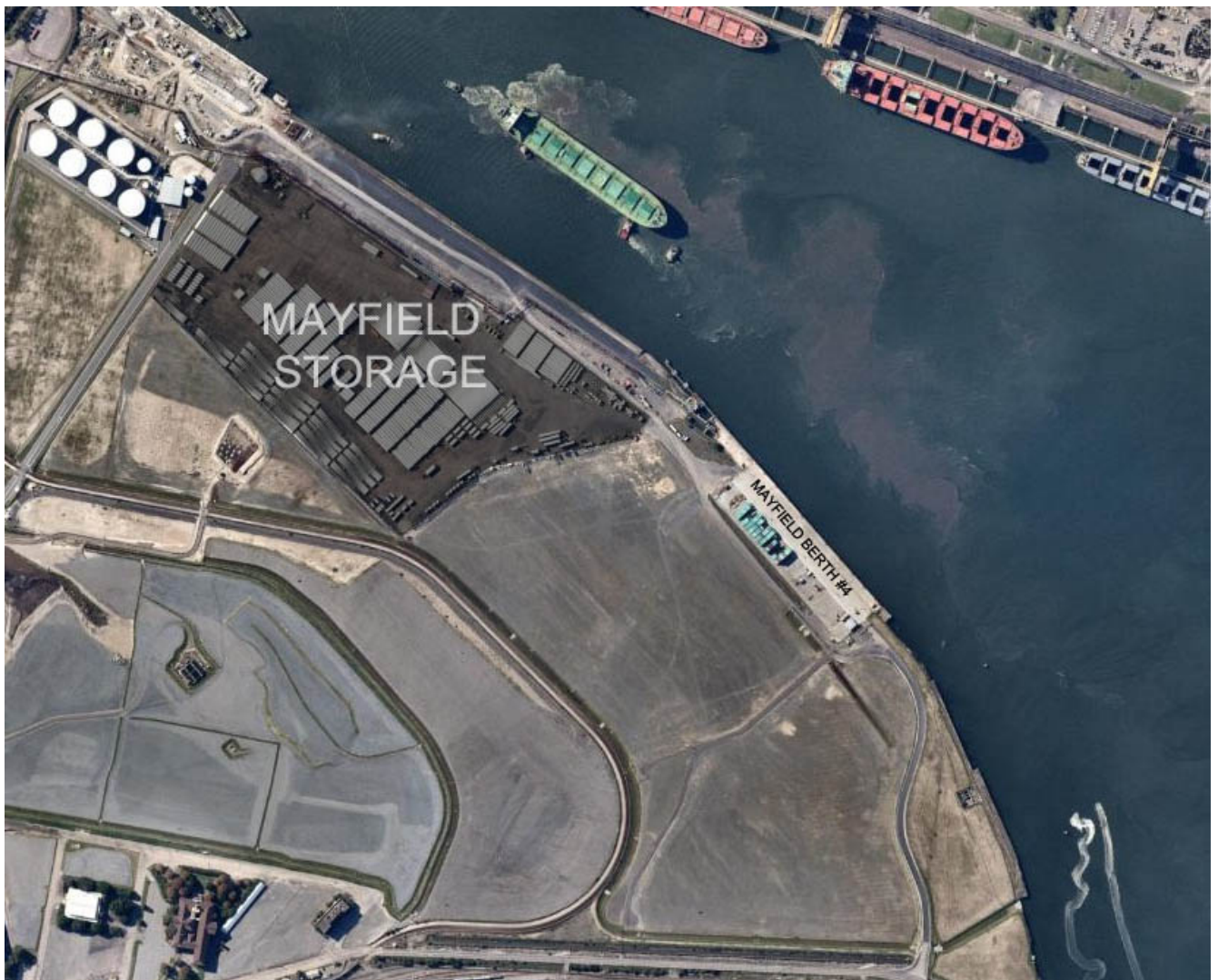
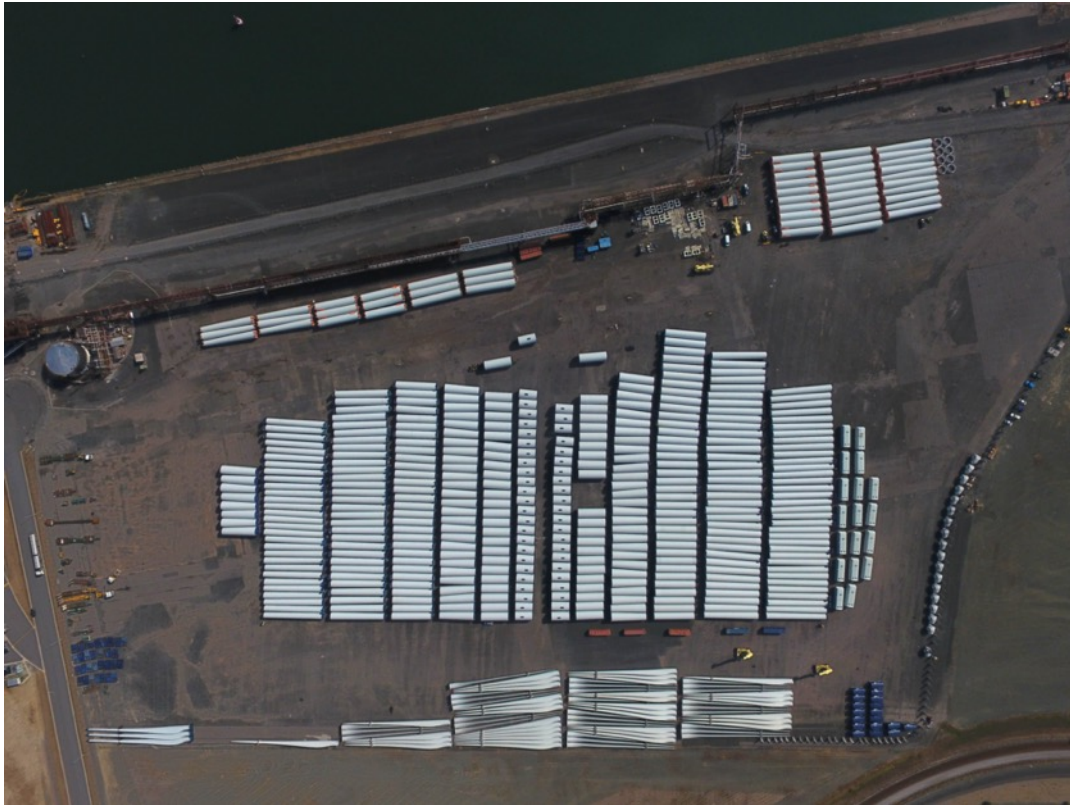


Image 2 & 3: Mayfield #4 Port storage area.

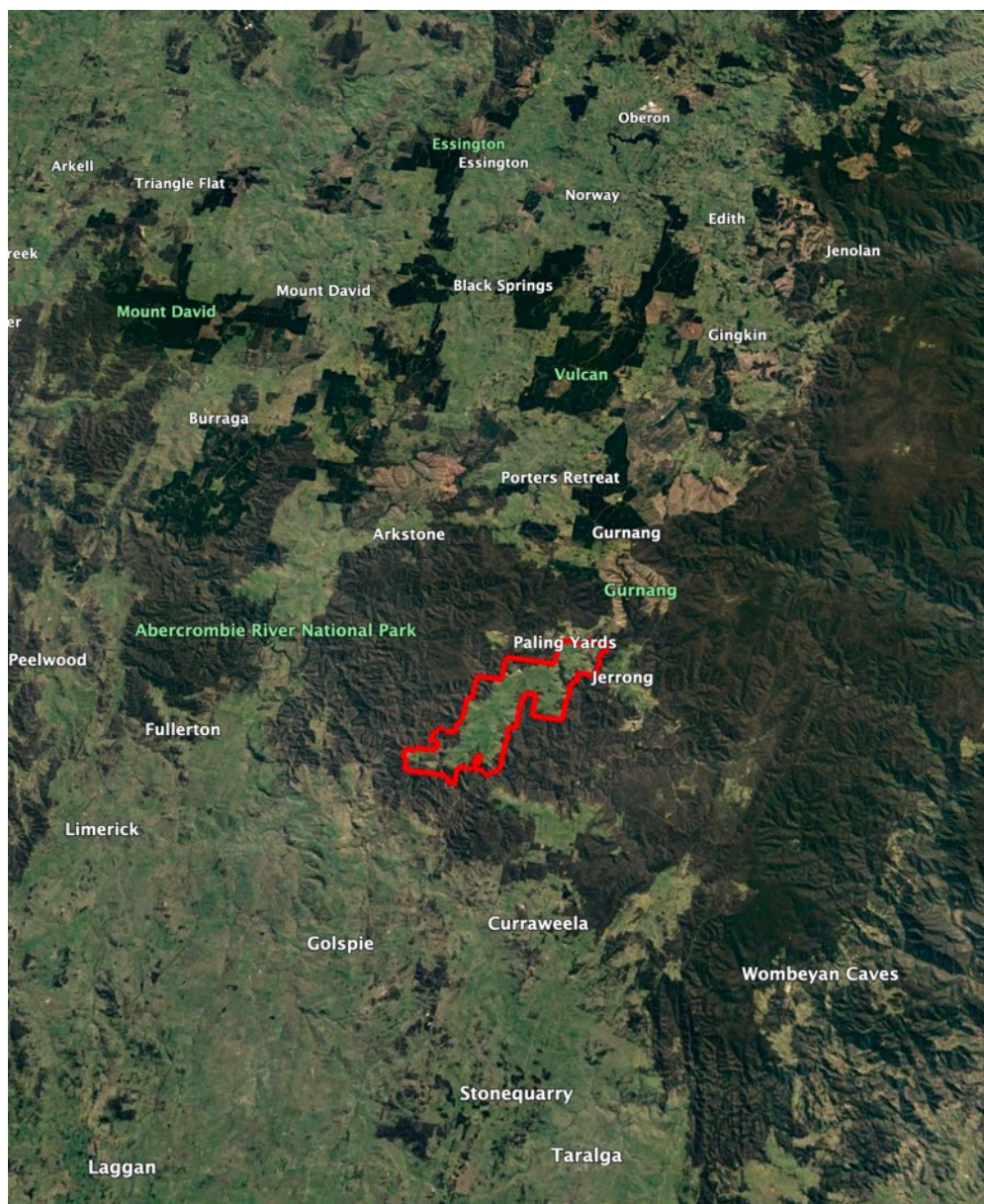


7.0 Site Location and layout.

The project site is proposed to cover four landholdings known as 'Mingary Park', 'Paling Yards', 'Middle Station' and 'Hilltop', which comprise a total of approximately 4,600 hectares. The site is within the Central Tablelands of NSW, approximately 60km south of Oberon and 60km north of Goulburn and falls within the Oberon LGA.

The Project will involve the following:

- Up to 47 wind turbines with maximum tip height of 240m
- On-site electrical substation and approximately 9km of overhead transmission line of up to 500kV - connecting to the Mt Piper to Bannaby transmission line.



8.0 Route studies: Newcastle to Paling Yards Wind Farm.

We have based this study on the turbine components, and all imported towers entering Australia via the Mayfield # 4 Berth at Newcastle. After reviewing the possible transport routes, we believe there should be 2 options. The blades and loads up to 5.1 metres in loaded height are to use Route 1. Loads over 5.1 metres and up to 5.9 metres in height are to use route 2.

ROUTE SURVEY 1 (Loads under 5.1 Metres in height): Newcastle to Paling Yards

Distance: 635.0 kilometres:

Route: Selwyn street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Thomas Mitchell Drive, Denman Road, Golden Highway, Castlereagh Highway, Great Western Highway, Littlebourne Street, O,Connell Road, Abercrombie Road.

GPS LINK: <https://goo.gl/maps/xQgSuWKKEEyVefR69>

ROUTE SURVEY 2 (Loads up to 5.9 Metres in height): Newcastle to Paling Yards

Distance: 654.0 kilometres:

Route: Selwyn street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, Golden Highway, Denman Road, Bengalla Road, Wybong Road, Golden Highway, Castlereagh Highway, Main Street, Pipers Flat Road, Range Road, Great Western Highway, Littlebourne Street, O,Connell Road, Abercrombie Road.

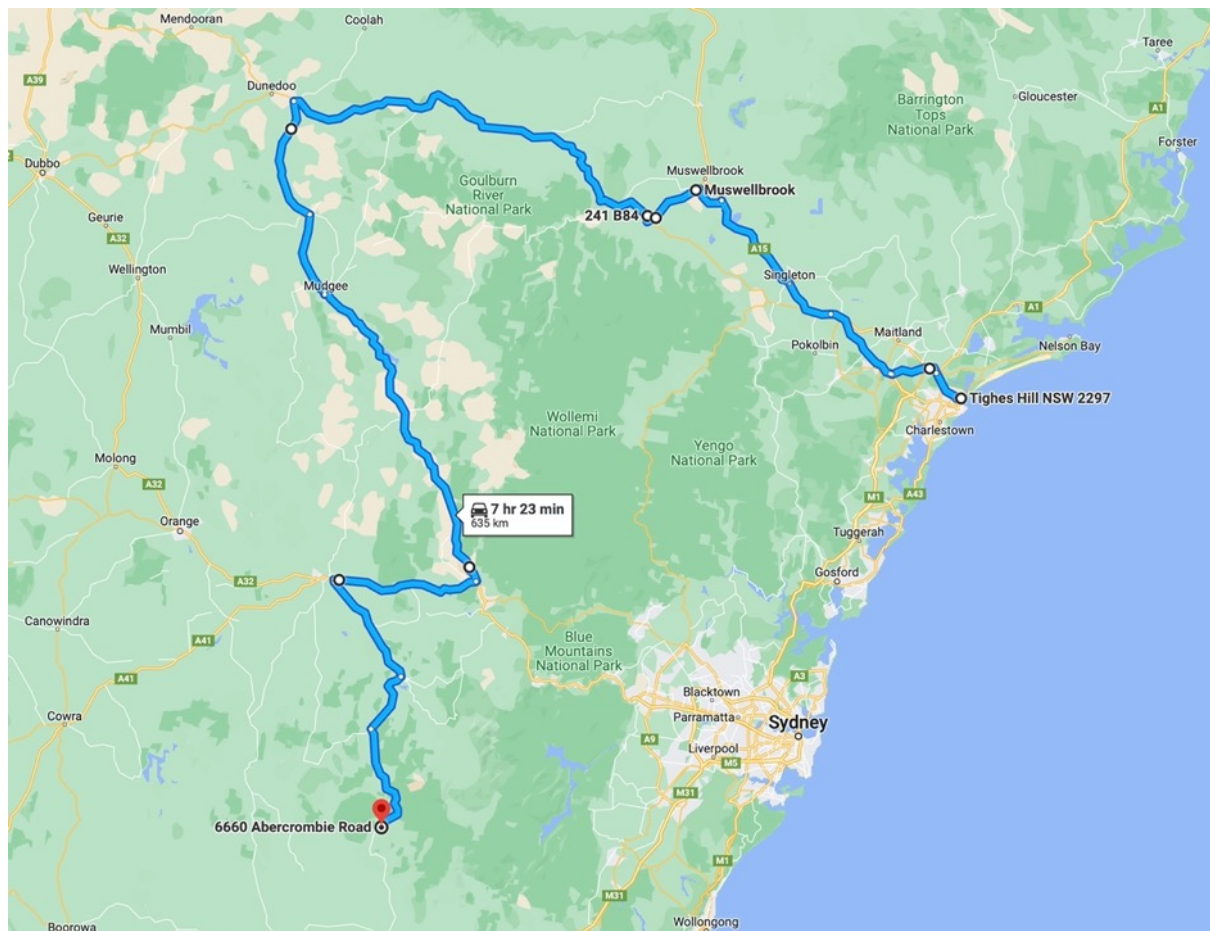
GPS LINK: <https://goo.gl/maps/8KqByBnVx3fl13mk9>

9.0 Route Survey 1: Loads under 5.1 metres in height.

Distance: 635.0 kilometres:

Route: Selwyn street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Thomas Mitchell Drive, Denman Road, Golden Highway, Castlereagh Highway, Great Western Highway, Littlebourne Street, O,Connell Road, Abercrombie Road.

GPS LINK: <https://goo.gl/maps/xQgSuWKKEEyVefR69>



KEY	
MODIFICATIONS REQUIRED	
PINCH POINT	
EMERGENCY PARKING	

KM index	Location	Section of road	Current Measurement	Procedure	Notes
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street GPS link: https://goo.gl/maps/aflwPYKuNdm	70.0 metres clearance	Moderate right hand turn	No works required. Spotter to guide the load through this pinchpoint.
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	Blades to travel right from Selwyn Street onto George Street, before turning to the incorrect side of Industrial Drive. Once onto Industrial Drive the loads will travel over the centre median strip and back onto the correct side of the road. No work required. Spotter to guide the load through this pinchpoint.
5.5	Mayfield West	Industrial Drive onto Maitland Road GPS link: https://goo.gl/maps/Kn49dhWG2qG2	70.0 metres clearance	Right hand turn	This blade will need to cross to the incorrect side 150 metres prior to the intersection, then return to the correct side 120 metres past the intersection. No work required. Spotter to guide the load through this pinchpoint.
17.4	Tarro	New England Highway onto John Renshaw Drive GPS link: https://goo.gl/maps/SRD5JigkBg	Length: N/A Width: 12.0 Mtrs	Left hand merge	No problems with the loads on this section of road.
28.7	Buchanan	John Renshaw Drive onto the Hunter Expressway GPS link: https://goo.gl/maps/pWg3RxcPzz9sYLBc8	Length: 65.0 Mtrs Width: 7.0 Mtrs	Right hand turn	Blades to travel around the roundabout on the correct side of the road. No work required. Spotter to guide the load through this pinchpoint.
59.0	Branxton	The Hunter Expressway onto The New England Highway GPS link: https://goo.gl/maps/7rauNuxzqjq	Length: 100.0 Mtrs Width: 12.0 Mtrs	Travel directly ahead	No problems with the loads on this section of road.
116.0	Muswellbrook	The New England Highway onto Thomas Mitchell Drive GPS link: https://goo.gl/maps/mamchevaSDCwHdTY6BYLjaA	Length: 70.0 Mtrs Width: 8.0 Mtrs	Left Hand turn	For the blades the prime mover will travel to the incorrect side of the road. Several signs will need to be made removable. Spotter to guide the load through this pinchpoint.
126.0	Muswellbrook	Thomas Mitchell Drive onto Denman Road GPS link: https://goo.gl/maps/3sqU2VXt6tSFTk9K6	Length: 70.0 Mtrs Width: 8.0 Mtrs	Left Hand turn	No works required. Spotter to guide the load through this pinchpoint.
144.0	Denman	Denman Road onto Golden Highway GPS link: https://goo.gl/maps/Vvh7Avx7QcdyC82k8	Length: N/A Width: 10.0 Metres	Travel directly ahead	No problems with the loads on this section of road.

KM index	Location	Section of road	Current Measurement	Procedure	Notes
149.0	Denman	Golden Highway rail crossing GPS link: https://goo.gl/maps/r7x7Qc685d82	Width: 9.0m	Travel directly ahead	Loads to travel over the crossing in the centre of the road. Approval required crossing this line, likely cross with caution.
176.0	Sandy Hollow	Golden highway GPS link: https://goo.gl/maps/2THBuV165xx	50.0 x 4.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
180.0	Sandy Hollow	Golden Highway under safety Cam GPS link: https://goo.gl/maps/b7t9zH2ankJcvWpT6	Height: 6.3 metres	Travel directly ahead on the correct side	No problems with the loads on this section of road.
187.0	Gungal	Golden highway GPS link: https://goo.gl/maps/WDoL2LfcCoP2	70.0 x 6.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
193.0	Merriwa	Golden Highway under safety Cam GPS link: https://goo.gl/maps/D92rzQ8vnUcYsqj56	Height: 6.4 metres	Travel directly ahead on the correct side	No problems with the loads on this section of road.
210.0	Merriwa	Golden highway GPS link: https://goo.gl/maps/NqrWzTsRmnt	100.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
245.0	Cassilis	Golden highway GPS link: https://goo.gl/maps/vs6YMT6TxCA2	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
275.0	Leadville	Golden highway GPS link: https://goo.gl/maps/ujxMGukhopeFWRhb8	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
293.0	Leadville	Golden highway onto the Castlereagh Highway GPS link: https://goo.gl/maps/sCmgFmgEZ621DVrf9	Length: 65.0 metres Width: 11.0 metres	Left hand turn	No work required. Spotter to guide the load through this pinchpoint.
322.0	Birriwa	Castlereagh Highway rail crossing GPS link: https://goo.gl/maps/BTrCz8VaeLN2	Length: 65.0 metres Width: 9.0 metres	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
349.0	Gulgong	Castlereagh Highway Goolma Road intersection GPS link: https://goo.gl/maps/US53QJHQ6R92	Length: 80 metres Width: 8.0 metres	Travel directly ahead	No work required. Spotter to guide the load through this pinchpoint.
337.0	Gulgong	Fisher Street onto Medley Rd GPS link: https://goo.gl/maps/QaJvNX8vB6h7cl58	Length: 45.0 metres Width: 9.0 metres	Right hand turn	Hardstand is required on the inside of the corner. Several signs and a barrier will need to be relocated. Additionally, some trees on the overhang will need to be trimmed.
362.0 to 372.0	Mudgee	Castlereagh Highway GPS link: https://goo.gl/maps/iZ4gK5Mo28KzNSDT7	Width: 6.0 metres	Follow the main Highway through Mudgee	Loaded trailers are to avoid travelling through Mudgee on schooldays between 7:00am and 9:00am and again 2:00pm and 4:30pm

KM index	Location	Section of road	Current Measurement	Procedure	Notes
365.0	Mudgee	Market Street onto Douro Street GPS link: https://goo.gl/maps/1Z4yK5Mo28KxhSQ77	Length: 45.0 metres Width: 6.0 metres	Right hand turn	Prime mover to stay on the correct side of the road, however the trailer will need to travel to the inside of the corner and over the centre median strip. The centre median strip will need to be concreted, and kerbs lowered. Additionally, some signs will need to be made removable and some no parking areas put in place.
365.4	Mudgee	Douro Street GPS link: https://goo.gl/maps/DsVfr7axnanL6XTm8	Length: 70.0 metres Width: 7.0 metres	Cross to the incorrect side of the road.	No work required. Spotter to guide the load through this pinchpoint. Police and pilots to provide suitable traffic control.
365.5	Mudgee	Douro Street onto Horatio Street GPS link: https://goo.gl/maps/VARstR2ucQWShdm6	Length: 50.0 metres Width: 7.0 metres	Left hand turn	Blades to travel around this corner on the incorrect side of the road. The centre median strip will need to be concreted, and kerbs lowered. Some trees will need to be removed, and some no parking areas put in place. Additionally, some signs will need to be made removable.
366.0	Mudgee	Horatio Street GPS link: https://goo.gl/maps/LtMDGuX6cbAL8eri6	Width: 6.5 metres	Travel directly ahead on the correct side of the roundabout	No work required. Spotter to guide the load through this pinchpoint.
367.0	Mudgee	Horatio Street onto the Castlereagh Highway GPS link: https://goo.gl/maps/r2USnGmXFP1vR58	Length: 45.0 metres Width: 9.0 metres	Right hand bend	Blade to travel around this corner on the incorrect side of the road. Several signs will need to be made removable.
399.0	Cudgegong	Castlereagh highway GPS link: https://goo.gl/maps/uh9zoP97RyC2ie8d6	Length: 250 metres Width: 20.0 metres	Parking Bay	Large parking bay. Suitable for fatigue breaks.
456.0	Ben Bullen	Castlereagh Highway rail crossing GPS link: https://goo.gl/maps/5ZtGAGDHBTq1vX2r8	Length: 60.0 metres Width: 9.0 metres	Left hand than right hand dogleg turn	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
480.0	Wallerawang	Castlereagh Highway under rail overpass GPS link: https://goo.gl/maps/ArPjkGWybsycKYhu8	Height: 5.1 metres	Travel directly ahead	Loads over 5.1 metres high are to use route 2.
482.0	Wallerawang	Castlereagh Highway onto the Great Western Highway access ramp. GPS link: https://goo.gl/maps/bF71VXv7L55QluQ8	Length: 50.0 metres Width: 8.0 metres	Right hand turn	The centre median strip will need to be made trafficable, and some signs made removable.
483.0	Wallerawang	Castlereagh Highway onto the Great Western Highway access ramp. GPS link: https://goo.gl/maps/bF71VXv7L55QluQ8	Length: 50.0 metres Width: 8.0 metres	Right hand turn	The centre median strip will need to be made trafficable, and a cable removed and some signs made removable.
511.0	Yetholme	Great Western Highway GPS link: https://goo.gl/maps/Ds2WjpbmKCp1rCSA8	Length: 150.0 metres Width: 10.0 metres	Left merge	Parking on the left-hand side of the road.
532.0	Kelso	Great Western Highway Roundabout GPS link: https://goo.gl/maps/ekjPbnNshQ4hYeEC9	Length: 50.0 metres Width: 6.5 metres	Travel directly ahead through the roundabout	A light pole will need to be relocated and several signs will need to be made removable.

KM index	Location	Section of road	Current Measurement	Procedure	Notes
533.0	Kelso	Great Western Highway onto O'Connell Road GPS link: https://goo.gl/maps/E173Wm1bX1cn3aPA	Length: 50.0 metres Width: 7.0 metres	Left hand turn	Several signs will need to be made removable.
537.0	Kelso	O'Connell Road GPS link: https://goo.gl/maps/tE5Mq3onTKm1V9LG8	Length: 100.0 metres Width: 6.0 metres	Left merge	Parking on the left-hand side of the road.
551.0	O'Connell	O'Connell Road GPS link: https://goo.gl/maps/pAAeAGkYPdZnYhf8A	Width: 6.0 metres	Continue on O'Connell Rd	Low trees on either side of the road. Some trimming may be required.
552.0	O'Connell	O'Connell Road GPS link: https://goo.gl/maps/zDc3rvvAUv2IXddo8	Length: 80.0 metres Width: 6.0 metres	Left merge	Parking on the left-hand side of the road.
561.0-562.5	Oberon	O'Connell Road (Range) GPS link: https://goo.gl/maps/3u2yNM3MBwZQnAGC8	Length: 70 metres Width: 6.0 metres	Very steep ascent with several very tight turns.	A large number of modifications are required on several of the corners. This will require some embankments cut back, and vegetation removed as a minimum
563.0	Oberon	O'Connell Road GPS link: https://goo.gl/maps/8cjX5U4ol9WJLm2C7	Length: 60.0 metres Width: 10.0 metres	Left merge	Parking on the left-hand side of the road.
574.0	Oberon	O'Connell Road onto Abercrombie Road GPS link: https://goo.gl/maps/nV3jps1195Y7xyc8	Length: 60 metres Width: 6.0 metres	Right hand turn	2x trees and 4x signs need to be removed. A large amount of hardstand is required on the inside and outside of the corner.
597.0	Black Springs	Abercrombie Road intersection of Campbells River Road GPS link: https://goo.gl/maps/wPB6vRlyWCvYfUu6	Length: 55.0 metres Width: 7.0 metres	Left hand turn	Several signs need to be removed on the corner. A small amount of hardstand is also required.
627.0	Gurnang	Abercrombie Road GPS link: https://goo.gl/maps/bfTpozcyaoth6CYVs6	Length: 100.0 metres Width: 10.0 metres	Left merge	Parking on the left-hand side of the road.
627.0-635.0	Paling Yards	Abercrombie Road GPS link: https://goo.gl/maps/pTSFwJczPgB319mK7	Length: 100.0 metres Width: 10.0 metres	Undulating section with sweeping bends	No issues with this section for blades up to 68m in length
635.0	Paling Yards	Abercrombie Road into windfarm entrances GPS link: https://goo.gl/maps/xc0faoEa7ThQwXXKW6	Proposed design Length: 70.0 metres Width: 10.0 metres	Left and right hand turns	Location of site entrance to be confirmed. Site entrance will need to be designed to suit all components.

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



PROCEDURE: Right hand turn.

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

COMMENTS: Spotter to guide load through this pinchpoint.

ROAD MODIFICATIONS: No works required.

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



PROCEDURE: Travel directly ahead over the crossing.

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

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

ROAD MODIFICATIONS: No works required.

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



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

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

COMMENTS: Load to travel right from Selwyn Street onto George Street, before turning to the incorrect side of Industrial Drive. Once onto Industrial Drive the loads will travel over the centre median strip and back onto the correct side of the road.

Spotter to guide load through this pinchpoint.

ROAD MODIFICATIONS: No works required.

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



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

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

COMMENTS: The blades will need to cross to the incorrect side 150 metres prior to the intersection, then return to the correct side 120 metres past the intersection.

Spotter to guide load through this pinchpoint.

ROAD MODIFICATIONS: No works required.

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



PROCEDURE: Blades to travel around the roundabout on the correct side of the road.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/pWg3RxePzz9sYLBes8>

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

ROAD MODIFICATIONS: No modifications required.

116.0 Km's: New England Highway onto Thomas Mitchell Drive.



PROCEDURE: Blades to travel onto the incorrect side of the road for this procedure.

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

COMMENTS: Several signs will need to be made removable.

Spotter to guide the load through this pinchpoint.

ROAD MODIFICATIONS: A small amount of works are required.

126.0 Km's: Thomas Mitchell Drive onto Denman Road.



PROCEDURE: Blades to travel onto the incorrect side of the road for this procedure.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/5oqU2VXfehSFYk9K6>

COMMENTS: Spotter to guide the load through this pinchpoint.

ROAD MODIFICATIONS: No works required.

293.0 Km's: Golden Highway onto Castlereagh Highway.



PROCEDURE: Blades to travel onto the incorrect side of the road for this procedure.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/sCmgFmgEZ621DVrf9>

COMMENTS: Spotter to guide the load through this pinchpoint.

ROAD MODIFICATIONS: No works required.

337.0 Km's: Fisher St onto Medley St at Gulgong.



PROCEDURE: Blades to travel around this right hand corner on the correct side of the road.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/GxJvNXi8vB6h7oLS6>

COMMENTS: Hardstand is required on the inside of the corner. Several signs and a barrier will need to be relocated.

Additionally, some trees on the overhang will need to be trimmed.

