



EIA REPORT:

UMMBILA EMOYENI RENEWABLE ENERGY FACILITY: WIND ENERGY FACILITY, MPUMALANGA PROVINCE

TRANSPORT STUDY

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Second Issue

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**PROPOSED UMMBILA EMOYENI RENEWABLE ENERGY
WIND FACILITY,
MPUMALANGA PROVINCE**

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PROPOSED UMBBILA EMOYENI RENEWABLE ENERGY WIND FACILITY, MPUMALANGA PROVINCE

1 INTRODUCTION AND METHODOLOGY

1.1 Scope and Objectives

Emoyeni Renewable Energy Farm (Pty) Ltd is proposing the development of a commercial Wind Energy Facility (WEF), named Umbbila Emoyeni Wind Energy Facility, consisting of a commercial wind farm and associated infrastructure, located approximately 6km southeast of Bethal in the Mpumalanga Province of South Africa. The project is located across the Govan Mbeki Lekwa and Msukaligwa Local Municipalities within the Gert Sibande District (see **Figure 1-1**).

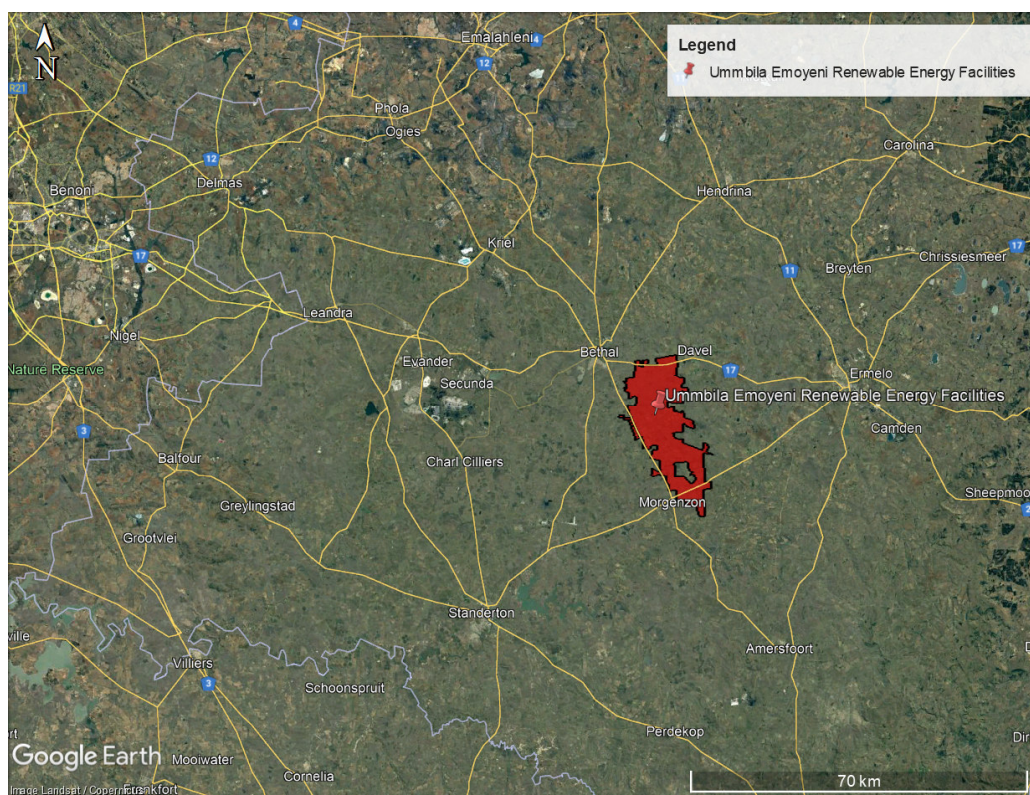


Figure 1-1: Aerial View of location of the site for the Umbbila Renewable Wind Energy Facility

As part of the Environmental Impact Assessment (EIA) process undertaken, the services of a Transportation Specialist are required to conduct a Transport Study and JG Afrika (Pty) Ltd was consequently appointed to conduct the Traffic Impact Assessment for the commercial wind farm.

The following two main transportation activities will be investigated:

- Abnormal load vehicles transporting components to the site.
- The transportation of construction materials, equipment, and people to and from the site/facility.

The transport study will aim to provide the following objectives:

- Assess activities related to traffic movement for the construction and operation (maintenance) phases of the facility.
- Recommend a preliminary route for the transportation of the components to the proposed site.
- Recommend a preliminary transportation route for the transportation of materials, equipment, and people to site.
- Recommend alternative or secondary routes where possible.

1.2 Terms of Reference

General:

A specialist report prepared in terms of the Regulations must contain the following:

- (a) details of-
 - (i) the specialist who prepared the report; and
 - (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;
- (b) a declaration that the specialist is independent in a form as may be specified by the competent authority;
- (c) an indication of the scope of, and the purpose for which, the report was prepared;
 - (cA) an indication of the quality and age of base data used for the specialist report
 - (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;
- (d) the duration date and season of the site investigation and the relevance of the season to the outcome of the assessment;
- (e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;
- (f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;
- (g) an identification of any areas to be avoided, including buffers;
- (h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
- (i) a description of any assumptions made and any uncertainties or gaps in knowledge;
- (j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;
- (k) any mitigation measures for inclusion in the EMPr;
- (l) any conditions for inclusion in the environmental authorisation;
- (m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;
- (n) a reasoned opinion-
 - (i) whether the proposed activity, activities or portions thereof should be authorised; and (considering impacts and expected cumulative impacts).

- (iA) regarding the acceptability of the proposed activity or activities, and
- (ii) if the opinion is that the proposed activity, activities, or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;
- (o) a description of any consultation process that was undertaken during the course of preparing the specialist report;
- (p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
- (q) any other information requested by the competent authority.

Specific:

- Extent of the transport study and study area;
- The proposed development;
- Trip generation for the facility during construction and operation;
- Traffic impact on external road network;
- Accessibility and turning requirements;
- National and local haulage routes;
- Assessment of internal roads and site accesses;
- Assessment of freight requirements and permitting needed for abnormal loads; and
- Traffic accommodation during construction.

1.3 Approach and Methodology

The report deals with the traffic impact on the surrounding road network in the vicinity of the proposed sites:

- during the construction of the access roads;
- construction of the facility; and
- operation and maintenance during the operational phase.

This transport study was informed by the following:

Project Assessment

- Overview of project background information including location maps, component specs and any possible resulting abnormal loads to be transported.
- Research of all available documentation and information relevant to the proposed facility.

The transport study considered and assessed the following:

Traffic and Haul Route Assessment

- Estimation of trip generation;
- Discussion on potential traffic impacts;
- Assessment of possible haul routes; and
- Construction and operational (maintenance) vehicle trips.

Site layout, Access Points, and Internal Roads Assessment per Site

- Description of the surrounding road network;

- Description of site layout; and
- Assessment of the proposed access points.

1.4 Assumptions and Limitations

The following assumptions and limitations apply:

- This study is based on the project information provided by Savannah Environmental (Pty) Ltd.
- According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer – total maximum height 5 000mm, total maximum width 4 300mm and total maximum length 10 500mm.
- Maximum vertical height clearances along the haulage route are 5.2m for abnormal loads.
- Imported elements will be transported from the most feasible port of entry, which is deemed to be the Port of Richard's Bay.
- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads.
- Construction materials will be sourced locally as far as possible.
- Approximately 30 full-time employees will be stationed at each of the four sites during the operational phase.

