BASIC ASSESSMENT REPORT:

THE PROPOSED POORTJIES WES CLUSTER GRID CONNECTION NEAR NELSPOORT, WESTERN CAPE PROVINCE

TRANSPORT STUDY

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First Issue

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SYNOPSIS

Preparation of a Transport Study for the proposed Poortjies WES Cluster Grid Connection, located near Nelspoort in the Western Cape Province, pertaining to all relevant traffic and transportation engineering aspects.

KEY WORDS:

Transport Study, Basic Assessment, Renewable Energy Facility, Abnormal Loads, Grid Connection, Trip Generation

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO 9001: 2015 which has been independently certified by DEKRA Certification.

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THE PROPOSED POORTJIES WES CLUSTER
GRID CONNECTION
NEAR NELSPOORT, WESTERN CAPE PROVINCE

1 INTRODUCTION AND METHODOLOGY

1.1 Scope and Objectives

Poortjies Wes Cluster Grid (Pty) Ltd (the "Independent Power Producer") proposes to develop the Poortjies Wes Cluster Grid and its associated electrical infrastructure (the "Project/Facility") approximately 15km north-west of Nelspoort and 60km south-west of Beaufort West within the Central Karoo District Municipality in the Western Cape Province, as shown in **Figure 1-1**. This project aims to connect seven (7) renewable energy ("RE") facilities, which form part of the Poortjies Wes Cluster, to the Eskom grid.

The Cluster entails the development of six (6) solar energy facilities and a wind energy facility. All seven (7) renewable energy facilities will connect to the proposed 132kV Belvedere Collector Switching Station (the "Collector Switching Station") via 132kV Overhead Lines ("OHLs"). The proposed Collector Switching Station will connect to the new Poortjies Wes 400/132kV LILO substation ("Poortjies Wes LILO MTS") via a 132kV OHL. The grid connection is shown in **Figure 1-2**.

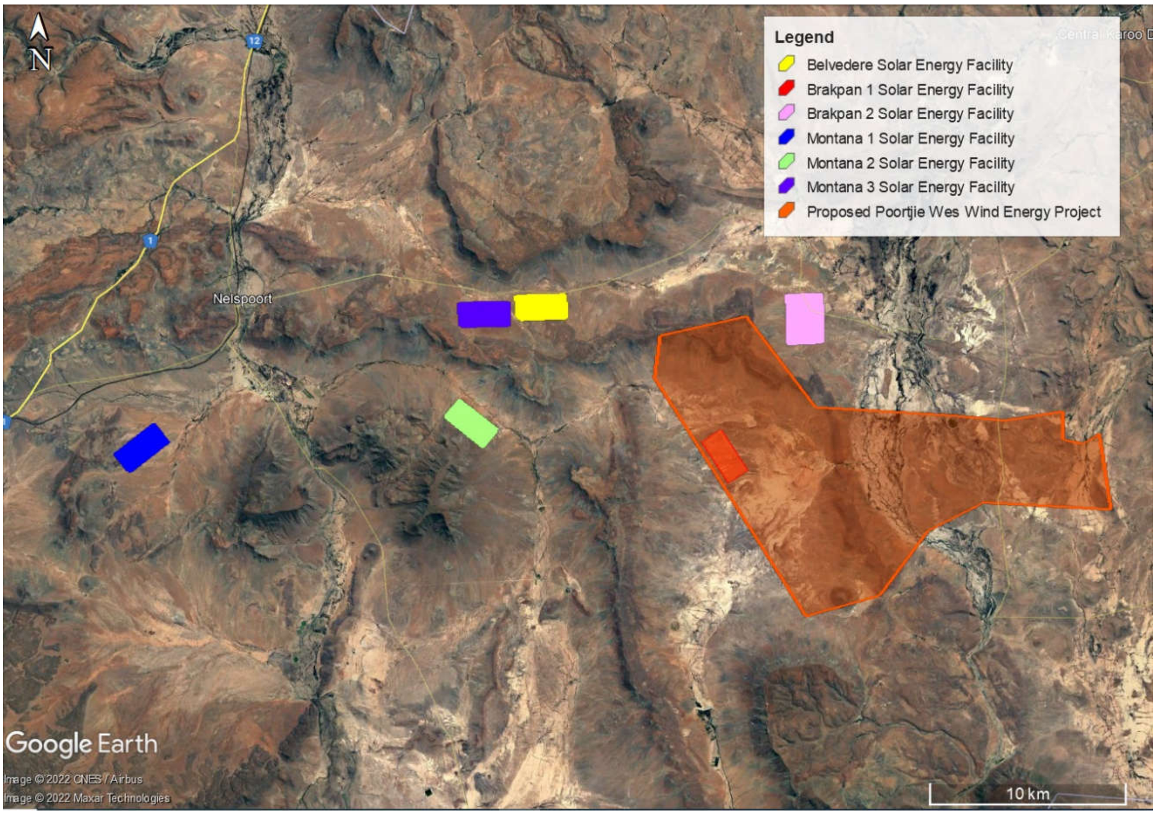

Figure 1-1: Locality Plan: Poortjies Wes Cluster

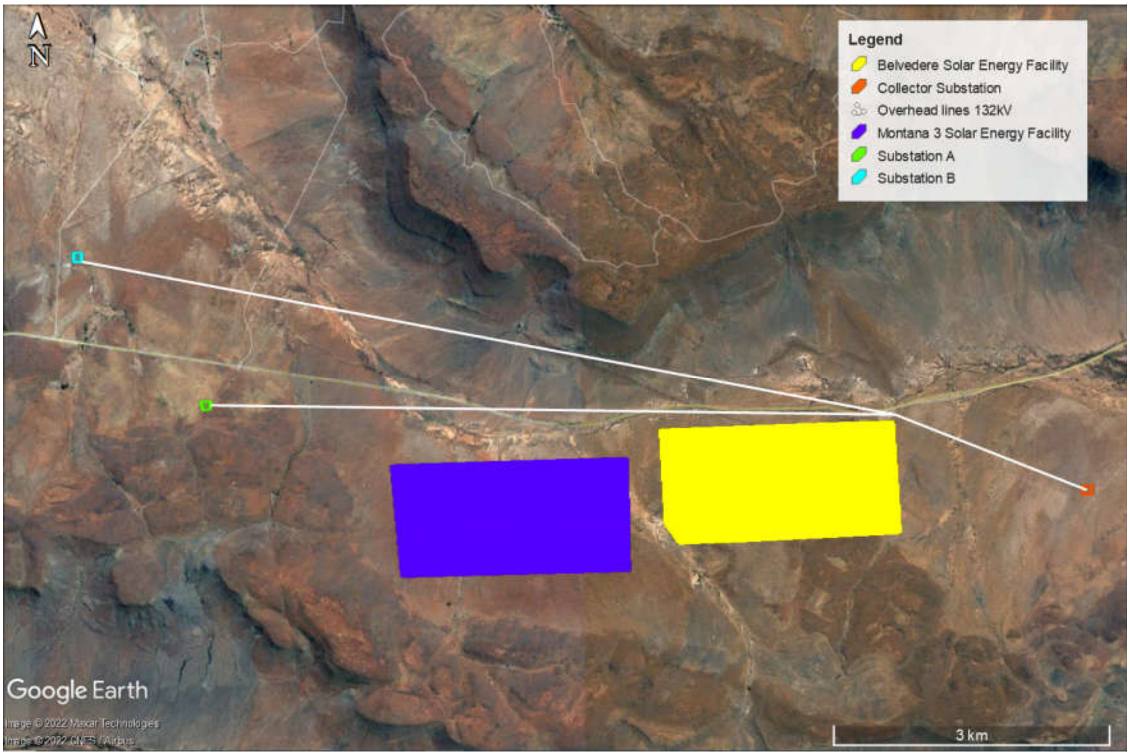

Figure 1-2: Locality Plan: Poortjies Wes Cluster Grid Connection

The Project site is located within the Beaufort West Renewable Energy Development Zone ("REDZ 11") and the Central Transmission Corridor.

As part of the Basic Assessment (BA) process undertaken, the services of a Transportation Specialist are required to conduct a Transport Study.

The following two main transportation activities will be investigated:

- Trip generation and potential traffic impact during construction and operation.
- The transportation of construction materials, equipment and people to and from the site/facilities.

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

JG Afrika (Pty) Ltd was appointed by Savannah Environmental on behalf of the Client, Poortjies Wes Cluster Grid (Pty) Ltd, to undertake a Transport Study as part of the Basic Assessment study for the development of Poortjies Wes Cluster Grid Connection and its associated electrical infrastructure to be located in the Western Cape province. The specialist report shall include the following:

General:

(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, operation and decommissioning;
- Traffic impact on external road network;
- Accessibility and turning requirements;
- National and local haulage routes;
- Assessment of internal roads and site access;
- 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 site:

- 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:

Site Visit and Project Assessment

- Site visit on 5 February 2022 to gain a good understanding of the location
- Overview of project background information including location maps, component specs and any possible resulting abnormal loads to be transported; and
- 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.
- Investigation of the impact of the development traffic generated during construction and operation.