Spotter to guide the load through this pinchpoint.

ROAD MODIFICATIONS: A moderate amount of work is required.

365.0 Km's: Market St onto Douro St at Mudgee.



PROCEDURE: Prime mover to stay on the correct side of the road, however the trailer will need to travel to the inside of the corner and over the centre median strip.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/jZ4gK5Mo28KzNSDT7>

COMMENTS: The centre median strip will need to be concreted, and kerbs lowered. Additionally, some signs will need to be made removable and some no parking areas put in place.

Spotter to guide the load through this pinchpoint.

ROAD MODIFICATIONS: A large amount of work is required.

365.5 Km's: Douro St onto Horatio St at Mudgee.



PROCEDURE: Blades to travel around this corner on the incorrect side of the road.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/VARs5R2ooQWShcim6>

COMMENTS: The centre median strip will need to be concreted, and kerbs lowered. Some trees will need to be removed, and some no parking areas put in place.

Additionally, some signs will need to be made removable.

Spotter to guide the load through this pinchpoint.

ROAD MODIFICATIONS: A large amount of work is required.

366.0 Km's: Horatio St at Mudgee.



PROCEDURE: Blades to travel through this roundabout on the correct side of the road.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/LtMDGuX6cbAL8eri6>

COMMENTS: Spotter to guide the load through this pinchpoint.

ROAD MODIFICATIONS: No works required.

367.0 Km's: Horatio St onto Sydney Road at Mudgee.



PROCEDURE: Blades to travel around this corner on the incorrect side of the road.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/z2USgGmixFP1vfR58>

COMMENTS: Several signs need to be made removable.

Spotter to guide the load through this pinchpoint.

ROAD MODIFICATIONS: A small amount of work is required.

482.0 Km's: Castlereagh Highway onto the Great Western Highway access Road at Wallerawang.



PROCEDURE: Blades to travel around this corner on the correct side of the road.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/qF71VXv7L55QfurG9>

COMMENTS: The centre median needs to be made trafficable, and several signs need to be made removable.

Spotter to guide the load through this pinchpoint.

ROAD MODIFICATIONS: A moderate amount of work is required.

483.0 Km's: Castlereagh Highway access Road onto the Great Western Highway at Wallerawang.



PROCEDURE: Blades to travel around this corner on the correct side of the road.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/qF71VXv7L55QfurG9>

COMMENTS: The centre median strip will need to be made trafficable, and a cable removed and some signs made removable.

Spotter to guide the load through this pinchpoint.

ROAD MODIFICATIONS: A moderate amount of work is required.

532.0 Km's: Great Western Highway roundabout at Kelso.



PROCEDURE: Travel through the roundabout on the correct side of the road.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/eKjPbsNshG4bYeEC9>

COMMENTS: A light pole will need to be relocated and several signs will need to be made removable.

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

533.0 Km's: Great Western Highway onto Littlebourne St at Kelso.

PROCEDURE: Left turn at the roundabout.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/iF173WmTbXTcnXsFA>

COMMENTS: Loads will turn from the correct side of Great Western Highways onto the wrong-side of Littlebourne St and cut back to the correct side after the traffic island. The tail swing will overhang onto the Eastbound lanes of the Great Western Highway so the roundabout will need to be blocked from all directs. Several signs will need to be made removable.

ROAD MODIFICATIONS: Yes, minor amount of works are required.

561.0 Km's to 562.5 Km's: O'Connell Road Range

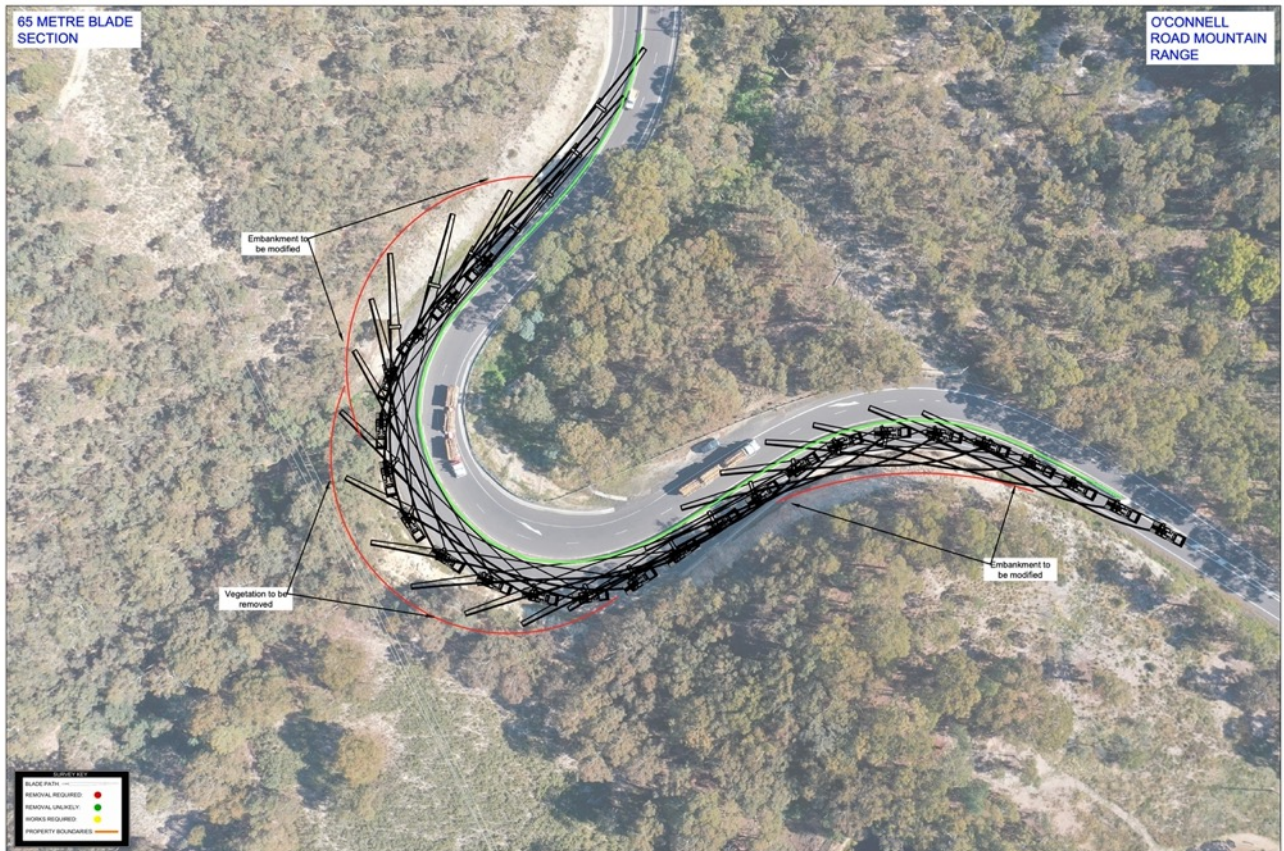
Image 1: Left hand bend



Image 2: Right hand bend



Image 3: Dogleg corner



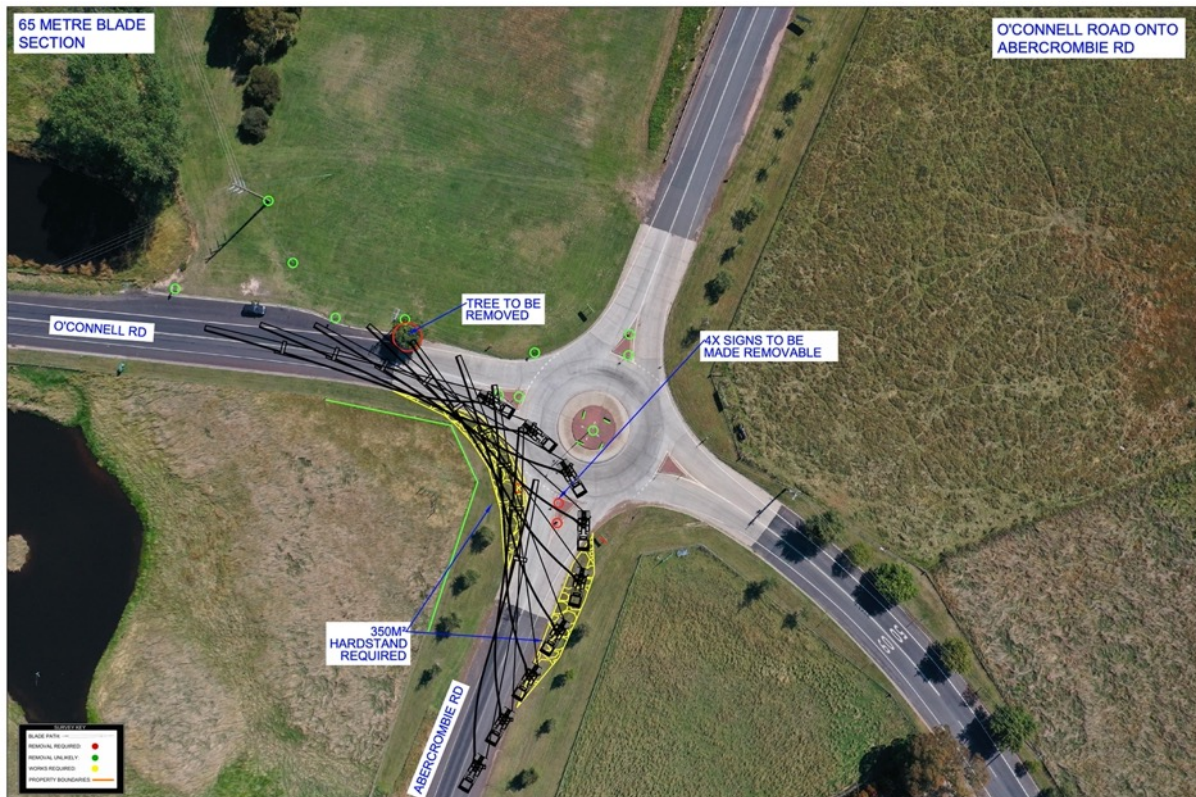
PROCEDURE: Very steep ascent with several very tight turns.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/Lq6yNM3MBwZGpASC6>

COMMENTS: A large number of modifications are required on several of the corner. This will require some embankments cut back, a vegetation removed as a minimum.

ROAD MODIFICATIONS: Yes, major works required.

574.0 Km's: O'Connell Road onto Abercrombie Road at Oberon.



PROCEDURE: Right-hand turn at the roundabout from the wrong side.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/nV3ygxLL9SV7xy6z8>

COMMENTS: 2x trees and 4x signs need to be removed. A large amount of hardstand is required on the inside and outside of the corner.

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

597.0 Km's: Abercrombie Road intersection of Campbells River Roads at Black Springs.



PROCEDURE: Left-hand turn to stay on Abercrombie Rd.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/wPBfjVRiyWCrVtFU6>

COMMENTS: Several signs need to be removed on the. A small amount of handstand is required.

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

627.0 – 635.0 Km's: Abercrombie Road.









PROCEDURE: Continue on Abercrombie Rd.

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/pTSFwJczPgB319mK7>

COMMENTS: This is an undulating section of road with numerous sweeping bends. Blades up to 70m will navigate this section without issue. Trees should be checked closer to commencement to ensure no trimming is required.

ROAD MODIFICATIONS: No works required.

10.0 Route 1 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 large number of bridges on route that will require bridge assessments for the capacity of the listed loads.

OVERHEAD STRUCTURES: (5.1 Maximum loaded height)

- There are a large number of overhead structures between Newcastle and Wallerawang. The lowest of these structures is the rail underpass on the Castlereagh Highway at Wallerawang. There are a number of other structures noted as pinchpoints 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 5.2 metres is required for this project.

OVERHEAD TREES:

- Several trees need to be removed in Mudgee.
- The remaining route up until the turnoff onto O'Connell Road 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. There is a section of road just before O'Connell that is of particular concern.

ROAD PAVEMENT:

- The road is of highway standard up to the turnoff onto Abercrombie Road at Oberon. The width and quality of the pavement will be ok.
- Abercrombie road to site is generally of good quality and there won't be any issues with width up to site. There were lots of sections of road work along Abercrombie road. During the winter months there could be a lot of snow and ice on the road and conditions may become severe enough to stop transport until they improve.

NEWCASTLE:

- No works required.

GULGONG:

- One corner will require upgrades at Gulgong before the blades could travel along this route.

MUDGEES:

- Several corners require upgrades at Mudgee before the blades could travel along this route.

BEN BULLEN:

- The dogleg turns over the rail line will require some rail signals to be hinged and lowered for each blade load.

WALLERAWANG:

- Two corners require upgrades at Mudgee before the blades could travel along this route.

BATHURST:

- Two corners require upgrades at Bathurst before the blades could travel along this route.

O'CONNELL ROAD:

- Major works are required to travel up the O'Connell Rd range for these blades. However, the loads could travel up the incorrect side of the road and the centre barrier could stay in place.
- There are some sections along this road that will require the embankment to be cut back and trees to be removed and trimmed.

ABERCROMBIE ROAD:

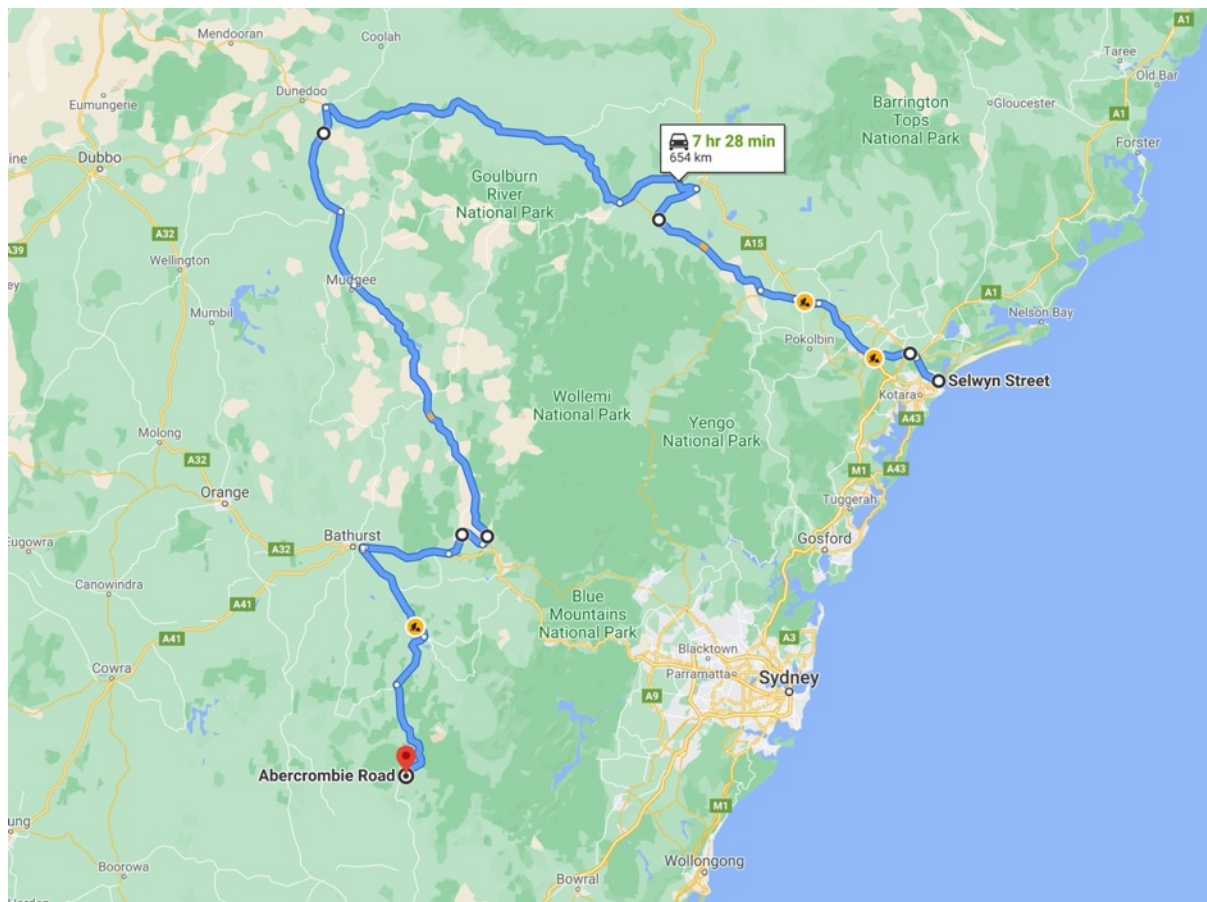
- Two corners require modifications on Abercrombie road at Oberon and the left-hand turn at Black Springs before the blades could travel along this route.
- Some trees may need trimming closer to the project start date.

11.0 Route Survey 2: Loads up to 5.9 metres in height.

Newcastle to Paling Yards via Mudgee 654.0 kilometres:

This route took us via Selwyn street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, Golden Highway, Denman Road, Bengalla Road, Wybong Road, Golden Highway, Castlereagh Highway, Main Street, Pipers Flat Road, Range Road, Great Western Highway, Littlebourne Street, O,Connell Road, Abercrombie Road.

GPS LINK: <https://goo.gl/maps/8KqByBnVx3f113mk9>



KEY	
CRITICAL	
CAUTION	
EMERGENCY PARKING	

KM index	Location	Section of road	Current measurement	Procedure	Notes
0.0	Mayfield	Mayfield #4 berth onto Selwyn Street GPS link: https://goo.gl/maps/aflwPYKuNdm	Length: 70.0 Mtrs Width: 8.0 Mtrs	Moderate right hand turn	No problems with the loads on this section of road.
0.4	Mayfield	Selwyn Street over rail crossing GPS link: https://goo.gl/maps/AmohE54hKSz	Length: 90 metres Width: 9.0 Metres	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
1.3	Mayfield	Selwyn Street onto George Street GPS link: https://goo.gl/maps/gXeHvBtCp4D2	Length: 40.0 Mtrs Width: 8.0 Mtrs	Right hand turn	No problems with the loads on this section of road.
1.4	Mayfield	George Street onto Industrial Drive GPS link: https://goo.gl/maps/s4ayrsuoAsD2	Length: 40.0 Mtrs Width: 8.0 Mtrs	Right hand turn	No problems with the loads on this section of road.
4.9	Mayfield	Industrial Drive under traffic signals GPS link: https://goo.gl/maps/YmqhiS2iR582	Height: 5.4 metres	Travel directly ahead in the far right lane.	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 metres will need to travel in the right-hand lane. Clearance in the right end lane is 6.0 metres.
5.5	Mayfield West	Industrial Drive onto Maitland Road GPS link: https://goo.gl/maps/Kn49dhWG2qG2	Length: 40.0 Mtrs Width: 7.0 Mtrs	Right hand turn	No problems with the loads on this section of road.
6.4	Sandgate	Maitland Road over rail bridge GPS link: https://goo.gl/maps/W2JWWjhfv5UMviB7	Length: 90 metres Width: 9.0 Metres	Travel directly ahead in the right-hand lane	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.
13.9	Hexham	New England Highway under gantry GPS link: https://goo.gl/maps/YTMOFe7Aick	Height: 5.9 metres	Travel directly ahead	This is the lowest structure on route. There is no bypass around the gantry. A maximum loaded height of 5.9 metres should not be exceeded.
15.1	Tarro	New England Highway over rail bridge GPS link: https://goo.gl/maps/tNWLwQC2hzSPhAp6	Length: 90 metres Width: 7.0 Metres	Travel directly ahead in the right-hand lane	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.
17.4	Tarro	New England Highway onto John Renshaw Drive GPS link: https://goo.gl/maps/SRDt5JigkBp	Length: 100.0 Mtrs Width: 12.0 Mtrs	Left hand merge	No problems with the loads on this section of road.
18.4	Beresfield	John Renshaw Drive GPS link: https://goo.gl/maps/N19vJih1Fgr	Length: 100.0 Mtrs Width: 10.0 Mtrs	Travel directly ahead	No problems with the loads on this section of road.
28.7	Buchanan	John Renshaw Drive onto the Hunter Expressway GPS link: https://goo.gl/maps/1STJ1PfQ9E2	Length: 65.0 Mtrs Width: 7.0 Mtrs	Right hand turn	No problems with the loads on this section of road.
58.9	Branxton	The Hunter Expressway onto The New England Highway GPS link: https://goo.gl/maps/7rauNuxzqjq	Length: 100.0 Mtrs Width: 12.0 Mtrs	Travel directly ahead	No problems with the loads on this section of road.

KM index	Location	Section of road	Current measurement	Procedure	Notes
67.3	Whittingham	The New England Highway onto the Golden Highway GPS link: https://goo.gl/maps/nAnfkYfeUn42	Length: 70.0 Mtrs Width: 8.0 Mtrs	Left Hand turn	The NSW Government is currently upgrading this intersection. At this stage the data that is available for the upgrades shows that the section of road that we would need to access does not change considerably. However, it is recommended that you monitor the progress of the upgrades, and that any changes are thoroughly looked at.
67.4	Whittingham	Golden Highway GPS link: https://goo.gl/maps/R86RFuPnmFU2	115.0 x 9.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
68.0	Whittingham	Golden Highway over rail bridge GPS link: https://goo.gl/maps/5NwDQofandvvMKfY9	Length: 90 metres Width: 9.0 Metres	Travel directly ahead in the centre of the road.	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.
77.3	Mount Thorley	Golden Highway over rail bridge GPS link: https://goo.gl/maps/qTxSbkxPu87L5hx4A	Length: 90 metres Width: 9.0 Metres	Travel directly ahead in the centre of the road.	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.
77.4	Whittingham	Golden Highway intersection with the Putty Road GPS link: https://goo.gl/maps/7hQdEmK1EgE2	Length: 65 metres Width: 6.0 Metres	Left hand turn	No problems with the loads on this section of road.
77.5	Mount Thorley	Golden Highway GPS link: https://goo.gl/maps/zGvdupDuixx	100.0 x 10.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
80.6	Mount Thorley	Golden Highway over rail bridge GPS link: https://goo.gl/maps/ipGU4USXmWZ8GkJs6	Length: 90 metres Width: 9.0 Metres Height: 5.2 metres	Travel directly ahead in the centre of the road.	Approval from Rail company required to cross this structure. Travel over this structure may have specific conditions.
80.8	Mount Thorley	Putty Road under Mt Thorley Road GPS link: https://goo.gl/maps/SMzSLP1kvQYDMqa86	Heights: Left: 6.6 metres Centre: 6.3 Metres Right: 6.3 metres	Travel under the bridge in the left lane	Mt Thorley underpass is 6.3 metres in the centre of the road. Towers to pass under this structure on the correct side.
80.8	Mount Thorley	Golden Highway intersection with the Putty Road GPS link: https://goo.gl/maps/QS9quvSyHYWaFHoX9	Length: 45 metres Width: 6.0 Metres	Right hand turn	No problems with the loads on this section of road.
98.0	Warkworth	Golden Highway GPS link: https://goo.gl/maps/Y6V6EXaCwxq	100.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
107.0	Jerrys Plains	Golden Highway through Jerrys Plains village GPS link: https://goo.gl/maps/WgSCRsJ9ZGt	Length: 60 metres Width: 6.0 Metres	Left hand than right hand turn	No problems with the loads on this section of road.
126.0	Ogilvy	Golden Highway GPS link: https://goo.gl/maps/58Tj9ojs7CC2	Length: 90 metres Width: 8.0 Metres	Travel directly ahead up a 6% gradient	This section of road has a steep mountain range that will require additional pull trucks to assist loads that exceed 80T gross weight.
131.9	Denman	Golden Highway onto Denman Road GPS link: https://goo.gl/maps/sf4PNnycxB32	Length: 55 metres Width: 6.0 Metres	Right hand turn	No problems with the loads on this section of road.
137.9	Muswellbrook	Denman Road onto Bengalla Road GPS link: https://goo.gl/maps/3sK4m6YSHNHgkqn68	Length: 60 metres Width: 8.0 Metres	Left hand turn	No problems with the loads on this section of road.
149.0	Bengalla	Bengalla Road onto Wybong Road GPS link: https://goo.gl/maps/zfDyG4GQq6G37imB9	Length: 90 metres Width: 8.0 Metres	Left hand bend	No problems with the loads on this section of road.

KM index	Location	Section of road	Current measurement	Procedure	Notes
158.0 to 183.0	Bengalla	Wybong Road GPS link: https://goo.gl/maps/ekGZA5wFFK55Mvmc7	Length: 60 metres Width: 8.0 Metres	Travel directly ahead	This road is maintained by Muswellbrook Council. Approval will be required to travel on this section of Road.
183.0	Sandy Hollow	Wybong Road onto Golden Highway GPS link: https://goo.gl/maps/5ft3VnWpnPhpeN4u7	Length: 60 metres Width: 8.0 Metres	Right hand turn	No problems with the loads on this section of road.
197.0	Sandy Hollow	Golden highway GPS link: https://goo.gl/maps/2THBuV165xx	50.0 x 4.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
201.0	Sandy Hollow	Golden Highway under safety Cam GPS link: https://goo.gl/maps/b7t9zH2ankJcvWpT6	Height: 6.3 metres	Travel directly ahead on the correct side	No problems with the loads on this section of road.
208.0	Gungal	Golden highway GPS link: https://goo.gl/maps/WDoL2LfeCoP2	70.0 x 6.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
214.0	Merriwa	Golden Highway under safety Cam GPS link: https://goo.gl/maps/D9t3rzQ8vnUcYsqj56	Height: 6.4 metres	Travel directly ahead on the correct side	No problems with the loads on this section of road.
231.0	Merriwa	Golden highway GPS link: https://goo.gl/maps/NqrWzTsRmnt	100.0 x 5.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
266.0	Cassilis	Golden highway GPS link: https://goo.gl/maps/vs6YMT6TCA2	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
296.0	Leadville	Golden highway GPS link: https://goo.gl/maps/uixMGukhopeFWRhb8	200.0 x 8.0 metres	Parking Bay	Suitable parking for Fatigue breaks.
314.0	Leadville	Golden highway onto the Castlereagh Highway GPS link: https://goo.gl/maps/sCmgFmgEZ621DVrf9	Length: 65.0 metres Width: 11.0 metres	Left hand turn	No problems with the loads on this section of road.
343.0	Birriwa	Castlereagh Highway rail crossing GPS link: https://goo.gl/maps/BTrCz8VaeLN2	Length: 65.0 metres Width: 9.0 metres	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
370.0	Gulgong	Castlereagh Highway Goolma Road intersection GPS link: https://goo.gl/maps/US53QJHQ6R92	Length: 80 metres Width: 8.0 metres	Travel directly ahead	Spotter to guide load through this pinchpoint. Police and pilots to supply traffic control as per the procedure for this section of road.
358.0	Gulgong	Fisher Street onto Medley Rd GPS link: https://goo.gl/maps/GxJvNXi8vB6h7oLS6	Length: 45.0 metres Width: 9.0 metres	Right hand turn	No problems with the loads on this section of road.
383.0 to 393.0	Mudgee	Castlereagh Highway GPS link: https://goo.gl/maps/iZ4gK5Mo28KzNSDT7	Width: 6.0 metres	Follow the main Highway through Mudgee	Loaded trailers are to avoid travelling through Mudgee on schooldays between 7:00am and 10:00am and again 2:00pm and 4:30pm
386.0	Mudgee	Market Street onto Douro Street GPS link: https://goo.gl/maps/iZ4gK5Mo28KzNSDT7	Length: 45.0 metres Width: 6.0 metres	Right hand turn	Loads to travel over the centre of the roundabout. No problems with the loads on this section of road.
386.5	Mudgee	Douro Street onto Horatio Street GPS link: https://goo.gl/maps/VARs5R2ooQWShcim6	Length: 50.0 metres Width: 7.0 metres	Left hand turn	No problems with the loads on this section of road.
387.0	Mudgee	Horatio Street GPS link: https://goo.gl/maps/LtMDGuX6cbAL8eri6	Width: 6.5 metres	Travel directly ahead on the correct side of the roundabout	No problems with the loads on this section of road.

KM index	Location	Section of road	Current measurement	Procedure	Notes
388.0	Mudgee	Horatio Street onto the Castlereagh Highway GPS link: https://goo.gl/maps/z2USqGmixFP1vfr58	Length: 45.0 metres Width: 9.0 metres	Right hand bend	No problems with the loads on this section of road.
420.0	Cudgegong	Castlereagh highway GPS link: https://goo.gl/maps/uh9zoP97RyC2ie8d6	Length: 250 metres Width: 20.0 metres	Parking Bay	Large parking bay. Suitable for fatigue breaks.
477.0	Ben Bullen	Castlereagh Highway rail crossing GPS link: https://goo.gl/maps/5ZtGAGDHBtq1vX2r8	Length: 60.0 metres Width: 9.0 metres	Left hand than right hand dogleg turn	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
499.0	Wallerawang	Castlereagh Highway onto Main Street GPS link: https://goo.gl/maps/TsL2Ur8tUJJ5CfZe9	Length: 60.0 metres Width: 8.0 metres	Right hand turn	No problems with the loads on this section of road.
502.0	Wallerawang	Main Street onto Pipers Flat Road GPS link: https://goo.gl/maps/KyEM8hfSLqAGavq9	Length: 45.0 metres Width: 8.0 metres	Right hand turn	Towers to cross to the inside of the corner. Spotter to guide load through this pinchpoint. Police and pilots to supply traffic control as per the procedure for this section of road.
502.0	Wallerawang	Pipers Flat Road GPS link: https://goo.gl/maps/A5Y7hNkBiRdwU4Gi7	Width: 8.0 metres	Travel directly ahead	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution.
510.0	Portland	Pipers Flat Road onto Range Road. GPS link: https://goo.gl/maps/h61jrKzNjcyZL22A6	Length: 45.0 metres Width: 8.0 metres	Left hand turn	No problems with the loads on this section of road.
510.0 to 520.0	Portland	Range Road GPS link: https://goo.gl/maps/4eakYvGyonYVwvov/T3	Width: 7.0 metres	Travel directly ahead	This section of road will need trees to be pruned.
520.0	Meadow Flat	Wallerawang-Rydal Road onto the Great Western Highway GPS link: https://goo.gl/maps/qF71VXv7L55QfurG9	Length: 50.0 metres Width: 8.0 metres	Right hand turn	No problems with the loads on this section of road.
531.0	Yetholme	Great Western Highway GPS link: https://goo.gl/maps/Ds2WjpbmKcP1rCSA8	Length: 150.0 metres Width: 10.0 metres	Left merge	Parking on the left-hand side of the road.
551.0	Kelso	Great Western Highway GPS link: https://goo.gl/maps/eKjPbsNshG4bYeEC9	Length: 50.0 metres Width: 6.5 metres	Travel directly ahead through the roundabout	No problems with the loads on this section of road.
552.0	Kelso	Great Western Highway onto O'Connell Road GPS link: https://goo.gl/maps/iF173WmTbXTcnXsFA	Length: 50.0 metres Width: 7.0 metres	Left hand turn	No problems with the loads on this section of road.
556.0	Kelso	O'Connell Road GPS link: https://goo.gl/maps/tE5Mq3onTKm1V9LG8	Length: 100.0 metres Width: 6.0 metres	Left merge	Parking on the left-hand side of the road.
571.0	O'Connell	O'Connell Road GPS link: https://goo.gl/maps/zDc3vrvAUv2tXddo8	Length: 80.0 metres Width: 6.0 metres	Left merge	Parking on the left-hand side of the road.
580.0	Oberon	O'Connell Road GPS link: https://goo.gl/maps/Lq6vNM3MBwZGpASC6	Length: 50.0 metres Width: 6.0 metres	Travel around several tight corners while ascending a mountain range.	All loads over 70T gross will require a backup prime mover to assist with the gradient on this section of road. The largest towers will need to have assistance from a steer operator.
582.0	Oberon	O'Connell Road GPS link: https://goo.gl/maps/8cjX5U4oL9WJLm2C7	Length: 60.0 metres Width: 10.0 metres	Left merge	Parking on the left-hand side of the road.