1.5 Source of Information

Information used in a transport study includes:

- Project Information provided by the Client;
- Google Earth.kmz provided by the Client;
- Google Earth Satellite Imagery;
- Road Traffic Act, 1996 (Act No. 93 of 1996)
- National Road Traffic Regulations, 2000
- SANS 10280/NRS 041-1:2008 - Overhead Power Lines for Conditions Prevailing in South Africa
- The Technical Recommendations for Highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads; and
- Project research of all available information.

2 DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE TRANSPORT STUDY

2.1 Port of Entry

It is assumed that if components are imported to South Africa, it will be via the Port of Richard's Bay, which is located in KwaZulu-Natal. The Port is located approximately 460km from the proposed site. The Port of Richard's Bay is a deep-sea water port boasting 13 berths. The terminals handle abnormal loads and among others dry bulk ores, minerals, and break-bulk consignments. The terminal exports over 30 varied commodities from magnetite to ferrochrome, woodchips to aluminium and steel. A large percentage of dry bulk commodities are handled via a computer-controlled network of conveyor belts extending 40 km to seven harbour bound industries. The Richards Bay Port is operated by Transnet Port Terminal.

Alternatively, components can be imported via the Port of East London, located approximately 1130km from the proposed site, or from the Port of Ngqura, approximately 1200km from the proposed site, both being located in the province of the Eastern Cape. Please note that shorter routes exist between the Port of East London and the proposed site, but the poor condition of these roads aren't suitable for transport with heavy and/or abnormal vehicles.

2.2 Selected Candidate Turbine

The possible range of wind turbines varies largely with various wind turbine manufacturers operating worldwide. The project information states that a turbine with a hub height of up to 200m and a tip height of up to 300m is to be considered.

In general, each turbine unit consists of a tower, a Nacelle (final weight dependent on the supplier and whether the nacelle has gears or not) and rotor blades.

2.3 Transportation requirements

2.3.1 Abnormal Load Considerations

Abnormal permits are required for vehicles exceeding the following permissible maximum dimensions on road freight transport in terms of the Road Safety Act (Act No. 93 of 1996) and the National Road Traffic Regulations, 2000:

- Length: 22m for an interlink, 18.5m for truck and trailer and 13.5m for a single unit truck
- Width: 2.6m
- Height: 4.3m measured from the ground. Possible height of load – 2.7m.
- Weight: Gross vehicle mass of 56t resulting in a payload of approximately 30t
- Axle unit limitations: 18t for dual and 24t for triple-axle units
- Axle load limitation: 7.7t on the front axle and 9t on the single or rear axles

Any dimension / mass outside the above will be classified as an Abnormal Load and will necessitate an application to the Department of Transport and Public Works for a permit that will give authorisation for the conveyance of said load. A permit is required for each Province that the haulage route traverses.

2.3.2 Further Guideline Documentation

The Technical Recommendations for Highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads” outlines the rules and conditions that apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.

The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power / mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the Road Traffic Act and the relevant regulations.

2.3.3 Permitting – General Rules

The limits recommended in the TRH 11 guideline document are intended to serve as a guide to the Permit Issuing Authorities. It must be noted that each Administration has the right to refuse a permit application or to modify the conditions under which a permit is granted. It is understood that:

- a) A permit is issued at the sole discretion of the Issuing Authority. The permit may be refused because of the condition of the road, the culverts and bridges, the nature of other traffic on the road, abnormally heavy traffic during certain periods or for any other reason.
- b) A permit can be withdrawn if the vehicle upon inspection is found in any way not fit to be operated.
- c) During certain periods, such as school holidays or long weekends an embargo may be placed on the issuing of permits. Embargo lists are compiled annually and are obtainable from the Issuing Authorities.

2.3.4 Load Limitations

The maximum load that a road vehicle or combination of vehicles will be allowed to carry legally under permit on a public road is limited by:

- the capacity of the vehicles as rated by the manufacturer;
- the load which may be carried by the tyres;
- the damaging effect on pavements;
- the structural capacity on bridges and culverts;
- the power of the prime mover(s);
- the load imposed by the driving axles; and
- the load imposed by the steering axles.

2.3.5 Dimensional Limitations

A load of abnormal dimensions may cause an obstruction and danger to other traffic. For this reason, all loads must, as far as possible, conform to the legal dimensions. Permits will only be considered for indivisible loads, i.e., loads that cannot, without disproportionate effort, expense, or risk of damage, be divided into two or more loads for the purpose of

transport on public roads. For each of the characteristics below there is a legally permissible limit and what is allowed under permit:

- Width;
- Height;
- Length;
- Front Overhang;
- Rear Overhang;
- Front Load Projection;
- Rear Load Projection;
- Wheelbase;
- Turning Radius; and
- Stability of Loaded Vehicles.

2.3.6 Transporting Wind Turbine Components

Wind turbine components can be transported in a number of ways with different truck / trailer combinations and configurations, which will be decided upon at a later stage by the transporting contractor and the plant hire companies, when applying for the necessary permits from the Permit Issuing Authorities. All required permits will need to be obtained prior to the commencement of construction.

2.3.6.1 Nacelle

The heaviest component of a wind turbine is the nacelle (approximately 100 tons depending on manufacturer and design of the unit). Combined with road-based transport, it has a total average vehicle mass of approximately 145 000kg for a 100-ton unit. For larger turbines, the maximum weight can even increase to around 180 tons. Route clearances and permits will therefore be required for transporting the nacelle by road-based transport. The unit will require a minimum height clearance of 5.2m.



Figure 2-1: Example - Transporting the Nacelle

2.3.6.2 Blades

These are the longest and possibly most vulnerable components of a wind turbine and hence need to be transported with utmost care. The blades need to be transported on an extendible blade transport trailer or in a rigid container with rear steerable dollies. The blades can generally be transported individually, in pairs or in three's; although different manufacturers have different methods of packaging and transporting the blades. It should be noted that larger blades are transported individually. The transport vehicle exceeds the dimensional limitation (length) of 22 m and will only be allowed under permit, provided the trailer is fitted with steerable rear axles or dollies.

For the candidate turbines of this study, the blades will need to be transported individually (see example in **Figure 2.2** and **Figure 2.3**). At present, there are no suitable abnormal load trucks available within South Africa to transport such large blades and suitable trucks will therefore need to be sourced from overseas and shipped to South Africa.



Figure 2-2: Example -Transport of Blades on extendible trailers

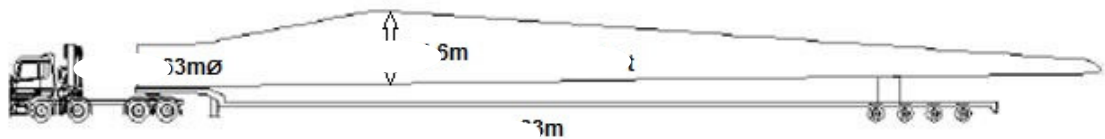


Figure 2-3: Example of Blade Transport

Due to the abnormal length, special attention needs to be given to the route planning, especially to suitable turning radii and adequate sweep clearance. Vegetation or/and road signage may have to be removed before transportation commences. Once transported to site, the blades need to be carefully stored at the respective laydown area before being installed onto the rotary hub.

