Prepared for
Cleve Wind Farm Pty Ltd
ABN: 70 664 155 104

Cleve Wind Farm

Traffic Impact Assessment

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Prepared by

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Glossary of Abbreviations

Acronym	Description
CWF	Cleve Wind Farm
DIT	Department for Infrastructure and Transport
HVNL	Heavy Vehicle National Law
Km	kilometres
LGA	Local Government Area
M	Metres
NHVR	National Heavy Vehicle Regulator
OSOM	Oversize Overmass Vehicles
OMP	Operational Management Plan
PBS	Performance-Based Standards
TIA	Traffic Impact Assessment
TMP	Traffic Management Plan
VPD	Vehicle Per day

References

- DPTI (now DIT) *A Functional Hierarchy for South Australia's Land Transport Network* *A_Functional_Hierarchy_for_SAs_Land_Transport_Network.pdf (www.sa.gov.au)*
- Location SA Viewer, available at *Location SA Viewer*
- NHVR *| NHVR*
- DIT *RAVnet - Department for Infrastructure and Transport - South Australia (dit.sa.gov.au)*

Executive Summary

AECOM Australia Pty Ltd (AECOM) has been commissioned by Vestas Development Australia Pty Ltd (Vestas) to undertake a Traffic Impact Assessment (TIA) for the traffic and transport impacts on the existing road network mainly during the construction phase of transporting over size and over mass components from the Port to the Cleve Wind Farm project (CWF).

CWF is located approximately 3 kilometres north-west of the township of Cleve, in the District Council of Cleve. Access to the project site is mainly via surrounding key routes – Birdseye Highway to the south, Cleve Road to the east, Plane Road and Evans Gum Flat Road to the north, and Old Drake Peak Road to the west. It then filters to local rural roads and access tracks, mostly unsealed bisecting the project area and in some areas, new access tracks would be required within the project site.

The CWF Project will incorporate approximately 70 wind turbine generators with a maximum capacity of approximately 500 megawatts (MW) and a battery storage facility (BESS) of up to 240MW.

A route option was assessed for the delivery of equipment and construction vehicles that offers better accessibility with minimal risk of delays and logistic challenges. Other ports were assessed but ultimately not recommended due to several limitations.

- Whyalla Port – Shipyard Road – Lincoln Highway – Broadbent Terrace – Lincoln Highway – Birdseye Highway – Main Street – Birdseye Highway – CWF project area.

Whyalla Port, a deep-sea facility, provides a strategic location with direct access to key transport routes, enabling efficient delivery of goods to inland destinations. Its adaptable operations and ability to accommodate a diverse range of cargo types make it highly flexible and well-suited to meet the needs of various industries.

For the assessment of the potential impacts to the existing road network, as a result of the construction phase (over 36 months), the total generated traffic is divided into the following vehicle categories:

- Light Vehicle traffic (i.e., 4WDs and cars) associated with staff movements to and from the construction site;
- Heavy Commercial Vehicles (i.e., >2-tonne trucks, semi-trailers, dump trucks etc.) associated with deliveries to site that will travel on State controlled roads;
- Over Size and/or Over Mass vehicles associated with haulage of large turbine components (i.e. blades, nacelles, tower sections).

Over Size and/or Over Mass vehicles may only travel under NHVR and DIT permits. Permits will need to be obtained from NHVR and DIT for all vehicles outside the mass and dimension limits of current gazetted routes transporting equipment and materials to CWF.

The estimated number of traffic movements to be generated by the project is summarised in the following table.

Traffic generated during construction (one way)

Vehicle Type	Total Generated Traffic	Traffic during peak construction period (assumed 80%)	Peak daily traffic (assumed 6 working days/10 months)
Light Vehicles	76,689	61,351	232 trips/day
Heavy Commercial Vehicles	7,560	6,048	23 trips/day
Over Size/Over Mass (OSOM)	870	696	2 – 3 trips/day
Total	**85,119**	**68,095**	**258 return vehicle trips/day**

In the context of traffic impacts onto the existing road network, the additional traffic volumes associated with the project are expected to result in a relatively minor impact even where there is a significant percentage increases on some roads. This is due to all roads operate well under capacity.

To ensure minimal impacts to the adjacent towns and local residents, it is recommended to develop an Operational Management Plan (or Traffic Management Plan), in conjunction with consultation with DIT and Local Councils. Subject to lack of detail information and design, detail assessment including turn path and road geometry for the designated routes and site are required in preparation of the Operational Management Plan.

1.0 Introduction

Cleve Wind Farm Pty Ltd (being a related entity of Vestas Development Australia Pty Ltd (Vestas) is proposing to develop a large-scale renewable energy generation and storage project on the Eyre Peninsula to the north-west of the township of Cleve. The Cleve Wind Farm (the Project) has been named in recognition of its proximity to the Town of Cleve.

1.1 Project Description

AECOM has been engaged by Vestas to prepare a Traffic Impact Assessment (TIA) to inform the development application planned for the Cleve Wind Farm (CWF).

The CWF Project incorporates:

- Approximately 70 wind turbine generators;
- Maximum blade tip height of 250 metres;
- Maximum capacity of approximately 500 megawatts (MW);
- Battery storage facility (BESS) of up to 240MW.

The project will help to achieve the South Australian Government's recently revised renewable energy target of net 100% renewable energy generation by 2027. When fully operational, the Project is expected to generate sufficient energy to power around 390,000 average South Australia homes per year and will prevent approximately 1,360,000 tonnes of CO2-e being emitted into the atmosphere each year.

In addition, the Project will generate significant economic and employment opportunities for the State with over $1 billion investment in the local region and the construction and operational workforce of up to 350 and 12 respectively, required to deliver and operate the Project.

1.2 TIA Overview

This technical report documents the TIA for the Cleve Wind Farm to support the Licence Application under the *Hydrogen and Renewable Energy Act 2024* (HRE Act). This TIA outlines the traffic and transport implications for Phase 1 (Construction), Phase 2 (Operation) and Phase 3 (Decommission) for Cleve Wind Farm site and provides recommendations in response to the impacts.

This TIA is an expression of the professional view of AECOM, based upon details that were available during the time of the assessment. It is to be taken as a guideline in consideration for actual transport setup and route to be used, and/or modifications to be done. Those details will need to be finalised in the Operation Management Plan (OMP) which will be required to be prepared to obtain a Licence for the project under the HRE Act.

This TIA is based on observations made of each route using Nearmap, Google Street View and site visit in March 2024. All parties should be aware that road conditions could change anytime between the time of route assessment and the project execution, for reasons including road modifications/maintenance by relevant authorities, adverse weather and general deterioration.

2.0 Existing Area Conditions

2.1 Locality

The project site for CWF is located approximately 3 kilometres north-west of the township of Cleve, in the local government of District Council of Cleve. The township of Cleve is a small agriculturally based town on Central Eyre Peninsula in South Australia, 226 kilometres southwest of Port Augusta.

The land within the project site is primarily used for primary production. There are a number of dwelling and associated farm buildings on the land surrounding the project site.

Key features within the extended locality include:

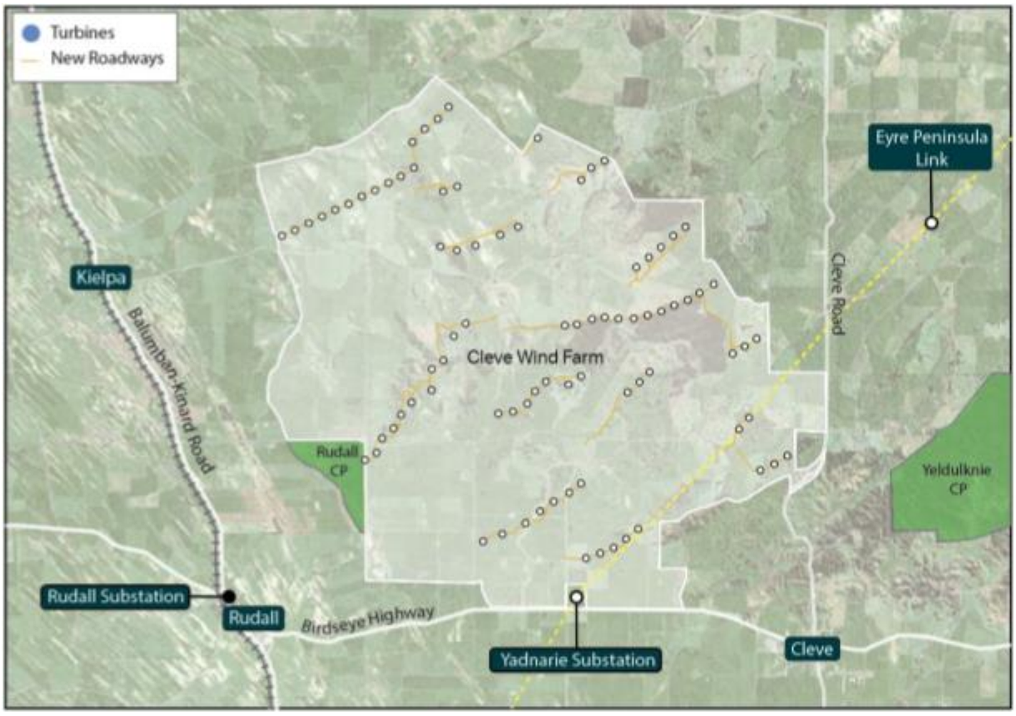
- The Birdseye Highway to the south;
- Rudall Conservation Park to the southwest;
- Cleve approximately 3 kilometres to the southwest;
- Yelduknie Conservation Park approximately 3 kilometres to the east;
- Rudall approximately 5 kilometres to the southwest;
- Mount Millar Wind Farm approximately 20 kilometres to the east.