KM index	Location	Section of road	Current measurement	Procedure	Notes
593.0	Oberon	O'Connell Road onto Abercrombie Road GPS link: https://goo.gl/maps/LNzzcY93MTxbrg3y8	Length: 45.0 metres Width: 6.0 metres	Right hand turn	Some signs will need to be removed for the longest loads.
616.0	Black Springs	Abercrombie Road intersection of Campbells River Road GPS link: https://goo.gl/maps/wPBfjVRiyWCrVtFU6	Length: 55.0 metres Width: 7.0 metres	Left hand turn	No problems with the loads on this section of road.
646.0	Gurnang	Abercrombie Road GPS link: https://goo.gl/maps/blTpozcyaoth6CYVs6	Length: 100.0 metres Width: 10.0 metres	Left merge	Parking on the left-hand side of the road.
646.0-651.8	Gurnang	Abercrombie Road GPS link: https://goo.gl/maps/pTSFwJczPgB319mK7	Length: 100.0 metres Width: 10.0 metres	Undulating section with sweeping bends	No problems with the loads on this section of road.
654.0	Paling Yards	Abercrombie Road into windfarm entrance GPS link: https://goo.gl/maps/hdptanEa7hcQwXKw8	Proposed design Length: 70.0 metres Width: 10.0 metres	Left and right hand turns	Location of site entrance to be confirmed. Site entrance will need to be designed to suit all components.

12.0 Route 2 conclusion:

After studying all options and undertaking a route survey, this route in its current condition will require a moderate 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 large number of bridges on route that will require bridge assessments for the capacity of the listed loads.

OVERHEAD STRUCTURES THAT CANNOT BE DETOURED: (5.9 Maximum loaded height)

- The overhead gantry on the New England Highway at Hexham is the lowest structure on route with a maximum clearance of 5.9 metres in height.

OVERHEAD STRUCTURES THAT CAN BE DETOURED: (5.4 in height)

- A traffic signal on Industrial drive has a maximum clearance of 5.4 metres in the left lane. However, if the loads stay in the right hand lanes, they can pass this signal at up to 5.9 metres in height.

OVERHEAD UTILITIES:

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

VEGETATION:

- The state highways have suitable clearance from Vegetation; however, Wybong Road, Main Street, Pipers Flat, Range Road, O'Connell Road and Abercrombie Road will have sections where vegetation will require pruning and possible removal.

WIDTH and PAVEMENT:

- The road has suitable clearance other than Range Road and Abercrombie Road and will require some vegetation pruning. The width and quality of the pavement will be ok for the route; however, several council roads would need to be checked for capacity, these include Wybong Road, Main Street, Pipers Flat, Range Road.

O'CONNELL ROAD:

- If the works undertaken by the blades have been done, then the towers will fit along the proposed route.

ABERCROMBIE ROAD:

- If the works undertaken by the blades have been done, then the towers will fit along the proposed route.

13.0 References:

Australian Load Restraint Guide
Rex J Andrews P/L Drawings
Rex J Andrews route survey # 310 REV01
GPG
Google Earth/Maps
Nearmaps
NHVR (OSOM)

Disclaimer: This route study is provided on the basis of information only purposes and is to be used strictly as a guide only; Government approvals would be required before these routes could be deemed suitable for transporting the components over the listed routes.

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

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

Actual approved routes may differ from those surveyed.

Proposed routes may change subject to approvals from authorities.

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

Appendix F1:

Key Intersections of OSOM Material Transport Route

Legend	
	No environmental impacts
	Minor environmental impacts
	Larger environmental impacts
	The proposed entire route (Route 2 in Rex J Andrews report) can be reviewed via the link below:
	https://goo.gl/maps/8KqByBnVx3f113mk9

This spreadsheet presents a summary of the route assessment undertaken by Rex J Andrews with links to relevant aerial and street view providers.

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
0	0.0	Mayfield berth #4 onto Selwyn Street at Mayfield.	No upgrades are required as shown in the below swept path assessment.	Spotter to guide the load through this pinchpoint.



NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.9004700,151.7531300,18.00z,0d/V+R/20221026?locationMarker	https://goo.gl/maps/864FhMSaF9P2



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
1	0.4	Rail crossing over Selwyn Street at Mayfield.	No upgrades are required.	Travel directly ahead over the crossing. Large width clearance and good ground clearance over this crossing. Police and escorts to control local traffic either side of the crossing. Rail company (ARTC) approval will need to be obtained to travel over this crossing.

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.8985287,151.7599307,20.00z,0d/V/20221026?locationMarker	https://goo.gl/maps/864FhMSaF9P2



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
2	1.3	Selwyn Street onto Industrial Drive, via George Street at Mayfield.	No upgrades are required as shown in the below swept path assessment.	Right hand turn from Selwyn Street through George Street and onto Industrial Drive. Load to travel right from Selwyn Street onto George Street, before turning to the incorrect side of Industrial Drive. Once on Industrial Drive, the loads will travel over the centre median strip to return to the correct side of the road. Spotter to guide load through this pinchpoint.

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.8985389,151.7599235,21.00z,0d/V+R/20221026?locationMarker	https://goo.gl/maps/qXeHvBtCp4D2

Legend	
	No environmental impacts



ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
3	4.9	Industrial Drive under traffic signals at Steel River Blvd intersection	No upgrades are required.	The lowest traffic signal on route is at the intersection of Steel River Blvd. Trucks that exceed 5.3 metres will need to travel in the right-hand lane. Spotter to guide load through this pinchpoint.



NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.8842439,151.7244190,20.00z,0d/V/20230115?locationMarker	https://goo.gl/maps/YmqhiS2iR582

Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
4	5.5	Industrial Drive onto Maitland Road at Mayfield West.	No upgrades are required as shown in the below swept path assessment.	The blades will need to cross to the incorrect side of Industrial Drive 150 metres prior to the intersection. Once on Maitland Road, the blades will return to the correct side 120 metres past the intersection. Spotter to guide load through this pinchpoint.

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.8819800,151.7191100,18.00z,0d/V/20221026?locationMarker	https://goo.gl/maps/Kn49dhWG2qG2



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
5	6.4	Maitland Road over rail bridge	No upgrades are required.	Travel directly ahead in the right-hand lane. Approval from rail company (ARTC) is required to cross this structure. Spotter to guide load through this pinchpoint.



NearMap Link https://apps.nearmap.com/maps/#/@-32.8766400,151.7135900,18.00z,0d/V+R/20221026?locationMarker	Google Maps Link https://goo.gl/maps/W2JWWjhfgv5UMviB7
Legend	No environmental impacts

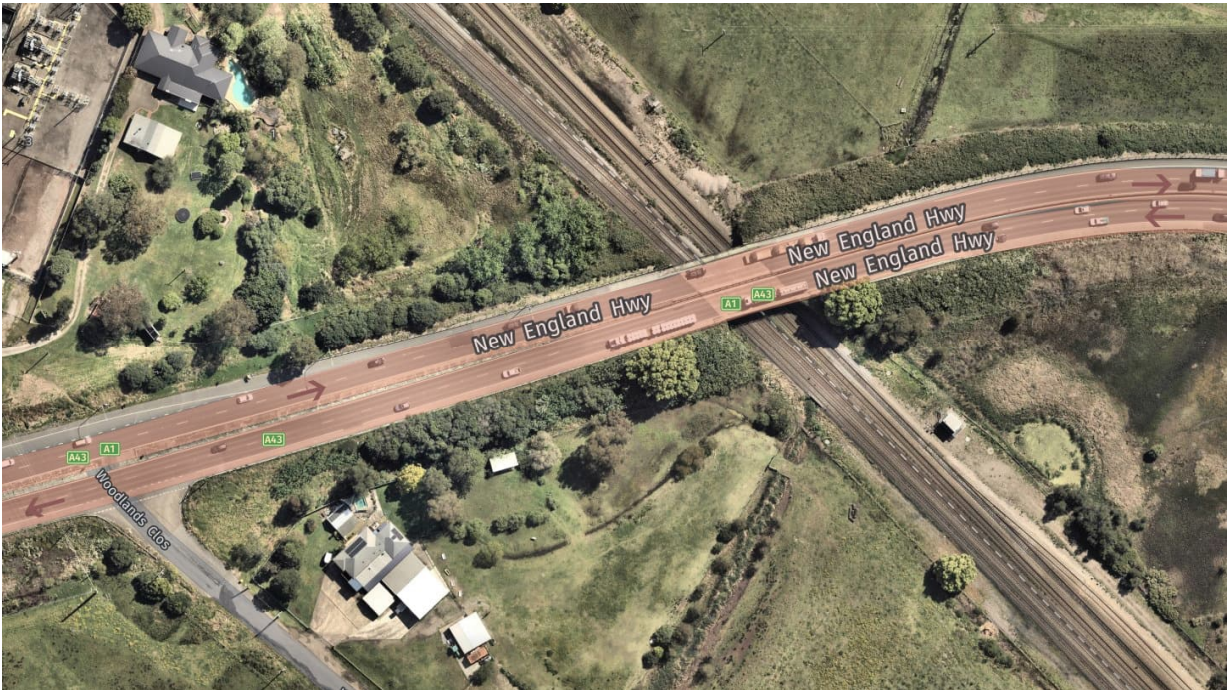
ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
6	13.9	New England Highway under gantry	No upgrades are required.	This is the lowest structure on route. There is no bypass around the gantry. A maximum loaded height of 5.9 metres should not be exceeded. Spotter to guide load through this pinchpoint.

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.8141100,151.6767500,18.00z,0d/V+R/20221004?locationMarker	https://goo.gl/maps/YTMoFe7Aick

Legend	
	No environmental impacts



ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
7	15.1	New England Highway over rail bridge, Tarro.	No upgrades are required.	Travel directly ahead in the right-hand lane. Approval from rail company (ARTC) is required to cross this structure. Travel over this structure may have specific conditions. Spotter to guide load through this pinchpoint.



NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.8106200,151.6715000,18.00z,0d/V+R/20221004?locationMarker	https://goo.gl/maps/tTnWLwQC2hzSPhAp6

Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
7A	28.7	John Renshaw Drive onto the Hunter Expressway at Buchanan.	No upgrades are required as shown in the below swept path assessment.	Loads to turn left onto the slip lane. Spotter to guide the load through the corner.

NearMap Link

Google Maps Link

<https://apps.nearmap.com/maps/#/@-32.8293879,151.5317395,19.00z,0d/V/20230331?locationMarker><https://goo.gl/maps/pWg3RxePzz9sYLBe8>

Legend	
	No environmental impacts



ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
8	67.3	The New England Highway onto the Golden Hwy, Whittingham.	No upgrades are required.	(Left-hand turn) The NSW Government is currently upgrading this intersection. At this stage the data that is available for the upgrades shows the section of road does not change considerably. However, we will monitor the progress of the upgrades, and that any changes will be thoroughly looked at.

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.6428100,151.2339900,18.00z,0d/V+R/20220503?locationMarker	https://goo.gl/maps/nAnfYfeUn42



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
9	68.0	Golden Highway over rail bridge, Whittingham.	No upgrades are required.	Travel directly ahead in the centre of the road. Approval from rail company (ARTC) will be required to cross this structure. Travel over this structure may have specific conditions. Spotter to guide load through this pinchpoint.

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.6423721,151.2272542,19.00z,0d/V+R/20220503?locationMarker	https://goo.gl/maps/5NwDQofandvvMKfY9



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
10	77.3	Golden Highway over rail bridge, Mount Thorley.	No upgrades are required.	Travel directly ahead in the centre of the road. Approval from rail company (ARTC) required to cross this structure. Travel over this structure may have specific conditions. Spotter to guide load through this pinchpoint.



NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.6255519,151.1356291,22.00z,0d/V+R/20220503?locationMarker	https://goo.gl/maps/qTxSbkxPu87L5hx4A

Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
11	80.6	Golden Highway over rail bridge, Mount Thorley.	No upgrades are required.	Travel directly ahead in the centre of the road. Approval from rail company (ARTC) required to cross this structure. Travel over this structure may have specific conditions. Spotter to guide load through this pinchpoint.

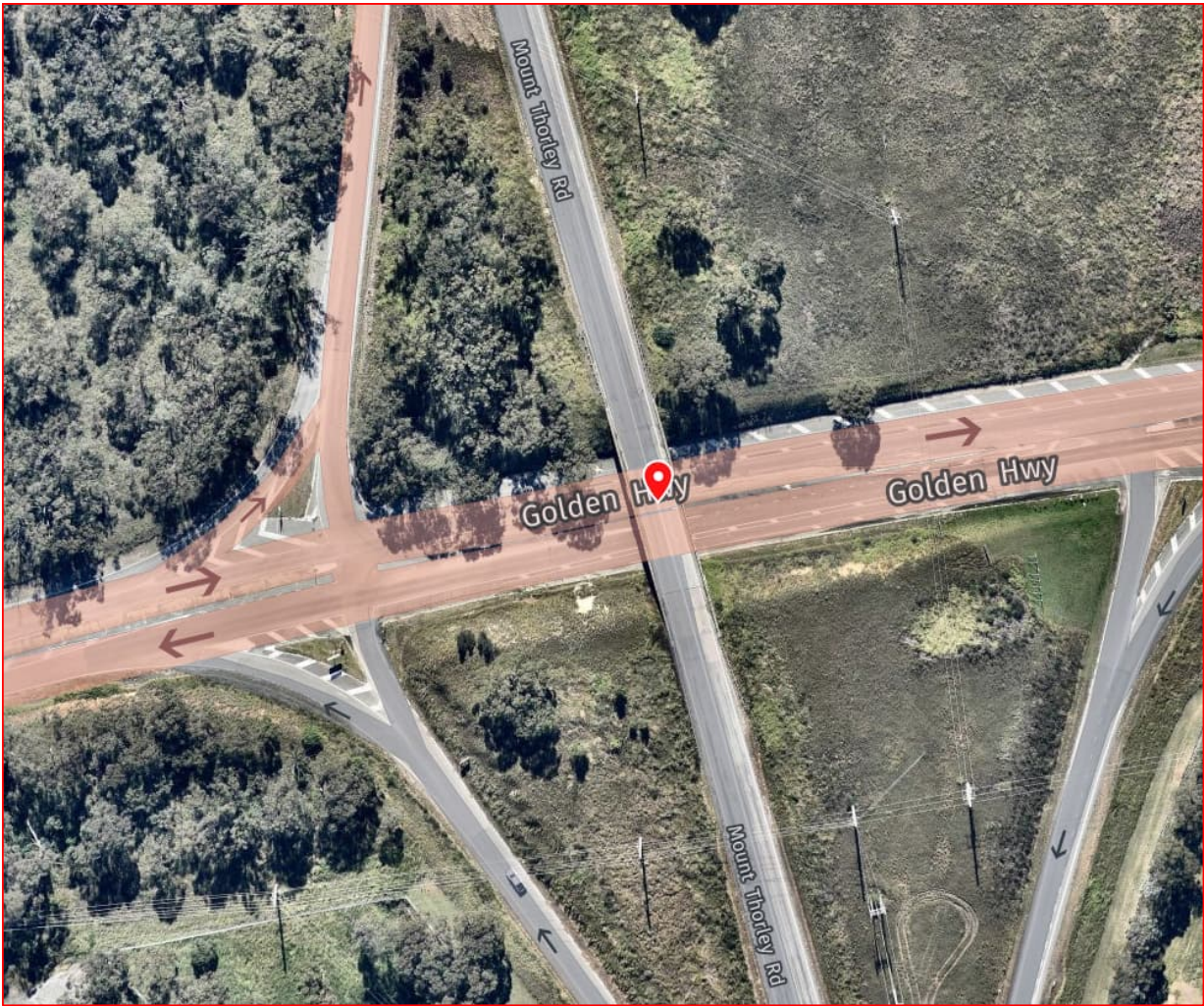
NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.6173413,151.1080047,21.00z,0d/V+R/20220503?locationMarker	https://goo.gl/maps/ipGU4USXmWZ8GkJs6



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
12	80.8	Putty Road under Mt Thorley Road, Mount Thorley	No upgrades are required.	Travel under the bridge in the left lane. Mt. Thorley underpass is 6.3 metres in the centre of the road. Towers to pass under this structure on the correct side. Spotter to guide load through this pinchpoint.

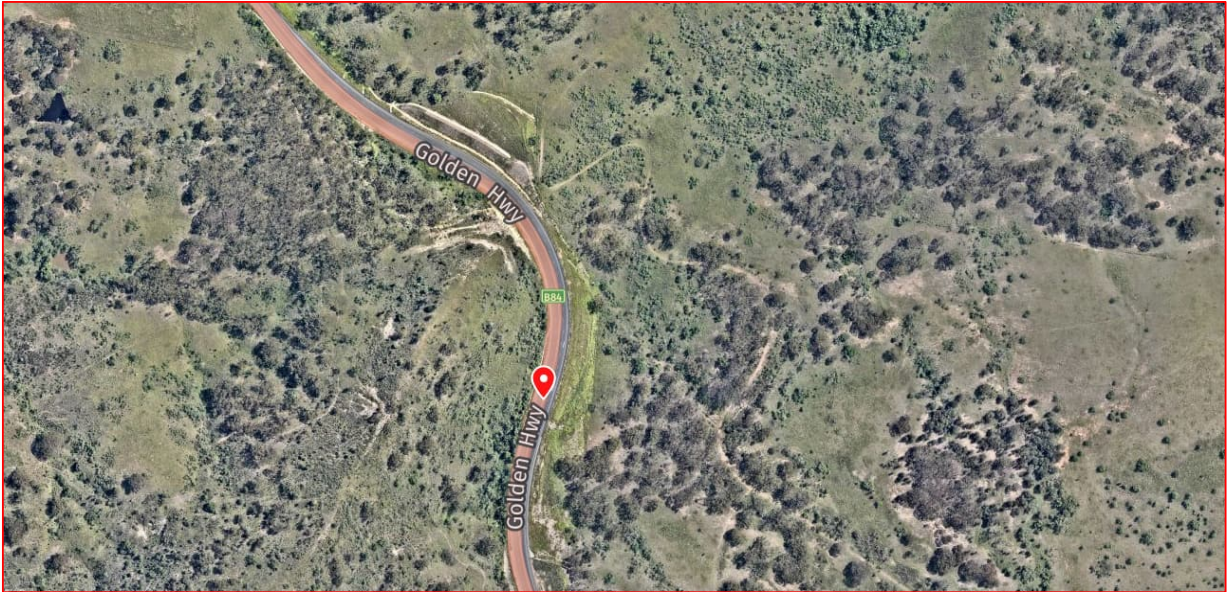
NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.6176400,151.1025000,18.00z,0d/V+R/20220503?locationMarker	https://goo.gl/maps/SMzSLP1kvQYDMqa86



Legend	
	No environmental impacts

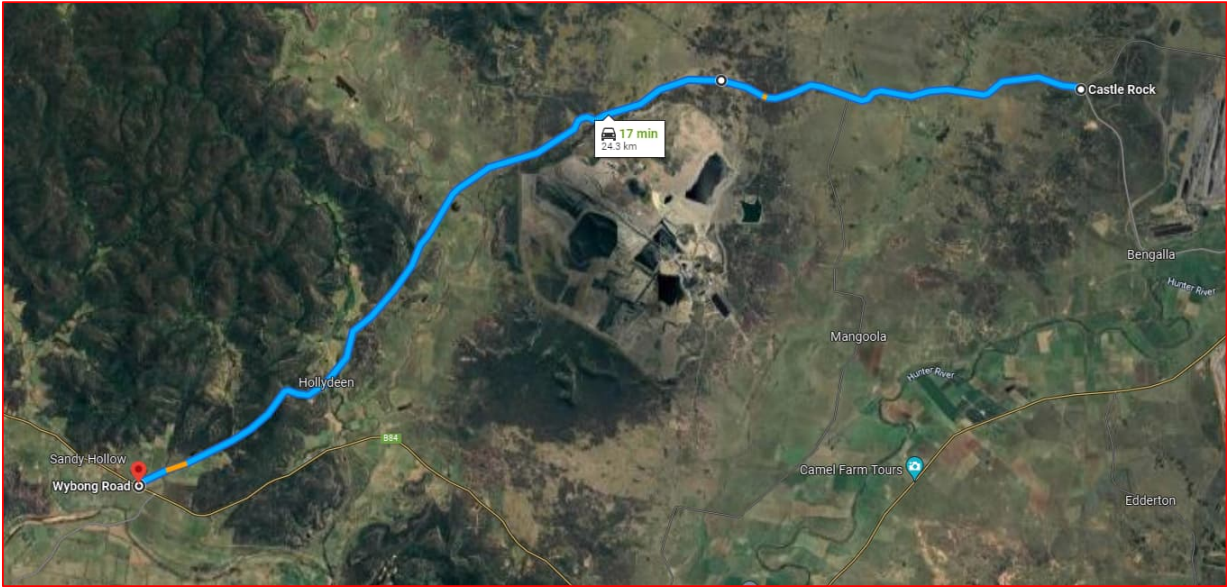
ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
13	126.0	Golden Highway, Ogilvy	No upgrades are required.	Travel directly ahead up a 6% gradient. This section of road has a steep mountain range that will require additional pull trucks to assists loads that exceed 80T gross weight. Spotter to guide load through this pinchpoint.

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.4112431,150.7429618,17.00z,0d/V+R/20220209?locationMarker	https://goo.gl/maps/58Tj9ojs7CC2



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
14	158.0-183.0	Wybong Road, Bengalla	No upgrades are required.	This road is owned and maintained by Muswellbrook Council. Approval will be required to travel on this section of the route. Obtain approval from the local council.	Not available.	https://goo.gl/maps/ekGZA5wFFK55Mvmc7



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
15	314.0	Golden highway onto the Castlereagh, Leadville.	No upgrades are required as shown in the below swept path assessment.	Left hand turn. Blades to travel onto the incorrect side of the road for this procedure. Spotter to guide the load through this pinchpoint.

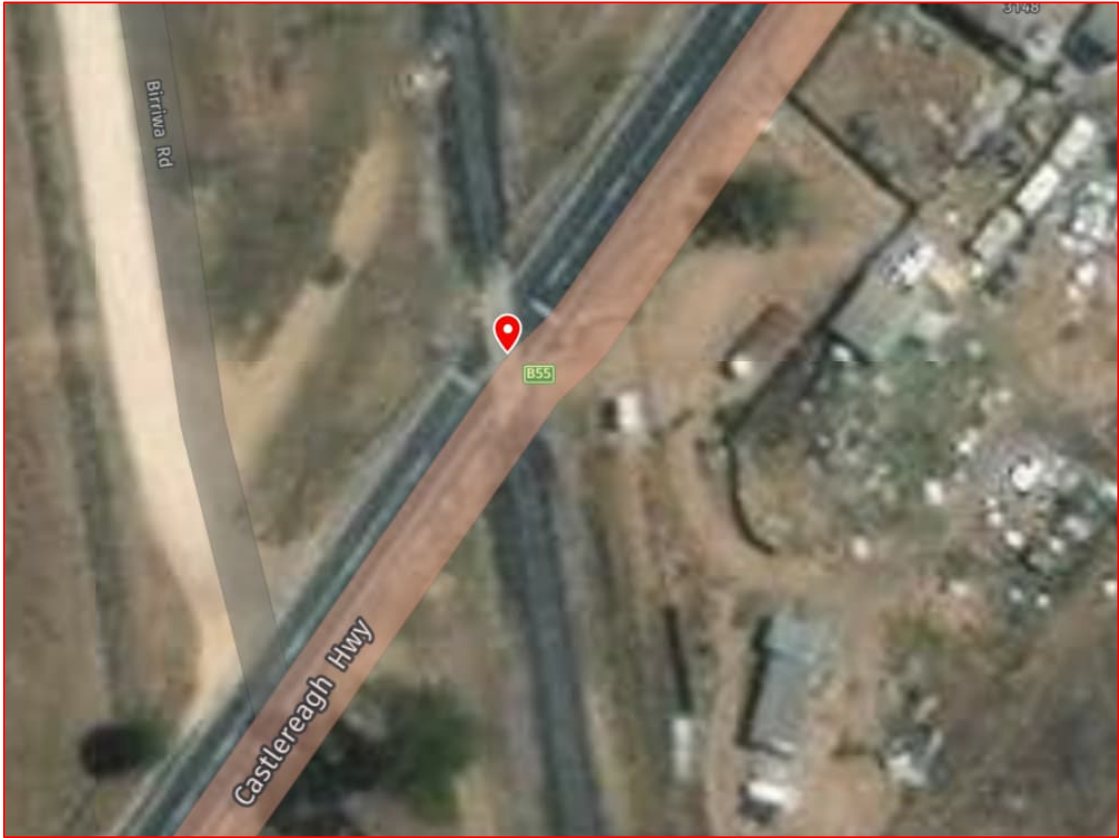


NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.0372871,149.4771025,20.00z,0d/V+R?locationMarker	https://www.google.com/maps/@-32.0373378,149.4771067,291m/data=!3m1!1e3



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
16	343.0	Castlereagh Highway in Birriwa	No upgrades are required.	Loads to travel over the crossing in the center of the road. Approval required crossing this line, likely cross with caution. Spotter to guide load through this pinchpoint.



NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.1221276,149.4653748,20.00z,0d/V+R?locationMarker	https://www.google.com/maps/@-32.1222853,149.4652342,122m/data=!3m1!1e3



Legend	
	No environmental impacts

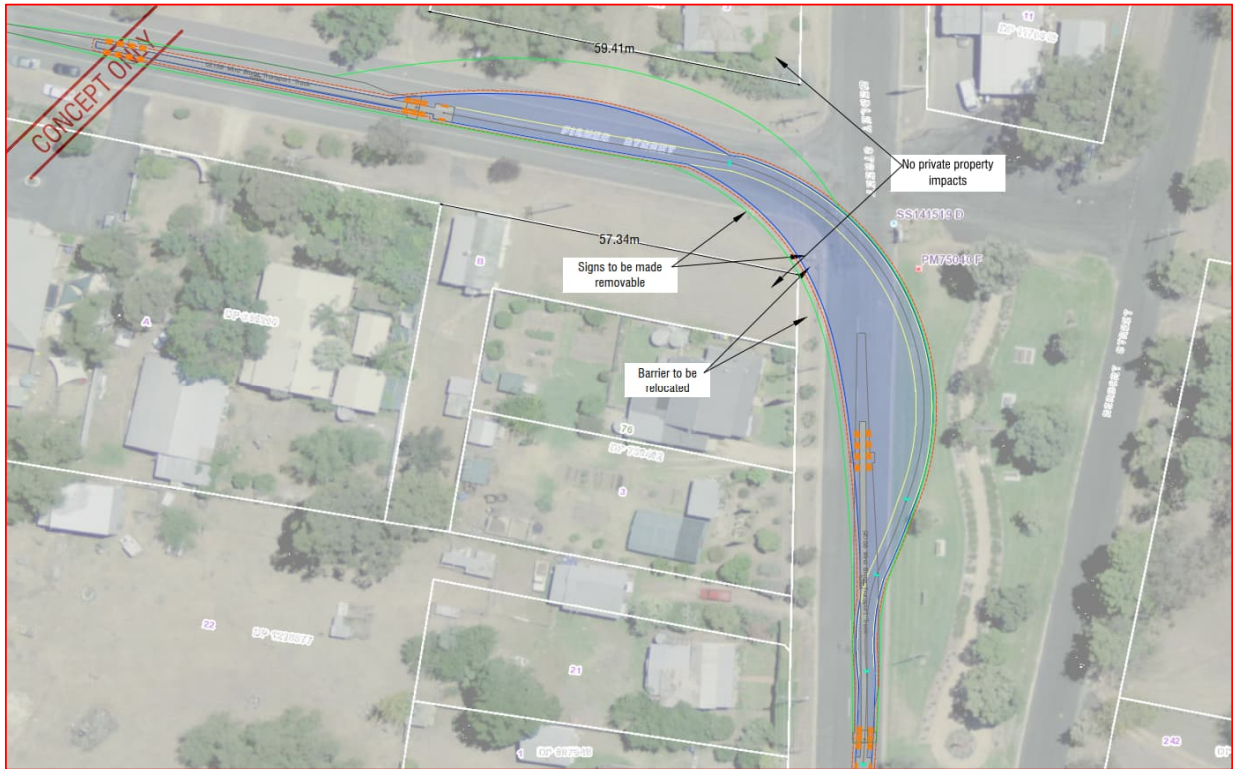
ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
17	370.0	Castlereagh Highway Goolma Road intersection, Gulgong.	No upgrades are required.	Travel directly ahead. Spotter to guide load through this pinchpoint. Police and pilots to supply traffic control as per the procedure for this section of road. Spotter to guide load through this pinchpoint.



NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.3654438,149.5259977,18.00z,0d/V+R?locationMarker	https://www.google.com/maps/@-32.3653277,149.5259539,488m/data=!3m1!1e3

Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
17A	370.0	Fisher Street (Castlereagh Highway) onto Medley Street (Castlereagh Highway) at Gulgong.	Minor upgrades are required as shown in the below swept path assessment.	Blades to travel around this right hand corner on the correct side of the road. Hardstand is required on the inside of the corner. Several signs and a barrier will need to be relocated. Additionally, some trees on the overhang will need to be trimmed. Spotter to guide the load through this pinchpoint.	https://apps.nearmap.com/maps/#/@-32.3669781,149.5319960,20.00z,0d/V+R?locationMarker	https://goo.gl/maps/GxJvNXi8vB6h7oLS6



Legend	
	Minor environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
18	383.0-393.0	Castlereagh Highway, Mudgee.	Minor upgrades are required. See the next tab for additional information.	Follow the main road (Castlereagh Highway) through Mudgee. Loaded trailers are to avoid travelling through Mudgee on school days between 7:00am - 10:00am and 2:00pm - 4:30pm.



NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.5904090,149.5836966,18.00z,0d/V+R?locationMarker	https://www.google.com/maps/@-32.5901998,149.5843574,410m/data=!3m1!1e3

Legend	
	Minor environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
19	386.0	Market St onto Douro St at Mudgee	Minor upgrades are required as shown in the below swept path assessment.	Prime mover to stay on the correct side of the road, however the trailer will need to travel on the inside of the corner and over the centre median strip. The centre median strip will need to be concreted, and kerbs lowered. Additionally, some signs will need to be made removable and some no parking areas put in place. Spotter to guide the load through this pinchpoint.

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.5904090,149.5836966,18.00z,0d/V+R?locationMarker	https://www.google.com/maps/@-32.5901998,149.5843574,410m/data=!3m1!1e3



Legend	
	Minor environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
20	386.5	Douro St onto Horatio St at Mudgee.	Minor upgrades are required as shown in the below swept path assessment.	Blades to travel around this corner on the incorrect side of the road. The centre median strip will need to be concreted, and kerbs lowered. Some trees will need to be removed, and some no parking areas put in place. Additionally, some signs will need to be made removable. Spotter to guide the load through this pinchpoint.

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.5982900,149.5818300,18.00z,0d/V?locationMarker	https://goo.gl/maps/VARs5R2ooQWShcim6



Legend	
	Larger environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
20A	387.0	Douro Street onto Horatio Street at Mudgee.	No upgrades are required as shown in the below swept path assessment.	Blades to travel through this roundabout on the correct side of the road. Spotter to guide the load through this pinchpoint.

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-32.5992817,149.5870716,20.00z,0d/V+R?locationMarker	https://goo.gl/maps/LtMDGuX6cbAL8eri6



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
21	367.0	Horatio St onto Sydney Road at Mudgee	Upgrades are required as shown in the below swept path assessment. However, blades will be lifted/tilted upwards to minimise ecological impacts where possible.	Blades to travel around this corner on the incorrect side of the road. Several signs need to be made removable. Spotter to guide the load through this pinchpoint.	https://apps.nearmap.com/maps/#/@-32.6004600,149.5970900,18.00z,0d/V?locationMarker	https://goo.gl/maps/z2USgGmixFP1vfR58



Legend	
	Larger environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
22	477.0	Castlereagh Highway Rail Crossing, Ben Bullen.	No upgrades are required.	Left hand than right hand dogleg turn. Loads to travel over the crossing in the center of the road. Approval is required from the rail company (ARTC) crossing this line. Likely cross with caution. Spotter to guide the load through this pinchpoint.



NearMap Link https://apps.nearmap.com/maps/#/@-33.2194000,150.0223200,18.00z,0d/V+R?locationMarker	Google Maps Link https://goo.gl/maps/5ZtGAGDHBtq1vX2r8
Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
23	499.0	Main Street onto Pipers Flat Road	No upgrades are required.	Towers to cross to the inside of the corner. Spotter to guide load through this pinchpoint. Police and pilots to supply traffic control as per the procedure for this section of road.	https://apps.nearmap.com/maps/#/@-33.4251199,150.1043757,20.00z,0d/V/20230218?locationMarker	https://www.google.com/maps/place/33%C2%B025'30.5%22S+150%C2%B006'15.7%22E/@-33.4251409,150.1037083,241m/data=!3m2!1e3!4b1!4m10!1m5!3m4!2zMzPCsDlzJzUwLjliUyAxNTDCsDA0JzU2LjUiRQ!8m2!3d-33.3972778!4d150.0823611!3m3!8m2!3d-33.425142!4d150.104352



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
24	502.0	Main Street onto Pipers Flat Road	No upgrades are required.	Towers to cross to the inside of the corner. Spotter to guide load through this pinchpoint. Police and pilots to supply traffic control as per the procedure for this section of road.	https://apps.nearmap.com/maps/#/@-33.4109182,150.0639861,19.00z,0d/V+R/20211231?locationMarker	https://www.google.com/maps/place/33%C2%B024'39.1%22S+150%C2%B003'50.8%22E/@-33.4110583,150.0638235,241m/data=!3m1!1e3!4m4!3m3!8m2!3d-33.4108611!4d150.0641111



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
25	502.0	Pipers Flat Road, Wallerawang.	No upgrades are required.	Travel directly ahead. Loads to travel over the crossing in the center of the road. Approval from the rail company (ARTC) is required for crossing this line. Likely cross with caution.

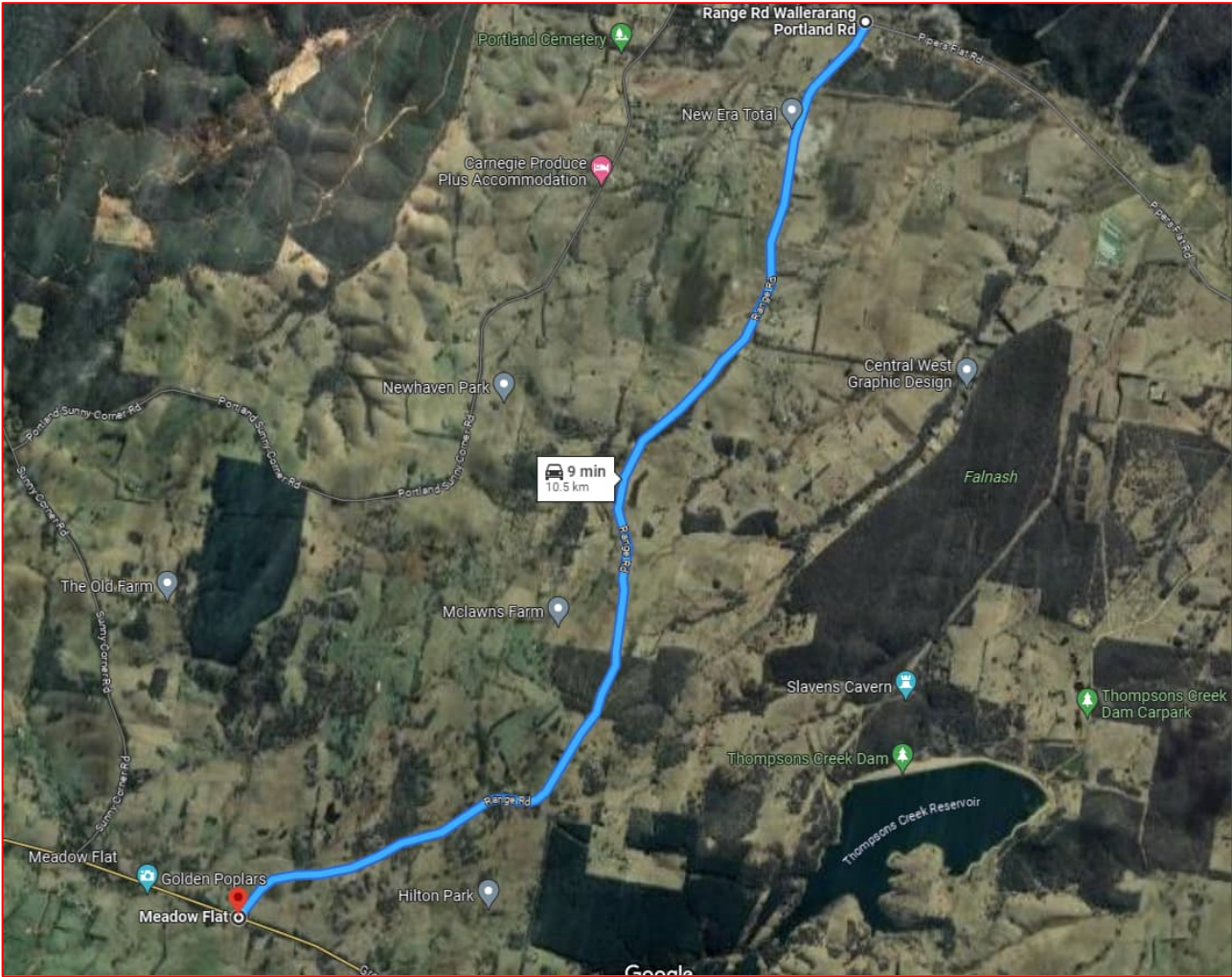
NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-33.4102600,150.0588700,18.00z,0d/V+R/20211231?locationMarker	https://goo.gl/maps/KyEM8hfuSLgAGavq9



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
26	510.0 - 520.0	Range Road, Portland	No upgrades are required.	This section of road will need trees to be pruned. However trees will be maintained.

NearMap Link	Google Maps Link
Not available.	https://goo.gl/maps/dezKvGygnYWownJT9



Legend	
	No environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)
27	532.0	Great Western Highway roundabout at Kelso.	Minor upgrades are required as shown in the below swept path assessment.	A light pole will need to be relocated and several signs will need to be made removable. Spotter to guide the load through this pinchpoint.



Legend	
	Minor environmental impacts

NearMap Link	Google Maps Link
https://apps.nearmap.com/maps/#/@-33.4206900,149.6254400,18.00z,0d/V+R/20221208?locationMarker	https://www.google.com/maps/@-33.4206287,149.6251443,241m/data=!3m1!1e3

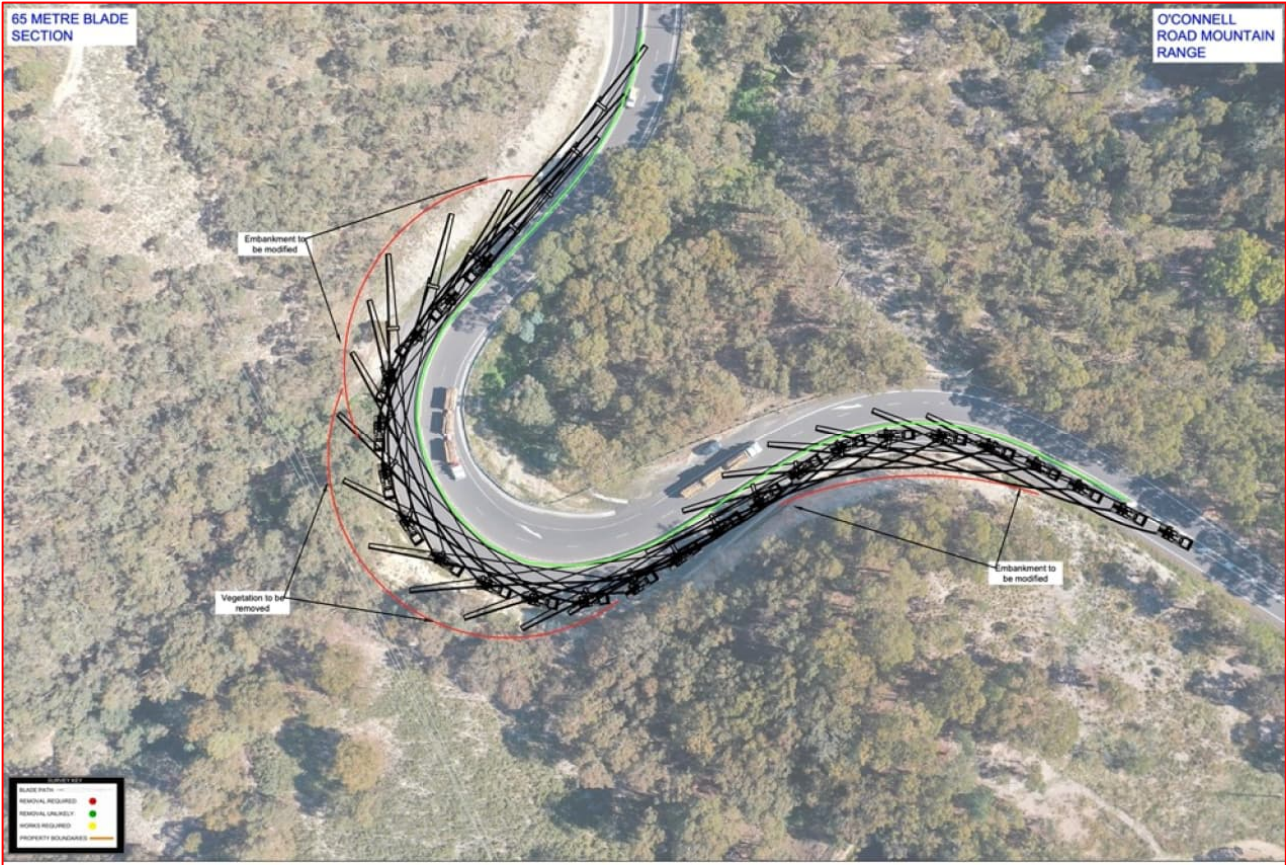


ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
28	533.0	Great Western Highway onto Littlebourne St at Kelso.	Minor upgrades are required as shown in the below swept path assessment.	Loads will turn from the correct side of Great Western Highways onto the wrong-side of Littlebourne St and move to the correct side after the traffic island. The tail swing will overhang onto the eastbound lanes of the Great Western Highway so the roundabout will need to be blocked from all directions. Several signs will need to be made removable. Spotter to guide the load through this pinchpoint.	https://apps.nearmap.com/maps/#/@-33.4197300,149.6154400,18.00z,0d/V/20221208?locationMarker	https://www.google.com/maps/@-33.4193399,149.6148107,203m/data=!3m1!1e3



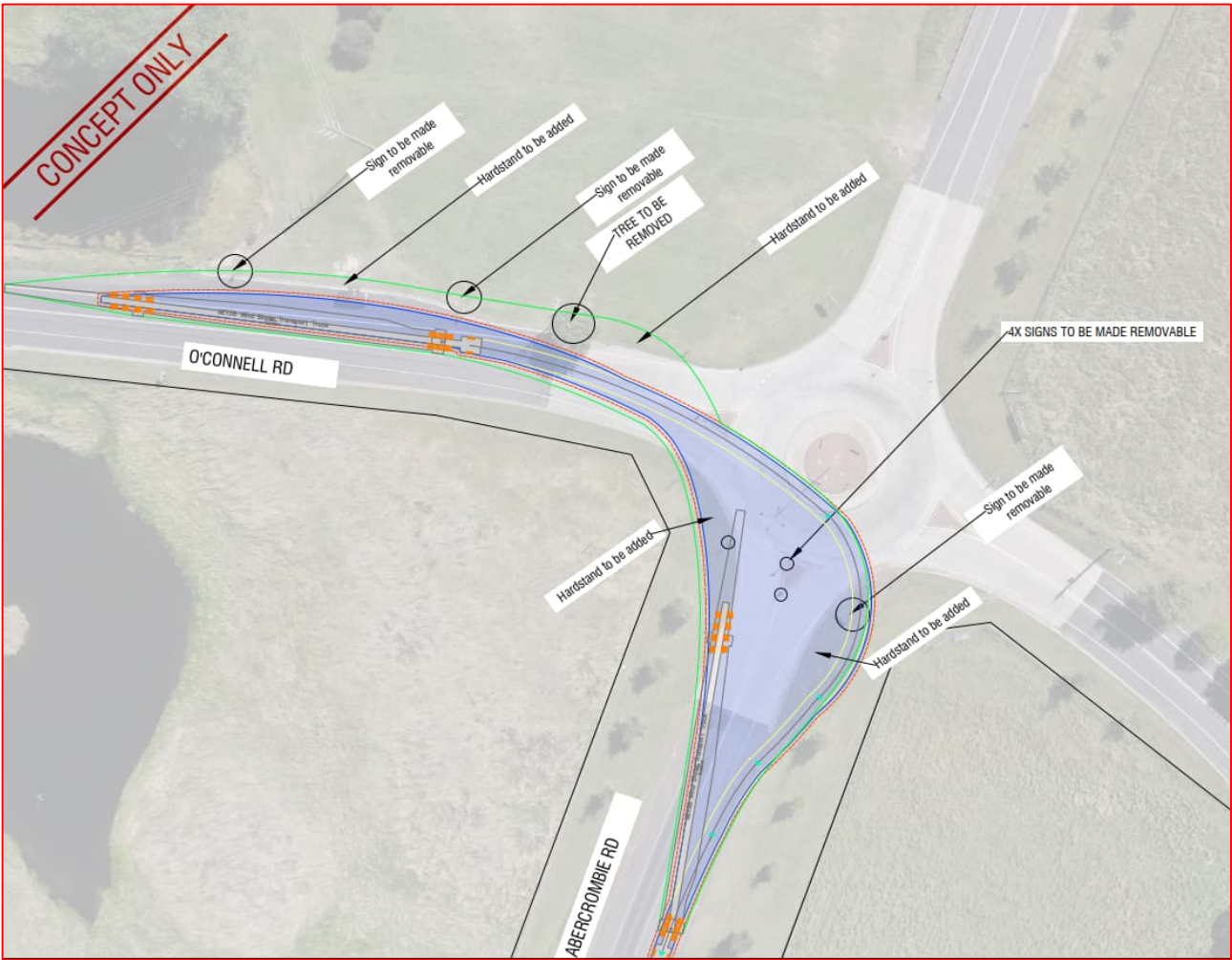
Legend	
	Minor environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
29	580.0	O'Connell Road Range: Dogleg corner	Upgrades are required as shown in the below swept path assessment. However, blades will be lifted/ tilted upwards to minimise ecological impacts where possible.	Very steep ascend with several very tight turns. A large number of modifications are required on several of the corners. This will require some embankments cut back, some vegetation removal as a minimum. Spotter to guide the load through this pinchpoint.	https://apps.nearmap.com/maps/#/@-33.6090160,149.7798739,16.00z,0d/V?locationMarker	https://goo.gl/maps/Lq6yNM3MBwZGpASC6



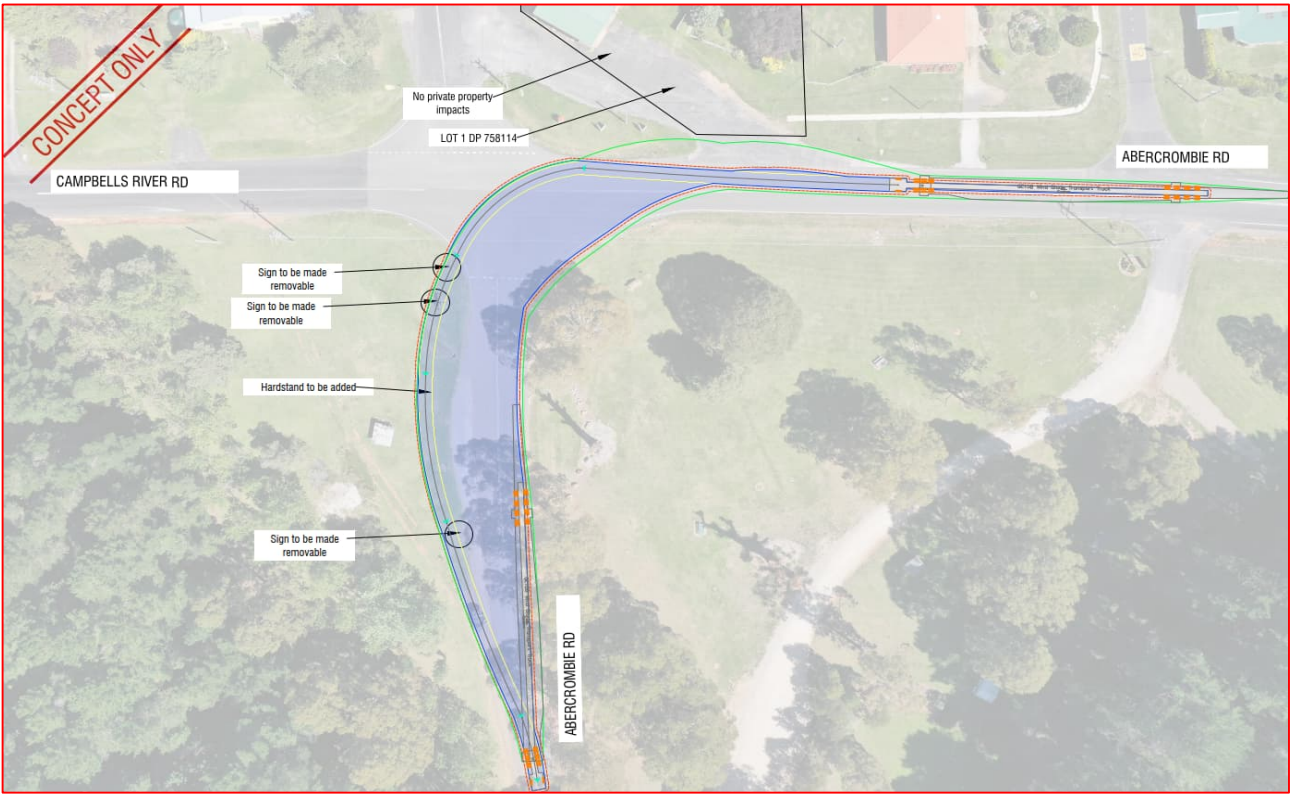
Legend	
	Larger environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
30	574.0	O'Connell Road onto Abercrombie Road at Oberon.	Upgrades are required as shown in the below swept path assessment. 2 trees and 4 signs need to be removed.	Right-hand turn at the roundabout from the wrong side. A large amount of hardstand is required on the inside and outside of the corner of the roundabout between O'Connell Road and Abercrombie Road. Spotter to guide the load through this pinchpoint.	https://apps.nearmap.com/maps/#/@-33.6985400,149.8450500,18.00z,0d/V?locationMarker	https://goo.gl/maps/nV3yqxLL9SV7xy6z8



Legend	
	Larger environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
31	597.0	Abercrombie Road, intersection of Campbells River Roads at Black Springs.	Upgrades (hardstand area) are required as shown in the below swept path assessment.	Left-hand turn to stay on Abercrombie Rd. Several signs need to be removed on the. A small amount of hardstand is required on the western portion of Abercrombie road to widen the southern leg. Spotter to guide the load through this pinchpoint.	https://apps.nearmap.com/maps/#/@-33.8477804,149.7430512,18.21z,0d/V+R/20221208?locationMarker	https://goo.gl/maps/wPBfjVRiyWCvVtFU6



Legend	
	Larger environmental impacts

ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
32	627.0 – 635.0	Abercrombie Road	No upgrades are required as shown in the below swept path assessments.	This is an undulating section of road with numerous sweeping bends. Blades up to 70m will navigate this section without issue. Trees should be checked closer to commencement to ensure no trimming is required. Spotter to guide the load through this pinchpoint. All loads over 70T gross will require a backup prime mover to assist with the gradient on this section of road. Assistance from a steer operator may be required.	Not available.	https://www.google.com/maps/dir/-34.1093412,149.7931008/-34.0791667,149.8318889/@-34.0950686,149.8033645,3829m/am=t/data=!3m1!1e3!4m2!4m1!13e0



ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
32	627.0 – 635.0	Abercrombie Road	No upgrades are required as shown in the below swept path assessments.	This is an undulating section of road with numerous sweeping bends. Blades up to 70m will navigate this section without issue. Trees should be checked closer to commencement to ensure no trimming is required. Spotter to guide the load through this pinchpoint. All loads over 70T gross will require a backup prime mover to assist with the gradient on this section of road. Assistance from a steer operator may be required.	Not available.	https://www.google.com/maps/dir/-34.1093412,149.7931008/-34.0791667,149.8318889/@-34.0950686,149.8033645,3829m/am=t/data=!3m1!1e3!4m2!4m1!13e0



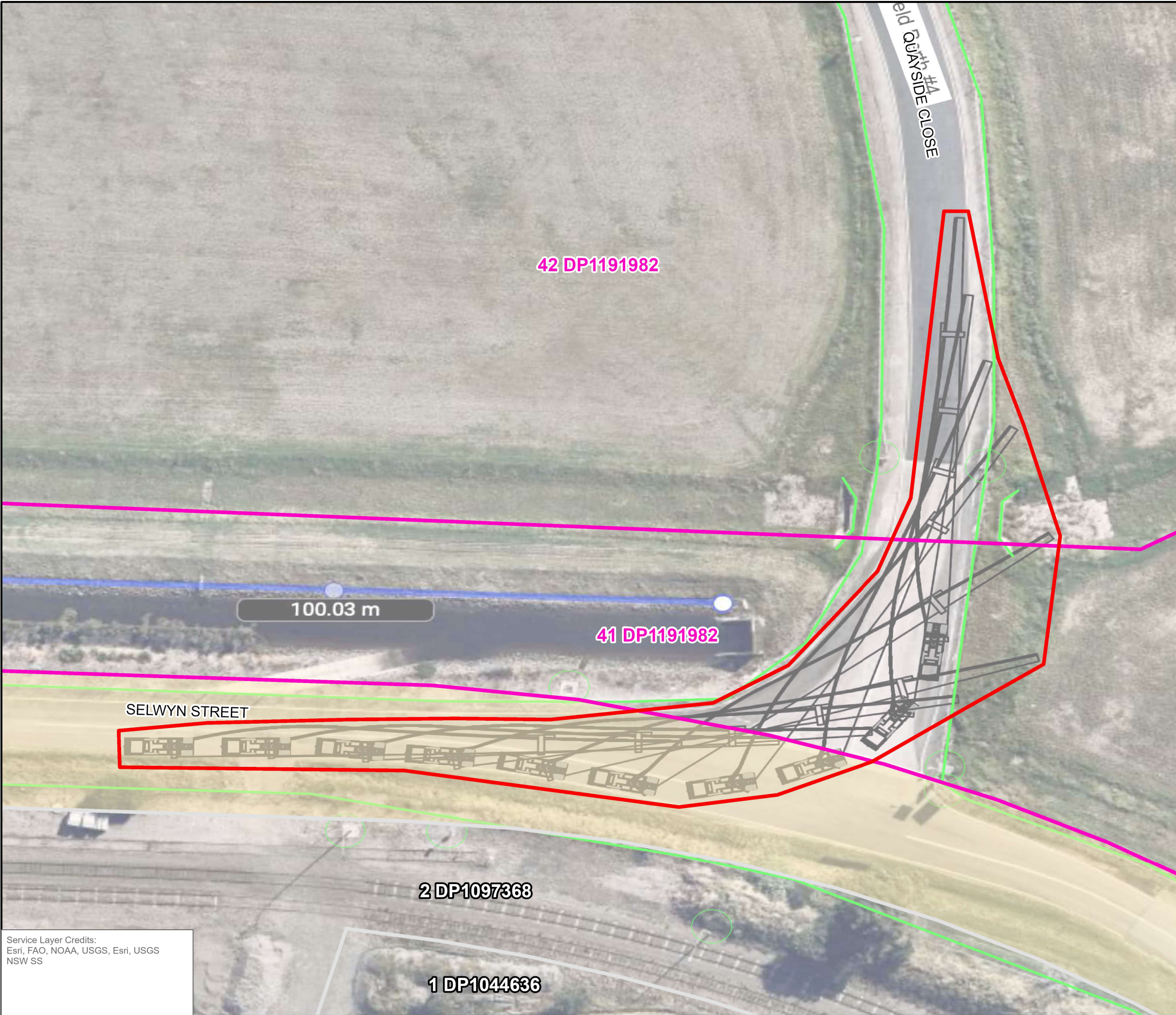
ID	KM index	Item	Required Upgrades	Anticipated Environmental Impact (if any)	NearMap Link	Google Maps Link
32	627.0 – 635.0	Abercrombie Road	No upgrades are required as shown in the below swept path assessments.	This is an undulating section of road with numerous sweeping bends. Blades up to 70m will navigate this section without issue. Trees should be checked closer to commencement to ensure no trimming is required. Spotter to guide the load through this pinchpoint. All loads over 70T gross will require a backup prime mover to assist with the gradient on this section of road. Assistance from a steer operator may be required.	Not available.	https://www.google.com/maps/dir/-34.1093412,149.7931008/-34.0791667,149.8318889/@-34.0950686,149.8033645,3829m/am=t/data=!3m1!1e3!4m2!4m1!3e0



Legend	
	No environmental impacts

Appendix F2:

Potential Land Impacts of OSOM Material Transportation



PALING YARDS WIND FARM

NEWCASTLE TO
PALING YARDS ROUTE

Site: 0.0 km Mayfield North

SITE 0

LEGEND

-  Blade Impact Area
-  Cadastre
-  Intersecting cadastre
-  Public road corridor

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Coordinate System: GDA2020

Scale: 1:800 at A4

Project Number: 640.30153

Date Drawn: 22-May-2023

Drawn by: JH



Service Layer Credits:
Esri, FAO, NOAA, USGS, Esri, USGS
NSW SS

SP70888

INDUSTRIAL DRIVE
Industrial Dve

101 DP852110

INDUSTRIAL DRIVE

332 DP1176879

49.94 m

SELWYN STREET

Selwyn St

George St

GEORGE STREET

2 DP1097368

1 DP577013

KEY

RED: [Red dot]

ELY: [Green dot]

ED: [Yellow dot]

Service Layer Credits:
Esri, FAO, NOAA, USGS, Source: Esri,
Maxar, Earthstar Geographics, and the GIS
User Community, Esri, USGS
NSW SS