2.3.6.3 Tower Sections

Steel towers generally consist of 20m long sections, the number of sections being dependent on the selected hub height. A hub height of 200 metres would therefore consist of approximately ten (10) tower sections. Each section is transported separately to site on a low-bed trailer. Depending on the trailer configuration and height when loaded, some of these components may not meet the dimensional limitations (height and width) but will be permitted under certain permit conditions.



Figure 2-4: Example – Transportation of Tower Sections

2.3.6.4 Turbine Hub and Rotary Units

These components need to be transported separately, due to their significant weights – a hub unit weighs between 45 and 60 tons and the rotary unit weighs over 90 tons.

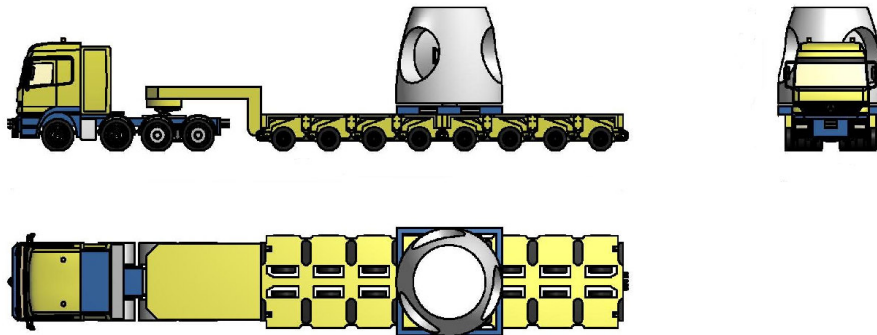


Figure 2-5: Transporting the Hub and Rotary Units

2.3.6.5 Transporting Cranes, Mobile Crane, and other Components

One main crane and at least one supporting crane are required per wind turbine erection, with the auxiliary crane able to change position several times during the turbine erection.

This technology has developed rapidly, and several different heavy lifting options are available on the market. Costs involved to hire cranes or import suitable cranes (if necessary) vary and should therefore be compared in advance. For this assessment, possible crane options are discussed hereafter.

2.3.6.6 Cranes for Assembly and Erection on Site

Option 1: Crawler Crane & Assembly Crane

One possible option is that the main crane performing the required lifts, i.e., lifting the tower sections into position, lifting the nacelle to the hub height, and lifting the rotor and blades into place, needs to be similar to the Liebherr Crawler Crane LR1750 with a SL8HS (Main Boom and Auxiliary Jib) configuration. A smaller 200-ton Liebherr Mobile Crane LTM 1200- 5.1 is also required to lift the components and assist in the assembly of the crawler crane at each turbine location.

- *Crawler Crane LR1750 with the SL8HS boom system (Main Lifting Crane):*

The Crawler Crane will be transported to site in sections and the heaviest load will be the superstructure and crawler centre section (83 tons). The gross combination mass (truck, trailer, and load) will be approximately 133 000 kg. The boom sections, counterweights and other equipment will be transported on conventional tri-axle trailers and assembled on site. It will require a number of truckloads of components to be delivered for assembly of the Crawler Crane before it can be mobilised to perform the heavy lifts.

- *Mobile Crane LTM 1200-5.1 (Assembly Crane):*

The Liebherr LTM 1200-5.1 crane is a 5-axle vehicle with rubber tyres, which will travel to site on its own. However, the counterweights will be transported on conventional tri-axle trailers and then assembled on site. The assembly crane is required to assemble the main lift crane as well as assist in the installation of the wind turbine components.

Option 2: GTK 1100 Crane & Assembly Crane

The GTK 1100 hydraulic crane was used for the assembly of the single wind turbine at Coega (see example in picture below). The GTK 1100 was designed to lift ultra-heavy loads to extreme heights.



Figure 2-6: Example - Cranes at work

- *Mobile Crane LTM 1200-5.1 (Assembly Crane):*

A smaller 200-ton Liebherr Mobile Crane LTM 1200-5.1 is also required to lift the components and assist in the assembly of the hydraulic crane at each turbine location.

2.3.6.7 Cranes at Port of Entry

Most shipping vessels importing the turbine components will be equipped with on-board cranes for safe off-loading of wind turbine components to the abnormal load transport vehicles, parked adjacent to the shipping vessels.



Figure 2-7: Example - Cranes at Port of Entry

The imported turbine components may be transported from the Port of Entry to the nearby turbine laydown area. Mobile cranes will be required at these turbine laydown areas to position the respective components at their temporary storage location.

2.3.6.8 Transporting Other Plant, Material and Equipment

In addition to transporting the specialised lifting equipment, the normal civil engineering construction materials, plant, and equipment will need to be brought to the site (e.g., sand, stone, cement, concrete batching plant, gravel for road building purposes, excavators, trucks, graders, compaction equipment, cement mixers, transformers in the sub-station, cabling, transmission pylons etc.). Other components, such as electrical cables, pylons, and substation transformers, will also be transported to site during construction. The transportation of these items will generally be undertaken with normal heavy load vehicles.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Description of the site

The proposed Ummbila Emoyeni Renewable Wind Energy Facility will be located approximately 6km southeast of Bethal in the Mpumalanga Province, as shown in **Figure 3-1**. The proposed site is bounded by the N17 to the north, the R39 to the east and south and the R35 to the west.

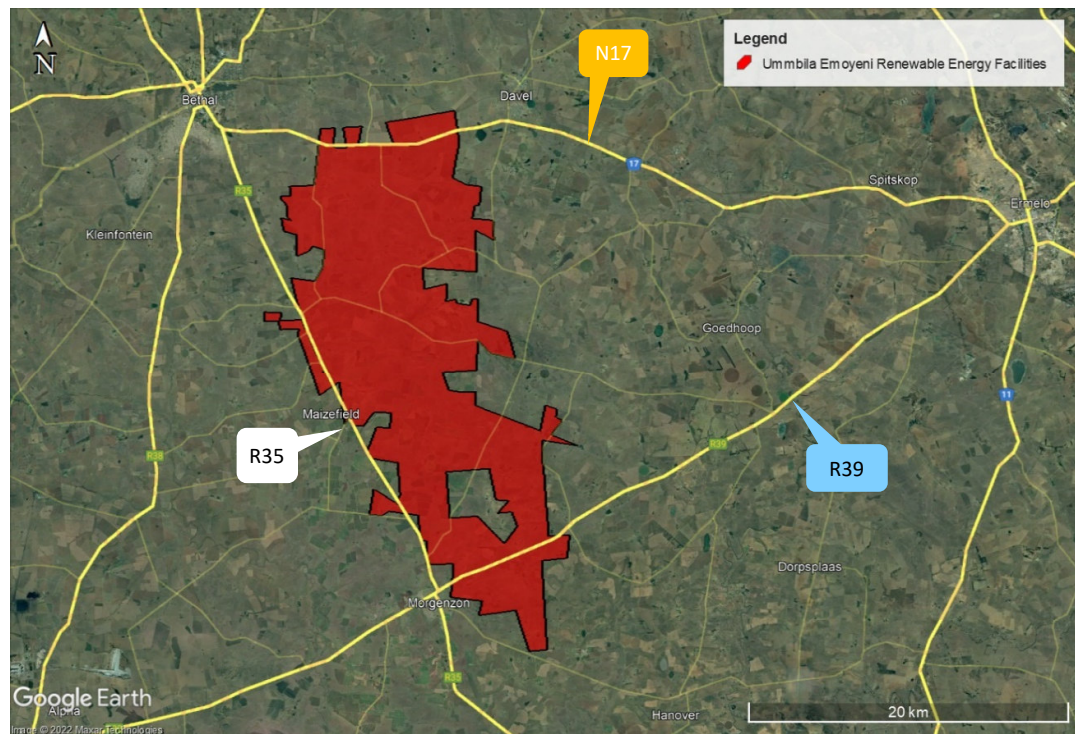


Figure 3-1: Aerial View of the proposed Ummbila Emoyeni Renewable Energy Facility

A preferred project focus area with an extent of 27 819ha been identified by Emoyeni Renewable Energy Farm (Pty) Ltd as a technically suitable area for the development of the Ummbila Emoyeni Renewable Wind Energy Farm with a contracted capacity of up to 666MW. The proposed solar facility of 150MW has been addressed in a separate transport report.