Site layout, Access Points and Internal Roads Assessment per Site

- Description of the surrounding road network;
- Description of site layout;
- Assessment of the proposed access points; and

1.4 Assumptions and Limitations

The following assumptions and limitations apply:

- This study is based on the project information provided by Poortjies Wes Cluster Grid (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 5 000 mm, total maximum width 4 300 mm and total maximum length 10 500 mm.
- Maximum vertical height clearances along the haulage route are 5.2 m for abnormal loads.
- Imported elements will be transported from the most feasible port of entry, which is deemed to be Port of Ngqura.
- If any elements are manufactured within South Africa, these will be transported from their respective manufacturing centres.

- 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.
- The developer or his appointed representative is responsible for applying for all wayleaves and permits with the relevant rail authority well in advance of construction commencing.
- The decommissioning phase will have a similar transport impact as the construction phase.

1.5 Source of Information

Information used in a transport study includes:

- Project Information provided by Poortjies Wes Cluster Grid (Pty) Ltd;
- Google Earth .kmz provided by Poortjies Wes Cluster Grid (Pty) Ltd;
- Google Earth Satellite Imagery; and
- Project research of all available information provided by Savannah Environmental.

2 DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE TRANSPORT STUDY

2.1 Port of Entry

It is assumed that some of the grid connection components will be imported to South Africa via the Port of Ngqura in Coega, which is located near Gqeberha in the Eastern Cape. The Port of Ngqura is a world-class deep-water trans-shipment hub offering an integrated, efficient and competitive port service for containers on transit. The Port forms part of the Coega Industrial Development Zone (CIDZ) and is operated by Transnet National Ports Authority.

Alternatively, components can be imported via the Port of Saldanha (585 km from the proposed site) in the Western Cape.

2.2 Transportation requirements

It is anticipated that the following vehicles will access the site during construction:

- Conventional trucks within the freight limitations to transport building material to the site;
- 40ft container trucks transporting solar PV modules, frames and the inverter, which are within freight limitations;
- Flatbed trucks transporting the cable coils and frames, which are within the freight limitations;
- Light Differential Vehicle (LDV) type vehicles transporting workers from surrounding areas to site; and
- Drilling and piling machines and other required construction machinery being transported by conventional trucks or via self-drive to site.

2.3 Abnormal Load Considerations

Expected abnormal vehicles will comprise of lifting equipment required to off-load and assemble the components. Mobile cranes are considered for the purposes of this report and are classified as non-load carrying vehicles. Mobile cranes usually exceed mass and legal dimension limits and must therefore be operated under permit. Abnormal permits are required for vehicles exceeding the following permissible maximum dimensions on road freight transport in terms of the Road Traffic Act (Act No. 93 of 1996) and the National Road Traffic Regulations, 2000:

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

- Axle load limitation: 7.7 t on the front axle and 9 t 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.

2.4 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.

2.5 Permitting – General Rules

The limits recommended in TRH 11 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 or permits. Embargo lists are compiled annually and are obtainable from the Issuing Authorities.

2.6 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.

2.7 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.

2.8 Transporting Other Plant, Material and Equipment

In addition to transporting the specialised equipment, the normal Civil Engineering construction materials, plant and equipment will need to be transported to the site (e.g. sand, stone, cement, gravel, water, compaction equipment, concrete mixers, etc.). Other materials/components required for the construction of the overhead lines and substations can include electrical cables, ground wires, insulators, dampers, wire conductors, towers/poles as support structures for electrical cables and associated tower/pole foundations, pylons and substation transformers. These will also be transported to site during construction and will generally be conducted with normal heavy loads vehicles, except for the transformers which require abnormal load vehicles.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Description of the site

The proposed Poortjies Wes Cluster Grid Connection will be located approximately 15km north-west of Nelspoort and 60km south-west of Beaufort West within the Central Karoo District Municipality in the Western Cape Province, as shown in **Figure 3-1**. Main Road 587 (MR587) is an existing provincial gravel road that passes through the site and the proposed overhead lines cross this road a number of times. Minor Road 9222 (OP9222) is another provincial gravel road and bounds the site in the east in the vicinity of Substation B.

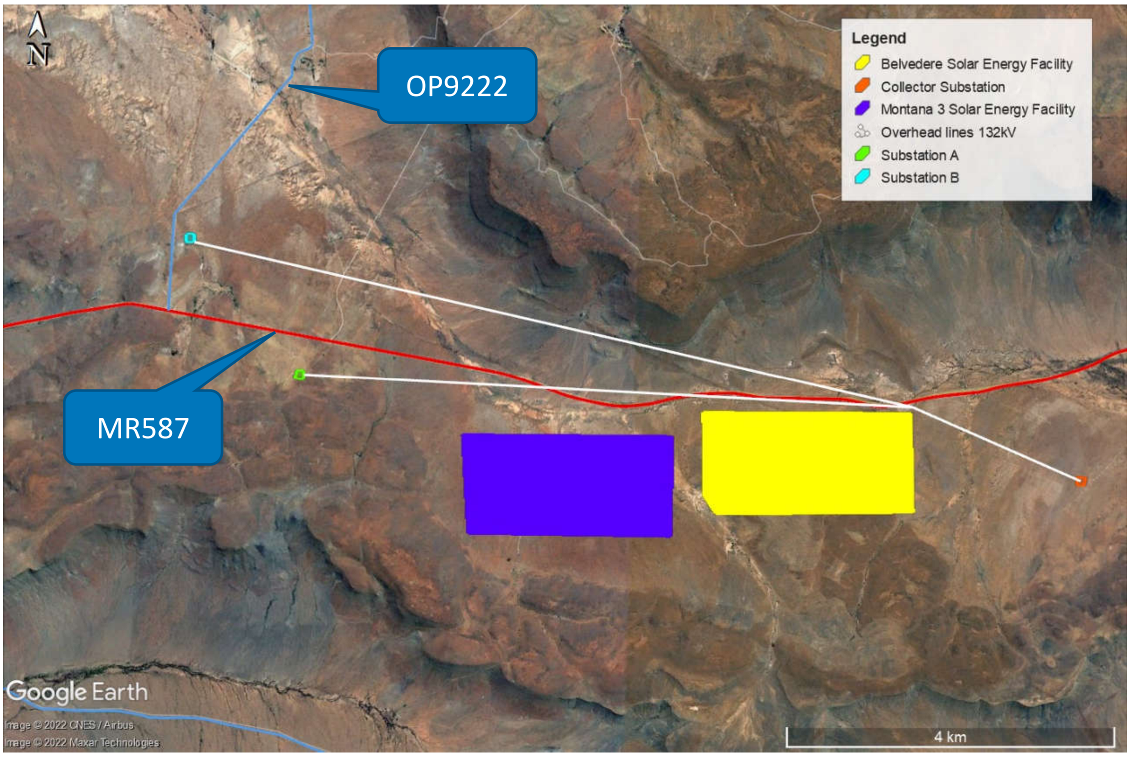

Figure 3-1: Aerial View of the proposed Poortjies Wes Cluster Grid Connection

The Poortjies Wes Cluster entails the development of six (6) solar energy facilities and a wind energy facility. All seven (7) renewable energy ("RE") facilities will connect to the Eskom grid via the following infrastructure:

- A 132kV Belvedere Collector Switching Station (the "Collector Switching Station") via 132kV Overhead Lines ("OHLs"). The Collector Switching Station will be +/-16ha in extent and will be located on Remaining extent of Portion 2 of the Farm Belvedere Nr. 73
- The proposed Collector Switching Station will connect to the new Poortjies Wes 400/132kV LILO MTS ("Poortjies Wes LILO MTS") via a 132kV OHL (approximately 7km). This OHL will cross the 400kV Droërivier/Hydra OHL. A corridor of 300m is being considered in the BA process, within which the 32m servitude for this power line will be located.

- The MTS will connect to either of the existing 400kV Droërivier/Hydra OHL) traversing the property via a Loop-in Loop-out (“LILO”) connection. The 2 x 400kV LILO OHLs will be +/- 1km in length. It is unclear at this stage which of the two OHLs will be approved by Eskom. A corridor of 500m is being considered in the BA process, within which the two 55m servitudes for these power lines will be located.

3.2 National Route to Site for Imported Components

There are two viable options for the port of entry for imported components – the Port of Ngqura in the Eastern Cape (535 km from the site) and the Port of Saldanha in the Western Cape (585 km from the site). The Port of Ngqura is the preferred port of entry, however, the Port of Saldanha can be used as alternative should the Port of Ngqura not be available.