The project area and locality are further illustrated in Figure 1, Figure 2 and Figure 3.

Figure 1 Project Area and Regional Setting

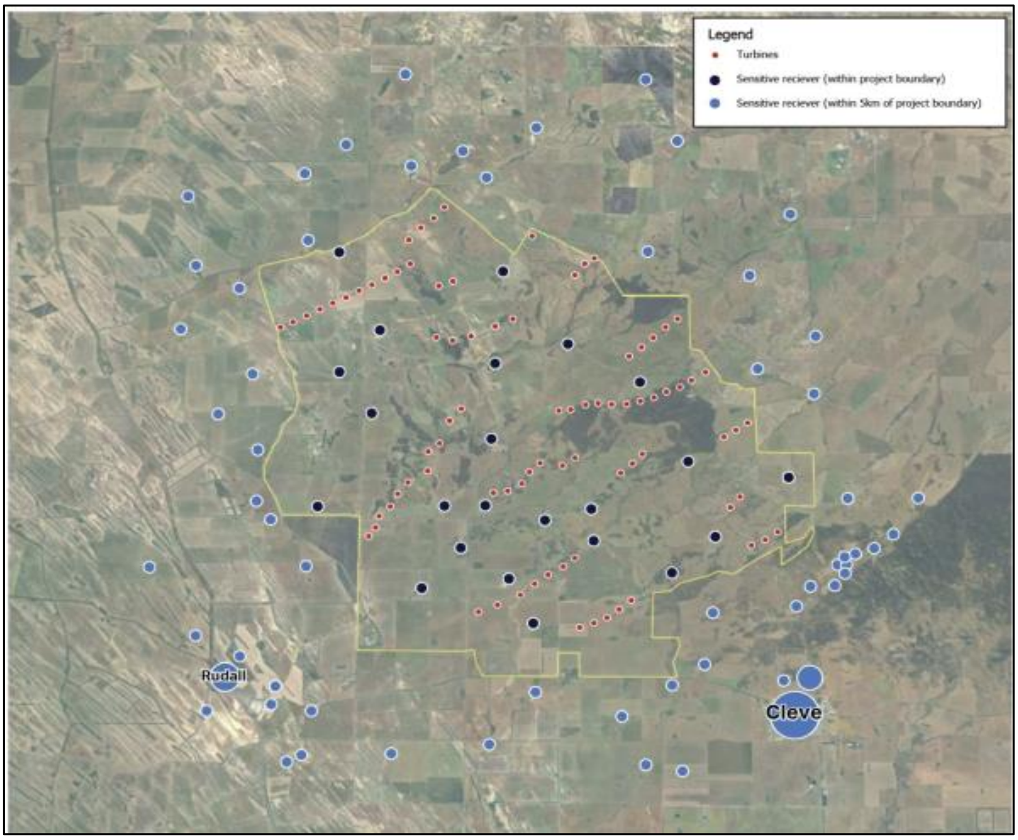
Source: AECOM, 2024

Figure 2 Project Area and Locality



Source: AECOM, 2024

Figure 3 Project Area and Sensitive Receivers



Source: AECOM, 2024

2.2 Project Area

The Eyre Peninsula is one of the best wind resource areas in South Australia and Vestas has been investigating the wind resource potential of the Project area since 2021. Together with the viable wind resource, the Project area is well serviced by existing high voltage transmission infrastructure and is strategically situated to support future hydrogen facilities and major infrastructure projects proposed for the wider Eyre Peninsula region.

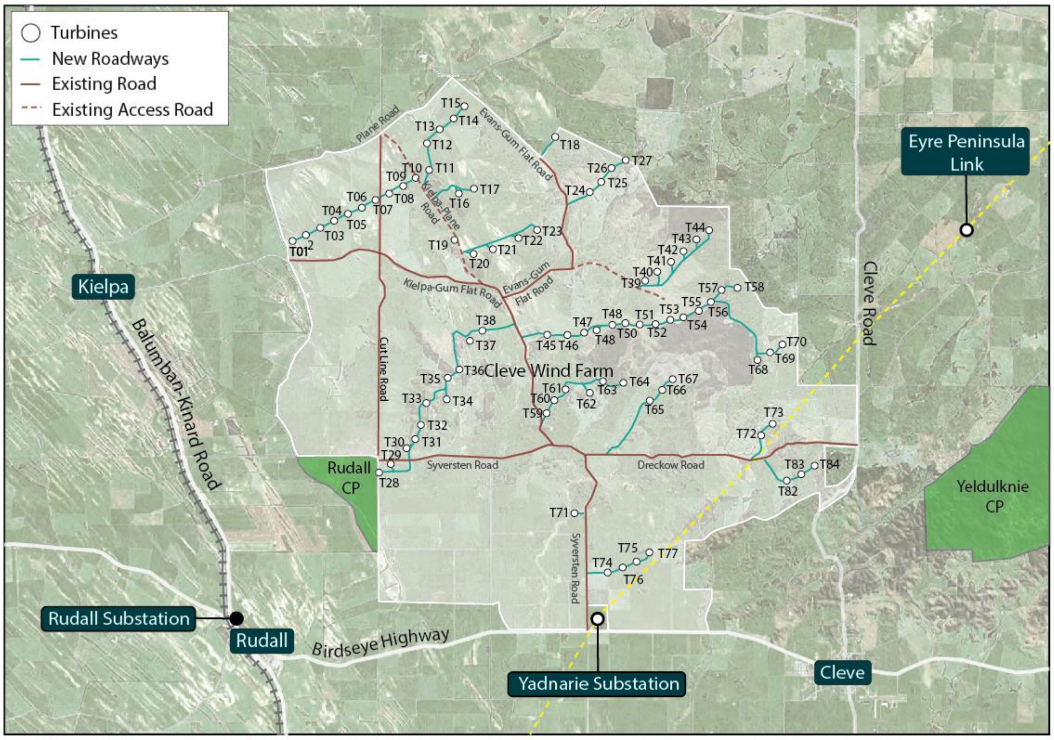
The Project area as shown in Figure 4 comprises an area of approximately 23,900 hectares. The allotments that from the Project area generally consist of cleared faming land with development limited to associated dwellings and farm buildings scattered throughout. Patches of native vegetation exist, mostly within the central and northeastern portion of the Project area.

The Project area and the surrounding land feature an undulating landscape with land generally falling from the northeast to the southwest. The difference between the highest and lowest points across the Project area is approximately 250 metres. As a result of the undulating characteristics, numerous watercourses exist throughout the Project area.

A 275kV transmission line (currently operating at 132kV - Eyre Peninsula Link) intersects the southeast portion of the Project area which connects to the Yadnarie Substation. This substation adjoins the Project area's southern boundary. Development within the Project area is serviced by 19kV electricity distribution infrastructure.

Access to the Project area is mainly via surrounding key routes – Birdseye Highway to the south, Cleve Road to the east, Plane Road and Evans Gum Flat Road to the north, and Old Drake Peak Road to the west. It then filters to local rural roads and access tracks, mostly unsealed bisecting the Project area and in some areas, new access tracks would be required within the site boundary to support the Project. The existing local roads within and bisecting the Project area include Dreckow Road, Syversten Road, Kielpa-Gum Flat Road and Kielpa-Plane Road.