The project site comprises the following farm portions:

Table 3-1: Farm Portions comprising the project site

Parent Farm Number	Farm Portions
Farm 261 – Naudesfontein	15, 21
Farm 264 – Geluksplaats	0, 1, 3, 4, 5, 6, 8, 9, 11, 12
Farm 268 – Brak Fontein Settlement	6,7,10,11,12
Farm 420 – Rietfontein	8,9,10,11,12,15,16,18,19,22,32
Farm 421 - Sukkelaar	2, 2, 7, 9, 9 10, 10 11, 11 12, 12 22 ,25, 34, 35, 36, 37, 37, 38, 39, 40, 42, 42

Farm 422 – Klipfontein	0, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23
Farm 423 – Bekkerust	0, 1, 2, 4, 5, 6, 10, 11, 12, 13, 14, 15, 17, 19, 20, 22, 23, 24, 25
Farm 452 – Brakfontein	5
Farm 454 – Oshoek	4, 13, 18
Farm 455 – Ebenhaezer	0, 1, 2, 3
Farm 456 – Vaalbank	1, 2, 3, 4, 7, 8, 13, 15, 16, 17, 18, 19
Farm 457 – Roodekrans	0, 1, 4, 7, 22, 23, 23
Farm 458 – Goedgedacht	0, 2, 4, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 21, 22, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 37, 39
Farm 467 – Twee Fontein	0, 1, 4, 5, 6, 7, 8, 10
Farm 469 – Klipkraal	5, 6, 7, 8
Farm 548 – Durabel	0

The wind farm is proposed to accommodate the following infrastructure:

- Up to 111 wind turbines with a maximum hub height of up to 200m. The tip height of the turbines will be up to 300m.
- 33kV cabling to connect the wind turbines to the onsite collector substations, to be laid underground where practical.
- 3 x 33kV/132kV onsite collector substation (IPP Portion), each being 5ha.
- Battery Energy Storage System (BESS).
- Cabling between turbines, to be laid underground where practical.
- Construction compounds including site office (approximately 300m x 300m in total but split into 3ha each of 150m x 200m):
 - Batching plant of up to 4ha to 7ha.
 - 3 x O&M office of approximately 1.5ha each adjacent to each collector SS.
 - 3 x construction compound / laydown area, including site office of 3ha each (150m x 200m each).
- Laydown and crane hardstand areas (approximately 75m x 120m).
- Access roads of 12 -13m wide, with 12m at turning circles.

The grid connection infrastructure will include a 400/132kV Main Transmission Substation (MTS), to be located between Camden and SOL Substations, which will be looped in and out of the existing Camden-Sol 400kV transmission line; on-site switching stations (132kV in capacity) at each renewable energy facility (Eskom Portion); and 132kV power lines from the switching stations at each renewable energy facility to the new 400/132kV MTS. The grid connection infrastructure will be assessed as part of a separate Environmental Impact Assessment process in support of an application for Environmental Authorisation.

It is anticipated that the power generated by the project will be bid into the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme and/or into private off take opportunities.

An aerial view of the proposed turbine locations and internal roads to the turbines is shown in **Figure 3-2**.

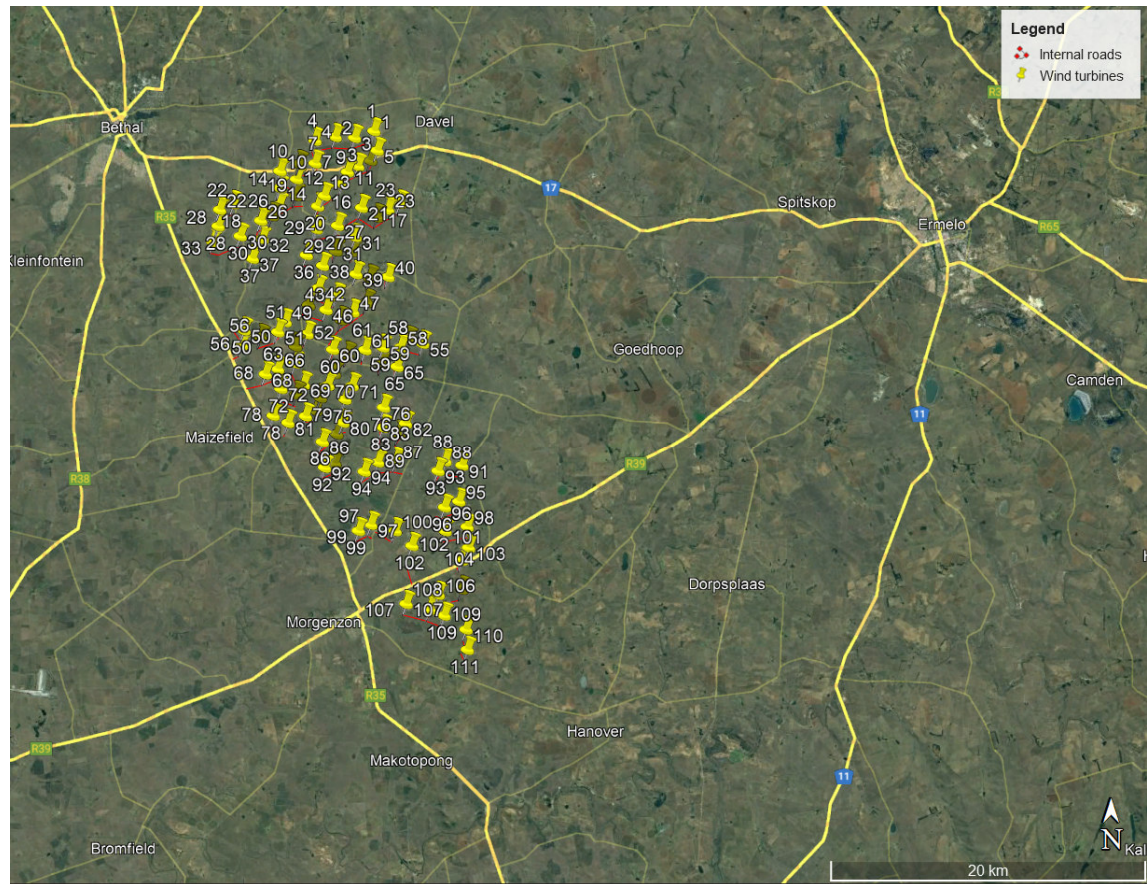


Figure 3-2: Aerial View of Turbines

3.2 National Route to Site for Imported Components

There are three viable options for the port of entry for imported components - the Port of Richard's Bay in KwaZulu-Natal, and the ports of East London and Ngqura in the Eastern Cape.