PALING YARDS WIND FARM

NEWCASTLE TO
PALING YARDS ROUTE

Site: 1.3 km Mayfield East

SITE 2

LEGEND

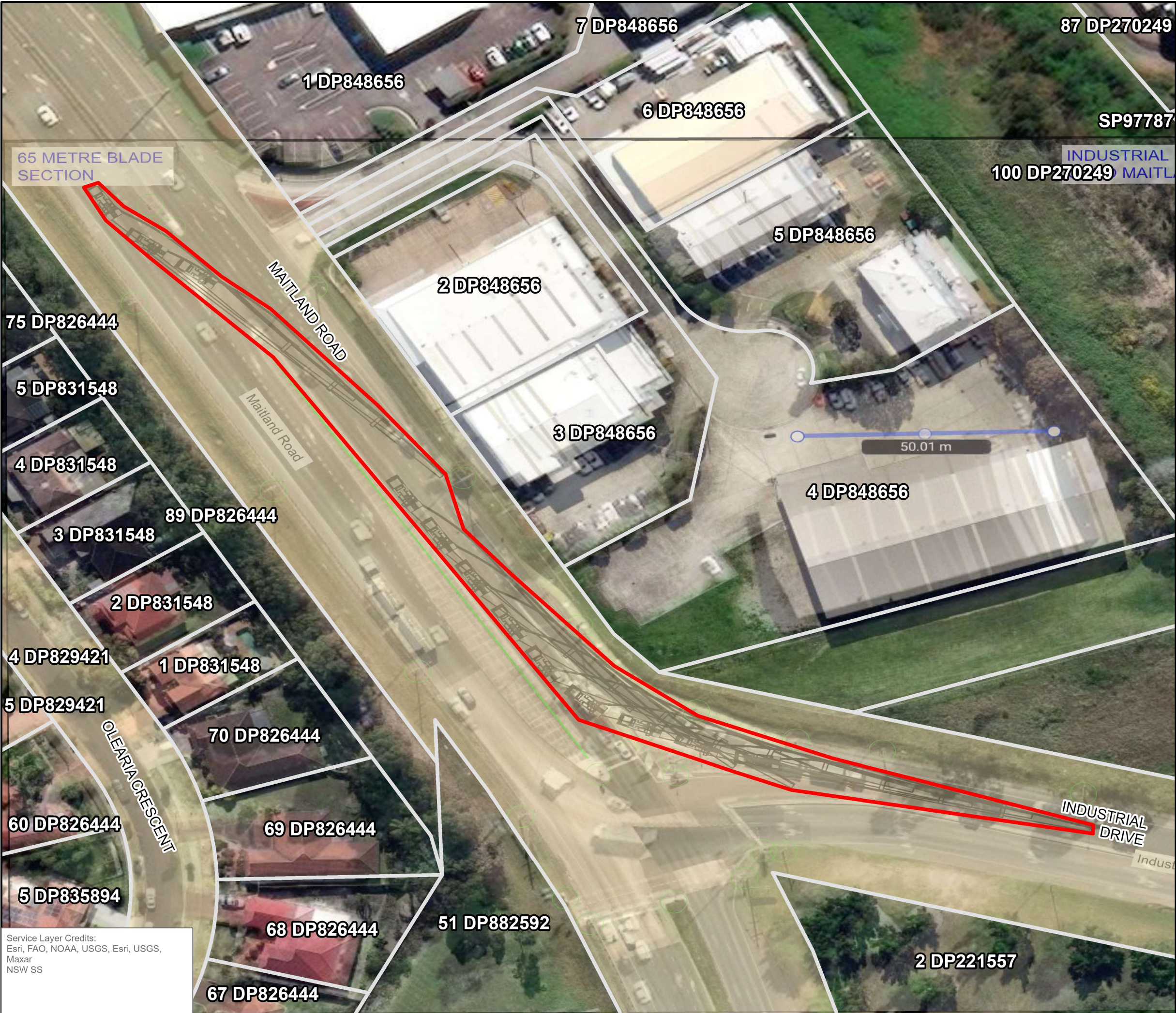
- [Red outline] Blade Impact Area
- [Grey outline] Cadastre
- [Pink outline] Intersecting cadastre
- [Yellow outline] Public road corridor

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Coordinate System:	GDA2020
Scale:	1:1,000 at A4
Project Number:	640.30153
Date Drawn:	22-May-2023
Drawn by:	JH





PALING YARDS WIND FARM

**NEWCASTLE TO
PALING YARDS ROUTE**

Site: 5.5 km Mayfield West

SITE 4

LEGEND

-  Blade Impact Area
-  Cadastre
-  Intersecting cadastre
-  Public road corridor

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Coordinate System: GDA2020

Scale: 1:1,200 at A4

Project Number: 640.30153

Date Drawn: 22-May-2023

Drawn by: JH



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Maxar
NSW SS



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Maxar
NSW SS

PALING YARDS WIND FARM

NEWCASTLE TO
PALING YARDS ROUTE

Site: 28.7 km Buchanan

SITE 7A

LEGEND

-  Blade Impact Area
-  Cadastre
-  Intersecting cadastre
-  Public road corridor

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0 12.5 25
m

Coordinate System: GDA2020

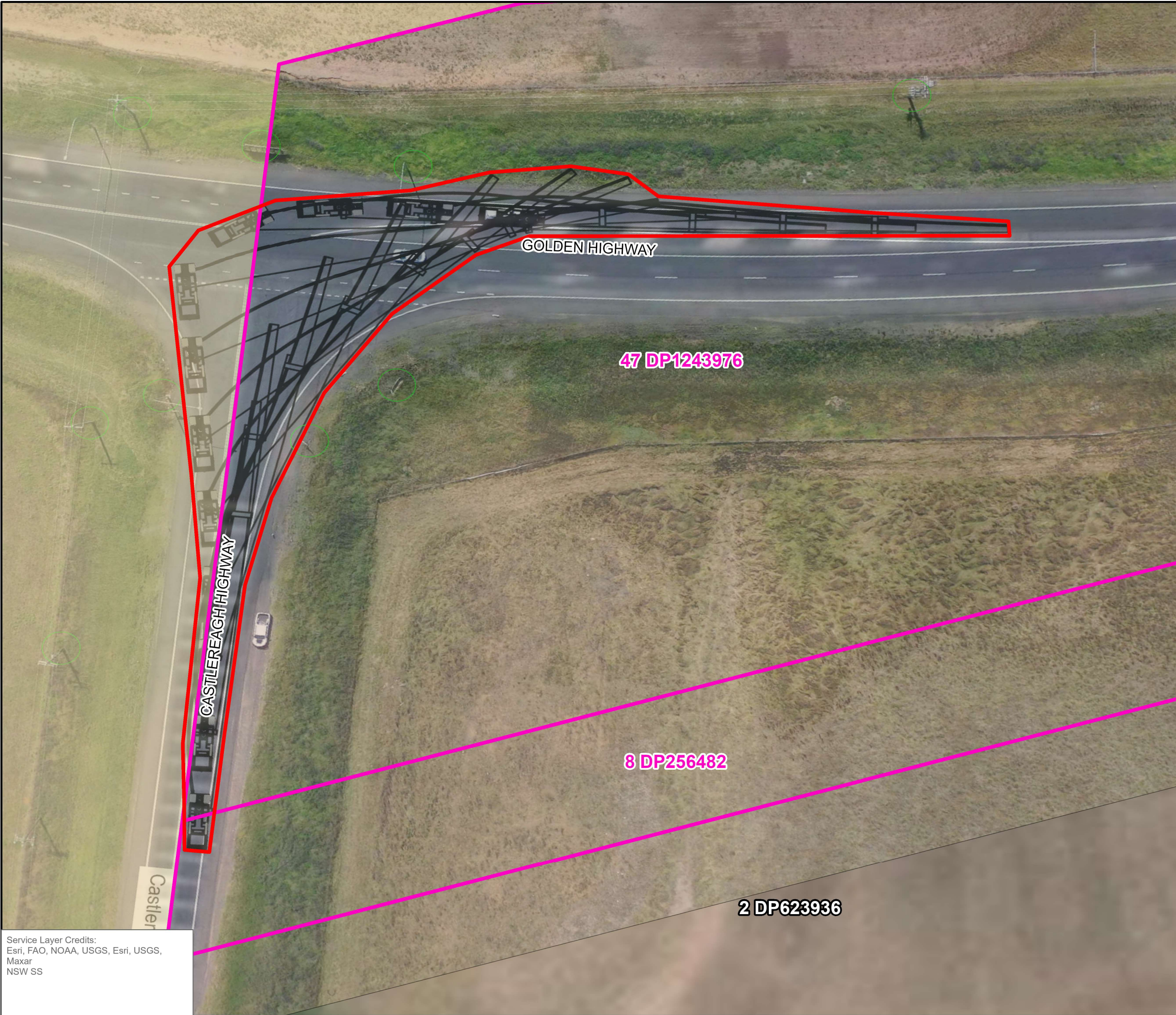
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Project Number: 640.30153

Date Drawn: 22-May-2023

Drawn by: JH





PALING YARDS WIND FARM

**NEWCASTLE TO
PALING YARDS ROUTE**

Site: 314.0 km Dunedoo

SITE 15

LEGEND

-  Blade Impact Area
-  Cadastre
-  Intersecting cadastre
-  Public road corridor

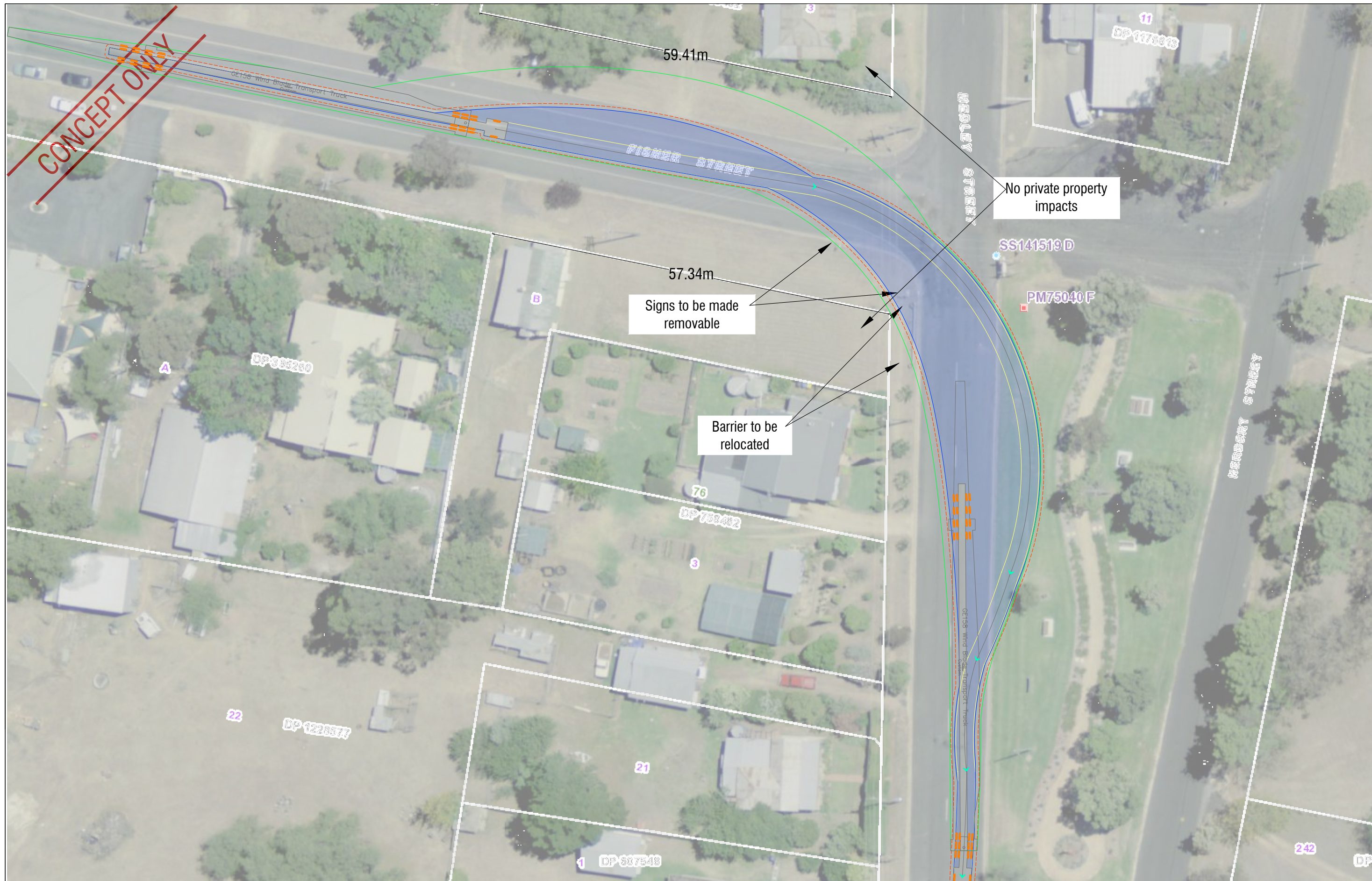
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Coordinate System:	GDA2020
Scale:	1:800 at A4
Project Number:	640.30153
Date Drawn:	22-May-2023
Drawn by:	JH



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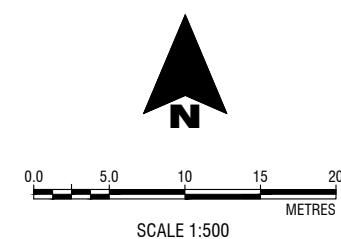
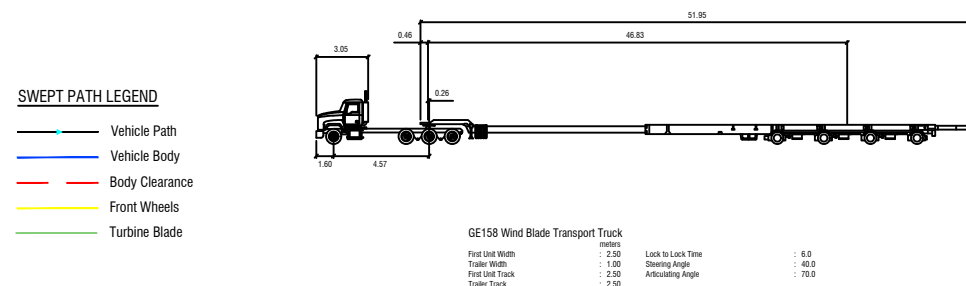




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Project No:	640.30153
Date:	28/05/2023
Drawn by:	Charlie Seventekin
Scale:	AS SHOWN
Sheet Size:	A3
Projection:	-



Global Power Generation Australia

Paling Yards Wind Farm

**GE158 Turbine Blade -
Gulgong**

SITE 17A



PALING YARDS WIND FARM

NEWCASTLE TO
PALING YARDS ROUTE

Site: 386.0 km Mudgee

SITE 19

LEGEND

-  Blade Impact Area
-  Cadastre
-  Intersecting cadastre
-  Public road corridor

Required hardstand and upgrades
are only within the road reserve
and do not impact private property.

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any purpose.



Coordinate System: GDA2020

Scale: 1:800 at A4

Project Number: 640.30153

Date Drawn: 22-May-2023

Drawn by: JH



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NSW SS



PALING YARDS WIND FARM

**NEWCASTLE TO
PALING YARDS ROUTE**

Site: 386.5 km Mudgee

SITE 20

LEGEND

-  Blade Impact Area
-  Cadastre
-  Intersecting cadastre
-  Public road corridor

Required hardstand and upgrades are only within the road reserve and do not impact private property.

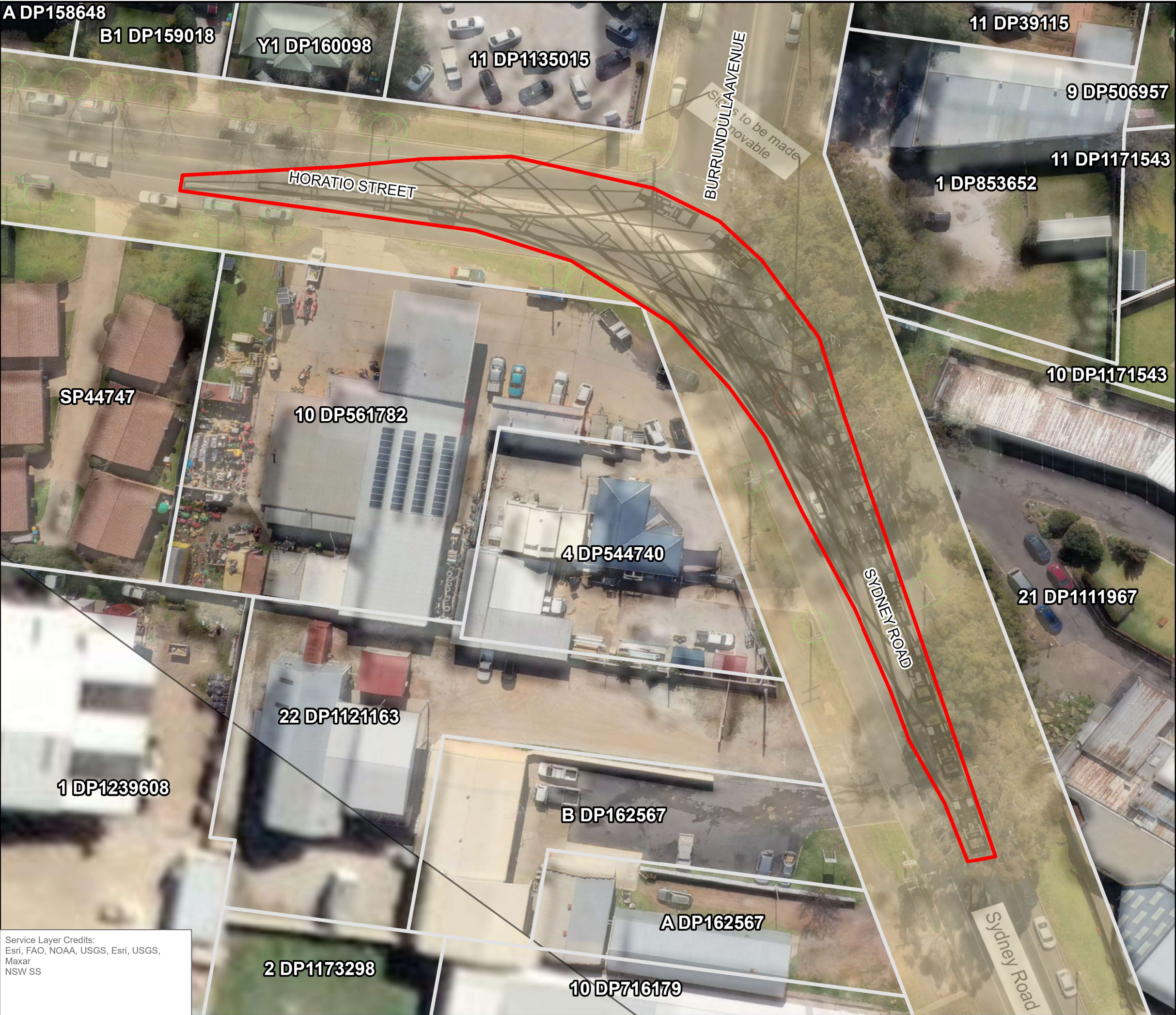
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Scale:	1:800 at A4
Project Number:	640.30153
Date Drawn:	22-May-2023
Drawn by:	JH



Service Layer Credits:
Esri, FAO, NOAA, USGS, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Esri, USGS NSW SS



PALING YARDS WIND FARM

NEWCASTLE TO
PALING YARDS ROUTE

Site: 367.0 km Mudgee

SITE 21

LEGEND

- Blade Impact Area
- Cadastre
- Intersecting cadastre
- Public road corridor

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Coordinate System: GDA2020

Scale: 1:800 at A4

Project Number: 640.30153

Date Drawn: 22-May-2023

Drawn by: JH



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Maxar
NSW SS

SITE 23

LEGEND

- Blade Impact Area
- Cadastre
- Intersecting cadastre
- Public road corridor

Required hardstand and upgrades are only within the road reserve and do not impact private property.

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Coordinate System: GDA2020

Scale: 1:1,000 at A4

Project Number: 640.30153

Date Drawn: 22-May-2023

Drawn by: JH



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PALING YARDS WIND FARM

**NEWCASTLE TO
PALING YARDS ROUTE**

Site: 532.0 km Kelso

SITE 27

LEGEND

-  Blade Impact Area
-  Cadastre
-  Intersecting cadastre
-  Public road corridor

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Coordinate System: GDA2020

Scale: 1:1,200 at A4

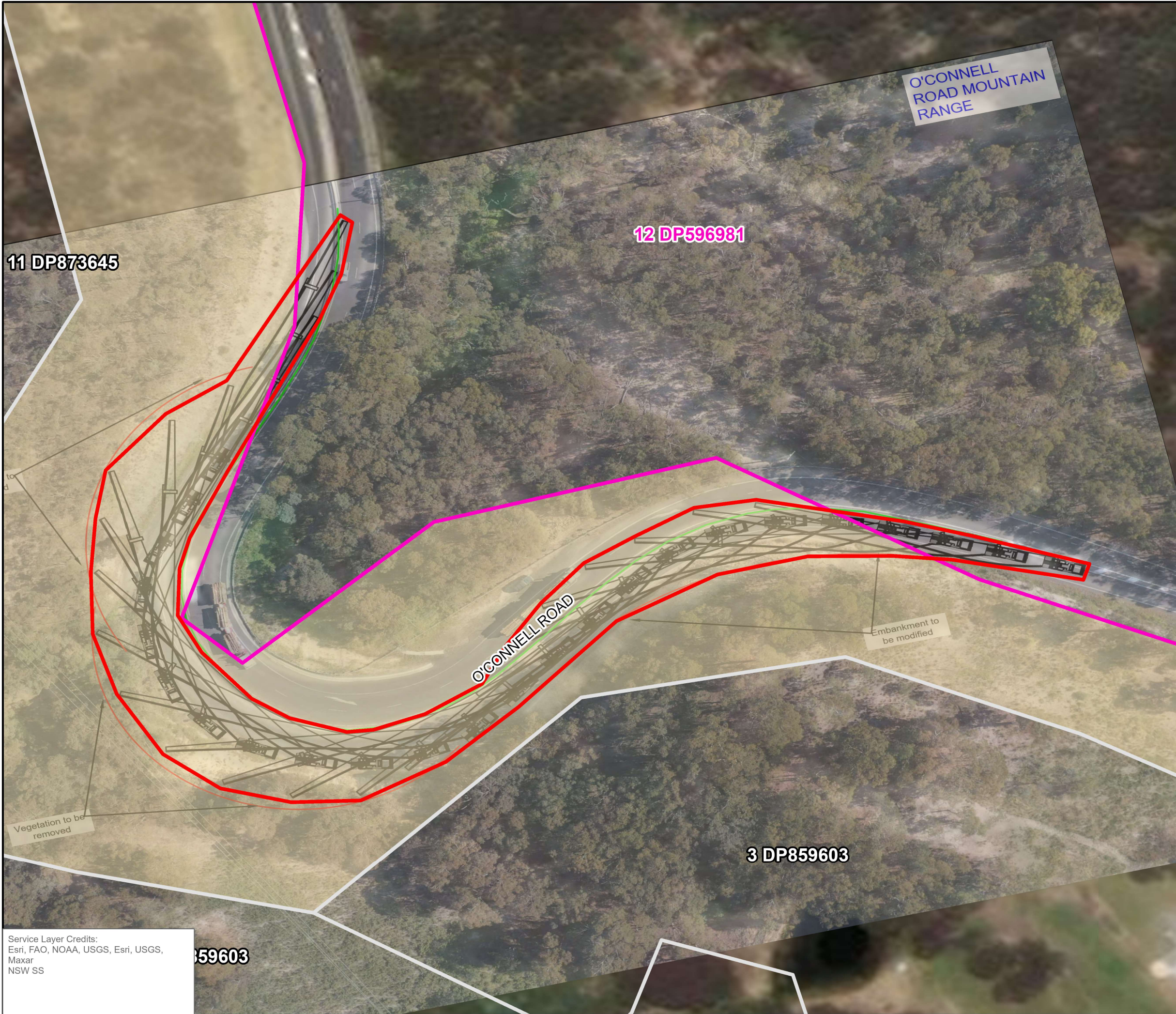
Project Number: 640.30153

Date Drawn: 22-May-2023

Drawn by: JH



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Maxar
NSW SS



PALING YARDS WIND FARM

NEWCASTLE TO
PALING YARDS ROUTE

Site: 580.0 km Oberon

SITE 29

LEGEND

- Blade Impact Area
- Cadastre
- Intersecting cadastre
- Public road corridor

Required hardstand and upgrades
are only within the road reserve
and do not impact private property.

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Coordinate System: GDA2020

Scale: 1:1,200 at A4

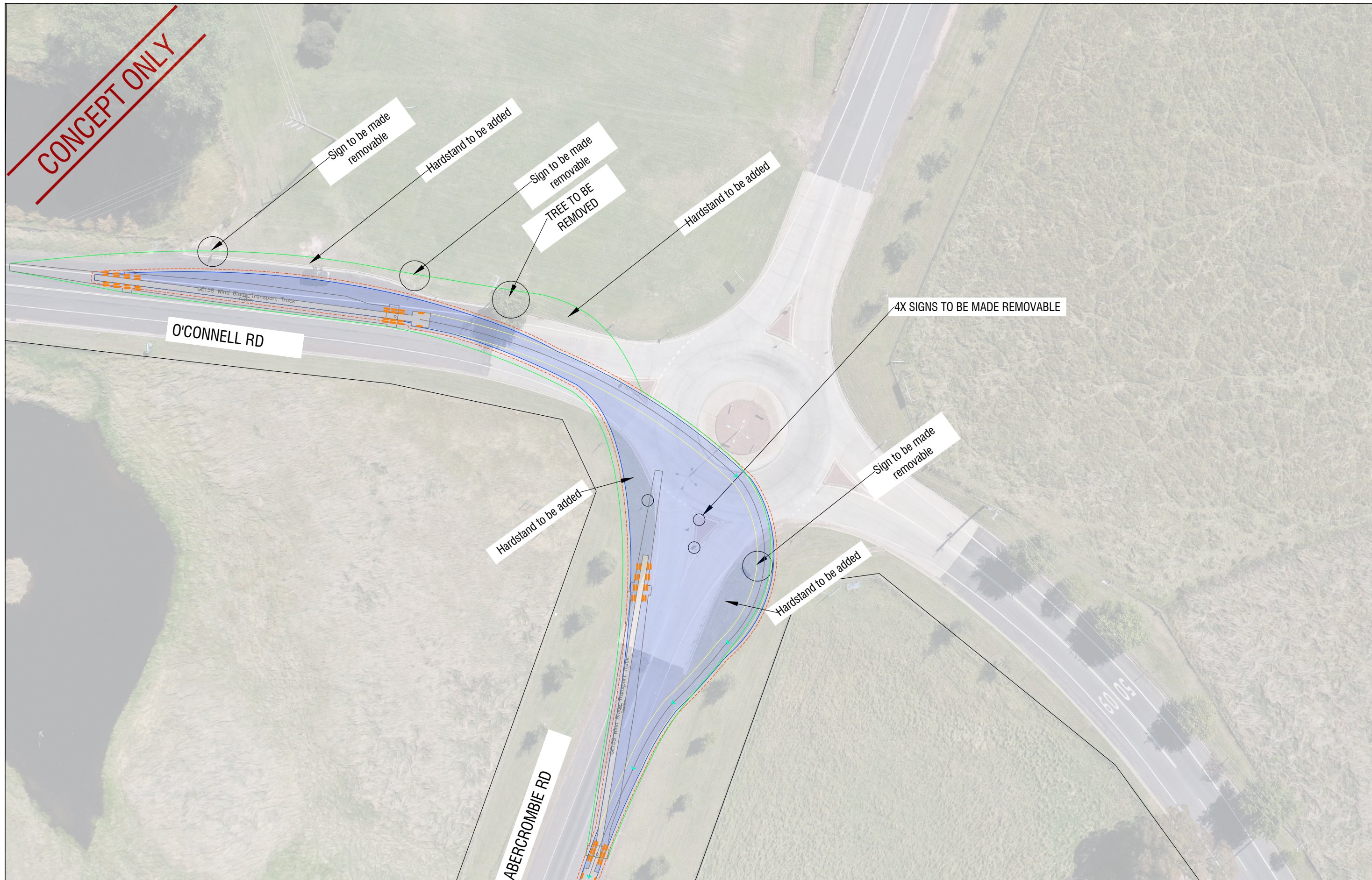
Project Number: 640.30153

Date Drawn: 22-May-2023

Drawn by: JH

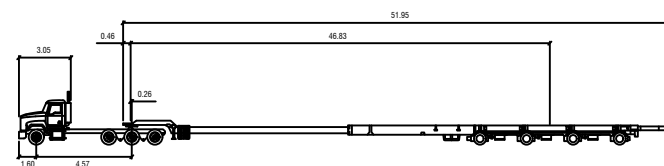


Service Layer Credits:
Esri, FAO, NOAA, USGS, Esri, USGS,
Maxar
NSW SS

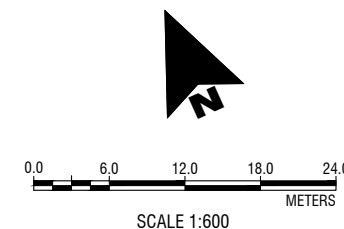


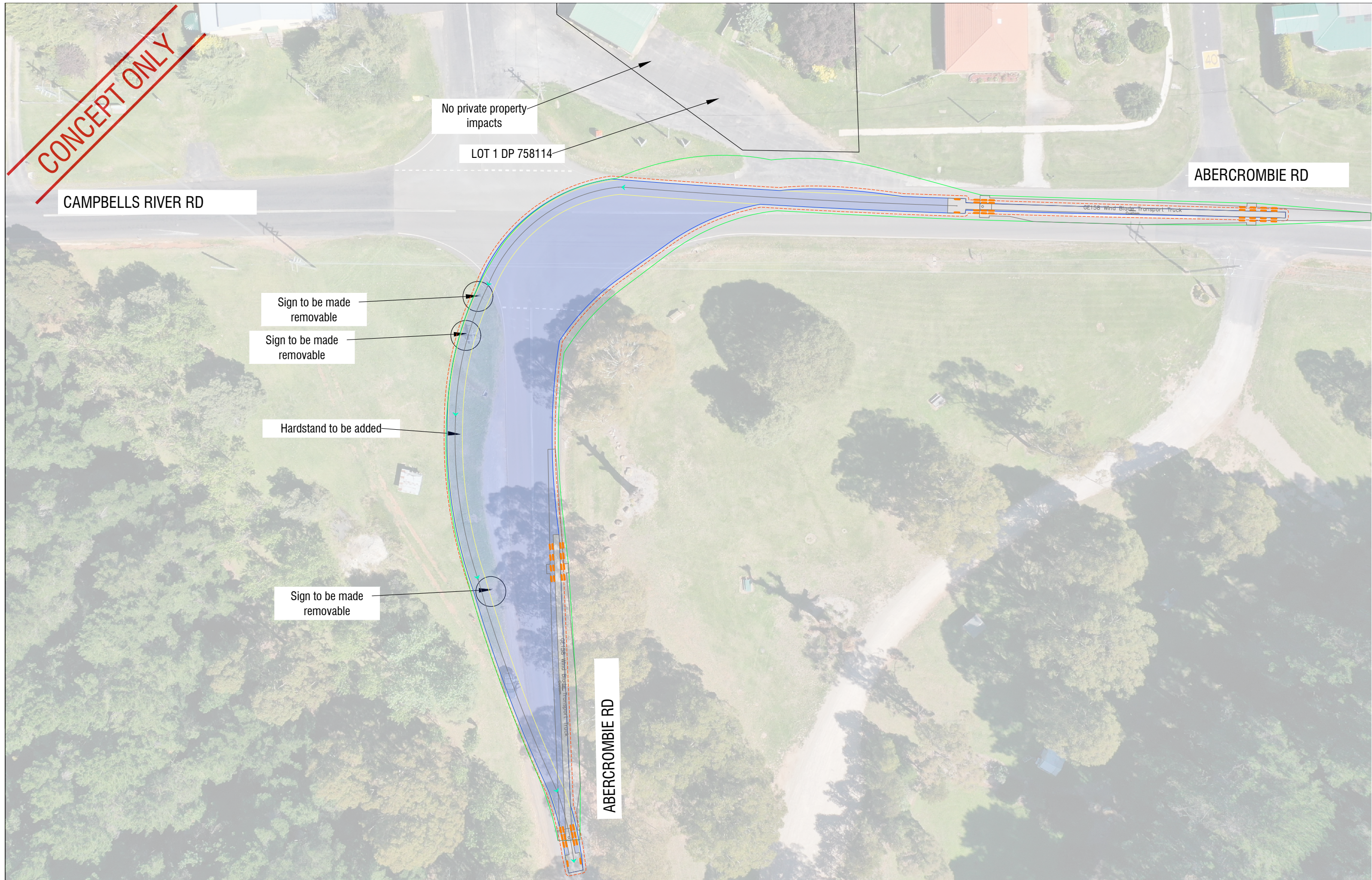
SWEPT PATH LEGEND

- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels
- Turbine Blade



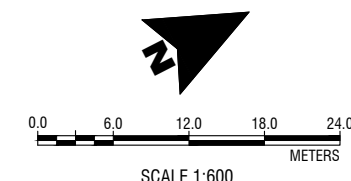
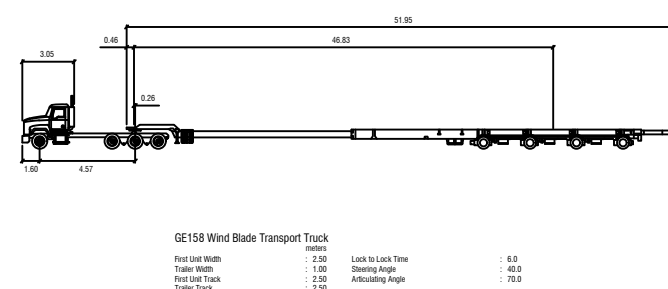
GE158 Wind Blade Transport Truck			
First Unit Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 1.00	Steering Angle	: 40.0
First Unit Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		