Figure 4 Cleve Wind Farm – Site Plan



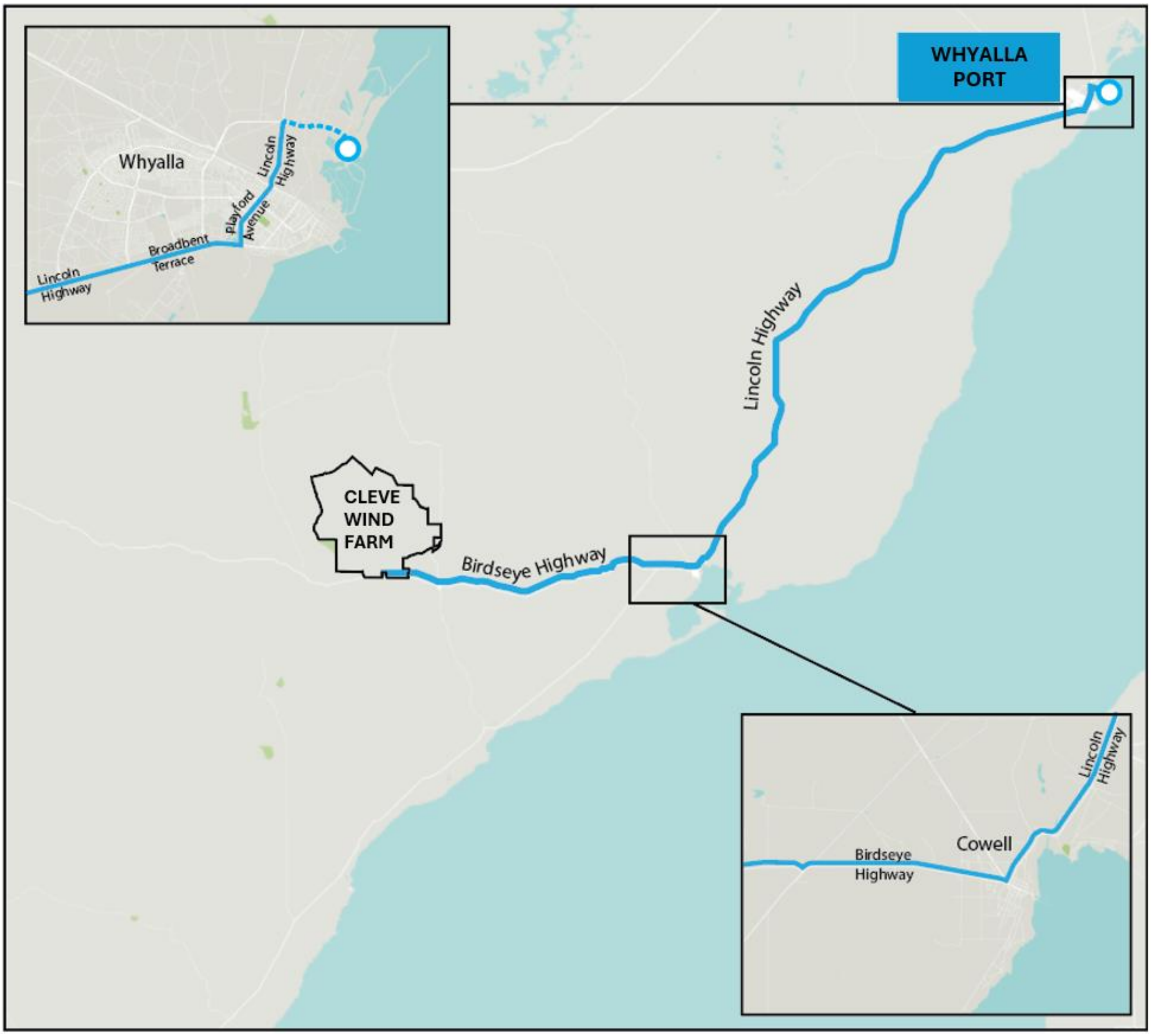
Source: AECOM, 2024

3.0 Routes Assessment

3.1 Transport Routes

Potential key transport routes connecting to CWF from the Whyalla Port is shown in Figure 5. The route is assessed based on maximum allowable heavy vehicles route (gazetted for PBS Level 3B) to CWF site.

Figure 5 Major road routes connecting the project site



Source: AECOM, 2024

A description of the proposed routes is provided below:

- Whyalla Port – southbound along Lincoln Highway from Shipyard Road (then Playford Avenue) including crossing a bridge over Eyre Peninsula railway. Westbound along Broadbent Terrace (then Lincoln Highway), traverse south-west towards Cowell Township intersecting with Birdseye Highway. The travel continues westbound along Birdseye Highway, crossing a culvert (west of Maratta Road) and a bridge approaching Cleve Township. The route continues west along Birdseye Highway to CWF site, i.e., junction of Syvertsen Road. The route is approximately 150km in length.

3.1.1 Arterial Road Network

Table 1 summarised the traffic data for key routes under the care and control of Department for Infrastructure and Transport (DIT) which may be used for the transportation of goods and materials. The information is obtained from Location SA. The table below identified that the existing traffic volumes are relatively low for the DIT arterial network.

Table 1 Routes selection – Key State Routes Classification

Road	Surface	Traffic Volume Estimates	*CVs %	Year
Lincoln Highway, between Shipyard Road and Mcbryde Terrace	Sealed	501-3000	20.5	2023
Playford Avenue (then Broadbent Terrace), between Mcbryde Terrace and Mcdouall Stuart Avenue	Sealed	3001-10000	4	2021
Broadbent Terrace (then Lincoln Highway), between Mcdouall Stuart Avenue and Main Street (Cowell)	Sealed	501-3000	15.5	2017
Lincoln Highway, between Main Street (Cowell) and Birdseye Highway	Sealed	501-3000	21	2019
Birdseye Highway (then Cowell Road and as Main Street in Cleve), between Lincoln Highway and East Terrace (Cleve)	Sealed	101-500	15.5	2019
Main Street (Cleve), between East Terrace and West Terrace	Sealed	501-3000	14	2019
Rudall Road (then Birdseye Highway) and Syvertsen Road	Sealed	101-500	15.5	2019

**Commercial Vehicles*

3.1.2 Local Road Network

The 'last-mile' access to the project site is via several local roads under the care and control of the District Council of Cleve. As these roads are typically low volume, traffic data is often unavailable. The key local roads in the vicinity of the site are discussed below. Refer to Figure 4 for site plan of CWF.

3.1.2.1 Dreckow Road

Dreckow Road (Figure 6) is an unsealed undivided rural road, intersecting with Cleve Road on the east to the junction of Syvertsen Road approximately 14km to the west. Dreckow Road has an approximate width of 8m within a corridor approximately 20m wide. Three rural properties appear to have direct access to/from Dreckow Road. There are no records available to provide traffic volume information. Dreckow Road is intended to provide access to a cluster of wind turbines (T65-67, T72-73, T82-84), likely via new internal access track connections.

Figure 6 Dreckow Road facing west from Cleve Road

Source: Google Street View, 2022

3.1.2.2 Syversten Road

Syversten Road (Figure 7) is an unsealed undivided rural road, intersecting with Birdseye Highway/Pine Corner Road on the south, traversing north approximately 6km to the junction of Dreckow Road and ultimately to the junction of Balumbah-Kinnard Road approximately 13km to the west. Syversten Road is approximately 12m wide within a corridor range width between 20m (between Birdseye Road and south of Dreckow Road) to 60m (between Dreckow Road and Balumbah-Kinnard Road). Nine rural properties have access to/from Syversten Road, including Yadnarie sub-station at the north-east corner of Birdseye Highway/Syversten Road/Pine Corner Road intersection (Figure 8). The sub-station has primary access to/from Birdseye Highway and secondary access from Syversten Road. There are no records available to provide traffic volume information. Syversten Road is intended to provide access to a cluster of wind turbines (T74-77, T71, T28-38) via new internal access track connections and the BESS and supporting infrastructure.

Figure 7 Syversten Road facing north from Birdseye Highway

Source: Google Street View, 2022

Figure 8 Yadnarie sub-station view from Birdseye Highway

Source: Google Street View, 2022

3.1.2.3 Kielpa-Gum Flat Road

Kielpa-Gum Flat Road (Figure 9) is approximately 13km unsealed undivided rural road, traverse north from Syvertsen Road to the west intersecting Old Darke Peake Road (project extend). The road width ranges from 8 to 14m within a 60m corridor wide. Seven rural properties have access to/from Kielpa-Gum Flat Road. There are no records available to provide traffic volume information. Kielpa-Gum Flat Road is intended to provide access to cluster of wind turbines (T59-64, T45-58, T68-70) via new internal access track connections and a site compound.

Figure 9 Kielpa-Gum Flat Road facing east from Balumbah-Kinnard Road

Source: Google Street View, 2023

3.1.2.4 Kielpa Plane Road

Kielpa Plane Road (Figure 10) is a rural unsealed access track, traversing north-south between Plane Road and Kielpa-Gum Flat Road. Kielpa Plane Road is approximately 6km in length, 8m wide within 60m corridor. Two rural properties have access to/from Kielpa Plane Road. There are no records available to provide traffic volume information. Kielpa Plane Road provides internal access track connection to cluster of wind turbines (T1-15, T16-17, T19, T20-23) and the concrete batching plant.

Figure 10 Kielpa Plane Road facing south-east from Plane Road

Source: Google Street View, 2023

3.1.2.5 Evans-Gum Flat Road

Evans-Gum Flat Road (Figure 11) is a rural unsealed undivided rural road, traverse north-south between Plane Road and Kielpa-Gum Flat Road. The road is approximately 10km in length, width ranges from 8-13m within 20m wide corridor. Eight rural properties have access to/from Evans-Gum Flat Road. There are no records available to provide traffic volume information. Evans-Gum Flat Road is intended to provide access to cluster of wind turbines (T18, T24-27, T39-44) via new internal access track connections.

Figure 11 Evans Gum Flat Road facing south-east from Plane Road

Source: Google Street View, 2023

3.1.2.6 Plane Road

Plane Road (Figure 12) is a rural unsealed undivided rural road, traverse east-west between Harris Road and Old Darke Peake Road (project extend). Plane Road is approximately 7km in length, 19m wide within a 60m wide corridor and providing access to one rural property. There is no records available to provide traffic volume information. Plane Road is intended to provide access to cluster of wind turbines (T1-15, T16-17, T19-23) via new internal access track connections. Alternative potential access to the wind turbines includes Kielpa-Gum Road.

Figure 12 Evans Gum Flat Road facing south-east from Plane Road

Source: Google Street View, 2023

3.2 Functional Hierarchy – Freight Routes

As components and materials for the construction of CWF will involve travel predominantly on the State's arterial road network, A *Functional Hierarchy for South Australia's Land Transport Network* identifies which corridors are important for different modes of transport.

Lincoln Highway and Birdseye Highway in the vicinity of the project are identified as having the following functions:

- Freight routes – the role of freight routes is to cater safety and efficiently for freight vehicles for up to 24 hours a day, seven days a week. These routes need to provide optimal travel efficiency and reliability of travel times throughout the day for heavy vehicles, especially when freight and commuter peak periods coincide.