The Port of Richard's Bay is located approximately 460km travel distance from the proposed site whilst the Port of East London and Ngqura is respectively located approximately 1130km and 1200km travel distance from the proposed site. The Port of Richard's Bay is the preferred port of entry, however, the Ports of East London and Ngqura can be used as alternatives should the Port of Richard's Bay not be available.

The preferred route from the Port of Richard's Bay is shown in yellow in **Figure 3-3** below. The route is approximately 460km and follows the N2 north, passing through Pongola and

Piet Retief before turning off on to the N17 in Ermelo that leads to an unnumbered gravel road towards the proposed site.

The alternative route from the Port of East London, shown in green in **Figure 3-3**, will follow the N6 north-west to Bloemfontein before taking the N1 north-east to Johannesburg. Vehicles will head east on the N12 and N17, passing through Bethal before turning off onto an unnumbered gravel road that leads to the proposed site.

The Port of Ngqura can also be considered as an alternative and the route is shown in blue in **Figure 3-3**. The route is approximately 1200km long and follows the N10 north up to Cradock before taking the R390 further north, passing through the town of Steynsburg and turning onto the N1 at Gariep. The route will continue north-east along the N1, through Bloemfontein, up to Johannesburg. Vehicles will head east on the N12 and N17, passing through Bethal before turning off onto an unnumbered gravel road that leads to the proposed site.

It should be noted that, although shorter routes exist, travel on national routes are proposed as the condition of some of the roads on the shorter routes are poor and not deemed suitable for hauling with heavy vehicles. There are also a number of toll plazas located on the national routes, but alternative roads can be considered in order to bypass these toll roads. This can however only be done at a later stage when more information is available regarding the type of heavy/abnormal vehicles, number of trips, etc.



Figure 3-3: Preferred and Alternative Routes

It is critical to ensure that the abnormal load vehicle will be able to move safely and without obstruction along the preferred route. The preferred route should be surveyed prior to construction to identify any problem areas, e.g., intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, which may require modification. After the road modifications have been implemented, it is recommended to undertake a “dry-run” with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that the delivery will occur without disruptions.

It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.

3.3 Proposed main access road and access points to the Proposed Development

The proposed site is bounded by the N17 in the north, the R39 in the south and the east and the R35 in the west, as shown in **Figure 3-4**. Access to the proposed site can be obtained from any of these three roads, depending on the traffic volumes of each road. The road carrying the least traffic will be considered as the best option. However, the N17 is a toll route and should be avoided as main access if other alternatives exist along either the R39 or the R35.

There is also an existing network of unnumbered gravel roads that might be suitable as a main access road to the proposed site as shown in pink and blue in **Figure 3-4**. Once the site layout and project capacity has been reduced as a result of the environmental constraints identified during the EIA and Scoping process, the options for a main access road and access points can be further investigated.

The proposed main access road should link to the site access road, and possible access points are shown in **Figure 3-5**.

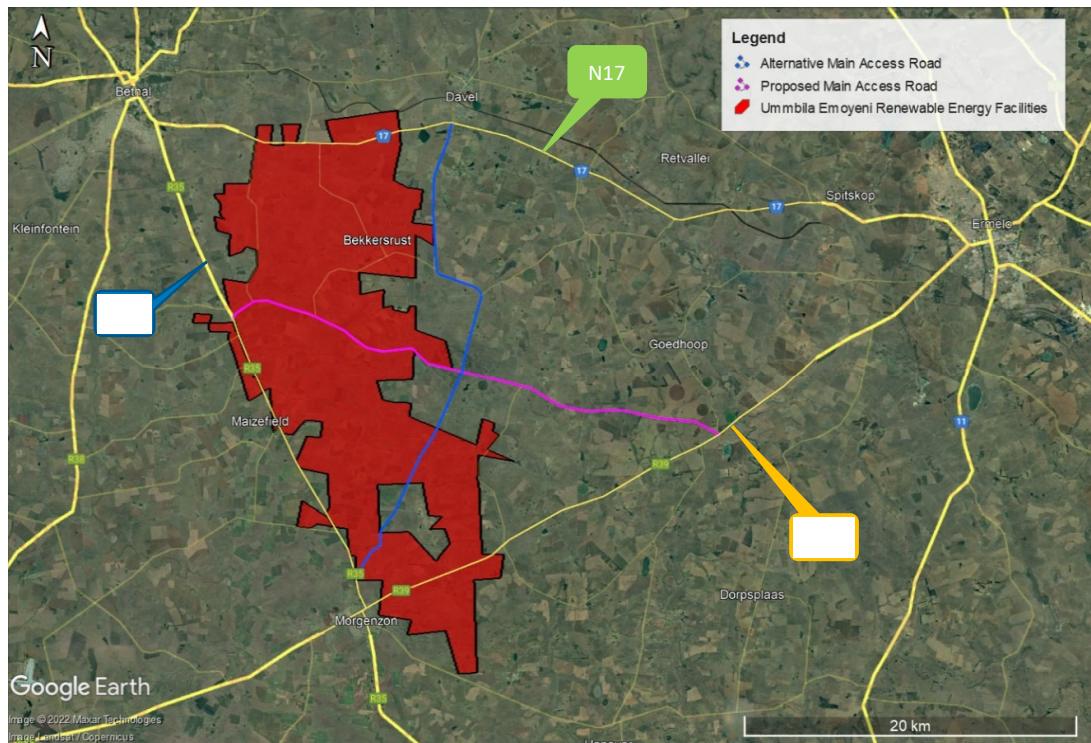


Figure 3-4: Proposed Main Access Roads and alternatives

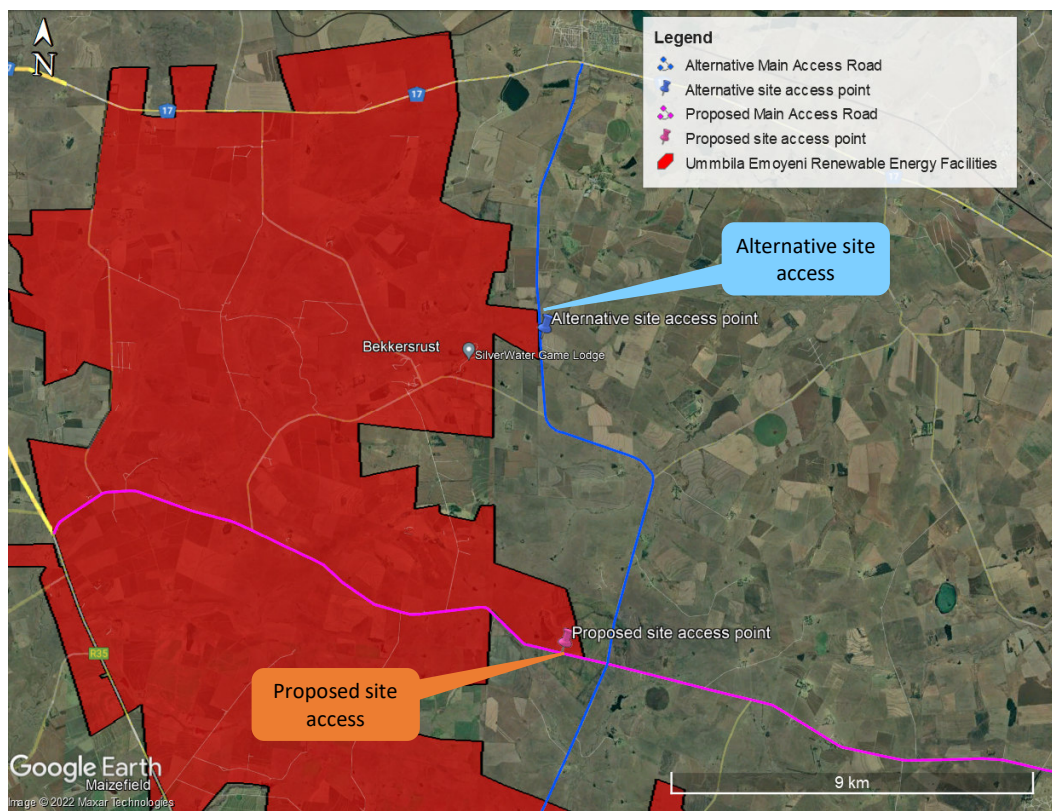


Figure 3-5: Proposed site access points

Other alternative site access roads and points can be investigated at a later stage once the project area has been more clearly defined. All options should, however, conform to the requirements of access spacing and sufficient shoulder sight distances at these locations.