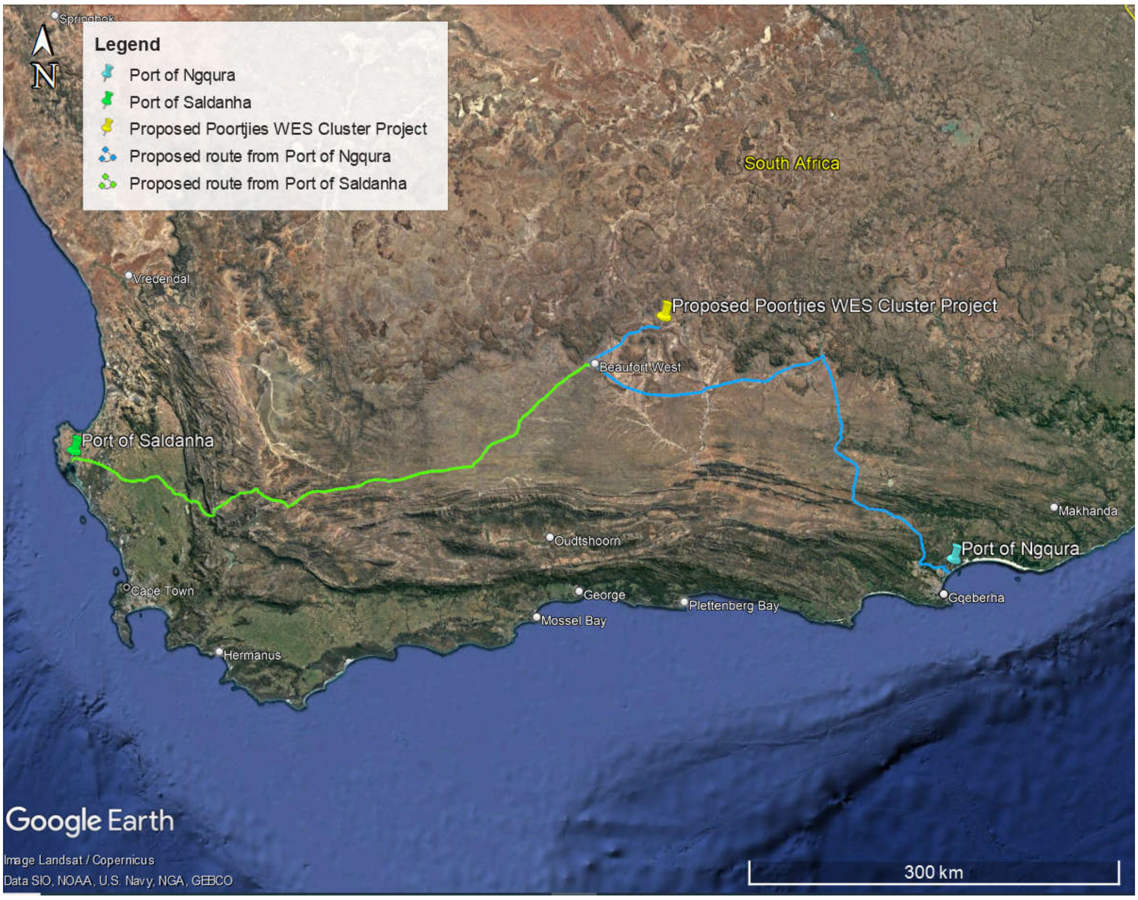

Figure 3-2: Preferred and Alternative Route

The preferred route from the Port of Ngqura is shown in blue in **Figure 3-2**. The route starts at the Port and primarily follows the R334 to Uitenhage. Vehicles will head north on the R75 through the town of Jansenville before continuing to the R63 that leads to Graaff-Reinet. Vehicles will then turn onto the N9 that leads to Aberdeen where they will then access the R61 and continue west to the town of Beaufort West, before taking the N1 north-east to Nelspoort. The road continues onto the MR587, a gravel road, across the railway line and on to the main access road that leads to the site.

The alternative route from the Port of Saldanha, shown in green in **Figure 3-2**, will follow the R45 east to Moorreesburg before taking the R46 east to Ceres. Vehicles will head east on the N1, passing Beaufort West before turning onto the MR587, a gravel road, across the railway line and on to the main access road that leads to the site.

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, that 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 any 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 Route for Components manufactured locally

As mentioned in Section 1.4 (Assumptions and Limitations), it is anticipated that elements manufactured within South Africa will be transported to the site from the various manufacturing centres (e.g. Cape Town, Johannesburg and Pinetown/Durban). It is also assumed that the substation transformers, which will be transported with an abnormal load vehicle, will be transported from the Johannesburg area and therefore it needs to be verified that the route from the manufacturer to the site does not have any load limitations for abnormal vehicles. At this stage, only a high-level assessment can be undertaken as no information of the exact location of the manufacturers are known and all road structures (such as bridges and culverts) need to be confirmed for their load bearing by the South African National Roads Agency (SANRAL) or the respective Roads Authority.

3.4 Route from Cape Town to Proposed Site

Components manufactured in Cape Town will be transported to site via road as shown in **Figure 3-3**. Haulage vehicles will travel from Cape Town on the N1, passing Laingsburg and Beaufort West. Vehicles will turn off the N1 onto the MR587, heading through Nelspoort and continuing to the site.

Haulage vehicles will mainly travel on national highways and the total distance to the proposed site is approximately 531 km.

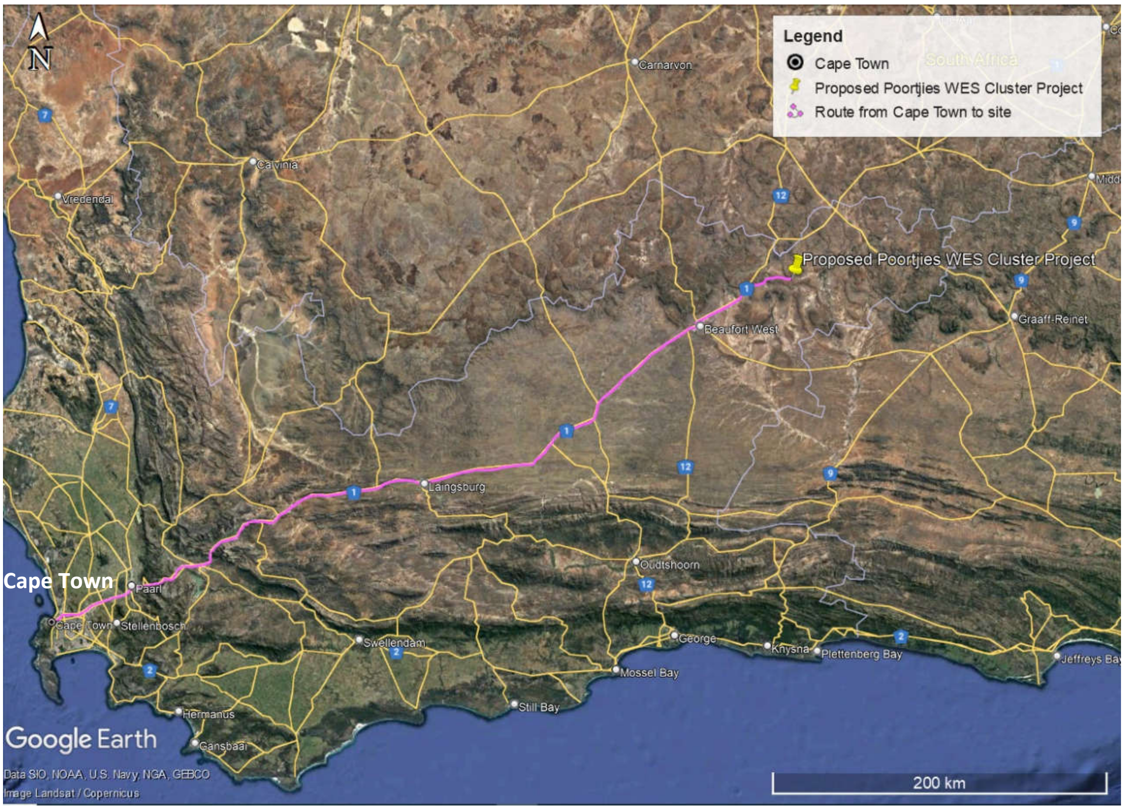

Figure 3-3: Route from Cape Town to Proposed Site

3.5 Route from Johannesburg to Proposed Site

Any components/structures manufactured in the Johannesburg area will be transported to site via the N1. The travel distance is around 905 km and no road limitations are expected on this route for normal loads vehicles as it will mainly follow national and provincial roads. The route is shown in **Figure** 3-4.