DIT's functional hierarchy has defined regional South Australian sealed freight routes as desirably having:

- wide lanes and sealed shoulders
- smooth sealed roads with a high standard of pavement marking
- frequent overtaking opportunities (including climbing lanes) and rest areas in rural areas.

Based on DIT's functional hierarchy, these key functions indicate that the State Roads (Lincoln Highway, Birdseye Highway) are appropriate for accommodating large heavy vehicles and conforms to the above-mentioned criteria.

The arterial road network in the project vicinity provides strategic connections between important regional centres, particularly linking Port Augusta and Port Lincoln on the east-coast of Eyre Peninsula, and also east-west linking Western Australia and South Australia via the Nullarbor Plain.

3.3 Approved Heavy Vehicle Routes

The transportation of componentry for the construction of the project will predominantly from Whyalla Port and conducted via the State road network.

Table 2 provides a summary of the key State routes that serve as potential freight routes for goods and materials for the project. Data listed in the table below was obtained from RAVnet under the Performance-Based Standards (PBS) Scheme.

The PBS Scheme is administered by the NHVR, which assesses vehicles and assign vehicle classes based on dimensions and performance. PBS vehicle routes are classified into four national network levels, with additional sub-class categories of A and B as defined in Table 3. It is noted that no jurisdiction currently has a published PBS Level 4B network which would provide access for combinations greater than 53.5m up to 60m in length.

Table 2 Maximum allowable heavy vehicles by road – Whyalla Port

Major Road	Road Authority	Surface	Maximum Allowable Vehicle
Lincoln Highway, between Shipyard Road and Birdseye Highway	DIT	Sealed	PBS Level 3B, Greater than 36.5m up to 42m; 4.0m wide Load Carrying Vehicle; 6 Axle Crane – Day Travel; 40t Special Purpose Vehicle Network (OSOM)
Birdseye Highway, between Lincoln Highway and Balumbah-Kinnard Road	DIT	Sealed	PBS Level 3B, Greater than 36.5m up to 42m; 25m 59.5t Low Loader; 36.5m Road Train (HML/GML) 40t Special Purpose Vehicle Network (OSOM)

Table 3 PBS Vehicle Route Standards

Road Network	Vehicle Length	Vehicle Description
Level 1A	≤ 20 m	Prime mover and semitrailer, or truck trailer combination
Level 2A	≤ 26 m	B-double
Level 2B	26 m ≤ 30 m	A double
Level 3A	≤ 36.5 m	Double road train (type I) – eg A-double, B-triple
Level 3B	36.5 ≤ 42 m	Double road train (type I) – eg AB-triple
Level 4A	≤ 53.5 m	Triple road train (type II) – eg BAB-quad, ABB-quad

3.4 Vehicle Type and Permits

3.4.1 Over Size and Over Mass Permits (OSOM)

An Oversize Overmass (OSOM) vehicle is a heavy vehicle that is carrying a large indivisible item. A heavy vehicle is a Class 1 heavy vehicle, if in combination with its load, does not comply with a prescribed mass and dimension requirement or a heavy vehicle carrying a large indivisible item. Examples of OSOM vehicles include a combination of prime movers, low loaders, low loader dollies, platform trailers and jinkers. The operator of OSOM vehicles must apply to the NHVR to obtain a Mass or Dimension Exemption Permit if a Class 1 OSOM vehicle does not comply with the mass or dimension limits set out in the transition notice, Table 4.

Table 4 Maximum limits - OSOM

Criteria	Dimension (m)
Length	30
Width	4.6
Height	5.0
Mass	42.5 tonnes. The maximum allowable mass is 49.5 tonnes

3.4.2 Equipment Deliveries

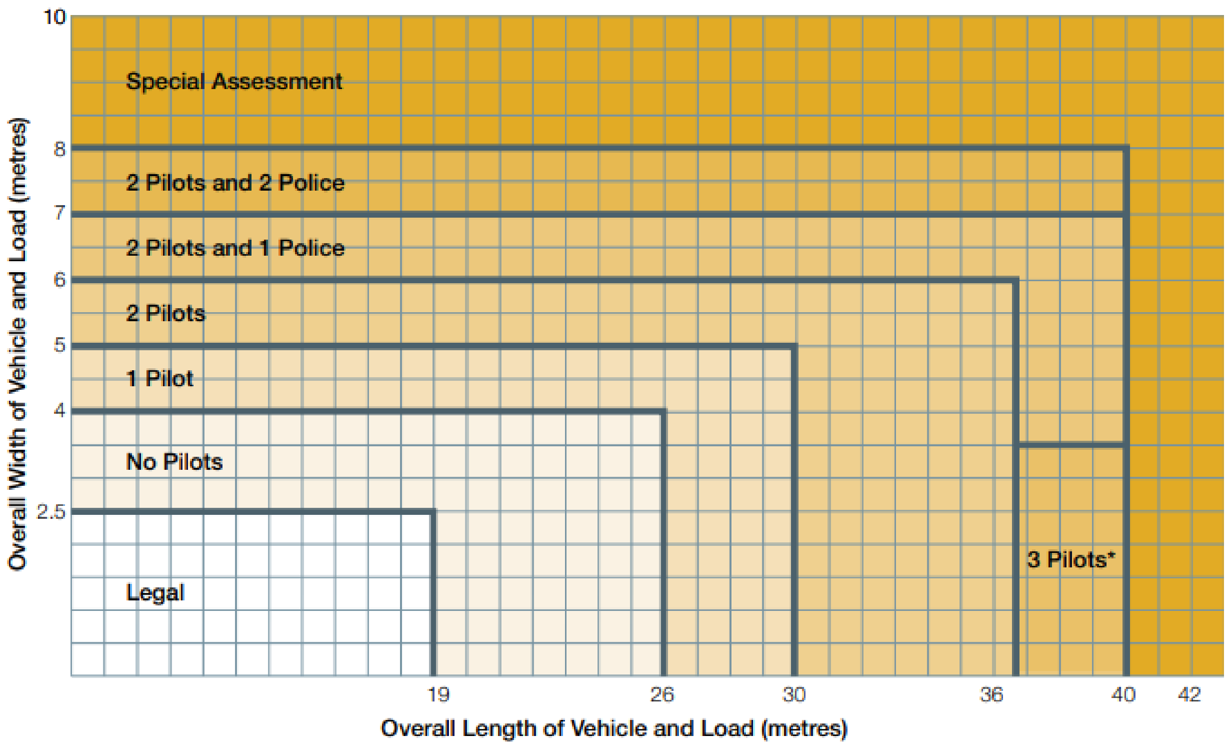
The deliveries of the equipment will have an impact on the existing road network due to the size and weight of the particular components, i.e., wind turbines components and substation equipment. Depending on the equipment dimension, the OSOM permits will need to be obtained through the NHVR and DIT.

Conditions for transporting OSOM would involve:

- Pilot and escort requirements – to provide advanced warning to approaching traffic through appropriate signage;
- Police escort requirements – required for safe movement of other traffic;
- Night travel restrictions.

The minimum daytime pilot and escort requirements for OSOM in South Australia Country Area is shown in Figure 13.

Figure 13 SA Country Area – Minimum pilot and Escort Requirements



Source: Escorting Guidelines for Oversize and Overmass vehicles and loads in South Australia, DIT (2020)

Deliveries of equipment will make up the majority of the heavy vehicles traffic over the estimated 36 months construction phase. Other deliveries to the site may include concrete and related items associated with construction which could been sourced locally. The principal construction for traffic and transport activities during the construction stage will be required to travel along the designated routes listed in Section 2.8.

The delivery of construction-related materials is relatively straightforward, with the following items likely to be transported to the site:

- Reinforcing steel for concrete slabs;
- Quarry materials;
- Frames and cladding for site structures and buildings;
- Transportable buildings if/as required;
- Security fencing;
- Switchyard equipment.

The CWF site will also require the delivery of large, indivisible items that may require OSOM vehicle permits, including the following:

- Wind turbine components
- Large water tanks (if/as required).

These activities include:

- Delivery of the wind turbine components, including foundation materials;
- Delivery of the substation and power connection equipment;
- Delivery of the battery components;
- Delivery of other construction equipment and materials.

The periods of highest heavy vehicle activity are likely to be during the following:

- Excavation of site material in preparation for foundations, trenches etc;
- Delivery of concrete, crushed rock and rubble;
- Delivery of the various electrical components of the CWF.

3.5 Constraint Points

The following section details the suitability of the designated routes regarding the impacts of traffic and transport related activities associated with CWF during the construction, operational and decommissioning / renewal phases of the project.

A preliminary desktop assessment of potential constraint points at junctions/intersections along the designated routes is done to identify possible constraints/manoeuvre without tracking onto adjacent lanes or property. Coordination of heavy vehicles movement approaching and departing the site could minimise the need for additional widening at these intersections so that the entire road carriageway can be utilised for turning movements.

The designated routes from Whyalla Port, Figure 5 in general facilitates heavy vehicles (refer to Section 3.3 – Approved Heavy Vehicle Routes). A desktop review of the alignment from the Port to the Project Site indicates heavy vehicles, in general, should be able to safely manoeuvre the junctions/intersections within the town centre, with a selected few require further investigation. This is particularly the case in the rural areas where there is more space and fewer constraints. Note that turning path checks should be undertaken in greater detail during the preparation of the OMP to confirm the following.