3.4 Main Route for the Transportation of Materials, Plant and People to the proposed site

The nearest towns in relation to the proposed development site are Standerton, Secunda, Bethal and Kriel. It is envisaged that most materials, water, plant, services, and people can be procured within an 60km radius of the proposed facility. However, this would be informed by the REIPPPP requirements. The nearest city, Johannesburg, is located approximately 180km from the proposed development site.

Concrete batch plants and quarries in the vicinity could be contracted to supply materials and concrete during the construction phase, which would reduce the impact on traffic on the surrounding road network. Alternatively, mobile concrete batch plants and temporary construction material stockpile yards could be commissioned on vacant land near the proposed site. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions.

4 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

Key legal requirements pertaining to the transport requirements for the proposed development are:

- Abnormal load permits, (Section 81 of the National Road Traffic Act)
- Port permit (Guidelines for Agreements, Licenses and Permits in terms of the National Ports Act No. 12 of 2005), and
- Authorisation from Road Authorities to modify the road reserve to accommodate turning movements of abnormal loads at intersections.

5 IDENTIFICATION OF KEY ISSUES

5.1 Identification of Potential Impacts

The potential transport related impacts are described below.

5.1.1 Construction Phase

Potential impact

- Construction related traffic
- The construction traffic would also lead to noise and dust pollution.
- This phase also includes the construction of roads, excavations, trenching for electrical cables and other ancillary construction works that will temporarily generate the most traffic.

5.1.2 Operational Phase

During operation, it is expected that staff and security will periodically visit the facility. It is assumed that approximately 30 full-time employees will be stationed on the site. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.

5.1.3 Cumulative Impacts

- Traffic congestion/delays on the surrounding road network.
- Noise and dust pollution

6 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

6.1 Potential Impact (Construction Phase)

Nature of the impact

- Potential traffic congestion and delays on the surrounding road network and associated noise, dust, and exhaust pollution.

Significance of impact without mitigation measures

- Traffic generated by the construction of the facility will have a significant impact on the surrounding road network. The exact number of trips generated during construction will be determined by the contractor and the haulage company transporting the components to site, the staff requirements and where equipment is sourced from.

It is expected that the delivery of the components to the site during the construction phase will not result in a significant increase in traffic.

For the transportation of the turbines to the proposed site, it was assumed that the turbine blades will be transported to site individually. Steel or concrete towers can be utilised at the site. Alternatively, the towers can be of a hybrid nature, comprising concrete towers with top steel sections.

As a general assumption, for each wind turbine three (3) abnormal loads will be required for the blades, nine (9) abnormal loads for the tower sections and one (1) abnormal load for the nacelle. All further components can be transported with normal limitation haulage vehicles. With approximately thirteen (13) abnormal loads trips (3 trips for blades, 9 trips for tower sections and 1 trip for the nacelle), the total trips to deliver the components of 111 turbines to the proposed site will be around 1 443 trips (13 trips x 111 turbines). This would amount to 2.73 vehicle trips per day (1 443 trips / 24 months / 22 working days per month) for a construction period of 24 months. Should the turbines be delivered during an 18-month period, the vehicle trips would amount to 3.64 vehicle trips per day.

Several normal haulage vehicles will be required to transport materials, equipment, plant, and staff to the site. The construction of roads and concrete footings will also have an impact on the surrounding road network as vehicles deliver materials to the site. A concrete footing (approximately 600 m³) adds around 100 trips by concrete trucks to the surrounding road network. It is therefore advised to have concrete batching plants on site or in close vicinity to reduce trips.

The significance of the transport impact without mitigation measures during the construction and decommissioning phases can be rated as medium to high. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level of low to medium significance.

- *Proposed mitigation measures*
 - The delivery of wind turbine components to the site must be staggered and trips must be scheduled to occur outside of peak traffic periods.
 - Dust suppression of gravel roads during the construction and decommissioning phases, as required.

- Regular maintenance of gravel roads by the Contractor during the construction and decommissioning phases.
 - The use of mobile batching plants and quarries near the site would decrease the impact on the surrounding road network.
 - Staff and general trips should occur outside of peak traffic periods as far as possible.
 - Any low hanging overhead lines (lower than 5.1 m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.
 - The preferred route should be surveyed to identify problem areas e.g., intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, which may require modification. After the road modifications have been implemented, it is recommended to undertake a “dry-run” with the largest abnormal load vehicle, prior to the transportation of any turbine components, to ensure that the delivery of the turbines will occur without disruptions. This process is to be undertaken by the haulage company transporting the components and the contractor, who will modify the road and intersections to accommodate abnormal vehicles. It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.
 - Design and maintenance of internal roads. The internal gravel roads will require grading with a road grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage. This process is to be undertaken by a civil engineering consultant or a geometric design professional. The road designer should take cognizance that roads need to be designed with smooth, relatively flat gradients to allow an abnormal load vehicle to ascend to the top of a hill.
- *Significance of impact with mitigation measures*
The proposed mitigation measures for the construction traffic will result in a minor reduction of the impact on the surrounding road network, but the impact on the local traffic will remain low as the existing traffic volumes are deemed to be low. The dust suppression, however, significantly reduces the impact.

6.2 Potential Impact (Operational Phase)

The operational phase will not generate any significant traffic volumes. During operation, it is expected that maintenance and security staff will periodically visit the facility. It is assumed that approximately 30 full-time employees will be stationed on site (subject to change). Based on experience with similar projects, the number of full-time employees is generally low and consequently, the associated trips are negligible. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.

6.3 Potential Impact (Decommissioning Phase)

The decommissioning phase will result in the same impact as the construction phase as similar trips are expected. The potential traffic impact will be of medium significance before mitigation measures during the construction and decommissioning phases. However,

considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level of low significance.

7 NO-GO ALTERNATIVE

The no-go alternative implies that the proposed development of the Ummbila Renewable Wind Energy Facility does not proceed. This would mean that there will be no negative environmental impacts and no traffic impact on the surrounding network during the construction and decommissioning phases of the facility. However, this would also mean that there would be no socio-economic benefits to the surrounding communities, and it will not assist government in meeting its' targets for renewable energy. **Hence, the no-go alternative is not a preferred alternative.**

8 IMPACT ASSESSMENT SUMMARY

The assessment of impacts and recommendation of mitigation measures as discussed above are collated in the tables below. The assessment methodology is attached as **Annexure C**.