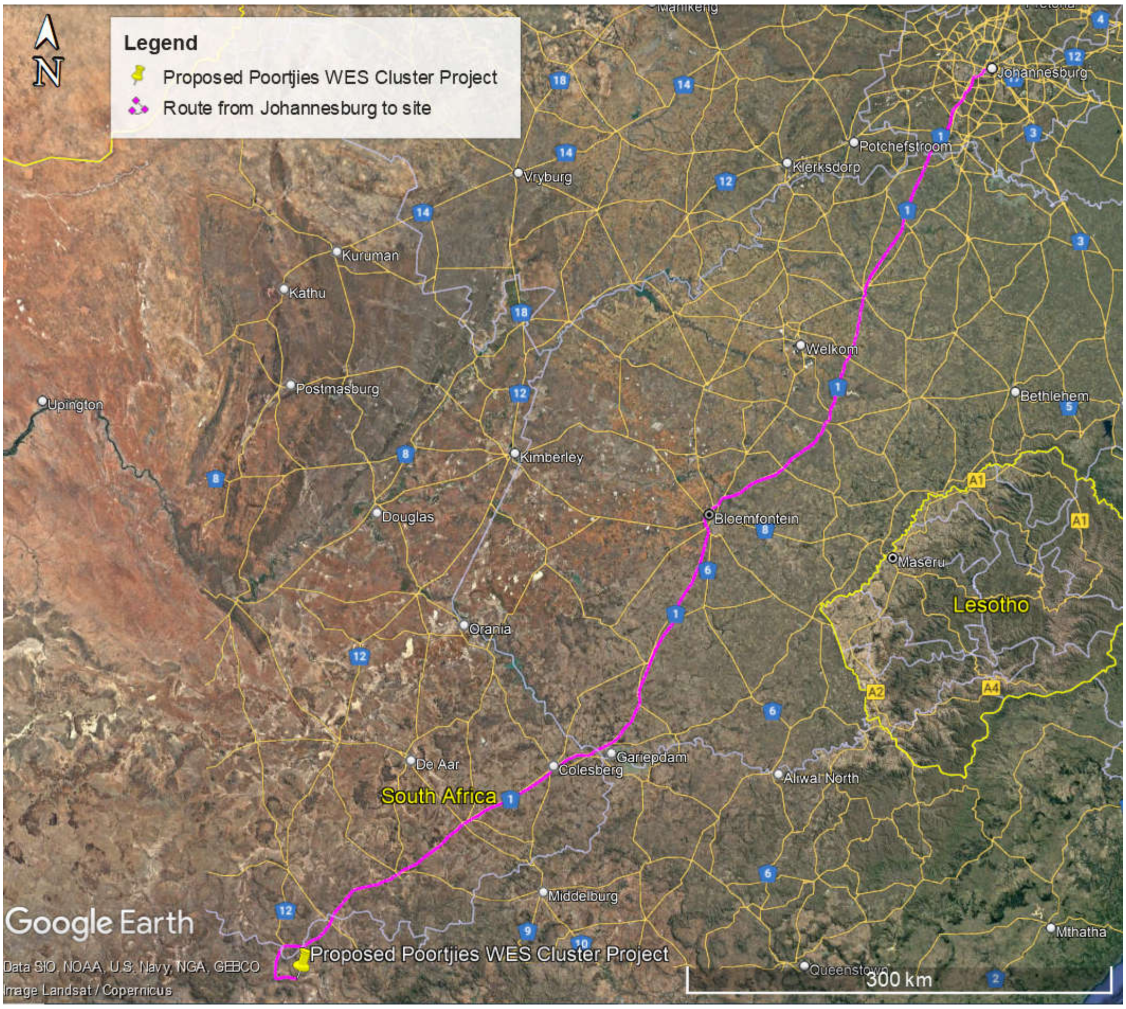

Figure 3-4: Route from Johannesburg to Proposed Site

3.6 Route from Pinetown / Durban to Proposed Site

Components manufactured in the Pinetown area, close to Durban, will be transported to site via road and is expected to be classified as normal loads. No road limitations are expected along the routes, which is shown **Figure** 3-5. Haulage vehicles will mainly travel on national and provincial roads, mainly following the N3, N5 and N1. The total distance to the proposed site is approximately 1 120 km.

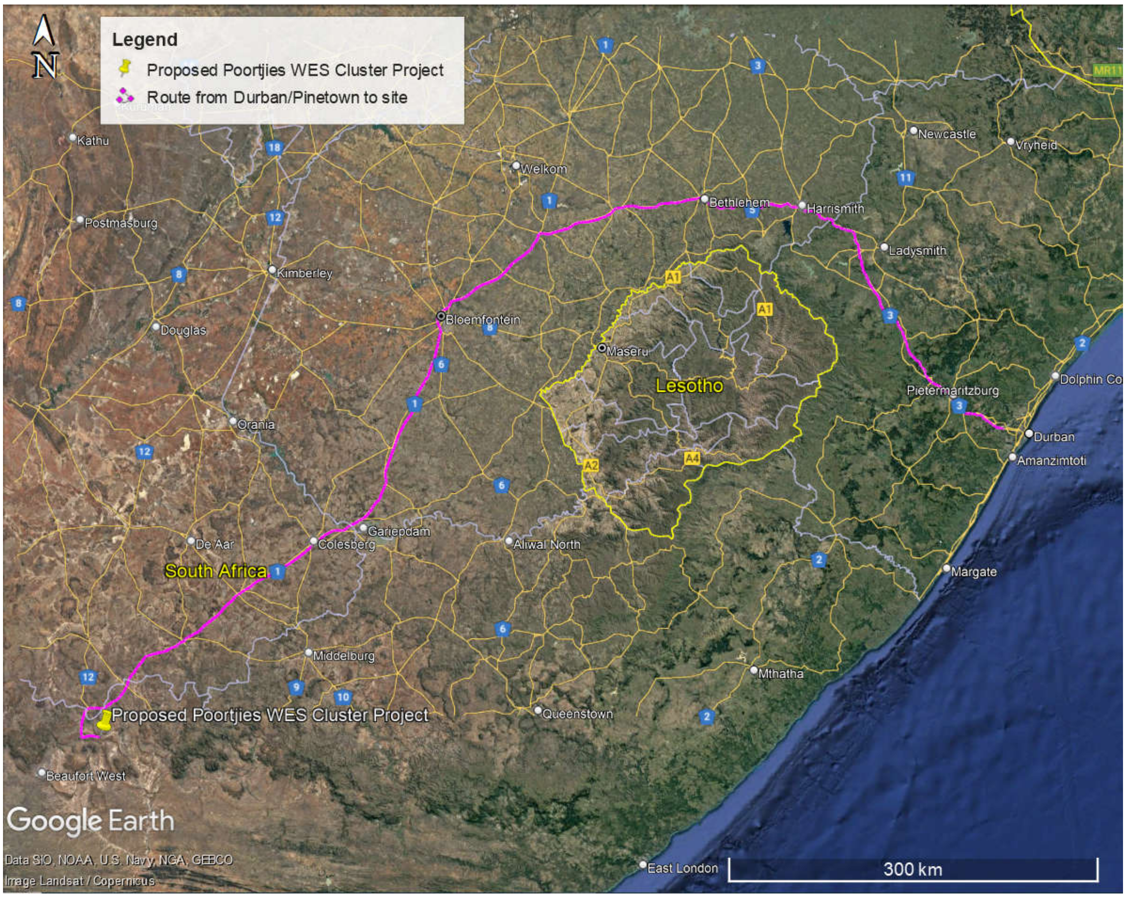

Figure 3-5: Route from Pinetown / Durban to Proposed Site

3.7 Route from Johannesburg Area to Site – Abnormal Load

It is assumed that the substation transformers will be manufactured locally in South Africa and be transported from the Johannesburg area to site. As the transformers will be transported with an abnormal load vehicle, the route planning needs a more detailed investigation of the feasible routes considering any limitations due to existing road features. Furthermore, a load of abnormal dimensions may cause an obstruction and danger to other traffic and therefore the transformer needs to be transported as far as possible on roads that are wide enough for general traffic to pass. It is expected that the transformers can be transported to site via the same route used for normal loads.

There are several bridges and culverts along this route, which need to be confirmed for load bearing and height clearances. There are several turns along the way and small towns to pass through. According to the desktop study, all turning movements along the route are manageable for the abnormal vehicle. However, there are many alternative routes which can be investigated if the above route or sections of the route should not be feasible.

3.8 Proposed main access road and access point to the Proposed Development

3.8.1 132kV Belvedere Collector Switching Station

The main access point for the site will be obtained via MR587 which is a gravel road (shown in red in **Figure** 3-6). This section of MR587 is located between the railway crossing in Nelspoort in the west and Murraysburg in the east. It is envisioned that both labour and materials will be transported via this route. The proposed site access road (shown in orange in **Figure** 3-6**)** is based on an existing gravel veld track. The condition of the road is not known and upgrades (including the provision of drainage infrastructure) might be required along the site access road to ensure it can accommodate abnormal and heavy load vehicles. The proposed access point meets the requirements of horizontal shoulder sight distance to either side. It is, however, recommended that vertical sight distances be verified on site prior to construction.