3.5.1 Pinch Point 1 – Junction of Lincoln Highway/Shipyard Road

The junction, shown in Figure 14, is situated to the west of Whyalla Port. The site is subjected to spatial constraints particularly on the eastern corners due to the presence of established vegetation and utility services. These include the SAPN low voltage overhead power lines located on both sides of Lincoln Highway, as well as stobie poles with street lighting located within the median and verge areas. These factors collectively impose restrictions on the turning radius, specifically entering Lincoln Highway. The south-east corner may require widening including relocation of utility services in the median and verge to accommodate a safe manoeuvre.

Figure 14 View of Shipyard Road from Lincoln Highway

Source: Google Street View, 2024

3.5.2 Pinch Point 2 – Junction of Lincoln Highway (Broadbent Terrace)/Playford Avenue

The junction, shown in Figure 15, is located on the southern outskirts of Whyalla. Lincoln Highway traverses north-west, forming a right angle turn. The site is subject to constraints due to the presence of street lighting infrastructure within both the verge and median island, along with regulatory signages. The turning radius, particularly for movement from north to west, may be limited by the existing infrastructure. However, this constraint could be alleviated through guided or escorted traffic, in conjunction with the utilization of the existing shoulder area and the mountable centre median.

Figure 15 Southbound view of Playford Avenue intersecting with Lincoln Highway (Broadbent Terrace)

Source: Google Street View, 2023

3.5.3 Pinch Point 3 – Junction of Lincoln Highway/Main Street

The junction, shown in Figure 16, is located in the Town of Cowell where Lincoln Highway traverses north-west, forming a right angle turn. There is presence of SAPN high and low voltage overhead power lines located on the eastern and southern sides of Lincoln Highway. This constraint could be mitigated utilizing the mountable centre island and the opposing traffic lane to safely manoeuvre the movement.

Figure 16 Southbound view of Lincoln Highway intersecting with Main Street (Lincoln Highway)

Source: Google Street View, 2023

3.5.4 Pinch Point 4 – Junction of Lincoln Highway/Birdseye Highway

The junction, shown in Figure 17, is located approximately 6km west of Town of Cowell. Lincoln Highway continues westward via Birdseye Highway, forming a right angle turn. The site presents low risk environment with minimal vegetation, flat topography and no presence of surface services. Although the junction's geometry can accommodate the turning movements, it may still require utilizing the opposing lanes to ensure safe manoeuvre. This is evidently shown in Figure 17 where a heavy vehicle is observed utilizing the chevron markings and the opposite traffic lane to navigate the turn.

Figure 17 Southwest view of the Lincoln Highway intersecting with Birdseye Highway

Source: Google Street View, 2023

3.5.5 Pinch Point 5 – Intersection of Birdseye Highway/Syvertsen Road

The site, Figure 18 is a four-way intersection located in a rural environment, approximately 9km west from the Town of Cleve. The intersection is in an undeveloped state, characterized by a relatively narrow and limited sealed surface. Natural drainage have formed on both corners of Syversten Road, leading to water ponding exacerbating drainage issues. The absence of dedicated turning lanes and basic traffic infrastructure further constraint vehicle manoeuvrability, especially for heavy vehicles. Significant improvements are required to enhance the intersection's geometry, improve traffic flow and ensure safe and efficient turning movement. Syvertsen Road is currently provides access to the Yadnarie Substation, located at the northeast corner of the intersection.

Figure 18 View north of Syvertsen Road from Birdseye Highway

Source: Google Street View, 2022

3.6 Site Access

Access to the CWF site (Appendix A – Preliminary Plan) is primarily facilitated via Syversten Road, Dreckow Road, Kielpa-Gum Flat Road, Kielpa Plane Road, Evans-Gum Flat Road and Plane Road, all of which are all local roads under the care and control of District Council of Cleve.

Based on available information at this point in time, Syversten Road provides the most direct route to the CWF, including access to the proposed BESS and supporting infrastructure, site compound and concrete batch plant. Additionally, Syversten Road also provides access to the existing Yadnarie Substation, located at the northeast corner of the site. A 275kV transmission line (currently operating at 132kV – Eyre Peninsula Link) intersects the southeast portion of the Project area which connects to the Yadnarie Substation. Development within the Project area is serviced by 19kV electricity distribution infrastructure.

Preliminary assessment of alternative access routes indicate they may be feasible but subject to further investigation and design. A comprehensive site access assessment is to be addressed in the OMP, which will identify and necessary upgrades.

4.0 Transportation Requirements for Development

4.1 Development Lifespan Phases

The Cleve Wind Farm is a large-scale renewable energy generation and storage project, consists of:

- Wind farms up to 500MW consisting of approximately 70 wind turbines;
- Approximately 240MW battery storage facility;
- Substation;
- Associated onsite facilities and infrastructure including:
  - turbine pads;
  - crane hard stands pads (for construction);
  - internal road network upgrades and new roads to accommodate turbine transport and maintenance;
  - construction compound;
  - concrete batch plant;
  - O&M building.
- Transmission connections to Yadnarie Substation (Figure 8).

There are three phases over the lifespan of the CWF project. These phases are construction phase, operational phase and the decommissioning/renewal phase. The project will generate additional traffic during the construction and operational phases, with the traffic generated during the construction phase to be significantly greater than that generated during the ongoing operational phase.

4.1.1 Construction Phase (Phase 1)

The construction phase is anticipated to be up to 3 year (36 months) process and will have impact on the surrounding road network. The principal construction activities during the construction stage will be required to travel along the designated routes listed in Section 3.3 – Approved Heavy Vehicle Routes. These activities include:

- Delivery of the wind turbine components, including foundation materials;
- Delivery of the substation and power connection equipment;
- Delivery of the battery components;
- Delivery of other construction equipment and materials;
- Transport of construction staff.

4.1.2 Operations Phase (Phase 2)

The operation phase of the CWF is forecasted to last approximately 30 years. The traffic and transport movement associated with the operation and maintenance of the site are recommended to travel along the designated routes, which includes:

- Staff accessing the site for regular maintenance;
- Routine servicing and maintenance of wind turbines;
- Wind turbines components;
- Possible maintenance of roads and access tracks.

4.1.3 Decommissioning Phase (Phase 3)

The wind turbines and BESS have an approximate lifespan of 30 years. By the end of the lifespan, a decision will be made whether to decommission the site, involving removal of existing turbines, BESS and other related site equipment, or to renew the site, involving installation of new turbines which will require relevant approvals. The construction traffic and transport movements in this phase will likely be less than the construction phase (Phase 1) due to most of the concrete associated with the turbines is anticipated to be retained in the ground and covered instead of removed and transported by road to minimise the ecological disturbance.

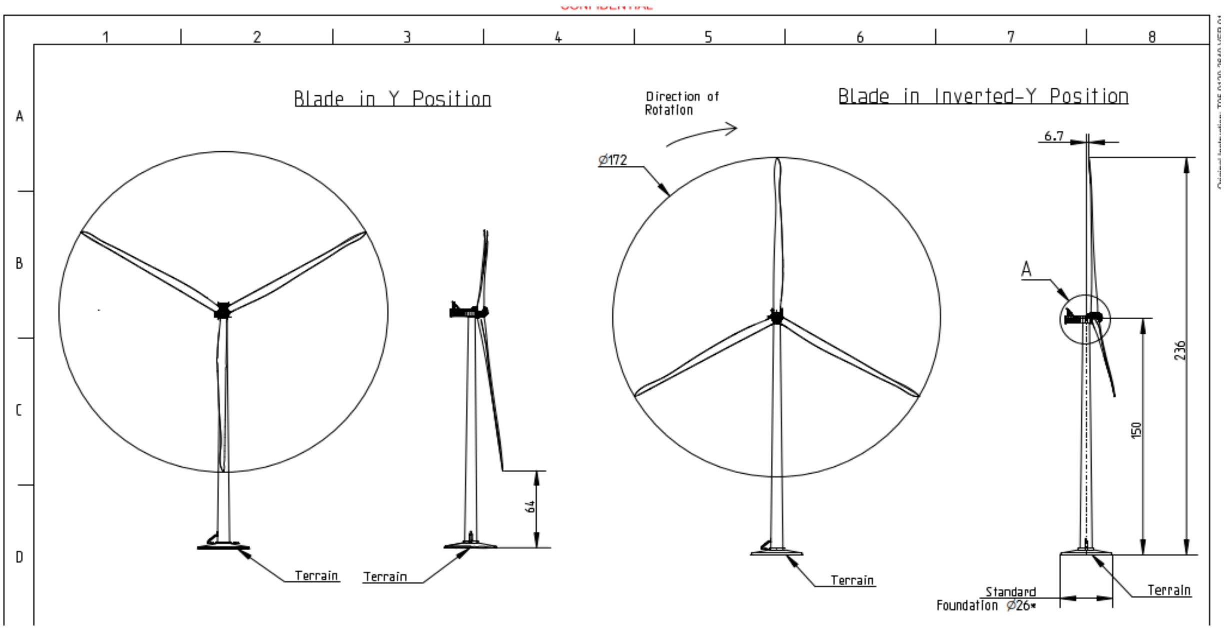
4.2 Equipment Specifications

The construction phase of the CWF will have an impact on the existing road network, mainly due to the size and weight of the particular components, i.e., wind turbine components, substation equipment. A proxy of reference is used for this section using other similar size projects due to lack of detailed information at this stage of the Project

The wind turbines proposed will have a maximum blade tip height of up to 240m. The turbine will comprise of blades of up to approximately 85m in length and a hub height of up to approximately 150m, Figure 19. Each turbine consists of the following components:

- 5 tower sections;
- 1 turbine hub;
- 1 nacelle;
- 1 cooler top;
- 1 drive train;
- 3 blades.