8.1 Construction Phase

Table 8-1: Impact Rating - Construction Phase – Traffic Congestion

Nature: Traffic congestion during the construction phase			
Impact description: The impact will occur due to added pressure on the road network due to the increase in traffic associated with the transport of equipment, material, and staff to site during the construction phase. Traffic congestion possible along the N17, R39 and R35, depending on the main access route selected.			
	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Short-term (2)	The construction period will last between 1 – 2 years.	Medium Negative (40)
Extent	Local (2)	Pressure will only be added on the local road network.	
Magnitude	Moderate (6)	The increase in traffic will have a moderate impact on traffic operations.	
Probability	Highly Probable (4)	The possibility of the impact on the traffic operations is highly probable.	
Mitigation/Enhancement Measures			
Mitigation: <ul style="list-style-type: none">Stagger component delivery to siteReduce the construction periodThe use of mobile batch plants and quarries in close proximity to the siteStaff and general trips should occur outside of peak traffic periods.Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase.It its recommended to avoid staggered intersections on the main access road. Intersections should rather be consolidated or realigned as far as possible.			
Post Mitigation/Enhancement Measures			
Duration	Short-term (2)	The construction period will last between 1 – 2 years.	Low Negative (18)
Extent	Local (2)	Pressure will only be added on the local road network.	
Magnitude	Low (2)	The increase in traffic will have a low impact on traffic operations.	
Probability	Probable (3)	The possibility of the impact on the traffic operations is probable.	
Cumulative impacts: <p>The duration of the construction phase is short term (i.e., the impact of the generated traffic on the surrounding road network is temporary and renewable energy facilities, when operational, do not add any significant traffic to the road network). Even if all renewable energy projects within the area are constructed at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.</p>			
Residual Risks: <p>Traffic will return to normal levels after construction is completed.</p>			

9 CUMULATIVE IMPACTS

To assess the cumulative impact, it was assumed that all renewable energy projects within 50km currently proposed and authorized, would be constructed at the same time. This is the precautionary approach as in reality; these projects would be subject to a highly competitive bidding process. Only a handful of projects would be selected to enter into a power purchase agreement with Eskom, and construction is likely to be staggered depending on project-specific issues.

The construction and decommissioning phases are the only significant traffic generators for renewable energy projects. The duration of these phases is short term (i.e., the impact of the generated traffic on the surrounding road network is temporary and renewable energy facilities, when operational, do not add any significant traffic to the road network). Even if all renewable energy projects within the area are constructed at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.

The assessments of cumulative impacts are collated in the table below.

Table 9-1: Cumulative Impact rating

Nature: Traffic generated by the proposed development and the associated noise and dust pollution. Traffic congestion and associated noise and dust pollution possible along the N17, R35, R39 and the existing gravel road network, depending on the main access route selected.		
	Overall impact of the proposed project considered in isolation (Post mitigation)	Cumulative impact of the project and other projects in the area
Extent	medium (2)	High (5)
Duration	Short term (2)	medium term (3)
Magnitude	minor (2)	High (8)
Probability	Probable (3)	Improbable (2)
Significance	Low (18)	Medium (32)
Status (positive/negative)	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Confidence in findings: High.		
Mitigation: <ul style="list-style-type: none"> • Stagger component delivery to site • Dust suppression • Reduce the construction period • The use of mobile batch plants and quarries in close proximity to the site • Staff and general trips should occur outside of peak traffic periods 		
Description of expected significance of impact The significance of the transport impact can be rated as high. The increase in traffic cannot be completely mitigated but mitigation measures will significantly reduce the impact. Noise and dust pollution is limited to the construction and decommissioning periods. It should be noted that even if all the facilities are constructed and decommissioned at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.		

10 ENVIRONMENTAL MANAGEMENT PROGRAM INPUTS

OBJECTIVE: It is recommended that dust suppression and maintenance of gravel roads form part of the EMPr. This would be required during the Construction phase where an increase in vehicle trips can be expected. No traffic related mitigation measures are envisaged during the operational phase due to the negligible traffic volume generated during this phase.

Project component/s	Construction Phase traffic
Potential Impact	Dust and noise pollution due to increase in traffic volume
Activity/risk source	Transportation of material, components, equipment, and staff to site
Mitigation: Target/Objective	Minimize impacts on road network and surrounding communities

Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> Stagger component delivery to site The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network Dust suppression Reduce the construction period as far as possible Maintenance of gravel roads Apply for abnormal load permits prior to commencement of delivery via abnormal loads Assess the preferred route and undertake a 'dry run' to test Staff and general trips should occur outside of peak traffic periods as far as possible. Any low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles, if required 	<ul style="list-style-type: none"> Holder of the EA 	<ul style="list-style-type: none"> Before construction commences and regularly during construction phase

Performance Indicator	Staggering or reducing the construction trips will reduce the impact of dust and noise pollution.
Monitoring	<ul style="list-style-type: none"> Regular monitoring of road surface quality. Monitoring congestion levels (increase in vehicle trips) Apply for required permits prior to commencement of construction

11 CONCLUSION AND RECOMMENDATIONS

This scoping report addressed key issues and alternatives to be considered for the proposed Ummbila Emoyeni Wind Energy Facility:

- The preferred Port of Entry for imported components is the Port of Richard's Bay.
- Several access points are feasible for this project, which have been discussed in this report.
- Alternative route should be determined where needed to avoid toll routes where abnormal and heavy vehicles cannot be accommodated, or to avoid excessive toll costs.
- It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed. The gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage.
- The construction phase traffic, although significant, will be temporary and can be mitigated to an acceptable level.
- During operation, it is expected that staff and security will periodically visit the facility. It is assumed that approximately 30 full-time employees will be stationed on the site. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- The construction and decommissioning phases of the development is the only significant traffic generator and therefore noise and dust pollution will be higher during this phase. The duration of this phase is short term i.e., the impact of the traffic on the surrounding road network is temporary and wind energy facilities, when operational, do not add any significant traffic to the road network.
- The traffic generated during the construction phase, although significant, will be temporary and impacts are considered to be negative and of medium significance before and of low significance after mitigation.

The potential mitigation measures mentioned in the construction and decommissioning phases are:

- Dust suppression
- Component delivery to/ removal from the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- The use of mobile batching plants and quarries near the site would decrease the impact on the surrounding road network.
- Staff and general trips should occur outside of peak traffic periods.
- A "dry run" of the preferred route.
- Design and maintenance of internal roads.
- Any low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved or raised to accommodate the abnormal load vehicles.

The construction and decommissioning phases of a wind farm are the only significant traffic generators and therefore noise, dust and exhaust pollution will be higher during these phases. The duration of these phases is short term i.e., the impact of the Wind Farm on traffic on the surrounding road network is temporary.

The access point to the proposed site has been assessed and was found to be acceptable from a transport perspective.

The development is supported from a transport perspective provided that the recommendations and mitigations contained in this report are adhered to.