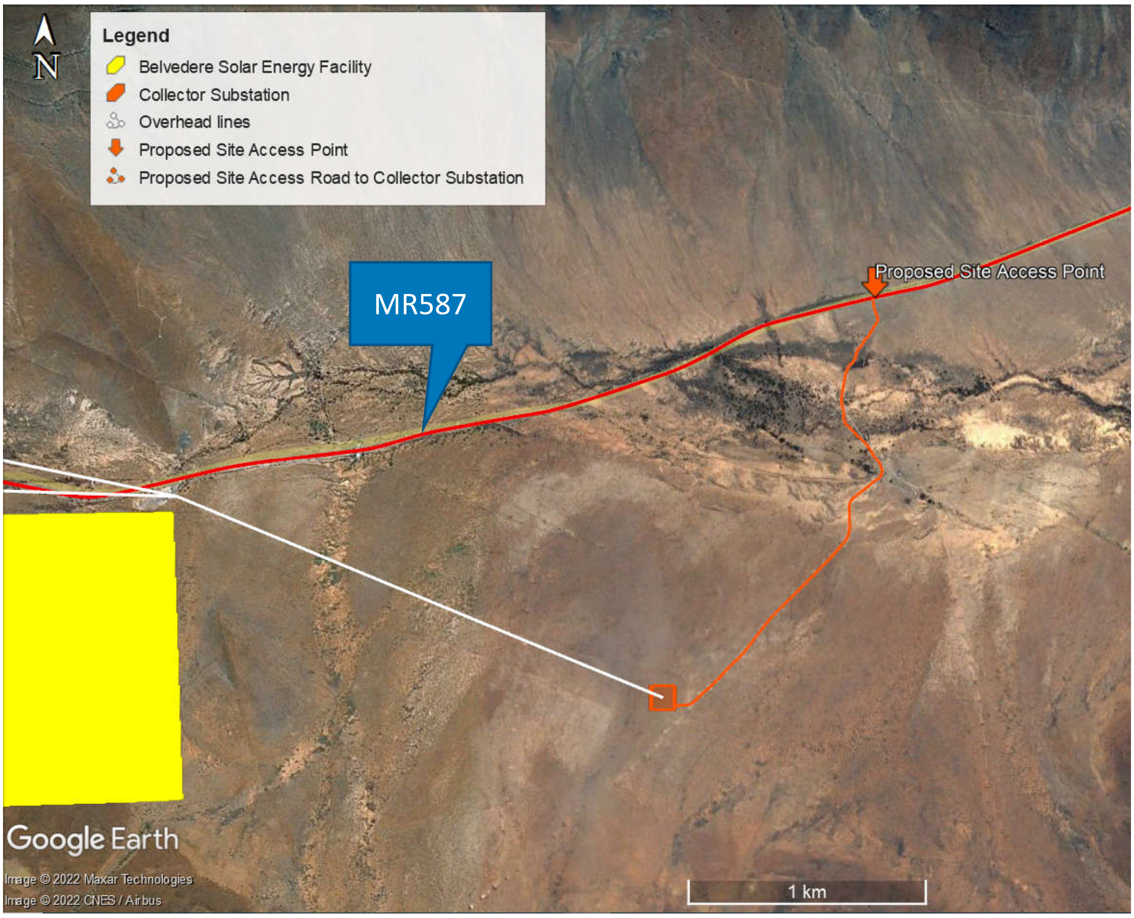

Figure 3-6: Proposed Main and Site Access Roads and Site Access Point for the Belvedere Collector Switching Station

3.8.2 Substation A

The main access point for the site will be obtained via MR587 which is an existing provincial gravel road (shown in red in **Figure 3-7**). This section of MR587 is located between the railway crossing in Nelspoort in the west and Murraysburg in the east. It is envisioned that both labour and materials will be transported via this route. The proposed site access road (shown in green in **Figure 3-7)** is based on an existing gravel veld track. The condition of the road is not known and upgrades (including the provision of drainage infrastructure) might be required along the site access road to ensure it can accommodate abnormal and heavy load vehicles. The proposed access point meets the requirements of horizontal shoulder sight distance to either side. It is, however, recommended that vertical sight distances be verified on site prior to construction.

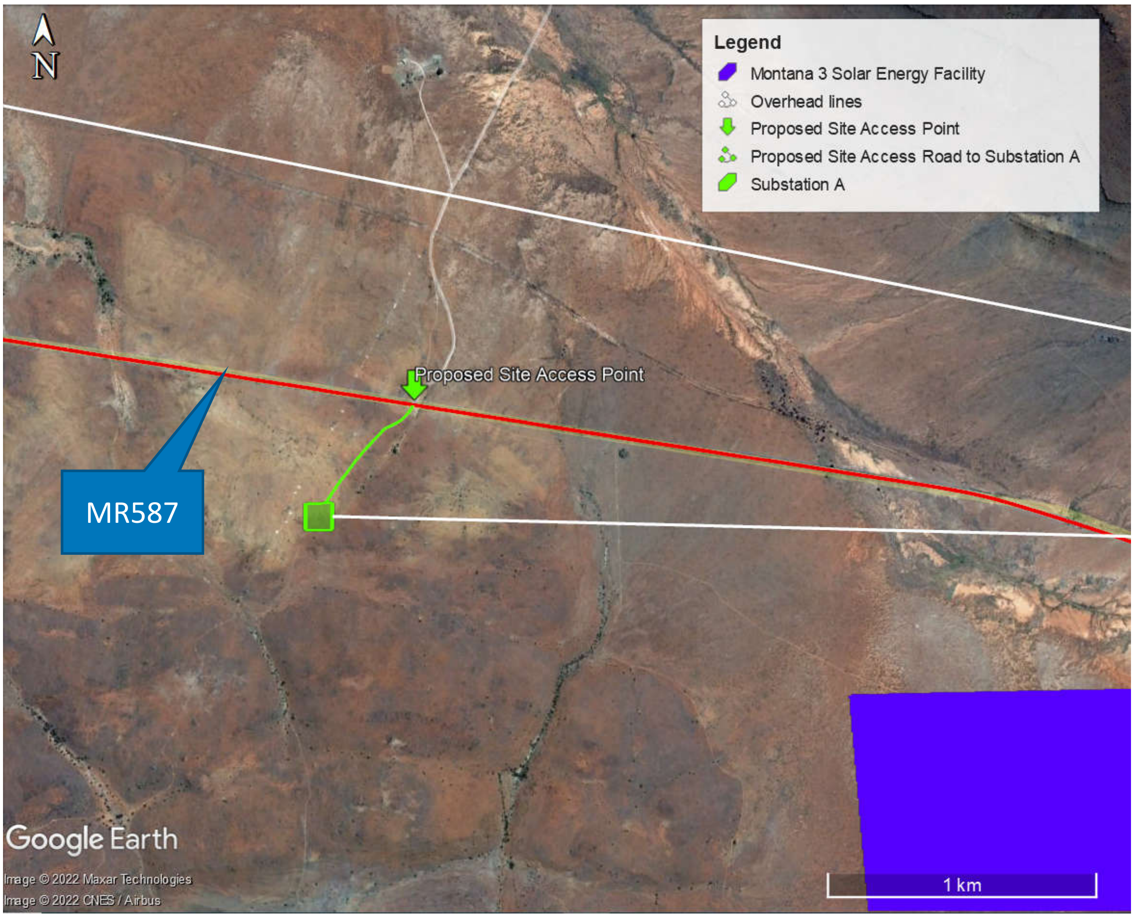

Figure 3-7: Proposed Main & Site Access Roads and Site Access Point for Substation A

3.8.3 Substation B

The main access point for the site will be obtained via OP9222 which is an existing provincial gravel road (shown in yellow in **Figure 3-8**). It is envisioned that both labour and materials will be transported via this route. The proposed site access road (shown in cyan in **Figure 3-8)** is approximately 160m in length and will have to be constructed new. The proposed site access road passes under existing overhead power lines. The proposed access point meets the requirements of horizontal shoulder sight distance to either side.

It is, however, recommended that vertical sight distances be verified on site prior to construction.