Figure 19 Proposed wind turbine dimensions for CWF



Source: Vestas

The approximate weight and dimensions of individual wind turbine components listed and the requirement of OSOM to transport the components are summarised in Table 5, Table 6 and Table 7.

Table 5 Wind turbine dimensions and requirements for OSOM

Component	Max Height (m)	Max Length (m)	Max Width (m)	Max Weight (tonnes)	OSOM Req	OD Req
Nacelle (w/o Power Train)	3.75	12.73	6.47	87.92		✓
Power Train	2.70	7.50	2.70	0.103	✓	
Hub	4.89	4.87	4.37	58.4	✓	
Coller Top	4.72	2.94	7.4	2.75		✓
Blades	4.0	84.35	4.5	25.4		✓

Table 6 Wind turbine tower dimensions and requirements for OSOM

Component	Max Diameter (m)	Max Length (m)	Max Weight (tonnes)	Over Mass Vehicle Required	Over Size Vehicle Required
5 Section Towers					
Tower Section	6.3	33.0	90		✓

Table 7 Substation and battery dimensions and requirements for OSOM

Component	Max Height (m)	Max Length (m)	Max Width (m)	Max Weight (tonnes)	Over Mass Vehicle Required	Over Size Vehicle Required
Substation Transformer	1.87	3.13	2.60	17	✓	
Battery Components	2.6	12.20	2.44	26	✓	

5.0 Projected Traffic Generation and Impacts

5.1 Construction Phase (Phase 1)

Estimated construction vehicle trips per construction stage are summarised in Table 8, Table 9 and Table 10. An increase of 10% has been applied as a conservative allowance for any unforeseen increases in the trip movements. The 10% contingency has not been applied to the tower sections, blades, hubs and nacelles as this is based on fixed number of components to the project.

There will be an increase in the volume of heavy and light vehicle traffic accessing the site, although it is likely to fluctuate as the project reaches different construction phase. However, given the sporadic nature of the construction activity across a vast area in rural settings, the traffic volume is likely to be low and can be managed with potential car-pooling or shuttle bus usage between the site and common meeting point (or points), i.e., site compound at Syversten Road.

Table 8 Estimated total construction traffic per stage for wind turbine components

Components	Estimated Total Construction Traffic per stage for turbine components (Over 36 months)		
	Estimated Total Trips (One Way)	Revised (Additional 10%) Estimated Total Trips (One Way)	Vehicle Type to Transport Components
Tower sections (5 Section Towers)	350	350	Heavy Duty Semi-trailer (Over Size/Over Mass)
Blades (3)	210	210	Extended Articulated Vehicle (Over Size)
Hubs & Transformers	70	70	Heavy Duty Semi-trailer (Over Size/Over Mass)
Power Trains	70	70	Heavy Duty Semi-trailer (Over Size/Over Mass)
Nacelle	70	70	Heavy Duty Semi-trailer (Over Size/Over Mass)
Cooler Top	70	70	Heavy Duty Semi-trailer (Over Size/Over Mass)
Tools – Shipping Containers	377	415	Semi-trailer
Crane equipment	53	58	Trucks
	3	4	Cranes
Pilot Vehicles	1750	1750	Light Vehicles
Total Light Vehicle Movements (one way)	**1750**	**1750**	**Car/Light Vehicles**
Total Heavy Commercial Vehicle (HCV) Movements (one way)	**500**	**543**	**HCVs**
Total Over Size / Over Mass (OSOM) Vehicle Movements (one way)	**843**	**844**	**OSOM**

Table 9 Estimated total construction traffic per stage for other construction materials

Components	Estimated Total Construction Traffic per stage for other construction materials (Over 36 months)		
	Estimated Total Trips (One Way)	Revised (Additional 10%) Estimated Total Trips (One Way)	Vehicle Type to Transport Components
Tower and substation foundation (materials delivered to on-site concrete batch plant)	1,960	2,156	Semi-trailer/B-Doubles
Reinforcement	210	231	Semi-trailer
Pavement materials for access tracks and hardstands (assume 50% imported off-site/50% sources on-site)	2,100	2,310	Semi-trailer/B-Doubles
Pavement materials for benches (i.e., site facilities bench, concrete batch plant bench, substation bench, laydown area bench, O&M bench)	212	233	Semi-trailer/B-Doubles
Water for dust suppression and material conditioning	1,260	1,386	Semi-trailer/tanker
Misc. deliveries	53	58	Semi-trailer/B-Doubles
Substation transformers	1	1	Heavy Duty Semi-trailer (Over Size/Over Mass)
Kiosk transformers	1	1	Semi-trailer/B-Doubles
Underground cables	106	117	Semi-trailer/B-Doubles
Misc. substation equipment – substation building	1	1	Heavy Duty Semi-trailer (Over Size/Over Mass)
Battery components	371	408	A-doubles/B-doubles
Pilot Vehicles	7	7	Light vehicles
Total Light Vehicle Movements (one way)	**7**	**7**	**Light vehicles**
Total Heavy Commercial Vehicle (HCV) Movements (one way)	**6,274**	**6,901**	**HCVs**
Total Over Size / Over Mass (OSOM) Vehicle Movements (one way)	**2**	**2**	**OSOM**

Table 10 Estimated total construction traffic per stage for construction staff/site establishment/demobilisation

Components	Estimated Total Construction Traffic per stage for construction staff and work site activities (Over 36 months)		
	Estimated Total Trips (One Way)	Revised (Additional 10%) Estimated Total Trips (One Way)	Vehicle Type
Site establishment – site facilities	21	23	Semi-trailer/B-double
Site establishment – Construction Equipment, i.e., standard excavators	32	35	Semi-trailer/B-double
Site establishment – Construction Equipment, i.e., large excavators	10	12	Heavy duty semi-trailer (Over size/Over mass)
Site Demobilisation – Site facilities	21	23	Semi-trailer/B-double
Site Demobilisation – Construction Equipment, i.e., standard excavators	32	35	Semi-trailer/B-double
Site Demobilisation – Construction Equipment, i.e., large excavators	10	12	Heavy duty semi-trailer (Over size/Over mass)
Staff and Contractors (assumed 100 vehicles/day for a peak of 10 months, 50 vehicles/day for 16 months, 25 vehicles/day for 10 months)	62,350	68,585	Car/Light vehicles
Site personnel and misc.- battery	5,727	6,300	Car/Light vehicles
Pilot vehicles	42	47	Light vehicles
Total Light Vehicle Movements (one way)	**68,119**	**74,932**	**Light vehicles**
Total Heavy Commercial Vehicle (HCV) Movements (one way)	**106**	**116**	**HCVs**
Total Over Size / Over Mass (OSOM) Vehicle Movements (one way)	**20**	**24**	**OSOM**

5.2 Operation Phase (Phase 2)

The traffic associated with the long-term operation of the CWF will be minimal.

This phase involves the commissioning and testing, and then the ongoing operations and maintenance. The commissioning and testing will require attendance by a number of technical and maintenance staff on a daily basis for a period of up to 6 months directly after construction (phase 1) is complete. The vehicles will typically be commercial vehicles such as light vehicles and four-wheel drives.

Once the commissioning and testing are completed, the development phase will move into the operations phase. The traffic generated during the operations phase is lower than the construction phase, and the traffic impacts on the surrounding area will therefore be minimal. The traffic generated during the operations phase will consist largely of the following:

- Permanent on-site operations personnel (most likely living locally) travelling to and from their homes to the operations and maintenance (O&M) compound/site office on a daily basis in light vehicles and four-wheel drives;
- Routine inspection and maintenance by operations personnel (most likely living locally) travelling from the O&M compound/site office to the substations, turbines and solar arrays on a daily basis in light vehicles and four-wheel drives. Note that only a few turbines would be subject to inspection and maintenance per day;
- Heavy maintenance or repair deliveries travelling to the O&M compound/site office, substations, and turbines on an as-required (rare) basis to deliver key spares, consumables or components. Some trips may be from interstate where items are not available locally.

During the operation phase, the project has the potential to support up to 12 local long-term service and maintenance jobs on an ongoing basis.

5.3 Decommissioning Phase (Phase 3)

Two options may be considered towards the end of the lifespan of the CWF. These options are:

- to decommission the site;
- to renew the site.

Regardless of which option is chosen, both options will require the removal of the wind turbines. Traffic generation will likely be less compared to the construction phase (as most of the concrete associated with the turbines foundations is anticipated to be left in the ground and covered over to minimise ecological disturbance). If the project is renewed, a separate approval will be required, which is outside the scope of this TIA. The traffic generation and impacts should be re-assessed around the time when the site will be decommissioned or renewed, as the baseline traffic conditions on the road network will likely be changed over the lifespan of CWF.