12 REFERENCES

- Google Earth Pro
- SANS 10280/NRS 041-1:2008 - Overhead Power Lines for Conditions Prevailing in South Africa
- Road Traffic Act (Act No. 93 of 1996)
- National Road Traffic Regulations, 2000
- The Technical Recommendations for Highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads"

Annexure A – SPECIALIST EXPERTISE

IRIS SIGRID WINK

Profession	Civil Engineer (Traffic & Transportation)
Position in Firm	Associate
Area of Specialisation	Manager: Traffic & Transportation Engineering
Qualifications	PrEng, MSc Eng (Civil & Transportation)
Years of Experience	20 Years
Years with Firm	10 Years

SUMMARY OF EXPERIENCE

Iris is a Professional Engineer registered with ECSA (20110156). She joined JG Afrika (Pty) Ltd. in 2012. Iris obtained a Master of Science degree in Civil Engineering in Germany and has more than 19 years of experience in a wide field of traffic and transport engineering projects. Iris left Germany in 2003 and has worked as a traffic and transport engineer in South Africa and Germany. She has technical and professional skills in traffic impact studies, public transport planning, non-motorised transport planning and design, design and development of transport systems, project planning and implementation for residential, commercial, and industrial projects and providing conceptual designs for the abovementioned. She has also been involved with transport assessments for renewable energy projects and traffic safety audits.

Iris is registered with the International Road Federation as a Global Road Safety Audit Team Leader.

PROFESSIONAL REGISTRATIONS & INSTITUTE MEMBERSHIPS

- PrEng** - Registered with the Engineering Council of South Africa No. 20110156
Registered Mentor with ECSA for the Cape Town Office of JG Afrika
- MSAICE** - Member of the South African Institution of Civil Engineers
- ITSSA** - Member of ITS SA (Intelligent Transport Systems South Africa)
- SAWEA** - Member of the South African Wind Energy Association
- SARF** - South African Road Federation: Committee Member of Council
- SARF WR** - South African Road Federation Western Region Committee Member
- SARF RSC** - South African Road Federation National Road Safety Committee
- IRF** - Global Road Safety Audit Team Leader

EDUCATION

- 1996 - Matric** – Matric (Abitur) – Carl Friedrich Gauss Schule, Hemmingen, Germany
- 1998 - Diploma** as Draughtsperson – Lower Saxonian State Office for Road and Bridge Engineering
- 2003 - MSc Eng** (Civil and Transportation) – Leibniz Technical University of Hanover, Germany

SPECIFIC EXPERIENCE (Selection)

JG Afrika (Pty) Ltd (Previously Jeffares & Green (Pty) Ltd)

2016 – Date

Position – Associate

- **Transport Impact Assessments and Management Plan** - Euronotus Wind&Solar Energy Cluster in the Western Cape, Client: WSP on behalf of G7 Energies
- **Transport Impact Assessment for De Aar Solarfarm** - Client: Mulilo
- **Transport Impact Assessments for the Mpumalanga Windfarms** - Client: Enertrag
- **Transport Impact Assessment for the Hyperion Thermal Plant** - Client: Red Rocket
- **Transport Impact Assessment for the Richards Bay Gas to Power Facility** - Client: Savannah
- **Transport Impact Assessment for the Pienaarspoort Wind Energy Facility** - Client: Savannah
- **Transport Impact Assessment for Oya Black Mountain Solar Farm** - Client: G7 Energies
- **Traffic Impact Assessment for the Nooiensfontein Housing Development** - Client: City of Cape Town
- **Kudusberg Windfarm** – Transport study for the proposed Kudusberg Windfarm near Sutherland, Northern Cape – Client: G7 Renewable Energies
- **Kuruman Windfarm** – Transport study for the proposed Kuruman Windfarm in Kuruman, Northern Cape – Client: Mulilo Renewable Project Developments
- **Coega West Windfarm** – Transportation and Traffic Management Plan for the proposed Coega Windfarm in Coega, Port Elizabeth – Client: Electrawinds Coega
- **Traffic and Parking Audits** for the Suburb of Groenvallei in Cape Town – Client: City of Cape Town Department of Property Management.
- **Road Safety Audit** for the Upgrade of N1 Section 4 Monument River – Client: Aurecon on behalf of SANRAL
- **Sonop Windfarm** – Traffic Impact Assessment for the proposed Sonop Windfarm, Coega, Port Elizabeth – Client: Founders Engineering
- **Universal Windfarm** - Traffic Impact Assessment for the proposed Universal Windfarm, Coega, Port Elizabeth – Client: Founders Engineering
- **Road Safety Audit** for the Upgrade of N2 Section 8 Knysna to Wittedrift – Client: SMEC on behalf of SANRAL
- **Road Safety Audit** for the Upgrade of N1 Section 16 Zandkraal to Winburg South – Client: SMEC on behalf of SANRAL
- **Traffic and Road Safety Studies** for the Improvement of N7 Section 2 and Section 3 (Rooidraai and Piekenierskloof Pass) – Client: SANRAL
- **Road Safety Appraisals** for Northern Region of Cape Town – Client: Aurecon on behalf of City of Cape Town (TCT)
- **Traffic Engineering Services** for the Enkanini Informal Settlement, Kayamandi - Client: Stellenbosch Municipality
- **Lead Traffic Engineer** for the Upgrade of a 150km Section of the National Route N2 from Kangela to Pongola in KwaZulu-Natal, Client: SANRAL
- **Traffic Engineering Services** for the Kosovo Informal Settlement (which is part of the Southern Corridor Upgrade Programme), Client: Western Cape Government

- **Traffic and Road Safety Studies** for the proposed Kosovo Informal Housing Development (part of the Southern Corridor Upgrade Program), Client: Western Cape Government.
- **Road Safety Audit** Stage 3 – Upgrade of the R573 Section 2 between Mpumalanga/Gauteng and Mpumalanga/Limpopo, Client: AECOM on behalf of SANRAL
- **Road Safety Audit** Stage 1 and 3 – Upgrade of the N2 Section 5 between Lizmore and Heidelberg, Client: Aurecon on behalf of SANRAL
- **Traffic Safety Studies** for Roads Upgrades in Cofimvaba, Eastern Cape – Client: Cofimvaba Municipality
- **Road Safety Audit** Stage 1 and 3 – Improvement of Intersections between Olifantshoek and Kathu, Northern Cape, Client: Nadeson/Gibb on behalf of SANRAL
- **Road Safety Audit** Stage 3 – Upgrade of the Beacon Way Intersection on the N2 at Plettenberg Bay, Client: AECOM on behalf of SANRAL
- **Traffic Impact Assessment** for a proposed Primary School at Die Bos in Strand, Somerset West, Client: Edifice Consulting Engineers
- **Road Safety Audit** Stage 1 and 3 – Improvement of R75 between Port Elizabeth and Uitenhage, Eastern Cape, Client: SMEC on behalf of SANRAL

Annexure B – ASSESSMENT METHODOLOGY

Assessment of Impacts

Direct, indirect, and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase must be assessed in terms of the following criteria:

- » The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- » The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- » The **duration**, wherein it will be indicated whether:
 - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - medium-term (5–15 years) – assigned a score of 3;
 - long term (> 15 years) - assigned a score of 4; or
 - permanent - assigned a score of 5;
- » The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - 0 is small and will have no effect on the environment
 - 2 is minor and will not result in an impact on processes
 - 4 is low and will cause a slight impact on processes
 - 6 is moderate and will result in processes continuing but in a modified way
 - 8 is high (processes are altered to the extent that they temporarily cease)
 - 10 is very high and results in complete destruction of patterns and permanent cessation of processes
- » The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring.
Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium, or high; and
- » The **status**, which will be described as either positive, negative, or neutral.
- » The degree to which the impact can be reversed.
- » The degree to which the impact may cause irreplaceable loss of resources.
- » The *degree* to which the impact can be *mitigated*.

The **significance** is calculated by combining the criteria in the following formula:

$$S=(E+D+M)P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- » < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- » 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).