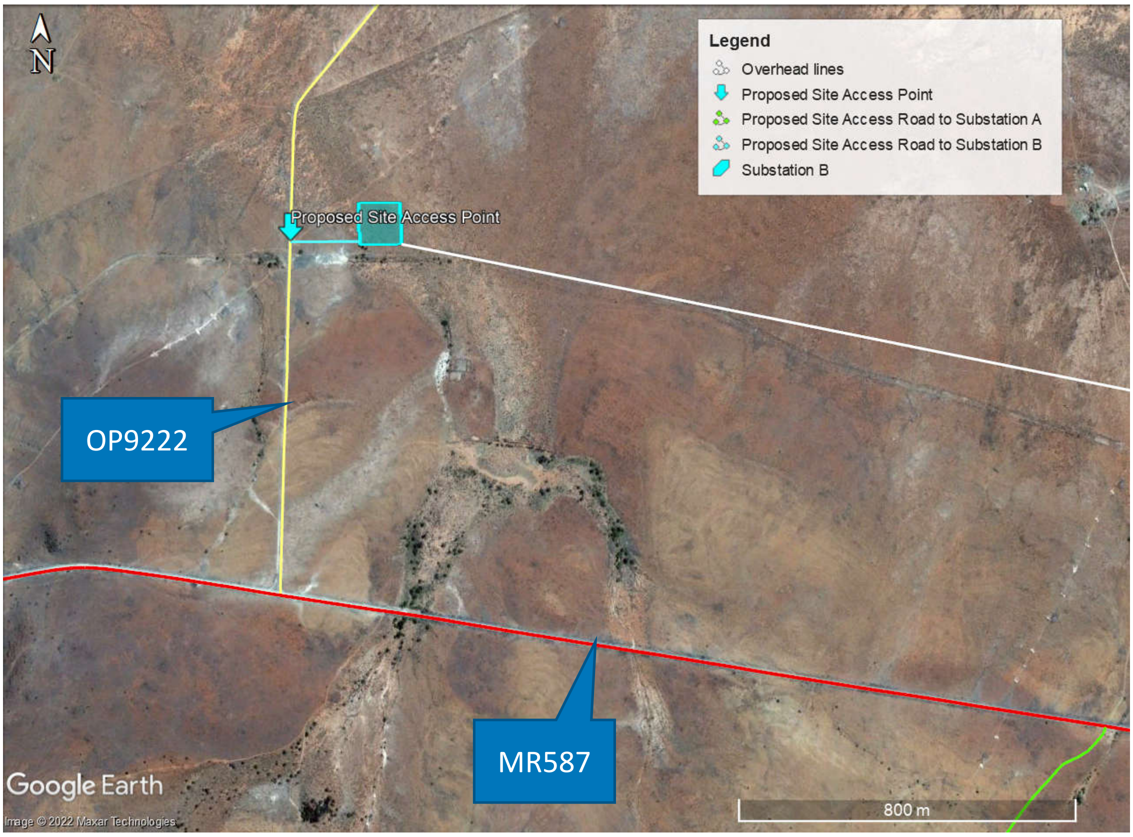

Figure 3-8: Proposed Main & Site Access Roads and Site Access Point for Substation B

MR587 crosses an existing railway line just south of Nelspoort before continuing to the proposed sites. The Client should note that application for wayleaves and permits should be made to the railway authority (Transnet) well in advance of construction commencing. Special safety measures e.g. access booms might be required to protect drivers of vehicles from oncoming railway traffic, especially in instances of poor visibility and increased traffic flow. All vertical clearances appear to be sufficient, but the height clearances need to physically be verified, especially in the vicinity of overhead power supply at the railway crossing. Should the railway authority not grant permission for the level crossing to be used during construction and operational phases, accessing the site via MR587 from Murraysburg in the east can be considered as an alternative. However, the condition of the road is unknown. There are several drainage paths and streams that cross the road along both approaches, and the condition/capacity of the existing drainage structures need to be verified. Upgrades to the existing drainage infrastructure and/or construction of new infrastructure might be required, and it is recommended that a site visit be conducted to determine the suitability thereof.

Photo 3-1: MR587 at the existing level crossing

Photo 3-2: MR587, looking east toward the proposed sites

In lieu of the possible poor condition of the existing roads and drainage infrastructure, it is strongly recommended that a geometric design engineer be appointed to do a geometric design of the roads (both main access routes as well as site access routes). All geometric design constraints should be taken into consideration by the geometric designer.

The internal roads need to be designed with smooth, relatively flat gradients (recommended to be no more than 8%). It should be noted that turning radii of all roads must conform to the specifications needed for the abnormal load vehicles and haulage vehicles. Run-off calculations should be done to determine where new culverts are required, or where existing culverts need to be upgraded to ensure sufficient capacity.

Generally, the road width at the access point needs to be a minimum of 8 m. The radius at the access point needs to be large enough to allow for all construction vehicles to turn safely. It is recommended that the access point be surfaced and the internal access roads on site remain gravel.

The type of access control will determine the required stacking distance. The stacking distance is measured between the access boom and the kerb/road edge of the external road. For example, for a boom-controlled access, this boom will need to be moved sufficiently into the site to allow for at least one abnormal vehicle to stack in front of the boom without impeding on external traffic. It is recommended that the site access be controlled via a boom and gatehouse. It is also recommended that security staff be stationed on site at the access booms during construction. A minimum stacking distance of 25 m should be provided between the road edge of the external road and the boom.

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 camber of between 3% and 4% (to facilitate drainage) and regular maintenance blading will also be required. The geometric design of these gravel roads needs to be confirmed at detailed design stage.

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

The nearest towns in relation to the proposed development sites are Three Sisters, Murraysburg and Beaufort West. It is envisaged that most materials, water, plant, services and people will be procured within a 70 km radius of the proposed facility.

Concrete batch plants and quarries in the vicinity could be contracted, where reasonable and feasible, 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 sites. 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, where required.
- SANS 3000-2-2-1: Technical Requirements for Engineering and Operational Standards –Track, Civil and Electrical Infrastructure –Level Crossings
- Transnet Freight Rail Technical requirements for new level crossing application

5 IDENTIFICATION OF KEY ISSUES

5.1 Identification of Potential Impacts

Traffic is expected to be generated by the proposed substations and overhead line construction. This can be dived into the three phases outlined below and the potential transport related impacts of each phase are discussed below.

5.1.1 Construction Phase

This phase includes the transportation of construction staff, construction materials and equipment and machinery to the sites. This phase also includes clearing the sites for the substations and pylons/cable tower foundations, construction of footings, buildings and hardstand areas, roads, drains and culverts, excavations, trenching and ancillary construction works. This phase will temporarily generate the most development traffic.

1. **Material and component delivery:** Vehicle trips for material and component delivery vary depending on the construction task/program, fuel supply arrangements, as well as distance from the material source to the site. Not enough detail about the grid connection is known at this stage to provide an accurate estimated trip generation volume for material and component traffic. However, it is expected that all materials and components (except substation transformers) can generally be transported by normal heavy load vehicles. Project planning can be utilised to reduce delivery trips during peak hours. In addition to this, the use of mobile batch plants as well as temporary construction material stockpile yards near the proposed sites, can also reduce peak hour trips.
2. **Construction machinery:** Cranes for pylon/tower assembly, heavy vehicles required for earthworks etc. These vehicles are expected to have a negligible impact on traffic generation as they will travel to site (via self-drive or flat-bed delivery vehicles) during establishment and, once on site, will likely only generate internal site traffic with minimal effect on the external road network.
3. **Site personnel and construction staff:** Construction staff will be required for both substation building and related infrastructure as well as for the construction of pylons/towers. It is assumed that they would travel to the sites from the nearest towns on a daily basis with busses and minibus taxis.

Potential impact

- Construction related traffic.
- The construction traffic would also lead to noise and dust pollution.

5.1.2 Operational and Maintenance Phase

This phase includes the operation and maintenance of substations and pylons/towers throughout its life span. During operation, it is expected that the substations will be unmanned while staff and security will only periodically visit the facilities for maintenance purposes. The traffic generated during this phase will be negligible and will not have an impact on the surrounding road network.

5.1.3 Decommissioning Phase

The decommissioning phase will generate construction related traffic including transportation of staff, construction materials, water and equipment. It is therefore expected that the decommissioning phase will generate similar impacts to that of the construction phase.

5.1.4 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)

6.1.1 Nature of the impact

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

6.1.2 Significance of impact without mitigation measures

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

6.1.3 Trip Generation – Construction Phase

The number of trips generated during the construction phase vary greatly depending on the number of construction staff, component delivery and contractor's programme. It is, however, estimated that the construction period of each substation would be between 6 and 12 months.

6.1.3.1 Trips resulting from material and component delivery

Actual numbers of construction vehicles are unknown at this time, but it is assumed that the expected maximum trips for the delivery of soil for each of the substation terraces could be in the order of 10 trips per day, with an additional maximum 5 trips for other construction material. It is also assumed that the construction of the substations will not take place simultaneously.

It is further estimated that material and component delivery will result in a total maximum of 25 trips per pylon/tower and that these will be spaced out over a 5-day period, thus resulting in 5 trips per day. It is also assumed that the construction of one pylon will be finished before the team moves on to the next location.