5.4 Traffic Impacts

The impact of the generated traffic during the construction stage is split into three categories:

- Light Vehicle traffic (i.e., 4WDs and cars) associated with staff movements to and from the construction site;
- Heavy Commercial Vehicles (i.e., >2-tonne trucks, semi-trailers, dump trucks etc.) associated with deliveries to site that will travel on State controlled roads;
- Over Size and/or Over Mass vehicles associated with haulage of large turbine components (i.e., blades, nacelles, tower sections) to site that may only travel under NHVR and DIT permit.

To evaluate the impacts of generated traffic on the capacity of the adjacent road system, the estimated trips from Section 5.1 - Construction Phase (Phase 1) is converted to daily traffic volumes in each category in following table.

Table 11 Traffic generated during construction (one way)

Vehicle Type	Total Generated Traffic	Traffic during peak construction period (assumed 80%)	Peak daily traffic (assumed 6 working days/10 months)
Light Vehicles	1750 + 7 + 74,932 = 76,689	61,351	232 trips/day
Heavy Commercial Vehicles	543 + 6,901 + 116 = 7,560	6,048	23 trips/day
Over Size/Over Mass (OSOM)	844 + 2 +24 = 870	696	2 – 3 trips/day
Total	**85,119**	**68,095**	**258 return vehicle trips/day**

These generated daily trips (doubled to reflect two-way movements, i.e., 516 trips per day) may then be compared to the current daily traffic volumes along the key state routes, Table 12.

Table 12 Traffic impact assessment on key state routes

Road	Existing Volume Estimates	Total (Existing + Generated)	Traffic increase (%)
Lincoln Highway, between Shipyard Road and Mcbryde Terrace	501-3000	3516	17
Playford Avenue (then Broadbent Terrace), between Mcbryde Terrace and Mcdouall Stuart Avenue	3001-10000	10516	5
Broadbent Terrace (then Lincoln Highway), between Mcdouall Stuart Avenue and Main Street (Cowell)	501-3000	3516	17
Lincoln Highway, between Main Street (Cowell) and Birdseye Highway	501-3000	3516	17
Birdseye Highway (then Cowell Road and as Main Street in Cleve), between Lincoln Highway and East Terrace (Cleve)	101-500	1016	100
Main Street (Cleve), between East Terrace and West Terrace	501-3000	3516	17
Rudall Road (then Birdseye Highway) and Syvertsen Road	101-500	1016	100

From a traffic capacity viewpoint, the impact of the construction traffic is not considered significant. Although the % increase on some roads is substantial, the roads still have the spare capacity to accommodate the increase volume, therefore impact is not considered major. The OSOM vehicles will operate under pilot and may be pulled over when necessary to minimise traffic delay.

6.0 Recommendations

6.1 Site Accessibility / Route Assessment

The following routes have been assessed and identified:

- Whyalla Port – Shipyard Road – Lincoln Highway – Broadbent Terrace – Lincoln Highway – Birdseye Highway – Main Street – Birdseye Highway – CWF project area.

Several constraints have been identified along these routes, which require further investigation and assessment to determine the extent of improvements require.

6.2 Traffic Impacts

Traffic impacts will be evident on the road network during the construction phase. This is due to the delivery of over size and over mass equipment, and the high number of construction vehicle movements. The traffic generated during the operational and maintenance phase will be minimal compared to the existing traffic movement volumes on the road network.

To ensure minimal impacts to the adjacent towns and local residents, it is recommended to develop a OMP, in conjunction with consultation with DIT and Local Councils. The OMP should include:

- Definite delivery periods, routes and access points to the development area for all equipment and materials supplied;
- Designated warning signage, appropriate controls and procedures to address potential traffic impacts and to ensure vehicles use the designated routes;
- Controls to inform road users and local communities of the changed traffic conditions.

6.3 Improvements

Coordination of heavy vehicles movement approaching and departing the site could minimise the need for additional widening at these intersections so that the entire road carriageway can be utilised for turning movements. Subject to further details/design, detail assessment, i.e., turn path and routes assessment are required for the designated routes and site access in preparation of the OMP. The preliminary desktop assessment of potential constraint points has identified the following intersections and route that require further investigation:

- Junction of Lincoln Highway/Shipyard Road;
- Junction of Lincoln Highway (Broadbent Terrace)/Playford Avenue;
- Junction of Lincoln Highway/Main Street;
- Junction of Lincoln Highway/Birdseye Highway;
- Intersection of Birdseye Highway/Syvertsen Road.

7.0 Conclusions

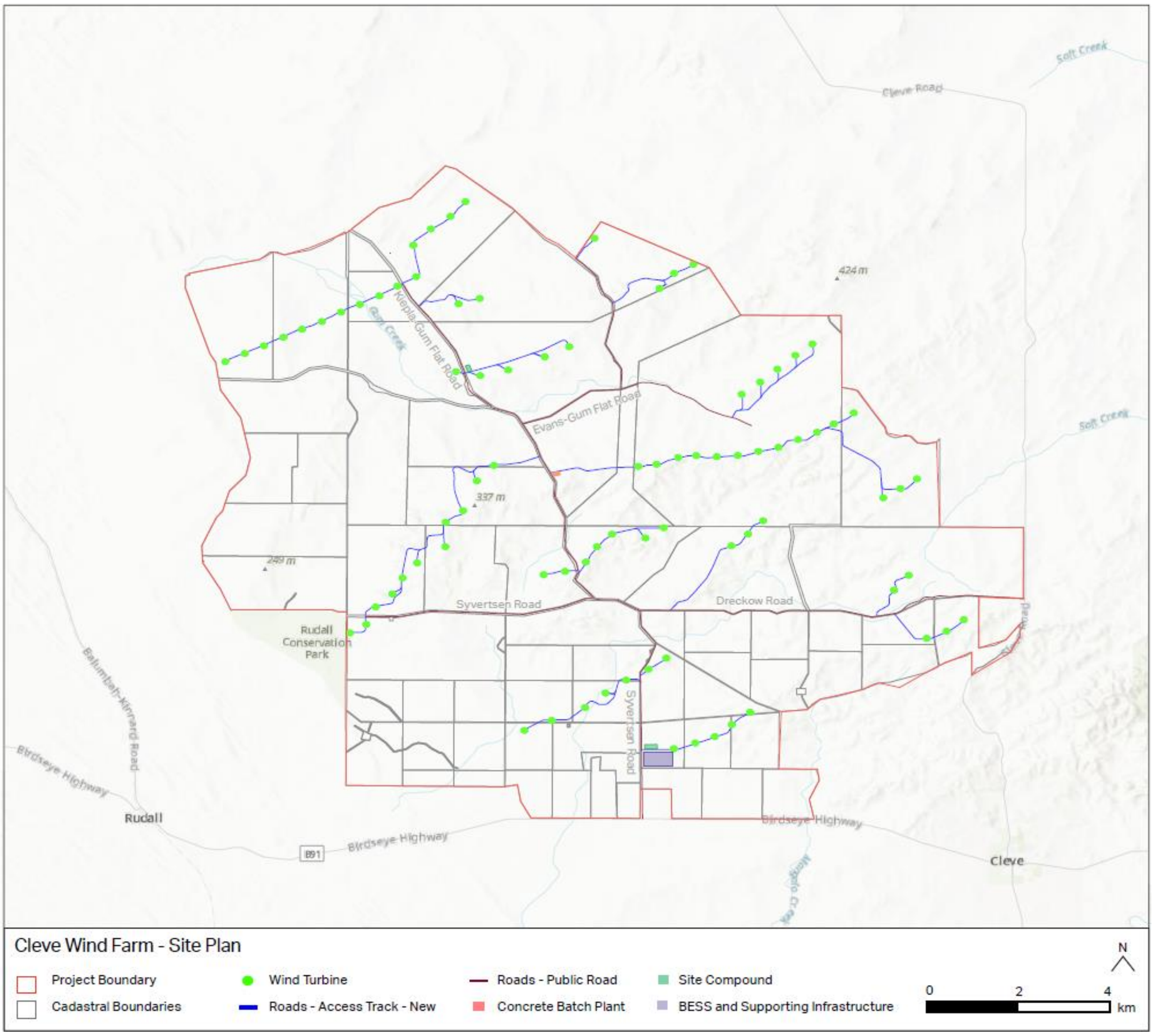
The traffic and transport issues will primarily occur during the construction phase where there will be a large number of vehicle movements within a short period of time which has the potential to impact the local community adjacent the proposed site and the through traffic along the surrounding highways.

Through adopting specific and gazetted routes, the traffic impacts associated with the additional vehicle movements generated during the construction stages should be minimised. Further assessment on the adopted routes and site access will be required in the OMP.

Traffic impact can be minimised by providing adequate notification to the local community, restricting OSOM vehicle deliveries to off-peak times where practical, and employment of appropriate traffic control. Light vehicle traffic generation could also be reduced through the encouragement of car-pooling amongst staff, or through the use of people-mover vans and/or minibuses to ferry staff between the site and a common meeting point (or points) in centralised places. A detailed OMP will be required in consultation with DIT and local Councils prior to the construction to ensure overall impact and disturbance to the road network and other road users is minimised.

There will be a substantial increase in vehicles traffic during the construction stage of the project, however existing traffic volumes in the surrounding road network is relatively low. There is a safety risk of existing road users unexpectedly encountering slow-moving vehicles. Signs warning drivers to expect slow moving traffic should be considered as part of the OMP to manage this risk. Permits will need to be obtained from NHVR and DIT for all vehicles outside the mass and dimension limits of current gazetted routes transporting equipment and materials to the CWF.