SWEPT PATH LEGEND

- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels
- Turbine Blade



Appendix F3:

Title Searches (Land Ownership Details)

Site_ID	PDF Page	Comments	lotnumber	sectionnum	planlabel	classsubty	controllin	Site	Address	Ownership Type
Site 0	1 of 14	No action necessary.	41		DP1191982	Standard Lot	FREEHOLD	0.0 km Mayfield	109 Selwyn Street Mayfield North, NSW, 2304	No information available
Site 0	1 of 14	No action necessary.	42		DP1191982	Standard Lot	FREEHOLD	0.0 km Mayfield	109 Selwyn Street Mayfield North, NSW, 2304	No information available
Site 2	2 of 14	No action necessary.	ROAD RESERVE							
Site 3	3 of 14	No action necessary.	ROAD RESERVE							
Site 7A	4 of 14	Land belongs to RTA. No action necessary.	1		DP732222	Standard Lot	FREEHOLD	28.7 km Buchanan	916 Buchanan Road Buchanan, NSW, 2323	Public
Site 7A	4 of 14	No action necessary.	36		DP1085798	Standard Lot	FREEHOLD	28.7 km Buchanan	LOT 36 John Renshaw Drive Buchanan, NSW, 2323	No information available
Site 7A	4 of 14	Belongs to RTA. No action necessary.	37		DP1085798	Standard Lot	FREEHOLD	28.7 km Buchanan	No address	Public
Site 15	5 of 14	Appears to be road reserve but misaligned. Frequently observed in rural environments.	47		DP1243976	Standard Lot	FREEHOLD	314.0 km Dunedoo	4081 Castlereagh Highway Dunedoo, NSW, 2844	No information available
Site 15	5 of 14	Appears to be road reserve but misaligned. Frequently observed in rural environments.	8		DP256482	Standard Lot	FREEHOLD	314.0 km Dunedoo	4081 Castlereagh Highway Dunedoo, NSW, 2844	No information available
Site 17A	6 of 14	No action necessary.	B		DP395260	Standard Lot	FREEHOLD	370.0 km Gulgong	1 Fisher Street Gulgong, NSW, 2852	Private
Site 19	7 of 14	No action necessary.	ROAD RESERVE							
Site 20	8 of 14	No action necessary.	ROAD RESERVE							
Site 21	9 of 14	No action necessary.	ROAD RESERVE							
Site 23	10 of 14	No action necessary.	ROAD RESERVE							
Site 27	11 of 14	No action necessary.	ROAD RESERVE							
Site 29	12 of 14	Appears to be road reserve but misaligned. Frequently observed in rural environments.	12		DP596981	Standard Part Lot	FREEHOLD	580.0 km Oberon	1354 O'Connell Road Oberon, NSW, 2787	Private
Site 30	13 of 14	No action necessary.	11		DP1185095	Standard Lot	FREEHOLD	574.0 km Oberon	24 O'Connell Road Oberon, NSW, 2787	Private
Site 31	14 of 14	No action necessary.	1	1	DP758114	Standard Lot	FREEHOLD	597.0 km Black Springs	2278 Abercrombie Road Black Springs, NSW, 2787	Private

Appendix G:

Traffic Survey Results

AUTOMATIC COUNTER SUMMARY AND DATA SHEET



Site Abercrombie Rd Access Location 1

Direction Northbound [Back to Site Summary Page](#)

Day Date	Monday 06-06-2022	Tuesday 31-05-2022	Wednesday 01-06-2022	Thursday 02-06-2022	Friday 03-06-2022	Saturday 04-06-2022	Sunday 05-06-2022	7 days		Weekday		Weekend	
								Total	Average	Total	Average	Total	Average
AM Peak	11:00	11:00	11:00	11:00	11:00	10:00	10:00	N/A	11:00	N/A	11:00	N/A	10:00
PM Peak	14:00	14:00	12:00	13:00	15:00	13:00	13:00	N/A	15:00	N/A	14:00	N/A	13:00
00:00	0	0	0	0	0	0	1	1	0	0	0	1	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	1	1	1	0	0	4	1	4	1	0	0
04:00	0	0	0	1	0	0	0	1	0	1	0	0	0
05:00	0	2	2	0	0	2	0	6	1	4	1	2	1
06:00	3	2	5	3	3	8	3	27	4	16	3	11	6
07:00	4	5	6	5	4	7	4	35	5	24	5	11	6
08:00	3	5	5	5	7	12	3	40	6	25	5	15	8
09:00	7	5	6	7	16	38	12	91	13	41	8	50	25
10:00	6	3	7	7	12	42	29	106	15	35	7	71	36
11:00	11	15	12	12	18	37	25	130	19	68	14	62	31
12:00	14	12	10	12	27	21	16	112	16	75	15	37	19
13:00	10	8	10	15	17	37	21	118	17	60	12	58	29
14:00	16	13	9	10	42	13	17	120	17	90	18	30	15
15:00	15	9	1	12	46	26	14	123	18	83	17	40	20
16:00	13	7	10	14	29	17	16	106	15	73	15	33	17
17:00	8	1	2	5	29	9	16	70	10	45	9	25	13
18:00	6	7	1	7	20	12	5	58	8	41	8	17	9
19:00	5	3	3	3	13	5	2	34	5	27	5	7	4
20:00	2	1	0	5	9	2	2	21	3	17	3	4	2
21:00	1	1	0	0	5	0	2	9	1	7	1	2	1
22:00	1	2	0	1	1	0	0	5	1	5	1	0	0
23:00	1	0	0	3	2	2	1	9	1	6	1	3	2
Total	126	102	90	128	301	290	189	1226	176	747	149	479	245
% Heavy	10.32%	18.63%	23.33%	28.13%	16.94%	15.17%	12.70%	16.97%		18.74%		14.20%	

AUTOMATIC COUNTER SUMMARY AND DATA SHEET



Site
Abercrombie Rd
Access Location 1

Direction

Southbound

▼

[Back to Site Summary Page](#)

Day Date	Monday 06-06-2022	Tuesday 31-05-2022	Wednesday 01-06-2022	Thursday 02-06-2022	Friday 03-06-2022	Saturday 04-06-2022	Sunday 05-06-2022	7 days		Weekday		Weekend	
								Total	Average	Total	Average	Total	Average
AM Peak	10:00	11:00	08:00	10:00	11:00	11:00	11:00	N/A	10:00	N/A	10:00	N/A	11:00
PM Peak	12:00	12:00	13:00	12:00	12:00	14:00	13:00	N/A	12:00	N/A	12:00	N/A	14:00
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	1	0	1	0	0	0	1	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	2	2	0	0	0	2	1
04:00	0	1	1	2	0	1	0	5	1	4	1	1	1
05:00	1	3	1	0	2	3	1	11	2	7	1	4	2
06:00	2	4	0	5	4	2	1	18	3	15	3	3	2
07:00	2	2	2	2	8	7	2	25	4	16	3	9	5
08:00	6	10	8	4	13	13	2	56	8	41	8	15	8
09:00	8	7	6	12	16	23	7	79	11	49	10	30	15
10:00	14	9	6	31	17	23	18	118	17	77	15	41	21
11:00	10	12	8	10	20	24	22	106	15	60	12	46	23
12:00	17	10	10	16	36	18	26	133	19	89	18	44	22
13:00	10	6	12	9	21	14	31	103	15	58	12	45	23
14:00	10	8	10	12	18	22	25	105	15	58	12	47	24
15:00	8	7	8	13	18	13	28	95	14	54	11	41	21
16:00	7	6	5	7	14	12	28	79	11	39	8	40	20
17:00	9	0	3	9	28	12	21	82	12	49	10	33	17
18:00	6	4	2	8	18	6	6	50	7	38	8	12	6
19:00	2	0	4	2	7	3	4	22	3	15	3	7	4
20:00	0	0	0	1	3	1	1	6	1	4	1	2	1
21:00	0	0	0	0	2	1	1	4	1	2	0	2	1
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	1	0	0	1	0	1	3	0	2	0	1	1
Total	112	90	86	143	246	199	227	1103	159	677	136	426	219
% Heavy	10.71%	22.22%	27.91%	18.18%	17.07%	13.57%	16.30%	17.04%		18.32%		15.02%	

AUTOMATIC COUNTER SUMMARY AND DATA SHEET



Site Abercrombie Rd Access Location 5

Direction Northbound ▼

[Back to Site Summary Page](#)

Day Date	Monday 06-06-2022	Tuesday 31-05-2022	Wednesday 01-06-2022	Thursday 02-06-2022	Friday 03-06-2022	Saturday 04-06-2022	Sunday 05-06-2022	7 days		Weekday		Weekend	
								Total	Average	Total	Average	Total	Average
AM Peak PM Peak	11:00 14:00	11:00 14:00	11:00 12:00	11:00 13:00	11:00 14:00	10:00 13:00	11:00 13:00	N/A N/A	11:00 13:00	N/A N/A	11:00 14:00	N/A N/A	11:00 13:00
00:00	0	0	0	0	1	3	1	5	1	1	0	4	2
01:00	0	0	0	0	0	1	0	1	0	0	0	1	1
02:00	0	0	0	0	0	3	0	3	0	0	0	3	2
03:00	0	1	0	1	1	0	0	3	0	3	1	0	0
04:00	0	0	1	1	0	0	0	2	0	2	0	0	0
05:00	0	2	2	0	0	2	0	6	1	4	1	2	1
06:00	1	0	5	3	3	7	2	21	3	12	2	9	5
07:00	3	3	4	4	4	8	5	31	4	18	4	13	7
08:00	4	6	4	3	7	10	3	37	5	24	5	13	7
09:00	5	3	4	9	12	33	12	78	11	33	7	45	23
10:00	8	6	9	7	17	43	24	114	16	47	9	67	34
11:00	11	14	10	11	18	41	29	134	19	64	13	70	35
12:00	12	11	11	10	24	28	14	110	16	68	14	42	21
13:00	11	8	10	15	18	36	24	122	17	62	12	60	30
14:00	15	12	6	12	42	15	14	116	17	87	17	29	15
15:00	14	9	1	13	40	23	16	116	17	77	15	39	20
16:00	14	6	8	13	36	18	15	110	16	77	15	33	17
17:00	8	2	4	6	28	11	14	73	10	48	10	25	13
18:00	6	7	2	5	19	13	6	58	8	39	8	19	10
19:00	6	4	3	5	16	5	2	41	6	34	7	7	4
20:00	2	0	0	4	8	1	2	17	2	14	3	3	2
21:00	1	2	0	1	6	0	2	12	2	10	2	2	1
22:00	1	2	0	1	1	0	0	5	1	5	1	0	0
23:00	1	0	0	2	2	2	1	8	1	5	1	3	2
Total	123	98	84	126	303	303	186	1223	173	734	147	489	252
% Heavy	8.13%	19.39%	22.62%	20.63%	12.87%	11.55%	9.14%	13.49%		15.40%		10.63%	

AUTOMATIC COUNTER SUMMARY AND DATA SHEET



Site Abercrombie Rd Access Location 5

Direction Southbound

[Back to Site Summary Page](#)

Day Date	Monday 06-06-2022	Tuesday 31-05-2022	Wednesday 01-06-2022	Thursday 02-06-2022	Friday 03-06-2022	Saturday 04-06-2022	Sunday 05-06-2022	7 days		Weekday		Weekend	
								Total	Average	Total	Average	Total	Average
AM Peak PM Peak	10:00 12:00	10:00 15:00	11:00 12:00	10:00 13:00	11:00 12:00	10:00 14:00	11:00 15:00	N/A N/A	10:00 12:00	N/A N/A	10:00 12:00	N/A N/A	11:00 14:00
00:00	0	0	0	0	0	1	0	1	0	0	0	1	1
01:00	0	0	0	0	0	2	0	2	0	0	0	2	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	2	2	0	0	0	2	1
04:00	0	1	1	2	0	2	0	6	1	4	1	2	1
05:00	0	3	1	0	2	3	1	10	1	6	1	4	2
06:00	2	4	0	5	4	3	1	19	3	15	3	4	2
07:00	2	2	2	2	9	7	2	26	4	17	3	9	5
08:00	9	9	7	6	16	12	2	61	9	47	9	14	7
09:00	7	6	6	10	15	23	7	74	11	44	9	30	15
10:00	13	12	4	28	17	28	19	121	17	74	15	47	24
11:00	11	10	9	11	21	26	24	112	16	62	12	50	25
12:00	14	8	12	11	34	16	24	119	17	79	16	40	20
13:00	9	8	8	12	19	13	29	98	14	56	11	42	21
14:00	10	6	8	11	21	23	25	104	15	56	11	48	24
15:00	9	9	8	12	18	11	30	97	14	56	11	41	21
16:00	7	4	4	8	16	14	27	80	11	39	8	41	21
17:00	10	1	3	12	28	11	18	83	12	54	11	29	15
18:00	6	3	3	5	20	6	5	48	7	37	7	11	6
19:00	2	0	3	2	7	4	4	22	3	14	3	8	4
20:00	0	0	0	1	2	1	1	5	1	3	1	2	1
21:00	0	0	0	0	2	1	1	4	1	2	0	2	1
22:00	0	0	2	0	0	0	0	2	0	2	0	0	0
23:00	0	1	0	0	1	0	1	3	0	2	0	1	1
Total	111	87	81	138	252	207	223	1099	157	669	132	430	219
% Heavy	9.01%	18.39%	17.28%	15.22%	10.71%	13.04%	19.28%	14.38%		13.15%		16.28%	

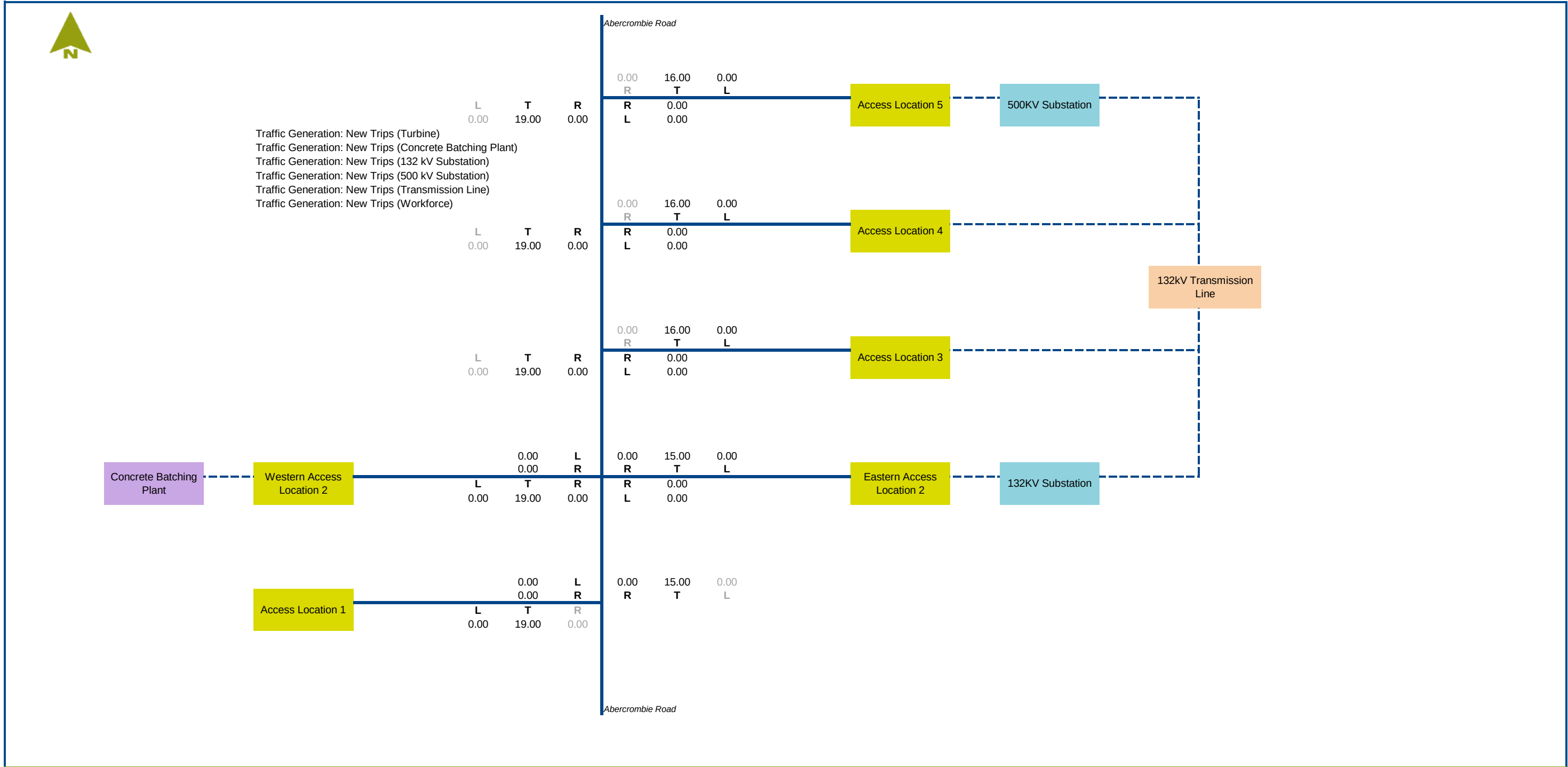
Appendix H:

Desktop Models

Project Paling Yards Wind Farm
Project number 640.30153
Prepared by KD
Reviewed by CS

TITLE BLOCK REGISTER

Tab name	Figure	Sheet Title
Template	XX	Template
2022 Background	A1	Background Traffic Volumes
Turbine	A2	Traffic Generation: New Trips (Turbine)
Concrete Batching Plant	A3	Traffic Generation: New Trips (Concrete Batching Plant)
132kV Substation	A4	Traffic Generation: New Trips (132 kV Substation)
500kV Substation	A5	Traffic Generation: New Trips (500 kV Substation)
Transmission Line	A6	Traffic Generation: New Trips (Transmission Line)
Workforce	A7	Traffic Generation: New Trips (Workforce)
Total Volumes	A8	Total Background + Construction Traffic



Legend

- L Left Turn
- T Through
- R Right turn
- U U-turn

0 Peak Hour Volumes

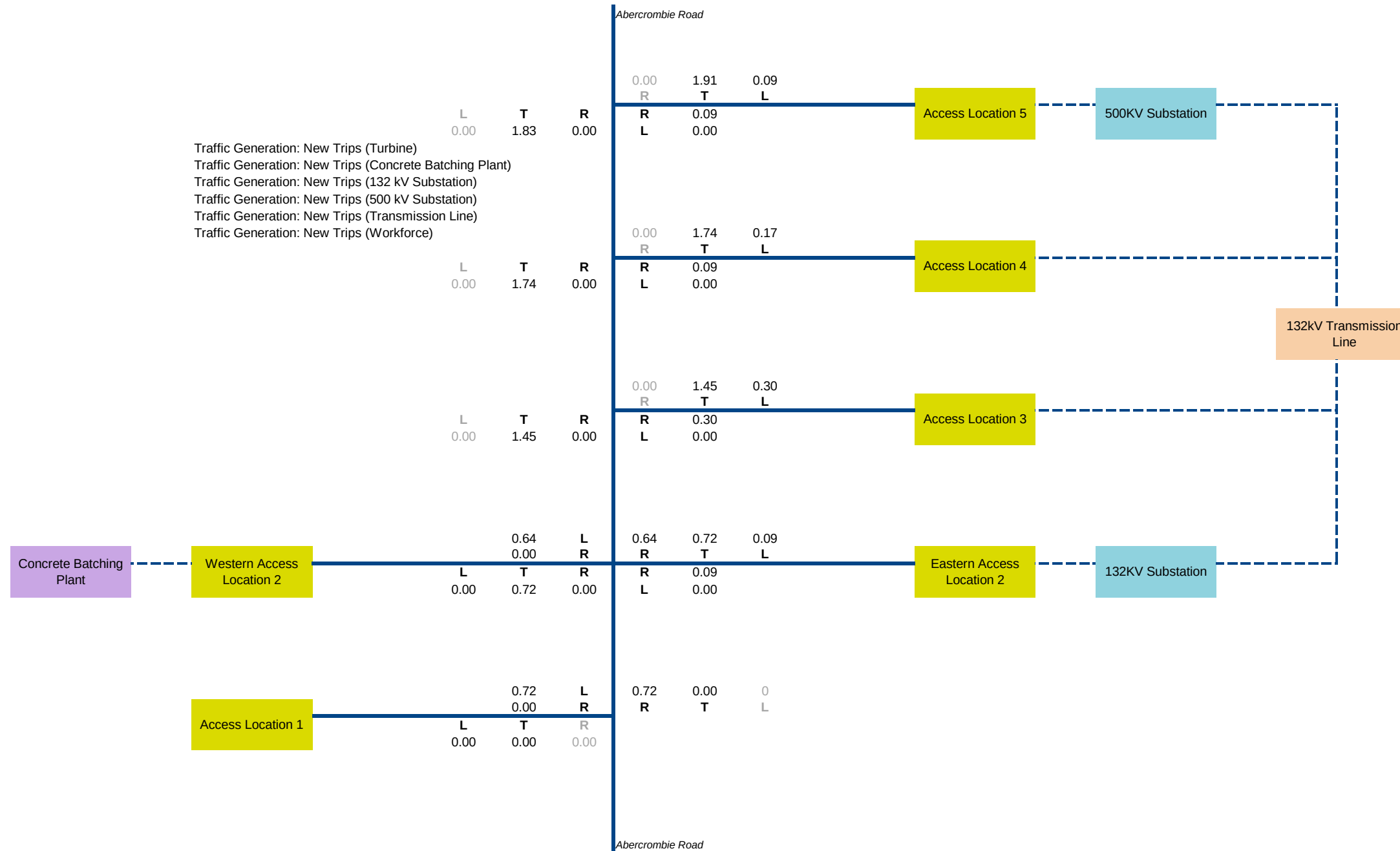
Figure: A1
Background Traffic Volumes

640.30153
 Paling Yards Wind Farm
 03-11-2022





Traffic Generation: New Trips (Turbine)
Traffic Generation: New Trips (Concrete Batching Plant)
Traffic Generation: New Trips (132 kV Substation)
Traffic Generation: New Trips (500 kV Substation)
Traffic Generation: New Trips (Transmission Line)
Traffic Generation: New Trips (Workforce)



Legend

- L Left Turn
- T Through
- R Right turn
- U U-turn

0 Peak Hour Volumes

Figure: A2

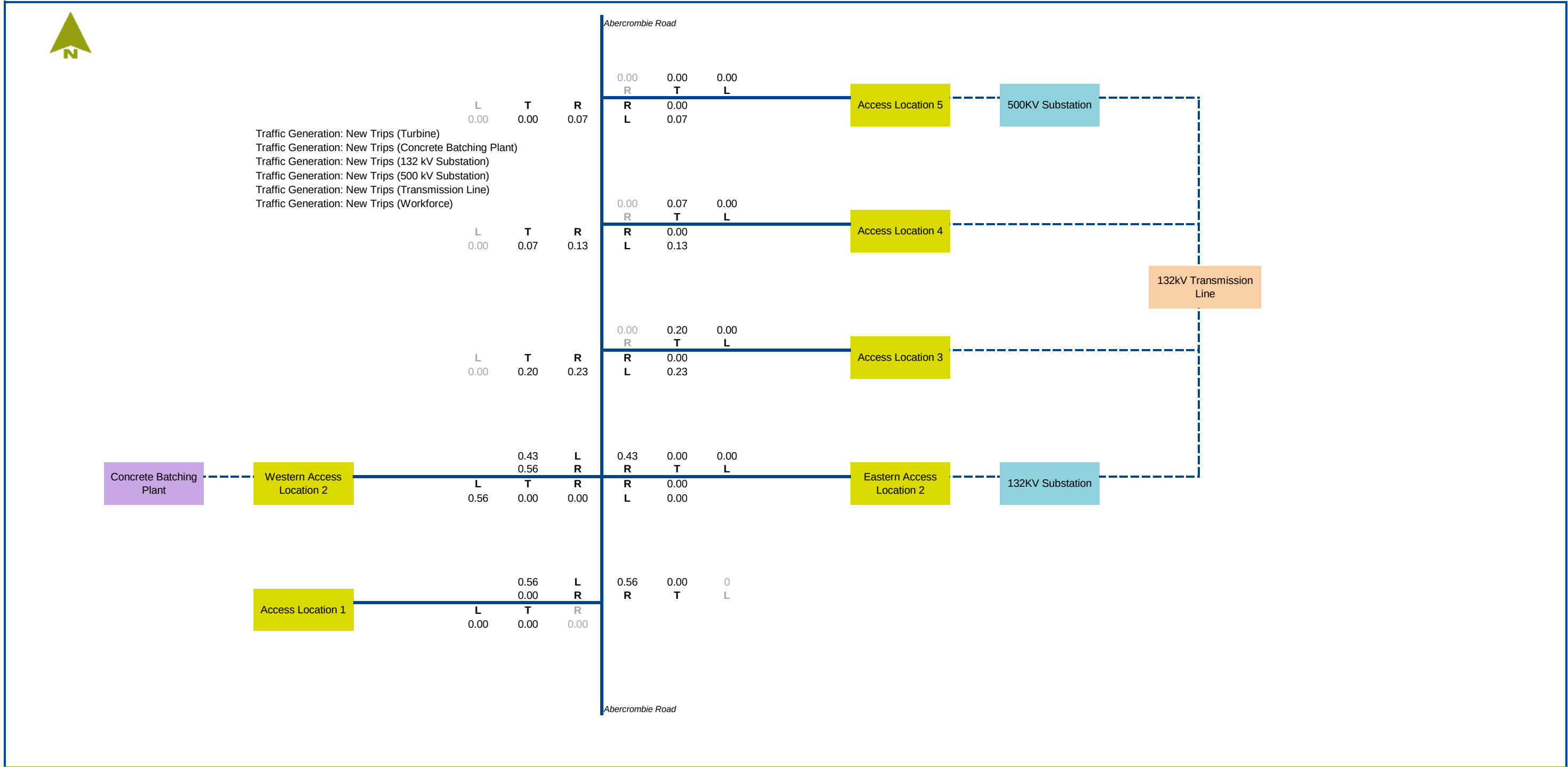
Traffic Generation: New Trips (Turbine)