6.1.3.2 Trips resulting from construction machinery

As noted previously, trips generated by construction machinery (e.g. cranes for pylon/tower construction) can be considered negligible as, once established on site, the machinery will likely only generate internal site traffic. As a worst-case scenario, provision is made for 5 trips per day.

6.1.3.3 Trips resulting from site personnel and construction staff

Based on similar projects, the workforce required during the substation construction stage can be expected to reach 120 staff during the peak of the proposed construction. It is assumed that 20% (24 managerial, skilled and semi-skilled construction workers) will utilize private vehicles to travel to and from the sites. The remaining 96 will travel to site by bus or minibus. Staff trips are assumed to be:

Table 6-1: Estimation of daily staff trips for substation construction

Vehicle Type	Number of vehicles	Number of Employees
Car	8	12 (assuming 1.5 occupants)
Bakkie	12	18 (assuming 1.5 occupants)
Taxi – 15 seats	2	30
Bus – 60 seats	1	60
Total	**23**	**120**

Based on information obtained from similar projects the following trip generation assumptions are made for construction personnel in terms of activities required for pylon/tower construction:

Table 6-2: Activity, team size and approx. duration for pylon/tower construction

	Activity	Traffic-related Comment	Approx. team size	Approx. duration at a point (i.e., tower location)
1	Centre line pegging and identification of new gates	(light vehicle access)	3	1 day
2	Access Negotiations	(light vehicle access)	1	1 day
3	Tower Pegging	(light vehicle access)	5	1 days
4	New gate installation	(light vehicle access)	5	1 days
5	Foundation nominations (for main structure and anchors)	(heavy vehicle access)	5	2 days
6	Excavation of foundations	(heavy vehicle access)	10	2 days
7	Foundation steelwork (reinforcing)	(heavy vehicle access)	10	2 days
8	Foundation (concrete) pouring	(heavy vehicle access)	20	2 days
9	Delivery of tower steelwork	(heavy vehicle access)	5	1 day
10	Assembly team / Punching and painting	(light vehicle access)	10	3 days
11	Erection	(abnormal load vehicle access)	20	2 days
12	Stringing	(abnormal load vehicle access) (intensive vehicle activity likely within the working area)	50	7 days
13	Sag and tension	(heavy vehicle access)	10	3 days
14	Rehabilitation	(heavy and light vehicle access)	5 to 15	2 – 10 days

It is assumed that the same team will move together from one construction location (pylon/tower site) to the next. Based on this assumption a maximum of 50 to 75 workers can be expected on site per day. Again, it is assumed that 20% of the staff (managerial, skilled and semi-skilled construction workers) will travel with private vehicles while the remainder will make use of bus or minibus. Considering the worst-case scenario of 75 staff members the staff trips for pylon construction are assumed to be:

Table 6-3: Estimation of daily staff trips for pylon construction

Vehicle Type	Number of vehicles	Number of Employees
Car	2	3 (assuming 1.5 occupants)
Bakkie	8	12 (assuming 1.5 occupants)
Taxi – 15 seats	0	0
Bus – 60 seats	1	60
Total	**11**	**75**

The total estimated daily site trips for the construction phase are shown in the table below.

Table 6-4: Estimation of daily site trips

Trip Origin	Number of trips
Material and component delivery – substations	15
Material and component delivery – pylons	5
Construction machinery movement	5
Site personnel and construction staff - substation	23
Site personnel and construction staff - pylons	11
Total	**59**

The impact on general traffic on the surrounding road network is therefore deemed nominal as the 59 trips will be distributed across a 9 hr working day. The majority of the trips will occur outside the peak hours.

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

6.1.4 Trip Generation – Operational Phase

Traffic during the operational phase will consist of maintenance staff maintaining the proposed facilities and infrastructure. During operation, it is expected that the substations will be unmanned while staff and security will only periodically inspect the pylons. Allowance of 5 peak hour staff trips is made at this stage.

6.1.5 Trip Generation – Decommissioning Phase

The decommissioning phase will generate construction related traffic including transportation of people, construction materials, water and equipment. It is therefore expected that the decommissioning phase will generate the same impact as that of the construction phase.

6.1.6 Proposed general mitigation measures

The following are general mitigation measures to reduce the impact that the additional traffic will have on the road network and the environment.

- The delivery of components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- Dust suppression of gravel roads (including internal roads and gravel roads used for project purposes) during the construction phase, as required.
- Regular maintenance of gravel roads (including internal roads and gravel roads used for project purposes) by the Contractor during the construction phase and by the Owner/Facility Manager during the operation phase.
- The use of mobile batch plants and quarries near the site would decrease the traffic impact on the surrounding road network, where available and feasible.
- If required, low hanging overhead lines (lower than 5.1 m) e.g. Eskom and Telkom lines, along the proposed routes will have to be moved by the haulage company to accommodate the abnormal load vehicles. The Developer is to notify the Contractor and the haulage company of this requirement. The haulage company is to provide evidence of completed work.
- 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, that 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 delivery 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 any gravel sections of the haulage routes (including internal roads and gravel roads used for project purposes) remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.
- The Developer is to notify the Contractor and the haulage company of this requirement.
- Design and maintenance of internal roads. The internal gravel roads will require grading with a grader to obtain a camber of between 3% and 4% (to facilitate drainage) and regular maintenance blading will also be required. 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.

- Staff and general trips should occur outside of peak traffic periods as far as possible during both the construction and operational phases.

6.1.7 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 moderate as the existing traffic volumes are deemed to be low. The dust suppression, however, will result in significantly reducing the impact.

The proposed mitigation measures for the operational traffic will result in a very low to negligible impact on the existing traffic on the surrounding road network.

7 NO-GO ALTERNATIVE

The no-go alternative implies that the proposed Poortjies Wes Cluster Grid Connection does not proceed. This would mean that there will be no negative environmental impacts and no traffic impact on the surrounding network.

The site is currently zoned for agricultural land use. Should the proposed activity not proceed, the site will remain unchanged and will continue to be used for agricultural purposes. The potential opportunity costs in terms of alternative land use income through rental for energy facility and the supporting social and economic development in the area would be lost if the status quo persist. **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 A**.

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.			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Very Short-term (1)	The construction period will last between 0.5 – 1 year.	**Medium Negative (36)**
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: • Stagger component delivery to site. • The use of mobile batching plants and quarries near the site would decrease the impact on the surrounding road network by reducing the construction trips and the distance travelled to transport the materials to the site. • Staff 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.			
Post Mitigation/Enhancement Measures			
Duration	Very Short-term (1)	The construction period will last between 0.5 – 1 year	**Low Negative (21)**
Extent	Local (2)	Pressure will only be added on the local road network.	
Magnitude	Low (4)	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: 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.			
Residual Risks: Traffic will return to normal levels after construction is completed			

Table 8-2: Impact Rating: Construction Phase – Air Quality

Nature: **Air quality will be affected by dust pollution**			
Impact description: The impact will occur due to the increase in construction traffic associated with the transport of equipment, material and staff to site during the construction phase.			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Very Short-term (1)	The construction period will last between 0.5 - 1 year.	**Medium Negative (32)**
Extent	Local (2)	Dust generation will only increase along the local gravel road network.	
Magnitude	Moderate (5)	The increase in traffic will have a moderate impact on dust generation.	
Probability	Highly Probable (4)	The possibility of the impact on the air quality is highly probable.	
Mitigation/Enhancement Measures			
Mitigation: • Dust suppression on gravel roads during the construction phase, as required. • Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase.			
Post Mitigation/Enhancement Measures			
Duration	Very Short-term (1)	The construction period will last between 0.5 - 1 year.	**Low Negative (15)**
Extent	Local (2)	Dust generation will only increase along the local gravel road network.	
Magnitude	Minor (2)	Dust suppression measures will result in a low occurrence of air pollution.	
Probability	Probable (3)	The possibility of air pollution is probable.	
Cumulative impacts: 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.			
Residual Risks: Traffic will return to normal levels after construction is completed. Dust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. Dust pollution is limited to the construction period.			

Table 8-3: Impact Rating: Construction Phase – Noise Pollution

Nature: **Noise pollution due to the increase in traffic**			
Impact description: The impact will occur due to the increase in construction traffic associated with the transport of equipment, material and staff to site during the construction phase.			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Very Short-term (1)	The construction period will last between 0.5 - 1 year.	**Medium Negative (326)**
Extent	Local (2)	Pressure will only be added on the local road network.	
Magnitude	Moderate (5)	The increase in traffic will have a moderate impact on noise levels.	
Probability	Highly Probable (4)	The possibility of an increase in noise levels due to increased traffic operations is highly probable.	
Mitigation/Enhancement Measures			
Mitigation: • Stagger component delivery to site. • Reduce the construction period as far as possible. • The use of mobile batching plants and quarries near the site would decrease the impact on the surrounding road network by reducing the construction trips and the distance travelled to transport the materials to the site. • Staff and general trips should occur outside of peak traffic periods.			
Post Mitigation/Enhancement Measures			
Duration	Very Short-term (1)	The construction period will last between 0.5 - 1 year.	**Low Negative (15)**
Extent	Local (2)	Pressure will only be added on the local road network.	
Magnitude	Minor (2)	The increase in traffic will have a minor impact on noise levels.	
Probability	Probable (3)	The possibility of an increase in noise levels due to increased traffic operations is a distinct possibility.	
Cumulative impacts: 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 noise pollution to the environment). 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.			
Residual Risks: Traffic will return to normal levels after construction is completed. Noise pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. Noise pollution is limited to the construction period.			