Appendix A – Preliminary Plan



Appendix B – Specification

Turbine Module	Configuration	Total Weight [kg]	Tolerance %	Dimensions, mm
Blade V172	**Without Tools**	25400 kg	3	84487 mm (Length) 4350 mm (Width) (Max Chord) 3336 mm (Height) (OD)
	Transport including transport frame (Root Foot + Tip Clamp) (155° Pitch)	29620 kg		85122 mm (Length) 4410 mm (Width) (Max Chord) 3336 mm (Height) (OD)
	Transport including transport frame (Root Cradle + Tip Clamp) (155° Pitch)	27870 kg		84737 mm (Length) 4410mm (Width) (Max Chord) 3336 mm (Height) (OD)
	Transport including transport frame (Root Cradle + Tip Clamp) (177.5° Pitch)	27870 kg		84737 mm (Length) 4490mm (Width) (Max Chord) 3336 mm (Height) (OD)
	Transport including transport frame (Root Frame + Root Foot + Tip Clamp) (155° Pitch)	31240 kg		85122 mm (Length) 4410 mm (Width) (Max Chord) 3800 mm (Height)
	Transport including transport frame (Root Frame + Root Foot + Vessel Root Frame + Vessel Tip Frame + Tip Clamp) (155° Pitch)	40720 kg		85527 mm (Length) 4630 mm (Width) (Max Chord) 3700 mm (Height)
	Transport including transport frame (Root Foot + Vessel Root Frame + Vessel Tip Frame + Tip Clamp) (155° Pitch)	39070 kg		85527 mm (Length) 4630 mm (Width) (Max Chord) 3700 mm (Height)
	Transport including transport frame (Dolly configuration – Root Frame)	28771 kg		85122 mm (Length) 4490mm (Width) (Max Chord) 3800 mm (Height)
	Storage	At root support: 16246kg At tip support: 12070kg (Weight dist. including storage tools (worst case COG combination)		Distance from blade root to root support: 1350 mm Distance from blade root to tip support: 83007 mm
	Installation including lifting tools (MBI)	40400 kg		84487 mm (Length) 6633 mm (Width) (Max Chord) 8210 mm (Height up to Crane hook)

Tower:

Preliminary weight & dimensions

Tower UID	Hub Height [m]	Tech	Climate	Market	Section	Section height [mm]	Bottom to COG distance [mm]	Section mass incl. internals [Kg]	Bottom reaction force [kN]	Top reaction force [kN]	Bottom section outer diameter [mm]	Top section outer diameter [mm]
TACA600	166	HTST	IEC	Nordics	7	35000	17650,8	78780	383,48	390,14	4172	3725
					6	32480	15291,9	92906	482,8	429,54	4977	4172
					5	26040	12621,4	92948	470,35	442,4	5531	4977
					4	22120	10827,3	93674	469,62	450,26	6032	5531
					3	19600	9689	93962	466,58	456,13	6037	6032
					2	16800	8259,5	90534	451,96	437,08	6043	6037
					1	11133	5338,4	90798	464,09	427,55	6300	6043
TAC7200	114	TST	IEC	MED	5	30000	15931,7	60499	278,6	315,5	3921	3725
					4	29960	13938,1	74727	392,43	341,39	4184	3921
					3	21280	10289,5	74356	377,12	353,06	4441	4184
					2	17360	8342	77510	395,39	365,75	4449	4441
					1	12573	6111,1	76800	387,61	366,56	4700	4449
TAC7500	117	TST	IEC	US	6	26773	14305,5	55919	255,72	293,41	4018	3725
					5	24920	11921,5	59157	303,01	277,91	4426	4018
					4	22680	10658,6	71620	372,79	330,52	4438	4426
					3	16800	8126,1	70910	359,52	336,82	4447	4438
					2	13440	6730	70460	345,45	346,47	4450	4447
					1	9560	4577,2	70602	361,37	331,95	4450	4450
TAC9600	150	HTST	IEC	AU	6	35000	18017,5	75230	358,46	380,3	3676	3725
					5	33320	15782,1	89423	462,21	415,93	4976	3676
					4	26040	12666,3	88618	446,94	423,3	5529	4976
					3	21840	10626,8	88523	446,32	422,98	5536	5529
					2	18480	9035	89661	450	430,47	5543	5536
					1	12493	6002,2	89177	454,98	420,74	5800	5543
HACA400	164	CHT	DIBt	DE	3	29960	Details not available					
					2	22960						
					1	16800						
HACAF00	175	CHT	DIBt	DE	3	29960	Details not available					
					2	22960						
					1	16800						

Turbine Module	Configuration	Total Weight [kg]	Tolerance %	Dimensions, mm
Hub * Lowered cylinders	**Without Tools**	58405 kg (Without Balde Studs, Hub Bolts, LCTU, root collar)		4868 mm (Length) 4369 mm (Width) 4890/4.010* mm (Height)
	Transport including transport tools (Road + Sea) **Transport** including transport tools (Rail)	64900 kg 62900 kg		4808 mm (Length) 4345 mm (Width) 4045 mm (Height) 4868 mm (Length) 4077 mm (Width) 4481 mm (Height)
	Installation including lifting tools	83405 kg (With Moly – 25t)		4980 mm (Length) 4401 mm (Width) 4880 mm (Height)

Turbine Module	Configuration	Total Weight [kg]	Tolerance %	Dimensions, mm
Power train **(incl. Main bearing arrangement + RTM module)**	**Without Tools**	99.300 kg	±2%	7500 mm (Length) 2700 mm (Width) 2700 mm (Height)
	Transport including transport frame See drawing of PTR on transport frame in Appendix	103.440 kg	±2%	8067 mm (Length) 3100 mm (Width) 3518 mm (Height)
	Installation including lifting tools	114.300 kg	±2%	7500 mm (Length) 2700 mm (Width) 2700 mm (Height)

Turbine System	Configuration	Total Weight [kg]	Tolerance %	Dimensions, mm
Nacelle assembled (main house + side compartment) for installation without Power Train (13T/15T/17T trafo)	**Without Tools**	87916 kg / 89916 kg / 91916 kg	±2%	12730 mm (Length) 6468 mm (Width main house + side compartment) 3750 mm (Height)
	Complete nacelle with tools for installation See concept drawing of lift with MOLY in Appendix	87916 kg / 89916 kg / 91916 kg + 11400kg (MOLY yoke)	±2%	
Nacelle Main house Without Power Train	**Without Tools**	52355 kg (Including Cooler Top PS1)	±2%	12730 mm (Length) 4000 mm (Width) 3750 mm (Height)
	Transport (No Transport Frame needed)	49605 kg (No Cooler Top – 2750kg larger variant larger variant (PS1))	±2%	12730 mm (Length) 4000 mm (Width) 3750 mm (Height)
	Installation including lifting tools (w.o. power train)	52355 kg + 11400kg (MOLY)	±2%	12730 mm (Length) 4.000 mm (Width) 5789 mm (Lifting Height including Molly Yoke)
	Installation including lifting tools and Cooler Top (w.o. power train)	52355 kg + 11400kg (MOLY)	±2%	12730 mm (Length) 4000 mm (Width no Cooler Top) 7400 mm (width with PS1 Cooler Top) 8446 (Height including PS1 Cooler Top)
Nacelle Side compartment with Transformer (13T/15T/17T trafo)	**Without Tools**	35775 kg / 37755 kg / 39755 kg	±1%	12192 mm (Length) 2438 mm (Width) 2896 mm / 3743 mm (Height without dome and with dome)
	Transport (No Transport Frame needed)	35775 kg / 37755 kg / 39755 kg	±1%	12192 mm (Length) 2438 mm (Width) 2896 mm / 3743 mm (Height without dome and with dome)
	Assembly configuration including lifting tools (Assumed 1T weight for lifting tools)	36775 kg / 38755 kg / 40755 kg	±1%	12192 mm (Length) 2438 mm (Width) 2896 mm / 3743 mm (Height without dome and with dome)
Cooler Top - (Without side covers)	**Without Tools**	2750 kg larger variant (PS1)	±2%	2941 mm (length – width of cooler top itself) 7400mm (Width in assembly position) 4724 mm (Height including aviation sensors)
	Transport including transport frame			
	Installation including lifting tools			

Transformer	Without Tools	13000 kg / 15000 kg / 17000 kg		3130 mm (Length) 2600 mm (Width) 1870 mm (Height)
	Transport	13250 kg / 15.250 kg / 17.250 kg		3130 mm (Length) 2640 mm (Width) 2120 mm (Height)
	Installation	13320 kg / 15320 kg / 17350 kg		Xxxx mm (Length) Xxxx mm (Width) Xxxx mm (Height)
Nacelle **Side compartment without Transformer**	**Without Tools**	22775 kg	±1%	12192 mm (Length) 2438 mm (Width) 2896 mm / 3743 mm (Height without dome and with dome)
	Transport (No Transport Frame needed)	22775 kg	±1%	12192 mm (Length) 2438 mm (Width) 2896 mm / 3743 mm (Height without dome and with dome)
	Assembly configuration including lifting tools (Assumed 1T weight for lifting tools)	23775 kg	±1%	12192 mm (Length) 2438 mm (Width) 2896 mm / 3743 mm (Height without dome and with dome)