640.30153

Paling Yards Wind Farm

03-11-2022





Legend

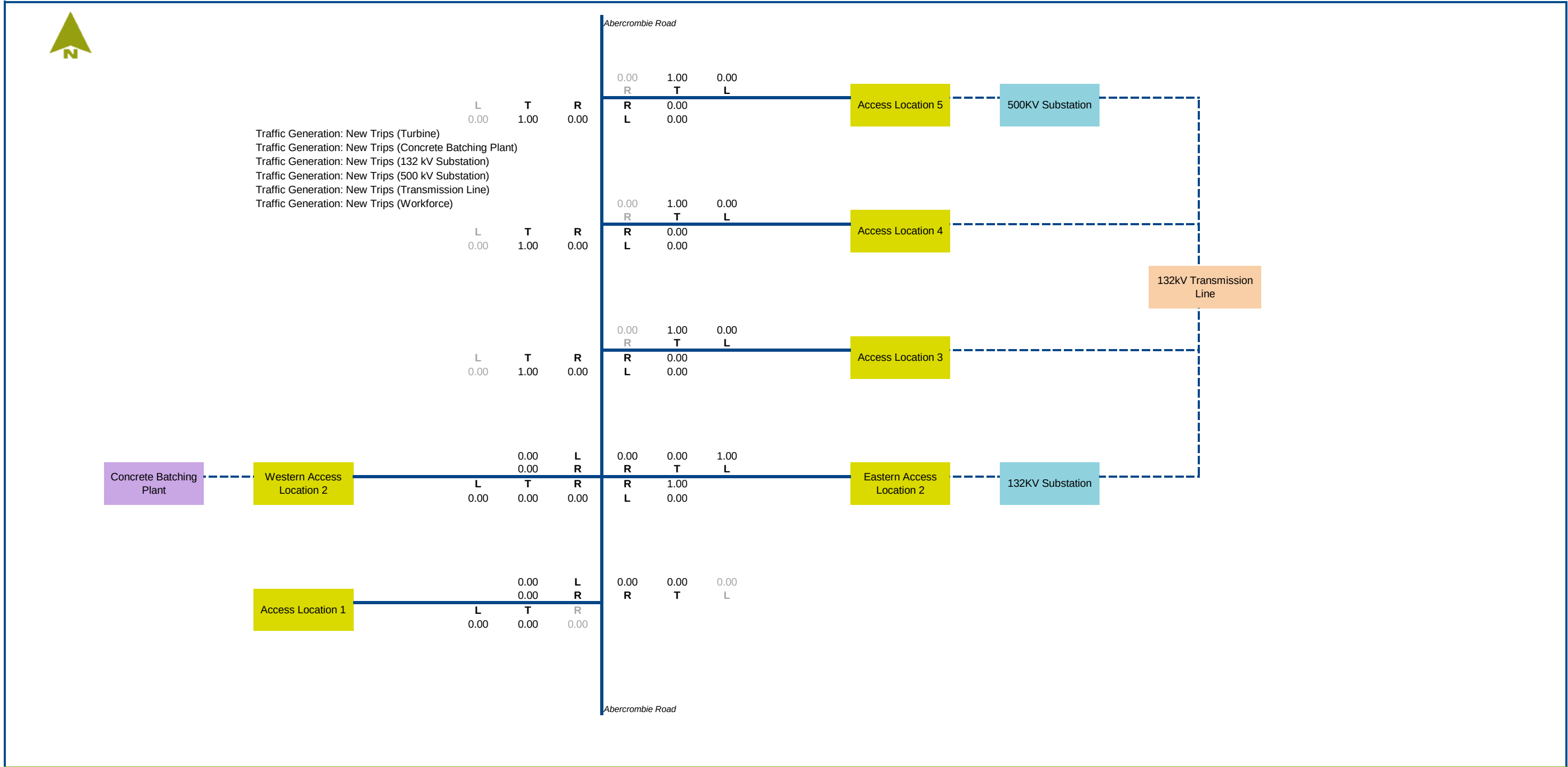
- L Left Turn
- T Through
- R Right turn
- U U-turn

0 Peak Hour Volumes

Figure: A3
 Traffic Generation: New Trips (Concrete Batching Plant)

640.30153
 Paling Yards Wind Farm
 03-11-2022





Legend

- L Left Turn
- T Through
- R Right turn
- U U-turn

0 Peak Hour Volumes

Figure: A4

Traffic Generation: New Trips (132 kV Substation)

640.30153

Paling Yards Wind Farm

03-11-2022





Traffic Generation: New Trips (Turbine)
Traffic Generation: New Trips (Concrete Batching Plant)
Traffic Generation: New Trips (132 kV Substation)
Traffic Generation: New Trips (500 kV Substation)
Traffic Generation: New Trips (Transmission Line)
Traffic Generation: New Trips (Workforce)

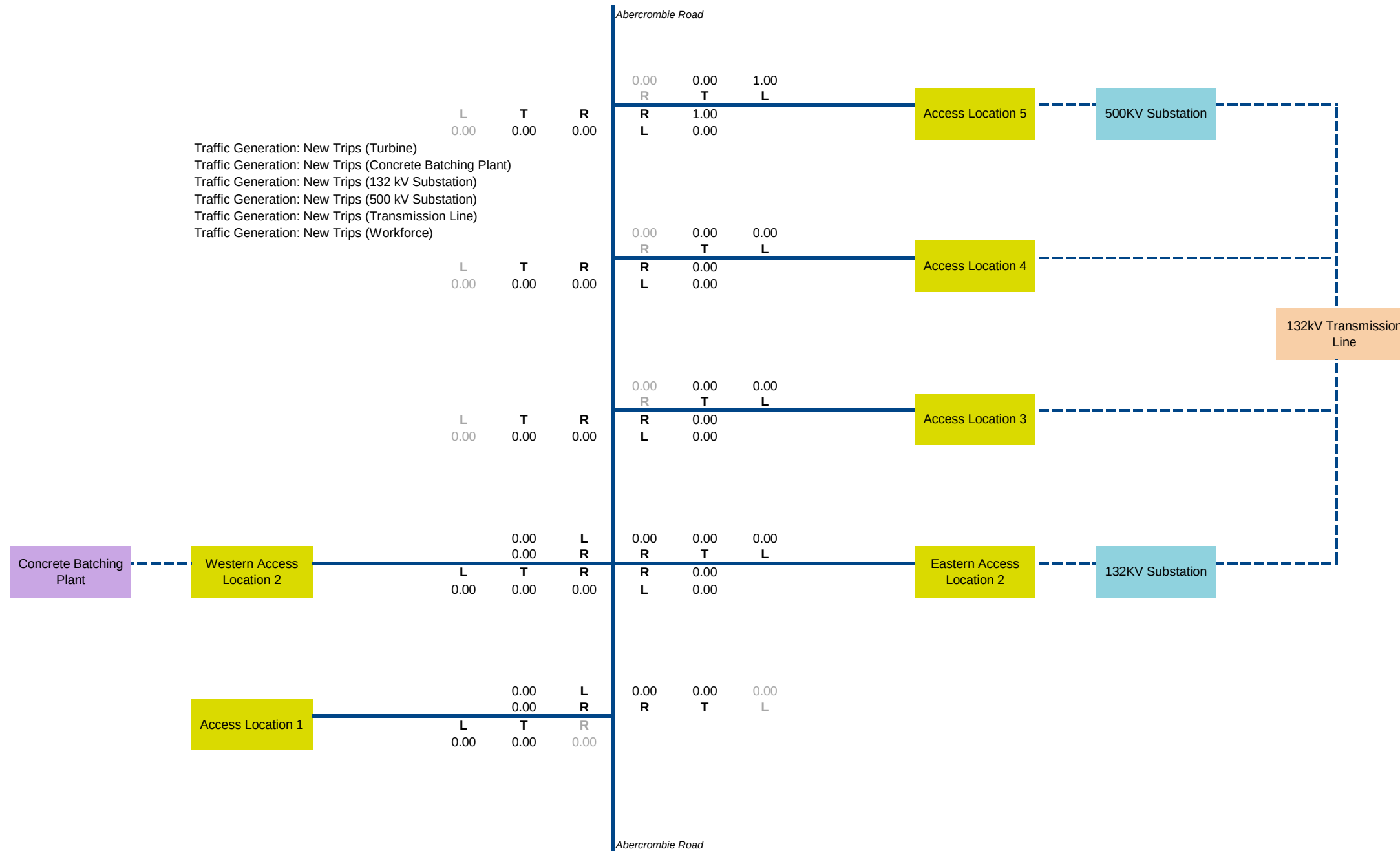
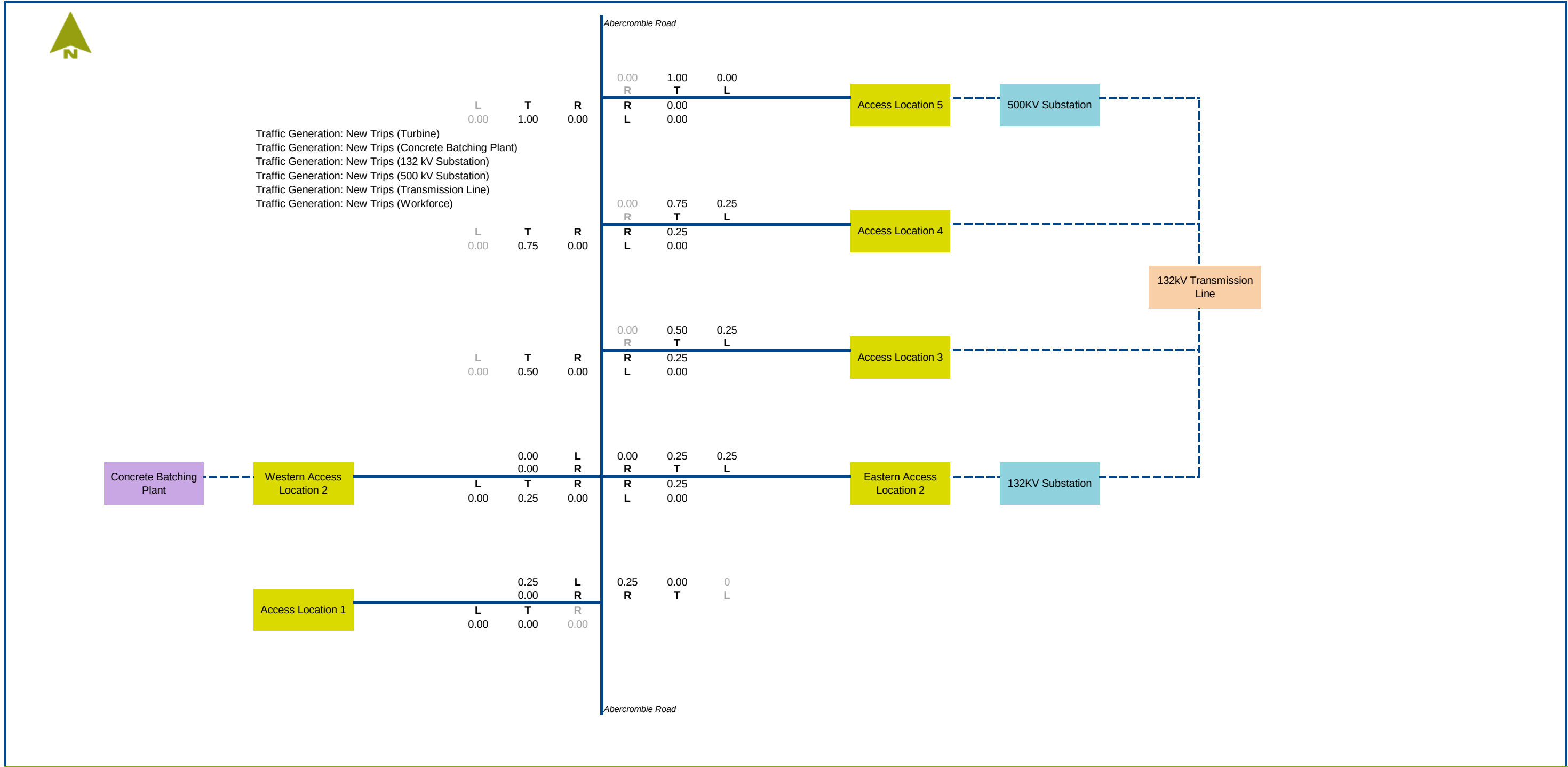


Figure: A5
Traffic Generation: New Trips (500 kV Substation)

640.30153
Paling Yards Wind Farm
03-11-2022





Legend

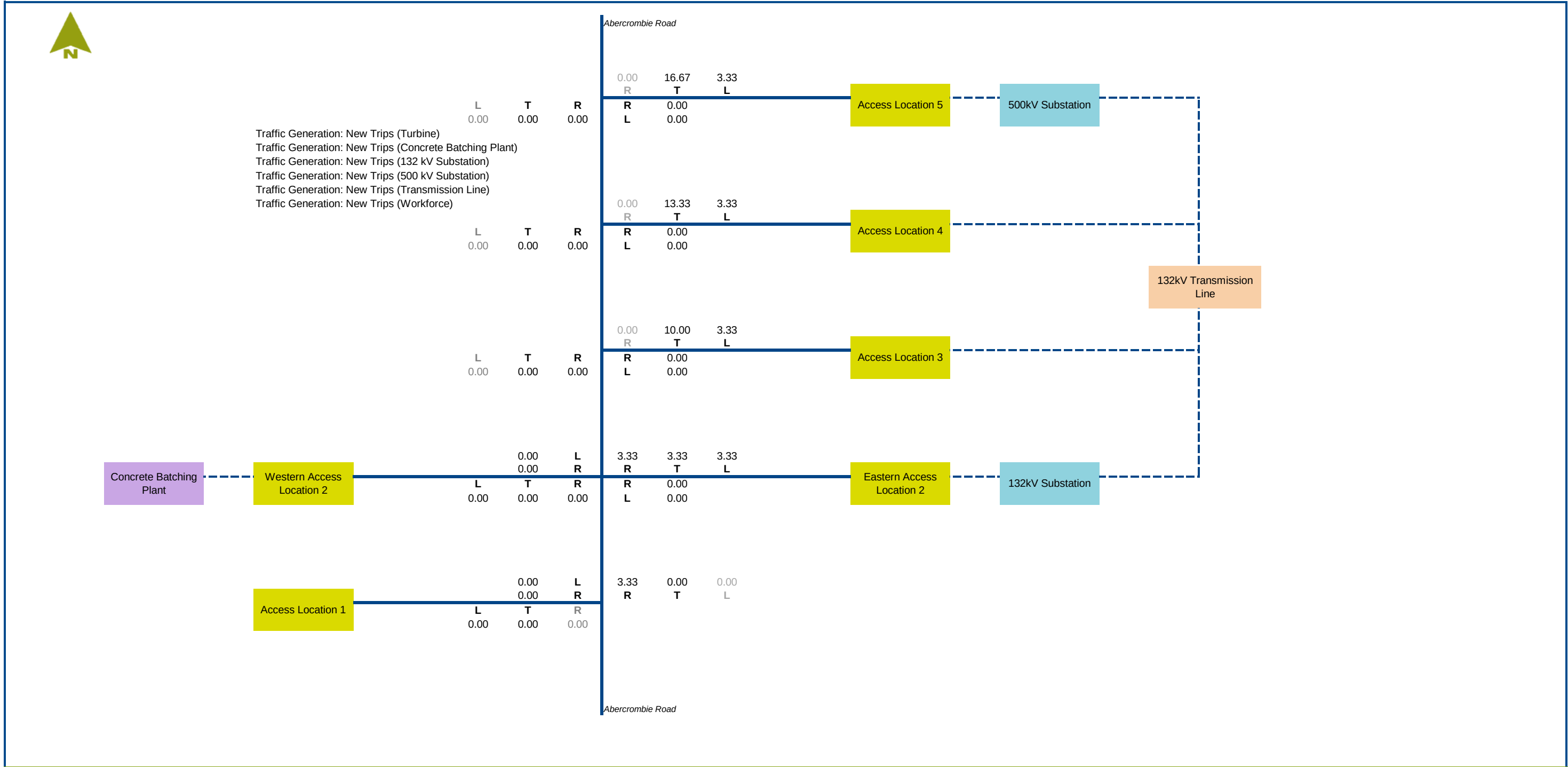
- L Left Turn
- T Through
- R Right turn
- U U-turn

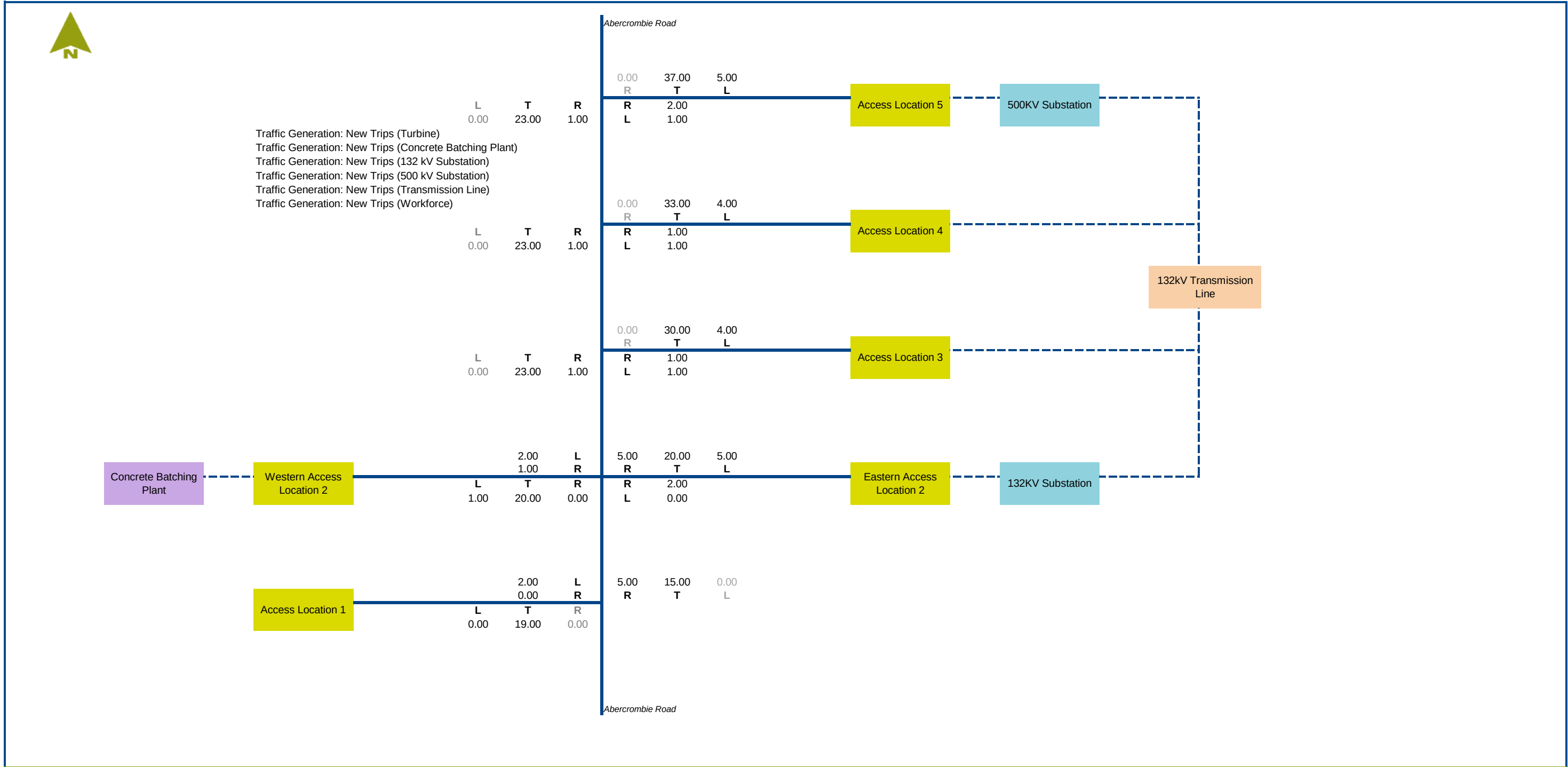
0 Peak Hour Volumes

Figure: A6
 Traffic Generation: New Trips (Transmission Line)

640.30153
 Paling Yards Wind Farm
 03-11-2022







Legend

- L Left Turn
- T Through
- R Right turn
- U U-turn

0 Peak Hour Volumes

Figure: A8
 Total Background + Construction Traffic

640.30153
 Paling Yards Wind Farm
 03-11-2022



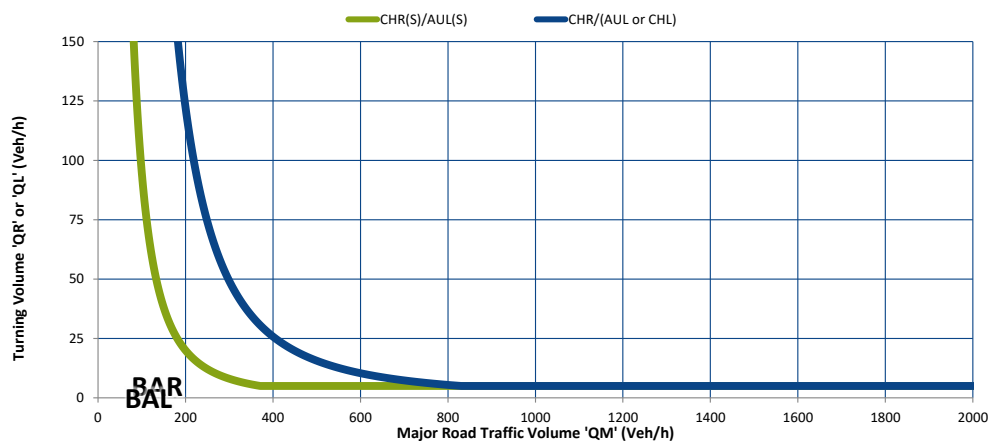
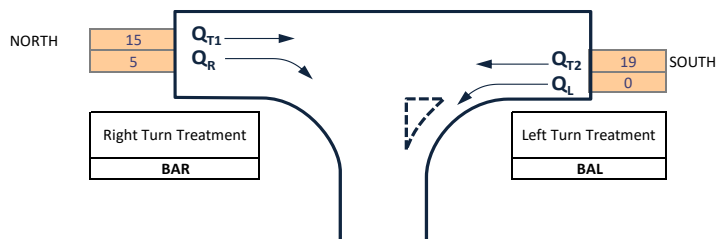
Appendix I:

Turn Lane Warrant Assessments

Assessment Year	2022
Peak Period	Peak
Scenario	Construction - Access 1 West

Design Domain	Normal Design Domain
Design Year	10
Lane Count	2L2W
Design Speed	>=100km/h
Splitter Island?	No

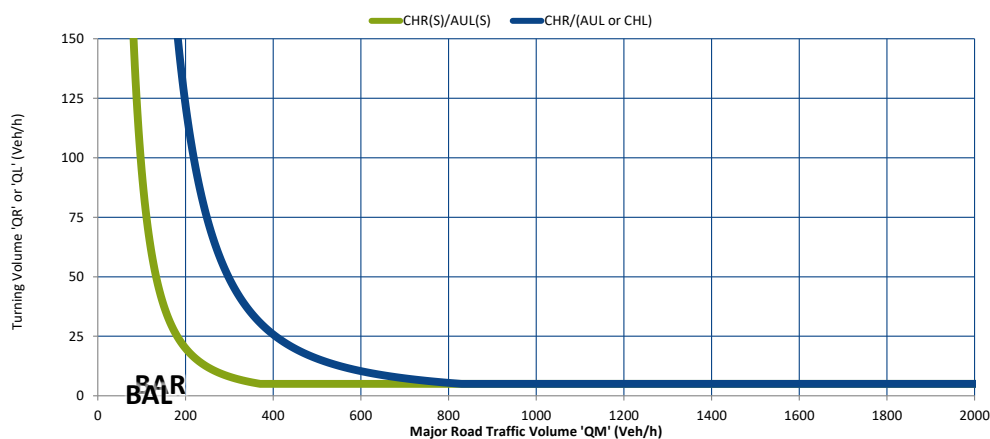
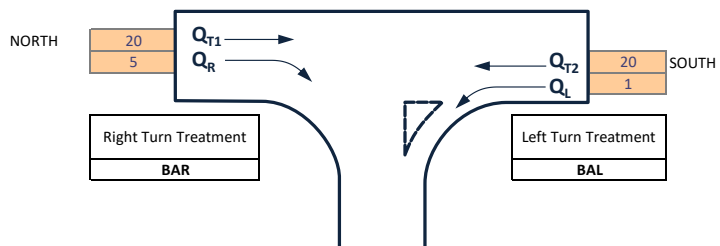
Q_M	Q_R/Q_L	
34	5	Right
19	0	Left



Assessment Year	2022
Peak Period	Peak
Scenario	Construction - Access 2 West

Design Domain	Normal Design Domain
Design Year	10
Lane Count	2L2W
Design Speed	>=100km/h
Splitter Island?	No

Q_M	Q_R/Q_L	
41	5	Right
20	1	Left



Reflects changes made in RPDM (Ed2: Vol3) Supplement to Austroads Part 4A (DTMR - August, 2014)

Turn Warrant Assessment

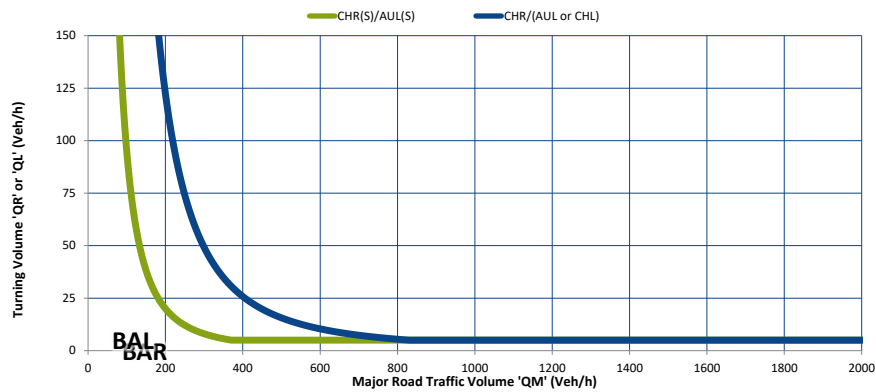
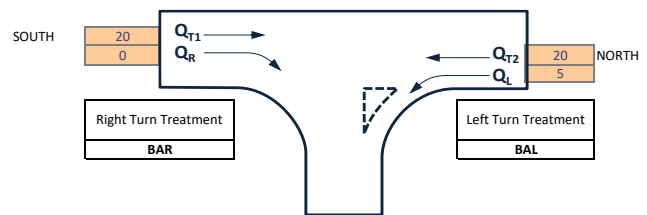
Major Road / Minor Intersection
03 November 2022

640.30153

Assessment Year	2022
Peak Period	Peak
Scenario	Construction - Access 2 East

Design Domain	Normal Design Domain
Design Year	10
Lane Count	2L2W
Design Speed	>=100km/h
Splitter Island?	No

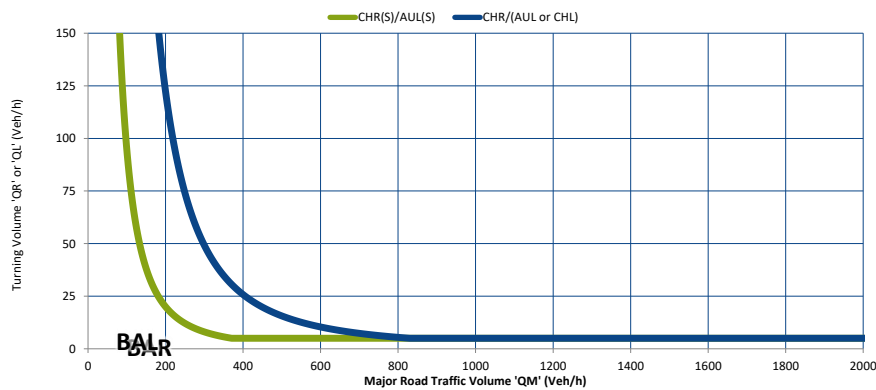
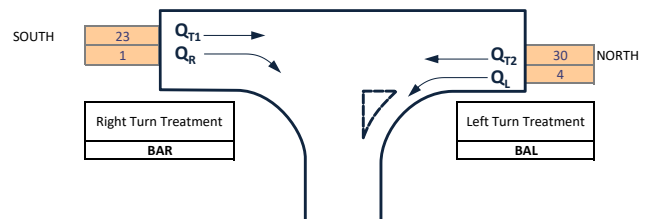
Q_M	Q_R/Q_L	
45	0	Right
20	5	Left



Assessment Year	2022
Peak Period	Peak
Scenario	Construction - Access 3 East

Design Domain	Normal Design Domain
Design Year	10
Lane Count	2L2W
Design Speed	>=100km/h
Splitter Island?	No

Q_M	Q_R/Q_L	
57	1	Right
30	4	Left



Reflects changes made in RPDM (Ed2: Vol3) Supplement to Austroads Part 4A (DTMR - August, 2014)

Turn Warrant Assessment

Major Road / Minor Intersection
03 November 2022

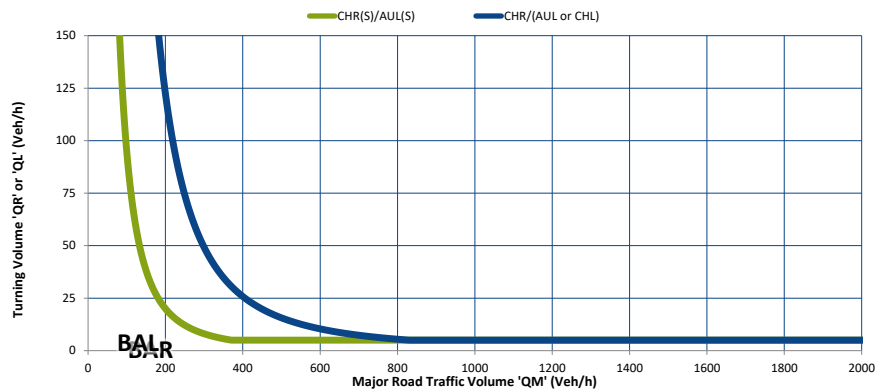
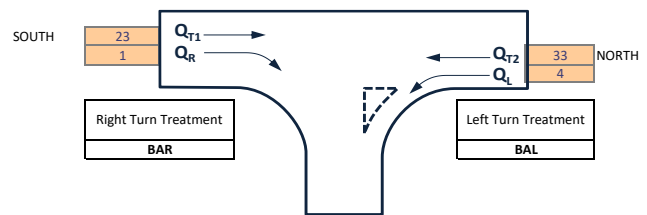
640.30153