Table 8-4: Impact Rating - Operation Phase

IMPACT TABLE – OPERATION PHASE
The traffic generated during this phase will be negligible and will not have any impact on the surrounding road network.

Table 8-5: Impact Rating - Decommissioning Phase

IMPACT TABLE – DECOMMISSIONING PHASE
This phase will have the same impact as the Construction Phase i.e. traffic congestion, air pollution and noise pollution, as similar trips/movements are expected.

9 CUMULATIVE IMPACTS

To assess the cumulative impact, it was assumed that all proposed and authorized renewable energy projects within 30 km be constructed at the same time. This is a 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.

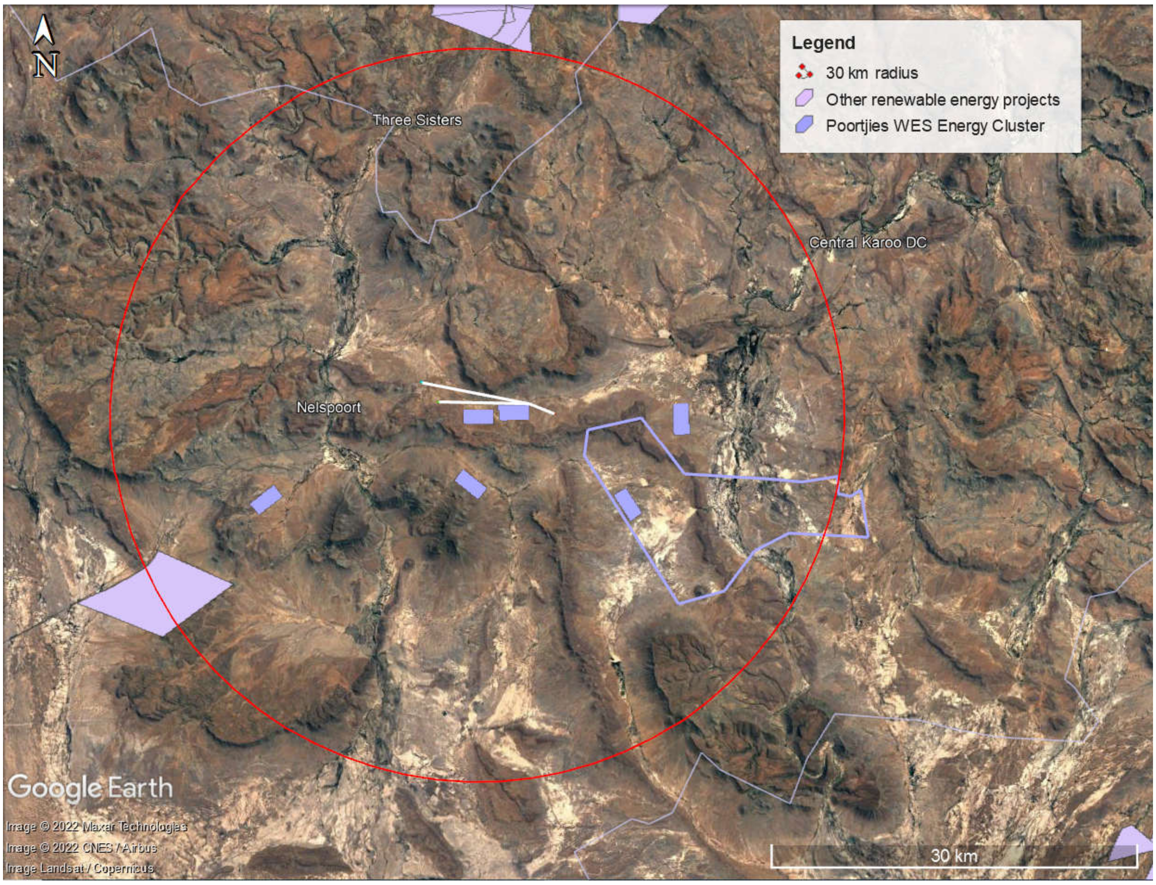

Figure 9-1: Other renewable energy projects within a 30km radius from site

According to the Department of Forestry, Fisheries and Environment's database there is one (1) other authorised renewable energy facility within a 30km radius of the proposed study area, as indicated in **Figure 9-1** above.

It is however unclear whether other projects not related to renewable energy is or has been constructed in this area, and whether other projects are proposed. In general, development activity in the area is focused on agriculture. It is quite possible that future renewable energy development may take place within the general area.

9.1 Assessment of cumulative impacts

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

Nature: Traffic generated by the proposed development and the associated noise and dust pollution.		
	Overall impact of the proposed project considered in isolation (post mitigation)	**Cumulative impact of the project and other projects in the area**
Extent	Low (2)	High (5)
Duration	Short (1)	Medium-term (3)
Magnitude	Minor (2)	High (8)
Probability	Probable (3)	Improbable (2)
Significance	Low (15)	Medium (32)
Status (positive/negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Stagger component delivery to site. • Dust suppression. • Reduce the construction period. • The use of mobile batching plants and quarries near the site would decrease the impact on the surrounding road network by reducing the construction trips and the distance travelled to transport the materials to the site. • Staff and general trips should occur outside of peak traffic periods.		
Residual Impacts: • Minimal increase in traffic during the operational phase on local roads. • Decrease in air quality due to dust generation during construction phase only. • Increase in noise levels only during the construction phase.		

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.

Table 10-1: EMPr Input – Construction Phase

<table>
<tr><td>Project component/s</td><td colspan="2">Construction Phase traffic</td></tr>
<tr><td>Potential Impact</td><td colspan="2">Dust and noise pollution due to increase in traffic volume</td></tr>
<tr><td>Activity/risk source</td><td colspan="2">Transportation of material, components, equipment and staff to site</td></tr>
<tr><td>Mitigation: Target/Objective</td><td colspan="2">Minimize impacts on road network and surrounding communities</td></tr>
<tr><td>Mitigation: Action/control</td><td>Responsibility</td><td>Timeframe</td></tr>
<tr><td>• 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 ensure that the delivery of the components will occur without disruptions.
• 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.</td><td>• Holder of the EA</td><td>• Before construction commences and regularly during construction phase</td></tr>
<tr><td>Performance Indicator</td><td colspan="2">Staggering or reducing the construction trips will reduce the impact of dust and noise pollution.</td></tr>
<tr><td>Monitoring</td><td colspan="2">• Regular monitoring of road surface quality and dust generation.
• Monitoring congestion levels (increase in vehicle trips)
• Apply for required permits prior to commencement of construction</td></tr>
</table>

11 CONCLUSION AND RECOMMENDATIONS

The potential traffic and transport related impacts for the construction and operation phases for the proposed Poortjies Wes Cluster Grid Connection were assessed:

- 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.
- During operation, it is expected that maintenance and security staff will periodically visit the facility. Substations will be unmanned. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- The traffic generated during the decommissioning phase will be slightly less than the construction phase traffic and the impact on the surrounding road network will also be considered negative and of medium significance before and of **low significance** after mitigation.

The potential mitigation measures mentioned in the construction phase 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 by reducing the construction trips and the distance travelled to transport the materials to the site.
- Staff and general trips should occur outside of peak traffic periods.
- A "dry run" of the preferred route.
- Design and maintenance of internal roads.
- If required, 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 construction and decommissioning phases of a 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 very short term i.e. the impact of the traffic on the surrounding road network is temporary and a grid connection facility, when operational, does not add any significant traffic to the road network.

Both the proposed access points and the access roads to the sites/facilities are deemed feasible from a traffic engineering perspective, however, vertical sight distances at the proposed access points should be verified on site.

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

The potential impacts associated with the proposed Poortjies Wes Cluster Grid Connection and associated infrastructure are acceptable from a transport perspective and it is therefore recommended that the proposed facility be authorised.

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
- Transport Impact Assessment for the proposed Agulhas 400/132KV 2x500 MVA Main Transmission Substation, Sturgeon Consulting, September 2016.
- Technical Note: Power Line Construction Process and Construction Camps, Fourth Element, October 2012

13 ANNEXURES

Annexure A – 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 from0-10, 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).

Annexure B – 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 20 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.

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
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

- **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 Appraisal**s 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