Assessment Year	2022
Peak Period	Peak
Scenario	Construction - Access 4 East

Design Domain	Normal Design Domain
Design Year	10
Lane Count	2L2W
Design Speed	$\geq 100\text{km/h}$
Splitter Island?	No

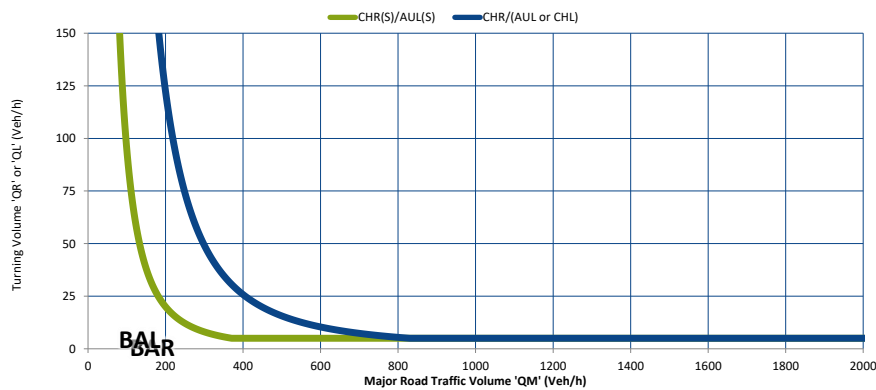
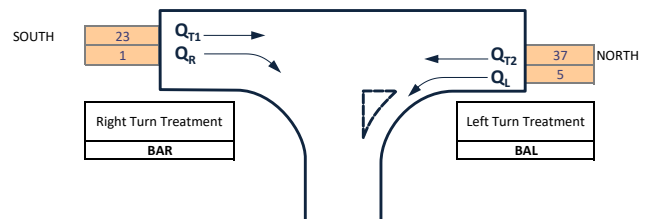
Q_M	Q_R/Q_L	
60	1	Right
33	4	Left



Assessment Year	2022
Peak Period	Peak
Scenario	Construction - Access 5 East

Design Domain	Normal Design Domain
Design Year	10
Lane Count	2L2W
Design Speed	$\geq 100\text{km/h}$
Splitter Island?	No

Q_M	Q_R/Q_L	
65	1	Right
37	5	Left



Reflects changes made in RPDM (Ed2: Vol3) Supplement to Austroads Part 4A (DTMR - August, 2014)

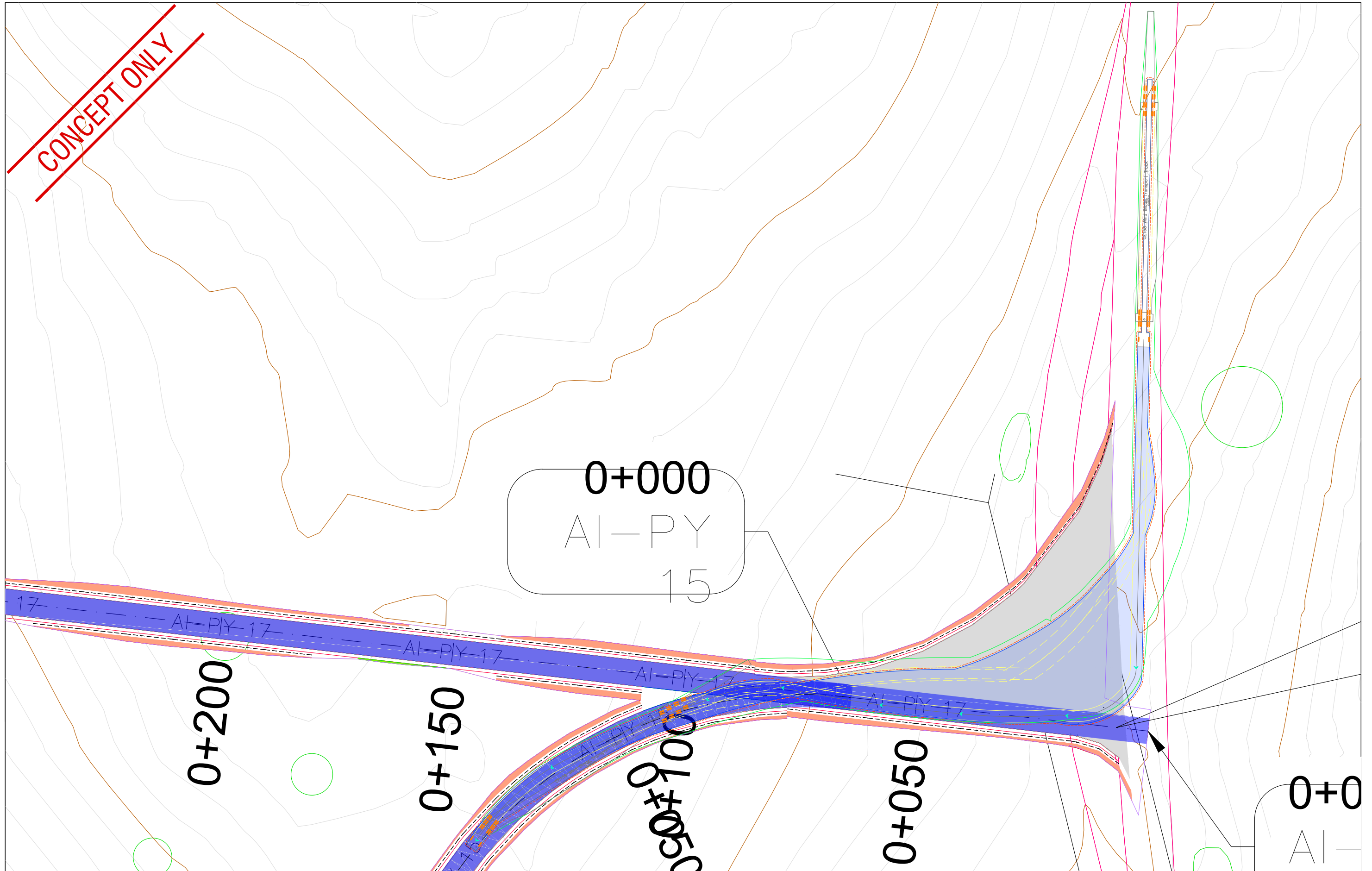
Turn Warrant Assessment

Major Road / Minor Intersection
03 November 2022

640.30153

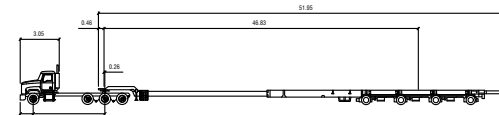
Appendix J:

Swept Path Assessments

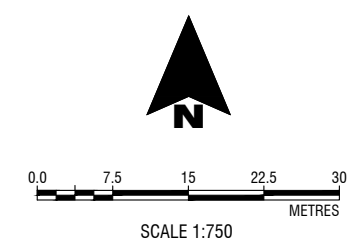


SWEPT PATH LEGEND

- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels
- Rear Wheels
- Load (Turbine)



GE158 Wind Blade Transport Truck	Index	Look to Look Time	1:00
Front Load Width	11.00	Steering Angle	40.0
Trailer Width	1.00	Articulating Angle	70.0
Front TAT Truck	2.00		
Trailer Truck	2.00		

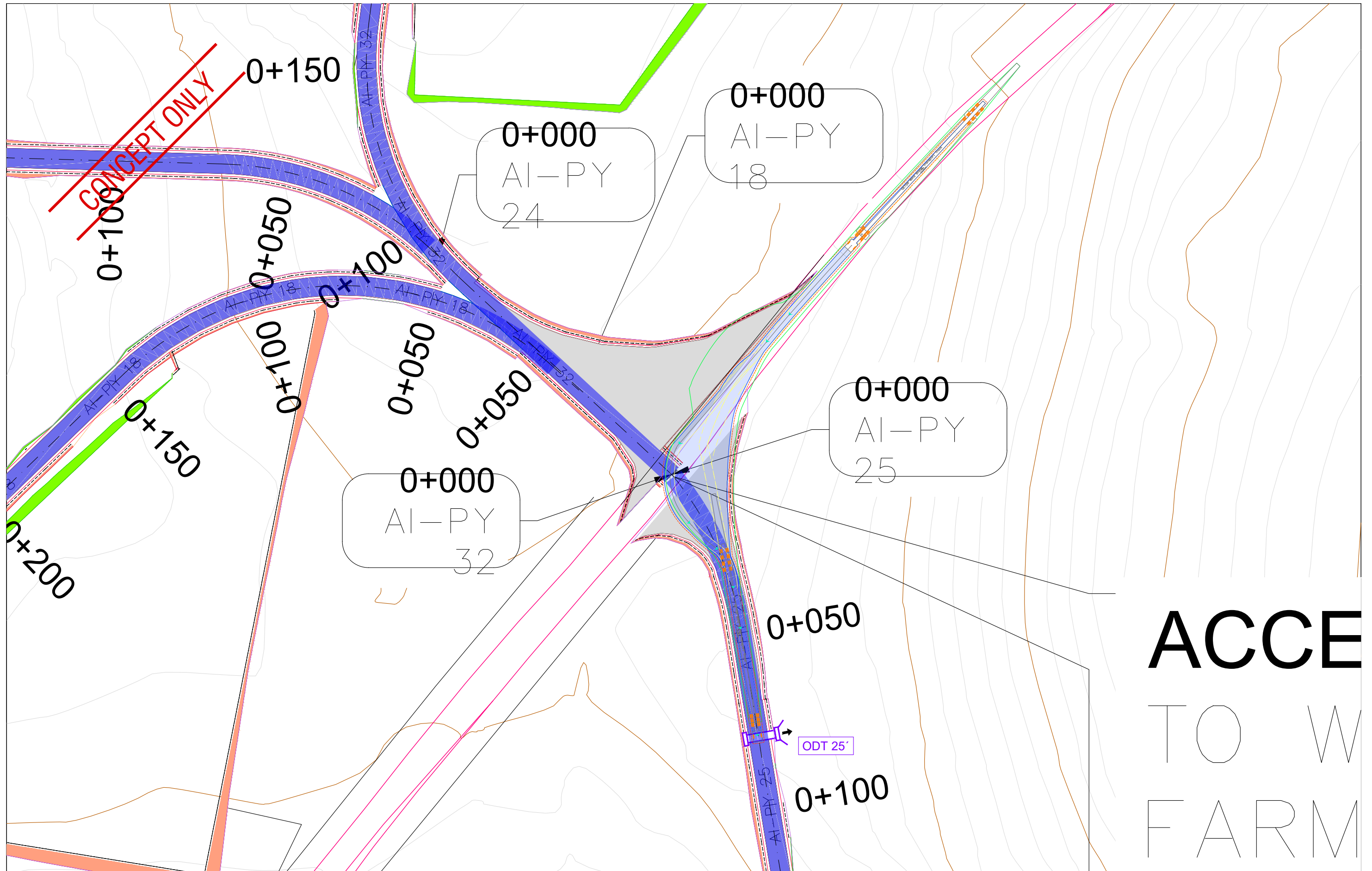


Global Power Generation

Paling Yards Wind Farm

**GE158 Turbine Blade -
Access Location 1**

FIGURE SK-01



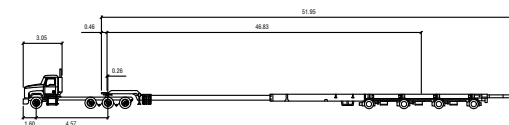
ACCE
TO W
FARM



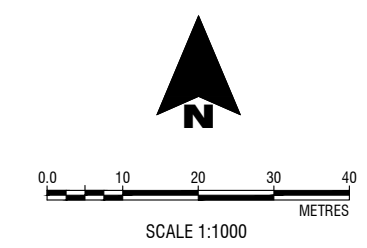
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Project No:	640.30153
Date:	23/09/2022
Drawn by:	Charlie Seventekin
Scale:	AS SHOWN
Sheet Size:	A3
Projection:	GDA2020

- SWEPT PATH LEGEND**
- Vehicle Path
 - Vehicle Body
 - Body Clearance
 - Front Wheels
 - Rear Wheels
 - Load (Turbine)



GE158 Wind Blade Transport Truck	Index	Look to Link Time	0.0
Front Load Width	1.00	Downing Angle	40.0
Trailer Width	2.20	Allowing Angle	70.0
Trailer Track	2.20		

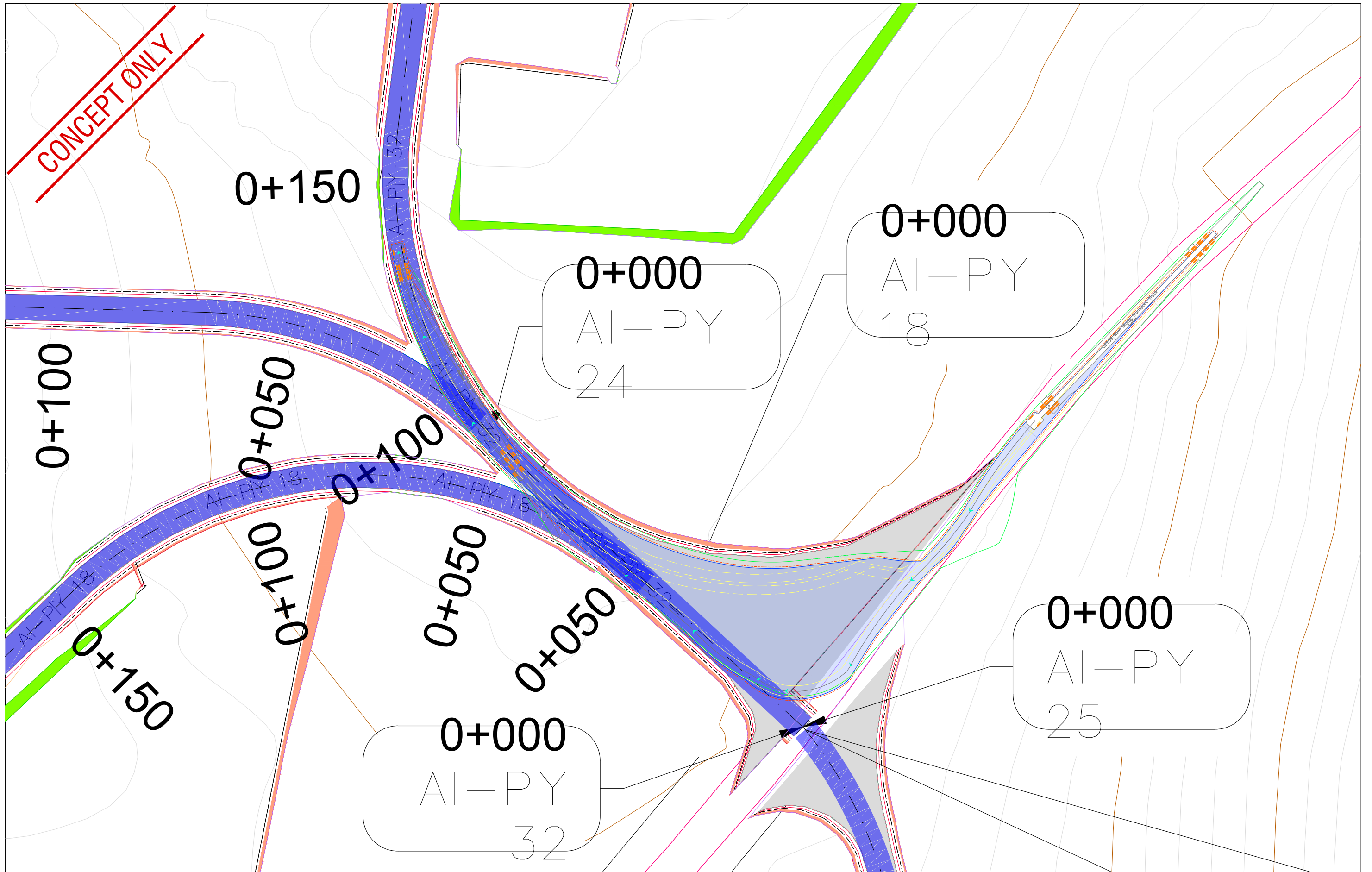


Global Power Generation

Paling Yards Wind Farm

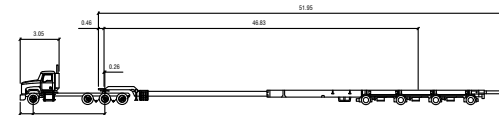
GE158 Turbine Blade - Access Location 2 East

FIGURE SK-02E

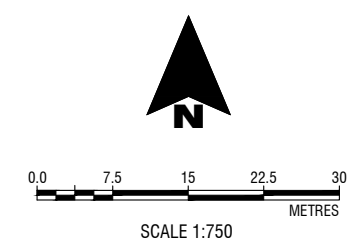


SWEPT PATH LEGEND

- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels
- Rear Wheels
- Load (Turbine)



GE158 Wind Blade Transport Truck			
Front Overlap	1.00	Looking to Link Time	0.0
Trailer Width	1.00	Swinging Angle	40.0
Front Overlap	2.00	Allowing Angle	70.0
Trailer Track	2.00		



Global Power Generation

Paling Yards Wind Farm

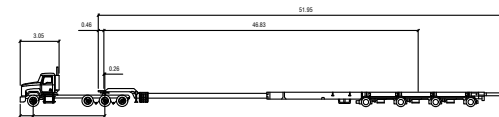
**GE158 Turbine Blade -
Access Location 2 West**

FIGURE SK-02W

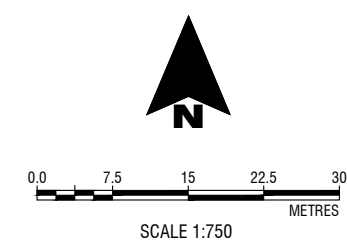


SWEPT PATH LEGEND

- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels
- Rear Wheels
- Load (Turbine)



GE158 Wind Blade Transport Truck	Height	Load to Lock Time	6.0
Front Load Width	7.50	Unloading Angle	40.0
Trailer Width	1.00	Wheeling Angle	70.0
Front Load Truck	2.00		
Trailer Truck	2.00		

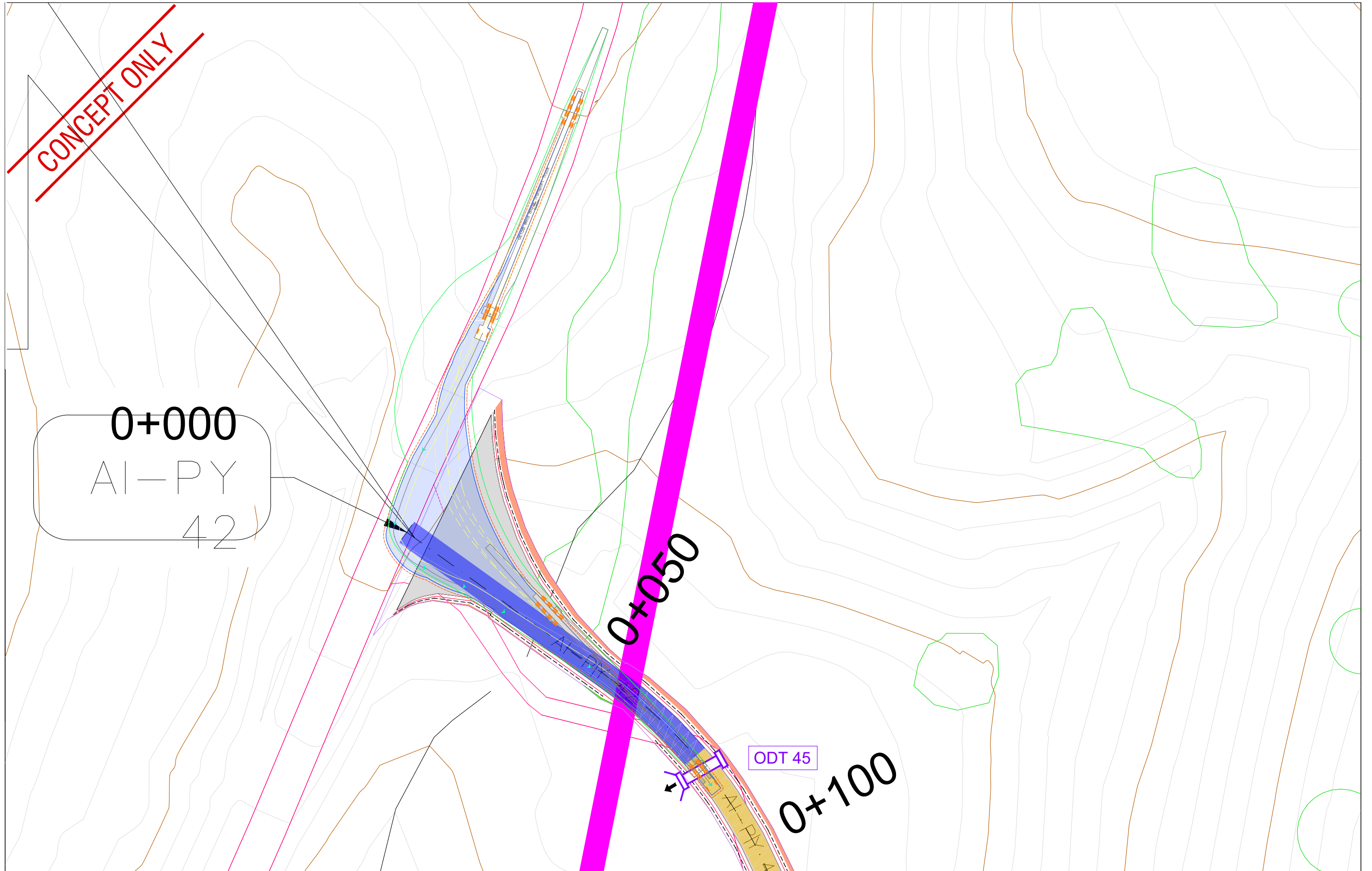


Global Power Generation

Paling Yards Wind Farm

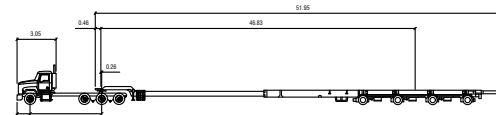
**GE158 Turbine Blade -
Access Location 3**

FIGURE SK-03

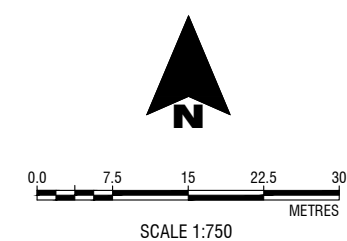


SWEPT PATH LEGEND

- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels
- Rear Wheels
- Load (Turbine)



GE158 Wind Blade Transport Truck			Height	11.00	Look to Look Time	0.0
Front Load Width	1.00	Swinging Angle	40.0			
Trailer Width	2.20	Wheeling Angle	70.0			
Trailer Track	2.00					

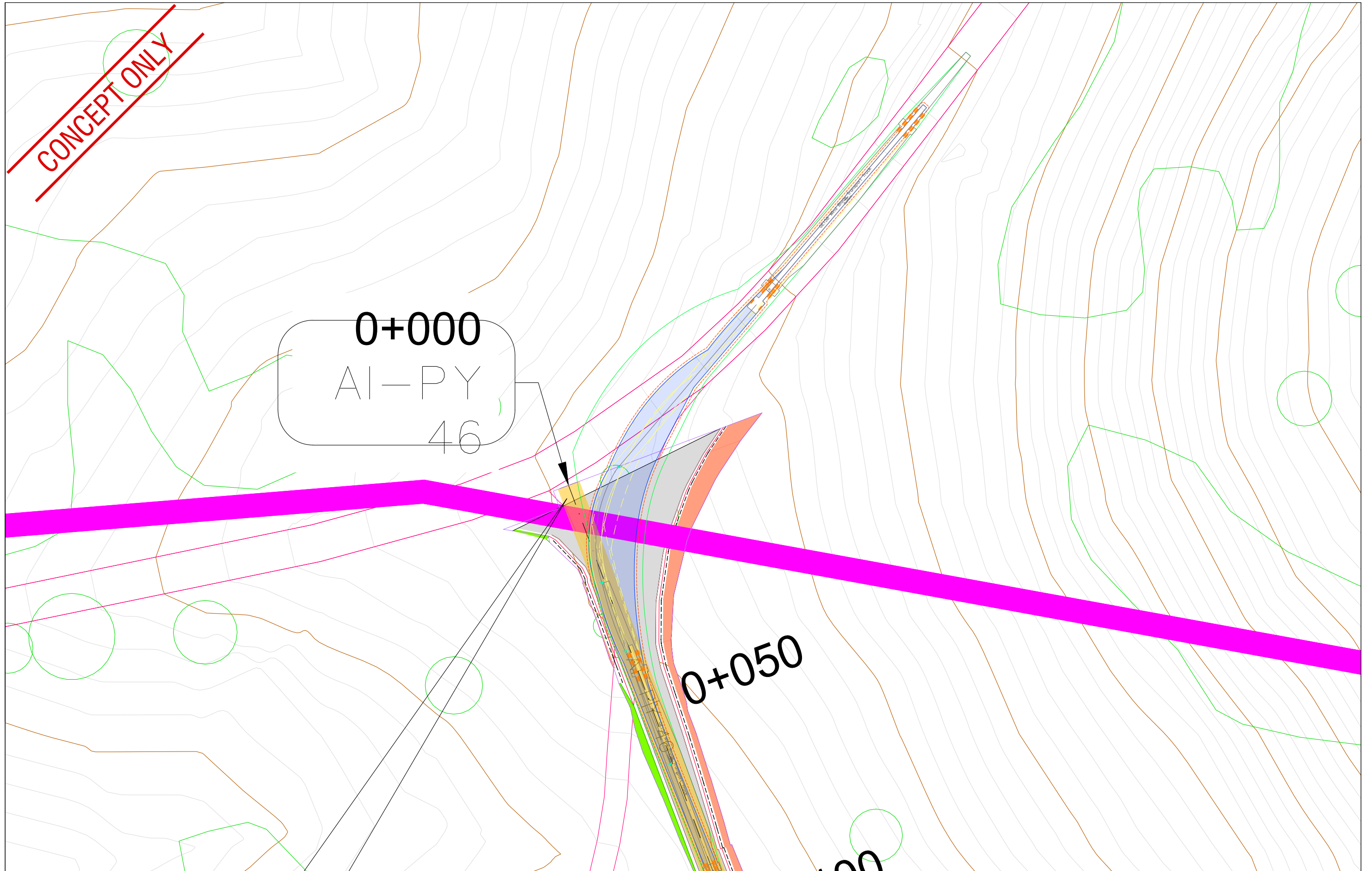


Global Power Generation

Paling Yards Wind Farm

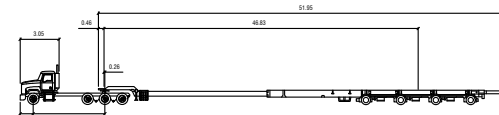
**GE158 Turbine Blade -
Access Location 4**

FIGURE SK-04

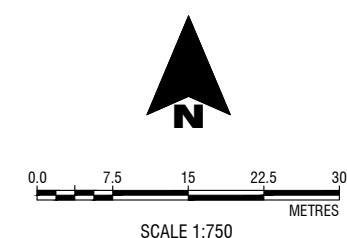


SWEPT PATH LEGEND

- Vehicle Path
- Vehicle Body
- Body Clearance
- Front Wheels
- Rear Wheels
- Load (Turbine)



GE158 Wind Blade Transport Truck		Load to Lock Time		Allowing for	
Front Load Width	11.00	Locking Time	1.00	Allowing for	1.00
Trailer Width	1.00	Unloading Time	1.00	Allowing for	1.00
Front Load Height	0.40	Unloading Height	1.00	Allowing for	1.00
Trailer Height	2.00	Unloading Height	1.00	Allowing for	1.00



Global Power Generation

Paling Yards Wind Farm

**GE158 Turbine Blade -
Access Location 5**

FIGURE SK-05

Appendix K:

Drivers' Code of Conduct

DRIVERS' CODE OF CONDUCT

All drivers on site must abide by the following requirements:

1. Be responsible and accountable for their own actions while travelling to/from the proposed development;
2. Must have a current driver's license for the class of vehicle they are operating;
3. Read this document and sign below that they acknowledge the requirements set out by management;
4. Undertake a site induction carried out by an authorised GPG staff member or suitably qualified person under the direction of the site manager;
5. Heavy vehicle drivers are to coordinate time of access into the site with on-site management which should aim to reduce travelling in the peak hours and therefore minimise impacts on the external road network;
6. All drivers are to adhere to the routes they are instructed to follow which are developed by the management with a view to prioritise the use of arterial roads and avoid the use of local streets;
7. Always display professional road courtesy towards other road users;
8. Appropriate signage is to be displayed on all trucks used to transport materials from/to the development so that they can be readily identified by road users;
9. Secure all loads, with drawbars, tailgates and side combings cleaned down prior to leaving site;
10. Comply with all traffic and road legislations and drive within the legal speed limit and drive to the road conditions;
11. Trucks slowing down when approaching the development are not to use engine or compression braking systems except where required for safety reasons and turn off vehicles when not in use;
12. Do not queue on public roads unless an approval has been obtained from the local and state authorities;
13. Under any circumstance, never drive under the influence of alcohol and other drugs, inclusive of the prescriptions and over the counter medication that possibly could cause drowsiness;
14. Avoid any distractions while driving such as any form of interaction with their mobile phones. Adjustments to mirrors and vehicle stereo are to be done before taking off;
15. Report all near-misses, crashes, community complaints and vehicle defects to the management;
16. Keep loads covered at all times and do not leave the site if weight is in excess of the approved GVM;
17. Remain in the truck cabin whilst being loaded unless directed otherwise by the loading driver;
18. Do not use UHF radios inappropriately and unnecessarily;
19. Remain within the truck cabin unless instructed by the ground staff;
20. Wear steel cap boots and high visibility clothing at all times;
21. Acknowledge that all site mobile equipment will have right of way at all times;
22. Acknowledge that there will be regular alcohol and drug detection tests on the site.

NOTE: Non-compliance with any directive provided above, either on or off site, may lead to refusal of future employment or contract opportunities for the driver and vehicle owner.

Driver Name:

Vehicle Owner Company:

Driver Signature on behalf of the Vehicle Owner Company:

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